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COPY & PASTE POLICIES?! AN ANALYSIS OF THE TRANSFERABILITY OF SUCCESSFUL LOCAL AND NATIONAL POLICIES RELATED TO ALTERNATIVE FUELS

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INTRODUCTION

To reduce the dependency on fossil fuels and to reduce emissions in the transport sector, countries worldwide stimulate the development, distribution, sales and use of alternative fuels (AF) and alternative automotive technologies (AAMT). This stimulation is often translated to specific policies on the local, regional, national and supra-national level. Because most governments do not have a long history with the development[1] nor experience with the effectiveness and efficiency of these policies, they have a relatively small knowledge base to build upon. Knowledge about these policies and their effects must thus be gained via other means. A very relevant source of information are the lessons learned by and experiences from other governments with successful and less successful policies related to the field of AF and AAMT. Incorporating these lessons and experiences effectively can result in a more successful implementation of new policies. And indeed copying and pasting of policies to other situations looks a simple and successful measure, but it implies some risks as well. A transfer might even fail when the circumstances in which a copied policy is implemented differ from the original context.

Focus and limitations of the paper

This paper focuses on the process of copying and pasting, called transfer of policies related to the use, technology development and implementation of AF and AAMT within 11 countries in the EU. We investigate in this paper to what extent a set of existing policies relating to this field can be transferred to other situations, e.g. other geographic locations and/or other fuels or fuel technologies. In this we take into account the factors influencing the success of the policies in a particular context. The outcomes of this analysis are translated into a step-by-step approach for policy makers in the EU to support them in the creation, improvement and implementation of successful governmental policies to promote alternative fuels and fuel technologies on local, regional and national level.

The conclusions and recommendations of this paper are related to the aspects that policy makers need to take into account when developing and improving policies which are based on policies that already exist elsewhere. Herewith we do not focus on specific policies, but on categories of policies based on the stage of the fuel chain they are targeting: policies related to feedstock of alternative fuels, policies related to fuel production, policies related to distribution and sales of alternative fuels, policies related to vehicles that are using alternative fuel (technologies) and

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[1] LPG was the first alternative fuel that was promoted since the 1950s. Other alternative fuels and fuel technologies are promoted in the EU since the 1990s.

policies related to the users of alternative fueled vehicles. It is beyond the scope of this paper to indicate what exact policies (what measures, what policy goals, etc) should be developed or implemented on the different governmental levels in the EU.

This paper is based on a study performed within the European Alter-Motive project[2]. The framework of the Alter-Motive project including the selection of AF and AAMT[3] which is focused on, is used in this study as well.

METHODS

Two different methods are used for this study. First, a condense literature review is performed focusing on the concept of transferability and the application of it in the field of policies related to alternative fuels and fuel technologies. The aim of this literature search is to provide the needed background for the data collection. Secondly, based on the outcomes of the literature search a questionnaire is designed to collect data about existing successful policies, the alternative fuels or fuel technologies they target, the policy measures these policies consist of, the external factors influencing these policies, and the transferability of (elements of) these policies. This questionnaire is distributed throughout 11 EU member states via the partners of the Alter-Motive project.

People with different backgrounds and interests are involved in the policy process. Because they also might have different opinions about the items raised in the questionnaire, the questionnaire was distributed to different target groups: local and national policy makers, policy observers (researchers) and policy users (representatives of transport companies) in different EU countries. The questionnaire focuses on two most successful existing policies according to the respondent and includes both open and closed (multiple choice) questions. This data collection method is chosen because although literature exists about successful policies in the different EU countries[4], only very limited literature is available about the external factors influencing existing policies related to alternative fuel (technologies) and the transferability of these policies.

OUTCOMES LITERATURE STUDY

Policy transfer exists as long as organized governments exist and it is a very widely used practice. Governments have been looking at and learning from each other since the Greek times, e.g. the ancient cities which copied each other's policies on market protection (import taxes). In scientific literature the concept of policy transferability is introduced by Dolowitz and March in 1996 [2] who link it directly to lesson drawing and emulation. The concepts are defined a "a process in which knowledge about policies, administrative arrangements, institutions and ideas in one political system (past or present) is used in the development of policies, administrative arrangements, institutions and ideas in another political system" [1,3]. In these studies the concept is further described by pointing out the different degrees of policy [2,3] and the objects of policies that can be transferred: policy goals; structure and content; policy instruments or

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[3] AF comprise bioethanol, biodiesel, synthetic fuels, biogas, hydrogen, renewable electricity, LPG & natural gas, whilst AAMT include biofuel, fuel cell & electric vehicles and various types of hybrid systems as well as systems based on natural or biogas.

[4]   For example the Evaluation of Swedish policies [7]

administrative techniques; institutions; ideology; ideas, attitudes and concepts; and negative lessons [2].

Apart from the above mentioned sources, there is limited literature on the concept of policy transferability. One of the reasons could be that the concept is studied in many different disciplines (political science, comparative politics, etc) and thus does not have a common theoretical or methodological discourse [4]. In recent years, policy transferability is studied in relation to transport policies within several research projects funded by the European Commission[5]. Although having different foci, these projects created a common conceptual base for transferability (see [5]).

A hypothesis about transferability of policies formulated in the METEOR project emphasizes the key of the concept and is therefore also important for this study: "if a measure or package of measures has been successfully implemented within a given geographical, demographic, socio-economic, cultural, technologic, institutional and organizational setting, then comparable results in terms of degree of attainment of the measure or package of measures objectives can be achieved in areas characterized by a similar setting" [5].

This thus means that the external factors influencing the setting, or context of a policy, also influence the success of the policy. To be able to transfer a policy successfully, these external factors must be known and taken into account. The hypothesis also implies the focus on successful policies (and not on less successful ones). The definition of successful is thus important. In the METEOR project success is related to the objectives set for the policy and the extent to which these are achieved (mostly quantitative) [5]. This definition is still very general and does not focus on the efforts done to reach the objectives of a policy. We prefer therefore to use a definition of success which includes the extent to which the objectives are reached in terms of effectiveness, efficiency and lasting changes. With the latter we refer to the effect of a policy in a longer period of time, whether the objectives are not only reached but also remain (or improve further). Effectiveness refers to the extent in which the objectives are met in terms of investments. Efficiency refers to the extent in which the target group of the policy is reached and objectives are met. Our definition defines successful policies thus as policies that have reached their objectives in an efficient and effective manner for a longer period of time.

ANALYSIS OUTCOMES QUESTIONNAIRE

Based on the outcomes of the literature study, we compiled a questionnaire to collect data about existing successful policies related to AF and AAMT, the aims of these policies, the fuels or fuel technologies they targeted, the external factors influencing the success of these policies and the elements of these policies that can be transferred to other situations[6]. In total, 61 questionnaires were filled in[7]. All questionnaires were filled in between January and April 2010. While reading the analysis set out below, it must thus be taken into account that the data set has limitations in both its size and content and provides more of a 'snapshot' of the current situation and the policies and technologies that are 'en vogue' at a specific moment.

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[5] Including LEDA, TRANSPLUS, CUPID, MARETOPE, CIVITAS I and METEOR.
[6] For the questionnaire and more detailed description of the questions see [6].
[7] Due to budget and capacity constraints of the study and translation issues, not more questionnaires were filled in and returned.

Most questionnaires were filled in by researchers (21), followed by national policy makers (15), local policy makers (7), representatives of transport companies (5) and people that do not fit one of these categories (13). All respondents are from 11 EU countries and all European areas are represented (see figure 1).
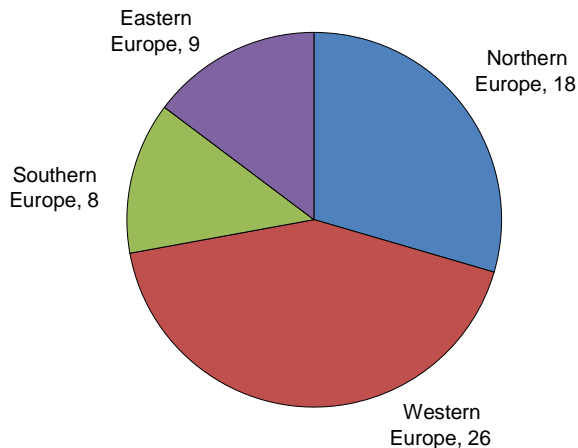

Figure 1   *Geographic coverage of respondents in EU*

Within these questionnaires 113 successful policies to stimulate the use and development of alternative fuels and fuel technologies were named by respondents (most respondents followed the instruction to name the two policies they thought were most successful). Some policies were named by more than one of the respondents. Taking into account these 'doubles' 87 unique policies are named. However the respondents gave different answers to the questions about the successful policies that were named more than ones. To include all these answers we include all 113 successful policies named into the further analysis. A large majority of these successful policies named by the respondents are national policies (64%[8]). Additionally local (23%) and regional (9%) polices were named. 4% of the policies are a combination of two of these levels at the same time (local and regional or regional and national) according to the respondents.

The policies analysed via the questionnaire are thus geographically spread over Europe. This enables drawing EU-wide conclusions. The total number of questionnaires per country however does not provide enough data and insights to draw country based conclusions. The high number of national policies named by the respondents might be explained by the high number of researchers (often working at national organisations) and national policy makers among the respondents.

Alternative fuels (technologies) targeted
70% of the successful policies mentioned by the respondents target more than one fuel (technology). Half of the policies target at least electricity and electric vehicles. Additionally hybrid vehicles, biodiesel, bioethanol, biogas and CNG are targeted by many policies as well (between 32 and 37% policies). Less targeted by the successful policies named by the respondents are synthetic fuel, hydrogen, LPG and fuel cells (between 18 and 13% of the policies). See Figure 2.

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[8]   All percentages mentioned in this document are round up to the nearest integer.
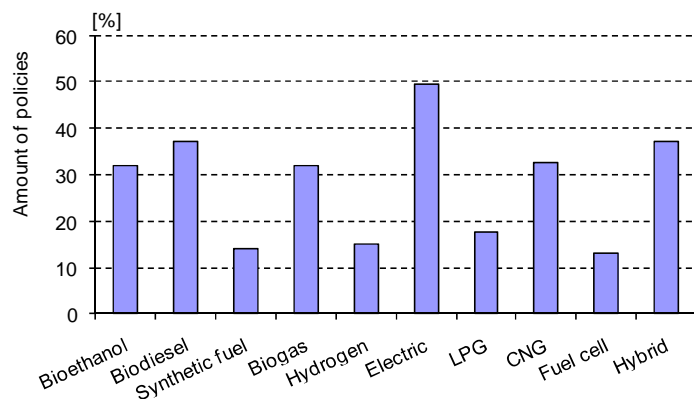
Figure 2   *Alternative fuels and fuel technologies targeted by policies*

Of the policies that only target one fuel (technology), 42% target only electricity and electric cars[9] and 18% biodiesel. Fuel (technologies) that are always targeted in combination with others (and thus never as a single fuel) in the successful policies are: synthetic fuels, hydrogen and LPG.

Types of policy instruments

A policy consists of one or more policy instruments. Some policy instruments are easier to transfer to other situations than others. Secondly the complexity of a set of policy instruments also influences the possibility to transfer it to another situation. The outcomes of the questionnaire show that almost half of the policies consists of one policy instrument, the others consist of a combination of policy instruments. Most of the policies consisting of a single instrument are fiscal measures (40%), followed by legislative and regulatory measures (32%) and stimulation of research and technology development (20% of the single policy instrument policies). Only 6 % of the single instrument policies are based on information dissemination and awareness raising.

When looking at all the policies named by the respondents more than half (57%) consist of fiscal instruments (alone or in combination with other instruments). Stimulation of research and technology development and legislative and regulatory instruments are often also part of the successful policies. See Figure 3.
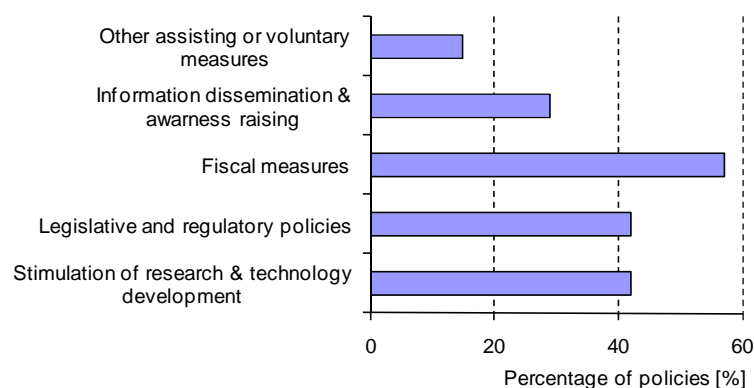

Figure 3   *Policy measures policies consist of*

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[9] This high number of policies related to electricity and electric fuels corresponds with the large attention for electric vehicles since 1-2 years in the EU.

External factors influencing the success of policies

In the questionnaire the respondents could indicate what external factors influence(d) the outcomes of the policies they named positively[10]. The factors are categorised in four categories and each category had six or seven factors named including the option 'other' which respondents could fill in their selves. Most of the respondents indicated more than one factor and often also more factors per category. Technical factors were named most often (194 times), followed by 177 social and environmental factors, 170 economic and financial factors and 155 cultural and demographic factors were indicated to influence the outcomes of the policies positively. See Figure 4.
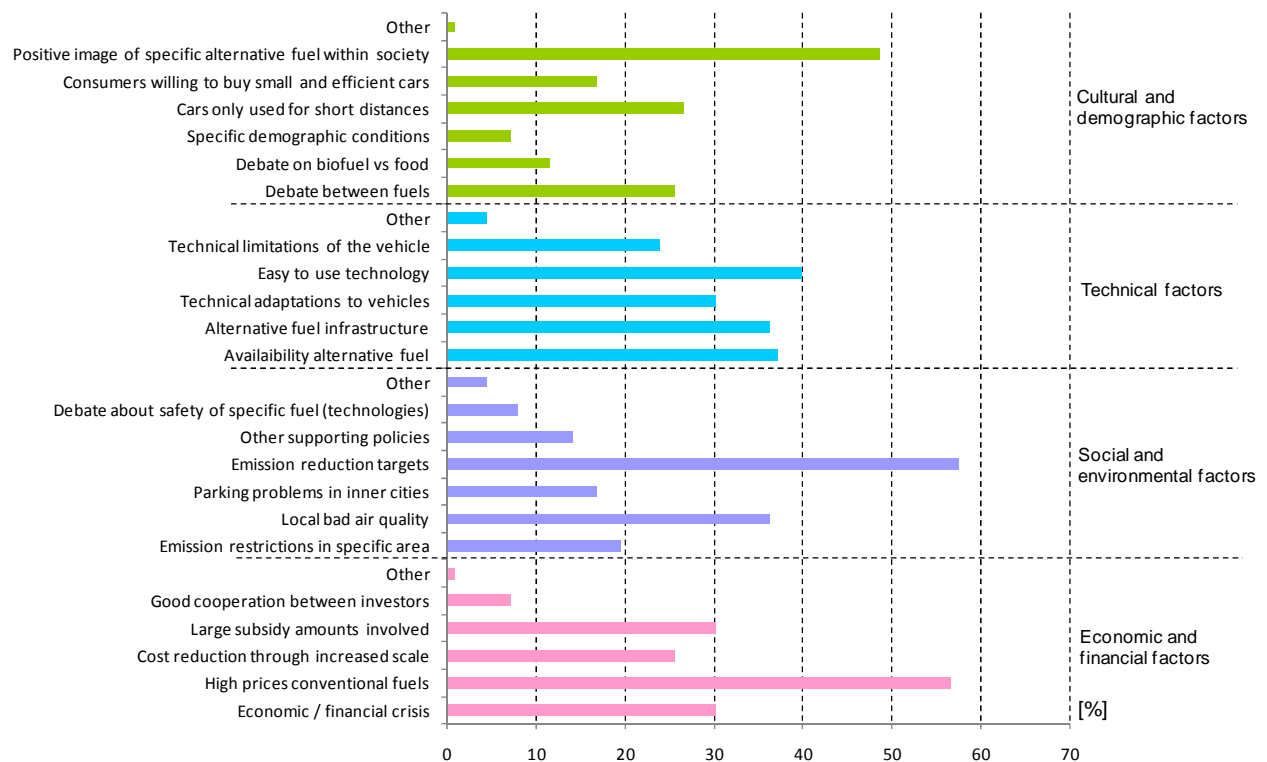

Figure 0   *External factors influencing the success of policies*

The four external factors indicated most often are equally divided over the categories (one in all four categories):

1. *Existing emission reduction targets* (a social or environmental factor) is influencing the outcomes of 57,5 % of the named successful policies.
2. *High price of conventional fuels* (an economic or financial factor) is influencing 57 % of the policies;

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10 Due to the use of a not definitive version of the questionnaires in order to be able to disseminate it through an Alter-Motive conference, those filled in by French respondents (13 questionnaires describing 24 policies in total) included less options to choose from in three of the four categories of external factors influencing the successful policies named in these questionnaires. The option 'good cooperation with investors' in the category of social and environmental factors was not included in the French questionnaire, neither was 'Emission restrictions in specific area' as a social and environmental factor, nor were 'debate on biofuel vs food' and 'specific demographic conditions' as cultural and demographic factors.

3. *A positive image of specific alternative fuel in society* (a cultural or demographic factor) is influencing the outcomes of 49 % of the policies;
4. *Easy to use technology* (a technical factor) is influencing the outcomes of 40% of the policies.

The four external factors that influence the 113 named policies least are:
1. *Good cooperation between investors* (an economic or financial factor) and *specific demographic conditions* (a cultural or demographic factor) are only influencing 7% of the policies.
2. A *debate about safety of specific fuel (technologies)* (a social or environmental factor) is only influencing 8% of the policies
3. the *debate between biofuel and food* (a cultural or demographic factor) is only influencing 12% of the policies.

Transfer of successful policies
A majority (80%) of the successful policies can be transferred to other situations according to the respondents. For the other 20% the respondents did not give an answer or indicated that the policy could not be transferred. When focusing on the specific elements of the policies that could be transferred, the respondents said in more than half of the cases that the complete policy could be transferred[11]. In the other cases one or more of the elements of the policy could be transferred according to the respondents. See Figure 5.
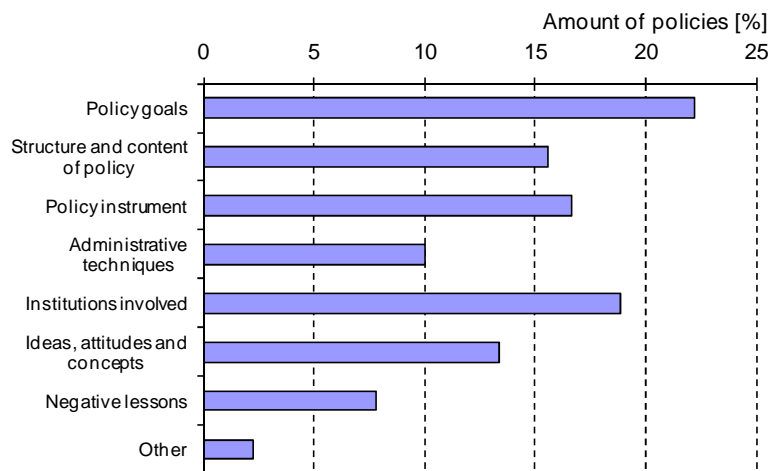

Figure 4   *Elements of policy transfer*

Analysis per policy category
To improve the comparison of the policies named by the respondents and to draw more specific conclusions about the transferability of these policies, we categories the policies in groups based on the five stages of the fuel chain that the policies target: feedstock, fuel production, fuel distribution and sales, vehicles and users of the vehicles. There are two main arguments for this choice. Firstly governmental aims and targets are often based on these categories, e.g. increase of fuel production or increase of alternative cars on the roads. Policies to reach these governmental aims are thus often designed directly around these categories. Secondly most of the policies

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[11] The percentages in this paragraph are based on the total amount of policies that can be transferred (thus the 80%) of the total amount of policies named by respondents)

analysed target only one stage of the fuel chain, thus can easily be categorised[12]. Within some of the categories we found many similar policies named by the respondents. When this was the case we grouped these policies in sub-categories. This led to a categorization (all illustrated with some examples of policies named by the respondents) presented in table 1.

% of all policies	Stage of the fuel chain that policies relate to	Examples (named by respondents)
3%	feedstock	• Danish policy to support wind power (and increase feedstock of electricity) • Swedish local policies to support biogas production
5,5%	Fuel production	• French policy to encourage the use of electricity produced from waste in public transport • Polish R&D grants for industrial biofuels projects to introduce biofuels with required standards.
38%	Fuel distribution and sales	• Portuguese national electric mobility policy that implies the building of recharging infrastructure for electric cars.
	23% of these is related to blending of biofuels	• Existing national standards for blending of biofuels in Austria, Sweden and other countries
	40% of these is related to tax reduction of fuels	• German tax deduction on CNG and LPG or on biofuels in Poland
28,5%	Vehicles	• French regional research project with local authorities on improvement hydrogen and fuel cells cars.
	19% of these is related to tax reduction of vehicles	• Dutch tax reductions for vehicles with low emissions
	31% of these is related to subsidy on vehicles	• Danish subsidy for buying electric cars • French financial incentives to eliminate old vehicles
17%	Users of vehicles	• Local policies for building electricity charging spots at parking places (France) or where owner of electric car wants (the Netherlands)
	74% of these is related to driving or parking areas for specific vehicles	• Italian regional policy to allow 'green cars' in city centres when pollution limits are reached • Local Polish policy to allow electric cars in city centre of Krakow

Table 1: categorization of policies according to the stage of the fuel chain they relate to

There are only few policies in the two first categories. The limited amount of data makes it difficult to draw general conclusions as any abnormality or deviation can have large influence on the general conclusions. We therefore focus on the three other categories (Policies related to fuel distribution and sales, to vehicles and to the users of the vehicles). When analyzing these three categories special attention is given to the outcomes per category that deviate largely to the outcomes of the analysis of the complete set of policies analysed in the previous paragraphs.

Firstly, some deviations between the three categories and the overall analysis based on the fuel and fuel technologies targeted by the policies exist. The policies related to fuel distribution and sales are merely targeting bioethanol and biodiesel than the other fuels or fuel technologies.

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[12] Another argument for following this categorization is that also in other studies performed in the ALTER-MOTIVE this categorization is used. Using the same categorization makes comparison and integration of research results possible.

Policies related to the vehicle are mostly targeting electric and hybrid vehicles while policies related to the users are mostly targeting electric and CNG vehicles.

Related to the policy instruments the different policies consist of a large deviation in the policies related to users exist. Here most of the policies are based on information dissemination and awareness raising while in the other categories the fiscal measures exist most and the information dissemination is named much less. Another important deviation to the overall analysis is the low number of policies consisting of legislative and regulatory instruments in the categories of policies related to the vehicle and users.

Looking at the external factors influencing the success of policies, the factor local bad air quality deviates relatively largely from the overall analysis and has a different impact in the three categories. Only 19% of the policies related to the fuel distribution and sales are influenced by this factor compared to 47% of the policies related to the vehicle and even 53% of the policies related to the users. Focusing on the transferability we also see some differences between the three categories. The policies related to the fuel distribution and sales seem to be easier to transfer (88% can be transferred) than the policies related to the vehicles (66% can be transferred). The transferability of policies related to the users is around average.

From the analysis of the three different categories of policies, we can conclude that the different categories have many things in common. Some deviations however are remarkable and should be taken into account when transferring policies related to fuel distribution and sales, vehicles or users.

CONCLUSIONS AND STEP-BY-STEP APPROACH FOR POLICY MAKERS

Conclusions

Apart from the characteristics of a policy, its success is also largely influenced by different external factors. When transferring a successful policy these should thus be taken into account. A set of 113 successful policies spread over Europe on different levels (local, regional and national policies) named by 66 respondents illustrate the diversity and importance of the different factors influencing the success of these policies and the possibilities for transfer of these policies.

The most important outcomes of the analysis of these data are:
- Related to the fuel or fuel technology targeted by the policies
  - Most of successful policies target more than one alternative fuel or fuel technology.
  - Most successful policies target electric and/or hybrid vehicles and/or biodiesel as a fuel.
  - Policies targeting only one fuel or fuel technology are most successful when targeting electric vehicles or biodiesel as a fuel. No successful policies targeting only synthetic fuels, hydrogen or LPG are mentioned by the respondents.
- Related to policy instruments
  - Both policies based on a single policy instrument as well as policies based on a combination of different policy instruments can be successful.
  - Most successful policies include fiscal measures, followed by legislative and regulatory measures and measures to stimulate research and technology development.
- Related to the external factors
  - External factors can be categorised in economic and financial factors; social and environmental factors; technical factors and cultural and demographic factors.

- The four categories of factors influence the success of the policies relatively equally.
- Large differences exist in the impact of individual factors.
- Influencing the success of more than 50% of the policies are *existing emission reduction targets* and *high prices of conventional fuels*.
- Related to transferability
  - Most of the policies can be transferred to another situation (geographic location, other policy level or other fuel (technology).
  - In half of the cases the whole policy measure can be transferred.
  - When only parts of the policy can be transferred, these are mainly the policy goals and the institutions involved.

More detailed conclusions about the factors influencing the success and the transferability of policies can be drawn from three different categories of policies which are analysed more thoroughly: policies related to fuel distribution and sales, policies related to vehicles and policies related to the users. We see some deviations to the overall analysis of all the policies. These are summarized in table 2.

	All policies	Policies related to <u>fuel distribution and sales</u>	Policies related to <u>vehicles</u>	Policies related to <u>users</u>
Fuels (technologies) targeted by policies				
Most	Electric fuel technology	Bioethanol & biodiesel	Electric & hybrid fuel technologies	Electric vehicles &CNG
Least	Synthetic fuel & fuel cell	Fuel cells & hydrogen	Synthetic fuel and LNG	Hydrogen, synthetic fuels &fuel cells
Policy instruments used				
Most	Fiscal measures	Fiscal measures	Fiscal measures	Information dissemination & awareness raising
Least	Other assisting or voluntary measures	Other or voluntary measures	Other or voluntary measures	Legislative and regulatory
Influence of categories of external factors				
Most	Technical factors	Technical factors	Economic & financial factors	Social & environmental factors
Least	Cultural & demographic factors	Social & environmental factors	Cultural & demographical factors	Cultural & demographic factors
Influence of individual external factors				
Most	Emission reduction targets	Emission reduction targets	High price conventional fuels & emission reduction targets	Parking problems inner cities
Least	Good cooperation between investors	Parking problems inner cities & specific demographic conditions	Good cooperation between investors & debate between biofuels and food	Debate about safety of specific fuel
Potential for (complete or partial) policy transfer				
Total	80%	88%	66%	79%
Elements of policy transfer				
Complete policy	51%	63%	52%	33%
Most	Policy goals	Policy goals & policy instruments	Policy goals	Institutions involved
Least	Negative lessons	Administrative techniques	Negative lessons	Administrative techniques & negative lessons

Step-by-step approach for policy makers

Many successful policies to promote alternative fuels and fuel technologies exist in the EU on different levels. These are an important resource in the development of new policies. On first sight, the easiest way to make use of existing policies is to copy and apply them in another situation. This transfer of policies is an efficient way to create new policies because experiences from others can be incorporated, shortcomings can be improved and time for reinventing the wheel is saved. Based on the analysis of the outcomes of the questionnaire performed in this study, we developed a step by step approach for policy makers that are involved in the creation, development and improvement of policies related to the promotion of alternative fuels and alternative fuel technologies on local, regional and national level in Europe. Following these steps will increase the chances for the successful transfer of policies to another situation.

Step 1: define the target that you want to reach, the impact that the new policy should have, e.g. have citizens buy more electric cars (and not hybrids).

Step 2: investigate what policies currently exist elsewhere (other cities, other countries, or policies having similar aims but targeting other technologies) that are / have been successful in reaching the same or very similar aims. This should be done by investigating the 'successfulness' of policies in terms of effectiveness and efficiency of reaching the objectives and having lasting effect. Only policies that fulfill these requirements sufficiently are eligible for transfer.

Step 3: Once one or more policies eligible for transfer are found, a third step is to investigate in detail the combination of elements that influence the success of these existing policies. This combination of elements is unique in every case and consists of:
- The *external factors* that cannot be influenced (easily) by the policy maker. These include financial and economic factors, social and environmental factors, technical factors and cultural and demographic factors.
- The *characteristics of the policy* that can be influenced and changed by policy makers. These include the objectives, the fuels or fuel technologies targeted and the policy instruments it consists of.
  The external factors should be investigated first. Only when these are similar to those in your own situation, the chances for successful policy transfer increase. When these are not similar, little chances for successful transfer exist and we recommend to look for other policies with more similar external factors. When the external factors are similar to your own situation you can continue with investigating the characteristics of the existing policy. These characteristics are the base for your new policy.

Step 4: design your new policy based on the characteristics of the existing policy which is eligible for successful transfer based on the previous steps. This design should be based on a detailed investigation of what elements of the existing policy can be transferred (whole policy or only the policy goals, structure and content, instrument, administrative techniques, institutions involved, ideas, attitudes and concepts, etc). The parts that cannot be transferred should be replaced by others.

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