California’s Transition Towards a Future-Proof Transport & Mobility Sector

- An Explaining-Outcome Case Study -

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Abstract / Zusammenfassung

Today, California is not only considered to be a vanguard of science, technology, and innovation, but has also established effective emission standards and the world's most ambitious roadmap towards a future mobility sector fully based zero-emission-vehicles (ZEVs). While the origins of this noteworthy development go back to the 1940s, when the city of Los Angeles suffered from air pollution and smog, especially during the last 20 years many efforts have been taken in terms of GHG emissions reductions and cleaner vehicles.

Regarding this, especially California's ambitious ZEV Program needs to be considered as a cutting-edge approach towards a sustainable and future-proof transport and mobility sector. It not only comprises ambitious GHG emissions reductions targets and market-based mechanisms (Cap-and-Trade), but also mandatory annual ZEV sales targets.

In order to fully grasp and understand the evolution of the ZEV Program in detail, this research is to re-trace the most important events in order to provide a full explanation of the major factors that make up the overall success-story. The overall time-period of two decades (2002-2022) will be allocated in different phases and episodes that will be presented in a more or less chronological order. However, when necessary or useful, there might be some leaps in time (flashbacks) as well.

The different episodes were mainly arranged in order to take account of relevant changes of government, either on the state-level or on the federal level. The naming of these episodes was not only done to deliver some proper buzzwords, but also to provide the episode's essence within one or two words.

Kalifornien ist nicht nur bekannt als ein Vorreiter in Sachen Wissenschaft, Forschung und Innovationen, sondern hat auch wirksame Abgasnormen und Emissionsstandards entwickelt. Die Transformation hin zu einem komplett emissionsfreien Transport- und Mobilitätssektor wird in Kalifornien durch das weltweit wohl anspruchsvollste Programm für schadstofffreie Fahrzeuge (Null-Emissions-Fahrzeuge) vorangetrieben. Während die Ursprünge hinsichtlich der weitreichenden Reduzierung von Luftverschmutzung im Los Angeles der 1940er Jahre liegen, wurden insbesondere in den letzten zwanzig Jahren wesentlichen Maßnahmen ergriffen um die Treibhausgasemissionen zu reduzieren und sauberere Fahrzeuge zu fördern.

Insbesondere das Kalifornische Programm für Null-Emissions-Fahrzeuge ist als ein wegbereitender Ansatz hin zu einem nachhaltigen und zukunftssicheren Transport- und Mobilitätssektor zu begreifen. Das Programm umfasst nicht nur anspruchsvolle Zielsetzungen im Hinblick auf eine Reduzierung von Treibhausgasen, sondern ebenfalls ein marktbasiertes Anreizsystem (Cap-and-Trade), sowie verpflichtende jährliche Verkaufszahlen für Null-Emissions-Fahrzeuge.

Um die Entwicklungsgeschichte vollumfänglich erfassen und begreifen zu können, werden im Rahmen dieser Arbeit die wesentlichsten Ereignisse nachgezeichnet um so eine detaillierte Erklärung der Hauptfaktoren dieser Erfolgsgeschichte präsentieren zu können. Der Untersuchungszeitraum von zwei Jahrzehnten (2002-2022) wird hierzu in verschiedene Zeiträume bzw. Episoden aufgeteilt um diese anschließen (soweit als möglich) in chronologischer Reihenfolge zu präsentieren. Die konkrete Einteilung basiert zumeist auf den entsprechenden Regierungswechseln in Kalifornien bzw. in Washington D.C., während die Namensgebung der Episoden dazu dient, Ereignisse in Form eines Schlagwortes darzustellen.

Acknowledgements

- Für meine Mutter -

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List of Abbreviations

A.B.	Assembly Bill
ACP	Alternative Compliance Path
ACF	Advocacy Coalition Framework
AT-PZEV	Advanced Technology Partial Zero Emission Vehicle
CAA	Clean Air Act
CAFEE	Center for Alternative Fuels, Engines & Emissions
CaH2Net	California Hydrogen Highway Network
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
COC	Certificate of Conformity
DOT	Department of Transportation
EO	Executive Order
EPA	Environmental Protection Agency
EPCA	Energy Policy and Conservation Act
EV	Electric Vehicle
FCV	Fuel Cell Vehicle
FIP	Federal Implementation Plan
GHG	Green House Gases
$GtCO_2$	Giga tons of CO_2
HEV	Hybrid Electric Vehicle
HFCV	Hydrogen Fuel Cell Vehicle
ICEV	Internal Combustion Electric Vehicle
ICCT	International Council on Clean Transportation
IEA	International Energy Agency
LEV	Low-Emission Vehicle
NAAQS	National Ambient Air Quality Standards
NEV	Neighbourhood Electric Vehicle

NHTSA	National Highway Traffic Safety Administration
NRDC	Natural Resources Defense Council
NZE	Net Zero Emissions
OBD	On-Board-Diagnosis
PHEV	Plug-in Hybrid Electric Vehicle
PPP	Public-Private-Partnership
PZEV	Partial Zero Emission Vehicle
SAFE	Safer Affordable Fuel Efficient
S.B.	Senate Bill
SIP	State Implementation Plan
TCP	Transportation Control Plan
UNCED	United Nations Conference on Environment & Development
UNFCCC	United Nations Framework Convention on Climate Change
VMT	Vehicle Miles Travelled
WSPA	Western States Petroleum Association
WVU	West Virginia University
ZEV	Zero-Emission Vehicle

1 Introduction

No matter for what kind of human activities, the availability of energy is considered to be a vital component. Regarding this, reliable and affordable energy is not only necessary for the provision of the very basic requirements of human life (e.g. food and water supply, heating, etc.), but is nowadays also one of the principal ‘ingredients of life’ in modern societies.

Despite abundant renewable energy resources and competitive technologies, conventional energy sources are still considered as the backbone of global energy supply. According to a variety of complex and interrelated challenges (e.g. climate change, increase in global energy demand, increase in population, etc.), it becomes more and more urgent to start with a large-scale implementation of alternatives to fossil fuels. Especially in the transport and mobility sector, fossil fuels are predominant by tradition, which makes it difficult to develop and implement competitive and widely accepted clean and renewable alternatives on a large-scale basis.

During the last decades, the focus was mainly on increased efficiencies (e.g. advanced combustion engines, lightweight materials, etc.) and the post-treatment of exhaust gases (e.g. catalytic converter, particulate filters, etc.). While such measurements contributed to increased fuel efficiency, reduced GHG emissions, and less air pollution, there are insuperable physical limits of combustion engines. Modern combustion engines do reach a maximum efficiency of 30-35 percent, which means that around 65 percent of the fuel’s energy content cannot be converted into the vehicles motion. As a result to this, there is a need for a revised approach, namely the implementation of low- and ultimately zero-emission propulsion technologies. Figure 1 presents the efficiency-losses-showcase for a combustion engine with a 16-25% efficiency.

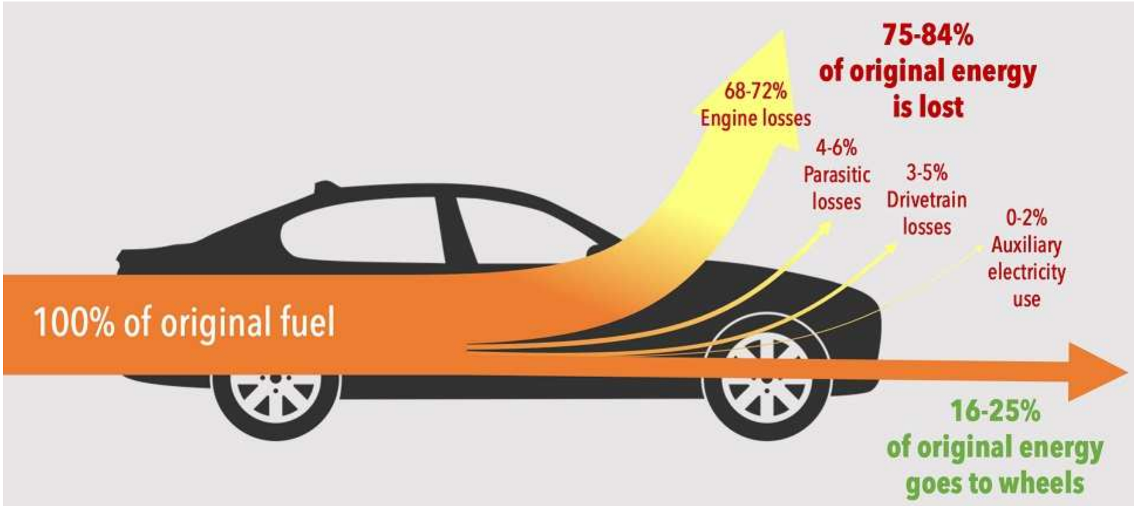

Figure 1 – Energy Flow Diagram of a Combustion Engine

Source: Kirk, 2024

While both biofuels and synthetic fuels are considered to be a viable option for specific applications (aviation, freight shipping, etc.) as well as a preliminary solution for existing combustion engines, the large-scale implementation of advanced propulsion systems (battery electric vehicles and fuel cell electric vehicles) in the road-based transport and mobility sector is inevitable to meet the challenges of air pollution and the mitigation of climate change. While one could argue that it would be a much more promising approach to substitute individual means of transport and mobility (e.g. cars, trucks, motorcycles, etc.) with public means of transport and mobility (e.g. trains, underground railway, buses, etc.), it is vital to highlight the global needs for transport and mobility. Especially in developing countries and emerging economies, the individual means of transport and mobility remain to be predominant in the long term. Aside from being kind of a status symbol, this is mostly due to the lack of public transport infrastructure and the substantial investment costs. While most industrialised countries do already have quite substantial and effective public transport services, a complete substitution of the entirety of individual transport and mobility aspects is definitely nothing but a pipe dream.

1.1 Research Interest - Why Clean Transport & Mobility matters?

The road-based transport and mobility sector consumes the vast majority of global oil demand and is therefore obviously a good (maybe the very first) starting point for discussing and examining transition processes towards a clean and renewable future. While global restrictions and economic cutbacks during the COVID-19 pandemic resulted in less CO_2 emissions, since 2022 there was not only a significant rebound effect[1], but still a continuous growth by an annual average rate of about 1.7% between 1990 and 2022. According to latest figures of IEA, Statista, global emissions in the transport and mobility sector reached a total of 7.6 $GtCO_2$ in 2021 and are expected to grow further by about three percent annually. Figure 2 shows the 2022 shares by type of transport.

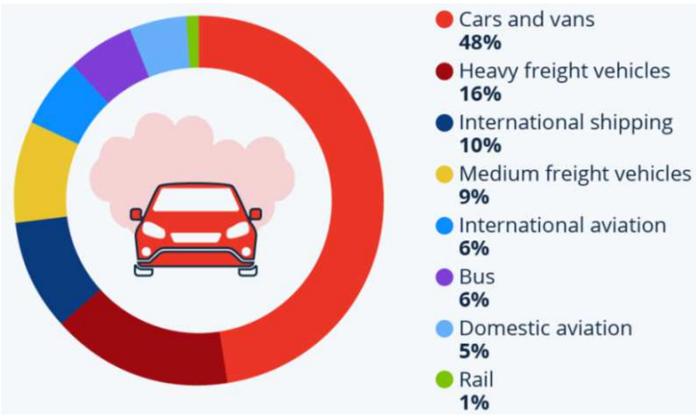

Figure 2 – CO_2 Emissions - Global Transport & Mobility Sector

Source: IEA, Statista 2023

According to this negative trend and due to the irreversible implications of CO_2 emissions, the International Energy Agency (IEA) estimates that emissions of the transport and mobility sector need to drop by at least 3 percent annually.

[1] According to the IEA, this led to a 3 percent increase in transport & mobility based CO_2 emissions in 2022, compared to the previous year (see https://www.iea.org/reports/tracking-clean-energy-progress-2023).

Otherwise, it would not be possible to achieve the goals of the Net Zero Emissions (NZE) by 2050 Scenario[2]. Due to the high relevance of emissions from the road based transport and mobility sector (especially cars and vans) it is not only necessary to implement effective science-based rules and regulations, but also effective incentives that contemporarily promote the large-scale implementation of Low-Emission Vehicles (LEVs) and ultimately Zero-Emission Vehicles (ZEVs). Electric vehicles do directly convert electric power into motion and therefore have quite good overall energy efficiency. In contrary, hydrogen vehicles (in principle EVs that have fuel cells instead of batteries) are powered with hydrogen (from electrolysis) that is converted into electricity in a fuel cell which is then available for the drive (see Edinger and Kaul, 2003). This causes less energy efficiency as outlined in Figure 3 which presents the overall efficiencies of both kinds of propulsion systems.

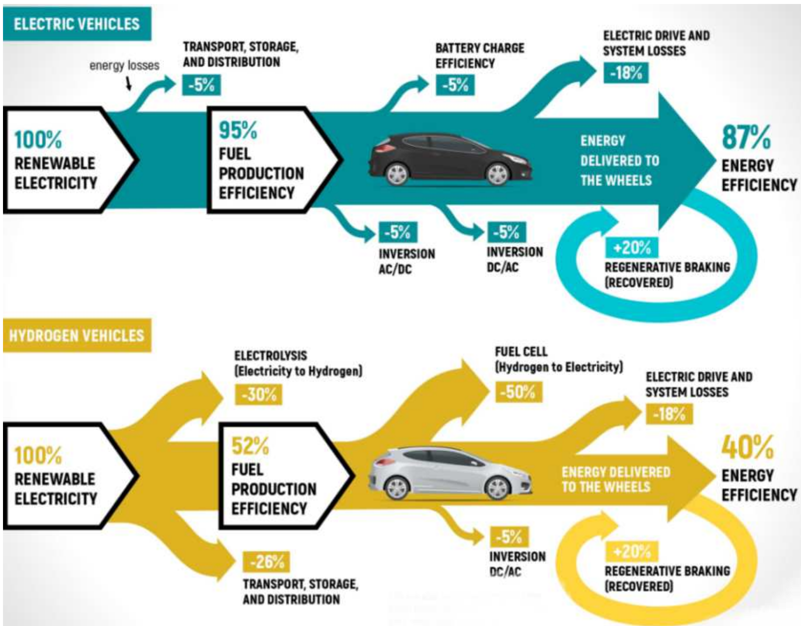

Figure 3 – Efficiencies of Electric and Hydrogen Vehicles

Source: Inside EVs, 2023

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[2] This scenario outlines a pathway to potentially achieve net zero CO_2 emissions by 2050 in order to limit global temperature rise to a maximum of 1.5 °C (see: https://www.iea.org/reports/global-energy-and-climate-model/net-zero-emissions-by-2050-scenario-nze).

Such kind of large-scale implementation of low- and subsequently zero emission vehicles is both a vital and necessary step within the pathway to a clean and sustainable transport and mobility sector. Against this background, today's fossil-fuel based transport and mobility sector needs to be considered as a highly gridlocked system of well-established and mature technologies, solidified practices and habits, as well as a huge variety of consolidated actor networks that provide a significant stabilising momentum to the overall system.

Regarding this, new and advanced technologies (e.g. electric vehicles and modern propulsion systems in general) are often based on (sometimes quite radical) inventions, while the underlying socio-technical system in existence - in this context the system of transport and mobility, based on liquid fossil fuels - needs to get adapted and modified by a step-by-step transition process that introduces and implements both technical improvements as well as social change (e.g. habits, values, ambitions, welfare, etc.).

Hughes introduced the notion *'Battle of the Systems'* for a state of dialectic tension between existing and new technologies (Hughes 1983, p. 79). Regarding this, the system under discussion needs to move away from a *'business as usual'* mode to a new phase where essential aspects of the system (e.g. overall function and configuration, core technologies, organizational concept, steering mechanisms, etc.) need to be questioned (see Grundmann 1994). When considering the road-based transport and mobility sector, substantial changes are definitely necessary however, they cannot be done in a fast and easy way.

This accounts for technical aspects like the large-scale implementation of alternative fuels (e.g. biofuels or hydrogen) and advanced propulsion technologies (electric mobility) as well as for the necessary promotion and diffusion of more sustainable mobility patterns. New technologies and modified attitudes cannot simply access and take over existing markets and society structures which were coined over a long time by both consolidated technologies and solidified lifestyles. Rather, the long-term success of advanced technologies, products, and services is time-consuming as it needs to change the consumer and user preferences in order to get integrated to existing structures and patterns (see Lie and Sørensen 1996).

Due to the necessity of a timely and successful shift towards a (more) sustainable transport and mobility sector, it definitely makes sense to take a global perspective and incorporate the policy know-how and the lessons learned from elsewhere in greater detail. While this does definitely not mean that such highly case-specific approaches or country-specific rules and regulations may serve as a one-to-one blueprint to other countries, it is assumed that results of such an in-depth single-case study will be - at least to some extend - productive and enlightening for interested parties and potential adopters.

1.2 Research Issue - What's the matter with California?

When focusing on climate targets that allow limiting global temperature increase[3] to a maximum of about 1.5-degrees Celsius, "a massive transformation of the transportation sector" needs to be done (IEA, Statista, 2023). This includes the most integral parts (propulsion systems, fuelling infrastructure, etc.) that are considered to be quite resistant to innovation and fundamental changes. Therefore, the posed questions are how to get on this challenging, time-demanding pathway and especially how to stay on track even if there will be for sure numerous challenges and severe setbacks included.

[3] Compared to pre-industrial levels.

While getting and staying on track are already quite cumbersome tasks, such kind of a transition process not only requires early movers which are eager to achieve their goals, but also followers that are motivated by the success. No matter if it is about inventions that may or may not become technical (product) innovations[4], which then may or may not get implemented into large-scale operation or about associated standards and regulations that may or may not support such pioneering inventions and may or may not promote the large-scale implementation[5] of emerged innovations.

The overall transition towards a clean transport and mobility sector is considered to be a highly complex maze that not only includes a set of basic choices of direction, but also an abundantly high number of seminal junctions, numerous unexpected obstacles and all kinds of potentially inhibiting factors.

California, also called the *Golden State*, is the third largest U.S. state by area and the largest U.S. state by population. Together with its strong economy that contributes with around 14 percent to the overall GDP of the United States (see BEA, 2024), California is not only considered to be one of the most famous states of the United States of America, but also the most influential one. While some immediately associate the state with its breathtaking coastline, places like Malibu or even the TV show Baywatch, others straightforwardly proclaim Silicon Valley to be the undisputed origin of high technology and innovation. According to current figures (see CompTIA, 2024: 10), California's tech workforce is over 1.53 million strong.

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[4] Such kind of innovations are regularly based on an invention (new technology) or a combination of inventions (new technologies) that are about to be introduced to the market (see Utterback and Abernathy, 1975).

[5] The implementation and diffusion of such innovations are fundamental part of the overall technological change (see Fisher and Pry, 1971).

However, when it comes to rather fameless environmental technologies and the control of air pollution, quite few think of California in the first place. As a matter of fact, California has been a pioneer of clean air technologies and a vanguard of air quality standards and regulations much longer than expected. Based on the early efforts and the lasting endurance, California has not only been successful in achieving its own goals (e.g. improved air quality, increased fuel efficiency, ambitious emission standards), but has also encouraged other states and countries to join the Californian way. The transfer and adoption of both proven technologies as well as the diffusion of rules and standards is oftentimes labeled the 'California effect'.

As argued by Barry G. Rabe, the *"California effect has long guided auto emission standards, and may do so once again with that state's 2002 legislation on carbon dioxide emissions from vehicles"* (Rabe 2002, p. 77). More recently, David Vogel stressed the unique role of California in terms of environmental rules and regulations when arguing:

> *"No state in the United States has exercised its discretion over environmental regulation as extensively as California. In this area, it has been the nation's most 'courageous' state and its most important and influential policy 'laboratory'. Nor has any state had as much impact on the environmental regulations of the federal government as well as on other states. This pattern of state policy leadership and diffusion has come to be labeled the California effect"* (Vogel 2018, p. 7).

While at the end numerous rules and regulations *"were subsequently adopted by the federal government, including the requirement that cars be equipped with twoway catalytic converters and use unleaded gasoline"* (ibid.), California started off as kind of a Maverick when *"in the 1970s California mandated catalytic converters to scrub auto exhaust"* [however,] *it soon became impossible to buy cars in Wisconsin or Texas* *that did not contain the device as well"* (Kettl, 2002). The author excellently summarised the leading role of California with: *"As California goes, at least in air pollution, so goes the nation"* (ibid.).

While California soon became the environmentally-leading state, its outreach and impact was definitely not limited to the United States as Vogel put it straightforward: *"What happens in California also has a global impact"* (Vogel 2018, p. 8). When sticking with the examples of catalytic converters and unleaded gasoline, both the transfer of technology and the diffusion of rules & regulations finally caused that as soon as 1993, the strict exhaust emission standards[6] were fully adopted and implemented to the European market and several other markets around the globe.

When highlighting the role of California in the field of clean air and the reduction of polluting emissions in the transport and mobility sector, it is only just and equitable to emphasise the role of several other U.S. states in various environmental protection efforts as well. While Colorado is considered to be quite successful in reintroducing endangered species (e.g. Lynx), Wyoming is known as a leader in the preservation of wildlife and habitat. Iowa has successfully preserved and protected its groundwater while Florida accomplished to protect and restore the famous Everglades (see Klyza and Sousa 2008, pp. 254-255).

When it comes to the much more global issue of climate change and related mitigation efforts, several other U.S. states are *active by tradition*, namely New Jersey, Oregon, Wisconsin, New Hampshire, and all of the New England states (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont).

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[6] Those strict emission limits were only to be fulfilled with both the implementation of three-way catalytic converters and unleaded gasoline (lead would cause catalyst poisoning and subsequently the damage).

According to Barry G. Rabe, these *"prime time states have formally recognized climate change as a serious environmental threat"* and have implemented strategies that comprise regulatory standards, reduction commitments, and reporting mechanisms for CO_2 and GHG (Rabe 2002, pp. 30-34).

Based on these examples, it is worth to mention that there are for sure also other U.S. states which dedicate themselves to environmental protection and the mitigation of climate change. California is not only a pioneer with a quite long tradition in the field of environmental protection, but also provides guidance to other U.S. states and countries. Despite of its rapidly growing economy and a continuously increasing population, California has managed to preserve its unique natural environment to the greatest possible extend (Vogel 2018, p. 11).

From a more general point of view it could be argued that policymakers at the state-level obviously attempt to tackle problems which: a) are directly visible/tangible within the state and b) are addressed/solved by the federal government (see DeWitt 1994). While focussing on climate change policies, Barry G. Rabe argues that when *"hopelessly deadlocked in Washington, a set of state governments that cuts across partisan and regional lines is demonstrating that it is possible to make some significant inroads on this issue"* (Rabe 2002, p. 4).

However, a 'deadlocked' situation at the federal level is not solely the reason for states to take over the leadership. This is especially the case when the government in Washington D.C. is not (fully) aware that there are problems at the state-level that require federal intervention or even a dedicated federal law. No matter if it is because of a considerable geographical distance or a considerable different mindset and attitude, the lack of awareness is definitely a significant reason for issues to be addressed by policymakers at the state-level rather than by the federal government.

Reconsidering the role of California within the United States, its unique and pioneering role is not only obvious but has a tradition as well. As argued by Barry G. Rabe, *"California led the nation in earlier initiatives regarding the use of unleaded gasoline, catalytic converters, and clean diesel fuel, establishing a precedent for the greenhouse gas reduction legislation"* (ibid., p. 142). The success story of being a role model to both other states and other countries has been continued when *"California reassumed its historic role as a national leader in air emissions when AB 1493 was signed into law by Democratic Governor Gray Davis* on July 22, 2002" (ibid., p. 141).

Likewise, David Vogel argues that California has managed to become and remain the most relevant innovator in environmental policies of the United States. For several decades, California has accomplished significant achievements in various policy areas (Vogel 2018, p. 6). Regarding this, the outstanding role of California needs to be awarded as *"the nation's most 'courageous' state"* and the countries *"most important and influential policy 'laboratory'* (ibid., p. 7).

Concerning the focus of this thesis and the reason for explicitly choosing the state of California as the case/object of investigation, it needs to be stressed that any of today's global efforts to implement low and zero emission vehicles have its origins in California. While nowadays the main motivations are to be found in the mitigation of climate change (e.g. reduction of GHG emissions), it is worth to mention that the Californian commitment *"emerged out of the larger policy debate over air quality"* and definitely did not focus on aspects like the substitution of fossil fuels or global warming in the first place (Collantes and Sperling 2008, p. 1303).

California's - primarily - somehow self-serving motivation to improve its air quality (especially in the city of Los Angeles) was due to the fact that federal emission standards were too weak (see Vogel 2018, p. 176) and therefore not capable to guarantee a decent air quality in California. Regarding this, it is essential to consider the long-term evolution of the transport and mobility sector (together with technological improvements such as catalytic converters and unleaded gasoline) as the starting point of a (revolutionary) transition process towards low and zero emission vehicles in California.

As argued beforehand, California not only took the lead in order to solve its own problems (e.g. air pollution), but also became a role model for other states, the federal government, and countries around the globe. Regarding this, it is reasonable to ask for the potential reasons for this long-term success story. In California, a mix of different causative reasons seems to be accountable. One of the most prominent explanations is to be found in California's unique geography and its abundant natural environment that deserves all-embracing protection (see Vogel 2018, p. 9).

According to Parsons, it is also a matter of the *"regional consciousness of Californians, remarkably strong for so restless and rootless a population, has had its origins in the common problems and interests imposed by geography"* (Parsons 1955, p. 45). In addition to this, the author argues that the unique climate of California is another vital factor that in combination with *"the geographical remoteness of California from the rest of the nation and the world"* is accountable *"for whatever quality of regional identity, of uniqueness, that here exists"* (ibid., p. 48).

Embedded by the Pacific Ocean and the Sierra Nevada mountains, the geography of California is quite special. This geographical narrowing is considered as an important reason for the 'different-mindedness' of

Californians in environmental aspects. When living within such kind of geographic isolation potential risks are most likely not only to be identified earlier, but also with a different significance (see Vogel 2018, p. 12). While the vigilance for potential risks and the identification of arising threats are fundamental prerequisites, what really matters are the conclusions which need to be drawn and the policy activities which are about to be implemented.

With respect to potential explanations for the Californian performance in the field of environmental policies, David Vogel convincingly argues that *"three interconnected political, economic, and institutional factors"* are relevant to understand the Californian policy development, namely a) the successful mobilisation of citizens, b) the support of environmental policy initiatives by the business world, and c) the Californian regulatory capabilities (Vogel 2018, p. 12).

In California, ***citizen mobilisation*** is neither a modern nor a marginal phenomenon. According to Vogel, related *"values and interest have deep historical roots"* that can be traced back until 1892 when the Sierra Club[7] was founded by *"a group of academics, professionals, and businessmen from the San Francisco Bay Area"* (ibid.). The members of the Sierra Club had the vision that for California *"a regional heritage could be defined and preserved"* as a *"cultural resource which needed to be known, shared, protected for the future"* (Cohen 1988, p. 10).

The high degree of citizen mobilisation in California is caused by both the geographic isolation and the high visibility of environmental threats. Either the Californian citizens could have let things go and suffer from a disrupted environment or – and that's what they have done - choose to demand and

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[7] The Sierra Club is the oldest and largest environmental protection organisation in the United States.

support environmental initiatives. In fact, environmental regulations improved the personal living conditions of Californians, as they may enjoy clean beaches, sound nature and breathable, clean air.

While - at the beginning - the citizen mobilisation in California was more or less focused on the closer local vicinity (e.g. city or county at the most), until the early 1970s, the perspective was broadened to the state level. Same accounts for the diversity of activists. While in the early days, ecological movement was dominated by only few elites, the general public started to participate in broad campaigns that for example called for cleaner air in Los Angeles or the conservation of the San Francisco Bay (see Vogel 2018, p. 14).

While the ***business support for environmental policies*** in California is considered to be an important factor, it needs to be stressed that there is not a universal unity among the business sector as a whole. As a result to this, there are both, strong supporters as well as strong opponents of stricter rules and standards (ibid.). Nevertheless, the majority of companies ever since considered that environmental protection lead to more profit on the long run, wherefore they were quite in favour of pushing and supporting California to be as green as possible.

While this kind of support was shown by the railroads, oil companies, and real estate industry in the past, lately the key players of the Californian environmental technology sector have become significant supporters of various state initiatives to mitigate climate change. This obviously happens within a win-win-collaboration where regulatory activities are not only supported, but also encouraged by the regulated branches.

Likewise, the collaboration between environmental organisations and environmentally aware business community members is mainly about to support each other. Regarding this, the Californian success story is mainly based on the fact that all stakeholders somehow benefit from tailor-made and efficient environmental regulations. As a result to this, California's long-term achievements in the field of environmental policies result from both continuously growing ***regulatory capacities*** and the quality of public administration. As a matter of fact, California not solely increased the number of its regulatory institutions, but also succeeded in assigning them with proper responsibilities and duties. By doing so, California managed to gain regulatory expertise and administrative skills, independent from the federal government (see Vogel 2018, pp. 14-15).

The importance of California's regulatory capacity has also been highlighted by Ann E. Carlson. She argues that *"the state had created regulatory institutions of extraordinary sophistication and capacity and real political agility"*. These regulatory institutions are considered to be fundamental as without those, *"the state simply could not lead as ably or quickly as it has"*. According to this, the expertise in environmental regulations and the sector's leadership *"are mutually reinforcing"* each other (Carlson 2017, pp. 64-65).

According to Vogel, the most important regulatory institution of California is its Air Resources Board - CARB that has both, *"the largest staff and budget of any state environmental regulatory body"* (Vogel 2018, p. 16). According to this, it is vital to focus on the interplay between the U.S. federal government and the state of California. Especially as the Clean Air Act (CAA) ever since granted a special status (provision of waivers) and therewith allowed California to develop and implement more stringent rules and regulations that on the federal level. This widespread permission however, *"did not require the state to actually* *use that status, nor did the federal government direct California in how to use its leadership role*" (Carlson 2017, p. 65). Against this background, the waiver privilege of California was rather a necessary precondition than a sufficient explanation for the success story of CARB that *"has won the confidence of both the public and of elected officials"* (ibid.). Against this background it is no snapshot impression but rather a long-term evolution that resulted in an *"extraordinary regulatory capacity"* that has been established in California *"over the past several decades"* (ibid., p. 78).

Bringing all of the above factors together, California achieved a number of environmental improvements that are appreciated and cherished by both citizenship and the business sector. By implementing numerous effective and well-accepted rules and regulations, California has not only established a specific tradition and political identity, but also gained its reputation to be the environmental policy innovator and environmental leader of the United States (see Vogel 2018, p. 16).

As argued earlier in this chapter, the long-term evolution of California's environmental leadership has its origins in the Clean Air Act (CAA) and the amendments of 1967. Regarding this, the special legal status of California is considered to be most important prerequisite for its today's role within the United States of America. During the past decades, the claim of being as green as possible as well as being greener than the others turned out to be the collective goal of California. In fact, the CAA established the routine of providing waivers to California in order to set its own (stricter) rules and regulations. By implementing innovative rules and regulations, the state not only managed to take care of its challenges and problems, but also became the role model of environmental regulations with a mission to transfer knowledge and best-practice experience to other states and countries (ibid., pp. 179-188).

By profoundly re-tracing the overall evolution process of the Californian Low Emission Vehicles (LEV) / Zero Emission Vehicles (ZEV) Program (period of investigation 2002-2022) and subsequently examining relevant explanatory factors in detail, the aim of this research is to find explanations how and why California has achieved ambitious goals in this specific policy field. Due to the fact that California has a remarkable and long-lasting success story in the field of environmental policies (especially in the field of road-based transport & mobility), it is essential to find out about the underlying rationales and supportive features for this resilient and lasting development as well.

No matter if it is about the actual legislative processes in this specific policy area or about more general long-term sector-specific goals, a 'bipartisan approach' seems to be a quite important aspect of the successful 'Californian Way'. In contrary to the federal government in Washington D.C., both the significant stability regarding long-term policy goals and the continuous amendments of specific policies, regulations, and standards seems to be widely unbiased and decoupled from impeding partisanship here in California. As this special feature and distinctive characteristic is obviously not limited to the legislative process, but also seems to be true for the executive branch, special focus will be put on the examination of selected legislative and regulatory efforts in the state of California.

Against the background of this continuous and far-reaching bipartisan approach in California, relevant focus will be put on significant individual actors (legislative and executive champions) and salient coalitions as well. Regarding this, the aim is to examine both basic requirements and potential supportive factors for the existence of effective and long-lasting coalitions in California.

1.3 Structure & Brief Overview of this Thesis

Within the framework of this thesis, the aim is to re-trace the overall evolution process of the Californian Low Emission Vehicles (LEV) / Zero Emission Vehicles (ZEV) Program and to examine relevant explanatory factors in great detail. While the general subject and its overarching chronicle is definitely expanding over several decades, due to the focus of this thesis and limited resources alike, the actual timeline of the accentuated account needed to be more narrow and prioritised. As a result to this, the overall period of investigation covers two decades (2002-2022).

The ***introductory chapter*** is mainly to serve as kind of a 'teaser' it is also meant to provide some fundamental information and basic thoughts about a clean and future-proof transport & mobility sector. Regarding this, it is not only dealing with the across-the-board research interest of the thesis, but also with the specific case under investigation and the explicit research question aka *the riddle behind the story*. Against this background, a sub-chapter chapter commences to put the focus on the most essential aspects of the 'Californian Way' in order to raise questions about the underlying reasons for the long-term success story in the field of environmental policies. Besides that, the first chapter is to present and emphasises some rationales and reasons for this specific kind of research.

The ***second chapter*** briefly outlines the overall evolution of clean transport and mobility in the state of California. The presentation of an extensive historical background serves to gain a better understanding of the quite unique situation and relevant circumstances that reason the compelling and extraordinary conditions of California. On the basis of some renowned examples (e.g. catalytic converter, OBD-systems, etc.), California's role as a technological pioneer in the clean transport and mobility sector is outlined. Same accounts for clean air policies as well as effective rules and regulations that promote the large-scale implementation of cleaner vehicles. Furthermore, a brief literature review is not only to present the most relevant research in this specific field, but also to stress existing shortcomings that justify the need for conducting the research at hand.

The ***third chapter*** pursues with a suggested reasoning for the (inevitable) substitution of fossil fuels and subsequently a valiant shift towards clean and sustainable alternatives in the transport and mobility sector. This essential hint is followed by a brief outline of the corresponding research topic, namely the evolution of relevant rules, regulations and standards (e.g. LEV I / LEV II / LEV III / ZEV) that shaped and depicted the dedicated approach of a large-scale implementation of low- and subsequently zero emission vehicles in California. This section is completed with an outline of the principal conceptualisation of the study as well as a brief presentation of the related research design.

The theoretical framework of this thesis is outlined in the ***fourth chapter***. Based on a brief discussion of available theories of the policy process, the Advocacy Coalition Framework (ACF) will serve as the major theory. The ACF is extended with a set of supplementary approaches in order to examine policy change and policy implementation in more detail. This includes the concept of path dependency as well as the conception of policy legacies / policy continuity. Regarding this, the aim is to highlight long-term determining factors that cause a significant stability regarding policy goals and a continuous development of specific policies, regulations, and standards. The theoretical framework of this research is complemented by the theory-based research method of process-tracing (PT) based on the foundations and guidelines of Derek Beach and Rasmus Brun Pedersen. The dedicated variant of *'explaining-outcome'* has been chosen as it seems to be highly appropriate for the intrinsic case-study and best suited to re-trace existing causal mechanisms within a specific case in detail.

The ***fifth chapter*** of this thesis comprises of the explaining-outcome single-case study, namely the evolution of the Californian ZEV-Program. Regarding this, the overall time-period of two decades (2002-2022) is to be split up into five phases / episodes that will be presented more or less chronologically. The actual partition is mainly guided by the criterion ‘change in government’ as this is considered to bring up a potential change in terms of existing policies and subsequently (major) policy change.

Based on the explaining-outcome single-case study, ***chapter six*** is essentially to explain and clarify the most important findings for the success-story and the Californian leadership. The focus is put on the striking features of outstanding individual actors that were essential to made things happen in retrospective. Aside from this, more general - but likewise highly relevant – aspects are recapitulated within a sub-chapter that deals with the special prerequisites and circumstances of the case under investigation, namely the state of California.

The ***seventh chapter*** is to sum-up the episodes and results of the explaining-outcome single-case study and to draw a set of more general conclusions to the overall research. The thesis closes with the brief outlook/final remarks section that presents some thesis-specific lessons-learned. Furthermore, an attempt is made to draw at least some general findings from the highly case-specific results of this research. Despite the limits of such a case-focussed research (e.g. uniqueness of the case, highly case-specific explanation), this is a reasonable approach for explanations with more general features. With special focus on such findings of case studies examined by the method of explaining-outcome process tracing “it is possible to point outwards when presenting findings” (Beach and Pedersen, 2019, p. 285).

2 California's Evolution of Clean Transport&Mobility

As already mentioned earlier in this thesis, California is one of the most famous states in the United States of America. Not only well-known for its unique tourist-attractions like the Golden Gate Bridge or the former prison island Alcatraz, California is also well-known for its agricultural products (e.g. Almonds, wine, etc.) and its exceptional nature that not only comprise of sunny beach sites like Malibu and Santa Monica, but also vast National Parks like the Yosemite National Park with its giant, thousands of years in age sequoia trees.

Ever since, California has derived significant revenues from both tourism and international trade. Apart from a broad variety of agricultural products, the 'Golden State' is well-known for the Silicon Valley that hosts some of the world's most valuable Tech-Companies like Apple, Alphabet or Tesla. While the vast majority of big-selling products like the iPhone are produced outside[8] the United States, the head offices of numerous technology companies are based in the State of California which leads to the fact that its economy is the largest in the United States and one of the largest world-wide[9].

The flourishing economy of California is mainly based on a long educational tradition that focuses on innovation and entrepreneurship which is considered to be a key factor for both economic growth and long-term competitiveness. Most of today's Tech-Companies were started off from pretty wild entrepreneurial activities and small business start-ups. While it definitely takes inventive genius as well as an intuition for future trends and opportunities, there is also a need for a supportive or at least a non-aggravating surrounding that is available in the United States and especially in the state of California.

[8] Apple products are "designed in California" but produced and assembled in Asia (China, India, etc.).

[9] https://www.gov.ca.gov/2022/10/24/icymi-california-poised-to-become-worlds-4th-biggest-economy

Apart from the leading universities of Berkeley and Stanford and a number of well-known Tech-Companies, the Bay Area is a High-Tech Hub that also hosts a vast number of well-funded Tech-Start-ups (e.g. SpaceX, Sonos, Hyperloop One, etc.) that are (about to become) the next global players. Figure 4 presents a sketch-map of Silicon Valley and the Bay Area, indicating the closeness of leading Universities and numerous Tech-Companies.

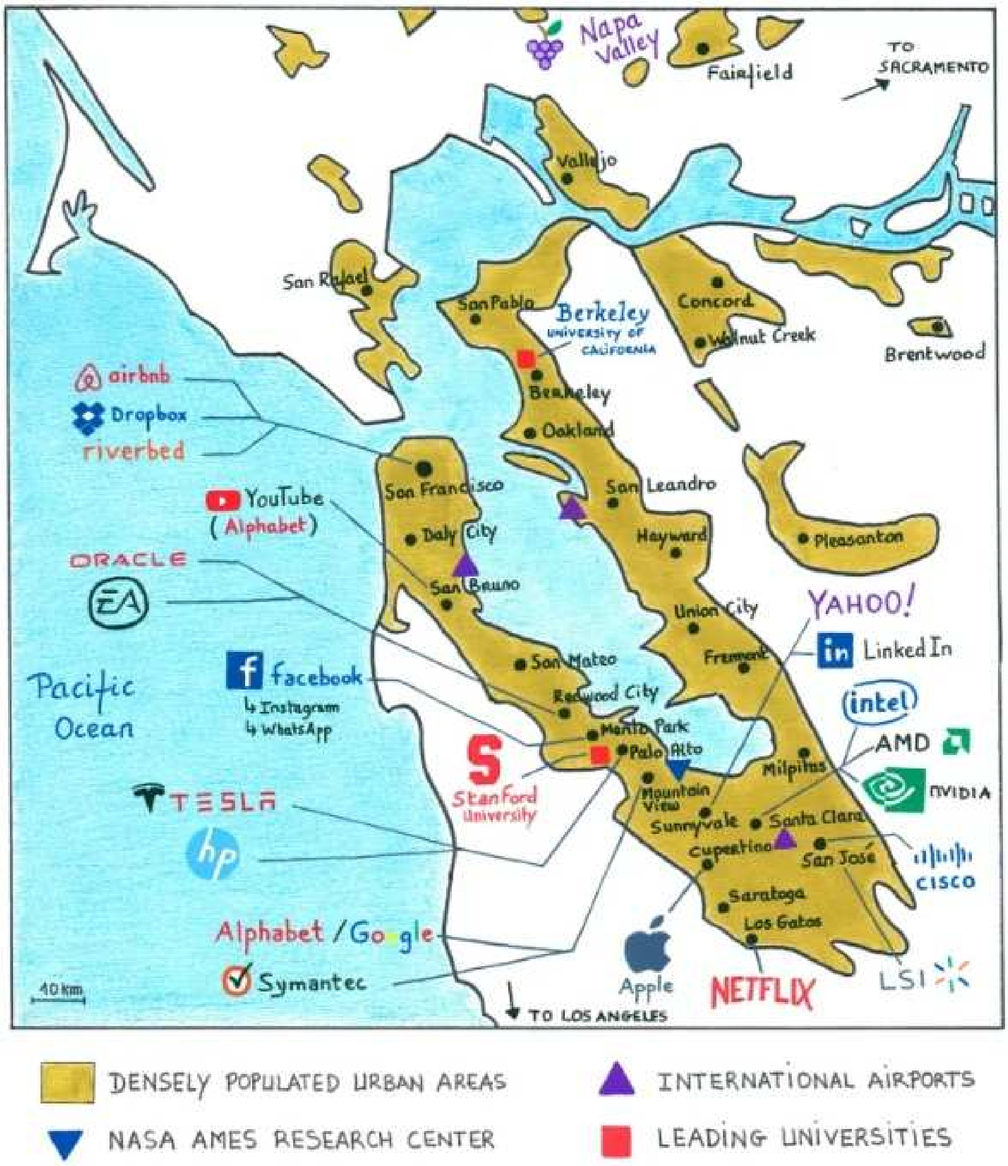

Figure 4 – Silicon Valley Sketch-Map

Source: Chabert, 2018

2.1 Historical Background

The remarkable economic growth and outstanding performance of California doesn't come for free and therefore the most populous U.S. state also holds a quite inglorious attainment. The first-ever event of smog occurred in the city of Los Angeles as early as summer of 1943, when the remaining visibility was only a few hundred meters and thousands of people suddenly suffered burning eyes, breathing problems and even nausea. Due to the novelty of such an event, and the fact that it happened in the midst of WWII, the general public first thought that the city was under attack. Even well-informed governmental authorities kept on blaming a nearby rubber plant to have caused the city-wide 'hellish cloud'[10].

As a result to persistent and steadily increasing air pollution, the Los Angeles County Air Pollution Control District was formed as early as 1947, becoming the first of its kind in the United States of America. Even though the existing industrial facilities were controlled and regulated, smog persisted to be an issue of Los Angeles. It took several years until the Dutch chemist Arie Haagen-Smit[11], a research fellow at the California Institute of Technology (Caltech), identified the composition and underlying chemical reactions of photochemical smog. As soon as it became clear that airborne hydrocarbons and oxides of nitrogen (NOx) from internal combustion engines unfavourably react with sunlight, the automobile was identified as the decisive origin. As a matter of fact, the research of Haagen-Smit at Caltech became the scientific basis for all of today's air pollution regulations. Years later, Haagen-Smit served as first Chair of the California Air Resources Board between 1968 and 1973.

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10 https://www.smithsonianmag.com/smart-news/1943-hellish-cloud-was-most-vivid-warning-las-smog-problems-come-180964119.

11 https://ww2.arb.ca.gov/about/leadership/dr-arie-haagen-smit

In Washington D.C. President John F. Kennedy (Democratic Party) considered air pollution as a problem to be tackled on the federal level. After almost one year of adjustments, the bill finally passed Senate and the House in December. The Clean Air Act (CAA) was finally signed into law by his successor Lyndon B. Johnson on December 17, 1963[12]. While the Clean Air Act has to be considered as the first attempt[13] of the federal government to establish and implement binding air pollution limits for industry and the transport sector, the CAA of 1963 comprised of less than 10 pages[14].

As poor air quality and subsequently the negative effects on health remained to be a high priority issue in California[15], a group of governmental officials began to think of air pollution as a problem that is strongly related to specific conditions and requirements of California. As a result to these state-level efforts, on August 30, 1967, Republican Governor Ronald Reagan approved[16] the so called Mulford-Carrell Air Resources Act[17] that in result created the California Air Resources Board (CARB) as a merger of the former Bureau of Air Sanitation and the California Motor Vehicle Pollution Control Board.

> *"It is imperative to provide a single state agency for administration, research, establishment of standards, and the coordination of air conservation activities carried on within the state"*[18].

[12] https://www.epa.gov/clean-air-act-overview/evolution-clean-air-act

[13] Major revisions and amendments to the CAA were done in 1970, 1977, and 1990.

[14] https://www.govinfo.gov/content/pkg/STATUTE-77/pdf/STATUTE-77-Pg392.pdf

[15] During that time period (1959-1967), Edmund Gerald Brown (Sr.) was the Governor, when California became the nation's largest state and air pollution reached new peak values.

[16] Governor Reagan did this in response to suburban housewives in Los Angeles that were concerned about smog.

[17] Cal. Stat. 1967, ch. 1545, at 3680.

[18] California Health and Safety Code § 39013 (1973)

After two years of work CARB released a first set of emission standards for the most common types of air pollution. While general national standards needed to comply with federal standards, due to the compelling and extraordinary conditions of California, Congress approved the states vehicle standards. Within the 1967 Amendments of the Clean Air Act, California was thereby granted the first waiver to regulate emissions from new and used vehicles.

As a result to this, the Californian rules became more stringent than the federal ones. Nevertheless, it needs to be stressed that the approval of state-level rules and standards was not undisputed at all. Paul G. Rogers, Chair of the House Subcommittee on Health and the Environment during the Clean Air Act deliberations of 1970 remarked about 20 years later[19], that there were considerable doubts in terms of the viability of the state-level approach to air pollution control as air pollution affects large areas and does not stop at any kind of regional boundaries. While Congress gave California the right to implement its own standards, the federal government pursued its own strategy on creating a federal counterpart to the Californian Air Resources Board.

On July 9, 1970 President Richard Nixon (Republican Party) submitted Reorganization Plan No. 3[20] to the Congress of the United States in order to establish the Environmental Protection Agency (U.S. EPA). Nixon argued that in terms of environmentally-related activities federal government is not well-structured and defies effective and concerted action. Likewise, existing federal activities are scattered at various departments and agencies. Therefore, Nixon wanted EPA to become an independent and powerful agency that incorporates

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[19] https://www.epa.gov/archive/epa/aboutepa/epa-history-clean-air-act-1970.html

[20] https://www.epa.gov/archive/epa/aboutepa/reorganization-plan-no-3-1970.html

all relevant research, monitoring, standard-setting and enforcement activities[21]. However, it is very important to briefly focus on the actual extent of its independence. While the EPA was designed to be independent from formal jurisdiction and the influence of other agencies, the "administrator and assistant administrators were to serve at the President's pleasure and formally report to the President through OMB[22]" (Lazarus 1991, p. 318).

As a matter of fact, the reorganisation led to a broad mandate of EPA and incorporated the responsibilities and competencies of several other pollution control authorities[23]. Nixon argued that this would help to assure that no other environmental problems would come into existence by controlling the already existing ones. Only few months later, on December 2, 1970, William D. Ruckelshaus was confirmed as EPA-Administrator by the U.S. Senate and officially took office two days later on December 4, 1970. According to Ruckelshaus, the remarkably fast and determined implementation of EPA was probably due to a significant public pressure at that time.

> *"I think it's important to remember that EPA was created in a period in our history when the concern for the environment and pollution was at a peak. Earth Day had occurred in April of 1970. The agency opened its doors on December 1st of that same year. All of this was a reaction to what the public perceived as being a big public health problem associated with pollution in the air and in the water, and in drinking water"*[24].

[21] U.S. EPA obviously was meant to be the federal counterpart of CARB.

[22] Office of Management and Budget.

[23] EPA was formed from a total of 15 separate agencies or pieces of agencies (e.g. Federal Water Quality Administration, National Air Pollution Control Administration, Bureau of Solid Waste Management).

[24] Excerpt of an interview with William D. Ruckelshaus, conducted by the EPA Alumni Association on February 18, 2013 (https://www.epaalumni.org/userdata/pdf/605EA9C8EF2DD115.pdf).

After being established, EPA has been authorised by Congress to autonomously set national air quality standards. As a result, a shift in competency in terms of granting waivers to California, as well as a substantially expanded enforcement authority of EPA took place. The agency started to conduct major scientific studies on pollutant emission inventories and developed sophisticated monitoring & control techniques as part of its refined enforcement activities.

During the very first years of struggling against air pollution it already became clear that there is going to be a growing rivalry[25] between the State of California and the federal government. Both in terms of the establishment of professional authorities as well as the continuously ratcheting of air quality standards. However, it turned out that air pollution and related public health problems remained to be at high levels in California as well as throughout the United States. Figure 5 presents an overview of important events from 1943 to 1970.

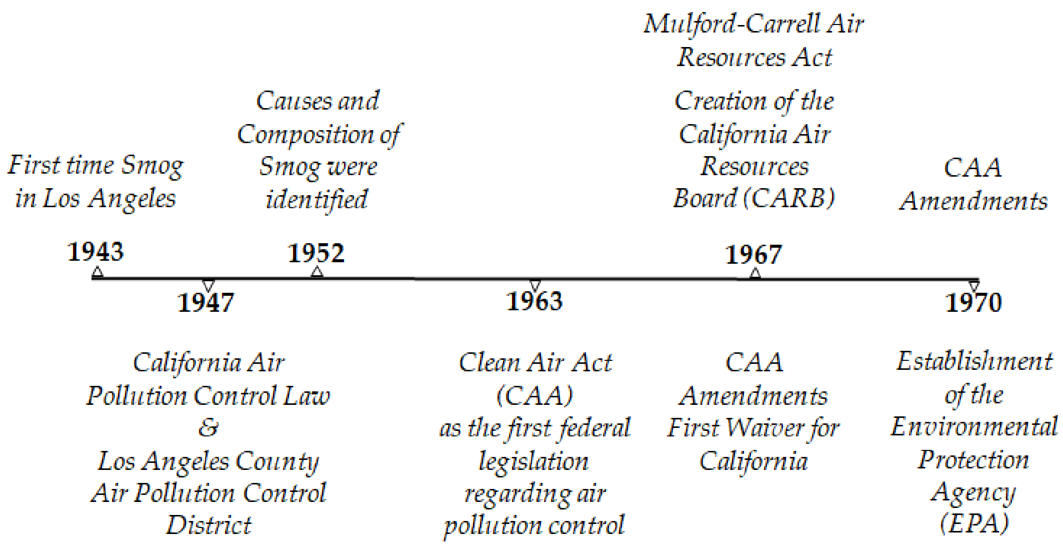

Figure 5 – Timeline 1943-1970

Source: Author

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[25] This is quite exceptional as both, Governor Reagan (1967-1975) and President Nixon (1969-1974) were Republicans.

The first major and fundamental amendments[26] to the CAA took place in 1970 (see Downing and Brady 1978) and was the result of a bipartisan (Republicans together with Democrats) legislative process. It paved the way for a set of national air quality standards that required up to 90% reduction in emissions from new automobiles by the year 1975[27]. 1970 amendments also asked for the best available control technologies in order to regulate air toxics. The introduction of nation-wide standards on six pollutants (sulphur oxides, particulate matter, carbon monoxide, photochemical oxidants, nitrogen oxides, hydrocarbons) was followed by the implementation of National Ambient Air Quality Standards (NAAQS) in 1971 which should help to protect public health as well as plants, forests, crops, and materials from potential negative effects due to the exposure to above pollutants.

Based on this, EPA asked each state to develop a mandatory State Implementation Plan (SIP) that had to be submitted within 9 months after the promulgation of standards. The EPA was in charge of either approving or disapproving the provided SIPs within a period of 4 months. After having accomplished the defined criteria, it was approved by Environmental Protection Agency (EPA) and the state was obliged to prepare a detailed implementation plan and re-submit it to EPA within 6 months. If a state fails to submit an acceptable SIP (that fulfils the minimum criteria), the Clean Air Act (CAA) requires[28] the EPA and its Administrator instead to provide and subsequently enforce a substitution plan, called Federal Implementation Plan (FIP). Table 1 gives an overview of major aspects for both the State Implementation Plan (SIP) and the Federal Implementation Plan (FIP).

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[26] Frequently also called "Muskie Act" because Senator Edmund Muskie played a significant role in drafting the bill.

[27] Originally planned for 1980, however Senator Muskie wanted to have a much more stringent timing.

[28] Section 110 (c) of the Clean Air Act, 42 U.S.C. § 1857c-5(c).

Table 1 – Major Aspects of Federal and State Implementation Plans

Source: Author

	State Implementation Plan (SIP)	***Federal Implementation Plan (FIP)***
Developed by:	State	EPA
Objective:	Set of regulations and provisions adequate to implement, maintain, and enforce the National Ambient Air Quality Standards (NAAQS) and to fulfil requirements of the Clean Air Act (CAA), to be delivered to EPA	If SIP is not delivered or does not fulfil the entirety of requirements, the Environmental Protection Agency (EPA) has to provide a mandatory substitution plan, called Federal Implementation Plan (FIP) to the state

The Clean Air Act Amendments of 1970 resulted in a tremendous administrative task for EPA. As Lazarus argued: *“the Act challenged not only "business as usual" but "life as usual" in the United States and demanded that EPA immediately seek dramatic change in both”*(Lazarus, 1991, p. 325). As a result to very demanding standards that were far beyond the technology of 1970s, *“fewer than 15 percent of the Clean Air Act's deadlines were met”* (ibid.).

Besides demanding standards and severe deadlines, the 1970 amendment of the Clean Air Act also included a dedicated citizen suit provision. This allows every citizen to bring a suit in federal court if the EPA misses to impose air quality standards in time. Therefore it definitely can be argued that Congress on purpose[29] intended to allow the general public to kind of supervise EPA enforcement activities of air quality standards. This approach makes perfect sense, as the citizens are the ones who suffer from air pollution in the first place.

[29] Probably Congress was inspired by the Civil Rights Act of 1964.

It did not take too long until the first lawsuits were filed under the Clean Air Amendments[30] of 1970 to the Air Quality Act of 1967[31]. In May 1972, the Sierra Club[32] and several other environmental groups filed the first major suit against the EPA[33] (see Milhaly 1972). However, the probably most prominent suit is considered to be *City of Riverside v. Ruckelshaus*[34], when, Mary D. Nichols[35], back then a 27 year old lawyer sued the U.S. Environmental Protection Agency[36], represented by the Administrator William D. Ruckelshaus on September, 6 1972.

The main impetus for filing the lawsuit[37] against EPA was that it failed to prepare a Federal Implementation Plan (FIP) as mandatory reaction to the disapproval of the State Implementation Plan (SIP), submitted by the state of California (see English, 1975). Section 110 (c) of the Clean Air Act obligates EPA to provide a plan, if a state fails to submit an approvable plan. Regarding this, the Administrator has broad authority to enforce such a plan both civil and criminal penalties. While EPA Administrator Ruckelshaus failed to do so, a comprehensive plan for the South Coast Air Basin, however, was urgently required in order to meet the National Ambient Air Quality Standards (NAAQS)[38] in the Basin within the mandatory time-frame.

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[30] 42 U.S.C. §§ 1857-58a (1970), amending 42 U.S.C. §§ 1857-571 (Supp. V, 1970).

[31] The Air Quality Act of 1967 itself consisted of amendments to the Clean Air Act of 1963.

[32] Founded in 1892, the Sierra Club is the oldest and largest environmental protection organisation in the United States.

[33] Sierra Club v. Ruckelshaus, 344 F. Supp. 253 (D.D.C. 1972).

[34] 4 ERC 1728 (C.D. Cal. 1972)

[35] Under the Clinton Administration, Nichols worked at the U.S. EPA and later on served as Chair of CARB.

[36] Primarily, Riverside envisaged to sue Los Angeles due to massive loads of smog that came from the city's traffic.

[37] District Court for the Central District of California - ERC 1728 (C.D. Cal. 1972).

[38] Nitrogen Oxides, Particulates and Photochemical Oxidants

The court's decision of November 16, 1972 pledged EPA Administrator Ruckelshaus to prepare and publish[39] a decent implementation plan in order to accomplish the NAAQS for photo-chemical oxidants in the state of California. All necessary transportation controls and land use controls were obliged to be used in order to fulfil standards within a time frame of three years from the date of final adoption or - in case of an approved request[40] for a two-year extension - no later than five years from the date of adoption[41].

After the sentence, all the stops were pulled out and California's updated SIP was approved by EPA on January 17, 1973. It turned out that most of the reactive hydrocarbon emissions in the South Coast Basin were attributable to motor vehicle emissions. As a result, standards asked for a reduction of 87% in hydrocarbons, equivalent to a reduction in vehicle miles travelled (VMT) of over 80%. The mandatory standards, determined by Congress[42], were considered to be far beyond the available technology of 1970[43]. Therefore, according to EPA[44], the only way to accomplish such a reduction at short notice would be to reduce the vehicle miles travelled (VMT), which in turn can only be achieved by the rationing of gasoline.

Within this context, a Transportation Control Plan (TCP) was delivered by EPA, as California missed to submit an appropriate plan by the deadline.

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[39] Publication in the Federal Register had to be done no later than January 15, 1973.

[40] To be made by the Governor of California.

[41] The original NAAQS, relevant for the court's decision, were adopted in 1971.

[42] The underlying intention of high standards was most probably to force technological progress.

[43] Implementation of Clean Air Act Amendments of 1970: Hearings before the Subcommittee on Air and Water Pollution of the Committee on Public Works, 92d Cong., 2d Sess. 911-12 (1972).

[44] 38 Federal Register, page 2195 (1973): https://www.govinfo.gov/content/pkg/FR-1973-01-22/pdf/FR-1973-01-22.pdf

The TCP[45] included a review of new parking facilities, increased parking fees, a potential ban[46] of motorcycles, as well as a mandatory inspection and maintenance of light-duty vehicles[47]. Furthermore, the plan asked for bus and carpool preference systems to be set up on selected major streets and highways, as well as mandatory incentives to switch from single-passenger car commuting to carpools and public transport. Due to the binding force of the TCP, the State of California was obliged[48] to fully implement its tasks and report compliance to the Environmental Protection Agency.

Due to the strict rules and regulations of the EPA-prescribed Transport Control Plan, on November 29, 1973 the Governor[49] of California and others[50] petitioned the responsible 9th Circuit Court of Appeals in San Francisco. The aim was to get a review of the plan and its severe constraints as, for example, the demanded reduction of vehicle miles travelled would have eliminated large proportions of traffic in Los Angeles. Furthermore, several provisions of the TCP were considered to be ineffective.

Although EPA-Administrator Ruckelshaus has meanwhile suspended the review of new parking facilities and increased parking fees, he retained all other regulations and proclaimed that they had to be obeyed. In contrast to this, petitioners argued that under the provisions of the Clean Air Act, the

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45 38 Federal Register, page 31232 (1973): https://archives.federalregister.gov/issue_slice/1973/11/12/31217-31251.pdf

46 Only applicable if new models fail to comply with emission standards.

47 This also included the retrofitting of catalysts by 1977.

48 42 U.S.C.A. § 1857h-5(b)

49 While 1973, Ronald Reagan (Republican) was the Governor of California, by the time of the Courts decision in 1975, Edmund G. Brown Jr. (Democrats) was his successor. Brown Jr. served as Governor of California for a total of 4 terms.

50 Petitioners included trustees of the California State University & Colleges, CARB, several cities, counties, and others.

Administrator has no authority to put sanctions on the State of California or its officials in any case. On April 11, 1975, EPA submitted a Notice of Violation to California, as it failed to proof compliance with the mandatory inspection and maintenance of light-duty vehicles.

Few months later, on August 15, 1975, the court replied the disputants with a kind of Solomon Judgment[51], when it recognised that any activities which cause pollutions within the State of California are subject to regulations of the Administrator. As a consequence, California is not entitled to impede the enforcement of regulations. However, such sanctions are not eligible when the State only fails to administer or enforce a regulatory system. To put it more simply: the Clean Air Act allows sanctions against a polluting state, but not against a state that fails to regulate polluters.

While disagreement between California and the Federal State (represented by the EPA) remained[52] and litigations continued[53], there were also some improvements in air quality due to technological innovations[54]. For example, the combustion process of vehicles was improved by the implementation of crankcase ventilation[55] valves, while emissions were reduced by the rollout of

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[51] 521 F.2d 827 - 9th Circuit Court of Appeals, 1975, p. 832

[52] During that time period, Democrat Edmund Gerald Brown (Jr.) was the Governor of California (1975-1982), while the U.S. President changed from Republican Gerald Ford (1974-1977) to Democrat Jimmy Carter (1977-1981), and subsequently to Ronald Reagan (1981-1989), who was also former Republican Governor of California (1967-1975).

[53] Governor Brown and the EPA had several legal disputes that also engaged the Supreme Court (431 U.S. 99 - 1977).

[54] See the performance-based, technology-forcing standards set by Congress in the CAA amendments of 1970.

[55] Formerly escaping crankcase gases are to be returned to the combustion chamber, which reduces air pollution.

catalytic converters[56]. While California is clearly the geographic source of innovation, in the years 1975-76, the catalytic converters came into large-scale use as part of the U.S. Motor Vehicle Emission Control Program. Nevertheless, it is vital to mention that the State of California has played a vital role to shape the program. Same is true for the implementation of vapour recovery nozzles at gas stations and the phasing out of leaded fuels.

Inaugurated on January 6, 1975 Governor of California Edmund Gerald ‘Jerry’ Brown Jr. focussed on the empowerment of CARB in order to keep up with EPA. In this context, the appointment of Mary D. Nichols (see above *City of Riverside v. Ruckelshaus*) as Board Member (1974-1978) and subsequently CARB Chair (1979 – 1983), is considered as an important turning point. The long-term strategy of the California Air Resources Board was to operate proactively in air pollution control and to gain full responsibility with even more stringent requirements than the federal air quality standards. Hence, the CARB adopted (and sometimes even tightened) several subjects[57] of the SIP requirements that have been imposed by the EPA.

On the federal level, the Energy Policy and Conservation Act (EPCA)[58], enacted on December 22, 1975, assigned authority to set fuel efficiency standards[59] for passenger cars and light trucks to the Department of Transportation (DOT) and ultimately to the National Highway Traffic Safety Administration (NHTSA). While some of the federal requirements were voluntarily implemented by

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[56] Catalytic converters turn toxic gases & pollutants into less-toxic residues by the catalyzing of redox reactions.

[57] Vapour recovery nozzles at gas stations, treatment of solvents, etc.

[58] Pub. L. 94–163, 89 Stat. 871

[59] As aftermath to the 1973 Oil Embargo, fuel efficiency standards should help to reduce the dependence on oil imports

California, EPA still was responsible for enforcing several other provisions that have not been implemented by CARB. In retrospect however, EPA obviously was not really motivated to enforce some of the assignment of the SIP.

As a result to this, the provisions of the ambient oxidant standard was not met until 1977, which - to put it in a nutshell - means that the federal Clean Air Act that was again amended in some parts has more or less failed to accomplish its goals. On the other hand, the state of California continuously intensified its air pollution control activities and made a quite respectable progress in the reduction of air pollution.

While it is hard to determine, whether the development of California was because of or despite of the federal interventions of EPA, the California Air Resources Board became a powerful and dynamic institution under the curatorship of Governor Brown. Figure 6 presents an overview of important events that took place between 1971 and 1977.

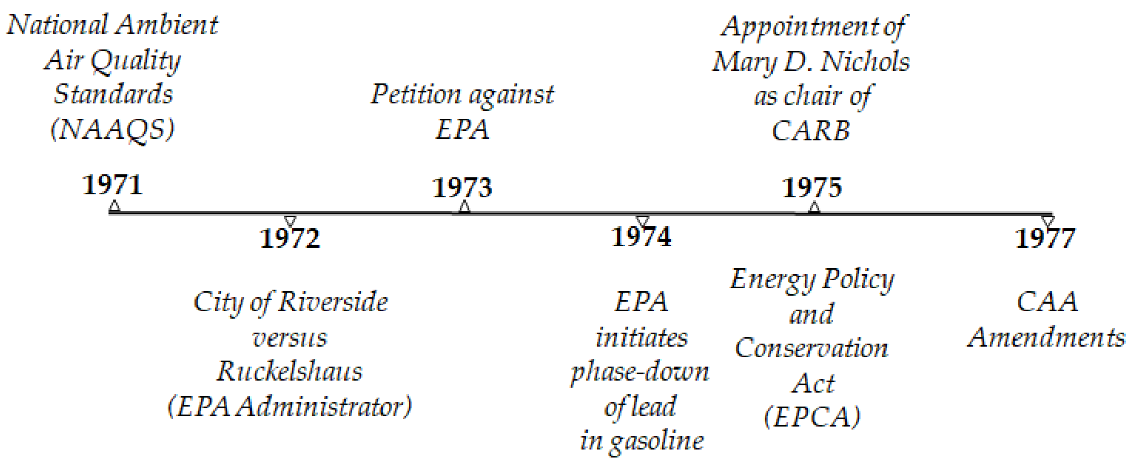

Figure 6 – Timeline 1971-1977

Source: Author

2.2 California's Trailblazing Role for Clean Transport & Mobility

While numerous areas of high population density came into being, Los Angeles soon turned out to be the area with the worst air quality throughout the United States. Mainly caused by extraordinary growth rates (industry and population) and the regions very specific topography, Los Angeles continuously suffered from massive air pollution and frequent smog events.

While the burdensome situation in Los Angeles needs to be considered as both a trigger and an important catalyst, California' compelling and extraordinary conditions as a whole are the reason for its enduring and lasting regulatory leadership. As a result to a long-term evolution of science-based rules & regulations, as well as a remarkable progress in clean technologies, CARB more or less completely overtook the role of EPA in the state of California by the end of the 1970s.

Regarding this, a highly relevant aspect is the waiver provision[60] that ever since allowed California to set its own air quality standards and subsequently to push both innovation and the implementation of clean technologies. This included the development and mandatory implementation of 2-way and 3-way catalytic converters[61]. California not only became a forerunner[62] in the United States, but also around the globe.

As a result to demanding emission standards for new vehicles and the states significant market power, during the 1980s and 1990s, Californian vehicles

[60] The provision of waivers to California has its origin in the Federal Air Quality Act of 1963.

[61] A two-way catalytic converter oxidizes carbon monoxide and hydrocarbons, while the three-way catalytic converter additionally reduces nitrogen oxides to nitrogen.

[62] The pioneering lead of California was essential to get a grip on the vast air pollution from combustion engines.

became the world´s cleanest ones with advanced computer controlled engines that regulate dedicated fuel and exhaust systems. While regular emission tests guaranteed that the equipment kept working properly, the phasing-out of lead in fuels was completed in 1985 and facilitated[63] clean air technologies.

CARB was also the vanguard of On-Board-Diagnosis[64] (OBD) implementation, when beginning in 1988 all new cars sold in California had to be equipped with basic self-diagnostic and reporting capabilities (OBD-I). As a follow-up to this, the more sophisticated OBD-II specifications became mandatory in 1996 for all cars to be sold in the United States. Few years later, the European Union started to fully adopt the OBD-II specifications to new vehicles in 2001.

Due to innovations and large-scale implementation of clean vehicle technologies, the air quality of California steadily improved during the last decades. Despite of population growth and a flourishing economy with a significant increase in both registered vehicles and miles travelled. However, the improvement of conventional propulsion technologies (gasoline & diesel combustion engines) is limited. Considered to be a long-term approach, the California Air Resources Board formulated the very first version of the Zero-Emission Vehicle (ZEV) requirements[65] in 1990.

The Low-Emission Vehicle (LEV) regulations of 1990[66] included three components: a) strict emission standards that promote the development of low-

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[63] Leaded fuels were a burden to catalytic converters, since lead poisons and thus inactivated the catalyst.

[64] OBD continuously monitors the engine components for any kind of failures that might cause increased emissions.

[65] As part of the Low-Emission Vehicle (LEV) regulations that obligated manufacturers to develop cleaner vehicles.

[66] LEV regulations of 1990 are nowadays labeled as LEV-I regulations.

emission vehicles, b) mandatory and increasing introduction of LEV models to the portfolio of car manufacturers, c) defined share of Low-Emission vehicles in overall traffic. Based on these regulations, the follow-up version tightened the emission standards for all new light- duty and medium-duty from model year 2004 onwards (see CARB, 2019).

As traditional propulsion technologies (no matter how clean they are) are inevitably based on the burning of fossil fuels and subsequently release vast amounts of carbon dioxide (CO_2) and other greenhouse gases (GHG) to the atmosphere, discussions on the controlling of GHG emissions from motor vehicles started in the late 1990s.

A turning point regarding an appropriate valuation of GHG emissions in the transport and mobility sector happened when then-Assembly Member Frances J. "Fran" Pavley introduced Assembly Bill (A.B.) 1058[67] on February 23, 2001. The bill[68] was initially drafted by a strong coalition of environmental organisations that was coordinated by the Bluewater Network[69].

The law required the California Air Resources Board to achieve the maximum feasible (and cost-effective) reduction of GHG emissions from motor vehicles[70] as early as possible. The far-reaching objectives of A.B. 1058 were strongly opposed by a coalition that comprised of the *Alliance of Automobile*

[67] http://www.kirschfoundation.org/care/documents/AB1058.pdf.

[68] AB 1058 was the predecessor to AB 1493.

[69] The Bluewater Network (nowadays a division of Friends of the Earth) aims to reduce dependence on fossil fuels.

[70] Passenger vehicles and light-duty trucks.

Manufacturers[71], the California Chamber of Commerce, General Motors, and the Western States Petroleum Association (WSPA)[72].

As a result to this, the California State Assembly and the California State Senate passed different versions of A.B. 1058, and the successor bill A.B. 1493 was introduced in 2002 as a parallel bill that was signed into law by then-Governor Gray Davis (Democratic Party) on July 22, 2002. A quite rough timeline for the time period between 1982 and 2002 is presented in Figure 7.

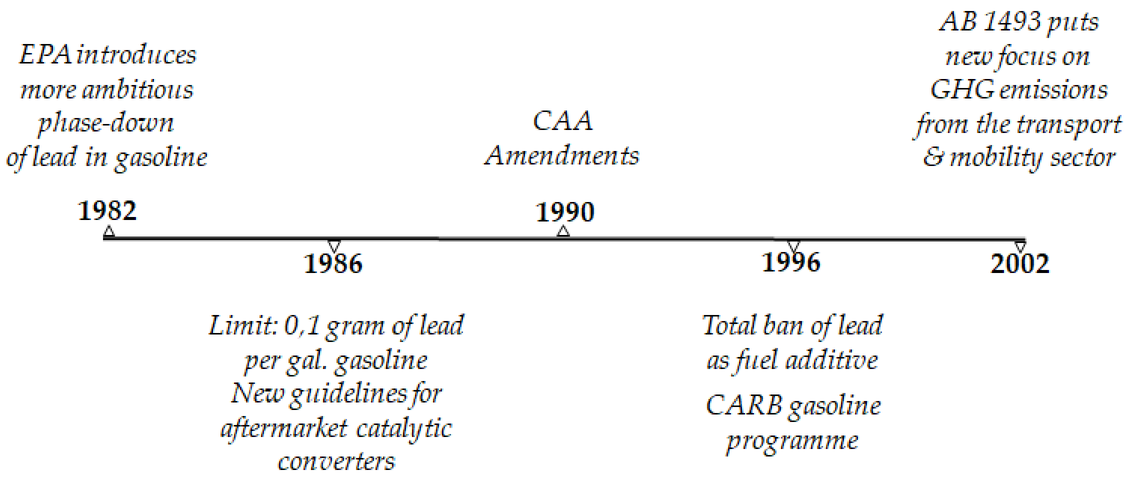

Figure 7 – Timeline 1982-2002

Source: Author

Within the framework of this thesis, Assembly Bill 1493 is not only considered to be the turning point in terms of a more comprehensive incorporation of transport & mobility based GHG emissions, but also determines the starting point of the 20-years-period of investigation (2002-2022).

[71] The Auto Alliance (AAM) was a trade group of automobile manufacturers and literally the leading advocacy group for the car industry with a market share of almost 80% of all passenger-vehicles & light trucks sold in the U.S.

[72] Represents companies (e.g. BP, Shell, ExxonMobil) in Arizona, California, Hawaii, Nevada, Oregon, and Washington.

2.3 Literature Review and Past Research - What still needs to be done?

There are numerous case-studies that put a thematic focus on energy transition of multiple sectors and various countries around the globe. Some of them are designed as comparative case studies that either have a quite general focus on energy transition or are dedicated to specific sectors and countries.

Likewise, existing studies comprise of an abundant variety of underlying research designs and scientific focus. This section is to briefly present an overview of selected showcase studies in order to highlight findings as well as to spot aspects still to be examined.

Solomon and Krishna (2011) considered the shock waves of the oil embargos ("first oil shock" of 1973-1974 and "second oil shock" of 1978/1979) as the most relevant drivers for enforced energy autonomy in general and in particular the increased substitution of fossil fuels. Regarding this, the authors examined three cases for different sectors in Brazil, France and the United States. While in the Brazilian case the focus was on the substitution of fossil fuels in the transport and mobility sector (ethanol from sugar cane), France responded to the oil crises by substituting vast amounts of imported oil though the large-scale implementation of nuclear power plants.
In contrary to these country-specific[73] pathways, the United States decided to implement a much broader approach that included increased national oil production and fuel economy standards. While the study focused on the evolution of the different country-specific approaches, the single cases were presented without any relevant focus on individual actors and potential coalitions.

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[73] In contrary to Brazil's abundant renewable energy resources (e.g. ethanol from sugar cane), due to lacking natural (energy) resources, France had to take a quite different approach.

Another interesting case study was presented by Stokes and Breetz (2018) who examined the energy transition in the Unites States by focusing on the policies of alternative energy sources in the two fastest growing sectors (electricity and transportation/mobility). While in the electricity sector solar energy and wind power was considered, the transport and mobility sector was considered with focus on biofuels and vehicles with electric propulsion systems. A quite interesting approach of the study is the parallel examination of these two sectors as they are considered to be interrelated in the future (electric mobility, electric heating, etc.). While the authors provided a quite interesting and elaborated overview of the different policy subsystems and a total of eight cases, there is a significant shortage in terms of an in-depth explanation of policy change that happened over a longer period of time.

Kester et.al. (2018) implemented a qualitative cross-country analysis of five countries[74] of the Nordic region in order to evaluate existing policy mechanisms that are to accelerate the large-scale implementation of electric vehicles. Regarding this, a series of 227 semi-structured interviews were transcribed, coded, and categorised in order to assess the most relevant aspects that stimulate, facilitate and boost the large-scale implementation of electric vehicles. While results showed that the reduction of costs, the availability of adequate charging infrastructure, and the provision of comprehensive information mostly matters for prospective electric vehicle customers, the study incorporates existing rules and regulations quite rudimental. Same accounts for any kind of alternative policies such as mandatory quotas, dedicated EV-lanes, parking incentives and other provisions.

[74] Iceland, Sweden, Denmark, Finland, and Norway.

Besides case studies that focus on different energy sectors and/or different countries, there are also some studies that explicitly focus on the transport and mobility sector of California. Sperling and Eggert (2014) for example, explicitly focused on the pioneering role of California within the thematic context of air pollution and a cleaner transport and mobility sector. While the authors provide a quite comprehensive status-quo-overview of the Californian LEV/ZEV policies and the characteristics of the California Air Resources Board (CARB), the study significantly lacks of more detailed depictions (aka good-to-know type of information) and completely missed out interactions of relevant actors and institutions. Same accounts for the evolution of related policies, the existing interrelations and dependencies with the federal government, as well as a consideration of basic origins and existing path-dependencies.

Collantes (2006) provided a quite comprehensive research that focused on the evolution of the California ZEV mandate and covered the overall time period of 1990-2004. The author's dissertation at UC Davis comprises of three papers that focused on the ZEV mandate. While the origin of the Californian ZEV mandate is re-narrated in the first part of the study, the second part comprises of an empirical study of the policy process in order to understand the dynamics of policy change. The third part of the study presents a theoretical examination of relevant actors and their behaviour in the underlying policy process. Mainly due to the strictly empirical research design, the author limited himself to provide just a series of comprehensive facts and figures and missed out the underlying dynamic interrelations that were decisive for the final policy outcomes. Same accounts for the missing evaluation of existing path dependencies, potential policy legacies, and policy diffusion processes (e.g. Section 177 states).

The empirical work of Collantes and Sperling (2008) is mainly based on the first section of Collantes (2006) and aims to study of the policy process regarding the adoption of the Californian ZEV mandate. Based on data that extracted from both public documents and personal interviews, the authors argue that overall circumstances (availability of technology, existing policies, etc.) created a window of opportunity that helped to successfully implement the LEV/ZEV rules and regulations. Similarly to Collantes (2006), the authors exercised the Multiple Streams framework in order to try to explain the evolution of the Californian ZEV program. According to Collantes and Sperling, the ongoing issue of air pollution in California converged with the rising technology of electric vehicles and the looming concerns of environmental degradation and negative effects of severe air pollution. Although providing some relevant findings, the study fails to provide more in-depth insights of the overall policy evolution and relevant intermediate steps of the policy process.

Kemp (2005) focussed on potential innovation effects of the Californian ZEV Mandate, especially the features which were designed to pull innovation. The author presents a quite detailed overview of the ZEV mandate as well as a historical synopsis of fleet sales from 1994 to 2003. One major argument for the accomplishment of emission reduction goals is considered to be the *"coincidence of factors and events opening a window of opportunity"* (p. 170) that was successfully used by CARB. While the study argues that a series of factors (e.g. severe air pollution, dedicated legislature, strong leadership, CARB's regulatory power, etc.) were to facilitate the implementation of the mandate in California, these factors are more likely essential enabling factors (absolute condition) for the Californian success story. While the author rightly argues that *"well-crafted regulations can be used to spur innovation"* (p. 184), the study's strong focus on pulling innovation noticeable limits a broader cause-and-effect approach as well as searching for alternative reasons.

The scientific contributions of Wesseling, Farla, Sperling, and Hekkert (2014) as well as Wesseling, Farlaa, and Hekkert (2015) focus on the counterpart that is the reaction of car manufacturers to technology-forcing regulations. Both studies focus on the ZEV Mandate of California over the period between 1990 and 2013. While the research of 2014 focuses on the political strategies and underlying Corporate Political Activities (CPAs) of car manufacturers and their coalitions, the follow up research of 2015 explicitly focuses on sales figures (commercial launch) and patents (innovation) to explore the reactions of car manufacturers to technology-forcing regulations. While the authors presented only a brief overview of the emergence and most relevant adaptations of the ZEV Mandate in California, they explicitly distinguish between different technologies (ICEV, HEV, PHEV, NEV, EV, HFCV) and car manufacturers (GM, Toyota, Chrysler, Nissan) in order to present both the innovation and political influence strategies.

Wells Bedsworth and Taylor (2007) highlighted the uniqueness of the Californian ZEV Program as it combines the approach of steadily increasing performance standards with mandatory EV sales for car manufacturers. Within their research, they focused on the interplay between the ZEV Mandate and the progress in technology development, the environmental outcomes and the overall lessons learned. While the authors argue to present an overview of the legislative and regulatory efforts in California, they exclusively focus on A.B. 32 and Executive Order S-3-05. Neither they presented the forerunners and the case history, nor they assumed the interrelation of relevant bills and related Executive orders within their research. Against this background, the authors do only present a quite narrow time period and limited aspects of the overall evolution of the Californian ZEV Program.

The research of Selvakkumaran and Ahlgren (2021) aims to explore social innovation in local energy transitions processes within three cases in Sweden and Denmark. The cases cover the PV sector, the transport and mobility sector (EVs and biogas vehicles) as well as alternatives to conventional heating systems (phasing-out scenario of oil-burners). The authors took a systems perspective and applied the Transformative Social Innovation (TSI) framework as well as the technique of Causal Loop Diagrams (CLD). While this approach seems to be quite promising for snap-shot highlighting a single event or limited time frames, the consideration of interrelated events within a longer time period seems to be out of reach. Regarding this, the authors argued to better substitute CLDs with simulations and flow diagrams in future research.

Mayer (2019) presented a conceptual framework that focuses on partisanship and politics in terms of ongoing energy transitions in the United States of America. Regarding this, the author argues that due to quite different perceptions and ideas of relevant issues (e.g. public health impacts of air pollution, mitigation of climate change, etc.) there are significant divides between Republicans and Democrats. According to Mayer, this is true for both the public and the government as well as for a wide range of policy issues. Without presenting any kind of proof or even an example, it is argued that states with Democratic leadership *"are more apt to implement renewable and energy efficiency policies, though some Republican legislatures enact said policies"* (p. 85). The author furthermore argues, that in general, partisan identification *"is a social identity, rather than a set of coherent policy positions"* (ibid.). Not being aware of the situation in all the U.S. States, at least for a significant number of states - especially California - this is most likely not the case. Within this thesis, the bipartisanship in the state of California is considered to be substantial and vital for the successful long-term transition towards a clean and sustainable transport and mobility sector. However, the argument of partisanship is relevant at the federal level, especially in terms of potential interferences to state governments.

Similar approaches were presented by Fraune and Knodt (2018) and Lockwood (2018), who argued that an increase of right-wing populist parties and the aspects of post-truth politics are about to lead to increased polarisation between parties and within the public. According to the authors this is especially an issue in terms of sustainable energy transition policies and climate change aspects. Their research highlighted the Trump withdrawal from the Paris Agreement and argued that is somehow followed a well-known pathway, as his Republican precursor, President George W. Bush, also refused to adopt the Kyoto Protocol. The authors argue that the Obama Administration *"put U.S. climate policy back on track"*, while during his eight years in office, *"the partisan polarisation on climate policy increased"* and resulted in *"climate-sceptical and even climate-denial attitudes"* of Republican elites. (p. 3). Fraune and Knodt coherently conclude that transition processes *"are not only determined by technological innovation and market implementation but also by socio-political processes"* (p. 6). With reference to Miller, Richter, and O´Leary (2015), the authors argue that the concept of "socio-energy systems" and their sustainable transitions need to be a subject of future research.

All of the above studies do highlight a number of relevant aspects and insights that may serve as a potential basis for generalisations. However, a common drawback is the lack of a more comprehensive and detailed historical investigation of evolutionary processes that may serve as a knowledge base for the needed transition processes. As argued earlier, California has achieved a long-term success story in the field of environmental regulations. The state not only has significantly shaped the rules and regulations throughout the United States, but also influenced several countries and regions around the globe.

According to this, it needs to be stressed that California's long-term success - as well as the state's strong will to keep on leading the climate change regulation - are based on both early efforts and early success. As Ann E. Carlson explicated in a quite catchy way, a basic sense of achievement is fundamental for dedicated states, as otherwise it will be *"less likely to engage in ambitious new environmental regulation unless its previous efforts have succeeded, both politically and in measurable environmental outcome"* (Carlson 2017, p. 65).

Especially when it comes to emissions reductions in the transport and mobility sector, California needs to be considered as the 'gold standard' in terms of improved air quality and the large-scale implementation of alternative propulsion systems. While there are many sectors that are subject to compulsory and contemporary transitions, a future-proof transport and mobility sector is expected to be at the top of the short-list of priorities. Against this background, it makes perfect sense to 'skip infancy' and instead consider the available know-how and lessons-learned in California.

While the basic motivation for selecting California as the object of investigation has already been touched several times within this thesis, a more detailed reasoning of the case selection will be presented in the next chapter. Same accounts for the overall conceptualisation of this thesis, namely to define what is the specific purpose and probably the value for doing this research. Last but surely not least it needs to come to the specification of the research design in order to 'get the thing done' in a proper way. To put it in other words, the aim of the upcoming chapter is to clearly define *where to look* (case selection), *what to look at* (conceptualisation), and *how to look* for findings and answers (research design).

3 Moving Towards a Clean Transport & Mobility Sector

Being considered as a vital part of liberal societies in a modern world, mobility in general and in particular the motorised individual transport are nowadays not only a means of transport, but more often an expression of a mobile lifestyle and a status symbol as well. While this trend is already an omnipresent phenomenon in industrialised countries, motorized individual transport appears to become one of the most desirable goals for citizens of emerging economies around the globe.

Since the invention of the internal combustion engine and its large-scale implementation in the transport and mobility sector, the consumption of liquid fossil fuels and subsequently GHG emissions are continuously reaching new peaks. Even though the first combustion engines were originally powered by alternative fuels, fossil fuels were the first choice and combustion engines were designed and optimised for them. As a result, the large-scale production and distribution network for fossil fuels grew globally and quite unplanned over many decades (see Grundmann, 1994).

The large-scale utilisation of fossil fuels caused a remarkable dependence of the transport and mobility sector. The reliable and affordable availability of fossil fuels became a vital condition for both economic and social development. As of 2019, the global oil demand averaged a total of 100.27 million barrels per day[75], whereof the road-based transport and mobility holds a share of around 80%.

According to a new report of the International Energy Agency (IEA), the fossil fuels utilisation for transport and mobility purposes is expected to reach its peak in 2026. Afterwards, the IEA anticipates a continuous shift towards clean

[75] https://www.statista.com/statistics/271823/global-crude-oil-demand/

energy technologies as result to both high prices and growing concerns about the security of supply (see IEA, 2023). While the report states that *"the petrochemical sector will remain the key driver of global oil demand growth"* (ibid., p.9), it becomes clear that the diversification of energy supply for transport and mobility gets more and more important on political agendas worldwide. Due to the IEA, this is mainly due to *"a pivot towards lower-emission sources triggered by the global energy crisis, as well as policy emphasis on energy efficiency improvements and the rapid growth in electric vehicle (EV) sales"* (ibid.).

The long-term transition towards a modern and sustainable transport and mobility sector comprises of various approaches. Besides utilising sustainable biofuels as direct substitutes[76] for fossil fuels, the implementation of advanced propulsion technologies (e.g. electric vehicles, hydrogen vehicles, and hybrid drive train systems) is considered to be viable step as well.

While such advanced technologies are already available on the market, they are most often not capable of (fully) competing with traditional combustion engines. On the one hand, the price of such cars is (still) quite high compared to vehicles with conventional combustion engines. In addition, the refuelling and recharging infrastructure for advanced propulsion technologies is not as comfortable and dense as the gas-station network which makes it quite difficult to praise the assets of renewable fuelling concepts to daily-routine customers.

A potential solution to this kind of classic chicken-egg-dilemma would be to simultaneously roll-out a working mobility system that comprise of both the necessary infrastructure and the application technology.

[76] The utilisation of such substitutes should only be considered as an intermediate step.

3.1 Research Topic & Case Selection

While the overall efficiency of vehicles with conventional combustion engines may still be improved to some extend (e.g. light weight materials, optimisation, energy recuperation, etc.), the maximum efficiency of combustion engines is limited by physical limits. While energy efficiency improvements and alternative propulsion systems gained importance in terms of GHG reductions and the mitigation of climate change during the last years, the evolutionary improvement of existing systems needs to be converted to a revolutionary change to advanced systems.

Against this background, the European Commission considers three aspects[77] to be the main drivers towards cleaner fuels and more sustainable propulsion systems, namely security of energy supply[78], climate change[79], and health[80]. Similarly to the implementation of the catalytic converter, the phasing out of lead in fuels, and the introduction of On-Board-Diagnosis systems, the origin of this multi-dimensional approach is the state of California. While the origins of performance-based, technology-forcing standards[81] are to be found in the Clean Air Act (CAA) amendments of the Congress in 1970, California soon adopted and refined the approach of technology-forcing.

By successfully implementing effective rules and regulations, California has managed to solve most of its environmental problems and subsequently

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[77] https://transport.ec.europa.eu/transport-themes/clean-transport_en

[78] Decrease the vulnerability of the transport and mobility sector, caused by supply disruptions and price volatility.

[79] Emission targets to reduce GHG-emissions (mainly CO_2, CH_4, N_2O).

[80] Air pollution and related public health problems are to be tackled, especially in urban areas.

[81] Although the performance standards were not fulfilled by the statutory deadlines, they resulted in the development and implementation of advanced technologies.

achieved some visible and tangible environmental improvements for its citizens. Based on its early achievements, California keeps up a well-established tradition in being a policy innovator and leader with the United States, but also at global level. Against this background, it perfectly makes sense to take a closer look at California which needs to be considered as the pacemaker and the point of origin[82] when it comes to sustainable mobility.

As argued earlier in this thesis (see chapter 1.2) California's environmental leadership is based on several factors (e.g. mobilisation of citizens, business support, regulatory capabilities) and results from a long-term evolution that has its origins in the Clean Air Act (CAA). While several aspects of the *'Californian Case'* would have been interesting to examine, the focus of this thesis is exclusively on road-based transport and mobility and the inevitable transition towards a future-proof transport and mobility sector, based on low-emission vehicles (LEVs) and ultimately zero-emission vehicles (ZEVs).

Gerard and Lave argue, that *"the state of California has maintained an interest in cleaning up urban air quality. The regulatory programs can influence what the carmakers have to do to meet California standards, and might also influence standard setting at the federal level as federal auto emissions regulations have often followed California's lead"* (Gerard and Lave, 2005, p. 776). In retrospect, California's ambitious standard setting needs to be considered as a quite effective approach to long-term technology-forcing. As a result to this, during the 1980s and 1990s, California cars became the cleanest in the world. Furthermore, the state also set the standard for other states in the U.S. and other countries around the globe. A quite famous example is the mandatory introduction of catalytic converters

[82] For example the two- and three-way catalytic converter, the phasing-out of lead in gasoline, and the introduction of On-Board-Diagnosis (OBD).

(paired with the phasing out of lead in gasoline) in California that later became the standard everywhere else.

The Californian Low-Emission Vehicle (LEV I) regulations that were first drafted in 1990 not only included strict emission standards, but also provided high flexibility on ways to fulfil them. Through an amendment (LEV II), the low-emission vehicle standards of passenger cars were expanded to other vehicle categories. Again, California took the role as pioneer in terms of moving towards a low-emission and in the long-term even a zero-emission transport and mobility sector.

Based on this approved leadership (see chapter 1.2), the research topic of this thesis is the genesis of the LEV II and the follow up Zero-Emission Vehicle (ZEV) Program in the state of California. The ZEV Program is not only based on multiple insights (affordable and safe energy supply, climate change, public health), but also on multiple approaches (strict rules & demanding standards, cutting edge technologies, and consumer incentives. Hence, California's ZEV Program is one of the most seminal and comprehensive pieces of legislation and frequently is considered as the archetype of how to move towards a sustainable transport and mobility sector.

While the 'technically-feasible' dimension[83] is combined with a high degree of 'stay flexible'[84], the constant accountability of achieving sound emission reductions is a highly relevant aspect to the overall approach of California. The LEV/ZEV Program of California is not only effective at the state level, but is also

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[83] What is currently possible / what technologies are currently available?

[84] This includes multiple technologies as well as flexible deadlines.

considered to be a paradigm to other states[85], the United States and other countries around the globe[86]. In short, it is definitely worth to study the ZEV Program of California in detail. Regarding this, the focus of this thesis is not only to examine the programs origins and the different stages of its development, but also to identify the involved key actors[87], and their motivations[88]. Furthermore, the individual levels of participation and the actual influence on the programs development are of general interest.

Besides this, the ubiquitous interdependence between the state of California and the federal government of the United States, as well as the competing rivalry between the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA) will be a focal point of this research as well. As indicated earlier, the granting of waivers to California is based on the provisions of the Clean Air Act (CAA) and allows the state to set its own standards and regulations. Likewise, Section 177 of the CAA allows other states to adopt Californian standards and regulations without any further approval by EPA. As these two mechanisms of the Clean Air Act are considered to be significant aspects for both the actual development and the subsequent diffusion (policy diffusion) of the LEV/ZEV standards, they will be incorporated to the study as well.

While the first draft of the Low Emission Vehicles (LEV I) regulations, as well as the follow up LEV II regulations will definitely serve as fundamental basis, the

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[85] Section 177 States (CAA based adoption of California's LEV-criteria, emission regulations, and ZEV-regulations).

[86] ZEV Alliance includes countries worldwide (see: https://zevalliance.org).

[87] Key actors within this thesis are institutions as well as individual persons.

[88] It is expected, that key actors have a long-term agenda that is based on dedicated perceptions and values.

focus of this research needs to be acuminated to some degree. As a result, the study begins with the introduction of Assembly Bill A.B. 1493[89] in 2002. This framing is not primarily due to an indispensable limitation of scope, but rather due to the fact that A.B. 1493 is widely considered as the turning point in history when vehicular emissions (e.g. GHG emissions) were first considered as highly relevant to both future development and a sustainable transport & mobility sector.

Commencing with A.B. 1493, the study comprises of a duration that covers a total of twenty years until the end of 2022[90]. By choosing this exclusive time period, the most relevant legislative processes and subsequently the related legislative documents (e.g. Global Warming Solutions Act of 2006, Senate Bill S.B. 32, etc.) are included. During the two decades of investigation, several changes in administration took place in both the state of California[91], as well as the United States[92]. Changing governments, especially when there is a change in power from one party to another, are considered to be important points in time and will therefore be examined in greater detail.

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[89] Authored by Assembly Member Frances J. "Fran" Pavley, AB 1493 is also known as the Pavley law.

[90] 20th Anniversary Celebration of California's Clean Car Standard (AB 1493).

[91] Governors: Gray Davis (Dem.) / Arnold Schwarzenegger (Rep.) / Jerry Brown (Dem.) / Gavin Newsom (Dem.).

[92] U.S. Presidents: George W. Bush (Rep.) / Barack Obama (Dem.) / Donald Trump (Rep.) / Joe Biden (Dem.).

3.2 Conceptual Framework of the Thesis

Based on the explications concerning the overall research topic and the actual case selection, the aim of this sub-chapter is to briefly outline and explain the general conceptualisation of this thesis. This is not only to define broad procedural aspects, but also to argue about the aspired range and the confined scope in more detail.

The conceptual framework of this thesis mainly builds on the aim to re-trace the genesis and evolution of specific legislative processes in California. Regarding this, exclusive focus will be put on the ongoing transition process towards a clean, sustainable, and future proof transport and mobility sector. In order to understand the underlying nexus and the basic origins of the Californian success story, a historic background is to present an outline of early efforts and achievements in the field of clean transport and mobility. Based on this, the legislative evolution process of two decades (2002-2022) will be re-traced in considerable detail.

The reason for determining a time-frame of two decades is mainly due to the fact that a considerable time period is needed in order to reveal and grasp the relevant aspects of the process under investigation. The specific period between 2002 and 2022 was mainly chosen due to the changes of government that occurred in the state of California, as well as on the federal level.

It is expected that this research is about to make a perceivable contribution to better understand relevant transition processes in the transport and mobility sector of California. While relevant parts of the overall transition are initiated, promoted, and long-term supported by adequate policies, it is essential to understand, that the successful development and implementation of such policies and strategies not only need to focus on the promotion and large-scale implementation of clean technologies, but also need to consider various societal factors. To put it in other words: even the most advanced and cleanest technologies - especially in the field of transport and mobility - are doomed to be total non-sellers without a significant degree and long-lasting public acceptance.

While the introduction of a buyer's premium, tax exemptions and other incentives are supposed to stimulate demand during the market introduction, without a broad and lasting acceptance this could easily turn out to be a 'flash in the pan'. Figuratively, same is true for the underlying policies and strategies that are not only to initially kick-start the transition process, but also to perpetuate and strengthen it on the long-run.

Within this thesis, the 20-years-genesis (2002-2022) of the Low Emission Vehicle (LEV) and Zero Emission Vehicles (ZEV) Program of California will be investigated in order to re-trace the main explanatory factors. Borrowing from Geertz, the concept of 'thick description' focuses on a detailed evaluation (and the provision of an appropriate base of information) in terms of ***who is doing what and why*** and considering the ***specific context*** in which activities and interactions are about to take place (see Geertz 1973, pp. 3-33).

One could easily think of a bunch of relevant questions to be raised which include: What relevant actors are involved? How their beliefs and preferences are formed? How they choose their actions? How do the individual actors "team-up" in order to collaborate with others that share a common set of beliefs and preferences? How do pertinent actions of actors (individual and collective) get accumulated in order to produce the outcomes within a specific policy field?

Aside from this, it is highly relevant to explore and investigate the causation for the successful transition process that happened and is still happening in the transport and mobility sector of California. This not only needs to focus on the (already traditional) environmental leadership role of California, but also the underlying strategy of ambitious environmental regulations which are regularly pushed and supported by bipartisan efforts (especially but not exclusively) in the legislative process. Same accounts for both individual leadership (single politician, administrator, officials, etc.) and collaborative leadership (initiatives, lobby groups, departments, etc.) which are expected to be highly relevant as well in order to grasp and explain the success-story of California in this specific policy area.

While the in-depth analysis of the Californian ZEV legislative evolution process of two decades (2002-2022) is about to reveal highly case-sensitive findings, a common concern of such single case-studies is the absence of more general inference. Regarding this, it is vital to stress that the specific conceptual framework of this research, does neither aim to build theoretical inference, nor to achieve empirical generalisation. Nevertheless, there is a chance that the findings are about to achieve a wider significance through concepts like 'naturalistic generalization' or 'transferability' (see chapter 3.3).

3.3 Research Design - How to Look for Answers?

Due to the fact that the story of how California established the world's most ambitious roadmap towards the large-scale implementation of zero-emission vehicles is unique and worth to examine in detail, this research is conceptualised as a *qualitative in-depth single case study*.

The main reason for choosing the pathway of qualitative research is the focus on explaining the evolution of the ZEV Program in California, which is strongly connected to involved key actors and their motivation, participation and influence in the process. Being aware of well-known reservations regarding qualitative research, it is expected to thereby achieve a rich and in-depth explanation of the case itself.

As the aim is to study real actors (both institutions and individuals) within a social setting over time in order to *"understand the meaning of participants' lives in the participants' own terms"* (Janesick, 2002, p. 38), the decision was in favour of a qualitative approach. However, this choice does not represent any judgment, as both qualitative and quantitative researchers do *"think they know something about society worth telling to others, and they use a variety of forms, media and means to communicate their ideas and findings"* (Becker, 1986, p. 122). The qualitative approach of this thesis perfectly matches the theoretical framework as well as the overall aim of performing such kind of re-tracing single-case study.

While it could be argued that a comparison of several cases would be more meaningful, the single-case study of the Californian road-based transport and mobility sector and it's clean and sustainably transition process has been chosen intentionally. As a matter of fact, California ('the case under investigation') is not only the vanguard in moving towards a clean and future-proof transport and mobility sector, but literally the origin and archetype for all other states and countries that may serve for case studies as well.

A comparison of several cases / countries would only make sense if there are relevant aspects and properties that may be compared in a meaningful way. Against this background, it is merely not viable to ensure that there is / or is not a substantial degree of equivalence available among several objects under investigation (equivalence issue). As argued by Peters, *"there is the danger of engaging in a wonderful, creative exercise of comparison that ultimately is meaningless because the systems or institutions being compared are not equivalent"* (Peters, 1998, p. 85).

The focus of this thesis is therefore - on purpose - not to draw any kind of comparisons (comparative research), but to examine the selected object of investigation California in considerable detail (single case research). Regarding this, the claim is not to present a simple narrative-fashioned story, but to re-trace the evolution of the ZEV Program in order to fully grasp its details and complexity.

The core idea of this research is to be denoted as an ***intrinsic case study***. As argued by Robert E. Stake, such kind[93] of a case study *"is undertaken because, first and last, the researcher wants better understanding of this particular case. Here, it is not undertaken primarily because the case represents other cases or because it illustrates a particular trait or problem, but because, in all its particularity and ordinariness, this case itself is of interest"* (Stake, 2003, p. 136). Mainly referring to an earlier version of Stake's publication (see Stake 1994), Gomm et al. argue that such an intrinsic case study *"involves the investigation of particular cases for their own sake"* as

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[93] "The purpose of case report is not to represent the world, but to represent the case" (Stake 2003, p. 156).

specific cases *"are of sufficient interest in themselves to a target audience for the findings to have intrinsic value"* (Gomm, Hammersley, & Foster, 2000, p. 99). According to the authors, this is not limited to evaluative case study research, as there are subjects and cases to be considered *"significant enough, or large enough, to be of widespread national or international relevance"* (ibid.). In a quite similar way, Peters argued that a case-study may be conducted *"simply for Dragnet purposes"* in order to reveal its facts and figures. Against this background, a *"valid reason for doing a case-study is to collect information on the topic in question, especially while the case is still in progress"* (Peters, 1998, p. 147).

While the selected case of this research is definitely significant and highly relevant to be examined in great detail, the in-depth evolutionary analysis of the Californian transport and mobility sector is also highly case-specific. Against this background, the aim is certainly not to generalise or to test theories, but to focus on the specific case as a *"complex entity operating within a number of contexts - physical, economic, ethical, aesthetic, and so on"* (Stake, 2003, p. 141). Within such an intrinsic case study design, the object of investigation is regularly examined and subsequently understood from the researcher's perspective. Thus, it would be highly questionable if such research would meet the (full) criteria for a scientific generalisation anyway.

Nevertheless, there are also arguments that support the (more general) relevance of highly case specific findings. Regarding this, Robert E. Stake emphasises the concept [94] of 'naturalistic generalization' that is mainly based on specific experience and *"the tacit knowledge of how things are, why they are, how people feel about them, and how these things are likely to be later or in other places with which this person is familiar. They seldom take the form of predictions but lead*

[94] Naturalistic generalisation was introduced by Stake in his 1976 paper 'The Case Study Method in Social Inquiry' that was reprinted in 2000.

regularly to expectation" (Stake 2000, p. 22). Likewise, Lincoln and Guba argue that 'transferability and fittingness' are suitable concepts to decide if the findings of one specific case (context/setting) are useful (or at least meaningful) to another case (context/setting). According to the authors, *"the degree of transferability is a direct function of the similarity between the two contexts"*, which they call *"fittingness"* that is *"the degree of congruence between sending and receiving contexts"* (Lincoln & Guba, 2000, p. 40).

Within the research at hand the evolution of the LEV/ZEV Program in California will be re-traced and explained in order to gain a comprehensive understanding of the particulars of this specific case. Regarding this Process-Tracing (see chapter 4.4) is considered to be an appropriate and handy toolset. The Process-Tracing approach comprise of four variants that include: a) Theory-Testing Process-Tracing, b) Theory-Building Process-Tracing, c) Theoretical-Revision Process-Tracing, and d) Explaining-Outcome Process-Tracing.

While the first three variants are either to test existing theories or to develop new theories, the variant of ***Explaining-Outcome Process-Tracing*** is completely case-focused and aims to *"trace causal mechanisms to produce a comprehensive explanation of a particular historical outcome"* (Beach and Pedersen, 2019, p. 11).

Against the background of a single-case study that is mainly based on the intrinsic motivation to grasp and understand an evolutionary process of two decades, the aim is to elaborate a case-sensitive explanation of the key aspects. Regarding this, the aim is not solely to check whether or not specific causal relationships are present, but to come up with an all-inclusive explication of the whole case. Regarding this, the most appropriate approach is considered to be the Explaining-Outcome Process-Tracing as presented by Derek Beach and Rasmus Brun Pedersen.

According to the authors, the Explaining-Outcome Process-Tracing variant *"does not seek to create synthetic grand theories but instead is a more pragmatic strategy for capturing the multiplicity of causes and linking them to outcomes that produce particular historical outcomes"* (ibid., p. 283). Therefore, exercising this specific variant of Process-Tracing is considered to conduct *"problem-oriented research"* (ibid.).

In order to re-trace the main explanatory factors (thick description – *who is doing what and why?*), the data acquisition will be based on document analysis. This allows incorporating a broad variety of texts, protocols, transcripts, web pages, and many other sources in order examine content and analyse the overall significance of data.

Regarding this, the review and in-depth analysis of legislative documents (e.g. Assembly Bills, Senate Bills, transcripts of hearings & meetings, Executive Orders, State of the State Addresses, Inaugural Addresses, etc.) will be most essential. Furthermore, other written records (e.g. notices of agencies & organisations, press releases, newspaper articles, etc.) as well as audio-visual media (e.g. videos, online conferences, recorded meetings and interviews, etc.) and already transcribed interviews will be considered as well.

Only by using this variety of data resources it would be possible to cover a period of 20 years (2002-2022), as - especially during this period of time - there has been tremendous technological progress that put forward several kinds of new media formats (e.g. YouTube) while traditional formats were and (at least to some extend) are still fading.

4 Choosing an appropriate Theoretical Framework

In contrast to a simple description or narration, within this research, the evolution of the LEV/ZEV Program in California will be re-traced and explained in both great detail and high fidelity. Regarding this, it is highly relevant to discover and unveil the causal mechanisms behind the story, namely in terms of ***who*** did ***what*** and ***why*** and with ***what consequences***. Borrowing from Kenneth Burke (1945), Harold D. Lasswell (1948), and Talcot Parsons (1951), it's not only about actors, their individual actions and efforts but equally about the context, the specific setting and the general situation. A quite similar conception, however with a special focus on case studies as a research method is presented by Robert K. Yin (2018).

As a result to this, actors and their actions, as well as their interactions with other actors will need to be analysed with focus on the specific conditions of the prevalent situation. Same accounts for coalitions of actors within specific policy subsystems. In order to serve as a capable guidance, this research approach will be accompanied with a proper theoretical perspective. Thus, the case study will be guided by a multi-theoretical approach, as *"the only scenario worse than claiming to go into the field without a theory is entering it with only one of them [...] A single theory or theoretical tradition means a limited range of observations"* (Timmermans and Tavory, 2022, p. 19).

Timmermans and Tavory propose to imagine *"two ideal types of theories"* and introduce the metaphors of a map and a compass. A map is essential for *"visiting a park in a land far from home, where you don`t speak the local language"* – it will guide you to the park and directs you even inside the park. In contrary, a compass *"is a very different kind of instrument"* as it does not provide detailed information like a map, but provides general orientation. *“What it lacks in specificity, it gains in flexibility”* (ibid., p. 32).

Based on this, the endeavour will be to have both[95] types of theories in the luggage and choose the most suitable one according to respective circumstances. While the compass-type is appropriate to regularly check and (if necessary) to correct the direction, the map-type is the right one to go and see a dedicated place in detail. In the following, a compilation of complementary approaches, research methods and theories is presented.

4.1 Theoretical Approaches to the Policy Process

When it comes to examining and understanding any kind of policy process, the high complexity soon falls into place. As argued by Sabatier, due to the *“staggering complexity of the policy process, the analyst must find some way of simplifying the situation in order to have any chance of understanding it”* (Sabatier, 2007, p. 4). Therefore, it seems to be highly recommendable and vital to consider an appropriate theoretical foundation.

According to this and due to the thematic focus of the present research, a special spotlight will be put on the presentation and selection of proper theoretical approaches to examine the underlying policy process and to grasp the case-specific singularities involved. Of course, there are several conceptual frameworks, theories, and models in existence that would qualify and be appropriate to serve as part of the overall theoretical framework of this thesis as well (see Weible and Sabatier, 2017).

[95] A map won´t help much, when you are finding yourself outside of its scope. Likewise, a compass is not really helpful if you don´t have a clue where to go.

Due to the limited time frame and the specific scope of this research, a qualified and well-educated selection of three theoretical approaches will be presented in brief (Multiple-Streams Framework, Punctuated-Equilibrium Theory, Narrative Policy Framework), while the elected theoretical approach - the Advocacy Coalition Framework (ACF) - will be presented in much more detail.

4.1.1 Multiple Streams Framework (MSF)

The Multiple Streams Framework (MSF)[96] as proposed by John W. Kingdon in 1984 is nowadays a well-known and often implemented toolset to examine the policy process. Strongly influenced by the garbage can model of organisational choice (see Cohen, March, and Olsen, 1972), it outlines the conception of three streams that comprise of actors and processes. The streams comprise of a) the ***Problem Stream***, b) the ***Policy Stream*** (problem solution), and c) the ***Political Stream*** (decision making). In order to successfully combine and bundle these streams, open ***policy windows*** need to be in place.

The ***Problem Stream*** comprises of issues and concerns that are considered as relevant deviations in terms of pristine expectations. According to Kingdon, such problems always include a *"perceptual, interpretative element"* (Kingdon, 2011, p. 222) and are therefore strongly dependent on actor-specific perceptions. Against this background, the Problem Stream cannot be seen as a conglomerate of relevant issues that are based on objective facts, but rather needs to be considered as socially constructed. In the words of Herweg, Zahariadis, and Zohlnhöfer:*"problems are conditions that derivate from policymakers' or citizens' ideal states"* (Herweg, Zahariadis, and Zohlnhöfer, 2017, p. 21).

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[96] Sometimes also denoted the Multiple Streams Approach (MSA).

Such ideal-type deviations are expected to be quite dynamic as they depend on both the situation and the actual observer. Furthermore, they may either become visible on their own within a system or when there happens to be a change of best practice and knowledge transfer among different systems. However, not all deviations from ideal-type perceptions of citizens or policymakers are going to get the political attention. According to Herweg et al. there is a need for "*indicators, focussing events, and feedback*" in order to attract the quite limited attention of policymakers (ibid.).

Within the ***Policy Stream*** of a specific policy subsystem, potential solutions for eligible problems are about to be discussed with different arguments articulated by proponents and supporters. According to Herweg, this stream is about to comprise of *"civil servants, interest groups, academics, researchers, and consultants (the so-called hidden participants), who engage in working out alternatives to the policy problem of a specific policy field"* (Herweg 2016, p. 132). Despite an apparently diversity of actors and stakeholders, the "majority of members of a policy community are policy experts who advocate and discuss policy ideas" (Herweg, Zahariadis, and Zohlnhöfer, 2017, p. 23). Against this background, Kingdon argued that the process of discussing policy ideas appears to be kind of *"softening up"* things in a *"primeval soup"* (Kingdon, 2011, p. 127). At the end of this process, there are only few of the initially proposed policy ideas that are about to become policy alternatives. According to Kingdon, the underlying *"criteria for survival"* includes different aspects such as the technical feasibility, public acceptance, and financial viability (ibid., p. 131 ff.).

Within the ***Political Stream*** it is predominantly about negotiations and bargaining to achieve majorities for both single proposals and general elections where officials of a political system are to be appointed. According to Kingdon's perception of the MSF, the Political Stream is composed by a set of three constituents that include the specific national mood, relevant activities of interest groups, and last but surely not least the elected government and its legislative activities. While Herweg et al., are quite explicitly when arguing that *"the three elements of the political stream do not need to point in the same direction for a given policy proposal"* (Herweg, Zahariadis, and Zohlnhöfer, 2017, p. 25), there it is less clear which one of the three is considered to be decisive or even predominant. While Zahariadis proposed that national mood, interest group activities, and governments are about to merge into *"party politics"* (see Zahariadis 1995, p. 35), it is argued by others that elected governments together with their legislative activities are predominant as they are about to shape any kind of policy change. While Herweg, Huß, and Zohlnhöfer follow the proposal of Zahariadis to emphasise the role of political parties, they also highlight *"other elements of the political stream and relate them to the behaviour of parties"* (Herweg, Huß, and Zohlnhöfer, 2015, p. 439). According to the authors, overall activities and dedicated campaigns of interest groups may *"have a significant impact on a party's electoral prospects"* (ibid., p. 440). Same accounts for the national mood that is strongly linked to the awareness and perception of policymakers when it comes to the acceptance of decisions and decision-makers in the general public (see Kingdon 2001: p. 66).

According to the Multiple Streams Framework, the above streams are quite autonomous and independent from each other. Therefore, policy change is only possible to happen when relevant aspects of these three streams somehow join and successfully combine. This requires open ***policy windows*** which allow such kind of a coupling process to happen. Even if a successful coupling of the three streams does not guarantee change to happen, the occurrence of open policy windows offers the *"opportunity for advocates of proposals to push their pet solutions, or to push attention to their special problems"* (ibid., p. 165). Regarding this, Kingdon introduces the concept of policy entrepreneurs (both individuals and corporate actors) who *"invest their resources - time, energy, reputation, money - to promote a position in return for anticipated future gain in the form of material, purposive, or solidary benefits"* (Kingdon, 2011, p. 179). The role of being such a policy entrepreneur is not limited to policy experts, as any kind of relevant actor (e.g. policymakers, bureaucrats, journalist, interest group representatives, etc.) may become and act as a policy entrepreneur (see Herweg, Zahariadis, and Zohlnhöfer, 2017, p. 28).

Open policy windows do either occur in the problem stream or in the political stream (see Kingdon, 2011 / Herweg, Huß, and Zohlnhöfer, 2015). While open problem windows are oftentimes associated to issues that are perceived by policymakers as potential threats to get re-elected (see Herweg, Huß, and Zohlnhöfer, 2015, p. 437), open political windows usually result from recent elections and a change in government. They apply to both new members of parliament that want to carve out their political territory and new governments that want to comply and fulfil their campaign pledges.

The Multiple Streams Framework (MSF) has been applied to manifold topics and areas (see Jones et al., 2015). It seems to be reasonable at the first glance to also apply the MSF to the research at hand. This theoretical approach would - most probably - fit well to examine and understand single legislative processes and outcomes (e.g. The California Global Warming Solutions Act of 2006). However, as the aim of this research is to re-trace an evolution process within a time-span of two decades, it seems to be all but impossible to spot and identify a set of isolated and reasonable policy windows or coupling processes. The MSF is based on a system-level approach that does not focus on single actors as the unit of analysis (see Zahariadis, 2023). Due to the fact that this research is to focus on the impact of individuals (e.g. legislative champions), the MSF is not fully appropriate.

4.1.2 Punctuated-Equilibrium Theory (PET)

While the underlying concept has its origins in evolutionary biology (see Eldredge and Gould, 1972) and describes the evolution of biological species, the Punctuated-Equilibrium Theory (PET) in social theory has been put forward by Baumgartner and Jones in 1993. Their aim was to examine and understand legislative policymaking in the United States. By analysing a series of policymaking cases, the authors realised that there could be both stasis as well as significant leaps. This special characteristic of political institutions in the United States has been denoted by the authors as ***punctuated equilibrium*** (see Baumgartner and Jones, 1993).

While the Punctuated Equilibrium Theory originally focussed on *"the dynamics of policy change in subsystems"*, the PET is nowadays considered as *"a more general formulation of punctuated change in policymaking"* (Baumgartner, Jones, and Mortensen, 2017, p. 79). It considers both substantial, sudden changes of public policies as well as distinct stability with step-by-step changes within a single theory. Such kind of universal approach is necessary, as *"policymaking often proceeds smoothly, with marginal or incremental accommodations, [however] it also is regularly torn by lurches and significant departures from incremental past"* (ibid., p. 56).

As argued, the PET outlines both periods of equilibrium (sometimes near stasis) and periods of disequilibrium (changes to various extend). Regarding this, the approach highlights the mechanism of positive and negative feedback. While the first *"causes future change to be amplified"*, the latter *"maintains stability in a system"* (True, Jones, and Baumgartner, 2007, p. 160).

Policy change is considered to happen when either updated or novel units of information and/or perceptions - so called ***policy images*** - come into place. Such policy images are subject to political discussions and dispute regarding a specific policy area, as “proponents may focus on one set of images while their opponents refer to a different set of images” (ibid., p. 162). New policy images do not only about to bring fresh starting points, but most probably also new actors and contributors to the dedicated policy playground.

Both individual and collective ***decision-making*** is vital part of the punctuated-equilibrium approach, especially when it comes to substantial punctuations of a quite stable policy. According to True, Jones, and Baumgartner they are caused by *“either a change in preferences or a change in attentiveness”* (ibid, p. 163). While it is argued that policy preferences are - on a regular basis - well-established and quite steady, considerable changes in decision-making mainly result from alternations of attention (see also Jones, 1994).

According to Baumgartner and Jones, decision-making takes place in so called policy venues which are *“institutional locations where authoritative decisions are made concerning a given issue”* (Baumgartner and Jones, 1993, p. 32). Regarding this, there happens to be interplay between policy images and policy venues that result in the formation, alternation, and replacement of policies in determined subsystems.

As long as an existing policy venue is widely unchallenged, the business-as-usual activities will reinforce (negative feedback) the related policy image. In contrary to this, modifications and (substantial) changes of an existing policy image (positive feedback) will most probably result in the establishment of new policy venues and could lead to a punctuation of former equilibrium. To put it in other words, both stability (sometimes even stasis) and change (sometimes even disruption) result from the same course of action.

The Punctuated-Equilibrium Theory (PET) originally aimed to unfold the process of legislative policymaking in the United States. Nevertheless, the theoretical approach could be applied to a variety of real-world processes that usually encompass both stability and (significant) changes. Definitely, the PET could be applied to some aspects of this research. This especially would be true for special events and turning points such as the refusal of the Kyoto Protocol or the denial of the California waiver. However, the focus is much broader and aims to include the series of events and sequences (during a time-frame of two decades) that add up to the overall evolution process of the Californian Low Emission Vehicles (LEV) / Zero Emission Vehicles (ZEV) Program.

Of course, the individual episodes to be re-traced within this thesis happened in the real world and therefore comprise of both periods of stability and periods of change. However, especially when considering the overall evolution process, substantial characteristic traits are patience, endurance, and stamina that happened to be the major ingredients in order to achieve defined aims and long-term targets. Same accounts for the stability and continuation of those objectives, which seem to be entirely uncoupled and independent from partisanship and political dispute.

The Punctuated-Equilibrium Theory (PET) focuses on the aspects of agenda setting and helps to understand why certain issues are prioritised while others are halted or postponed (see Beyer, Breunig, and Klüser, 2023). However, it is assumed that the PET is not entirely appropriate to examine and understand an evolutionary process which is entirely based on predefined aims and long-term targets.

4.1.3 Narrative Policy Framework (NPF)

While Sabatier's edited book "Theories of the Policy Process" of 1999 excessively portrayed the Multiple-Streams Framework (MSF) and the Punctuated-Equilibrium Theory (PET), it *"specifically excluded work in social construction and narrative"* (Jones, McBeth, and Shanahan, 2013, p. 3; see also Shanahan, Jones, McBeth, and Radaelli, 2017). However, the refusal of such approaches changed later, when dedicated chapters were published in the follow-up editions of the book, which were co-edited by Weible and Sabatier.

Therefore, the Narrative Policy Framework (NPF) needs to be considered as kind of an underdog approach that finally made its way and is nowadays a *"theory of the policy process whose central question turns an empirical eye on the truth claim of the power of the narrative"* (Shanahan, Jones, McBeth, and Radaelli, 2017, p. 173). The NPF highlights ***narratives*** as a procedural method to depict relevant issues and policy problems in a novel and simple simplified way. According to Blum and Kuhlmann, a policy narrative is a *"communicative portrayal of a sequence of actions and/or events in a simplified way, which reflects a certain construction of a policy problem and/or policy solution"* (Blum and Kuhlmann, 2023, p. 1). Another, somehow more straight-forward, definition outlines policy narratives as *"strategic constructions of a policy reality promoted by policy actors that are seeking to win (or not lose) in public policy battles"* (Jones, McBeth, and Shanahan, 2013, p. 9).

In terms of their specific structure, policy narratives are regularly composed of *"a setting, characters (heroes, victims, and villains), plots, and a moral of the story (policy solution)"* (ibid., p. 5). However, the authors consider the ***four key elements*** of the NPF as a non-exhaustive enumeration that may be subject to modifications as well as extensions.

The ***setting*** of a policy narrative outlines an explicit context in which relevant issues (policy problems) are embedded. A setting may comprise of widely uncontested elements (e.g. legal aspects, topographical facts, environmental issues). As Jones et al put it: *"setting is the stage, and just like in most plays, people accept the stage as-is without too much thought"* (ibid., p. 6).

Just like in any (good) story, the Narrative Policy Framework (NPF) highlights a set of different ***characters*** that comprise of a) heroes (problem fixers), b) villains (problem producers), and c) victims (problem sufferers). While it is common that characters are represented by individuals, the NPF does not take this as compulsory as *"in many cases characters are anthropomorphized abstractions of broad categories"* as well (ibid.).

The ***plot*** of the Narrative Policy Framework is another analogy to a (good) story where the arc of suspense - by default - likewise comprises of a beginning, the middle, and the end. Such policy narrative plots *"connect characters to one another and to the policy setting"* and *"can do this in a myriad of ways"* (ibid.).

Last but not least, the ***Moral of the Story*** is the fourth element of the NPF and oftentimes represents a viable solution to the policy problem. However, according to Jones, McBeth, and Shanahan, this could also be *"to maintain the status quo"* or to come up with *"a policy narrative without a solution"* (ibid.).

When focusing on the actual content of policy narratives, the NPF focuses on multiple ***policy beliefs*** and ***policy narrative strategies*** that are related to the variety of stakeholders and settings. The characters (heroes, villains, and victims) which interact within a specific setting do regularly have a specific set of individual policy beliefs. Regarding this it seems quite clear that policy beliefs of opponents and/or opposing coalitions are by default contrariwise.

When considering the strategies of policy narratives, they *"are understood broadly as the tactical portrayal and use of narrative elements to manipulate or otherwise control policy-related processes, involvement, and outcomes"* (ibid., p. 9).

While the NPF was refused in its 'early days', it is nowadays part of the mainstream when it comes to the study of narratives. As argued by Blum and Kuhlmann, there have been *"a broadening of narrative research in terms of geographical scope and political systems, as well as policy areas"* (Blum and Kuhlmann, 2023, p. 4). Being quite juvenile, the Narrative Policy Framework offers a set of promising approaches in order to highlight the role of narratives in the policy process, it sometimes appears to be quite loose and - at least to some extend - random as it quite often 'borrows' substantial aspects from other approaches (e.g. belief systems, policy learning).

All of the alternatively discussed theoretical approaches (Multiple-Streams Framework, Punctuated-Equilibrium Theory, and Narrative Policy Framework) are considered to be adequate and proper ways to examine the policy process both close to reality and in great detail. However, all of them comprise of some aspects that are considered to be inappropriate for the aims of this research.

Considered as a viable theoretical approach, the Advocacy Coalition Framework (ACF) is both sophisticated and well-proven. On top of that, it has its origins and thematic background in the field of air pollution control (see Sabatier, 1988, pp. 131 ff.). Against this background, the Advocacy Coalition Framework will not be listed as another theoretical approach in line with the others theories of the policy process, but will be presented individually and in great detail within the following sub-chapter.

4.2 Policy Change: The Advocacy Coalition Framework (ACF)

When it comes to the understanding of policy actor coalitions, policy change, and policy-oriented learning, the Advocacy Coalition Framework (ACF) is probably the first point of reference. As a result to several deficiencies and shortcomings[97] in the research of policy processes, the ACF was developed by Paul Sabatier and Hank Jenkins-Smith during the 1980s[98] (see Sabatier, 1988 / Sabatier and Jenkins-Smith, 1988). During the years, the ACF underwent several revisions, modifications and clarifications.

The original ACF conception of Sabatier was based on three basic premises. First, a time perspective of at least one decade is needed in order to fully understand both *"the process of policy change - and the role of policy-oriented learning therein"*. As second premise, Sabatier introduces the idea of policy subsystems to the concept of policy change. Within such a subsystem, actors of a specific policy area interact among each other. The third premise of the ACF argues, that *"public policies (or programs) can be conceptualised in the same manner as belief systems, i.e. as sets of value priorities and causal assumptions about how to realize them"* (Sabatier, 1988, p. 131).

Based on this, the concept of learning in politics needs to be understood as experience-driven alternation of behaviour or a change in response that occurs in a subsystem where actors[99] interact with each other and either directly or

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[97] For example, the limits of the policy cycle led to a much more dynamic analysis of policy processes. Likewise the quite simple depiction of policy actors was converted to the concept of multiple actors team-up in advocacy coalitions. The conception of policy subsystems was introduced as a more appropriate aggregation of policy fields. The ACF introduced the conception of information (both, technical and scientific) and emphasised the importance of a long-time perspective when policy change is under investigation.

[98] During the 1980s, Sabatier and Jenkins-Smith both quite independently developed similar conceptions.

[99] The perception of actors is not limited to the traditional "iron triangle" (see Sabatier 1991).

indirectly influences the subsystem parameters (see Heclo 1974, 1978). According to Sabatier, policy subsystems are characterised by a dedicated focus on a specific policy topic and have boundaries in terms of the covered territorial scope. Within such a policy subsystem, the involved actors do interfere in order to directly or indirectly control and alternate the characteristics of the subsystem.

The actors within a subsystem *"can be aggregated into a number of advocacy coalitions composed of people from various organizations who share a set of normative and causal beliefs and who often act in concert"* (Sabatier 1988, p. 133). Most likely, there will be interactions of two or more competing advocacy coalitions within an existing policy subsystem. Each of these advocacy coalitions comprise of *"actors from many public and private organizations at all levels of government who share a set of basic beliefs (policy goals plus causal and other perceptions) and who seek to manipulate the rules of various governmental institutions to achieve those goals over time"* (Sabatier, 1991, pp. 151-153).

In order to fully grasp the characteristics[100] of dynamic[101] policy subsystems, it is essential to consider that subsystems focus on dedicated policy topics and comprise of numerous actors that can be subsumed in advocacy coalitions. Actors or coalitions of actors continuously interact, either collaboratively or against each other in order to generate outcomes and policy output. Subsystems do comprise of a substantial number of diverse actors, like governmental officials, private sector, non-profit organisations, journalists, scientists and researchers, consultants, lawyers, judges, etc. (see Sabatier, 1998, p. 115).

[100] The characteristics of a subsystem are essential bits and pieces in order to understand the underlying policy process.

[101] Policy subsystems are considered to be dynamic as the characteristics might change (sometimes quite rapidly).

Nevertheless, in reality only a quite small proportion of the much larger target groups (interested or affected people within a polity subsystem) may actively participate and get involved in policy subsystems.

While policy subsystems are considered to be widely independent and imply a relevant degree of authority[102], there are frequently overlaps[103] and interferences[104] with other policy subsystems. Policy subsystems do have a relevant degree of authority that might comprise of monitoring, standard setting, as well as enforcement of policies and regulations. Regarding this, the ACF is not only capable to *"merely identify the competing sides of a political debate"* but has a much broader purpose, namely to *"explain belief change and policy change over long periods"* (Sabatier and Weible, 2007, p. 208).

The ACF emphasises policy-oriented belief systems for both individual actors and collective advocacy coalitions. This conception is based on the *theory of reasoned action* (see Ajzen and Fishbein, 1980), as well as on the assumption that real-life actors may act rationally, but never act in a perfect rational manner. Policy subsystems do comprise of numerous actors - mainly professional and policy elites. The ACF assumes such actors to be "instrumentally rational", which means that they gather *"information and other resources to achieve their goals"* (Sabatier and Jenkins-Smith, 1999, p. 130). Due to the absence of the general public, the available belief systems are expected to be rather complex and quite consistent (Sabatier, 1988, pp. 143-144).

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[102] Such authorities might comprise of monitoring, standard setting, as well as enforcement of policies and regulations.

[103] For example, the 58 counties of California do overlap within the boundaries of the state of California.

[104] The standards and regulations of the mobility sector in California are – by law – embedded in the federal standards and regulations (even if there are numerous and far-reaching exemptions through the possibility of waivers).

According to Sabatier, has a common belief system that is organised in a *"hierarchical tripartite structure"* (Sabatier and Jenkins-Smith, 1999, p. 121). In the following, the three different hierarchical categories of belief systems will be presented in more detail:

The most stable category of ***deep core beliefs*** reflects a set of fundamental normative orientations like political ideologies, normative values, basic priorities, and cultural orientations. According to Sabatier, any change of such *"fundamental normative and ontological axioms"* would be *"akin to a religious conversion"* (Sabatier, 1988., p. 145). According to his, deep core beliefs are considered to be quite rigid, wherefore it is extremely hard, almost impossible, to modify or change them. They are considered to be ubiquitous (not restricted to the characteristics of a single policy subsystem) and therefore may be applied to other policy subsystems as well (see Sabatier and Jenkins-Smith, 1993, Jenkins-Smith, et al., 2018).

The second category comprises the so-called ***policy core beliefs***, which are normative and empirical beliefs that are mainly based on scientific and technical information. Policy core beliefs reflect the general aims and purposes within a particular policy subsystem (and its related policy topics) and include a scheme of fundamental strategies and approaches for achieving them. Policy core beliefs are considered to be valid only within the specific policy subsystem and quite similar ones. They can be modified, but it is quite difficult and requires some convincing reasons. Any modification in the policy core beliefs is considered to result in major change that is for example *"change in the policy core aspects of a governmental program"* (Sabatier and Jenkins-Smith, 1999, p. 147). The ACF assumes that policy core beliefs are the *"fundamental glue of coalitions because they represent basic normative and empirical commitments within the domain of specialisation of policy elites"* (ibid., p. 122)

The third and least rigid category are the ***secondary beliefs*** that comprise of fundamental information as well as methods and instruments that are applied in order to achieve the main goals (policy core) of the related policy area (Sabatier, 1988, p. 144). According to this, secondary beliefs are exclusively linked to the specific policy subsystem and its characteristics and therefore may not be applied to other subsystems. Modifications and changes in secondary beliefs are fairly easy and occur quite often, sometimes even on a daily basis. This includes *"administrative rules, budgetary allocations, disposition of cases, statutory interpretation, and even statutory revision"* (ibid, p. 145). Such type of modifications (secondary aspects) is considered to be minor and less far-reaching than modifications in the policy core beliefs (core aspects). Nevertheless, it is the *"topic and the scope of policy change that determine whether it is major or minor"* (Sabatier and Jenkins-Smith, 1999, p. 147).

As argued beforehand, the ACF considers policy-oriented learning as a highly relevant component within the perception of policy change, which is *"not simply the result of competition among various interests"* (Sabatier, 1998, p. 117). Such learning processes are not only considered to refine the individual belief system of single actors, as well as those of advocacy coalitions, but also help to understand and probably improve interdependencies and related formal processes. Furthermore, policy-oriented learning offers a possibility to continuously identify and solve contradictions and deficiencies in existing belief systems (see Sabatier, 1988, pp. 149-151).

Regarding this, *"policy-oriented learning refers to relatively enduring alternations of thought of behavioural intentions"*, mainly resulting from existing knowledge as well as new scientific results and information, which will result in an *"attainment or revision of policy objectives"* Sabatier and Jenkins Smith, 1999, p. 123). As argued by the authors, policy-oriented learning is utilised by *"members* *of various coalitions seek to better understand the world in order to further their policy objectives"* (ibid.).

Sabatier considers policy-oriented learning as a vital ingredient of any kind of policy change, which *"can often alter secondary aspects of a coalition's belief system"* while more general (major) changes in the policy core beliefs (policy core aspects) will definitely *"require a perturbation in non-cognitive factors external to the subsystem"* (Sabatier, 1998, p. 105). While policy-oriented learning is considered to be a facilitator for policy changes in general, the occurrence of either an internal or external shock in combination with learning processes significantly increase the probability (see Nohrstedt, 2005, 2010 / Jenkins-Smith et.al., 2018 / Moyson et.al., 2017 / Bennett and Howlett, 1992 / Pandero, 2017 / Hall, 1993).

The ACF considers policy change as *"fluctuations in the dominant belief system"* of a specific policy subsystem and its related policy area (Sabatier, 1988, p. 158). In contrast to the perception that policy change is simply the outcome of a battle of resources, information and supremacy, the ACF understands policy change as *"the product of attempts by various actors to structure action situations - chiefly via institutional rules regarding the range and authority of participants - so as to produce the desired operational decisions"* (ibid., p. 160). Besides policy-learning, the ACF comprises of three other rationales that result in policy change, namely external events, internal subsystem events, and negotiated agreements between opponent coalitions within a specific policy subsystem.

According to the ACF, ***external events / external shocks*** happen beyond the sphere of influence of the participants of a specific policy subsystem. More precisely, such events are completely triggered and caused outside the influence of both individual actors and formed coalitions. Such external events could be quite extreme and may include regime changes, as well as any kind of crisis and serious disasters (e.g. Chernobyl disaster, Fukushima nuclear accident). Quite frequently, any (significant) change in the prevalent socio-economic conditions is considered to be the origin of policy change. While such kind of events *"increase the likelihood of major policy change [...] one or several enabling factors"* are necessary as well (Jenkins-Smith et.al., 2018, p. 145).

According to the authors, such enabling factors comprise of *"heightened public and political attention, agenda change, and most importantly redistribution of coalition resources and opening and closing of policy venues"* (ibid.). Such alternations within a policy subsystem may result in a major shift in terms of its leading advocacy coalition, when a *"previously dominant coalition [is replaced] by a minority coalition"* (Sabatier and Weible, 2007, p. 199). Likewise, occurring external shocks may also result in changes and modifications of prevalent policy core beliefs.

In contrast to the original version of the ACF which focussed exclusively on external events / shocks external to a subsystem (see Sabatier, 1988 / Sabatier and Jenkins-Smith, 1988), the follow-up versions included ***internal subsystem events*** and distinguished between the actual source of events / shocks. According to this, policy change is also about to result from *"major internal shocks can also occur from within a policy subsystem*[105] *and can lead to major policy change"* (Sabatier and Weible, 2007, pp 204-205). Such *internal subsystem events* that are about to cause a policy change include *"crises, policy fiascoes, scandals, and failures, are likely to influence beliefs and heighten attention to certain governmental programs"* (Jenkins-Smith et.al., 2018 p. 146).

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[105] According to the authors, internal events are about to happen inside the territorial boundaries and/or the topical area of a policy subsystem and are more likely affected by subsystem actors (Jenkins-Smith et.al., 2018).

As tangible examples, Sabatier and Weible introduce the Exxon Valdez oil spill[106] and aviation disasters that shocked the embracing policy subsystems and - at least to some extend - caused major technical changes (e.g. redesign of oil reservoirs, increased redundancy of safety systems) and stricter regulations[107]. Borrowing from Zahariadis (2007), policy change is facilitated by windows of opportunity that arise from urgent problems and imminent events like an airplane crash that leads to an increased attention for air safety issues.

The fourth pathway to policy change under the ACF is by ***negotiated agreements*** between opponent coalitions within a specific policy subsystem. While such agreements are expected to result in substantial changes in the outputs (e.g. regulations, standards, governmental programmes), they are quite hard to achieve, especially when *"coalitions that have been fighting for decades come to a negotiated agreement representing a substantial change from the status quo"* (Sabatier and Weible, 2007, p. 205).

According to the authors, within such opponent coalitions the involved actors *"often interpret the same piece of information in very different ways [and furthermore] distrust their opponents' ability to negotiate fairly and to keep their promises, and distrust their opponents' ability to understand [...] their own goals and interests"* (ibid.). In order to overcome these hindering premises and to *"force debate among professionals from different belief systems"* (Sabatier, 1988, p. 156), the authors propose a "professional fora" that facilitates dialogue and negotiations. They

[106] The Exxon Valdez oil spill was caused by an oil supertanker that leaked about 37.000 tonnes of crude oil and thereby caused tremendous damage to wildlife and nature in Prince William Sound, a remote area in Alaska.

[107] As a direct result to the Exxon Valdez oil spill, U.S. Congress passed the Oil Pollution Act (OPA) of 1990.

present a set of nine prescriptions that comprise of a hurting stalemate[108], broad representation[109], leadership[110], consensus decision rules[111], funding, duration and commitment[112], importance of empirical issues[113], importance of building trust[114], and lack of alternative venues[115] (see Sabatier and Weible, 2007, pp. 206-207).

Summing up the Advocacy Coalition Framework and its major components, the framework highlights both a long-term perspective of analysis and policy subsystems as the primary unit of analysis. Furthermore, it suggests accumulating individual actors with a shared set of beliefs (deep core beliefs / policy core beliefs / secondary beliefs) into coalitions. Policy subsystems focus on dedicated policy areas with specific goals and comprise of opponent coalitions that aim to achieve dedicated policy outputs by means of continuous development and subsequently policy change. The ACF incorporates a set of four rationales that finally result in policy change, namely policy-oriented learning, external events, internal subsystem events, and negotiated agreements.

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[108] A hurting stalemate describes the situation when opponent coalitions agree that the status-quo is unacceptable, however they lack of alternatives to achieve their goals and are often reluctant to open and serious negotiations.

[109] The authors stress that a broad stakeholder participation is vital, however hard to achieve.

[110] The professional forum needs to be chaired in a neutral way upon transparent and professional norms.

[111] Decisions need to be made on a level playing field as an agreement with a discontent party is often unstable.

[112] Due to the complexity, negotiations need to include meetings on a regular basis over an extended period of time.

[113] Science-based information and empirical data are vital for profound negotiations and the implementation of results.

[114] To overcome the prevalent distrust between opponent coalitions, is a time consuming and enduring task.

[115] Negotiations are more likely to be seriously if alternatives are relatively unattractive (see Leach and Sabatier, 2005).

For a visual insight and a better understanding, Figure 8 presents the flow diagram of the ACF which incorporates its key conceptualisations and existing interrelations.

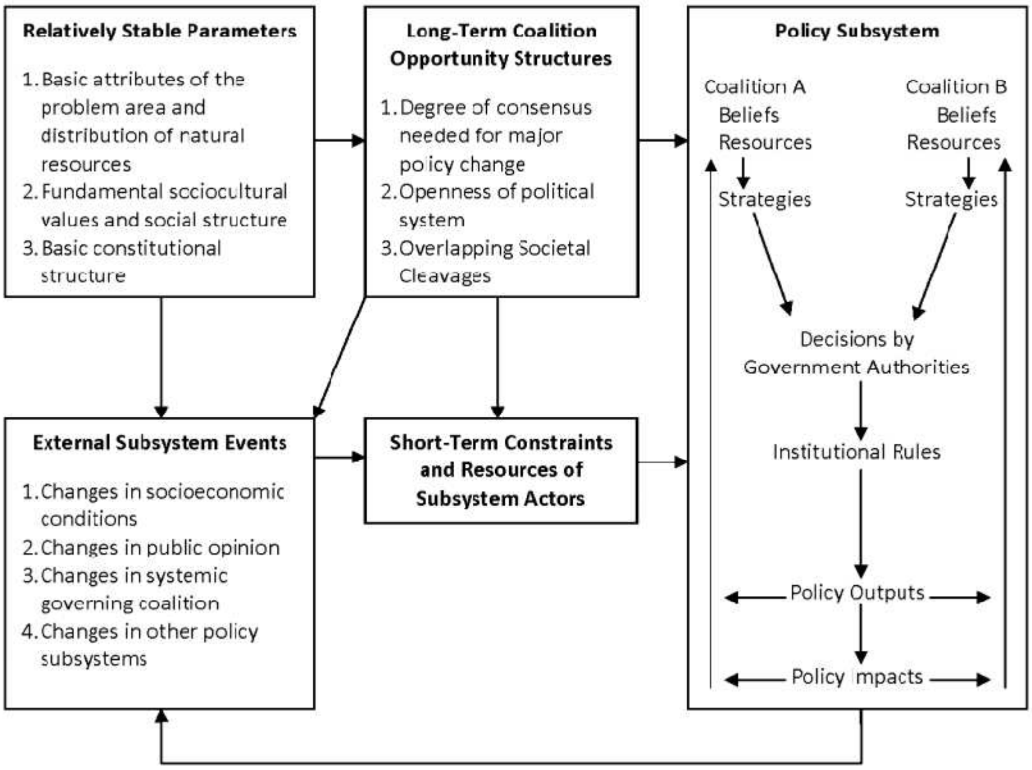

Figure 8 – Flow Diagram of the Advocacy Coalition Framework (ACF)

Source: Weible, et.al. 2011:352

The ACF needs to be understood as a conceptual framework that includes theoretical emphasis on coalitions, policy-oriented learning and policy change. According to the often-quoted authors, the framework is quite flexible as it supports various data sources and permits *theoretical uploads*[116]. In the following, a set of theoretical approaches for policy change and policy implementation will be presented in brief.

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[116] According to Weible, the framework is like a smartphone where theories can be uploaded like apps.

4.3 Supplementary Approaches to Policy Change & Implementation

In addition to the theoretical emphasis of the Advocacy Coalition Framework, this section will present a set of theoretical approaches that are considered to be helpful for this research.

4.3.1 Path dependence

When considering policy change as a complex process which happens within a policy subsystem that is continuously shaped[117] by actors and coalitions and takes place within the determining boundaries and surrounding conditions of the real social world, the pace and course of changes may differ significantly. While, a dedicated policy might either bring beneficial changes or drawbacks to a subsystems output, same is true for further developments that may either be hindered or supported by the policy itself.

Borrowing from Goodin et.al., path dependence is considered as double-sided and therefore may sometimes work *"to the advantage of policy makers"* while some other time it *"works the other way, making subsequent policy developments harder"* (Goodin et.al., 2006, p. 21). The authors argue that, *"policy is its own cause due to such path dependencies, as well"* (ibid.).

As stated by Pierson (2000) and Bardach (2007), the current policy options are predetermined by earlier decisions and the scope of previous policy choices. Regarding this, path dependence is determining as *"once a country or region has started down a track, the costs of reversal are very high"* (Levi, 1997, p. 27). Likewise, path dependence may not only determine the pace and speed of future

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[117] Decision making will not only affect and shape the outputs, but sets the frame for future decisions as well.

movement, but is also driven by *"the idea of increasing returns [...] because the relative benefits of the current activity compared with other possible options increase over time"* (Pierson, 2000, p. 252). While the emphasis of such *"self-reinforcing processes in no way precludes the investigation of other ways in which sequences can matter in explaining social outcomes"* (ibid.), especially in policy subsystems with a strong technological affiliation, both increasing returns and economies of scale may significantly impede technological change. Borrowing from Berkhout, slow and clumsy changes in technological regimes are depicted with the familiar metaphor *"of a super-tanker changing course"* (Berkhout, 2002, p. 3). However, even the most stable and confirmed patterns of technological regimes and related policies are to be disrupted[118] and probably replaced by new policy trajectories which may lead to the *"emergence of a new path of public policy"* (Peters et.al., 2005, p. 1290).

When focussing on the history of development of transport and mobility, the evolution started with a network of waterways that was soon replaced by the railway network. Likewise passenger mobility started with the horse-drawn carriage and ended up in the utilisation of cars, buses and airplanes. Even though transitions in technological regimes[119] may need time and results may be recognised quite late, major changes are expected to happen when improved technologies and new standards are available (see Berkhout, 2002 / Barnes et.al., 2004 / Liebowitz and Margolis, 1995 / Tilly, 1984).

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[118]Either by external shock or by the insight, that an existing technology has no more potential for further improvement.

[119] In technological regimes a restriction of alternatives may end up in a lock-in that is quite hard to overcome.

No matter if path dependence is analysed within the context of self-reinforcing sequences[120] (increasing returns) or as reactive sequences[121] (outcome of prior decisions), it always *"stresses the importance of early events for later occurrences"* (Mahoney, 2000, p. 536). However, not every single evolution or development within the focus of historical dynamics is per-se to be considered or labelled as a pattern of path dependence. According to Kay, there is a risk that it *"becomes a concept in search of a case and all historical policy studies are stripped down to parts that are, in some sense, path dependent"* (Kay, 2005, p. 569).

4.3.2 Policy Legacies / Policy Continuity

Mainly based on the notion of path dependence and the conception of policy change, the term policy legacies is to *"determine the course of subsequent policy [but also] raises questions about why some legacies are more influential than others"* (Hall, 1993, p. 275). As argued earlier, internal and external disruptions / shocks have the capability to bring significant changes to an existing policy subsystem. Borrowing from Weir and Skocpol (1985), such events can not only stimulate modifications, but may completely revise political demands and therewith pave the way for major innovations of existing subsystems and its policies.

However, existing policy legacies are considered to set determining factors for both minor modifications and more extensive revisions. According to the authors, *"the goals of politically active groups, policy intellectuals, and politicians can never simply be 'read off' their current structural positions. [...] Instead, the investigator must take into account meaningful reactions to previous policies"* (Weir and Skocpol, 1985, p. 119).

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[120] Positive feedback process, when an increase of a particular variable leads to a further increase of this very variable.

[121] Decisions of the past shape the scope of future actions.

Within this research, policy legacies are considered as long-term determining factors that were imposed in the past and - at least to some extend - predetermine the scope of action for upcoming actors and coalitions. Regarding this, the scope of action is equal to an imagination of *"administrators and politicians about what is feasible, for administrative capacity built up in one area cannot easily be altered to implement a new set of policies"* (ibid., p. 121).

It is assumed that both minor modifications and more extensive revisions of existing structures (agencies, public authorities, etc.) and policies (e.g. regulations, standards, etc.) are restrained by a set of subordinated values. Regarding this, the belief system of the ACF (presented in the previous subchapter) and its three-fold structure (deep core beliefs / policy core beliefs / secondary beliefs) is considered to provide an idea of such values. In particular deep core beliefs and to some extend also policy core beliefs are expected to play a significant role in terms of understanding policy legacies and the long-term continuity of policies.

According to Freeman, policy making quite often happens in a predefined and quite constricted setting as policy makers are oftentimes *"confronted by the legacy of previous decisions and the problems they have addressed, solved, and sometimes reproduced"* (Freeman, 2006, p. 373). A slightly extended version of this conception is presented by Immergut, who argues that *"previous policies also impart a lasting legacy to policy making by affecting the views and opinions of both citizens and the political elite"* (Immergut, 2006, p. 559).

According to this, any shifts in both elite and public opinion regarding the salience of a potential or existing problem (problem perception) need to be considered as a principal causal factor. Same accounts for the process of policy formulation and implementation, as well as for the struggles of negotiations within the necessity of policy re-formulation. Within the framework of thesis it is assumed that such lasting legacies to policy making are not limited by a change of government or changing majorities in parliaments, but are regularly to be retained by successors, no matter what party they belong to.

4.3.3 Policy Diffusion

The notion of policy diffusion is to describe the adoption of dedicated policies by other states or countries. While underlying policies need to be developed and successfully implemented by pioneering states or countries first, (early) adopters are about to start transferring and implementing such proven policies into their territories. Borrowing from Eyestone (1977), any kind of a successive adoption in terms of a specific policy or a policy innovation is to be categorised as policy diffusion.

Regarding this, the term innovation simply indicates that such a policy or program is *"new to the states adopting it, no matter how old the program may be or how many other states may have adopted it"* (Walker, 1969, p. 881). A quite plain definition of innovation is presented by Mohr who states that innovation is the *"successful introduction into an applied situation of means or ends that are new to that situation"* (Mohr, 1969, p. 112).

While in some cases the implementation of policies may be prescribed by the superior authority, according to Eyestone, policy diffusion is also quite often based on *"independent adoption decisions by several states"* (Eyestone, 1977, p. 441). Such adoption processes either have its origin within the territorial boundaries itself for example *"when interest groups within a state push for the adoption of a new policy, or when electoral and institutional forces within a legislature affect the likelihood* *of adoption. [However,] pressure for policy innovation also can come from outside"* as well (Shipan and Volden, 2008, p. 841).

When discussing the facilitating aspects for successful policy diffusion, Walker argues that *"states which provide the most extensive staff and research facilities in their legislatures ought to pioneer in the adoption of new programs"* (Walker, 1969, p. 885). Such innovative states are also considered to be *"wealthier and more competitive than their sister states at the time of adoption of a particular law"* (Gray, 1973, p. 1182). When it comes to the adoption of new programs, standards and regulations, the uncertainty of consequences is considered to be a serious barrier. Therefore, supporters of innovative policies regularly need to *"combat the arguments of those who predict dire consequences if some innovation is adopted"* (Walker, 1969, p. 890).

A quite fundamental aspect for policy diffusion is the awareness of relevant decision makers who need to know about innovative policies and programs, thus *"interstate communications are an important factor in the process of diffusion"* (ibid., p. 897). Regarding this, it is vital 'to know, what is going on' outside someone's own dominion, no matter if this is done through communication or *"by observing observing the politics of policy adoption and the impact of those policies"* (Shipan and Volden, 2008, p. 841). As argued by Berry and Baybeck, a quite prominent problem solution approach of decision maker is to *"simplify the task of finding a solution by choosing an alternative that has proven successful elsewhere"* (Berry and Baybeck, 2005, p. 505).

Within this thesis, the notion of policy diffusion is highly relevant when it comes to the adoption of existing rules, regulations, and standards of California to other states (e.g. Section 177 States) or to the federal level (e.g. provisions of A.B. 32 that were adopted in part). Same accounts for the adoption of technologies that are strongly connected to corresponding regulations (e.g. clean air regulations and the catalytic converters).

While it could easily be argued that the aspect of policy diffusion is fairly out of the focus of this research, it needs to be stresses that the policy leadership role of California would neither be in place without the pioneer itself, nor without potential followers. The role of California is not only to protect its natural environment, but also to serve as a role model and to spread its behaviour to other U.S. states and countries around the globe. As argued by Vogel: *"This pattern of state policy leadership and diffusion has come to be labelled the California effect"* (Vogel 2018, p. 7).

The research at hand focuses on the transition towards a clean and future proof transport and mobility sector in California, which is considered to be a major aspect of the state's leadership role. The Californian rules and regulations in this sector not only helped to improve the air quality, but also had a significant impact throughout the Unites States as a whole (see Vogel 2018, p. 155). California's outstanding capability[122] of setting its own emission standards, more stringent than those at the federal level, is another manifestation of the so called California effect.

As argued earlier, the leadership role of California is not motivated by humanity or kindness, but is based on legit self-interest. The state is able to set its own rules and regulations in order to fight against air pollution, however, it cannot take action on its own to effectively mitigate climate change. While the risks and impacts of climate change show up locally, climate change - as well as its mitigation - is to be tackled on the global level.

[122] The origins of this legal privilege are to be found in the Clean Air Act (CAA).

4.4 Process-Tracing: A theory-based Research Method

Within this thesis, the in-depth case study will strongly refer to the research method of process-tracing. The aim is to (re-)trace existing causal mechanisms in detail in order to reveal and understand the causal dynamics within the single-case of the Zero Emission Vehicles (ZEV) Program of California.

While the term process-tracing has its origins[123] in the field of cognitive psychology[124] in the United States, it more generally *"refers to the examination of intermediate steps in a process to make inferences about hypotheses on how that process took place and whether and how it generated the outcome of interest"* (Bennett and Checkel, 2015, p. 6). The authors argue, that from an epistemological and philosophical perspective, process-tracing is *"closely related to the turn toward social science explanations based on reference to causal mechanisms[125] or the underlying entities that generate observed processes and outcomes"* (ibid., p. 10).

Regarding this, the term (causal) mechanisms also needs to be explicated to some extent. While several authors (see Elster, 1998 / Falleti and Lynch, 2009 / Gerring, 2007 / Bunge, 1997, 2004), provide similar perspectives, a plausible and straight-forward definition is presented by Mayntz:

> *"The term "mechanism" is used both to designate a certain class of real phenomena (mechanisms are such and such, they do such and such), and to designate a class of (causal) propositions referring to such phenomena"* (Mayntz, 2004, p. 3).

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[123] According to Bennett and Checkel (2015), it remains quite unclear, when the term "process-tracing" was used first.

[124] In this field, the term process-tracing describes the steps within cognitive mental processes within decision making.

[125] A causal mechanism is considered as the link in-between a cause (set of causes) to an outcome.

However, when focussing on a process with embedded causal mechanisms, it is considered to be quite different from a *“simple and plain descriptive narrative of what happened in a case”* (Beach and Pedersen, 2019, p. 2). The actual process of revealing (tracing) such a process is to be done by *“observing the empirical fingerprints, or traces, left by the operation of a causal mechanism in a case”* (ibid.). Process-tracing should not be considered as a one-fits-all solution to any research problem, but if applied in the right way it helps to *“make strong within-case causal inferences about causal mechanisms based on in-depth single-case studies”* (ibid.).

In general, there are two understandings of mechanisms within process-tracing, which vary by the actual degree of fidelity and elaborateness. While in the minimalist understanding the link between cause(s) and outcome is presented quite roughly. In contrast to this, the systems understanding, includes a detailed presentation of existing traces that were left throughout the process.

The implementation of these two understandings is not to be seen as an either/or-decision, but as a sequential arrangement. Metaphorically speaking, *“in-depth process-tracing is like bringing out the electron microscope: we only do it after we have an idea that there might be something to look at because we have engaged in case research using minimalist process-tracing”* (ibid., p.4).

Borrowing from Beach and Pedersen (2019), process-tracing as a research method comprises of four different variants, which significantly vary due to their actual purpose: a) theory-testing, b) theory-building, c) theoretical-revision and d) explaining-outcome. As this research exclusively employs the explaining-outcome[126] process-tracing, just this variant will be presented in more detail.

While the variant of explaining-outcome is most appropriate to focus on a single case in order to analyse its most important causalities and determining factors, it also bears some risks and drawbacks. For example, resulting case-specific findings cannot be generalised to other cases as the case under investigation is unique and includes case-specific mechanisms.

According to this, at the most it will be possible to depict some major insights and lessons learned. One major risk of the explaining-outcome variant is noted by Schimmelfennig who argues that *"selecting causal-process observations and making valid inferences"* is sometimes done in a quite loose fashion, which entails the risk of looking less for existing patterns and regularities[127] than constructing and telling a consistent story (Schimmelfennig, 2015, p. 103).

This risk is also highlighted by other authors like Hedström and Ylikoski who appeal to *"avoid lazy mechanistic storytelling"* by putting a focus on explicitness, details and empirical evidence (Hedström and Ylikoski, 2010, p. 54). Sil and Katzenstein argue that a case needs to be explained, not only described. Regarding this, a quite careless approach may result in *"thick descriptions of a mish-mash variety"* (Sil and Katzenstein, 2010, p. 89). Therefore, they call for a clear and straightforward explanation as *"sometimes a single paradigm can explain a phenomenon better than an eclectic approach can"* (ibid.).

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[126] Case-focused research that aims to identify the mechanistic explanation that accounts for the historical outcome.

[127] See also Popper 1963.

Beach and Pedersen describe the explaining-outcome process-tracing as an *"iterative research strategy that aims to trace causal mechanisms to produce a comprehensive explanation of a particular historical outcome"* (Beach and Pedersen, 2019, p. 14). Regarding this, the aim is definitely not to test any theories, but to utilise them *"in a more instrumental fashion to enable us to craft comprehensive explanations of particular cases"* (ibid., p. 282).

As real-world cases are complex, the focus need to be on the variety of different causes and causal mechanisms that are considered to be embedded in dynamic interactions which are *"operating within or across different domains and levels of social reality"* (Sil and Katzenstein, 2010, p. 419). Based on this perception, one could think that by examining the existing causes and their linking mechanisms the result/output is determined for sure. However, as argued by Lebow:

> *"underlying causes, no matter how numerous or deep-seated, do not make an event inevitable [as] their consequences may depend on fortuitous coincidences in timing and on the presence of catalysts that are independent of any of the underlying causes"* (Lebow, 2000-2001, p. 591-592).

In terms of timing and temporal aspects of mechanisms, there are either continuous, quite slow moving causes or *"events and causes [that] can accumulate*[128] *quickly and thresholds can be reached rapidly, as the tipping*[129] *and cascade effects"* (Grzymala-Bussel, 2011, p. 1272). Against this background it is worth to recall *deep core beliefs* that matter, as *"revolutionaries advocate total and instant changes of society as a whole [while] systemic social reformers favor gradual reforms"* (Bunge, 2004, p. 191).

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[128] Such processes may move slowly, but then could unfold and elapse to outcomes quite fast (see Pierson, 2004).

[129] A tipping (point) could be described as a series of (tiny) changes that accumulate and lead to (significant) changes.

When returning to temporal aspects, Pierson criticises that, it is quite typical to *“take a ‘snapshot’ view of political life, but there is often a strong case to be made for shifting from snapshots to moving pictures”* (Pierson, 2004, p.1-2). To put it in other words: taking such kind of a *“cross-sectional snapshot”* will not qualify to exemplify a real-world long-term process (ibid., p. 150).

Borrowing from Beach and Pedersen, conducting an explaining-outcome process-tracing study needs to give explanations about what happened and why it happened as *”events happened for a reason, but providing a full account of an outcome requires including reasons that are complex and case specific”* (Beach and Pedersen, 2019, p.284). As a result to these aspects, it is necessary to unfold political processes by focussing on the plurality of dynamic causal mechanisms and occurring sequences and by explicitly *“specifying the length, tempo, and temporal placement of critical events”* (Grzymala-Bussel, 2011, p. 1291).

Aside from that, a significant level of attention needs to be put on the institutional, organisational and societal context, as this is necessary in order to deploy *“case-specific knowledge of formal and informal institutional structures, patterns of political competition, economic and social conditions, and details of the substantive issue at hand”* (Jacobs, 2015: p. 72). Borrowing from Schimmelfennig (2003), who profoundly analysed the historical enlargement process of NATO and EU, the aim of this research is not primarily to present a full-chronological account of the evolution of the ZEV-Program in California, but to present a coherent set of highly-relevant episodes[130] by re-tracing the most important causal mechanisms of this specific case.

[130] Referring to Pierson (2004), a series of highly-relevant episodes is used to represent the whole “movie”.

5 Evolution of the Californian LEV/ZEV-Program

Within the focus of this research, the evolution of the LEV/ZEV Program in California will be examined as a single-case study in great detail. As argued earlier, the state of California has a long-term history[131] regarding the development and implementation of air pollution regulations and emission standards. During the last two decades, the state has established the world's most ambitious roadmap towards zero-emission vehicles. Concerning this, the LEV/ZEV Program and its constituting bills not only underwent several updates and revisions, but also went through the aftermath of several changes in government both in California and on the federal level.

While the state of California has gained a special role and far-reaching authorities (especially trough the waiver provision under the Clean Air Act), there are still interdependencies with the U.S. federal government. Likewise, the California Air Resources Board (CARB) has a broad range of competencies and power however it is - at least to some extent - dependent on the actual ruling of the U.S. Environmental Protection Agency (EPA). Regarding this, there will also be a focus on the federal level in terms of both internal and external events to the subsystem under investigation.

The overall time-period of two decades will be allocated in different phases and episodes. They will be presented quite chronological, but - when considered as helpful – a flashback[132] is presented as well. As any change of government is considered to potentially serve as a turning point regarding the modification of

[131] Beginning with the founding of CARB in 1967, California has a tradition of more than 50years.

[132] Narrative technique of interrupting a chronological sequence of events that highlights and examines events (crucial backstory) which happened before the primary sequence of the story.

existing policies and major policy change, the allocation in different phases will be done as follows:

The ***first phase*** comprises of only a few months and begins with the final approval of A.B. 1493 by then-Governor of California Joseph Graham „Gray" Davis Jr.[133] (Democratic Party) on July 22, 2002. It ends with the recall election of October 7, 2003, resulted Gray Davis being removed from office, respectively on November 17, 2003, when Arnold Alois Schwarzenegger (Republican Party) was sworn in as the 38th Governor of California.

During the first phase, President George W. Bush[134] (Republican Party) was in office. While this episode is both a short and one without too many lines of action, it is considered to be seminal due to the creation (Fran Pavley) and the legal approval (Governor Davis) of Assembly Bill 1493. This legal piece is not only the basis for any additional legislative processes, but also consolidated the belief system of involved actors and set the foundation of a policy legacy that continues throughout the episodes afterwards.

The ***second phase*** continues these efforts and both advances and solidifies the policy towards a clean and sustainable transport and mobility sector. The episode covers the time period 2003-2011 and lasts until the end of the second governorship of Arnold Schwarzenegger, leaving office on January, 3 2011.

During this time, the Presidency of George W. Bush ended on January 20, 2009 when the inauguration of Barack Obama (Democratic Party) as the 44th

[133] Gray Davis during 1975-1981 served as Chief of Staff for Jerry Brown during his first two terms as Governor of California. Due to a change is legislation, Brown is the only Governor who stayed more than two terms in office.

[134] Bush's first inauguration was on January 2001, he (finally) left office on January 20, 2009.

president took place. Regarding this, there is a strong focus on both a beneficial and bipartisan facet as well as on an unfavourable and partisan one. While within the state level of California a quite stable long-term structure is established, the interplay between California and the federal government in Washington turned out to be clearly a matter of partisan dispute that negatively affected the overall evolution of the LEV/ZEV Program.

The ***third phase*** begins on January 3, 2011 when Edmund Gerald 'Jerry' Brown Jr. (Democratic Party) was sworn in for his third term as governor of California, succeeding Schwarzenegger who had been term-limited. It lasts until January 20, 2017, the inauguration day of Donald John Trump as the 45th president of the United States of America.

Within this episode there is an exemplary situation that reflects the beneficial influence of "positive" partisanship (Democrat President Obama and Democrat Governor Brown). This episode comprises not only of several straight-forward aspects of progressive evolution, but also of necessary far-reaching remedies of the George W. Bush aftermath.

The ***fourth phase*** instantly pursues the previous one and continues until January 20, 2021 when Trump left office and his successor Joseph 'Joe' Robinette Biden Jr. (Democratic Party) took over. During this time period Jerry Brown finished his third term and was sworn in for his fourth term as governor of California. He left office on January 7, 2019 when his successor Gavin Christopher Newsom (Democratic Party) was sworn in.

This episode is an exemplary situation of "negative" partisanship (Republican President Trump and Democrat Governors Brown / Newsom). While the previous episode was affected by the necessity of "healing the remedies" of the

Bush administration and subsequently led to a progressive evolution, this episode in contrary is characterised by substantial regression and a strong dispute between California and the federal government under the Trump administration.

The ***fifth phase*** is not a full episode, but rather a kind of teaser that begins with the inauguration of President Joe Biden on January 20, 2021 and covers the time period until mid-2022. Nevertheless, it outlines the most relevant aspects regarding the overall situation after the second half of the previous episode.

Just like the episode when Obama had to revoke[135] the decisions of his predecessor in office Bush junior (e.g. refusal of the Kyoto Protocol, denial of the California waiver), likewise this last episode is mainly about the necessary re-establishment of environmental regulations and standards that were taken down by the Trump Administration (e.g. leaving the Paris Climate Accord, withdrawal of the 2013 California waiver).

In the following, the five phases (episodes of evolution) are considered as stages of a historical frame story that build on each other and are re-traced in a more or less serial temporal sequence. However, some flashbacks (analepsis) are implemented as well in order to introduce and explicate relevant events. The referral to the Stage Hypothesis and the S Curve (see Nolan, 1973 / Lucas, 1977 / Fisher and Pry, 1971 / Utterback and Abernathy, 1975 / Christensen, 1991) is used to a) contextualise the phases to a complete sequence and b) to label each of the five episodes of evolution according to its main characteristics.

[135] In order to subsequently restore the environmental rules and regulations that existed beforehand.

Each episode of evolution includes a so-called *'Cast and Collaboration List'* that is not only to provide an overview of the most important actors / stakeholders, but also includes a selection of important features and characteristics. While the 'affiliation-tag' provides some basic insights on the membership in coalitions, the remarks-section provides basic information on the individual background.

The particular tint (colour and intensity) of the 'affiliation-tag' also indicates both compatible / incompatible policy beliefs systems and the different hierarchical categories of belief systems (from dark colour ≈ deep core beliefs towards bright colour ≈ secondary beliefs). The actual 'nomenclature' of beliefs and beliefs systems is presented in Table 2:

Table 2 – Classification of Beliefs and Beliefs Systems

Source: Author

	Anti-California Coalition	***Deep Core Beliefs*** (ideologies, normative rules, basic priorities, cultural orientations)
	Anti-California Coalition	***Policy Core Beliefs*** (normative & empirical beliefs, mainly based on scientific & technical information)
	Anti-California Coalition	***Secondary Beliefs*** (fundamental information, methods and instruments applied to achieve goals)
	Pro-California Coalition	***Deep Core Beliefs*** (ideologies, normative rules, basic priorities, cultural orientations)
	Pro-California Coalition	***Policy Core Beliefs*** (normative & empirical beliefs, mainly based on scientific & technical information)
	Pro-California Coalition	***Secondary Beliefs*** (fundamental information, methods and instruments applied to achieve goals)

5.1 Freshman and Old-Timer Episode (2002-2003)

Even though the time-period under investigation is about to start with the legal approval[136] of Assembly Bill (A.B.) 1493, it is vital to present both the history and the context of A.B. 1493. This legislative is not only considered to be the basis for all further legislative processes, but also as the starting point of strong bipartisan efforts concerning the transition towards a clean and future proof transport and mobility sector in California. Table 3 presents the cast list of this first episode and additionally delivers some relevant remarks to the individual actors.

Table 3 – Cast and Collaboration List – First Episode (2002-2003)

Source: Author

Person	***Role***	***Affiliation***	***Remarks***
Joseph Graham „Gray“ Davis Jr	Governor of California	neutral, resisted the automotive lobbying	Chief of Staff to Edmund G. 'Jerry' Brown Jr.(1975-1981)
President George W. Bush	President U.S.A.	Combatant of state-level authorities	Refusal Kyoto Protocol, Jerk
Christie Todd Whitman	EPA Administrator	Loyalty	Served 2001-2003
Frances J. "Fran" Pavley	Member California State Assembly	Coalition of environmental organisations	Former teacher, Author of A.B. 1493
John Lowell Burton	Member California State Senate	Supporter, well connected to (trade) unions	Saviour of A.B. 1493

Within Section 1 of A.B. 1493, a quite prominent placement, it is stated that *“global warming is a matter of increasing concern for public health and the environment in the state”* (Cal. A.B. 1493, 2002, p. 2-3). Against this background it

[136] Then-Governor of California Gray Davis approved AB 1493 on July 22, 2002.

needs to be stressed that the bill is considered to be the Californian response to the Kyoto withdrawal of George W. Bush. Only few weeks after his inauguration, President George W. Bush announced that the United States is not willing to implement[137] the Kyoto Protocol of 1997 (see Hovi et.al., 2010). This is quite interesting, as during Earth Summit[138] in Rio de Janeiro (1992), his father, then-President George H.W. Bush proudly endorsed the United Nations Framework Convention on Climate Change (UNFCCC), which was later ratified by the U.S. Senate and went into force in on March 21, 1994.

Against this background, the presidency of Bush junior is a clear marker of substantial changes in terms of fundamental normative orientations (deep core beliefs). Furthermore, there is also a clear deviation regarding the normative beliefs concerning policy subsystems, namely the mitigation of climate change and the global approach to this.

In contrary to the Rio Declaration of 1992, its follow-up, the Kyoto Protocol of 1997 was instantly met with a strong refusal in the United States and quite early, several government officials started to argue against the implementation. The most influential one was Christie Todd Whitman who was appointed as Administrator of the U.S. EPA and took office on January 31, 2001. Shortly after U.S. Congress refused the ratification of the Kyoto Protocol, Whitman said: “We have no interest in implementing this treaty” (BBC News, 2001).

Against this background, Whitman remarked to members of the Congress that *“the Kyoto Protocol would have put up to 5 million Americans out of work, for the sake of meeting unrealistic and arbitrary targets that would have a negligible effect on global*

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[137] Kyoto Protocol required at least 55 Parties to ratify, accounting for at least 55% of that group’s CO_2 emissions in 1990.

[138] Officially named the United Nations Conference on Environment and Development (UNCED).

emissions. [...] America has never been more engaged in meeting the long-term challenge of climate change with smart policies that guide both concrete actions today and long-term visions for progress in the years ahead" (Compilation of Exhibits 110th Congress, 2007, p. 41). It is worth to mention that under the Clinton[139] Administration, prior to Kyoto negotiations the U.S. Senate voted 95:0 on the Byrd-Hagel Resolution[140] which urged Clinton not to sign the agreement. Regarding this, the 2001 refusal of the Kyoto Protocol needs to be considered as a classical tit-for-tat response. However, it also reflects the diametrically opposed belief systems that came along with the change in government at the federal level.

When summing up only these few examples of available records, it becomes quite clear why the State of California was so ambitious (in a concerted and bipartisan effort) to individually reduce greenhouse gas (GHG) emissions at the state level. Nevertheless, these ambitions already have its origin as early as 1988, when Californian legislature passed A.B. 4420 that was to implement an inventory of GHG emissions long before there were attempts on the federal level of the United States. Several years later, S.B. 1771 established the California Climate Action Registry in order to record voluntary GHG emission reductions. Nevertheless, these efforts rather need to be categorised as plain monitoring and reporting activities.

As argued earlier, the enactment of A.B. 1493 was highly relevant as for the first time the transport & mobility sector's GHG emissions were considered to be highly relevant and therefore need to be tackled effectively. However, until the law got legally binding, it has to overcome a long and cumbersome way. The

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[139] Then-President Clinton (Democratic Party) signed the Kyoto Protocol in 1998.

[140] Sponsored by Senators Chuck Hagel and Robert Byrd, see Byrd-Hagel (1997).

bill was originally introduced as A.B. 1058 by then-freshman[141] Assembly Member Frances J. "Fran" Pavley[142] and passed California Senate by a vote of 22:13 on May 2, 2001. Afterwards, the bill went back[143] to the Assembly again[144] for final concurrence.

The expectations in A.B. 1058 were enormous, which is reflected by a then-statement of Ann Notthoff, California Advocacy Director of the Natural Resources Defense Council (NRDC) who argued that the bill will “bring cleaner skies and less of the carbon pollution responsible for global warming. It will give California drivers the freedom to choose the cars and trucks that they want without all the pollution. Once again, California is finding innovative solutions to clean up automobile emissions” (NRDC, 2002).

However, as argued earlier, the bill was immediately tackled by a strong coalition that comprised of the Alliance of Automobile Manufacturers[145], the California Chamber of Commerce, General Motors, and the Western States Petroleum Association (WSPA)[146]. This was mainly to the fear that a “California Car Standard” together with the state’s market power will literally be the standard setter for the entire market of the United States.

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141 Pavley, former middle-school teacher (American History), sponsored the bill during her very first term in Assembly.

142 When Pavley agreed to author the draft bill, Bluewater and the Coalition for Clean Air started to gather supporters that included several environmental organisations such as the California Public Interest Research Group (CALPIRG), Greenpeace and the Sierra Club California (see Paine, 2005 / Sragow and Darwish, 2018).

143 A.B. 1058 was amended twice in Assembly on May 31 and April 25, 2001 (see: Cal. A.B. 1058, 2001).

144 Based on the legislative procedure, the bill already passed the Assembly a few months earlier.

145 The Auto Alliance (AAM) was a trade group of automobile manufacturers and literally the leading advocacy group for the car industry with a market share of almost 80% of all passenger-vehicles & light trucks sold in the U.S.

146 Represents companies (e.g. BP, Shell, ExxonMobil) in Arizona, California, Hawaii, Nevada, Oregon, and Washington.

As a result to the strong pushback, A.B. 1058 was passed in different versions and finally got stalled[147] by a "well-funded campaign of television, radio and newspaper ads, opponents have portrayed it as an un-American attempt to force soccer moms from their beloved SUVs into smaller, less safe vehicles that will hurt the economy and cost workers their jobs" (Bustillo, 2002). The coalition against the bill has succeeded, at least for the moment.

While principal supporters of A.B. 1058 were quite shocked by the massive campaign that was mobilised with millions of dollars by special interest groups, a quite catchy statement was made by Peter Miller, scientist at NRDC, who argued that it will be *"critical that California take leadership on this issue [as] California has always been a leader in technology that not only benefits the state, but eventually the nation and the entire world"* (ibid.).

Against the background of the massive financial power of the automobile industry, it was quite clear that Assembly Member Pavley and her coalition of supporters cannot match up regarding financial resources[148]. As a result to this, they started to significantly extend the coalition both by adding co-authors[149] to the bill and by involving a diversity of interest groups (see Sragow and Darwish, 2018, pp. 91-92).

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[147] The media campaign resulted in "a flood of calls, letters and e-mails to legislators from voters who worried that their cars of choice could soon be endangered" (Bustillo, 2002).

[148] According to Sargon and Darwish (2018), the opposing coalition launched a five-million-dollar ad campaign and several other massive campaigns.

[149] By the end of 2001, almost 20 Assembly members were recruited as co-authors by Pavley.

A quite clever and strategic move was also to explicitly focus on the thematic links between climate change and public health[150], well-being, and other aspects of social life that were significantly to resonate with the majority of voters. This not only helped to mobilise resources (both human and financial), but also led to a significant and striking shock of the previously quite stable external parameters (business as usual mentality of the car manufacturers, oil industry, etc.). While the opposing coalitions (with both diverse policy targets and an incompatible policy beliefs system) somehow got stuck in their perceptions, the relevant policy actors (in both State Assembly and State Senate) obviously started to react to the external stimuli that came from interest groups, the general public, and voters.

In terms of the mandatory legislative procedure, it was Senator John Lowell Burton, then-Member[151] (and temporarily President) of the California State Senate who was strongly engaged in supporting the bill. Although he did not want to officially sponsor the bill (obviously he did not share all of its aspects on the one hand, but was committed to the long-term welfare of California on the other hand), several decisions were made by Senator Burton that (at least in retrospective) have definitely paved the way for the contents of A.B. 1058.

Against this background it needs to be mentioned that he turned out to be bill's saviour. For example, he decided[152] that the bill was sent to the Environmental Quality Committee, instead of bringing it to the attention of the Transportation

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[150] For example, the health implications of climate change brought support from the American Lung Association, the Physicians for Social Responsibility, the California Medical Association, and the California Nurses Association.

[151] Member of the California State Senate from the 3rd district between December 2, 1996 and December 6, 2004.

[152] Due to his opinion, the bill's focus was much more related to the environment than on the transport sector.

Committee, which was mainly due to the composition of members with a like-minded belief system. Burton urged unions to be either neutral or to support the bill which turned out to be an informational advertising as most unions[153] did not know beforehand that they were affected by the bill's implications.

At the end, Burton used a quite special feature of the California Legislature, the so-called procedure of *gut-and-amend bills*, to literally bring the full contents of A.B. 1058 back on track. By using this specific approach, amendments to a bill a) completely remove the current contents in their entirety and b) replace them with different provisions.

As a result to this, full contents and exact wording of previous A.B. 1058 was transferred to A.B. 1493, while "*amendments specified that the [California]Air Resources Board could not limit the number of miles motorists could drive, raise gas taxes, or restrict the type of vehicle consumers could purchase*" (ibid., pp. 92-94). The California State Senate passed A.B. 1493 on June 29, 2002 with vote of 23:6 and sent it to the Governor of California for final approval.

Few weeks before, then-Governor Gray Davis decided to enact Assembly Bill (A.B.) 1493, a substantial number[154] of both Support Letters[155] and Oppose Letters[156] were sent to his office. Several letters, especially Oppose Letters, stick out, for example the letter of the California Motor Car Dealers Association that (including appendixes) comprises of 22 pages. Aside from that, several

[153] At the end, the only labour union that opposed the bill was the United Automobile Workers.

[154] A rough count showed that around 230 Support Letters and about 35 Oppose Letters were sent by Senators, organisations, companies, as well as individual citizens.

[155] Available for download at: http://envirolaws.org/bills/listed-support/ab1493.2002.ltr.support.pdf.

[156] Available for download at: http://envirolaws.org/bills/letter-of-opposition/ab1493.2002.ltr.oppose.pdf.

renowned car manufacturers (e.g. BMW, DaimlerChrysler, General Motors, Honda), sent Oppose Letters to Governor Davis as well.

Regardless of the remaining and substantially influential opposing coalition with both a conflicting mindset and a totally divergent belief system regarding the purpose of the bill, A.B. 1493 was signed into law by Davis on July 22, 2002. Few weeks later, he told reporters that "opponents of this bill say the sky is falling. But they said it about unleaded gasoline. They said it about catalytic converters. They said it about seat belts and air bags. The sky is not falling. It's just getting a whole lot cleaner" (Planet Newsletter, Sept. 2002). This is an example of a strong belief system that positively contributes to long-term goals, as well as to the establishment of policy legacies that are not only to be preserved but also to be refined and advanced by successors.

Against this background in both genesis and final enactment of A.B. 1493 (and its content-precursor A.B. 1058), a relevant contribution was made by a coalition that comprised of a relatively small number of highly committed governmental officials and advocates, non-profit organisations, actors from the private sector, etc. (that share a common set of core beliefs and sometimes also deep core beliefs). The likewise "belief-system-equipped" opposing coalition was formed by numerous companies, associations, several governmental officials, etc.

It is assumed that the Bush Administration in D.C. and its massive decline (and subsequently) refusal of the Kyoto Protocol not only stimulated progress in the state of California, but also (unintentionally) contributed to bipartisan efforts and the overall legacy of A.B. 1493, that *"extends far beyond its immediate greenhouse gas reductions. The first of its kind anywhere in the world, it emboldened the environmental community and its supporters to press forward in their fight to mitigate global warming"* (Sragow and Darwish, 2018, p. 95).

The law required the California Air Resources Board (CARB) to *"develop and adopt regulations that achieve the maximum feasible and cost-effective reduction of greenhouse gas emissions from motor vehicles"* no later than January 1, 2005 (Cal. A.B. 1493, 2002, p. 5). As provisions were meant not to be in effect before January 1, 2006 and only accounted for model-year 2009 or later, automobile manufacturers a) were given time to fulfill the regulations and b) the development of cleaner cars was stimulated. Regarding this, A.B. 1493 not only fulfils the basic function of providing a framework for the implementation of rules, regulations, and standards, but also stimulates technological progress and the large-scale implementation of low- and zero emission vehicles.

Regarding this, CARB has to consider both the technological feasibility of provisions and its impact in terms of Californian economy (e.g. creation of jobs, impacts to the business sector). The bill puts a significant focus on flexibility, which means that a variety of alternative methods are allowed, as long as they bring compliance to the regulations. Regarding this, CARB has to make sure that *"any alternative methods for compliance achieve the equivalent, or greater, reduction in emissions of greenhouse gases as the emission standards contained in the regulations"* (ibid., p. 6).

According to the amendments approach of the gut-and-amend from A.B. 1058 to A.B. 1493, CARB is not authorised to a) impose any additional fees or taxes on motorised vehicles, fuels or vehicle miles travelled (VMT), b) implement any kind of ban on the sale of specific vehicle categories (e.g. SUVs, light-duty trucks), and c) reduction in vehicle weight. These amendments were quite nonsense as CARB never could have legally impose such regulations: Nevertheless they were necessary to successfully gut-and-amend the bill. Matter of fact, big SUVs are banned from most roads of California. The reason for this cannot be found in the provisions of A.B. 1493, but in simple traffic-signs that vehicles over 6,000 pounds of weight. Several major cities across California (e.g. San Francisco, Los Angeles, Pasadena, and Santa Monica) have implemented this 3-ton cut-off for the sake of less road damages, less noise and safer pedestrians.

Summing up the provisions of A.B. 1493, the aim was to bring together the technical expertise (what is currently possible and what will be possible) with the flexibility on how things are done (technology openness[157]) and the maintaining of overall accountability in terms of regulations and standards. Although Governor Gray Davis has signed the nation's first law to tackle global warming and to reduce greenhouse gases, his overall efforts in terms of renewable energies and a transition towards a cleaner transport & mobility sector were rather small. Until he had to leave office, due to the first time ever recall election in California on October 7, 2003, there were no significant efforts to be denoted. This conclusion can easily be affirmed by analysing the State of the State Address[158], delivered on January 8, 2003. Nevertheless, Davis has set both the basis for further legislative activities and the policy legacy that contributed to any kind of progress and evolution in the field.

Same accounts for the series of Executive Orders that took place during his second term in office. In contrary to this, Davis has been quite active[159] during his first term as Governor of California, which was mainly due to the electricity crisis that was followed by budget crisis. While supporters praised the performance and incentive of Davis, critics argued that using his executive

[157] See Huang et.al. (2020).

[158] Available at: https://governors.library.ca.gov/addresses/s_37-davis5.html.

[159] For example, Davis issued an Executive Order that called to remove all toxic additives from fuels sold in California. However, this demanded a waiver from U.S. EPA, which was not granted by then-President Bush.

powers is dramatically heading towards imperiousness (see Bailey 2001). Against the background of these two crises in the state of California, the focus was almost exclusively on the State's budget, the fiscal structure, and proposed structural reforms, but not a single word is found in terms of renewable energies, GHG emission reductions, mitigation of climate change or a cleaner transport and mobility sector with low- and zero emission vehicles.

In parallel to A.B. 1058, respectively A.B. 1493, the California Air Resources Board (CARB) had to deal with a legal dispute when the opponent coalition, namely General Motors, DaimlerChrysler, and Californian car dealerships filed a federal lawsuit[160] on January 3, 2002. The claim focussed on the new ZEV/LEV rules[161] which violate federal law that forbids states to impose regulations that affect fuel economy. As part of litigation tactic, the opponent coalition filed a series of three[162] lawsuits. While the main argument of all three lawsuits focused on a statutory violation[163] against federal law, the regulatory background is to be found in the Energy Policy and Conservation Act (EPCA) of 1975, which exclusively authorized the National Highway Traffic Safety Administration (NHTSA) to set national fuel economy standards.

The district court joined the arguments of petitioners and issued a preliminary injunction that prohibited the California Air Resources Board from enforcing the LEV and ZEV regulations in the upcoming model years of 2003 and 2004. As a result to this setback, CARB decided to downsize regulations and extend

[160] Central Valley Chrysler v. Kenny (#02-16395).

[161] Rules were considered to take effect in January 2002, starting with the model year 2003 and onwards.

[162] 1) Central Valley Chrysler-Plymouth, Inc., et al. v. Witherspoon, Case No. CIV F-02-05017 REC SMS (E.D. Cal.), 2) Liberty Motors, Inc., et al. v. California Air Resources Board, et al., Case No. 02 CE CG 00039 (Superior Court for Fresno County), 3) DaimlerChrysler Corp. et al. v. California Air Resources Board et al., Case No. 02 CE CG 04456 HAC (Superior Court for Fresno County)

[163] Petitioners argued that CARB implements fuel economy standards.

time limits which ultimately led to an official settlement agreement[164] for all three lawsuits (see previous footnote) to be achieved on August 12, 2003.

Within this episode, the legislative process that led to A.B. 1493 was not a straight-forward one, but included several obstacles and detentions. While the Kyoto withdrawal of President Bush junior caused the Climate Agreement to be delayed substantially, his decision was also the driving force for increased efforts in the state of California. Same is true for the bipartisan efforts towards the mitigation of climate change that were supported by the decision against the Kyoto Protocol. This kind of external disruption (federal level versus state level) not only initiated the legislative process of A.B. 1493, but also set the right basis for long-term policy continuity and the policy legacy that was set by the bill itself. Regarding this, a positive notion of path dependence can be attributed to the bill's aftermath as well. When considering the legislative process and the negotiations in both Assembly and Senate of California, there were not only negotiated agreements, but also aspects of policy-oriented learning involved.

5.2 *Governator* or the Bench Press Episode (2003-2011)

While the second time-period under investigation within this research is to begin with the inauguration of Arnold Alois Schwarzenegger (Republican Party) as 38th Governor of California on November 17, 2003, a short flashback to his election campaign is presented for a better understanding of this role. The most relevant actors within this episode are presented in Table 4.

[164] Agreement of Counsel Concerning the 2001 California ZEV Litigation, available for download at: https://www.tech-insider.org/electric-vehicles/research/acrobat/030812.pdf.

Table 4 – Cast and Collaboration List – Second Episode (2003-2011)

Source: Author

Person	***Role***	***Affiliation***	***Remarks***
Arnold Alois Schwarzenegger	Governor of California	Self-contained, but highly obliged to California	Recall election against his precursor Gray Davis
Terry Tamminen	Secretary of Cal/EPA	Coalition of environmental organisations	Former head of an environmental group in Santa Monica
Mary D. Nichols *precursors:* *Alan C. Lloyd (- 2005)* *Cindy K. Tuck (2005)* *Robert F. Sawyer (- 2007)*	Chair of CARB (appointed Aug. 2007)	Long-term collaboration with environmental groups, deep-routed in California	Sewed EPA in 1972 (see chapter 2.1) Former Board Member of CARB (1974-1978) Former CARB chair (1979-1983)
Frances J. "Fran" Pavley	Member California State Assembly	Coalition of environmental organisations	Author of A.B. 32 Global Warming Solutions Act of 2006
Fabian Núñez	Speaker California State Assembly	Side-kick to Pavley	Co-Author of A.B. 32
Barbara Boxer Sheldon Whitehouse	U.S. Senators	Pro California, against Bush-Administration	Main critics and slashers of EPA Administrator Johnson
George W. Bush	President U.S.A.	Combatant of state-level authorities	Served 2001-2009
Christie Todd Whitman	EPA Administrator	Loyalty	Until June 27, 2003
Stephen Johnson	"-"	Strong loyalty	First-time ever Denial of Waiver to California March 6, 2008
Barack Obama	President U.S.A.	Pro California	Served 2009-2017
Lisa P. Jackson	EPA Administrator	Pro California / strong loyalty	Reconsideration of Previous Denial of Waiver February 12, 2009

Schwarzenegger, who was a well-known bodybuilder (Mr. Universe and Mr. Olympia) that gained worldwide fame as a Hollywood action star (Conan the Barbarian, Terminator 1/2, etc.) was considered to be a complete greenhorn[165] in politics. He entered politics for the first time by running the recall election against his precursor Gray Davis who was the first Governor of the Democratic Party after 16 years (1983-1999) of Republican leadership in the state of California.

Being a native to showbiz, Schwarzenegger announced his gubernatorial candidacy on August 6, 2003 during an appearance on The Tonight Show with Jay Leno when he promoted his movie Terminator 3: Rise of the Machines to be released. Schwarzenegger promoted himself to be “the most unique candidate” by because “an outsider”. He furthermore said: “I know the people of California want better leadership, they want great leadership” (CNN, 2003a).

During his campaign he continued to present him as an outsider to the political elite when he argued that *“California is in trouble because the politicians have let us down. Everything I have, I owe to California. Now I want to give something back. I know what we need to do, and I know how to get it done. [...] In my life, the goals that I have set for myself I have been able to achieve. But this is bigger than me. I need your help. Together, we can bring California back”* (Arnold for Governor, 2003).

Mainly due to his fame and the public awareness, Schwarzenegger who was one of 135 candidates on the ballot, became the Republican candidate by defeating Cruz Bustamante[166] (Democratic Party) with a lead of 17%[167]. In his

[165] Mainly due to his fame he easily

[166] Bustamante was 45th Lieutenant Governor of California (1999-2007) under Governors Davis and Schwarzenegger.

[167] https://en.wikipedia.org/wiki/2003_California_gubernatorial_recall_election#Results

election victory speech, Schwarzenegger sounded much more conciliable than during his campaign when he promised to be the Governor for the people, [who wants] to represent everybody and who will reach out to Republicans, to Democrats, and independents[168].

When focussing on the potential goals and the thematic focus of Governor Schwarzenegger, it is worth to take a brief look at his Inaugural Address[169]. He argued that during the last years, Californian people have lost confidence in the government and therefore, the recall was “not about to replace one man or one party”, but to change “the entire political climate” of our state. When taking into account both the energy crisis and the budget crisis, Schwarzenegger promised to solve these problems and to pledge his governorship to people’s interests and not special interest. Regarding this he stated that his: “administration is not about politics. It is about saving California”.

While Schwarzenegger clearly focused on the financial crisis, the state’s budget deficit (back then the largest in the nation), and a bad business climate in California, he also referred to natural disasters that shocked California that “has endured earthquakes, floods and fires. The latest destroyed lives, homes, businesses, and devastated hundreds of thousands of acres of the land we love. In retrospective, this can be considered as the first indication of him, putting a strong emphasis on climate change during his governorship.

When remembering of his Governor campaign, Schwarzenegger outlined his environmental plan for California in September 2003 when he promised to cut the state's air pollution by half and insisting on the possibility of being both

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168 Schwarzenegger election victory speech, available at: https://www.youtube.com/watch?v=FES7QLDVLKo.

169 Available at: https://governors.library.ca.gov/addresses/38-schwarzenegger01.html.

pro-environment and pro-business. Being known as an enthusiastic Hummer driver, he argued: “I want a big SUV because I have four children and to protect the family” (CNN, 2003b). Against this background, Schwarzenegger claimed to make SUVs and other vehicles more environmentally friendly by fuelling them with hydrogen. He argued that this can be done by a public-private-partnership (PPP) that sets up hydrogen fuelling stations every 20 miles on interstate freeways in California, whereby *“hundreds of thousands of clean-burning vehicles”* will be on the road by the end of 2010 (ibid.). In the light of the last weeks of election battle, Schwarzenegger referred to then-Governor Davis (who have signed A.B. 1493 on July 22, 2002) and said: *“As you know, Gray Davis has just started talking about the environment in the last few days”* (ibid.). While Schwarzenegger already criticised the Democratic administration of Governor Davis to be incompetent to solve the problems like the budget crisis, this statement also reflects a critical review of climate-change related achievements.

Few months after taking office, Governor Schwarzenegger initiated the California Hydrogen Highway Network (CaH2Net) by signing Executive Order S-07-04[170] on April 20, 2004. The contents of the order do comprise several assignments to achieve “a clean energy and transport future based on the rapid commercialization of hydrogen and fuel cell technologies” by designating the 21 interstate freeways of California as the California Hydrogen Highway Network. The Executive Order furthermore directed the California Environmental Protection Agency[171] (Cal/EPA) and several other state agencies to implement its regulations and provisions in order to “plan and build a

[170] Archived version available at: https://web.archive.org/web/20060922230500/http://gov.ca.gov/index.php?/executive-order/3374/

[171] State cabinet-level agency, created by then-Governor Peter Barton „Pete“ Wilson (Republican Party) in 1991. Main tasks are to restore, protect, enhance the environment, to ensure public health, environmental quality and economic vitality (see https://calepa.ca.gov).

network of hydrogen fueling stations". The overall aim was that "every Californian will have access to hydrogen fuel, with a significant and increasing percentage produced from clean, renewable sources" (Executive Order S-07-04).

Schwarzenegger showcased the signing of S-07-04 in quite a memorable way when he arrived in a hydrogen-powered fuel cell car and refueled it at the first publicly accessible station at the University of California Davis. The overall mission of CaH2Net[172] was to assure that (a network of) hydrogen fueling stations would be in place when hydrogen-fuelled vehicles will enter the roads of California. This was to prevent a chicken-and-egg dilemma, when a limited number of fuelling stations would prevent the implementation of hydrogen vehicles due to an insufficient refueling network.

In October 2004, when attending the opening ceremony of a hydrogen fuel station at the Los Angeles International Airport (LAX), Schwarzenegger showed up with a hydrogen-powered Hummer[173] that has been custom-built by General Motors[174]. Instead of retrofitting an existing vehicle to hydrogen, the company developed a new concept car in order to "raise awareness about the technology[175]" (NBC News, 2004).

The California Hydrogen Highway Network is considered to be the very first extensive PPP-project in the state of California that comprised of the California Government, academia and stakeholders from industry. The related Executive

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[172] The budget for the California Hydrogen Highway Network was 100 million U.S. Dollars.

[173] Known as a passionately driving Hummer, Schwarzenegger promised to get one of his fleet converted to hydrogen.

[174] This fact is noticeable as GM was part of the coalition that filed three lawsuits against CARB's ZEV/LEV program.

[175] Hydrogen could either be used directly in a combustion engine or indirectly via a fuel-cell and an electric drive.

Order Executive Order S-07-04 called to “develop a California Hydrogen Economy Blueprint Plan for the rapid transition to a hydrogen economy in California” (Executive Order S-07-04) and at least led to initial policies and provided some funding to promote hydrogen technology. While CaH2Net was designed to quickly result in a revolutionary, large-scale implementation of hydrogen vehicles in California, the much-hyped hydrogen highway with a network of around 100 fuelling stations did not came true (at least not as fast as anticipated, which was mainly due to the 2007-2008 financial crisis and its impacts to the economy of California) (see The Atlantic, 2014).

While Executive Order S-07-04 and thereby the concept of the California Hydrogen Highway Network requested Cal/EPA to develop and implement necessary measures, CARB was widely excluded from these tasks. The reason for this might be the multitude of tasks (especially in terms of the LEV/ZEV litigations) that CARB has already to take care of. Another aspect is the fact that Cal/EPA as a cabinet-level agency[176] is under direct control of the governor, who directly appoints the leaders and superintendents of the agency.

The style of leadership of the cabinet-level agency was significantly changed when Schwarzenegger appointed Terry Tamminen[177], former head of an environmental conservation group in Santa Monica, as his secretary of the Environmental Protection Agency in November 2003. This move was quite significant in several aspects. On the one hand, Schwarzenegger proved to keep his promise that administration is not about politics, but about saving

[176] Cabinet-level agencies are sometimes informally referred to as superagencies.

[177] Tamminen has founded several environmental protection initiatives and was ever since dedicated to the protection and conservation of natural resources.

California. Nevertheless, due to the strong thematic affiliation of CaH2Net it would have made sense to incorporate[178] CARB at least to some extent.

Another seminal landmark regarding the transition towards a cleaner and more sustainable transport and mobility sector was Executive Order S-3-05 that was signed on June 1, 2005. The appointed date was only few days before the annual United Nations World Environment Day that was hosted by the city of San Francisco and its then-mayor[179] Gavin Newsom, who is the current[180] Governor of California.

The Executive Order comprised of a total of two pages and strongly focused on the effects of greenhouse gas emissions to climate change. Even if Governor Schwarzenegger was teasing his precursor during his election campaign (see above), his - in retrospective seminal - Executive Order S-3-05 strongly built on A.B. 1493 that was signed into law by then-Governor Gray Davis. Against this background, this is a strong evidence for the ongoing policy continuity and the policy legacy that was set by the bill itself.

According to this, the emphasis - just like beforehand - was on the exceptional conditions of California which causes the state to be *"particularly vulnerable to the impacts of climate change, [...] increased temperatures threaten to greatly reduce the Sierra snowpack, one of the State's primary sources of water; and [...] threaten to further exacerbate California's air quality problems and adversely impact human health*

[178] Especially, because of the fact that the California Air Resources Board (CARB) has enforcement authority.

[179] Newsom served as mayor of San Francisco from 2004 to 2011.

[180] Newsom was 49th Lieutenant Governor of California (2011-2019) and serves as Governor since January 7, 2019.

by increasing heat stress and related deaths, the incidence of infectious disease, and the risk of asthma, respiratory and other health problems" (Executive Order S-3-05, p. 1).

Against the background of severe impacts that are caused by GHG emissions, the Executive Order somehow was to directly built on A.B. 1493 when stressing that "mitigation efforts will be necessary to reduce greenhouse gas emissions and adaptation efforts will be necessary to prepare Californians for the consequences of global warming". Based on this, the (in retrospective landmark) Executive Order explicitly put a strong focus on the California Air Resources Board (CARB) that - among several other major achievements - has successfully implemented *"motor vehicle greenhouse gas emission reduction regulations"* (ibid.).

By signing Executive Order S-3-05, a threefold objective of greenhouse gas emission reduction targets for the state of California was formulated and included: 1) a reduction of GHG emissions to 2000 levels by 2010, 2) a reduction of GHG emissions to 1990 levels by 2020, and 3) a reduction to 80 percent below 1990 levels by 2050. These ambitious and demanding emission reduction targets are not to be considered as a simple follow-up to Assembly Bill 1493, but as an incremental add-on to reflect the changed needs and expectations of California and its inhabitants. Figure 9 indicates the overall GHG-emissions of California within the time period of 1990-2015 and outlines the relevant emission targets as well.

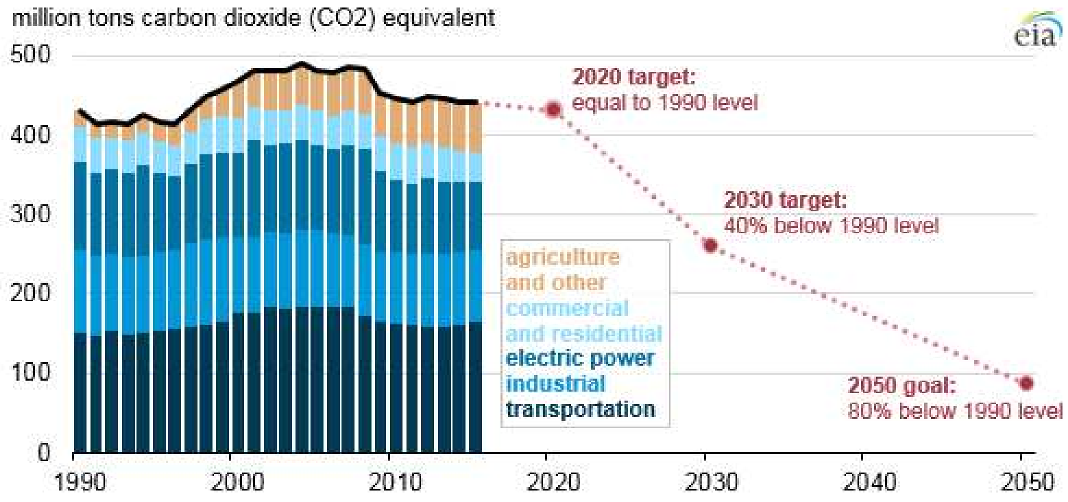

Figure 9 – California GHG emissions by sector (1990-2015)

Source: U.S. Energy Information Administration, 2018

Likewise to Executive Order S-07-04, the California Environmental Protection Agency (Cal/EPA) was fully in charge to coordinate all necessary efforts to achieve these objectives. However, in contrary, the Chairperson[181] of the California Air Resources Board (CARB) - amongst several others[182] - was now at least mentioned to be part of the coordination process. This is considered to be an early indication of ongoing policy-oriented learning during the governorship of Schwarzenegger.

Within the Governor's Remarks at the World Environment Day Conference, where he later signed Executive Order S-3-05, Governor Schwarzenegger thanked then-mayor Gavin Newsom for hosting the meeting and for "bringing true leadership to the environmental movement" (Governor's Remarks S-3-05). This expression of appreciation will be discussed in more detail at a later point,

[181] CARB's chair changed several times during the governorship of Schwarzenegger: Dr. Alan C. Lloyd (1999-2005), Cindy K. Tuck (2005), Dr. Robert F. Sawyer (2005-2007) and Mary D. Nichols (2007-2020).

[182] Secretary of the Business, Transportation and Housing Agency, Secretary of the Department of Food and Agriculture, Secretary of the Resources Agency, Chairperson of the Energy Commission, President of the Public Utilities Commission.

as Newsom not only served as Lieutenant Governor under Schwarzenegger's successor Jerry Brown, but currently serves as Governor of California since January 7, 2019. However, at this point it already needs to be stressed that there is sort of a strong and long-term coalition of politicians and policy makers in California. While this strong and enduring coalition is expected to share some relevant beliefs and mindsets (e.g. policy goals, perceptions and causal approaches), there is obviously no impeding partisanship.

For the first time in his governorship, Schwarzenegger revealed some tangible reasons for being committed to environmental aspects. He argued to be happy and honored to join the conference as he has *“always been a huge supporter of the environment”*. When growing up in Austria, he was *“surrounded by clean air, crystal clear streams and lakes, magnificent mountains and much more”* When he came to California some decades ago, he also *“found all this beauty” there [...] and today here in California we continue to do everything it takes to protect our environment and keep that beauty”* (ibid.).

In a quite philosophical manner Schwarzenegger argued that civilisation has turned to a better[183] by the development of industrial societies, however, such a progress does not come without negative consequences, such as health related problems. Therefore, progress is necessary to *”turn the clock back”* in terms of drinkable water and breathable air. Against this background, Schwarzenegger highlighted an Environmental Action Plan, which is to *“lead the way in meeting new environmental challenges”*. Furthermore, he referred to the California Hydrogen Highway Network, the already established hydrogen fueling stations and a program to *“replace dirty diesel trucks with clean alternative fuels”* (ibid.).

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[183] He argued that innovation and technology gave us the ability to cure diseases and enable people to live longer.

Moments before signing the Executive Order, Schwarzenegger stated without any ambiguity: "I say the debate is over. We know the science. We see the threat. And we know the time for action is now". By arguing that the long-term utilisation of fossil fuels caused GHG emissions which caused global warming that now directly threatens California he outlined the focus of action in a tangible way. As argued earlier, these statements need to be considered as a clear reflection of external events (climate change and negative effects on California) that trigger policy-oriented learning and ongoing policy change towards a clean and future proof transport and mobility sector in California.

Based on a retrospective consideration Governor Schwarzenegger argued that

> *"Now we do better. And if we do not do something about it, that will be our injustice. So we will take the next big step here in California and mobilize with an aggressive plan to reduce greenhouse gas emissions. We will fully implement California's landmark Greenhouse Gas Law which requires cleaner burning vehicles to be sold in our state starting in 2009"* (ibid.).

Within the closing remarks of his speech, Schwarzenegger emphasised *"California's leadership in the fight against global warming"* and challenged everyone[184] to join commitments as *"the world we live in and what we do to the land, air and water affects all of us"* (ibid.). This statement is considered to be a direct repayment to the George W. Bush Administration's withdrawal from the Kyoto Protocol in 2002. While at the beginning of his first term as Governor, Schwarzenegger was pretty close with his fellow party member, there was a significant estrangement during his second term in office.

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[184] According to Schwarzenegger this accounts not only the United States, but also other nations around the globe.

The overall evolution of the Low-Emission Vehicle (LEV) and Zero-Emission Vehicle (ZEV) Program was significantly decelerated by the already discussed series of three lawsuits. In response to the Agreement of Counsel concerning the LEV/ZEV litigations, the car manufacturers were offered more flexibility by a modification[185] of the existing crediting system[186]. The ZEV credit system is a key element[187] of the Californian ZEV Program as it provides transparency to customers and stimulates higher performance among manufacturers. While a positive credit balance of a car manufacturer not only shows the success of over-compliance with the ZEV regulations, such manufacturers are allowed to use balances to meet the future ZEV requirements as well. Furthermore, they can be traded among car manufacturers as well (see CARB, 2020).

On the basis of the agreement which ended litigations in 2003, CARB modified the ZEV requirements that were to take effect for production year 2005. Likewise, the regulations that affected model years 2005-2008 were decelerated and weakened by the implementation of credit multipliers for specific types of vehicles and technologies. CARB remained to insist on the 10 percent goal[188] and the conventional compliance pathway[189] to fulfil ZEV obligations. In addition to this, 2003 amendments allowed manufacturers to use an alternative compliance pathway. By this, Fuel Cell Vehicles (FCVs) were introduced as a

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[185] Alternative Compliance Path (ACP).

[186] Depending on the type of electric vehicle, credits range from 1 for **N**eighborhood **E**lectic **V**ehicle up to 10 for **Z**ero **E**mission **V**ehicle depending on the range (battery electric). Discounts are foreseen for **A**dvanced **T**echnology **P**artial **Z**ero **E**mission **V**ehicles (clean hybrids) as well as **P**artial **Z**ero **E**mission **V**ehicles (clean gasoline).

[187] Designed for the setting of goals and lowering of costs.

[188] ZEV sales must equal to a minimum share of 10 percent of overall vehicle sales in California.

[189] ZEV requirements can be fulfilled with ZEVs, PZEVs, and AT-PZEVs.

new technology to the ZEV Program and therefore qualified for receiving credits[190] as well (see McConnell et.al. 2019).

In terms of legislation, A.B. 1493 not only needs to be considered as pioneering in terms of ambitious GHG reduction goals, but also as a seminal bill that served as a blueprint for other states. When remembering the theory of policy diffusion and the idea that innovative policies like A.B. 1493 and related programs are going to diffuse / are to be transferred to other states, it is worth to mention that (mainly due to the lack of federal GHG regulations) a group of ten[191] other states have adopted Californian regulations. The possibility to do so has its origins in the Clean Air Act (CAA) of 1970. Therein other states may adopt California's motor vehicle emission standards under Section 177. Regarding this, all standards considered to be identical to such of California[192] that were granted a waiver by the Environmental Protection Agency (EPA) are approved per-se and do not require any additional approval under the terms of Section 177.

Aside from the aspect of policy diffusion, A.B. 1493 also set the basis for a number of successive regulations in California. After being both the author and the driving force regarding the formulation of A.B. 1058 / A.B. 1493, Pavley[193] started to author A.B. 32 as a multi-sector[194] approach in order to reduce emissions by establishing a set of a) short term, b) mid-term and c) long-term

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[190] FCVs are qualified for 40 credits as they were considered as new technology under ZEV regulations.

[191] Connecticut, Maine, Massachusetts. New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington

[192] Any California vehicle emissions standards must meet or exceed federal emission regulations in order to qualify.

[193] Pavley was elected to Cal. State Assembly in 2000 and served the maximum of three terms until November 30, 2006.

[194] While A.B. 1493 was focusing on tailpipe emissions, A.B. 32 was not limited to a specific sector.

targets for the reduction of GHG emissions. The initial draft of the bill was introduced to legislation on December 6, 2004 and had the overall aim to expand the existing emission reductions from transport and mobility (A.B. 1493) to other sectors as well. This evolution clearly illustrates a positive notion of path dependence (beneficial changes) as the underlying policy subsystem is continuously refined and advanced within self-reinforcing processes that are shaped by (the same) actors and coalitions.

As argued earlier, the California Climate Action Registry[195] was introduced via S.B. 1771 in 2001 and established a voluntary GHG emission reductions registry. As the large GHG emitters of California were quite active in reporting their emissions, it was assumed that switching from voluntary to mandatory measurements would not be opposed significantly. Nevertheless, early-mover incentives in terms of viable and robust mandatory reporting activities were both stimulated and rewarded via credits.

As Fran Pavley[196], author of A.B. 1058/A.B.1493 (and now A.B.32) was back-then elected to Assembly with the support of Terry Tamminen (now Secretary of Cal/EPA), it is quite easy to understand a close connection[197] among these two significant actors exists. In addition to that, Tamminen already proved to successfully serve under Governor Schwarzenegger, as he was one of the masterminds behind the development of CaH2Net. When additionally remembering the World Environment Day Conference in San Francisco on June

[195] https://www.climateactionreserve.org/about-us/california-climate-action-registry/

[196] Parts of this section are based on an interview of 2021 – see: California State Archives, 2022.

[197] Anne Baker who assisted Pavley with A.B. 1493 started to work at Cal/EPA under the lead of Tamminen.

1, 2005 and Schwarzenegger's Executive Order[198] S-3-05[199], these ingredients not only constitutes the thematic starting point of A.B. 32, but also the kind of straight-forward legislative process behind it. Again, this is considered to be an example for a long-term policy continuity that is connected with both policy legacies and path dependence. Likewise, the members of a strong and extensive coalition (with a common set of beliefs and mindsets) are vital part of this success story in California.

The overall aim of the existing policy and subsequently the follow-up legislative process that resulted in A.B. 32 was to put the contents of Executive Order S-3-05, especially the GHG emission reduction targets for the years 2010, 2020, and 2050 (see above), into a stable[200], long-lasting[201] and effective[202] bill. Furthermore, the intention was to put the independent California Air Resources Board (CARB) with its enforcement authority in charge for reaching those targets efficiently.

As a result to this, the 2020-targets were in focus of the draft version of the bill called for a public participation process in order to "determine what the statewide greenhouse gas emissions level was in 1990, and approve in a public hearing, a statewide greenhouse gas emissions limit that is equivalent to that level, to be achieved by 2020" (see Cal. A.B. 32, as of December 6, 2004). This goal was underlined by the provision of three related tasks that included that

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[198] It is worth to mention that Executive Orders, in contrast to bills, are most probably only effective during the time-period where the topic is under debate. Likewise, Executive Orders can be replaced by the follow-up administration.

[199] The Executive Order set the threefold aim of near-term, midterm, and long-term GHG emission reduction targets.

[200] The aim was to prevent that special interest groups are going to weaken the targets during time.

[201] Both the reduction of GHG emissions and the mitigation of climate change take long-term efforts.

[202] Implementation needs to be supported by research, monitoring and enforcement activities.

GHG emission reductions: a) remain effective unless amended or repealed, b) serve as basis for further reductions beyond 2020, and c) are to be matter of recommendations to both Governor and Legislature for continuous improvement. By this and strictly according to Executive Order S-3-05, Assembly Bill 32 was meant to not only put a cap on GHG emissions, but also to bring them back to 1990 levels by 2020.

During the legislation process and until the end of 2005, the bill was referred to and discussed by several Committees, including the ones on Natural Resources, Appropriations, Rules, and Environmental Quality. From its second reading, followed by amendments and a re-referral to the Committee on Environmental Quality A.B. 32 was then co-authored by then-Assembly Speaker Fabian Núñez (Democratic Party). Obviously, his task was neither to modify the formulations of the bill, nor to attend the numerous committee hearings. His main task was to directly negotiate[203] with the Governor's office as both Núñez and Schwarzenegger wanted a strong focus on market-based[204] approaches within the bill. Against this background, the productive collaboration between Schwarzenegger and Núñez was probably because of an existing consensus regarding the policy core (market-based approaches). Regarding this, they obviously had a common belief of how they are going to achieve their policy goals (secondary beliefs).

As a result to this thematic focus and line-up of above protagonists, A.B. 32 was mainly about the GHG emission reductions targets of Executive Order S-3-05 in

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[203] Linda Adams who was appointed as new Secretary of Cal/EPA in May 2006 joined the Governors negotiation team.

[204] This led to the surprising fact that the bill has many supporters from Californian industry, as well as nationwide.

combination with some parts of already existing policies[205] that focused on energy savings[206] in the state of California. As argued by Pavley, the bill was not (mainly) about *"cap and trade [as] actually 80 percent of A.B. 32 included the tailpipe bill that was being implemented, along with the RPS[207] bill that had passed under separate statute. [...] So the new part of AB 32 was that additional 20 percent reductions that would be identified through the scoping plan process[208]"* (California State Archives, 2022, p. 44).

This situation reflects that members of a coalition may also have different beliefs of how to achieve their common policy goals. While such kind of secondary beliefs are subject to changes, especially in terms of policy-oriented learning, there are rarely changes in terms of the shared goals (policy core beliefs) of an existing coalition.

While being quite clear about the majority of actual contents of the bill, one open question remained: what agency would be in charge of implementing A.B. 32. While Schwarzenegger (as well as the Republican Assembly members) again[209] preferred the California Environmental Protection Agency (Cal/EPA) to be in charge, Pavley (as well as the Democrats in Assembly) strongly insisted[210] that this time it would be the California Air Resources Board (CARB) who will be fully in charge. This circumstance proves that the idea of negotiated agreements is not exclusively to be applied to opposing coalitions, but also to the process of opinion building within a coalition.

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[205] In terms of biofuels, see Executive Order S-06-06.

[206] Existing standards for household electrical appliances.

[207] Renewables Portfolio Standard Program that was established in 2002 by Senate Bill 1078.

[208] Based on market-based mechanisms.

[209] See CaH2Net and A.B. 1493.

[210] Although CARB was mainly working on mobile sources of air pollution, it had a highly qualified staff of engineers, scientists and policy experts (see California State Archives, 2022).

Aside from the decision of leadership, several other issues were not settled as well, which caused that negotiations continued and almost collapsed due to the limits[211] of the 2005-2006 Legislative Session. During August 2006, the bill underwent several amendments by the Committees on Appropriations, Rules, and Natural Resources. On August 23, 2006, Senate made some major amendments to the bill when explicitly naming CARB to be in charge for both coordination and implementation. Until then, the bill included the creation of dedicated Greenhouse Gas Reduction Council, that - together with all kinds of issues about membership therein, as well as powers and duties thereof most probably would have led to an enormous bureaucracy.

Considered to be a compromise (negotiated agreement) regarding the preference of Schwarzenegger (and the Republicans in Assembly) to entitle Cal/EPA, a so called Climate Action Team was introduced to be established by the Governor of California in order to “coordinate the efforts set forth under Executive Order S-3-05 continue its role in coordinating overall climate policy”. (A.B. 32, as of August 23, 2006). By that, the Legislature passed the bill within the last 30 hours of the session period with a vote of 47: 32. On September 5, 2006 the bill was enrolled and sent to Governor Schwarzenegger. Few weeks later, Assembly Bill 32, the so called Global Warming Solutions Act of 2006 was signed into law by Governor Schwarzenegger on September 27, 2006.

In retrospective it is quite interesting to take also a brief look at the co-author of A.B. 32, then-Assembly Speaker Fabian Núñez. He first became a Member of the California State Assembly on December 2, 2002 and was elected on February 9, 2004 at the age of 37 to be its speaker. During a brief speech after being appointed as Assembly Speaker, Núñez said: “Some say we’re hopelessly

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[211] Any bill that has not passed until August 31 would have automatically lapsed

divided in this house. They say that Republicans and Democrats cannot get along. But however different we may be, there is far more that unites us than divides us. [Therefore] we should reestablish this great legislative body as the house of ideas and more importantly, we must work together for the benefit of all Californians" (Los Angeles Times, 2004). These statements are quite similar to those, Governor Schwarzenegger presented in his Inaugural Address[212] about a year before. This quite similar spirit[213] and especially the California-centred[214] perception of both could be the reason why they were working together on A.B. 32 in a quite productive way. According to the Governing Magazine who named Núñez 'Public Official of the Year' in 2007, Núñez "has played a classic legislative leadership role as the bridge between a Republican governor and a strongly liberal majority Democratic caucus, helping to forge and shepherd through a long list of impressive legislation over the past couple of years" (Governing, 2007). The close and fruitful collaboration between Schwarzenegger and Núñez is considered to be a unique paradigm for the bipartisan efforts in California.

After leaving Assembly due to a term limit of six years, Núñez started to work at a bipartisan public consulting company[215] together with Governor Schwarzenegger's former communications director Adam Mendelsohn. As one of the last commonalities between Núñez and Schwarzenegger it is worth to mention that then-Governor Schwarzenegger commuted a 16-years-in-prison

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[212] Took place on November 17, 2003 – see earlier in this section.

[213] Democrats praised Núñez to be passionate, patient and hard-working, in order to bring good jobs, health care, safe neighbourhoods and affordable college educations to Californians (see Los Angeles Times, 2004).

[214] It can be argued that both of them do put California first.

[215] Mercury Public Affairs, see: https://www.latimes.com/archives/la-xpm-2008-nov-27-me-briefs27.s1-story.html.

sentence of voluntary manslaughter against the son of Núñez to just seven years in prison (see Los Angeles Times, 2016a).

On October 17, 2006, Governor Schwarzenegger signed another Executive Order that needs to be considered as part of the overall evolution of the ZEV Program within the state of California. Executive Order S-20-06 directly builds upon prior S-3-05 that has outlined the GHG emissions reductions for 2010, 2020, and 2050. Besides the quite controversial[216] fact that the Secretary[217] of Environmental Protection (Cal/EPA) would again be in charge[218] of overall coordination activities, the Climate Action Team[219] was involved as well. Likewise, the reference to Assembly Bill 32 was explicated by highlighting the requirement to a) introduce a cap on GHG emissions by 2020, b) implement mandatory emissions reporting, and c) to develop a "market-based compliance program to achieve the emissions cap in the most cost effective and technologically feasible manner with the least impact on California consumers and business" (Executive Order S-20-06).

Due to being an important issue to both Schwarzenegger and Núñez, the development of a market-based compliance program took quite some space within Executive Order S-20-06 (to be considered as evidence for path

[216] This was considered as a breach of promise by some Democrats in Assembly who privileged CARBs primacy.

[217] While Terry Tamminen left administration in 2006, Linda Adams was appointed as the first woman ever to serve as Secretary of the California Environmental Agency (CalEPA).

[218] Cal/EPA designated as the statewide leader for GHG emission reduction programs in California, should work with the Climate Action Team, and shall coordinate with CARB in terms of GHG emission reduction policies and A.B. 32.

[219] Secretary of the Business, Transportation and Housing Agency, Secretary of the Department of Food and Agriculture, Secretary of the Resources Agency, Chairperson of the Air Resources Board, Chairperson of the State Energy Resources and Conservation Development Commission and President of the Public Utilities Commission.

dependence and policy continuity). Within three paragraphs, the foreseen development process was outlined in detail whereat Cal/EPA was requested to *"create a Market Advisory Committee of national and international experts"* in order provide CARB with recommendations regarding a market-based compliance program (ibid.). Regarding this, CARB was requested to collaborate with Cal/EPA and the Climate Action Team in order to implement regulatory measures as well as market-based mechanisms.

Assembly Bill 32 and its focus on market-based mechanisms is oftentimes related to a Cap-and-Trade approach where a maximum amount of 'allowed' GHG emissions is combined with tradable[220] allowances. As a result to this, polluters may either reduce their own emissions by implementing clean technologies and renewable energies, or they may buy[221] allowances from others via the Cap-and-Trade mechanism. The latter option is mostly relevant for industries that cannot (significantly) reduce GHG emissions (e.g. steelworks, cement mills, glass factories, etc.) and therefore need to compensate their GHG emissions via tradable allowances. The idea of implementing an overarching emissions trading program was to permit the trading of such allowances/credits not only within the U.S., but also with the European Union and other emissions trading schemes around the world.

Only few weeks after Governor Arnold Schwarzenegger signed Executive Order S-20-06, Fran Pavley, lead-author of A.B. 1493 and A.B.32 had to leave the California State Assembly on November 30, 2006, due to reaching the then-existing term limit of six years. By this day, Governor Schwarzenegger was

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[220] Allowances are comparable to a fee - either you cut emissions or you have to pay the fee (buy allowances). Herewith, the differentiation to a tax is quite essential as introducing a bill about tax issues demand a majority of 2/3 of the votes.

[221] Sometimes the buying of allowances is called the "pay-to-pollute" approach.

already re-elected as the 2006 California gubernatorial election took place on November 7, 2006. Due to the fact that he got elected the first time in a recall election[222] his first term in office was not a full term of four years as he served out the remainder of his predecessor Gray Davis.

To win again at the 2006 California gubernatorial election was not clear beforehand, as Schwarzenegger lost large parts of his former supporters. Therefore, in contrary to his first months in office when about two-thirds of California voters approved him, by April 2006, approval rating dropped to a low of less than 40 percent[223]. While his early peaks in popularity were mainly due to actions like the repeal of a quite unpopular vehicle registration fee, the lowest level in popularity was mainly due to his numerous out-of-favour decisions that mostly offended[224] nurses, teachers, and fire-fighters that were organised in quite powerful unions. Aside from that, the special election that was called by Schwarzenegger in November 2005 turned out to be an expensive[225] disaster as California voters rejected[226] all eight ballot propositions.

However, just like the famous quote in his movies (I'll be back) Schwarzenegger went back to his basics[227] and thereby accomplished a remarkable political

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[222] Recall election took place on October 7, 2003 thereby Schwarzenegger took the ongoing term of his precursor Davis.

[223] http://www.ocregister.com/ocregister/news/state/stateelections/article_1100965.php

[224] Schwarzenegger stopped the further implementation of laws that were started by his precursor Davis, who was known for focussing on education, healthcare and public service.

[225] In order to promote their special interests, lobby groups probably spent hundreds of millions of dollars (see https://www.labornotes.org/2006/02/california-nurses-lead-fight-against-arnold-schwarzeneggers-anti-union-ballot-measures.

[226] https://www.nytimes.com/2005/11/09/us/california-voters-reject-schwarzeneggers-plan.html

[227] Mainly by returning to his early promise to work for California by an inclusive, bipartisan strategy.

turnaround[228] and ended up in solidly defeating his Democratic opponent, Phil Angelides, by a lead of 17 percent.

When arguing about the back-to-basics approach of Schwarzenegger's second term as Governor, the appointment of Mary Nichols as chair of the California Air Resources Board (CARB) needs to be considered as another landmark within the evolution of the Californian LEV/ZEV Program. At the end of June 2007, Dr. Robert Sawyer was replaced as chair of CARB as a result of seemingly unbridgeable differences. While Sawyer claimed to be fired because of "his disagreements with the governor's office" in terms of implementing early action measures to slow down global warming. In contrary to this, Schwarzenegger's deputy chief of communications, Adam Mendelsohn, stated that "the governor's office did not think the air board or its staff were moving aggressively enough on air pollution and global warming" (Los Angeles Times, 2007a).

Mary Nichols, who sued the U.S. Environmental Protection Agency (EPA) and its Administrator William D. Ruckelshaus on September, 6 1972, already served at CARB as Board Member (1974-1978) and subsequently CARB Chair (1979 - 1983) under Governor Jerry Brown. Against this background, the re-appointment[229] of Nichols (Democrat) by the Republican Governor Schwarzenegger is definitely a proof for his back-to-basics approach when he argued that Mary Nichols was simply the best person for this job[230]. During a

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[228] https://www.theguardian.com/world/2006/nov/08/midterms2006.usa11

[229] Several years ago, under the Governorship of Jerry Brown, Nichols was already appointed as chair of CARB. Furthermore she served as Secretary of Natural Resources under Schwarzenegger's precursor Gray Davis.

[230] The primary job was to implement A.B. 32 – The Global Warming Solutions Act of 2006 and to move towards a low-carbon economy in the state of California, mainly by implementing a market-based cap-and-trade program.

news conference he argued that: “There is no one more qualified, more committed and more able to lead our efforts on climate change and air quality” (Los Angeles Times, 2007b).

The staffing /cast of characters does not only reflect the strong and stable coalition within this policy area, but also emphasises the continuity in both policies and personnel as well. As a result to this, the overall transition process towards a clean transport and mobility sector of the future was getting closer.

Nevertheless, it is important to mention that - due to considerable delays[231] and a lack of enforcement activities regarding the implementation of the LEV/ZEV Program - there was a need[232] for stronger and more experienced leadership at CARB. Due to the fact that two top board officials of CARB were abruptly terminated by the Schwarzenegger administration, a modified approach towards the reduction of GHG emissions and improving air quality was in evidence. Against this background it needs to be stressed that such coalitions may be quite stable, but are also subject to modifications, especially within the administrative machinery of involved agencies.

While before and at the beginning of this first term as Governor of California, Schwarzenegger was buddy-buddy[233] with then-President George W. Bush, things have gone quite different until the end of 2005. Close to the special election that was called by Governor Schwarzenegger he refused to meet President Bush during a short stop-over in Southern California. Schwarzenegger was not amused when Bush came to California for raising

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[231] See 2001 litigations, the related agreement and its consequences earlier in this section.

[232] Aside from every-day-business related to the ZEV program, CARB had to take care of implementing A.B.32 as well.

[233] https://www.nbcnews.com/id/wbna3225852

money close to the special election when stating: “We would have appreciated it if he had done his fundraising after November, 8” (NBC News, 2005). After fatally losing[234] the special election, this occasion was probably one of the reasons that the former close relation between Schwarzenegger and Bush began definitely to break off.

On December 21, 2005 the California Air Resources Board (CARB) requested a waiver of pre-emption under Clean Air Act (CAA) section 209(b) for California’s GHG emission regulations[235] that were considered to take effect from model year 2009 onwards. Attached to the letter[236], which was sent from Catherine Witherspoon, Executive Officer at CARB to Stephen Johnson, EPA Administrator, was CARB’s Executive Order G-05-061[237] that was to adopt regulatory terms with related findings. Furthermore, the waiver request included a comprehensive support document[238] that outlined GHG emissions regulations, as well as a list[239] of 25 pertinent documents.

As argued beforehand, the CAA of 1970 gives California special authority to implement air pollution standards different to those at the federal level. As long as such kind of standards in California are: a) at least as protective of public health and welfare as applicable federal standards, b) not needed to meet compelling and extraordinary conditions, and c) consistent with Section 202(a) of the Clean Air Act, EPA shall grant a waiver (see CAA section 209 - State Standards). Without an approved waiver from EPA, such standards may not go

[234] California voters rejected all eight ballot propositions that were introduced by Schwarzenegger.

[235] The adoption and amendments of existing regulations were approved by CARB at the end of September 2005.

[236] https://downloads.regulations.gov/EPA-HQ-OAR-2006-0173-0017/content.pdf

[237] https://downloads.regulations.gov/EPA-HQ-OAR-2006-0173-0004/attachment_1.pdf

[238] https://downloads.regulations.gov/EPA-HQ-OAR-2006-0173-0004/attachment_2.pdf

[239] https://downloads.regulations.gov/EPA-HQ-OAR-2006-0173-0004/attachment_3.pdf

into effect in California. When a waiver request such as the one of December 2005 is filed, EPA is obliged to publish a notice for a public hearing as well as for written comments in the Federal Register. On the basis of the public hearing and received written comments, EPA starts a review process that results in a declaration if requirements for obtaining a waiver are fulfilled.

After quite a while, on February 21, 2007, William Wehrum, EPA Acting Assistant Administrator[240] for Air and Radiation sent a letter in response to the waiver request of December 2005 to CARB's Catherine Witherspoon. Therein, EPA referred to a case[241] that was brought to the United States Supreme Court, dealing with Massachusetts adoption of Californian GHG regulations (see policy diffusion paragraph earlier in this section). EPA argued that there is no state authority[242] under the CAA to regulate GHG emissions in order to tackle global climate change. According to the pending[243] lawsuit, EPA argued that the Supreme Court's decision "could be directly relevant to issues EPA must address in the context of CARB's waiver request", why EPA announced will wait until the court's decision will be available[244] (U.S. EPA, 2007a).

As the Supreme Court basically confirmed[245] EPA's authority to regulate GHG emissions, California's waiver request, together with the appendixes, was published online. Same was true for the Federal Register notices in terms of the

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[240] Stephen L. Johnson was EPA's Administrator (first career employee / first scientist), who was nominated by President Bush and confirmed by the United States Senate on April 29, 2006.

[241] Massachusetts versus EPA, No. 05-1120.

[242] According to the perception of EPA this is neither the case for Massachusetts, nor for California or any other state.

[243] Aside from that, EPA referred to other cases like the Central Valley Chrysler-Jeep versus Witherspoon.

[244] This issue was resolved by the Supreme Court on April 2, 2007.

[245] The Supreme Court ruled 5:4 that GHGs were considered as air pollutants and are subject to the federal government.

Opportunity for Public Hearing[246], as well as the Opportunity for Second Public Hearing[247], published on April 30, 2007, respectively on May 10, 2007. The first public hearing was held in Arlington, Virginia on May 22, 2007, the second one in Sacramento, California on May 30, 2007.

On the occasion of a testimony[248] of EPA Administrator Johnson at the Committee on Environment & Public Works on July 26, 2007 he was urged by California's Senator Boxer then-chairman, Governor Schwarzenegger, and Attorney General Brown to speed up[249] the waiver process. While Johnson briefly presented the tasks that were already performed, he highlighted that EPA held two public hearings instead of one (EPA's normal practice). During the written comment period (closed on June 15, 2007) more than 60,000 comments were received. Johnson argued that comments are to be examined which takes its time. Nevertheless, he has committed to issue his decision by the end of 2007.

On December 19, 2007, almost two years after CARB requested the waiver[250], EPA's Administrator Johnson wrote a letter to Governor Schwarzenegger, informing him that he "*decided that EPA will be denying*[251] *the waiver*" and "*appropriate documents setting forth the rationale for this denial*" will be signed by

[246] https://www.govinfo.gov/content/pkg/FR-2007-04-30/pdf/E7-8168.pdf

[247] https://www.govinfo.gov/content/pkg/FR-2007-05-10/pdf/E7-9025.pdf

[248] https://archive.epa.gov/ocir/hearings/testimony/110_2007_2008/web/pdf/2007_0726_slj.pdf

[249] Schwarzenegger and Brown threatened to sue EPA if a decision was not to be in place by October 2007. Subsequently, the state did indeed file a suit against EPA on November 8, 2007.

[250] In case of a waiver approval, California and 16 other states would have implemented standards to cover at least 50 percent of all vehicles sold in the U.S.

[251] Decision was probably taken against the unanimous advice of EPA's technical and legal staff.

him as soon as possible (U.S. EPA, 2007b). The denial[252] was mainly justified by the argument that compared to all of the other waivers requested by California regarding air pollutants, this waiver requested for GHGs was completely different as *"unlike pollutants covered by the other waivers, greenhouse gas emissions harm the environment in California and elsewhere regardless of where the emissions occur"*. Johnson argued that *"California does not have a need to meet compelling and extraordinary conditions"* (ibid.).

Aside from denying the waiver request of California, the decision of EPA also prohibited other states that have adopted Californian GHG emission standards to do so. During a press conference call Johnson defended EPA's decision as "the Bush administration is moving forward with a clear national solution[253], not a confusing patchwork of state rules. I believe this is a better approach than if individual states were to act alone" (The New York Times, 2007b).

As a reaction to EPA's refusal of the waiver request and the letter from Johnson Governor Schwarzenegger promised to bring the issue to federal court in order to reverse the decision. He said:

> *"It is disappointing that the federal government is standing in our way and ignoring the will of tens of millions of people across the nation. We will continue to fight this battle"* (ibid.).

[252] First time ever California was refused to impose stricter rules as more than 50 waivers were granted before.

[253] While the federal law was to include a higher miles-per-gallon ratio, the overall focus was quite weak and unclear.

Likewise, California Attorney General, Jerry Brown[254], argued that the decision fully ignored a long-term and successful history of EPA granting waivers to California that has compelling and extraordinary conditions to be met via its own standards and regulations. Andrew M. Cuomo, then-Attorney General of New York (later Governor of New York from 2011-2021) announced that the state would challenge EPA's decision as EPA's Administrator Johnson *"cited federal law, not science, as the underpinning of his decision"* (ibid.).

On March 6, 2008 EPA's waiver denial (dated to February 29, 2008)[255] was formally issued in the Federal Register. Therein, Johnson exclusively justifies his decision by referring to section 209(b)(1)(B)[256] of the Clean Air Act (CAA) and argues that according to his finding "California does not need its GHG standards for new motor vehicles *to meet compelling and extraordinary conditions*" which was again just duplicating the text of federal law letter-by-letter.

Aside from the pure waiver denial for California he explicitly outlined that, *"because other states have adopted or may adopt California's GHG program for new motor vehicles [...] this decision will also affect those states and those persons in such states"* (Federal Register, 2008, pp. 1268-1269). As a matter of fact the decision of Johnson not only harshly stopped the implementation of stricter GHG emission standards in California, but in all of the other so called Section-177-states[257] within the United States as well.

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[254] Jerry Brown was Governor of California (1975-1983) and will later on become Schwarzenegger's successor which makes him the only Governor that served a total of four terms.

[255] https://www.govinfo.gov/content/pkg/FR-2008-03-06/pdf/E8-4350.pdf

[256] Includes: "Such State does not need such State standards to meet compelling and extraordinary conditions".

[257] https://www.transportpolicy.net/standard/us-section-177-states/

As a result to this, Governor Schwarzenegger and several others of the affected states[258] immediately filed suits against EPA to reverse the decision of Administrator Johnson. As a result, two petitions for review were filed at the U.S. Court of Appeals, the first from the state of California (together with 15 other states[259]), the second was filed by a coalition of six environmental groups.

In contrast to the litigation strategy of affected states, car manufacturers literally cheered and praised the decision of EPA's Administrator Johnson. For example, David McCurdy, then-president of the Alliance of Automobile Manufacturers said: "We commend EPA for protecting a national, 50-state program. Enhancing energy security and improving fuel economy are priorities to all automakers, but a patchwork quilt of inconsistent and competing fuel economy programs at the state level would only have created confusion, inefficiency and uncertainty for automakers and consumers" (The New York Times, 2007a).

The aftermath of the waiver denial - especially the role of EPA Administrator Johnson - is to be analysed in more detail, as it is considered as quite important for the upcoming pathway towards GHG emission reductions in California as well as in numerous other U.S. states. While the first legal suits were filed immediately after EPA's decision was made public, the U.S. Senate started investigations already a bit earlier. On February 27, 2008, during a hearing[260] of the Committee on Environment and Public Works on the EPA budget for financial year 2009, especially then-chair U.S. Senator Barbara Boxer (Democrats

[258] New York, New Jersey, Connecticut, Maine, Maryland, Massachusetts, New Mexico, Oregon, Pennsylvania, Rhode Island, Vermont and Washington.

[259] New York, Massachusetts, Arizona, Connecticut, Delaware, Illinois, Maine, Maryland, New Jersey, New Mexico, Oregon, Rhode Island, Vermont, Washington, and the Pennsylvania Department of Environmental Protection.

[260] Due to the extensive transcript of the three hours hearing only a brief overview with a small selection of questions and testimony is presented in the following.

California) as well as other Democratic Senators took the opportunity to confront Administrator Johnson with a series of questions regarding EPA's denial of the California Vehicles Waiver.

Johnson was asked for the reasons for denying the waiver as the first ever within a history of almost five decades. Furthermore, questions about the overall decision making process were raised, especially in terms of the scientific reasoning. Within several (in parts obviously repeating statements) EPA's Administrator Johnson emphasised that he was the only person in charge as he argued: *"Certainly, the California waiver was my decision under the Clean Air Act and mine alone. I made the decision, I made it independently, I carefully considered all the comments and I made that decision"* (U.S. Congress, 2008, p. 80).

When Johnson was confronted with the substantial delays[261] in terms of the overall waiver process, caused by the fact he waited for a lawsuit to be decided by the Supreme Court (earlier in this section) he testified that:

> *"First, the issue on the California waiver is not whether there is or isn't global climate change. And I am directed under Section 209, as we discussed, to look at the criteria. That is what I did. I evaluated it, I made the decision, I have committed to both Chairman Boxer and the Governor to have that documented completed by the end of this month, which means Friday. And I intend to meet that deadline. Second is that we have staff who are active participants as part of the IPCC process. It is a very good process, a group of highly qualified scientists. And in fact, as you will see later this week, the scientific rationale for my decision, which I believe is the right decision on the California waiver, I understood that Members of Congress and others disagree with that decision. As*

[261] On December 21, 2005 CARB requested the waiver that was denied on December 19, 2007, almost two years later.

> *I said, I will have my final decision out, the documentation out by the end of the week"* (ibid., p. 89).

Senator Boxer directly asked Johnson, if he received any advice *"from the President, the Vice President, the White House staff, anyone over there in terms of the waiver"* (ibid., p. 95). Furthermore, she asked about the delivery of e-mails regarding discussions with the Bush Administration about the California waiver issue. In response to that, Johnson testified: *"As I said at the last hearing, it was my decision and my decision alone. It is my responsibility under the Clean Air Act and I made the decision. I made the decision as Administrator of EPA. With regard to the documents, as I said at the last oversight hearing, and I will quote from page 55 of the transcript, I commit to provide you those documents as quickly as possible."* (ibid.).

Senator Whitehouse asked about the discussions regarding the California waiver issue and wanted to know if there were contacts to the Bush Administration. Johnson repeatedly argued that he as Administrator as well as EPA and its staff is in regular contact with other agencies and the White House. When Senator Whitehouse wanted to know: *"Did you go beyond your reporting on the time status of the waiver decision? Was there in fact White House input into that waiver decision through this routine conversation?"* Johnson repeatedly stated: *"Again, as I have stated and will state again, the decision was mine, solely mine. I heard a wide range of comments from inside the agency, outside the agency, I was presented with a range of options. I made the decision. It was my decision and my decision alone"* (ibid., p.105).

While Senator Whitehouse kept on asking about the means of communication between EPA and the Bush Administration, he further argued that there might be some *"improper informal means of communication from the White House into that [waiver] process"*. Johnson's response was quite simple when stating: *"I have not* *violated any laws or regulations in the decision making process. And as I said, my decision, my decision alone, I made the decision and you will see it on or before Friday"* (ibid., p. 106).

When Senator Whitehouse asked about viable options to a denial of the waiver and if there was any advice that such a step *"would withstand arbitrary and capricious standard review"*, Johnson kept on repeating: *"Again, all the options that were presented to me were presented as options, legally viable options for me to consider. Obviously with anything that we do in the agency, there is litigation risk. Again, I have to make my decision based upon what the law directs me to do and that is what I said that I have done"* (ibid. p. 108).

Few months later in mid-may 2008, Boxer again referred to a potential influence that the White House made in order to guide EPA's denial of California's waiver request when she said: *"clearly the Bush Administration at the highest levels killed the California waiver. The people of California and the other states have a right to know how this indefensible decision happened, and we demand that EPA and the Bush White House turn over the documents we have asked for immediately"* (U.S. Senate, 2008). When car manufacturers were about start again a coalition against California's attempt to keep on implementing GHG standards, Governor Schwarzenegger harshly told them to *"Stop whining!"*[262], as no pressure from industry will prevent California from imposing strict emission standards for vehicles sold in the state.

Mid-July former EPA deputy associate administrator Jason Burnett (who resigned in June 2008) confessed that EPA Administrator Johnson was initially

[262] https://www.nbcnews.com/id/wbna24540416

in favour[263] of granting[264] the requested GHG waiver to California. However, after the White House contacted Johnson and made him clear that Bush is against California's approach to set own standards, *"the administrator knew the president's preference for a single (national) standard"* (SFGATE, 2008). On July 29, 2008 a coalition of four[265] Democratic Senators announced to call up United States Attorney General Michael Mukasey (Republican Party) to start investigations whether Johnson made false statements during his Congressional hearings earlier in 2008.

On June 27, 2008 U.S. Senator Boxer reported that bill S. 2555[266] "Reducing Global Warming Pollution from Vehicles Act of 2008" was approved without amendment by U.S. Congress. The bill was to instruct President Bush to sign the California waiver in order to allow California, but also all the other Section-177-states[267] to implement stricter GHG emission reductions standards than the federal one. In sum, these states represented more than half of the U.S. population.

Within the second half of 2008 there were no further steps towards a review of EPA's waiver denial as the decision of Administrator Johnson was confirmed

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[263] In December 2007, a communication between EPA officials and the White House stated that elevated GHG levels in the California waiver context may "reasonably be anticipated to endanger public welfare" (SFGATE, 2008).

[264] According to Burnett, Johnson had some remaining legal questions, however his trend was clear pro-waiver).

[265] Barbara Boxer, Sheldon Whitehouse (Rhode Island), Amy Klobuchar (Minnesota), Frank Lautenberg (New Jersey).

[266] https://www.congress.gov/110/bills/s2555/BILLS-110s2555rs.pdf

[267] Altogether 14 other states: Arizona, Connecticut, Florida, Maine, Maryland, Massachusetts, New Jersey, New Mexico, New York, Oregon, Pennsylvania, Rhode Island, Vermont and Washington adopted California standards In addition to this, Colorado, Delaware, Illinois, and Utah were thinking about steps to adopt California standards.

and backed by President Bush. Mainly due to the fact that Bush preferred a single, national solution instead of having several, state-level standards, he had signed a federal law to increase the miles-per-gallon ratio to 35 by 2020.

When considering the role of EPA under the Bush Administration, it needs to be stressed that the former independent and authority-based agency lost both its independency and strength while becoming a servant for Bush's political agenda. Several former directors of EPA confirm this by the statements they made in late 2008 when they argued that the agency totally forgot about their initial role to protect the environment and is now weak and demoralised. For example, William K. Reilly, former EPA's Administrator stated that *"for a long time, conservatives have said follow the science, and in the climate-change decision, [However, EPA] did not follow the science - it abdicated leadership and responsibility"*. Likewise, former-EPA Administrator under Presidents Nixon and Ford argued that this event was "a real failure of leadership, EPA has become a nonentity" (PENNLIVE 2008).

When moving forward in re-tracing the evolution of the Californian LEV/ZEV Program, two important events need to be considered during the time-period of end 2008 and January 2009. The first one is dealing with the overall situation in Washington D.C., namely the Presidential Election that took place on November 4, 2008. The second one is focussing on the state-level of California, namely the California Senate election that took place on December 1, 2008. Despite the different scope, both elections resulted in a change of leadership which definitely mattered when focussing on the overall consequences for the evolution of the LEV/ZEV Program in the state of California as well as the other Section-177-states.

Regarding the so called section-177-states it is vital to stress that these states have adopted the Californian rules and standards into their own transport and mobility sectors. Within such kind of policy diffusion the adoption of specific policies by other states can also be defined as policy innovation as such policies and programs are entirely new to them.

When heading back to the main story, after the maximum of two terms[268] in office, Republican President Bush was not allowed to run for another term as U.S. President. Against this background, the United States Presidential Elections were definitely about to bring substantial change in several ways. Against this background, the partisan and confrontational conflict between the federal government and California was finally about to come to an end.

The Presidential Election was held on November 4, 2008 to decide if either Team Obama[269] or Team McCain[270] would form the next Presidential administration in Washington. The election resulted in a clear victory of Obama that achieved a popular vote of 52.9 percent against McCain's 45.7 percent. After obviously being fed-up from the Bush Administration and eight years of crisis and negative mood, Obama was considered as a new type of candidate and the right type of candidate at that time. This mood for a new beginning was also underlined by the slogan of his campaign "Change we believe in" and the chant "Yes We Can" (The Washington Post, 2012). The inauguration of Barack Obama as the 44th president took place on January 20, 2009.

On January 21, 2009, the day after Obama took office, Governor Schwarzenegger sent a letter to President Obama. Likewise CARB chair Mary

[268] The two-term-limit was established by the 22nd Amendment.

[269] Barack Obama, then-Senator of Illinois and his running mate Joe Biden, then-Senator of Delaware.

[270] John McCain, then-Senator of Arizona and his running mate Sarah Palin, then-Governor of Alaska.

Nichols sent a letter to EPA Administrator-Designate[271] Lisa P. Jackson, a devoted scientist[272], regarding the reconsideration its March 6, 2008 *"decision (73 Fed.Reg 12156) denying California's request for a waiver of preemption to enforce its adopted new motor vehicle greenhouse gas emission standards"* (CARB, 2009, p. 1).

Within the letter Nichols argued that EPA has an "inherent authority to reconsider the denial and should do so" as more than three years have passed since the waiver was originally requested to continue the pioneering role of California regarding air pollution regulations. Furthermore, Nichols underlined that *"the former Administrator's denial decision misinterpreted the Clean Air Act to set new flawed tests and then misapplied facts to these new tests in order to deny the waiver"* (ibid.). As result to this, Nichols asked EPA initiate a reconsideration process *"in a speedy timeframe due to the previous, extensive comment input and the limited scope of the issues to be reconsidered"* (ibid.). According to Nichols such a process, is not about new information (as all the facts are available), it will be exclusively about a proper evaluation and reconsideration as the former Administrator[273] not only misinterpreted the Clean Air Act, but also made faulty assumptions, improper evaluations, inconsistent comparisons, and misleading conclusions.

Likewise, Johnson *"ignored substantial evidence that the greenhouse gas regulations will also reduce traditional smog-related emissions"* (ibid., p. 2). According to these arguments, Nichols stated that EPA is capable of reconsidering the waiver denial *"in a manner that fulfills its public notice and comment obligations without*

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[271] Jackson was confirmed by the U.S. Senate on January 23, 2009 as the first Afro American EPA Administrator.

[272] According to Jackson, "Science is great, science policy is great, but if it's science being politicized I think it's really dangerous for our country" World Science Festival, https://www.youtube.com/watch?v=brggebPKJyQ

[273] Nichols never used the name of Johnson, instead she solely used "former Administrator".

undue delay" (ibid., p. 3). Due to the fact that "EPA has already noticed and held hearings", the California's GHG regulations are the same as before, and *"interested parties have had more than ample notice and opportunity to comment on all issues"*, Nichols argued that no additional hearings will be necessary (ibid.).

Nichols briefly referred to the GHG emission standards that were part of the waiver request of December 2005. According to the former focus on 2009 model-year vehicles (that were now in production) she argued that *"all manufacturers can comply with California's 2009 model-year greenhouse gas fleet average [and] all manufacturers would obtain credits"* (ibid.). She furthermore argued that all these issue *"would not transform this reconsideration request into a new waiver request and would allow EPA to grant a waiver for the entire regulation for model-years 2009 through 2016"* (ibid.). It is worth to mention that this time-frame was already included in Attachment 2 of the 2005 waiver request, however they were split into "near-term emission standards, phased in from 2009 through 2012, and mid-term emission standards, phased in from 2013 through 2016" (CARB 2005).

Only a few days later, on January 26, 2009 President Obama signed a Presidential Memorandum for the Administrator of the Environmental Protection Agency that requested EPA's Administrator Jackson "to assess whether the EPA's decision to deny a waiver based on California's application was appropriate in light of the Clean Air Act". In addition to that Obama requested "that, based on that assessment, the EPA initiate any appropriate action" (Presidential Memorandum, 2009). This change in direction exclusively depended on a change of government that resulted in a (more) compatible set of belief systems. As a matter of fact, there happened a kind of line-up of allies (with shared deep core and policy core beliefs) that was to result in cooperation (reconsideration of prior decisions) and collaboration (adoption of Californian rules and regulations at the federal level).

On February 12, 2009 EPA published a notice[274] regarding the reconsideration of previous denial of the waiver of preemption in the Federal Register. As this fundamental change in agenda setting resulted from the change of government, it needs to be considered as an internal event (federal perspective), respectively external event (state-level perspective) to the underlying policy subsystem. Due to fundamental changes in EPA administration, this is expected to include some aspects of policy-oriented learning (return to science-based decision making), resulting in policy change. Aside from a plain official announcement of starting a reconsideration process, EPA confessed that “the denial was a substantial departure from EPA’s longstanding interpretation of the Clean Air Act’s waiver provisions and the history of granting waivers to California.” As “many different parties—including California, States that have adopted or are interested in adopting California’s standards, members of Congress, scientists, and other stakeholders—have expressed similar concerns about the denial of the waiver. EPA believes there is merit to reconsidering its decision denying California’s waiver. According to concerns about the denial of the waiver that were made by different parties, *“EPA believes there is merit to reconsidering its decision denying California’s waiver”* (Federal Register, 2009a, p. 7041).

In contrary to the suggestion of Nichols to skip another public hearing and a written comments period in order to speed up the reconsideration process, EPA announced to hold a public hearing[275] and to accept[276] written comments. On

[274] https://www.govinfo.gov/content/pkg/FR-2009-02-12/pdf/E9-2913.pdf

[275] The hearing was done on March 5, 2009.

[276] Written comments were to be submitted by April 6, 2009 and accounted a total of nearly 500,000 contributions.

July 8, 2009, only three months after the written comments period was closed, the EPA published a notice of decision[277] granting a waiver of Clean Air Act peemption for California's 2009 and subsequent model year GHG emission standards for new motor vehicles. While the notice in the Federal Register regarding the denial[278] of granting the waiver back in 2008 only comprised of 14 pages, whereof the last page was about a complete different notice, the notice of decision granting the waiver in 2009 comprised of 42 pages.

While the overall notice of decision granting a waiver to California is quite extensive, the Executive Summary section is worth to be recited in the following. EPA's Administrator Jackson argued that within the waiver denial of March 6, 2008 the agency determined "that California did not need its State standards to meet compelling and extraordinary conditions" which was wrong and is therefore now rejected by her. She argued that *"based on a review of the statutory language, legislative history, and the comments received, I am returning to EPA's traditional interpretation of this provision"* (Federal Register, 2009b, p. 32745).

By doing so, Jackson argued that she determined that the requested waiver should not be denied under any of the CAA's criteria. According to her, this also accounts for the *"technological feasibility of the model year 2009 and later model year standards, considering lead time and the cost of implementation"* (ibid.). She argued that the provisions of the CAA were intentionally designed so, that *"California could receive a waiver of preemption for its emission standards and enforcement procedures"*.

[277] https://www.govinfo.gov/content/pkg/FR-2009-07-08/pdf/E9-15943.pdf

[278] https://www.govinfo.gov/content/pkg/FR-2008-03-06/pdf/E8-4350.pdf

Regarding this, Jackson underlined that:

> *"Congress [has] recognized that California could serve as a pioneer and a laboratory for the nation in setting new motor vehicle emission standards" [and therefore] "intentionally structured this waiver provision to restrict and limit EPA's ability to deny a waiver, and did this to ensure that California had broad discretion in selecting the means it determined best to protect the health and welfare of its citizens"* (ibid.).

Jackson summarised that after a detailed reconsideration process she is withdrawing the waiver denial and has *"determined that the most appropriate action in response to California's greenhouse gas waiver request is to grant that request"* (ibid.).

Another interesting aspect within the notice of decision granting the waiver to California is that - in contrary to the denial[279] of granting the waiver - no special focus was put on the situation in terms of the so-called Section-177-states. Regarding this, Administrator Jackson solely argues that EPA has neither considered comments in-favour the adoption by other states, nor against it, *"because these arguments are outside the scope of our section 209(b)(1) waiver criteria. EPA's evaluation of California's waiver request is limited to the State of California"* Register, 2009b, p. 32754).

As argued earlier, the second event relevant to the re-tracing the evolution of the Californian LEV/ZEV Program was the California Senate election that took place on December 1, 2008 when Fran Pavley (former Assembly member and author of A.B. 1493 and A.B. 32) was elected to the Senate of California. Against this background it needs to be emphasised that there is again proof for a long-term and stable line-up of actors that collaborate within a dedicated coalition in

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[279] Johnson underlined that his decision will also affect states that have adopted or may adopt California' standard.

order to shape the results of a specific policy subsystem. While there is definitely a notion of stability involved, this does not mean that such actors need to remain at the same position over time.

Soon after Obama took office in January 2009, the President started to work on a National Fuel Efficiency policy that should create “uniform[280] federal standards to regulate both fuel economy and greenhouse gas emissions” while strictly “preserving the legal authorities of DOT, EPA and California” (The White House, 2009). This adoption of fundamental pieces of existing legislation (GHG rules and regulations of California) is based on the awareness and knowledge about innovative policies and programs elsewhere. Against this background it is essential to emphasise that this knowledge transfer (policy diffusion) happened within a bipartisan context (Democrat President Obama / Republican Governor Schwarzenegger) and focused on a simple approach to solve problems by applying solutions that already where effectual elsewhere.

Subsequently, the overall strategy to create the federal policy was directly based on the efforts of California’s A.B. 32 - Global Warming Solutions Act of 2006. The Strategy was presented during an announcement in the White House Rose Garden on May 19, 2009 that was attended by the CEO’s of numerous[281] car manufacturers, as well as EPA Administrator Jackson, Governor Schwarzenegger, Senator Boxer, CARB chair Nichols, California State Senator Pavley[282], as well numerous other high ranking members of unions, NGO’s and the science community. This event was not only to present the overall strategy, but was also meant to be get-together of stakeholders of involved coalitions that

[280] One national policy that implements the standards of California that applied to 13 other states as well.

[281] Ford, Toyota, GM, Honda, Chrysler, BMW, Nissan, Daimler, Mazda, Volkswagen.

[282] During the special event, Obama personally thanked Pavley for her engagement in California and the United States.

were about to find a stable and promising compromise after years of a hurting stalemate during the administration of Bush junior.

Based on the notice of decision granting the waiver to California, CARB finally had the authority to implement legally-binding modifications to its existing LEV/ZEV regulations. While it was initially planned to start with the 2005 model year, due to the substantial delays[283] it started to modify standards and regulations for model-years 2009 and ongoing. Under the general framework of the 1998 Low-Emission Vehicle (LEV) regulations, the already implemented LEV II amendments (inclusion of light-duty trucks, more stringent NOx standards, and others) and the waiver-based stricter GHG emission standards, LEV/ZEV regulations were valid for all new vehicles until model year 2014.

Until Schwarzenegger left office on January 3, 2011 there was kind of a business-as-usual in terms of the overall program evolution. As standards were now settled and legally approved through the granted EPA waiver, CARB was regularly implementing continuously stricter LEV/ZEV requirements. While such kind of a stable and contemplative phase is considered to be quite rare, it clearly reflects that there was a large consensus on policy goals (core beliefs) as well as on how to achieve them (secondary beliefs). Within such a phase there is a reinforcement of prevalent beliefs among both allies and opponents likewise.

While the minimum LEV/ZEV requirement for passenger cars and light-duty trucks (up to 1,7 tons) of model years 2009-2011 was set to 11 percent, it was foreseen to increase is to 12 percent (model years 2012-2014) respectively to 14 percent (model years 2015-2017)[284]. For larger light-duty trucks (> 1,7 tons, but <

[283] Almost three years due to delays within the overall process of the first waiver request until its approval.

[284] https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2012/zev2012/zevappa1.pdf

2,6 tons) the LEV/ZEV requirement was about to increase from 51 percent in 2009 to 100 percent after 2012 model year, which asked for a complete transition to ZEV in that vehicle category. The so called Credit Substitution Ratio was mandatory for 2009-2011 model years and varied depending on the Type[285] of ZEV from 0.57 to 2. Until the end of 2011, the ZEV Program remained to include the base pathway (Electric Vehicles, Hybrids) and the alternative pathway (Hydrogen Vehicles) as viable alternatives to fulfil the fleet requirements.

Despite of high approval ratings at the beginning of his first term as Governor and his astonishing comeback when being re-elected for his second term, during the last year of this governorship Schwarzenegger became more an more unpopular. While his precursor Gray Davis had an already high unfavourable rating of 67 percent of voters, Schwarzenegger's unfavourable rating reached 75 percent[286]. With reference to his favourable rate of about 79 percent in August 2008[287], the voter's-world somehow turned upside-down for Governor Schwarzenegger when he left office on January 3, 2011.

5.3 Making Progress: The Dream-Team Episode (2011-2017)

This episode covers the time period from 2011 - 2017 and begins when Jerry Brown (again) took office and became the 39th Governor of California on January 3, 2011. This time period is featured by a significantly stable coalition of decision-makers / well-known actors that already had some memorable appearances in the past.

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[285] Type I: (Battery El. V. (50-75 miles range), Type I.5: like Type I, but (75-100 miles range), Type II like Type I but (> 100 miles range), Type IV: Advanced Fuel Cell Vehicle (> 200 miles range), Type V: like Type IV but > 300 miles range.

[286] https://www.latimes.com/archives/blogs/politi-cal/story/2011-06-17/schwarzeneggers-popularity-hits-all-time-low

[287] https://news.gallup.com/poll/9076/almost-everybody-loves-arnold.aspx

While Lisa P. Jackson continued to serve as EPA's Administrator (until July 19, 2013), Mary D. Nichols remained to be CARB's chairwomen. Fran Pavley, former State Assembly member, who has authored A.B. 1493 and A.B. 32, was now Member of the California Senate, while Barack Obama was performing his first term as President of the United States. Table 5 outlines the most relevant actors of this episode.

Table 5 – Cast and Collaboration List – Third Episode (2011-2017)

Source: Author

Person	***Role***	***Affiliation***	***Remarks***
Edmund G. 'Jerry' Brown	Governor of California	Strongly committed to the long-term goals California	Already served two terms as Cal. Governor (1975-1983) Son of Edmund G. "Pat" Brown who served 1959-1967
Mary D. Nichols	Chair of CARB (re-appointed in 2011)	Long-term collaboration with environmental groups, deep-routed in California	Served at CARB several times before (1974-1978 & (1979-1983)
Frances J. "Fran" Pavley	Member California State Senate	Coalition of environmental organisations	Author of S.B. 32 California Global Warming Solutions Act of 2006: emissions limit
Eduardo Garcia	Member California State Assembly	New Side-kick to Pavley	Author of A.B. 197 State Air Resources Board: greenhouse gases: regulations
Barack Obama	President U.S.A.	Pro California	Served 2009-2017
Lisa P. Jackson	EPA Administrator	Strong Loyalty	until July 19, 2013
Gina McCarthy	"-"	Strong Loyalty to environmental administration	Served 2013-2017

Jerry Brown just started his third[288] term as Governor of California. While the maximum period was limited[289] to two terms, if served after November 6, 1990, Brown had the exclusive eligibility from the so called California's constitutional grandfather clause[290]. Regarding this, it needs to be reminded that Jerry Brown already served two terms as the 34th Governor of California from 1975 to 1983, when Gray Davis (precursor of Schwarzenegger) served as his chief of staff. Jerry Brown is son of Pat Brown, who served as the 32nd Governor of California (1959-1967).

As mentioned beforehand, before being (re-)elected again as Governor of California, Brown served as Attorney General of California during the second term of Schwarzenegger. This composition of staff again reflects the stable and long-term line-up of allies over periods of time. Furthermore, it emphasises the shared mind-set and belief systems as well as the existence of path dependence and policy continuity.

While it was expected that Brown will directly focus his governorship on the reduction of GHG emissions and the mitigation of climate change, his very first Executive Order, B-1-11 was about to recall 48,000 government-paid cell phones[291] by June 1, 2011. Brown argued that in the face of California's multi-billion dollar budget deficit this will help to save around 20 million Dollars per year[292]. This is not to serve as a kind of fun-fact, but to illustrate the lasting

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[288] After his first term (1975-1978) and his second term (1978-1983) as the 34th Governor of California.

[289] Reform to the Constitution of California.

[290] The "grandfather clause" is a provision in which the old rule (no term limit) continued to apply to Brown, while the new rule (maximum of two terms) will apply to all future Governors of California.

[291] According to figures, about 40 percent of all California state employees had such taxpayer-funded cell phones.

[292] https://www.ca.gov/archive/gov39/2011/01/11/news16875/index.html

impacts of the 2007-2008 financial crises and the prevalent budgetary conditions in California when Governor Brown took office.

On December 31, 2008 then-Governor Schwarzenegger's proposed budget[293] included a $42 billion deficit. While in reality the deficit turned out to be $15 billion higher than estimated, two revisions have addressed even larger deficits[294]. Against this background and regarding the focus of Governor Brown's agenda it needs to be stressed that three topics were about to become important during his governorship, namely *"water, budget and climate"* (California State Archives, 2022, p. 69). Regarding the focus of this research, the focus will be set on the latter topic, namely climate protection via the ZEV Program that focuses on the reduction of GHG emissions from the transport and mobility sector. Nevertheless, there are numerous other policy subsystems that were positively influenced by the existence of long-term goal-setting and stable coalitions that aim to achieve those goals.

In his inaugural address of January 5, 2015 Brown underlined that California leads the nation in energy efficiency, cleaner cars and energy storage. Furthermore, the Cap-and-Trade system under the framework of A.B. 32 successfully demonstrates how market incentives stimulate necessary innovations. With respect to the next 15 years, Brown proposed the goal to reduce the petroleum use in cars and trucks by up to 50 percent[295]. These clear remarks of Governor Brown do not only reflect the fundamental claims of strong leadership and long-term policy continuity (widely independent from partisanship) in California, but also are part of building and strengthening the corresponding policy legacies that were involved within this policy subsystem.

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[293] https://lao.ca.gov/reports/2018/3910/recession-recovery-121318.pdf

[294] As a result to this, California was an ungovernable, wrecked and failed state.

[295] https://governors.library.ca.gov/addresses/32-Pbrown01.html

Against this background, there is also a stable and strong leadership at the level of state agencies. As argued earlier, the California Air Resources Board (CARB) was then chaired by Mary D. Nichols, who already served on the Board of CARB during the second term of Gov. Schwarzenegger as well as under Jerry Brown when he served as Governor from 1975-1982. Since the early 1970s Nichols and Brown know each other, especially since then-lawyer Nichols filed a case against Ruckelshaus then-Administrator of EPA (see City of Riverside vs. Ruckelshaus earlier in this research).

The long-time allies Governor Brown and Mary Nichols, together with Fran Pavley, who authored two seminal bills (A.B. 1493 and A.B. 32) while being member[296] of the California State Assembly (2000-2006), were about to continue the strong and effective GHG-emission-reductions coalition in the state of California. This not only reflects the overall policy continuity, but also highlights the aspects of strong leadership, mutual trust and long-term agenda setting. While this situation happens to be an almost common situation in California, within this episode there is also a supportive counterpart-coalition at the federal level.

This coalition comprised of Democrat President Obama and EPA's Administrator Lisa P. Jackson[297]. Obama signed the Presidential Memorandum on January 26, 2009, requesting EPA to reconsider the denial of California's waiver few days after he took office on January 20, 2009. Jackson, who was in charge of the overall reconsideration process, not only fulfilled her duties as EPA's administrator, but accepted and mastered the challenge to reconsider the prior denial of the waiver in a science-based, sophisticated and well-balanced

[296] Pavley was member of the Assembly's Budget Committee, the Education Committee, the Transport Committee, and the Water, Parks and Wildlife Committee.

[297] Jackson was substituted by Gina McCarthy on July 19, 2013.

way. This needs to be considered as a vital and overdue step to regain trust and rebuild the former merits of the Environmental Protection Agency (EPA).

As his first Executive Order, focussing on the GHG emissions in the transport and mobility sector, B-16-2012 was signed by Governor Brown on March 23, 2012. Due to the fact that this sector was considered to be the major contributor to California's GHG emission (with a share of about 40 percent), the Executive Order was to *"support and facilitate the rapid commercialization of zero-emission vehicles"* (Executive Order B-16-2012, p. 1).

In order to push the large-scale market implementation[298] of low- and subsequently zero-emission vehicles (ZEVs), Brown called to establish a PPP-partnership between CARB, the California Energy Commission, the Public Utilities Commission and the Plug-in Electric Vehicle Collaborative, respectively the California Fuel Cell Partnership, as well as the private sector's investment, research, and the education sector. Some of these aspects are already well-known from the governorship of Schwarzenegger (see previous episode).

Brown's Executive Order B-16-2012 (quite similar focus as S-3-05) set a threefold goal for 2020, 2025, and 2050. The short-term called that by 2020: a) California's ZEV infrastructure will be able to support up to 1 million vehicles, b) ZEVs will be competitive with conventional cars, c) ZEVs will be available for mainstream customers, d) ZEVs for public transport and freight transport will be available, e) GHG emissions are significantly falling, f) EVs charging is part of the electricity grid, and g) the private sector strongly contributes to the development and manufacturing of ZEV components (ibid., p.2).

[298] Focus was on the infrastructure as well as on the vehicles in order to prevent a chicken-and-egg dilemma.

The approach was not only to significantly reduce emissions in the transport and mobility sector, but to begin to implement a net-zero-strategy that someday will result in carbon-neutral fleet. Of course, it will take quite some time and tremendous efforts to reach this goal as California has the largest fleet[299] of all states by far. Regarding this, the goals are about to be expanded by 2025 in order to reach 1.5 million ZEVs that are capable of saving at least 1.5 billion gallons of petroleum based fuels. By 2050 GHG emissions from the transport & mobility sector should be 80 percent less than 1990 levels.

In order to become a pioneer within California, Brown ordered that *"California's state vehicle fleet increase the number of its zero-emission vehicles through the normal course of fleet replacement so that at least 10 percent of fleet purchases of light-duty vehicles be zero-emission by 2015 and at least 25 percent of fleet purchases of light-duty vehicles be zero-emission by 2020"* (ibid.).

While Brown's first State of the State Address in 2012[300] was mainly focused on budget issues and economic growth, in 2013 he focussed on several topics, including climate change. Brown argued that climate change tipping points might be reached quite fast, but "again, California is leading the way. We are reducing emissions as required by A.B. 32 and we will meet our goal of getting carbon emissions to 1990 levels by 2020" (State of the State Address, 2013).

With his message he wanted to underline that the rules of A.B. 32, the California Global Warming Solutions Act of 2006 are effectively reducing GHG emissions and therefore are paving the way towards a more sustainable and

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[299] As of 2021, almost 14.3 million automobiles were registered in California, while the second largest fleet in the U.S. was in Florida (less than 7.9 million vehicles). See: https://www.statista.com/statistics/196010/total-number-of-registered-automobiles-in-the-us-by-state/).

[300] https://www.ca.gov/archive/gov39/2012/01/18/news17386/index.html

low-carbon future. However, it could also be understood as kind of a question mark for the time period after 2020 as A.B. 32 - in contrary to his Executive Order B-16-2012 does not comprise any plans on that. Again, this is a clear indication of both a long-term perspective that focused on policy continuity.

According to the fact that A.B. 32 and all its rules regarding GHG emission reductions and the Cap-and-Trade mechanism were about to run out after 2020, there was not an urgent, but an obvious need for an adequate follow-up bill. While one could spontaneously think that this would be a job for Fran Pavley, it needs to be mentioned that during 2014/2015 her reputation among the environmental protection community was damaged[301] to some extent. This was due to the fact that Pavley wanted to regulate hydraulic fracturing, better known as "fracking"[302]. Instead of trying to put a ban of this method, her approach was to regulate[303] it.

Accordingly, Pavley introduced S.B. 4 "Oil and gas: well stimulation" to California State Senate on December 3, 2012. After the bill passed legislation with a vote of 29:8 and was signed into law by Governor Brown on September 20, 2013, Pavley argued that a ban would have been impossible[304] as neither Senate would have accepted it, nor Governor Brown would have put his signature below the bill. This contradictory situation reflects that there are several aspects of interrelated policy subsystems that are not always thoroughly compatible. Especially when it comes to actors that have affiliations to other

[301] Opponents wanted facking to be completely banned not to be solely regulated.

[302] The injection of liquids (mainly water, chemicals and sand) into deep rock formations to extract oil and gas.

[303] This approach included public notice, freedom of information regarding the used chemicals, etc.

[304] https://calmatters.org/environment/2015/07/sen-fran-pavley-a-quiet-force-in-the-climate-storm

coalitions that have a conflicting mind-set and opposing belief systems regarding fundamental aspects that are to affect several policy subsystems.

Against this background Pavley, the author of S.B. 4, said: “So I’m also pragmatic. Who rather should carry a regulatory bill? I was going to be as tough as I could and at least get the transparency the public was demanding” (CalMatters, 2015). This reflects that there was a clash between fundamental beliefs that was dissolved by a focus on related priorities (public transparency). When re-focusing on California’s waiver requests within this episode, it needs to be stressed that requesting and receiving EPA waivers became regular business-as-usual (as it was meant to be by the CAA provisions). Against this background, CARB sent a department-level letter to EPA on June 27, 2012 to request a waiver of Federal Preemption for the 2012 Amendments[305] to California’s Low Emission and Zero Emission Vehicles (LEV/ZEV) Program.

Right the same day, CARB Chair Mary Nichols sent a letter to EPA Administrator Lisa P. Jackson to officially request the EPA “waive federal preemption for California’s amended zero emission vehicle (ZEV) standards and low emission vehicle standards pursuant to Clean Air Act (CAA) section 209(b)”[306]. As the upcoming 2012 ZEV and LEV amendments were also result of Obama’s May 2010 decision to adopt California’ standards at the federal level, the overall review process at EPA took place without any significant delays.

On January 9, 2013 EPA published a Notice of Decision[307] to grant CARB the requested waiver, allowing the implementation of the Advanced Clean Car Program under the framework of the California State Motor Vehicle Pollution

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[305] Amendments to LEV regulations were to affect model year 2014 vehicles.

[306] https://downloads.regulations.gov/EPA-HQ-OAR-2012-0562-0003/content.pdf.

[307] https://www.govinfo.gov/content/pkg/FR-2013-01-09/pdf/2013-00181.pdf.

Control Standards. By granting the waiver for amendments, a significant surplus of flexibility was added to the existing regulations of the ZEV Program. The so-called LEV-III (comprising ZEV) amendments were to implement more stringent criteria and GHG emission standards for model years 2015/2017. In general, amendments were not only designed to effectively boost the market introduction and sales figures of ZEVs, but also to stimulate and facilitate significant and long-term investments in the related infrastructures and connected services.

While there were early discussions on how to bring long-term GHG emission reduction targets into effect for the after-2020-period (as outlined by precursor Schwarzenegger in Executive Order S-3-05[308]), it was clear that solely an Executive Order would not be enough to make this happen. Furthermore, it turned out that the initial reduction targets of 2020 were about to be reached much earlier. It is estimated that GHG emissions have dropped below 2020 limits (1990-levels) in 2016 at the latest, while emissions were reduced to a total of 431 MMt CO_2-e[309] even earlier below 2020[310] GHG emission limits in 2014[311]. Figure 10 outlines the GHG emissions trend from 2000-2016 and highlights the effective 2020 emissions target of 431 million metric tons of GHG.

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[308] S-3-05 included near-term, midterm, and long-term GHG emission reduction targets for 2010, 2020, and 2050.

[309] Million metric tons of CO2 equivalent (with the same global warming potential as other greenhouse gases).

[310] 431 MMt CO2-e (level as of 1990).

[311] https://ww2.arb.ca.gov/sites/default/files/classic/cc/inventory/2000-2020_ghg_inventory_trends.pdf.

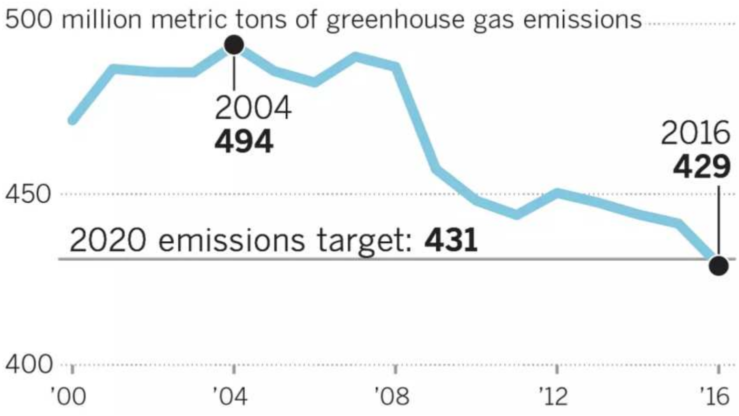

Figure 10 – GHG emissions trend-line between 2000 and 2016

Source: Lange, 2018

Despite these impressive figures the flipside of the coin was that GHG emissions in the transport and mobility sector were on the rise in terms of a significant post-recession economic growth. The combination with a fairly low gasoline price and a 'slower-than-anticipated' rollout of various electric vehicles resulted in a significant increase in GHG emissions.

According to the limited time perspective until 2020 and the fact that some sectors were performing not as good as expected (and necessary), it was about time to extent and increase the GHG emission reduction targets of California beyond 2020 and below the levels of 1990. The idea was to send a signal to (potential) investors that A.B. 32 the California Global Warming Solutions Act of 2006 and its market-based mechanisms will go well beyond 2020.

This is again a clear proof for the intended long-term perspective and likewise policy continuity. Same accounts for the continuation of the policy legacy that was related to Governor Brown and his precursors in office. Aside from that, the proposed continuation of California's transition towards a future-proof transport and mobility sector asked for ongoing (and even increased) investments. Both of these issues are considered to be positive aspects of a path dependence that already emerged at this point.

Due to the fact that Assembly Bill 32 was subject to a series of litigations since signed into law by then-Governor Schwarzenegger on September 27, 2006, the aim was to make it both legally binding and future-proof. Based on these premises, Fran Pavley decided to prepare a bill which was mainly to extend[312] A.B. 32 by the simplest and safest means. As a result to this approach, S.B. 32 was introduced by Pavley into the legislative process on December 1, 2014.

The first draft of the bill strongly focused on public participation (as a favoured option of Pavley) as it was foreseen to hold "one or more public workshops, with public notice, and an opportunity for all interested parties to comment". Likewise, it was first considered to determine and approve the actual GHG emission limits within a public hearing as well. These section as well as large parts of the bill's draft that focussed on potential benefits (e.g. job growth, economic growth, improved public health, innovations, etc.) were completely taken out and substituted during the first reading in Senate (see Cal. S.B. 32, as of December 1, 2014). This shows that there was a strong coalition in favour of extending A.B. 32, but also massive refusal of this specific S.B. 32 draft. As argued beforehand, the conflict between these opposing coalitions is a continuous one with an irreconcilable dispute. Against this background it needs to be stressed that the reinforcement of already existing beliefs is probably the most common form of policy-oriented learning.

[312] The aim was to go beyond the year 2020 and below the GHG emission levels of 1990.

As a result to this, the bill's text was about to become a compromise solution with strong focus on technical and administrative aspect as the following excerpt shows:

> *"The California Global Warming Solutions Act of 2006 [A.B. 32] (Division 25.5 (commencing with Section 38500) of the Health and Safety Code) authorizes the State Air Resources Board [CARB] to adopt regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions"* (ibid.).

After being amended the first time, the bill's draft was a pretty straight-forward and quite technocratic approach rather than a charismatic and salient one as it used to be earlier in the legislative process.

While being in Senate for the second reading on March 16, 2015 the bill's draft was not changed by amendments. However, Pavley started to include a definition of greenhouse gases, followed by an enumeration of those. Under the pressure[313] of Governor Brown, she also had to introduce a dedicated paragraph on Brown's favourite topic market-based compliance mechanisms (just like it was the case in terms of A.B. 32 under the influence of Schwarzenegger and Núñez - see previous episode). Just like beforehand, this strategy reflects the retention of fundamental approaches and the long-term achievement of agreed objectives in this specific policy subsystem.

Based on his fundamental intention to keep GHG emission targets "alive" after the end of 2020, Governor Brown proclaimed Executive Order B-30-15 on April 29, 2015. The aim was to focus on both mid-term and long-term GHG emission

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[313] Within a later interview, Pavley argued that market-based mechanisms could be considered as a tax which means that a 2/3 majority is necessary to pass the bill. Nevertheless, Governor Brown insisted that cap and trade stays in S.B. 32 (see California State Archives, 2022, p. 66).

reduction targets in California. The Executive Order called for *"a new interim state-wide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030 is established in order to ensure California meets its target of reducing greenhouse gas emissions to 80 percent below 1990 levels by 2050"* (Executive Order B-30-15, p. 2).

Brown called for a joint effort that includes *"all state agencies with jurisdiction over such sources of greenhouse gas emissions"* to collaborate with CARB and the California Natural Resources Agency in order to achieve the mid-term and long-term GHG emission reduction targets (ibid.). This highlights the existing self-conception of a strong and broad coalition within the state of California that presents the aggregated interests and objectives of numerous stakeholders despite of any change in government.

With the backing of Brown's Executive Order B-30-15, Pavley kept on trying to get a majority for S.B. 32. However, as beforehand, all new approaches to find a compromise were blocked within the legislative process (see Cal. S.B. 32, as of June 1, 2015). Due to occurring critics about CARB's increasing authority[314], Pavley included some paragraphs to confine authority by implementing reporting mechanisms and a stronger control function of legislature. As the majority of the Assembly obviously wanted the bill to stay plain and simple, these amendments were taken out as well. At this point, S.B. 32 literally got stuck in a death end by the end of 2015.

That was the time, when Eduardo Garcia, a newly elected Assembly Member who assumed office on December 1, 2014 came in. He was first-time participant

[314] Critics of S.B. 32 argued that CARB by regulating Californian climate issues has unreserved power that needs to be limited and controlled by the legislative branch.

to the 2015 United Nations Climate Change Conference[315] that was held in Paris from 30 November to 12 December 2015. While having no background in terms of environment and climate, Garcia argued not to be a climate change activist, but "an advocate for my community" (Los Angeles Times, 2016b). Garcia and Pavley[316] decided to work together in order to pass S.B. 32 as the extension bill to A.B. 32. After intensive discussions with a group[317] of allies, they decided to change strategy and to combine the two separate aspects (simple extension of A.B. 32 on the on hand, and more reporting to / more control of legislature on the other hand) in one bill.

As a result to this, Garcia authored A.B. 197 "State Air Resources Board: greenhouse gases: regulations" and introduced it to Assembly. When taking a brief look at two previous versions of A.B. 197 (see Cal. A.B. 197, as of April 29, 2015 / June 8, 2016) it becomes clear that an existing bill[318] was modified via the "gut-and-amend" method (see first episode). The bill included detailed aspects regarding reporting provisions and such requirements to be fulfilled by the California Air Resources Board (CARB). Within this, it outlined an extension of the Air Resources Board by two additional members to a total of 14 voting members[319]. In addition to a permanent legislative committee[320] to check-and-balance the work of CARB, board members were to be appointed for six-years which introduced kind of a mid-term approval mechanism.

[315] President Obama held a speech at the First Session of COP 21 and later - in total contrast to the perception of his precursor Bush - praised the Paris Agreement as turning point for the world.

[316] Later, Pavley argued that she went to Anthony Rendon, then-Speaker of Assembly, to discuss who would be the right person to collaborate with. He immediately named Eduardo Garcia (see California State Archives, 2022, p. 67).

[317] Carlos Gonzales, policy director of Garcias, informal group of lawyers, representatives of environm. lobby groups.

[318] Based on the deleted lines, it had something got do with school costs.

[319] https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB197

[320] Joint Legislative Committee on Climate Change Policies.

Pavley and Garcia decided to implement a vice-versa reference to both A.B. 197 as well as S.B. 32. In the case of A.B. 197 this was as follows: “This act shall become operative only if Senate Bill 32 of the 2015–16 Regular Session is enacted and becomes effective on or before January 1, 2017” (see Cal. A.B. 197, as of June 8, 2016). By implementing all of the relevant reporting and control aspects, on August 22, 2016, A.B. 197 was read the third time and passed Senate with a vote of 23:13. During amendments within Senate, some minor issues regarding the membership of the Joint Legislative Committee on Climate Change Policies were made. Finally, A.B. 197 passed Senate on August 24, 2016 with a vote of 45:30 and was signed into law by Governor Brown on September, 8, 2016.

When heading back to the legislative process of S.B. 32, the updated strategy to combine the bill’s draft with A.B. 197 showed quite some effect. Several amendments to S.B. 32, including the vice-versa reference[321] to A.B. 197 were implemented as follows: “This act shall become operative only if Assembly Bill 197 of the 2015–16 Regular Session is enacted and becomes effective on or before January 1, 2017” (see Cal. S.B. 32, as of June 10, 2016). Based on this draft, S.B. 32 was read the third time in Assembly on August, 23, 2016 where it passed with a vote of 48:31. Being immediately ordered to Senate, the bill passed on next day with a vote of 25:13 and was signed into law on September 8, 2016, the same day as A.B. 197.

About ten years after California has adopted A.B. 32 “Global Warming Solutions Act of 2006” and took the role as pioneering leader in GHG emission reduction goals, Governor Brown signed S.B. 32 by Senator Fran Pavley and A.B. 197 by Assembly member Eduardo Garcia. Despite of long and intensive

[321] Two days before, the vice-versa reference was included to A.B. 197.

discussions and negotiations, the final approval of S.B. 32 and A.B. 197 in both Senate and Assembly again highlights the bipartisan approach that was successful at the end.

The combination of these two bills required California to reduce its GHG emissions to at least 40 percent below 1990 levels by 2030. During his speech Brown said that “climate change is real, and knowing that, California is taking action. S.B. 32 and A.B. 197 are far-reaching moves that continue California on its path of vast innovation and environmental resilience” (Office Gov. Brown, 2016).

Senator Pavley amended that California GHG legislation has led to *“billions of dollars in private investment and spawned a thriving clean-energy sector. S.B. 32 sends an unmistakable message that California is resolute in its commitment to remain on that healthy and prosperous course”* (ibid.). Based on his focus, Assembly member Garcia added that *“in order for California to remain an economic and environmental leader the state will need to also be a trailblazer on issues related to equity”* (ibid.).

It is worth to mention that both Senate and Assembly closely worked together in order to finally pass the two bills. Senate President pro Tempore De León highlighted the bipartisan efforts when he said that *“together we redoubled our commitment to global climate leadership and building the clean energy economy of tomorrow”*. Likewise, Assembly Speaker Rendon stated that: *“the successful effort behind these two bills is the latest sign of a growing consensus that protecting the environment and improving public health”* (ibid.).

Against this background and when looking at A.B. 32 “California Global Warming Solutions Act of 2006: emissions limit” is important to keep in mind that is should not be considered as a single, individual bill, but as a legislative package that furthermore comprises of A.B. 197 “State Air Resources Board: greenhouse gases: regulation”, and is based on A.B.32 “Air pollution: greenhouse gases: California Global Warming Solutions Act of 2006”, Executive Order B-30-15[322] (Governor Brown, April 29, 2015), and last but surely not least Executive Order S-3-05[323] (Governor Schwarzenegger, June 1, 2005).

When looking at the two authors of S.B. 32 and A.B. 197, this alliance could also be considered as a shift[324] in personnel that takes place when new legislators come in and collaborate with more experienced legislators[325]. Aside from that aspect, it needs to be stressed that a lasting supportive-coalition aims to work for the long-term goal of a clean and future-proof transport and mobility sector in California.

When taking a brief look at the federal level and the activities of the Environmental Protection Agency (EPA) during this time period, the so-called ***Volkswagen emissions scandal*** is definitely worth to mention. While EPA’s performance was quite weak during the Bush Administration, under the lead of Lisa P. Jackson (and later Gina McCarthy), EPA re-gained its competence in both monitoring and enforcing compliance with existing federal rules. The enforcement of existing environmental laws is the duty of the EPA within its “Strategic Plan to protect human health and the environment”[326]. This authority also includes new vehicles and engines that need to comply with existing GHG rules and emission standards[327].

[322] B-30-15 extends 2020 targets by additional GHG emission reduction targets for 2030 and 2050.

[323] S-3-05 already included GHG emission reduction targets for 2010, 2020, and 2050.

[324] Transition to the next generation of legislative personnel, continues to work on the topic.

[325] Sometimes called legislative champions.

[326] https://www.epa.gov/enforcement/basic-information-enforcement.

[327] Standards apply to all kinds of vehicles and engines, independently from size or application.

Within this thematic area, the utilisation of so-called defeat devices[328] was in the focus of Volkswagen investigations as they were considered to violate the provisions of the Clean Air Act (CAA). A reasonable suspicion in terms of Volkswagen's defeat device existed since a report[329] of the Center for Alternative Fuels, Engines & Emissions (CAFEE) at the West Virginia University in May 2014. By an in-use[330] testing of three light-duty diesel vehicles[331], under real-world driving conditions, it turned out that all of the three vehicles' emissions were exceeding applicable standards.

Against this background, the *"real-world NO_x emissions were found to exceed the US-EPA Tier2-Bin5 standard[332] (at full useful life) by a factor of 15 to 35"* (CAFFE: 2014, p. 106). Although the authors argued that due to the limited data set of only three vehicles it *"does not necessarily permit drawing more generalized conclusions for a specific vehicle category or after-treatment technology"* (ibid., p. 108), it was quite clear that something is wrong with this type of Volkswagen diesel vehicles.

The CAFEE study is considered to be the point of origin for official investigations, which is also confirmed by EPA's Notice of Violation to Volkswagen of September 18, 2015 as it is stated that: *"The California Air Resources Board (CARB) and the EPA were[333] alerted to emissions problems with these vehicles in May 2014 when the West Virginia University's (WVU) Center for*

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[328] Defeat devices are to manipulate emission control devices which leads to increased GHG emissions.

[329] In-Use Emissions Testing of Light-Duty Diesel Vehicles in the United States.

[330] In contrary to classic dynamometer / bench tests, in-use tests measure emissions in real-world driving conditions.

[331] Vehicles were certified to US-EPA Tier2-Bin5 and California LEV-II ULEV emission limits.

[332] US-EPA Tier2-Bin5 standards were phased-in from 2004 to 2009.

[333] This is a clear sign for the increased collaboration between CARB and EPA under the Obama Administration.

Alternative Fuels, Engines & Emissions published results of a study commissioned by the International Council on Clean Transportation (ICCT) that found significantly higher in-use emissions from two light duty diesel vehicles (a 2012 Jetta and a 2013 Passat)" (U.S. EPA, 2014, p. 4).

EPA's Notice of Violation was to officially inform the Volkswagen AG, Audi AG, and Volkswagen Group of America (VW) about ongoing investigations[334] which showed that *"VW manufactured and installed defeat devices in certain model year 2009 through 2015 diesel light-duty vehicles equipped with 2.0 liter engines"* (ibid., p. 1). Accordingly,

> *"these vehicles do not conform in all material respects to the vehicle specifications described in the applications for the certificates of conformity that purportedly cover them" (ibid., p. 2). As a result to this, VW violated the provisions of the Clean Air Act (CAA) "by selling, offering for sale, introducing into commerce, delivering for introduction into commerce, or importing these vehicles, or for causing any of the foregoing acts"* (ibid.).

On the same day EPA sent its Notice of Violation to VW, likewise CARB did sent a letter to the Volkswagen Group of America referring to the ICCT study of 2014. On this basis, CARB started to investigate the issues and discussed with VW how the problem could be fixed (e.g. by a software update of the OBD unit). While in the first attempts to fix the issue already took place in the end of 2014, re-testing showed that NO_x emissions were still far beyond the limits. As result to a meeting[335] on September 3, 2015, *"VW admitted to CARB and EPA staff that these vehicles were designed and manufactured with a defeat device to bypass,*

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[334] Investigations already started in 2014, likewise there were also informal meetings with VW to resolve the issue.

[335] EPA threatened VW to not certify model year 2016 diesel cars, as a result VW admitted the use of defeat devices.

defeat, or render inoperative elements of the vehicles' emission control system" (CARB, 2014, p. 3). As such kind of device was not included within the overall certification process, *"each vehicle so equipped would not be covered by a valid federal Certificate of Conformity (COC) or CARB Executive Order (EO) and would be in violation of federal and state law"* (ibid.).

As a result to the official letters of EPA and CARB, the VW stock went down by more than 35 percent within two days which resulted in the withdrawal of Martin Winterkorn as CEO of Volkswagen AG on September 23, 2015[336]. VW admitted that around 11 million cars worldwide (and about 500,000[337] cars in the United States[338]) were manipulated by a software defeat device. In April 2016, VW started to buy back[339] the U.S. diesel cars as they were not able to refit the engines in order to fulfil existing emissions standards. After years of litigations, financial settlements and fines, as of 2020 it was estimated that the emission scandal had cost VW a total of $33.3 billion[340].

With respect to the overall fines and penalties that were paid concerning CARB's final settlement[341], 153.8 million dollars were to cover air quality violations and the costs of CARB's investigation. In addition to this, more than 422 million dollars were paid for the mitigation of environmental harms in California. A total of 800 million dollars were paid in ZEV related

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336 https://www.nytimes.com/2015/09/24/business/international/volkswagen-chief-martin-winterkorn-resigns-amid-emissions-scandal.html.

337 Of which approximately 85,000 were sold in California.

338 https://www.dw.com/en/us-regulators-order-volkswagen-to-recall-almost-500000-cars/a-18724662.

339 https://www.reuters.com/article/us-volkswagen-emissions-usa-idUSKCN0XH2CX.

340 https://www.bloomberg.com/news/articles/2015-09-22/volkswagen-probed-by-u-s-multistate-group-on-pollution-cheating.

341 https://ww2.arb.ca.gov/news/california-receive-153m-final-settlement-volkswagen.

investments[342]. Another 25 million dollars were paid in order to support ZEV investment programs (e.g. vehicle replacement for low-income residents). The California Attorney General received 86 million dollars for civil penalties and costs. In addition to this, consumers were entitled for extensive compensations (e.g. costs of re-fitting, modifications, or buy-back plus financial reimbursements).

The handling of the Volkswagen emission scandal between its revealing in 2014 and the first substantial settlements in 2016 are proof for the strong and effective collaboration established between EPA and CARB since Obama took office in early 2009. In the past, especially under the Bush Administration, the relation between the federal EPA and its California counterpart CARB was full of constraints and mistrust. Therefore, the recent collaboration between the federal and the state level, (joint action of EPA and CARB) needs to be highlighted as a salient effort for the whole country.

While within the previous episode, such collaboration was completely unimaginable, this obviously changed (mainly due to the change in federal government) during this episode, characterised by a strong coalition of federal and state-level agencies, but also a strong coalition within the state of California. Mainly due to experienced stakeholders like Governor Brown, Fran Pavley, Mary Nichols, Senator Boxer, and many others who teamed-up in order to push GHG emission reductions as well as the transition towards a sustainable future which includes a ZEV-based transport and mobility sector. These legislative and executive champions were supported by young leaders like Eduardo Garcia within an upcoming shift in personnel. However, after this progressive and beneficial period of time, things were about to change again.

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[342] This amount needs to be paid accordingly to a dedicated investment plan of CARB.

5.4 Turbulent "Stormy" Episode (2017-2021)

The beginning of this episode is determined on January 20, 2017 the day when Donald Trump was sworn in as the 45th President of the United States. The most relevant actors of this episode are presented in Table 6.

Table 6 – Cast and Collaboration List – Fourth Episode (2017-2021)

Source: Author

Person	***Role***	***Affiliation***	***Remarks***
Edmund G. 'Jerry' Brown	Governor of California	Strongly committed to long-term goals of California	-2019
Gavin Newsom	"-" (2019-today)	Strongly committed to long-term goals of California	Mayor San Francisco (2004-2011) Lieutenant Governor to Jerry Brown (2011-2019)
Mary D. Nichols	Chair of CARB	Long-term collaboration with environmental groups, deep-routed in California	Re-appointed in 2011
Liane M. Randolph	"-"	Californian regulatory agencies	2021-today
Eduardo Garcia	Member California State Assembly	Minorities & disadvantaged population	Author of A.B. 398
Donald John Trump	President U.S.A.	Egocentric approach "America first"	Withdrawal from Paris Climate Accord
Scott Pruitt	EPA Administrator (Feb. 2017 – July 2018)	Disruptive agenda in terms of EPA's future	Former Attorney General of Oklahoma, sewed EPA for more than a dozen times
Andrew R. Wheeler	"-" (2018-2021)	Lobbyist against environmental achievements	Withdrawal of the 2013 CAA waiver to California

Right after Election Day on November 8, 2016, then-President-elect Trump announced to nominate Scott Pruitt to lead the Environmental Protection Agency (EPA) as its Administrator. This step was anticipated early as both Trump and Pruitt had quite similar beliefs about climate change and EPA's role. Against this background it is vital to take a look at Trump's campaign, when he "regularly threatened to dismantle the E.P.A. and roll back many of the gains made" (The New York Times, 2016). Therefore, Scott Pruitt was expected to be the right person for bringing Trump's vision into reality.

The change in government was obviously the beginning of a new era of conflict between two coalitions with a completely different mind-set and incompatible belief-systems. Within such intense conflicts, involved actors are literally unable to see potential shortcomings in their own field of expertise and their own beliefs and values. This inevitably leads to reinforcement of beliefs rather than to minor modifications or even major changes of them. Both coalitions are somehow trapped within a paralysing path dependence that might end up in a hurting stalemate situation. The rising conflict between the Trump Administration and California however, was far away from such a dead-end where both coalitions may think of open and serious negotiations.

Several months before Election Day, Pruitt co-authored an online article in National Review and argued that "scientist continue to disagree about the degree and extent of global warming and its connection to the actions of mankind. That debate should be encouraged - in classrooms, public forums, and the hall of Congress" (National Review, 2016a). This statement triggered many responses from the scientific community blaming Pruitt to be a "climate denier"[343].

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[343] https://psmag.com/news/heres-why-donald-trumps-new-epa-chief-is-a-climate-change-deniers-dream.

Luther Strange, Pruitt's co-author, published an article on December 22, 2016 that was about to defend Pruitt. According to Strange, their co-authored column "wasn't about climate change itself or even public policies that purport to address it". However, "climate change is not an excuse for the EPA to ignore the bounds of law and issue illegal regulations that will cost jobs, shutter industries, and have little to no positive impact on the environment" (National Review, 2016b). He emphasised that he had *"joined with Scott Pruitt*[344] *and other attorneys general - Republicans and Democrats - to oppose the EPA when it oversteps*[345] *its bounds"* (ibid.). Under the Obama administration, there were several long-term litigations[346] against EPA its Administrator Jackson.

On June 1, 2017 President Trump officially announced that the United States will withdraw from the Paris Climate Accord. Trump began his statement with *"an update on our tremendous - absolutely tremendous - economic progress since Election Day on November 8th. The economy is starting to come back, and very, very rapidly"* (The White House, 2017). Based on his ideological doctrine to always put America first, Trump argued that he is *"fighting every day for the great people of this country. Therefore, in order to fulfill my solemn duty to protect America and its citizens, the United States will withdraw from the Paris Climate Accord"* (ibid.).

Trump said this accord is another *"example of Washington entering into an agreement that disadvantages the United States to the exclusive benefit of other countries, leaving American workers - who I love - and taxpayers to absorb the cost in terms of lost jobs, lower wages, shuttered factories, and vastly diminished economic production"* (ibid.).

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[344] By then, Scott Pruitt was Attorney General of Oklahoma.

[345] This was obviously referring to the waiver reconsideration under Obama.

[346] https://www.nrdc.org/bio/john-walke/setting-record-straight-obama-epas-clean-air-act-track-record-court.

He promised to *"ensure that America remains the world's leader on environmental issues, but under a framework that is fair and where the burdens and responsibilities are equally shared among the many nations around the world"* (ibid.). These few words of Trump for sure put the final nail in the coffin of the previously progressive approach and the then-sustainable development of the Obama Administration.

Later, Trump passed the word to Scott Pruitt, EPA's Administrator[347] who started his speech with

> *"Thank you, Mr. President. Your decision today to exit the Paris Accord reflects your unflinching commitment to put America first. And by exiting, you're fulfilling yet one more campaign promise to the American people. Please know that I am thankful for your fortitude, your courage, and your steadfastness as you serve and lead our country"* (ibid.).

After Pruitt highlighted the efforts that were made in the past[348], he argued that future efforts *"should be on exporting our technology, our innovation to nations who seek to reduce their CO2 footprint to learn from us"* (ibid.).

Not only by the U.S. withdrawal from the Paris Climate Accord, but especially when looking closer at the contents of both speeches, it becomes clear that there were already quite different focal points[349] than under the Obama Administration. With respect to California and its authority to implement own standards, Trump obviously planned to tackle this privilege and to modify federal fuel efficiency standards as well. While this significantly changed

[347] Pruitt took office as EPA Administrator on February 17, 2017 and left office on July 9, 2018 (to be discussed later on).

[348] Mostly he outlined efforts that were made in California but presented them as federal ones.

[349] Under the motto „America First" Trump started to cut-off several international agreements and cooperations.

situation was just the starting-point of conflict between federal government and the state of California, it was already obvious that a completely different mind-set as well as irreconcilable belief-systems were about to clash within this episode.

Against this background, the long-term members of the GHG-coalition in California also recognised[350] that things have significantly changed in Washington. Governor Brown, who was considered to be a strong supporter of the Cap-and-Trade mechanism that was established by A.B. 32 “California Global Warming Solutions Act of 2006” therefore pushed to find a way to extend market-based compliance mechanisms beyond 2020, the timeframe set by A.B. 32. As Fran Pavley had to leave California Senate on November 30, 2016, due to reaching term-limits, Brown had to rely on Assembly member Eduardo Garcia.

Garcia, who already authored A.B. 197 as legislative counterpart to Fran Pavley’s S.B. 32, introduced A.B. 398 with its quite bulky subtitle “California Global Warming Solutions Act of 2006: market-based compliance mechanisms: fire prevention fees: sales and use tax manufacturing exemption” on February 9, 2017. The bill’s focus was primarily to extend California’s Cap-and-Trade Program that would have expired in 2020[351] without any further legislative action. According to this, the bill calls CARB to “extend the market-based compliance mechanism adopted pursuant to subdivision (c) of Section 38562 from January 1, 2021, to December 31, 2030, inclusive, in a manner that effectively reduces greenhouse gas emissions; minimizes any adverse impacts on state consumers, businesses, and the economy; and continues elements of

[350] According to Trump, he wanted to “greatly shrink or even dismantle” EPA (The New York Times, 2016).

[351] This was mainly due to the GHG emission reduction target of 2020 that was included in A.B. 32.

the current program that protect state utility ratepayers" (see Cal. A.B 398, as of February 9, 2017.)

There are several[352] quite interesting aspects of A.B. 398 that are to be presented in brief. In contrast to many other related bills, it includes numerous referrals *"until January 1, 2031"* that highlights the limits in provisions such as the extension of "as system of market-based declining annual aggregate emission limits". Same accounts for the limited inclusion of *"specified price ceilings, price containment points, offset credit compliance limits, and industry assistance factors"* (ibid.). Another issue is the establishment of a *"Compliance Offsets Protocol Task Force*[353]*, with a specified membership, to provide guidance to the state board [CARB] in approving new offset protocols for a market-based compliance mechanism [...] while prioritizing disadvantaged communities, Native American or tribal lands, and rural and agricultural regions"* (ibid.).

The explicitly outlined limits of A.B. 398's applicability and the establishment of the Compliance Offsets Protocol Task Force could be considered as concessions towards Assembly members and Senators that were not (fully) convinced about giving such extensive and long-term authority to CARB. The focus on minorities and disadvantaged population groups and regions however, clearly reflects the beliefs and focal points of Assembly member Eduardo Garcia.

Another aspect to be highlighted is the fact that A.B. 398, unlikely to comparable bills, includes an urgency statute which calls for *"the immediate*

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[352] For a more comprehensive insight, please try the "compare versions" function at https://leginfo.legislature.ca.gov.

[353] On January 23, 2020, 13 Task Force members, representing different stakeholder groups, were approved (see: https://ww2.arb.ca.gov/our-work/programs/compliance-offset-program/compliance-offset-protocol-task-force).

preservation of the public peace, health, or safety within the meaning of Article IV of the California Constitution and shall go into immediate effect" The bill also named the constituting facts for this urgency statue, which are *"to secure a greater reduction in greenhouse gas emissions to prevent catastrophic climate change, it is necessary for this act to take effect immediately"*[354] (ibid.).

While the overall legislative process was smooth - at least compared to S.B. 32 - amendments were discussed and approved within a bipartisan partnership[355] in both Assembly and Senate. On July 17, 2017 the bill was read in California Senate for the third time. After the urgency clause was adopted, the bill passed with a vote of 28:12 and was immediately ordered to the Assembly. On the same day, the bill's urgency clause was also adopted and A.B. 398 passed Assembly with a vote of 55:22. On the next day, the Assembly Bill 32[356] was enrolled and presented to Governor Brown who was about to sign the bill into law.

During an official ceremony on Treasure Island, the place where also then-Governor Schwarzenegger signed A.B.32 in 2006, Brown, signed A.B 398 into law on July 25, 2017. Brown emphasised that "California is leading the world in dealing with a principal existential threat that humanity faces" and added that "we are a nation-state in a globalizing world and we're having an impact and you're here witnessing one of the key milestones in turning around this carbonized world into a decarbonized, sustainable future" (Office Gov. Brown, 2017).

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[354] A regular bill takes effect on the following January 1 at the earliest, an urgency clause bill takes effect immediately.

[355] As a result, in both Senate and Assembly, even it was not necessary, the bill passed with a 2/3 majority vote.

[356] On the next day, Brown also signed A.B. 617, co-authored by Garcia that aims at nonvehicular air pollution.

Being invited as a special guest, former-Governor Schwarzenegger highlighted in his laudation that *"thanks to bipartisan support California was able to extend its historic Cap-and-Trade Program which protects our environment and preserves our nation-leading economic growth."* He honoured that *"Governor Brown and legislative leaders from both parties came together to ensure that California continues to march toward a clean, prosperous future"* (ibid.).

Assembly member and author of A.B. 398, Eduardo Garcia emphasised that by a bipartisan effort it was possible *"to achieve our ambitious climate goals, retain industry jobs to sustain our ever growing, clean green economy, all while addressing vital public health and air quality issues"*. He then referred to his personal focus on *"equitable climate investments in the communities most impacted by pollution"* which now will come to reality (ibid.).

The bipartisan legislative process, the fast process of adoption and enacting, as well as the contents of speeches are considered to be a clear sign that California - no matter what is happening in Washington[357] - will be a safe harbour for climate investments. This was mainly due to Trump's official announcement on June 1, 2017, that the U.S. is going to withdraw from the Paris Climate Accord.

While now the frame was set and all the necessary bills were in place or were extended with new bills, Governor Brown's fourth and last term as California was about to come to an end on January 7, 2019. On January 25, 2018 Brown delivered his sixteenth[358] and last State of the State Address as Governor of California. He highlighted that several projects, such as the Cap-and-Trade

[357] According to Senate President pro Tempore Kevin de León, "the Trump Administration seeks to undermine our nation's climate leadership" (Office Gov. Brown, 2017).

[358] This was due to the fact that (according to the so-called grandfather-clause) Brown had the right to serve four terms.

Program, were only possible with joining forces and both Republican and Democratic votes[359].

Furthermore, he emphasised the leadership of California in terms of efficiency standards, renewable energy, and among others the incentives for ZEVs. Brown stressed that there will be some more goals to achieve, for example "to make our neighbourhoods and farms healthier, our vehicles cleaner- zero emissions the sooner the better - and all our technologies increasingly lowering their carbon output. To meet our ambitious goals, we will need five million zero-emission vehicles on the road by 2030" (State of the State, 2018).

This ambitious goal was also one of the main drivers for Brown to announce Executive Order B-48-18 on January 26, 2018. He emphasised that it "aims to curb carbon pollution from cars and trucks and boost the number of zero-emission vehicles driven in California" (Office Gov. Brown, 2018). Due to the fact that about California's transport and mobility sector is accountable for round about 50 percent[360] of the state's overall GHG emissions, increasing the number of ZEVs in terms of replacing conventional cars would definitely make a difference. Against this background and within Executive Order B-48-18 Brown ordered "that all State entities work with the private sector and all appropriate levels of government to put at least 5 million[361] zero-emission vehicles on California roads by 2030" (Executive Order B-48-18).

Being aware that this number of vehicles cannot be reached solely with Battery Electric Vehicles and without a consolidated re-fuelling infrastructure, B-48-18 also called *"to spur the construction and installation of 200 hydrogen fueling stations*

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[359] Especially S.B. 32, A.B. 197, and A.B. 398 were supported by a bipartisan coalition.

[360] https://ww2.arb.ca.gov/ghg-inventory-data.

[361] With this he referred to his State of the State Address of January 7, 2019.

and 250,000 zero-emission vehicle chargers, including 10,000 direct current fast chargers by 2025" (ibid.). In order to promote necessary investments, the Executive Order demanded that *"all State entities continue to partner with regional and local governments to streamline zero-emission vehicle infrastructure installation processes whenever possible"* (ibid.).

Executive Order B-48-18 also asked all State entities to collaborate in order to a) update of the 2016 ZEV Action plan to promote private investment and to expand ZEV-infrastructure with a special focus on low income and disadvantaged communities[362], b) make recommendations to boost ZEV-infrastructure and the economy, c) to create jobs in California, d) to promote the availability of EV-chargers and hydrogen fuelling stations (ibid.). When looking at the contents of Executive Order B-48-18 it becomes clear that Governor Brown wanted to make the large-scale implementation of ZEVs to become his legacy for the state of California.

Same accounts for Executive Order B-55-18 that was announced by Governor Brown on September 10, 2018. Explicitly referring to the Paris Agreement under the UNFCCC, it called California for achieving Carbon Neutrality as "a new statewide goal [...] as soon as possible, and no later than 2045" (Executive Order B-55-18). When remembering Trump's announcement to withdraw from the Paris Agreement, the formulation of a long-term goal to achieve Carbon Neutrality, together with the explicit reference to the Paris Climate Agreement was definitely a hard knock for the Trump Administration.

As presented at the beginning of this episode, President Trump nominated Scott Pruitt as Administrator of the Environmental Protection Agency (EPA).

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[362] This again refers to the personal focus of Eduardo Garcia.

Pruitt, then-Attorney General of Oklahoma, “has built a career out of suing[363] to block the E.P.A.’s major environmental rules and has called for the dissolution of much of the agency’s authority” (The New York Times, 2017). According to earlier investigations[364] by The New York Times, energy lobbyists drafted letters for then-Attorney General of Oklahoma Scott Pruitt to be sent to EPA in order to tackle existing environmental rules.

Based on his questionable past, Pruitt was confirmed by U.S. Senate on February in an extremely close vote of 52:46 and took office on February 17, 2017. Pruitt, who was considered to be a die-hard follower[365] of Donald Trump, was - by July 2018 - object to numerous internal investigations[366] concerning conflicts of interest, questionable management practices, prodigality, and secrecy conflicts[367].

Finally, on July 6, 2018, after months of almost daily scandals and public protests, Scott Pruitt resigned as EPA’s Administrator. When Pruitt resigned, Andrew Wheeler then-Deputy Administrator[368] became the Acting Administrator of EPA. On November 16, 2018 Wheeler[369] was nominated by

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[363] As Attorney General, Pruitt has sued EPA for thirteen times (as of January 2017).

[364] https://www.nytimes.com/2014/12/07/us/politics/energy-firms-in-secretive-alliance-with-attorneys-general.html.

[365] See Pruitt’s speech at Trump’s official Announcement that the U.S. withdraws from the Paris Climate Accord.

[366] For example the Government of Accountability Office, the EPA inspector general, two House committees, etc.

[367] https://www.theguardian.com/us-news/2018/jul/05/scott-pruitt-what-it-took-to-get-him-to-resign-from-his-epa-job.

[368] Wheeler was nominated by Trump and confirmed by Senate on April 12, 2018 with a close vote of 53:45.

[369] https://www.epa.gov/archive/epa/aboutepa/epa-administrator-wheeler.html.

President Trump to become Administrator of the EPA and subsequently was confirmed by U.S. Senate in a vote of 52:47 on February 28, 2019.

This unpleasant situation at the management level of EPA is considered as clear evidence that under the Trump Administration, the role of EPA again[370] started to become less science-based and instead much more politicised. Just like under the Bush Administration (2001-2009), the federal agency was active in undoing much of its previous efforts, in order to comply with the President's objectives. No matter if it was the clean power plan, the Paris Agreement[371] or the GHG emissions reductions targets for the mobility sector, every kind of environmental standard was about to get rolled back for the sake of alleged affordable[372] energy.

As a result to this, the EPA policy under President Trump literally dumped national emissions reduction targets and have not really cared about climate change. This was especially the case when considering EPA's decision-making during 2018 and 2020.

In 2017, President Trump announced to re-establish former, weaker standards, if newer, more demanding standards are about to threaten jobs of the automobile industry. Based on this announcement, EPA's Acting Administrator Wheeler published a Notice[373] of Proposed Rulemaking on August 24, 2018 concerning the so-called Safer-Affordable Fuel-Efficient (SAFE) vehicles rule for model years 2021-2026. Of course, the Notice of proposed rulemaking for fuel

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[370] Kind of a déjà vu experience when reconsidering the Bush Administration.

[371] According to Trump, the Paris Climate Agreement was unfair and one-sided and about to harm the United States.

[372] https://trumpwhitehouse.archives.gov/issues/energy-environment.

[373] https://www.govinfo.gov/content/pkg/FR-2018-08-24/pdf/2018-16820.pdf.

economy and emissions was expected to happen sooner or later as Trump's strategy was to roll back environmental regulations in general.

The proposed lowering of existing standards needs to be considered as a politically motivated decision. As argued by CARB's Chair Mary D. Nichols, *"this is not a technical assessment, it is a move to demolish the nation's clean car program. EPA's action, if implemented will worsen people's health with degraded air quality and undermine regulatory certainty for automakers"* (CARB, 2018). While the decision on the federal level was about to affect the country as a whole, the Californian standards - based on a waiver in the year 2013 - remained in place, just like the other 12 Section-177-states[374] that have adopted California's clean vehicle rules.

Due to reaching the term limits, Governor Brown was about to leave office on January 7, 2019 at the age of 80. When reminding his sixteenth and last State of the State Address of January 25, 2018 and his Executive Orders B-48-18 and B-55-18, Brown obviously wanted to leave his legacy but also had plans regarding a smooth and consistent transition of his governorship. Against this background it needs to be stressed that during his last year in office, Brown kept pushing forward long-term goals instead of focussing on prestigious short-term issues. Although Brown's agenda included several aspects (water distribution network, road infrastructure, etc.), the main aspect of Governor Brown's fourth and final term was about his crusade[375] against climate change. While Executive Order B-48-18 called for 5 million Zero Emission Vehicles on

[374] Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington.

[375] https://www.governing.com/archive/gov-california-governor-jerry-brown-legacy.html.

Californian roads by the end of 2030, Executive Order B-55-18[376] was to set the long-term goal of reaching Carbon Neutrality by 2045. Unlike most other leaders, Governor Brown was really eager to think about the future instead of just focussing on short-term goals.

This was also the case when Governor Brown started early to push his Lieutenant Governor Gavin Newsom to become his successor. On February 2018 Newsom announced to run for Governor in the 2018 elections. While being well-known by the Californians during his eight years as Lieutenant Governor to Jerry Brown, Newsom was subsequently successful at the primary in June 2018 and finally defeated his opponent John Cox (Republican Party) by a lead of 23.8 percent[377] of overall votes.

Now, when heading back to EPA's Notice of Proposed Rulemaking and Trump's announcement to roll back California Emission Standards and to freeze federal fuel-economy standards for new cars and light-trucks. About one year later, on September 27, 2019 this situation was about to change when EPA published "The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program[378]" in order to officially announce the withdrawal of its 2013 CAA waiver. Several days before there were already some rumours that the Trump Administration would soon withdraw California's 2013 CAA waiver. Based on this, California Attorney General Xavier Becerra issued a statement, directed to Trump: "You have no basis and no authority to pull this waiver. We're ready to fight for a future that you seem unable to comprehend;

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[376] As the legislative session ended in early September 2018, Brown decided to put long-term goals via Executive Order.

[377] https://www.nytimes.com/elections/results/california-governor.

[378] Although it was challenged in federal court and EPA received multiple petitions, the waiver's withdrawal remained.

we'll see you in court if you stand in our way"[379]. In response to this, EPA's Administrator Wheeler argued that Washington upholds federalism and the sovereignty of federal states however a single state cannot dictate the nation's standards[380].

As argued earlier, EPA and NHTSA had jointly published a notice of proposed rulemaking on August 24, 2018. However, this action was not directly to affect California that still had the 2013 CAA waiver. Same accounts for the so-called Section-177-states, as they have just adopted California's rules and standards in full compliance to the 2013 CAA waiver. However, by officially announcing the withdrawal of the 2013 CAA waiver, this comfortable situation changed.

Likewise to the first-ever waiver denial of March 6, 2008, EPA argued that CARB's *"regulations pertaining to greenhouse gases-related (GHG) emission standards for 2021 through 2025 model year (MY) passenger cars, light-duty trucks, and medium-duty vehicles are not needed to meet compelling and extraordinary conditions"* (Federal Register, 2019, p. 51350). Based on this assumption, *"EPA's action is to withdraw the waiver it had previously provided in January 2013 to California for that State's GHG and ZEV programs under section 209 of the Clean Air Act"* (ibid., p. 51356).

EPA's withdrawal was based on two premises. As first, *"EPA has determined EPCA[381] preemption renders its prior grant of a waiver for those aspects of California's regulations that EPCA preempts invalid, null, and void, thereby necessitating withdrawal of the waiver"* (ibid). By this, EPA argued that the Energy Policy and

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379 https://oag.ca.gov/news/press-releases/attorney-general-becerra-president-trump-you-have-no-authority-pull-california%E2%80%99s.

380 https://www.nytimes.com/2019/09/17/climate/trump-california-emissions-waiver.html.

381 Energy Policy and Conservation Act of 1975.

Conservation Act intended to give full and exclusive authority to the federal government, whereas the 2013 waiver was wrongly granted. The second argument for a waiver withdrawal doubles with earlier EPA statements as it puts the focus on global climate change which - according to EPA - cannot be addressed by California as a single state. Based on this, EPA concludes that the provisions of the Clean Air Act (CAA) do not justify a waiver to California if such *"standards for emissions from new motor vehicles [are] designed to address global climate change problems. Therefore, California does not meet the necessary criteria to receive a waiver for these aspects of its program"* (ibid.).

The withdrawal of the 2013 CAA waiver under President Trump was another example of his strategy to rollback[382] almost every single environmental standard that was established during the Obama Presidency from 2009-2017. Not only the circumstances, but also the wording and the reasoning strongly reminds of the Bush Administration, when EPA[383] turned into a compliant servant for Bush's political agenda. A vital part of Donald Trump's agenda to put America First, was to make America more independent from energy imports. As a result to this, energy policy[384] under the Trump Administration was rather focused on the expansion of domestic fossil fuels production than on the promotion of renewable energy sources.

Especially during the COVID-19 pandemic, all kind of environmental issues were put aside in order to foster and support the U.S. economy. Against this

[382] https://www.theguardian.com/environment/2018/aug/21/epa-clean-power-plan-rollback-affordable-energy-rule.

[383] The traditional role of EPA includes both to protect the environment and the American people from pollution, toxic chemicals, and other harms born of industrial activity. Furthermore to monitor and enforce compliance with its rules.

[384] Trump's energy policy was not about the environment, but exclusively focused on economic growth and job creation.

background EPA announced a Memorandum[385] on March 26, 2020 that focused on the agency's Enforcement and Compliance Assurance Program. Although EPA expected that full compliance with monitoring standards will continue, it was not planned "to ask facilities to 'catch-up' with missed monitoring or reporting" in terms of overall compliance activities. Same was true for EPA's enforcement activities that were basically suspended as well. While it was suggested that the specific nature and dates of occurring noncompliance should be identified, there were neither monitoring nor enforcement activities at EPA.

In April 2020[386], the Environmental Protection Agency even rejected stricter air quality standards on particulate matter, better known as soot emissions. Although EPA's staff scientists were in favour[387] of stricter rules, Administrator Wheeler announced to keep the current standard which is "protective of public health. Same accounts for several other standards that have not been tightened or have even been weakened under the Trump Administration. In retrospect it needs to be stressed that President Trump kept his promises - at least those that he made in terms of rolling back standards[388] and dismantling EPA.

When summing up this episode, it becomes quite clear that President Trump was not against single issues or particular aspects of the Californian approach towards a clean and sustainable transport and mobility sector. In fact, Trump and his inglorious companions were obviously against the whole conceptualisation of such transition processes that were about to lead the country away from its consolidated fossil fuels dependence towards a clean and

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385 https://www.epa.gov/sites/default/files/2020-03/documents/oecamemooncovid19implications.pdf.

386 https://www.washingtonpost.com/health/2020/04/14/epa-pollution-coronavirus.

387 According to figures, lowering particulate matter to 9 micrograms per cubic meter could save 12,200 lives a year.

388 https://www.nytimes.com/interactive/2020/climate/trump-environment-rollbacks-list.html

renewable future. While some aspects (e.g. withdrawal from the Paris Climate Accord, denial of the California waiver) easily reminds one of George W. Bush's Presidency, the entirety of dismantled rules and regulations was definitely incommensurable to any other period of time in the past.

5.5 How to get back on Track?! Episode (2021-2022)

As argued earlier, this last episode is considered to be rather a teaser than a complete chapter of re-traced processes. This is mainly due to the limited time frame of the research and the indispensable need for choosing a final break-off point. Especially when looking at both the most relevant events and the most valuable players to be highlighted within the overall evolution of the ZEV Program and related legislative processes. Table 7 presents the very brief outline of the relevant actors within this episode.

Table 7 – Cast and Collaboration List – Fifth Episode (2021-2022)

Source: Author

Person	***Role***	***Affiliation***	***Remarks***
Gavin Newsom	Governor of California	Strongly committed to long-term goals of California	Previously mayor of San Francisco (2004-2011) Lieutenant Governor to Jerry Brown (2011-2019)
Liane M. Randolph	Chair of CARB	Californian regulatory agencies	
Joseph 'Joe' Robinette Biden Jr	President U.S.A.	Re-establishment of Obama's environmental achievements	Full acceptance of the Paris Climate Accord Vice President (2009-2017)
Michael S. Regan	EPA Administrator	Loyalty	Reconsideration of Previous Withdrawal

According to this, it is to start with the inauguration of Joe Biden as the 46th President of the United States on January 20, 2021. It intentionally leaves out all aspects related to the campaigns, the Presidential Election, and the United States Capitol attack of January 6, 2019.

By having gained a long-term experience in U.S. Senate from 1973-2009, Biden served as vice president under President Barack Obama during 2009 and 2017. According to this, one of his primary intentions is obviously to re-establish all the environmental regulations and standards that were taken down during the four years of the Trump Administration. Against this background Biden said in his Inaugural Address of January 20, 2021 that there have been only "few periods in our nation's history [that] have been more challenging or difficult than the one we're in now"[389] He stressed that there will be: *"Much to repair. Much to restore. Much to heal. Much to build. And much to gain"* (The White House, 2021).

In order to achieve this, Biden not only appealed for unity in order to "*make America, once again, the leading force for good in the world*", but also stressed out that *"a climate in crisis"* is to be taken care of (ibid.). Only few hours after President Biden was sworn in, he signed an Acceptance on Behalf of the United States of America in order to accept the Paris Agreement "and every article and clause thereof on behalf of the United States of America" (The White House, 2021b). By this re-entry of the U.S. to the Paris agreement of 2015, Biden has ended the period "where the US became a near-pariah on the international stage with Trump's refusal to address the unfolding disaster of rising global temperatures"[390].

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[389] Biden was to referring to COVID-19 and the overall situation after four years of Trump's Presidency.

[390] https://www.theguardian.com/environment/2021/jan/20/paris-climate-accord-joe-biden-returns-us.

Within a series of signatures of his first day in office, President Biden also issued Executive Order 13990 *"Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis"* that was published in Federal Register on January 25, 2021. Within his, Executive Order Biden ordered that heads of all governmental agencies should *"immediately review all existing regulations, orders, guidance documents, policies, and any other similar agency actions (agency actions) promulgated, issued, or adopted between January 20, 2017, and January 20, 2021"* (Federal Register 2021a, p. 7037). By this, the necessary step was taken to reconsider all of the "rollback activities" that took place under the Trump Administration.

Just about two weeks later, on February 4, 2021 Biden put his remarks on America's Place in the World and emphasised that:

> *"America is back. America is back. Diplomacy is back at the center of our foreign policy"* (The White House, 2021d).

Based on Executive Order 13990 and Biden's strong focus to re-establish the provisions, regulations, and standards that were implemented under the Presidency of Barack Obama, he also forced the EPA to reconsider its decision of 2019, namely the 2013 CAA waiver withdrawal. On April 26, 2021, EPA announced that it is reconsidering the withdrawal. The official Notice of Reconsideration of the previous withdrawal, as well as the Opportunity for Public Hearing and Public Comment was published in the Federal Register on April 28, 2021.

Immediately after Biden's Executive Order, EPA and its Administrator Michael Regan[391] has started to review the decisions of 2019 that led to the withdrawal of the 2013 CAA waiver of California. Based on this review, EPA *"believes that there are significant issues regarding whether SAFE 1 was a valid and appropriate exercise[392] of agency authority [...] and whether EPA took proper account of the environmental conditions in California and the environmental consequences from the waiver withdrawal in SAFE 1"* (Federal Register, 2021b, p. 22421). Furthermore, EPA also highlighted the legal petitions *"filed by California (jointly with a number of States and Cities) and one jointly filed by nongovernmental organizations"* (ibid.).

Almost one year later, on March 14, 2022 Notice of Decision was published in the Federal Register, stating that EPA *"has completed the reconsideration of its 2019 action withdrawing a 2013 Clean Air Act (CAA) waiver of preemption for California's greenhouse gas (GHG) emission standards and zero emission vehicle (ZEV) sale mandate, which are part of California's Advanced Clean Car (ACC) program"* (Federal Register, 2022, p.14332). By the Notice of Decision EPA's Administrator Regan[393] rescinded the 2019 waiver-withdrawal actions as they were improper, flawed, misapplied, erred, and inappropriate measures taken by EPA and then-Administrator Andrew Wheeler under the Trump Administration (ibid., p. 14333).

[391] Regan was nominated by Biden on December 17, 2020 and was confirmed by U.S. Senate on March 10, 2021.

[392] This especially focussed on the time passed since EPA's 2013 waiver decision and the approach to withdraw it.

[393] In his first interview as EPA Administrator, Michael Regan said that his focus will be to focus on rebuilding the agency, fighting climate change, and helping communities, suffering from pollution (see: https://www.washingtonpost.com/climate-environment/2021/03/15/michael-regan-epa-administrator).

The decision to rescind EPA's 2019 waiver withdrawal not only brings the 2013 CAA waiver[394] of California back into legal force, but also the CAA's Section 177 provision[395] that allows states to adopt California's rules and standards. From a more general perspective, EPA has twice reconsidered / rescinded its prior decisions within a time frame of about 12 years[396]. Against this background it needs to be mentioned that EPA obviously learned its lessons as the agency will use a more standardised approach in waiver decisions as *"EPA has recognized that congressional intent in creating a limited review of California waiver requests based on the section 209(b)(1) criteria was to ensure that the federal government did not second-guess the wisdom of state policy"* (ibid., p. 14342).

A quite important issue (maybe the most central one) of the Biden Administration is considered to be the reversal of decisions that were made under the Trump Administration. Against this background, some of the most prominent environmental achievements of the Obama Administration were already re-established during the first days and weeks of Biden's presidency. However, it is unlikely that this objective of Biden is self-sufficient and can be achieved in its entirety. Aside from this, there is no future-oriented vision or even a set of defined long-term goals. During the last years, things have changed fundamentally. Even if climate change is a 'more-important-than-ever-topic', the political agenda of the United States most probably has a variety of other issues prior to that. Therefore, it will be quite interesting to see if California will experience another episode of backing that supports advancement or hindrance that will lead to standstill or even a deadlock.

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[394] This comprises the waiver of preemption for ZEV sales, as well as for GHG emission standards in California.

[395] The decision also withdrew EPA's former legal interpretation that other states may not adopt California's standards.

[396] Denial of waiver in 2008, its re-granting in 2009, as well as the waiver withdrawal in 2019 and the rescission in 2022.

6 What seems to matter: Explaining the Outcome

While the origin of the overall evolution process towards a clean and future-proof transport & mobility sector in California is considered to be the 1943 smog event (and subsequently the ***problem of air pollution***) in the city of Los Angeles, there are numerous intermediate steps and milestones that are considered to be important as well.

As argued beforehand, the long-term evolution of California's environmental policy leadership has its ***policy foundation*** in the Clean Air Act (CAA) and the amendments of 1967. While already President John F. Kennedy (Democratic Party) recognised air pollution as a problem that needs to be solved quickly on the federal level, the CAA was signed into law by his successor Lyndon B. Johnson on December 17, 1963. Although this first draft was quite rudimentary, it already put forward binding air pollution limits for industry and the transport sector.

While the implementation of the CAA is considered to be a quite seminal ***federal-level-approach***, due to its compelling and extraordinary conditions, California continued to suffer from air pollution. Hence, a group of Californian governmental officials started to work on a ***state-level-approach*** in order to develop and implement a more stringent air quality regime in California. As an effective system of rules and regulations not only needs to be implemented, but also demands enforcement and monitoring, the aim was to establish a ***capable and strong state authority***.

As a result to this state-level-approach, on August 30, 1967, Republican Governor Ronald Reagan finally signed the Mulford-Carrell Air Resources Act into law which simultaneously created the California Air Resources Board

(CARB) that merged the Bureau of Air Sanitation and the California Motor Vehicle Pollution Control Board into one single and strong state authority.

CARB soon presented a first draft of emission standards for the most common sources of air pollution. According to federal law, such state-level-standards are not eligible unless they fully comply with federal standards. However, due to its compelling and extraordinary conditions, the more stringent rules and regulations of California were approved by Congress under the framework of the 1967 Amendments of the Clean Air Act. Accordingly, California was granted the first-ever ***waiver to implement its own standards*** in order to effectively regulate emissions from new and used vehicles.

While the above aspects could be summarised as a set of required preconditions (problem identification / capacity to solve the problem / regulatory authority) to develop and implement potential solutions, the long-term evolution process towards a clean and future-proof transport & mobility sector in California comprises of a series of events (case-specific happenings) and decision-making (causal processes).

Both the ***regulatory capacity*** and the ***regulatory authority*** are considered to be highly relevant aspects of the Californian success-story. When the Californian Air Resources Board (CARB) was established, it has been equipped with a broad legal authority to enforce regulations and standards. Regarding this, what matters most is ***sufficient funding*** (long-term and nonpartisan financial resources) and staffing (***scientific knowledge & technical expertise***). While nowadays CARB has not only the largest staff, but also the largest budget among the Californian environmental state authorities and gained substantial confidence (see Vogel, 2018, p. 16 ff.), these are just the results of a long-term process of continuous empowerment that took place in the past decades.

While the original challenge (problem of air pollution), the approach to overcome it (stricter rules and regulations on air quality), and the basis of authority to take action (CAA-privilege to request waivers of federal preemption) are somehow referring to both the fundamental prerequisites and the historical background, the durable and continuing motivation to pursue long-term goals needs to be considered as quite outstanding.

Especially when looking at periods when the state-level approach (stricter rules and regulations in California) was heavily attacked by the federal government, the patience, endurance, and stamina of Californian decision-makers is worth mentioning. Literally referring to the saying ‘What doesn't kill you makes you stronger’, California has not only persevered challenges and setbacks, but also draw new strength and novel approaches from them. For example, President Bush’s withdrawal from the Kyoto Protocol, not only initiated the legislative process[397] towards Assembly Bill A.B. 1493, but also encouraged California to set the basis for long-term policy continuity.

Aside from negotiated agreements (bipartisan approach) and consistent advancements (policy learning), the policy continuity in California has evolved to a kind of policy legacy where long-term goals are embedded into a stable and resistant structure of path dependency. While California has been quite successful in achieving its own goals, it also encouraged other states in the U.S., as well as other countries around the globe to adopt its rules and standards. The ***Californian way*** of policies towards improved air quality, increased fuel efficiency, and ambitious emission standards extrapolated itself to the ***California effect***, namely the transfer and adoption of proven technologies as well as rules, regulations, and standards.

[397] The process was carried by a bipartisan spirit in both the Assembly and the Senate of California.

6.1 Striking Features: Decision-makers, Lawmakers, and Leadership

As argued beforehand, it was Californian Governor Edmund Gerald 'Jerry' Brown Jr., together with Mary D. Nichols who pushed CARB's employment regarding air pollution control and the monitoring and enforcement of air quality standards. As a result to this, CARB became California's 'coequal counterpart' (sometimes even a 'coequal combatant') to the U.S. Environmental Protection Agency (EPA), founded in 1970 by then-President Richard Nixon.

Throughout all episodes, there were a number of ***highly-committed actors*** (both individual and coalitions) with long-term visions and roadmaps. Once in a while there were also individual decision-makers that introduced their charismatic leadership in order to uphold and boost the evolution process.

Based on President Bush's withdrawal from the Kyoto Protocol, Assembly Bill A.B. 1493 was the Californian answer. The bill was authored by Fran Pavley and supported by a group of 'legislative champions', forming a strong coalition that included environmental groups, advocates, journalists, governmental officials, and many other stakeholders as well. On the other side, there was a well-financed opposing coalition that included the California Motor Car Dealers Association, several car manufacturers (e.g. BMW, DaimlerChrysler, GM, Honda), numerous advocates and a variety of lobby groups. Not being known as a charismatic leader, it was solely Governor Davis' merit that A.B. 1493 was enacted at the end of a controversial dispute.

In contrast to this, Arnold Schwarzenegger - an absolutely showman - not only took office from his precursor Davis (who got 'totally recalled'), but continued to run his governorship in a quite extraordinary way. Back then Schwarzenegger was married to Maria Shriver (member of the Kennedy family) and started his political career with the Republican Party as a greenhorn. While being completely underrated by the political class, Governor Schwarzenegger surprised everyone by putting forward his ambitious program that focused on a truly environmentally friendly agenda for his beloved California. Regarding this, Schwarzenegger soon started to use ***Executive Orders*** in order to implement his authorities as Governor of California. While this was so far a familiar at the federal-state-level (Presidential Executive Orders), Schwarzenegger obviously adapted it in order to push substantial policy changes. As a matter of fact, the series of Executive Orders that were signed between 2004 and 2018 are nowadays called 'The California Climate Change Executive Orders'.

Regarding this, Executive Order S-3-05 needs to be considered as a seminal landmark as it established GHG emission reduction targets for the years 2010, 2020, and 2050. As legislative counterpart, Assembly Bill A.B. 32 – The Global Warming Solutions Act of 2006 (that was again authored by Fran Pavley in collaboration with Fabian Nunez) was signed into law by Governor Schwarzenegger. The bill required California to *"achieve the maximum technologically feasible and cost-effective greenhouse gas emission reductions"* in order to reduce its GHG emissions to 1990 levels by 2020 (Cal. A.B. 32). While the bill itself did not stipulate how GHG reductions should be achieved, Schwarzenegger proclaimed Executive Order S-20-06, calling for a market-based pollution trading scheme (Cap and Trade). Regarding this, A.B. 32 and the related Executive Orders need to be considered as seminal milestones of the ZEV Program in California.

In contrary to this period of achievements and progress, the second term of Schwarzenegger's governorship was mainly dominated by EPA's refusal of a Californian waiver under the Bush Administration. This clearly demonstrates that there is a need for both ***state-level-leadership*** <u>and</u> ***federal-level-support*** (or at least federal-acceptance) in order to push things forward.

Such kind of a beneficial 'leadership-support-situation' happened during the Third Episode (2011-2017), when Jerry Brown (Governor of California) formed a powerful coalition with Fran Pavley (Member of California Senate) and Mary D. Nichols (CARB's chairwomen). The federal counterpart included Barack Obama (President of the United States) and Lisa P. Jackson (Administrator of EPA). During this quite unique period of state-level-leadership paired with federal-state-support, several Executive Orders (e.g. B-16-2012 and B-30-15) and another two legislative milestones (Senate Bill S.B. 32 and Assembly Bill A.B. 197) took effect. Regarding this, the significant leadership and vision of Governor Brown needs to be considered as a game-changer as being both a ***long-term Governor*** (1975-1983 and 2011-2019) and a ***charismatic leader***.

In total contrast to this, the time period between 2017 and 2021 was strongly dominated by the ***opposing coalition*** in Washington. Under the Trump Administration the federal-state-support for California rapidly turned into a ***federal-state-denial*** that nearly gridlocked the state's efforts towards a clean and future-proof transport and mobility sector. Trump started to roll back environmental regulations and decided to withdraw from the Paris Climate Accord.

Concerning California, the ***waiver withdrawal*** took the state's privilege to establish and implement its own standards and regulations. While (at least in general) California kept on working towards its clean and future-proof transport and mobility sector, things were getting harder and especially slower than beforehand. This was especially the case regarding the binding implementation of more stringent rules and regulations on vehicle emissions, as

Trump was aiming at a single, nationwide emission standard. However, Trump's rationale was not to implement one demanding emission standard throughout the whole United States[398], but simply to prevent California - and likewise the Section 177 states - from setting individual, more demanding standards that intervene into federal policies.

Even if there was still a strong and focussed coalition in California, leaded by Governor Brown (and later by his successor Gavin Newsom), it was impossible to overcome the federal-state-denial and subsequently the policy-gridlock on the short-run[399]. As a result to this, the last two years of Brown's final term as Governor of California were rather to ***fight for the status-quo achievements*** than to keep on moving forwards. Regarding this, the waiver withdrawal of September 2019 is considered to be climax of a nightmare scenario.

Since Brown left office, his successor, Governor Newsom - who already served as Lieutenant Governor to Jerry Brown (2011-2019) - has been proceeding the policy legacy. At the federal level, President Biden immediately started to 'turn back the Trump-time' when he not only fully accepted the Paris Climate Agreement, but also signed Executive Order 13990 that asked for an immediate ***review of all decisions*** made by Trump. This, of course, also included the decision of the Environmental Protection Agency (EPA) to revoke the waiver of preemption for California's Advanced Clean Car (ACC) program. As a result to this, EPA announced to put the ***Californian waiver back into legal force*** as former decisions were improper, flawed, misapplied, erred, and inappropriate.

[398] Trump argued that this would lead to both safer and far less expensive cars, as current vehicles are designed on basis of Californian rules and regulations which is increasing the cost when sold in U.S. states with less pollution than California.

[399] During the entire duration of the Trump administration, the legal dispute regarding the waiver withdrawal (and subsequently the mandatory Californian authority) was tied up in court.

While Governor Newsom is not considered to be as charismatic as his precursor Jerry Brown, he is definitely highly-committed in fighting for the status-quo of the Californian achievements. Based on a successful recall attempt, on September 14, 2021, the recall election was held, but failing to remove Governor Newsom from office. About one year later, on November 8, 2022, Newsom was re-elected to his second and final term[400] as Californian Governor.

6.2 California - Things that can be learned but not taught

As argued beforehand, the results of this explaining-outcome single-case study are highly case-specific and therefore cannot be generalised. The evolution of the Californian ZEV-Program as major aspect of California's transition towards a future-proof transport and mobility sector was chosen as a case, because it is considered to be ***unique & outstanding*** and therefore important to be understood in detail. While the case itself is unique, same accounts for the State of California and its ***long-term tradition*** of being a policy ***innovator and leader*** with the United States as well as around the globe.

Regarding this, the Californian agenda-setting process seems to be based on long-term goals and progressive targets that result from a kind of bipartisan gentlemen's agreement. In contrary to the federal government in Washington D.C.[401], both the ***significant directional stability*** regarding long-term policy goals and the ***continuous amendments*** of specific policies, regulations, and standards seems to be widely unbiased and ***decoupled from impeding partisanship***.

[400] Due to existing term limits (2 times 4 years), Newsom will have to leave office in November 2026.

[401] It needs to be stressed that the Clean Air Act (CAA) and subsequently the provision of waivers to California (allowance to develop and implement more stringent rules and regulations that on the federal level) were enacted by a bipartisan majority in Washington D.C. as well.

No matter if it is the California Air Resources Board (CARB) that was founded by Republican Governor Ronald Reagan in 1967 or the Schwarzenegger Administration (also Republican Party) that pushed forward an environmentally friendly agenda. Obviously, California does not offer any fertile ground for impeding partisanship, but is unique and outstanding in terms of being a truly ***bipartisan policy arena*** where Californian welfare is the ultimate ambition.

When talking about the California Air Resources Board (CARB) its exceptional and unique regulatory capacity needs to be stressed in particular, especially the monitoring and enforcement of relevant policies, regulations, and standards. While both CARB and the Environmental Protection Agency (EPA) are considered to be well-equipped (funding and staffing) ***authorities with a regulatory supremacy*** in general, the Environmental Protection Agency is considered to be directly subordinated to the U.S. President, while the Californian Air Resources Board by tradition is much more autonomous.

Against this background, the ***high level of independenc***e and the exclusively ***science-based decision-making*** of CARB are to be found throughout all episodes (see chapter five): In contrary to this, EPA has been undergoing some quite bad time, especially during the Bush Administration (2001-2009) and the Trump Administration (2017-2021). During these periods of time, the Environmental Protection Agency was abused to rather implement bizarre political agendas than to make reasonable, science-based decisions. As a result to this, both the regulatory capacity and the regulatory authority of EPA were diminished significantly.

The environmental leadership role of California is not only based on an ***ambitious and long-term agenda*** with ***achievable targets***[402], but also arises from both ***individual leadership*** (single politician, administrator, officials, etc.) and ***collaborative leadership*** (initiatives, lobby groups, departments, etc.). Especially when it comes to significant changes in an existing system or even the transition from one system to another, ***passion, persistence and tenacity*** are major ingredients for long-term success. Without those characteristics, the development and implementation of effective rules and regulations would not have been possible in California.

A quite outstanding example for such kind of sophisticated target-setting, paired with decent leadership are the terms in office of Edmund Gerald 'Jerry' Brown who served as Californian Governor from 1975 to 1983 and 2011 to 2019. During his first and second term, he focussed on the empowerment of the Californian Air Resources Board (CARB) and appointed Mary D. Nichols as CARB Chair. Both have known each other since the early 1970s when Nichols filed a case against then-Administrator of EPA William D. Ruckelshaus.

During Schwarzenegger's Governorship, Brown served as Attorney General of California (2007-2011) and tirelessly fought for the Californian waiver, requested by CARB and denied by EPA in 2007. Likewise, Nichols significantly contributed to this, when serving as chair of the California Air Resources Board. When Brown succeeded Schwarzenegger in office and served his third and fourth term as Governor, he again headed a strong coalition aiming at effective and long-term GHG-emission reductions in California.

[402] Targets should comprise of short-term, mid-term, and long-term targets and corresponding milestones.

This example does not only reflect the aspects of strong leadership to be paired with long-term agenda setting, but also highlights the significant policy continuity that was achieved by Brown's passion, persistence, and tenacity. Regarding this, another important aspect that needs to be emphasised is the remarkable ***continuity of personnel***. While the multi-term Governorship of Jerry Brown (1975-1983 and 2011-2019) is both unique and unrepeatable, it is worth to take a look at the other highly-committed actors as well.

As argued beforehand, Mary D. Nichols is not only a highly-committed actor who is deeply-routed in California, but has a long-term history of administrative collaboration with environmental groups. As a matter of fact, Nichols appeared first in 1972 when she filed a case against the EPA and his Administrator Ruckelshaus. Ever since she stayed in the 'Californian coalition' and for example held different positions at the California Air Resources Board (CARB). By being CARB's chairwomen for a remarkably long period (1979-1983 and 2007-2020) she definitely shaped[403] CARB that is nowadays (one of) the most influential and effective environmental authorities around the globe.

Another highly-committed actor to be mentioned without any doubts is Fran Pavley, former Member of California State Assembly (2000-2006) and former Member of the State Senate (2008-2016). During this time, Pavley was not only representing the Californian way to reduce GHG emissions and to mitigate climate change, but also authored three seminal bills (S.B. 32, A.B. 32, and A.B. 1493) that were signed into law by then-Governors Gray Davis (2002), Arnold Schwarzenegger (2006), and Jerry Brown (2016). This not only emphasises her role as a ***'legislative champion'***, but also reflects the long-term continuity of her legislative capability. It needs to be emphasised that there are commonly two

[403] CARB' broad legal authority is based on sound science and up-to-date technologies.

types of administrative personnel and decision-makers to be found: exceptional and highly-motivated performers (sometimes charismatic leaders) and regular staff that does the job at a daily basis. Table 8 presents a chronological overview of the different terms[404], performed by Californian decision-makers from 2002 until today.

Table 8 – Terms of Californian Decision-Makers (2002-ongoing)

Source: Author

Governor	Davis (1999-2003)	Arnold Schwarzenegger (2003-2011)	Jerry Brown (2011-2019)	Gavin Newsom (2019-)	
Lieut. Gov.	Bustamante	Bustamante/Garamendi Pasquil/Maldonado	Gavin Newsom (2011-2019)	Kounalakis (2019-)	
Att. Gen.	Lockyer (1999-2007)	Jerry Brown (2007-2011)	Kamala Harris (2011-2017)	Becerra (2017-2021)	Bonta (2019-)
CARB Chair	Lloyd (1999-2005)	Tuck Sawyer	Mary Nichols (2007-2020)	Randolph (2020-)	
Fran Pavley	Member of California State Assembly	Member of California State Senate	Environmental Policy Director USC Schwarzenegger Institute		

2002 2003 2004 2005 2006 2007 2008 2009 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 *ongoing*

The above table not only illustrates the long-term stability of relevant personnel. Regarding this it needs to be mentioned again that Jerry Brown additionally served as Californian Governor from 1975-1983, while Mary Nichols additionally served as CARB chair from 1979-1983. Aside from this, Table 8 depicts that there is a remarkable exchange between different key functions of the administrative system (e.g. Attorney General → Governor, as well as Lieutenant Governor → Governor).

The long-term stability of high-level policymakers, as well as the exchangeability of important functions needs to be considered as highly relevant in terms of both policy continuity and policy legacy of California.

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[404] In the case of Fran Pavley, the different functions (legislative / administrative) are presented instead.

6.3 Californian Leadership: Condemned to Success!?

As already argued earlier, the Californian leadership in the field of environmental policies has its roots in the federal-state Clean Air Act (CAA) and the amendments of 1967. When California suffered from severe air pollution, U.S. Congress recognised that due to the State's 'compelling and extraordinary circumstances' the issue of air pollution can only be solved by the implementation of 'more-stringent-than federal' emission standards.

While the very first Californian waiver was granted in order to put forward the emission standards for vehicles of model year 1969, numerous technological innovations were triggered by the stricter rules and regulations of California. One of the most important and also a quite famous one is the mandatory implementation of catalytic converters (and subsequently the phasing out of lead from gasoline). Aside from this, a series of technology-forcing policies were put in place as well.

The Low-Emission Vehicle (LEV) standards covered the model years from 1994-2003, while the upgraded LEV II standards were focussing on model years 2004-2010. From 2012 onwards, the advanced clean car standards are focussing on the large-scale implementation of zero-emission vehicles (ZEVs). As the most recent step, the Advanced Clean Cars II regulations were adopted in 2022, focusing on model years from 2026-2035.

In April 2023 California has achieved its goal to put 1.5 million zero emission vehicles (ZEVs) on the road, which was around two years earlier than planned[405]. According to Governor Newsom, *"no other state in the nation is doing*

[405] In 2012, then-Governor Jerry Brown announced Executive Order B-16-2012 in order to set the goal of 1.5 million ZEVs on Californian roads, to be achieved by 2025.

as much as we are to accelerate our electric and zero emissions future" (CARB 2023). The total amount of paid ZEV incentives[406] reached nearly 2 billion Dollars, resulting in a significant boost of California's climate action plan. Due to 2023 figures, 21% of all new cars sold in California were ZEVs, while 40% of all ZEVs sold in the U.S. were sold in California (ibid.).

While this is in total a quite remarkable success-story, there were also a number of challenges and severe setbacks included. The most recent one, namely the 2019 waiver withdrawal is still ubiquitous as Trump was the first U.S. President ever to revoke a Californian waiver under the Clean Air Act (CAA). Even if the waiver was later restored by President Biden, the related lawsuit[407] is still waiting for its decision at the Supreme Court.

When considering the current situation at the federal level and the upcoming Presidential Election in November 2024, it needs to be stressed that it is within the realms of possibility that Trump, Biden's precursor, could become his successor as well. Against this background it is most likely that Trump *"would go after California's special authority to set stricter-than-federal clean-car standards if he got another shot at the White House"* (Politico, 2024b).

As Karoline Leavitt, press secretary of the Trump campaign, expressed: *"On Day One of the Trump administration, not only will Crooked Joe's Electric Vehicle mandate be terminated, but any Biden waiver allowing gasoline-powered cars to be outlawed will be immediately revoked"* (ibid.) While the Californian administration already prepares for Trump's possible re-election, this quite harsh statement officially confirmed his schedule for California and the Section 177 states.

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[406] A strong focus of ZEV incentives is put on Californians with a low-income.

[407] A coalition of 17 Attorney General (all Republican) and various lobby groups (conventional and renewable fuel sector) filed a suit against EPA's decision to restore the Californian waiver in 2019.

In order to be prepared for Trump's re-election, there are various ongoing activities in California, the Section 177-states, and the federal level. For example, the California Air Resources Board (CARB) recently announced[408] a partnership with Stellantis, the world's fourth (currently fifth) largest car manufacturer. The agreement not only includes a general commitment to further promote ZEVs, but also quite tangible[409] efforts like investments in expanding the re-charging infrastructure, and advanced GHG-emission reductions for its upcoming light-duty vehicles.

Aside from this, Stellantis, the merger[410] of PSA, GM, Fiat, and Chrysler assures to keep on complying with Californian rules and regulations (especially the ZEV sales requirements), no matter if CARB will lose its regulatory authority *"as a result of judicial or federal action"* (CARB, 2024). The Stellatis-agreement is considered to be part of a new strategy to expand voluntary agreements with the industry sector, especially car manufacturers. As argued by Liane Randolph, serving CARB char: *"California's work with leading manufacturers is an example of the collaboration that will clean our air, combat climate change and improve health outcomes for residents in the state"* (ibid.).

The aim is clearly to keep on staying at the pathway towards a clean and future-proof transport and mobility sector, no matter if California's legal authority for setting its own GHG-emissions and ZEV standards remains or is taken by federal courts or the Trump 2.0 Administration. According to Randolph, such kind of collaboration: *"helps accelerate the deployment of zero-emissions options that will make a more sustainable future possible"* (ibid.).

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[408] https://ww2.arb.ca.gov/news/california-announces-partnership-stellantis-further-emissions-reductions.

[409] According to CARB, the partnership will help to avoid 10 million metric tons of GHG-emissions.

[410] Stellantis comprises of a total of 12 brands, including Citroën, DS, Peugeot, Opel, Vauxhall, Abarth, Fiat, Lancia, Alfa Romeo, Maserati, Chrysler, and Dodge.

While California was always pretty confident to ultimately be able to enforce its more stringent rules and regulations, there seems to be both a change in strategy and an adjusted self-perception. Even if CARB remains to be (one of) the most influential and effective environmental authorities around the globe, the Trump episode clearly demonstrated that it is possible to get completely blocked by a federal-state-denial attitude.

As a result to this, it needs to be stressed that California's long-term goals and progressive targets remain in place, while the actual approach to achieve them is obviously under modification. As argued by CARB Executive Officer, Steven Cliff: *"California's persistent air pollution and the growing threat of climate change require action and innovation, and our collaboration with Stellantis is an example of the industry partnerships that will further a clean air future* [...] *and a clear path forward toward our zero-emissions goals"* (ibid.).

Aside from these strategic plans, the prospective legal authority of CARB, and the upcoming administration in D.C., there are obviously some issues at the state-level as well. As the second and final term of Governor Newsom is to be ending in November 2026, there is a need for a successor that is not only highly-committed[411], but also keeps the long-term goals and progressive targets alive. To put it in other words, it is a question of both policy continuity and policy legacy that makes the difference in California. While there are already some (former) members of administration, who declared their candidacy (e.g. Lieutenant Governor Eleni Kounalakis, former California Senate president pro tempore Toni Atkins, etc.) it is highly questionable if the previous success-factor, namely the continuity of personnel, could get compensated by one of them at all.

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[411] As argued beforehand, this is connected to characteristics such as passion, persistence and tenacity.

7 Summing Up, Conclusions, and Final Remarks

In order to understand both the often cited extraordinary and compelling air pollution problems of California as well as the state's exceptional role within the United States a comprehensive Background and Information section is to provide basic insights and a common understanding. In this regard it is essential to keep in mind that - at least at first - it was not about California's role as a pioneer (within the U.S. and around the world) but rather the state's selfishness for clean air and subsequently public health.

7.1 Executive Summary

The fight against air pollution has its beginnings in summer 1943 when extremely high levels of ozone and particulate matters caused a new phenomenon that was later named smog. In the following decades, California started to become a frontier of air quality standards and environmental governance. For example, the California Air Resources Board (CARB) was established in 1967 - three years before the Environmental Protection Agency (EPA) was founded at the federal level in 1970.

The Clean Air Act (CAA) of 1970 established federal emission standards, while California already received the privilege to apply for waivers of federal preemption. Under Section 177 of CAA, other states can adopt California's rules and standards. Due to the California's privilege to implement its own emission standards the state soon has taken the lead within the United States. The first California waiver under the CAA was granted by EPA in 1968.

Within the framework of this research an overall time-period of two decades (from 2002 until 2022) was allocated into five different phases or episodes which will be briefly summarised in the following:

The ***first episode*** was not only hallmarked by President Bush's withdrawal from the Kyoto Protocol, but especially by the Californian response to this: Assembly Bill A.B. 1493 that was authored by Fran Pavley and supported by several other 'legislative champions' like John Lowell Burton that formed a strong coalition with environmental groups[412], advocates, journalists, governmental officials (local, state-level, federal-level), and many other stakeholders. Same accounts for the opponent coalition that not only had considerable financial resources, but also included the California Motor Car Dealers Association, numerous car manufacturers[413], advocates, and several lobby groups. At the end, by a bi-partisan effort the bill passed the legislative process and was signed into law by then-Governor Davis who resisted the pressure of lobby-groups that were calling him to weaken the bill or even put his veto on it.

The ***second episode*** was mainly about Arnold Schwarzenegger and his extraordinary governorship. Although Governor Schwarzenegger did not officially appreciate the efforts of his precursor Democratic Governor Davis, he soon started to change his perception both regarding Gray Davis and towards a more environmentally friendly agenda. Against this background, Executive Order S-3-05 needs to be considered as a seminal landmark as it set GHG emission reduction targets for the years 2010, 2020, and 2050. Likewise,

[412] Bluewater Network, Coalition of Clean Air, Environmental Entrepreneurs, Better World Group, Union of Concerned Scientists, League of Conservation Voters, Environmental Defense Fund, American Lung Association, Sierra Club, etc.

[413] BMW, DaimlerChrysler, General Motors, Honda, etc.

Assembly Bill A.B. 32, the so called Global Warming Solutions Act of 2006, signed into law by Schwarzenegger on September 27, 2006 - together with his Executive Order Executive Order S-20-06 are highlights within the overall evolution of the ZEV Program of California. The second term of Schwarzenegger's governorship was dominated by EPA's refusal (Bush Administration) of a waiver under the CAA, and its later granting after reconsideration of the previous denial (Obama Administration).

The ***third episode*** is characterised by a strong supportive coalition on both the state-level and the federal-level. It is dominated by Jerry Brown, who then served another two terms as 39th Governor of California. Other highly influential characters were Fran Pavley (Member of California Senate) and Mary D. Nichols (CARB's chairwomen), while Lisa P. Jackson served as Administrator of EPA under the continuing Obama Administration. In terms of further advancements of the ZEV program, Governor Brown's Executive Order B-16-2012 aimed at the large-scale implementation of zero-emission vehicles in California (1 million vehicles by 2020, respectively 1.5 million vehicles by 2025). The legislative twin-pack of S.B. 32 "California Global Warming Solutions Act of 2006: emissions limit" and A.B. 197 "State Air Resources Board: greenhouse gases: regulation", together with Brown's Executive Order B-30-15 are again landmarks within the evolution of the Californian Zero-Emission-Vehicle Program.

Likewise to the time-period until 2009 (Bush Administration), the ***fourth episode*** of the ZEV Program's evolution was shaped by a strong opposing coalition in Washington. Donald Trump, the 45th President of the United States, not only directed the U.S. to withdraw from the Paris Climate Accord, but had the general strategy to roll back almost every environmental regulation and standard, introduced during the Obama's Presidency. Trump, together with

Scott Pruitt, then-Administrator literally dismantled the Environmental Protection Agency (EPA) that originally was founded to protect human health and the environment. Under Trumps premise “America First” and the pretence to protect American jobs, EPA published “The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program”. The result was the withdrawal of California’s 2013 CAA waiver that subsequently took the state’s privilege to establish and implement its own standards and regulations.

The ***fifth episode*** includes many similarities to the time-period of the Obama Administration. Under President Biden (former vice president of Obama) the major premise was to immediately nullify the decisions of President Trump. On day one of his Presidency, Biden fully accepted the Paris Climate Agreement in its entirety on behalf of the United States of America. Likewise he signed Executive Order 13990 “Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis” that ordered the immediate review of all regulations, orders, policies, agency actions, etc. that took place under the entire Trump Administration. As a direct result to this, EPA announced to rescind its waiver withdrawal of 2019 and thereby put the 2013 CAA waiver of California back into legal force.

7.2 Overall Conclusions

When reconsidering the five episodes and occurring similarities therein, several conclusions can to be drawn. *First* of all, coalitions definitely matter, namely cooperation, collaboration, and partnership. While California’s state authorities started their efforts for clean air under public pressure from environmental organisations and individuals, they soon joined the “inner-state” coalition for clean air and climate protection. No matter if Republican or Democrat, all four Governors were not only pushing forward their own agenda, but defending the legacies of their precursors, by not only building on existing standards and regulations, but by extending and defending them as well.

During the times, when the Federal Government in Washington and especially the U.S. President was in favour of the Californian Way, the supportive coalition was extended and things worked out fine and easy, resulting in a continuous progress of California's LEV/ZEV Program. However, during the two episodes with a careless or even strongly reluctant Administration in D.C., the "inner-state" coalition of California had to defend the achievements of the last decades. This directly leads to the *second conclusion*, the importance of long-term goals and progressive targets. This is not about a time-frame of only a few years, but about decades. This not only accounts for upcoming rules and regulations, but also for those that are already in effect or those which are to expire. Within the case of California's LEV/ZEV Program, it obviously consists of complementary and matching components, namely bills (both from Assembly and Senate) as well as Executive Orders of different Governors.

The *third conclusion* to be drawn is about these bills and the legislative processes involved. While it is necessary to author and sponsor a bill with thematic focus in general, it is quite crucial to find supporters that not only defend the bill but also make beneficial amendments. With focus on both the California State Assembly and the California State Senate, there was always a "bipartisan spirit" that - even if it took some efforts and demanded time - was necessary to pass landmark legislations (e.g. A.B. 1493, A.B. 32, S.B. 32, and A.B. 197).

Besides this, there is a need for 'legislative champions', such as Fran Pavley who served as both Assembly Member (2000-2006) and as Senator (2008-2016), to (co-)author and to introduce such bills. Likewise, new legislators need to seamlessly take over (and become champions as well) when there is a shift in personnel. Aside from the legislative process, there is also a need for 'executive champions' in terms of determined and devoted Governor(s) of California in order to sign those bills, provide guidance and long-term perspectives via Executive Orders, and to stand strong by defending the achievements against opposition from Federal Government.

Another important aspect is that such a coalition of legislative champions, executive champions and all other kind of supporters (environmental groups, journalists, lawyers, judges, etc.) is enduring and lasting which establishes the *fourth conclusion*. It makes a difference if there are numerous stakeholders that have both long-term experience and outreach. In the case of the Californian LEV/ZEV Program there are several examples for such kind of asset. While Mary D. Nichols started as a lawyer at an environmental group to sew EPA, she stayed in the "inner-state" coalition and held different positions such as CARB's chairwomen (1979-1983 and 2007-2020) and Secretary of the California Natural Resources Agency (1999-2003). Same accounts for Jerry Brown who served as California Governor (1975-1983 and 2011-2019) and as Attorney General of California (2007-2011). A recent example for such a long-term dedication is Gavin Newsom who served as mayor of San Francisco (2004-2011), Lieutenant Governor to Jerry Brown (2011-2019) and is now the Governor of California (since 2019, re-elected 2022).

While highly-committed people are essential, there is also a need for powerful and independent state agencies which constitutes the *fifth conclusion*. This includes for example the California Air Resources Board (CARB) or - at least at its beginning and during most of the time - the U.S. Environmental Protection Agency (EPA). It is worth to remember that CARB was founded in 1967 by then-Governor Ronald Reagan (Republican Party), while EPA was founded in 1970 by then-President Richard Nixon. Such agencies need to have the authority, the scientific knowledge, and the capability to combine research, monitoring and enforcement activities within one single agency. Conversely, weak, incapable, and reluctant agencies are oftentimes the result of politically-motivated decisions, made by an ideological executive's branch.

The *sixth conclusion* is that top-down approaches might be the most common ones, but are not always considered to be the most effective choice to put issues on the political agenda or to change the public opinion on it. Oftentimes, citizens' initiatives and bottom-up grassroots campaigns are at least as effective as well. Especially, during the 2000s, the broad media coverage of numerous daily newspapers in California changed things to the better. This was especially the case during the legislative process of A.B. 1493, when such grassroots campaigns teamed-up the "inner-state" coalition in order to compete against a well-funded coalition of car manufacturers and allied lobby groups. Same accounts for the beginnings of the bill, as representatives from two environmental organisations initially provided Fran Pavley with input to draft the bill.

What does definitely qualify for a lessons-learned type of finding is the importance of coalitions. Without (a bipartisan) cooperation, collaboration, and partnership or at least a common-understanding of both the underlying problems and the general approach to tackle them, it will be extremely difficult or even impossible to solve complex more problems.

Furthermore, complex problems such as environmental pollution and climate change are closely connected to large-scale systems that were established over decades. Therefore, any (major) changes or even the transition from one system not only takes time, but also calls for a high degree of persistence and tenacity. Furthermore, long-term goals need to be set, together with short-term and also mid-term milestones. Especially in the case of such cumbersome and long-term goals, it is highly important to make the benefits visible/understandable to the general public. If this is not possible, such benefits at least need to be communicated in a plausible and coherent way.

The existence of powerful and independent state agencies does also qualify for a more general lessons-learnt. Regarding this, it is quite helpful to briefly remind the Volkswagen emissions scandal. It was not by accident that CARB and EPA unveiled the defeat-devices that were also implemented in vehicles sold in Europe. However, in contrary to Europe, the United States and California do have independent and powerful agencies like EPA and CARB that have not only developed but also applied tools and methods for a comprehensive testing of vehicle emissions. While in Europe, car manufacturers have provided their own data as well as their own type approval, in the U.S. and in California, every single type of vehicle and every single type of combustion engine needs to be certified independently and in great detail. As both CARB and EPA ever since implemented testing, questioning, recalling, and enforcing, it was no exceptional case to effectively resolve the substantial violations of Volkswagen in the United States. In contrary to this, the aftermath of the emissions scandal was not solved alike in Europe. No matter if this concerns the compensation of environmental damage or even the individual payments of compensation to diesel customers.

CARB is nowadays considered to be one of the most influential and effective environmental authorities around the globe. Based on sound science and up-to-date technologies, CARB has the broad legal authority to enforce regulations and standards. Therefore, it definitely may serve as a role model for Europe and its member states when it comes to establish an independent authority to check and enforce the compliance with regulations and emission standards.

The five episodes presented revealed both collaborative and opposing fractions of time. While the coalition, working towards a clean and future-proof transport and mobility sector within the state of California, remained stable and goal oriented, there was a significant impact happening at the federal level. Progress happened during time-periods when the federal government (Obama / Biden) was jointly working towards the common goal. In contrary to this, during times hallmarked by strong and irreconcilable conflicts between California and the federal government (Bush junior / Trump), the progress was significantly decelerated or even frozen. Against this background it is vital to stress that transition processes of well-established socio-technical systems cannot be done within single policy subsystems but only within at least whole countries.

7.3 Final Remarks and Outlook

Although both a map and a compass were available, the actual re-tracing of round about 20 years turned out to be a quite tricky task. Mainly due to the fact, that within the five different episodes - covering 20 years in total - there were several periods that were fully-packed with details.

Due to this, it was necessary to first get a pretty rough impression of what was going on. After having an idea about the repeating set of questions *who did what and why*, it was possible to literally zoom-in to more details. Regarding this, it was not always possible to strictly follow a chronological pathway, whereof it became quite important to sketch dozens of timelines and flowcharts before getting things (hopefully) right.

While it was facile to get access to most of the legislative documents and newspaper articles, for some of those it was necessary to first know what to look for and then dig much deeper into the world-wide-web. A really helpful tool was the Internet Archive[414] and its Wayback Machine[415]. After having signed-up to several trial subscriptions of newspaper, this turned out to be one of the best ways to find “hidden” records of events.

In order to re-trace the evolution of bills (California Senate and Assembly) a very helpful source was the California Legislative Information[416]. The website not only allows one not search for specific bills, but also provides detailed information about the bill’s history (e.g. dates of introduction, reading, amendment, etc). The “compare versions” function allows determining what kind of amendment was made at what stage of the legislative process.

Another critical issue was to determine to what extend details should be unveiled in order to get the picture right on the hand and not to get lost in negligible trivia. From today’s perspective every of the above mentioned landmark bills (and every legislative process involved) would have had the magnitude for a separate research topic. However, as the aim was to cover a time-period of 20 years to re-trace the overall evolution of California’s ZEV Program, it was sometimes necessary to use more a minimally sufficient explanation instead of the full-fledged mechanistic explanation.

It is oftentimes argued that an in-depth single-case study is highly case-specific and therefore any of its findings is solely a part of a comprehensive explanation that cannot be used for (more) generalised conclusions. This is at least true to some extent, as it is definitely not possible to deliver a kind of “one-size-fits-all” claims or even a blueprint for similar cases. However, it needs to be stressed

[414] https://archive.org.

[415] It is possible to reveal how websites looked in the past and get hands on documents that were on these websites.

[416] https://leginfo.legislature.ca.gov.

that it is absolutely possible to draw at least some lessons-learned and to put some “if-then” assumptions as well.

The long-term success story of California and its leadership-role in environmental protection and mitigation of climate change seems to be a clear and bright role-model to other states and countries around the globe. However, it would be a fatal mistake to consider that the various rules and regulations that were long-term approved, tested, and refined in California could be easily, quickly, and successfully transferred and implemented elsewhere.

When considering such an adoption process, it is worth to reconsider the Section 177 States. While other states are basically not allowed to develop and implement own emission standards, Section 177 of the Clean Air Act gives them permission to adopt Californian standards without any further approval. Currently, there are twelve Section 177 States that not only share common rules and regulations, but are also quite similar in other aspects. Nevertheless, a successful adoption does not just take place, but is considered to be a complex and time-consuming long-term process. While the pure transfer of technology is considered to be a kind of daily routine, it seems to be fairly impossible to think of a ‘sweeping policy-transfer’.

A quite good example for this would be the projected large-scale implementation of electric vehicles in Germany. The National Development Plan for Electric Mobility aimed at a minimum of 1 million electric vehicles on Germany’s roads by the end of 2020. While this goal was reached with a decent delay of about two years, recently a stagnation of electric vehicles registrations took place. The mainly incentive-based approach of Germany set ambitious goals, but failed to effectively create confidence and trust among potential customers.

When considering the future scenarios from a Californian perspective, things are about to get complicated again, especially depending on the results of the Presidential Election in November 2024. It is very likely[417] that a President Donald Trump would again try to attack California's special authority under the CAA to set its own 'stricter-than-federal' emission standards.

As a result to such an imaginable scenario, Governor Newsom argued that California has already started to future-proof its achievements "in every way, shape or form" (Politico, 2024a). Timing could not been worse as if Trump would take office in 2025 Governor Newsom will have to leave office (due to term limits) in November 2026.

Against this background, the ongoing actions in California need to be considered as an approach to preserve the both long-term goals and the overall policy legacy. Likewise to California, the Section 177-states as well as the federal government under the Biden Administration have started to implement a variety of actions[418] of 'Trump-proofing' their existing emission policies.

During the last months, Biden's controversial decision to run for a second term, his 'publicly orchestrated retirement', the nomination of Kamala Harris as candidate for the United States presidential elections - and last but definitely not least - **the election of Donald Trump as the 47th President** dominated political discussions and illustrated the substantial degree of anxiety about the future. Against this background it is worth to mention 'Project 2025 -

[417] Officials of the Trump campaign admitted that there are plans to repeal the Californian waivers as basis of the state's electric vehicle program (see https://www.politico.com/news/2024/03/26/california-trump-climate-policies-00149225).

[418] This comprises of legal activities, voluntary agreements with industry (e.g. car manufacturers), public awareness campaigns, and coalition building activities.

Presidential Transition Project', conducted by the Heritage Foundation which is a right-wing think tank with substantial influence[419] in public policy making.

The related Project 2025 playbook[420] comprises of more than 900 pages and outlines *"actions to be taken in the first 180 days of the new Administration to bring quick relief to Americans suffering from the Left's devastating policies"*[421]. The so called '180-day Transition Playbook' outlines a plan for each single federal agency and proposes the approach of 'Day One Executive Orders' to review (and subsequently roll back) the decisions of the Biden Administration.

Regarding this, there are detailed plans for the Environmental Protection Agency (EPA) as well. For example it is planned to *"restore the position that California's waiver applies only to California-specific issues"* (Project 2025 Playbook, p. 426), however may not focus on global climate change. Concerning this, it is planned to *"ensure that other states can adopt California's standards only for traditional/criteria pollutants, not greenhouse gases"* (ibid.).This would not only mean that the Californian standards and regulations would be diminished, but also the option for other states (Section 177 states) to adopt them.

Although President-elect Trump has argued to be fully unaware[422] of Project 2025, it might turn out to be the guiding pathway towards a replicated dismantling of environmental entities. Beyond any doubt, such a pathway would not only be disastrous for California, but also a menace to climate policies in general.

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[419] According to a listing of the University of Pennsylvania, is listed at number three of the TOP 100 Think Tanks of the United States (see https://guides.library.upenn.edu/c.php?g=1035991&p=7509974).

[420] https://static.project2025.org/2025_MandateForLeadership_FULL.pdf.

[421] https://www.project2025.org/playbook.

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