Understanding the Efficacy of Environmental Policy Instruments: the APRAISE 3E Method

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Abstract

This paper presents a new concept, the APRAISE 3E method, to assess the performance of environmental policy instruments. The concept aims at an improved understanding of the economic, social and environmental context of a policy, as well as of the design, implementation and evaluation cycle of policy instruments and possible interactions with other policy instruments. As such, the APRAISE 3E method helps to explain possible differences between observed and expected or targeted results. With these insights, policy makers can subsequently make better informed assumptions about the efficacy of an environmental policy instrument. Efficacy, as defined in this paper, refers to policy makers' anticipations prior to the implementation of a policy or policy instrument in terms of expected effects and impacts. The actual outcome may differ from the anticipated outcome of a policy or policy instrument due to a range of possible reasons, such as: lower or higher than expected economic growth, increased or decreased environmental awareness among consumers, stronger or weaker enforcement procedures, or positive or negative interactions with other environmental policy instruments. The paper briefly presents the APRAISE 3E method and will apply it to examples of small hydropower expansion in Austria and Slovenia. Special emphasis is given to contextual factors and policy instruments interactions. The method allows to conclude whether the policy instrument was susceptible to impacts of contextual factors or showed adaptability and flexibility and where adaptions need to be made in order to increase the efficacy and thus the effectiveness and efficiency of environmental policy instruments.

Introduction

Efficacy, a term originally used in medical sciences, is defined in this paper as the policy makers' anticipations, prior to the implementation of an environmental policy, regarding its potential effects. These anticipations include making assumptions about the mechanisms through which the policy or policy instrument would bring about its desired effects. The APRAISE 3E method builds upon previous work on theory based evaluation (e.g. Harmelink et al., 2007) as it contrasts the actual outcomes with expectations policymakers had when designing the policy with its policy instruments. However, it also introduces an advanced framework to systematically assess the policy context, policy implementation aspects and possible interactions with other policies.

After all, in virtually all policy instrument design processes, various assumptions about future contingencies are made which could negatively/positively affect the operation of policy instruments during the implementation stage. The aim of the APRAISE 3E method is that through a better understanding of these contingencies, policy makers will obtain a better understanding of the efficacy of policy instruments when implemented in certain contexts, so that the eventual policy effects will stay closer to anticipations. Such improved efficacy knowledge furthermore helps

Member States to select the most suitable policy instruments within the country context, for meeting the environmental objective as formulated by the EU Directives.

In addition, the APRAISE 3E method assesses a policy's efficiency, by analyzing whether a policy effect could have been achieved with fewer resources or whether the used resources could have led to a stronger effect. Figure 1 shows the relationship between anticipated (efficacy) and realized policy effects (effectiveness), as well as adds expected and actual efficiency in the assessment of policy impacts.

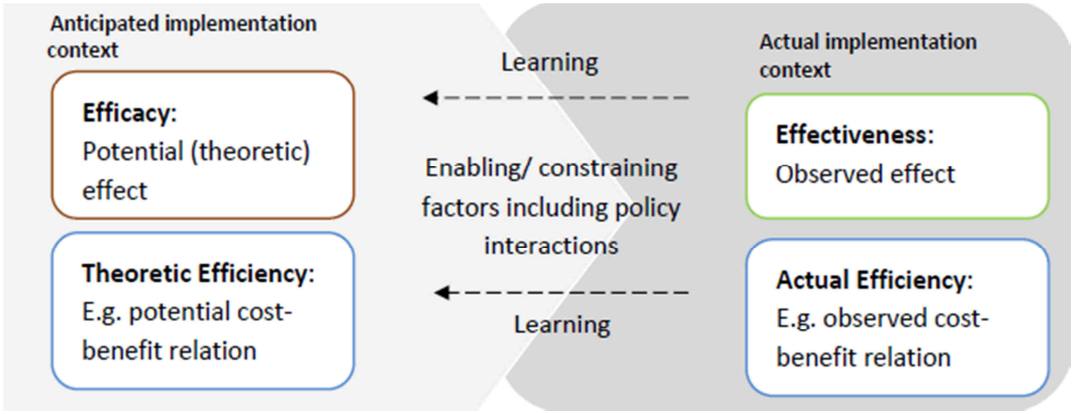

Figure 1. Relationship between efficacy, effectiveness and expected and actual efficiency in the APRAISE 3E method

Framework of analysis

The APRAISE 3E method was developed as part of the EU FP7 project APRAISE[1]. When similar policies or policy instruments are compared in different EU Member States, the outcome can differ widely depending on the presence or absence of favorable or unfavorable factors, which can be:

- the **broader contextual factors** such as environment, economic, social, and technological factors called "system context factors" in this paper;
- **implementation barriers or inefficiencies** (i.e. institutional factors, such as enforcement and institutional collaboration) that prevent the efficacious transposition and implementation of EU Directives into national policy instruments as well as policy specific influences related to policy instrument design, operation and enforcement both called "policy instrument context factors" in this paper, and
- **interactions** between policies and policy instruments, where one policy instrument could potentially reduce the effectiveness of another instrument or joint implementation of policy instruments could result in synergies.

In order to assess the impacts of these factors on the eventual environmental effect of a policy instrument, APRAISE adopts a systems approach, which goes beyond existing literature, e.g. the pairwise comparison of policy instruments interactions (Sorrell et al., 2008), which assessed policy instrument interaction independent of other contextual factors. Following a systems perspective, APRAISE examines policies and policy interactions as part of a policy and stakeholder system operating within a broader national or international socioeconomic and political context.

[1] www.apraise.org

Categories of evaluation factors

System context factors

System context factors are defined in this paper as contextual factors that are not specific to the assessed policy instrument, but which could impact its environmental effect. These may include the following categories:

Environmental factors: Low or high environmental stress/ pressure, which was an important determining factor during the design of a policy or policy instrument may change over time and lead to less effective policy instruments as stakeholders may feel less inclined to comply with the policy instrument.

Economic factors: As environmental policy is able to change the structure of an economy, supporting some sectors and repressing others, it is important to consider the structure in the beginning and take into account whether the structural changes incentivized by the policy are in accordance or contradiction with the capacities available in the economy.

Social factors: The achievement of policy objectives set by a policy/ policy instrument may be influenced by social factors such as habits, customs and social attitudes by either opposing (e.g. a target as such may not be fully accepted by society) or supporting its implementation.

Technological factors: Policy instruments can influence the development of technological inventions, foster innovation and incentivize the widespread dissemination of sustainable solutions in the market; technology development during the policy implementation could support the environmental impact that a policy instrument may have.

Policy instrument implementation factors

Policy instruments implementation factors are those that are directly related to the implementation of the assessed policy instrument. These may include the following categories:

Political & Social Acceptance: Policy makers should consider determinants of social and political acceptance when re-designing policies and evaluating the performance of instrument mixes. Political & social acceptance is defined as the political and social response of interference during the policy formulation, implementation and evaluation. From the perspective of targeted stakeholders it is assessed to what extent a policy instrument comprises key design elements that can generate or ease resistance of target groups in accepting a policy (Mundaca, 2009).

Policy Consistency and Coherence: Policy Consistency and Coherence within APRAISE is associated with the public process (i.e. harmonization, coordination and cooperation procedures across government departments and agencies) aiming at the alignment of incentives to sustainability objectives working both vertically across levels of government and horizontally across different actors and issues within a given level of governance (Hertog & Stross, 2011).

Implementability: This captures the practical feasibility of implementation (or enforcement) and is defined as the aggregate applicability of the policy instrument linked with the national infrastructure (institutions and human resources) and legislative framework (Konidari & Mavrakis, 2007).

Policy instrument interactions

Policy interactions in the APRAISE 3E method are examined at the level of stakeholder, by assuming that these interactions essentially take place through the behavior of stakeholders and their response to multiple policy instruments. In order to assess the dynamics of regulated or incentivized behavior within a given system with relationships between targeted and other indirectly influenced stakeholders, the APRAISE 3E method uses a system analysis tool called ‘system mapping’. This tool aims to display: (1) the relationship between directly targeted stakeholder, and their competing

and collaborating stakeholders in the system, (2) how one or multiple policy instruments impact the behavior of the targeted stakeholder, (3) how other environmental policy instruments targeting competing and/or collaborating stakeholders may influence the behavior of the targeted stakeholder, thereby causing a policy interaction.

Methodological steps

The APRAISE 3E method defines several steps to operationalize the 3E method: (1) Specify the basic environmental policy area, (2) Characterize policy instruments and identify main stakeholders, (3) Analyse effectiveness and efficiency, (4) Analyse the policy system context and its impact on environmental effectiveness and efficiency, (5) Analyse the policy transposition and implementation process and possible impact on policy effectiveness, (6) Explore policy instrument interaction including an analysis of stakeholder behavior, (7) Asses the relative importance of system factors and factor groups for the deviation of expected and observed performance of policy instruments, and (8) draw conclusion for improved efficacy of policy instruments and policies.

Empirical Examples: The impact of hydropower generation on river basins – the cases of Austria and Slovenia

In this section the 3E method is applied to one policy area -the expansion of small hydropower plants- being analyzed in two European countries in order to draw conclusions on the efficacy of the corresponding EU policies; however it could be applied to any other environmental policy areas. The examples are based on two case studies carried out within the APRAISE project (see Fruhmann & Tuerk, 2014 and Gubina & Prislan, 2014). The assessment included desktop research and stakeholder interviews. A range of stakeholder in Austria and Slovenia (about 10 in each country) were included at different points in time, in the beginning to understand the policy and stakeholder systems related to the case studies, at a later stage to validate the results.

Specification of the basic environmental policy area (Step 1)

Environmental policy targets related to hydropower decisions are showing multiple characteristics by aiming to meet both: nature/ water protection and renewable energy expansion. This case study has therefore examined the performance of the national environmental policy mix regarding hydropower decision-makings in the Member States Austria and Slovenia.

Characterize policy instruments and main stakeholders (Step 2)

In Austria the entire sector small- and mid-sized hydropower plants (maximum capacity $\leq$ 20MW) and in Slovenia the entire sector small hydropower plants (maximum capacity $\leq$ 10MW) have been considered. Important directly targeted stakeholders are investors and operators of small hydro power plants and the public authority that grants the permission to build new hydro power plants.

Identification of relevant EU Directives and member state policy package to implement EU Directives (Step 3)

Table 1. Most relevant EU Directives in regard to hydropower decision-makings

	Renewable Energy Sources (RES) expansion	Water and nature protection	
Directive	**Renewable Energy Directive (RED)(2009/28/EC)**	**Water Framework Directive (WFD) (2000/60/EC)**	**Habitats (92/43/EEC) and Birds (2009/147/EC) Directive; Environmental Impact Assessment Directive (2011/92/EU)**
Target	Individual RES target achievement obligations for different MSs	Prohibition of further deterioration in future/ achievement of a good status of all water bodies until 2015 (2027 at the latest)	Halt and reserve the loss of biodiversity (disclosing "Natura 2000 " areas); assessing possible environmental impacts of planned projects
Relevance in regard to hydropower decision-makings	Construction of new HPPs/ improvement of already existing plants may help MSs in achieving their RES target	Hydropower decision-makings need to ensure coherence with objectives given by the WFD – newly planned projects as well as reconstruction of old plants which are no longer in line with new implemented policy targets	Not generally relevant for hydropower decision-makings, relevance depending on specific criteria such as hydropower plants size, hydropower plants location

Similar policy instruments have been identified in Austria and in Slovenia, as national key policy instruments responsible for hydropower permissions: the national water act (AT), act on waters (SI) implementing the EU Water Framework Directive (WFD) pursuing the target of water/nature protection and on the other hand the green electricity act (AT), and the energy act (SI) including regulations on support for electricity generated from renewable energy sources implementing the EU RES Directive. Additionally also in both countries there are policy instruments for nature conservation in place that are based on EU directives.

Effectiveness and efficiency of the policy instruments (Step 4)

National implementation of the WFD/ nature conservation legislation. Generally the WFD imposes EU Member States to meet given requirements especially regarding the achievement of its two main targets to prevent further deterioration and to achieve a good ecological and chemical status/potential for surface water, a good chemical and quantitative status for ground water until 2015 (2027 at the latest), requirements that are also concerning hydropower decision-making.

Austria as well as Slovenia, like many other Member States, have shifted their target achievements for a significant proportion of water bodies to 2027. The WFD and therefore also its national implementation in both Members States surveyed include(s) a number of possible exemptions that enable the permission of new hydropower plants and accept a deterioration of the ecological status of surface water. In Austria however most of the recently approved hydropower plants got exemptions argued by overriding public interest for new hydropower plants and these are also planned in future, not only in the context of the water law but most likely also regarding the nature conservation act and e.g. "Natura 2000" areas where possible exemptions permissions are also possible. If becoming the rule in practice such exemptions may possibly become crucial for the WFDs national implementations effectiveness. In Slovenia on the contrary "Natura 2000" areas are less endangered by new planned hydropower projects. Therefore, Slovenia has achieved a quite good effectiveness regarding the prevention of deterioration of water bodies. In both countries surveyed it is difficult to assess whether the planned budged will be sufficient to finance all necessary activities

and measures until 2027.

National implementation of the RES Directive. Regarding the achievement of small- and mid-sized hydropower expansion targets in Austria, as well as in Slovenia the case study has shown that both countries face problems to meet interim or 2020 expansion targets if staying at current expansion level, although e.g. in Slovenia the years before enough new capacity has been installed to meet projected interim targets. Regarding installed capacity the 2020 target in Austria will likely be met although the 2015 target will be missed, whereas in Slovenia the current expansion level for targeted projections is generally too low. Regarding the efficiency of hydropower expansion, both in Austria as well as in Slovenia, the support of hydropower in comparison to other RES technologies belongs in principle to the cheapest forms of RES expansion support. However especially in Slovenia, although the policy to expand RES expansion was designed to increase energy from all RES, some technologies, especially photovoltaic, have increased more than others due to more lucrative feed-ins. Some investors in SHPP decided to wait for better economic climate or even to invest in more lucrative technologies. In Austria also another possibly important factor for the efficiency of hydropower expansion are increasing transaction costs due legal disputes related to the permission process as will be described later in more details.

Impact of system context factors on environmental effectiveness and efficiency (Step 5)

In this section system context factors that had the biggest influence on the performance of national key policy instruments will be compared between the two countries Slovenia and Austria and deviations from what was expected by policymakers and what was observed will be contrasted.

Most of the time context factors for both countries turned out to have similar impacts whether these were positive or negative, but in some cases reasons behind the impacts of system context factors have been identified as being rather different. The choice of the system context factors and the impact they had on effectiveness was first desktop research based, then stakeholder validated the choice or proposed additional context factors as well as validated the possible impacts they may have. The range of different stakeholders involved (policymaker, NGOs, investors) aimed to make the validations robust.

National implementation of the WFD/ nature conservation legislation. The economic crisis in the years 2007 and 2008 was not anticipated. As a result less money was available for actions regarding water conservation and improvements of water body's status required by the WFD. This was not only affecting governmental efforts to improve water status but also operators of hydropower plants which were experiencing a lack of funds to renovate and improve hydropower plants no longer in line with the WFD requirements. Slovenia e.g. also used money from a water fund, which actually has been intended to improve water and river bed status, to mitigate the financial crisis.

Over the last years the importance of energy import independency experienced a high upward trend in the overall EU. Therefore also Austria and Slovenia have been assumed to have expected an increase in the importance of energy import independency within the country. In practice this has also being the case in Austria, which is currently especially favoring the expansion of domestic electricity generation capacity from hydropower plants due to the in comparison to other Member States high hydro potential and the general acceptance of hydropower plants in society. As a result in Austria an increase of the public/governmental interest in (small- and mid-sized) hydropower generation was observable. This phenomenon is negatively affecting the performance of the WFDs national implementation by increasing e.g. the frequency of possible exemption permission in hydropower-decisions. In Slovenia on the contrary, importance of energy independence has in practice not been considered as one of most important topics in energy policy.

Especially in Austria hydropower expansion has been/is often politically prioritized compared

to other RES technologies due to its long history in Austria's electricity generation and associated high know-how as well as acceptance in society. In Slovenia on the contrary, for the 2020 target achievement no technology was specifically prioritized.

Political programs of governmental coalition (on federal state level) are generally also assumed to influence the effectiveness/efficiency of the national water act either negatively or positively, thus alike on national level by either prioritizing (small- and mid-sized) hydropower expansion adverse to its negative environmental impacts or vice-versa. This system context factor is especially relevant in Austria also on regional level that is responsible for hydro power permissions. Slovenia is not facing such problems since it is not divided into smaller provincial governments.

Another critical context factor which was also not observed in Slovenia, however critically impacted the national WFDs implementation in Austria are existing national property rights. In Austria the duration of permits for (small- and mid-sized) hydropower plants are lasting over several decades (average 50 years however in a variety of cases also much longer), which makes it difficult for the government to schedule reconstruction plans of already existing plants no longer in line with WFDs requirements. In Slovenia on the contrary although permits for SHPP are generally lasting for ~30years, no such problems have been observed.

Awareness of biodiversity is one of the most important factors that support implementation of WFD. In Slovenia and in Austria public as well as political awareness of biodiversity increased more than what was expected, thus due to e.g. environment conservation being a quite important media topic.

Additionally it was also expected in both countries that monitoring implementation of WFD from EU in the extent that was needed isn't going to be possible due to generally limited staff. As a result in Austria it has been observed that it was/is often infringed upon WFD targets, as offenses will possibly not always be detected. Such frequent infringements however have been not observed in Slovenia, which is generally highly focusing on the proper achievement of targets given by EU directives.

National implementation of the RES Directive. As a result of unexpected economic crisis which appeared in 2007/2008 both countries experienced tougher conditions for investments in small- and mid-sized (AT), small-sized (SI) hydropower plants which have not been expected, thus due to more expensive bank loans or due to low feed-in tariffs, which weren't high enough to balance the cost of loan. In Austria e.g. government lowered subsidies available for energy generation from RES thus including also support for small- and mid-sized hydropower generation. As a result economic crisis hindered effectiveness of policy more than it was expected, and fewer hydropower plants than expected have been realized in both countries.

Price of electricity: After 2008 the price of electricity dropped very low in both countries and resulted in a challenge for the government in both countries to adapt subsidy systems in order to achieve hydropower expansion targets. In Slovenia e.g. falling electricity price most effected operators that decided to use the operating subsidy (operators receive some funds for each MWh of electricity generated, but are selling the electricity on the market) which suffered from falling price of electricity, because overall yielding was lower than anticipated.

Theoretical hydropower potential of both countries is quite high but has in recent years shrunk significantly with the implementation of WFD and tougher environment conditions for new hydropower plants. In Austria shrinking hydro potential got so limited that negatively affects required expansions of hydro generation. Such an effect however, although hydropower potential is also shrinking due to new implemented environmental legislation, was not observable in Slovenia.

National legal preconditions and related procedures in acquiring permissions is a big problem in Slovenia. Very slow and in some cases expensive procedures to acquire all permits are significantly hindering the expansion of hydropower generation. In Austria on the contrary national legal preconditions haven't been observed to significantly affect the expansion of hydropower generation.

Increase in awareness of biodiversity was noticed in Slovenia and Austria. This has a

significant negative impact on constructing new small- and medium- sized (AT), small-sized (SI) hydropower plants as it is supporting increasingly tougher condition for environment permissions and it also persuades different environmental groups that can potentially slow down or even interrupt constructing new hydropower plants. Impact of awareness of biodiversity was therefore in both countries being observed to affect the performance of RES Directives national implementation rather negatively.

Table 2. Impact of system context factors on water/nature protection and RES expansion in AT/SI

System context factors		Impact on effectiveness of Hydro expansion in		Impact on effectiveness of WFD/ nature conservation legislation in	
		AT	SI	AT	SI
Economic	Economic development	Highly negative	Highly negative	Highly negative	Highly negative
	Importance of energy import independency			Highly negative	No impact
	Price of electricity	Highly negative	Slightly negative		
Political	Political priority of hydropwoer generation			Slightly negative	No impact
	Political programm			Highly negative	
	National legal preconditions		Highly negative		
Social	Awareness of biodiversity	Highly negative	Highly negative	Highly positive	Highly positive
Technical	Theoretical hydro potential	Slightly negative	No impact		
Good Governance	Monitoring of national implementation of EU environmental legislation			Highly negative	Slightly negative

Positive Negative Not relevant

Impact of policy context factors on environmental effectiveness and efficiency (Step 6)

Effectiveness and efficiency of national policy instruments can also be affected by contextual factors related to transposition and implementation (policy instrument context factors). The most relevant context factors and their comparison between countries and how they have affected effectiveness/efficiency will be described in this section.

National implementation of the WFD/ nature conservation legislation. While in Slovenia coordination among institutions is not significantly relevant regarding the WFDs national implementation, in Austria implementation difficulties regarding coordination among institutions e.g. high complexity of necessary administration and management activities, relatedness of policy and electricity companies have been observed, thus slightly hindering the implementation of the WFD in Austria in its desired performance. No similar problem was observed in Slovenia. In both countries enforceability was not expected by stakeholders to have any significant influence on the performance of the WFD's national implementation. In Austria in practice however enforceability had a much more negative impact than expected, especially due the quite large interpretation tolerance within the WFDs wording (e.g. water quality of river basins has not been defined as high but rather as good, thus to give hydropower permissions much easier). In Slovenia on the contrary no particular problems regarding enforceability arose.

National implementation of the RES Directive. In Austria motivation to invest in new small and medium sized hydropower plants was very moderate and with the introduction of new feed-in schemes it was expected that motivation would improve. However in practice motivation to invest was decreased due to unfavorable electricity market price development, several uncertainties such as legal uncertainty etc. but also due to increasing environmental awareness. The same can also be said for the motivation to invest in small-hydropower plants in Slovenia, whereas especially in the context of the RES support scheme, feed-in tariffs have been identified as too low to increase motivation to invest in hydropower generation. In both countries it was expected that adaptability of policy instruments with the experience through years would be sufficient and will help promote small and medium sized (AT)/ small sized (SI) hydropower plants. But in practice policies weren't changed often or strongly enough to mitigate all factors negatively affecting the motivation to invest in hydropower generation e.g. price of electricity, economic development etc. In both countries it was already expected that financial feasibility will have a negative impact on building new small- and medium- sized (AT)/ small-sized (SI) hydropower plants. The introduction of WFD meant that all new hydropower plants had to meet stricter environmental conditions. This usually takes longer and is also more expensive. In Austria e.g. a big problem has also been observed regarding existing hydropower plants that had to rebuild fish facilities to meet new regulation to acquire all needed permissions. Such uncertainties regarding investment costs in connection with the WFD are therefore decreasing the interest to invest in hydropower plants, thus in succession possibly hindering the RES directives national implementations performance in both countries. In Austria, legal certainty couldn't be always guaranteed (e.g. a governmental/official promise that a hydropower project is able to be realized and complying with all surrounding policy requirements already at the projects start of the planning may not be able to be kept until the end of the authorization process), thus negatively affecting the RES directives national implementation by decreasing interest to invest in hydropower projects. In Slovenia in contrast, the administrative set up led to long approval procedures contributing to legal uncertainty and were main barriers for the RES directives' national implementation.

Table 3. Impact of policy context factors on water/nature protection and RES expansion in AT/SI

Policy context factors		Impact on effectiveness of Hydro expansion in		Impact ofneffectiveness of WFD/ nature conservation legislation in	
		AT	SI	AT	SI
Policy Coherence	Coordination among institutions			Highly negative	No impact
Political and Social Acceptance	Adaptability	Highly negative	Slighlty negative		
Implementability	Motivation to invest	Slightly negative	No impact		
	Enforceability	Highly negative	Highly negative	Highly negative	No impact
	Financial feasibility	Highly negative	Highly negative		
	Administrative set up & legal certainty	Highly negative	Highly negative		

Positive Negative Not relevant

Policy instrument interaction including an analysis of stakeholder behavior (Step 7)

Interactions between policy instruments either perusing renewable expansion or nature (especially water) protection targets have been highlighted to have a detrimental role in achieving the

desired performance of the national environmental policy mix regarding hydropower decision - makings in both countries. The policy interaction analysis has been rather important in this case study and is introduced in more detail in the following figure (Figure 2) for the case of Austria. Policy interactions in general are the result of different policy instruments influencing stakeholder behaviour that in turn is also influenced by the behaviour of other stakeholders. The system analysis distinguishes between stakeholders directly target by the assessed policy instrument(s) and stakeholders indirectly targeted by the assessed policy instrument(s). Within an interaction analysis, first the relationship between stakeholders directly affected by the policy instruments is assessed, then the impact of individual policy instruments on stakeholders behavior and in a last step the impact of multiple policy instruments. The following figure displays the stakeholder system in the realistic scenario of a multi policy environment for hydropower decisions in Austria:

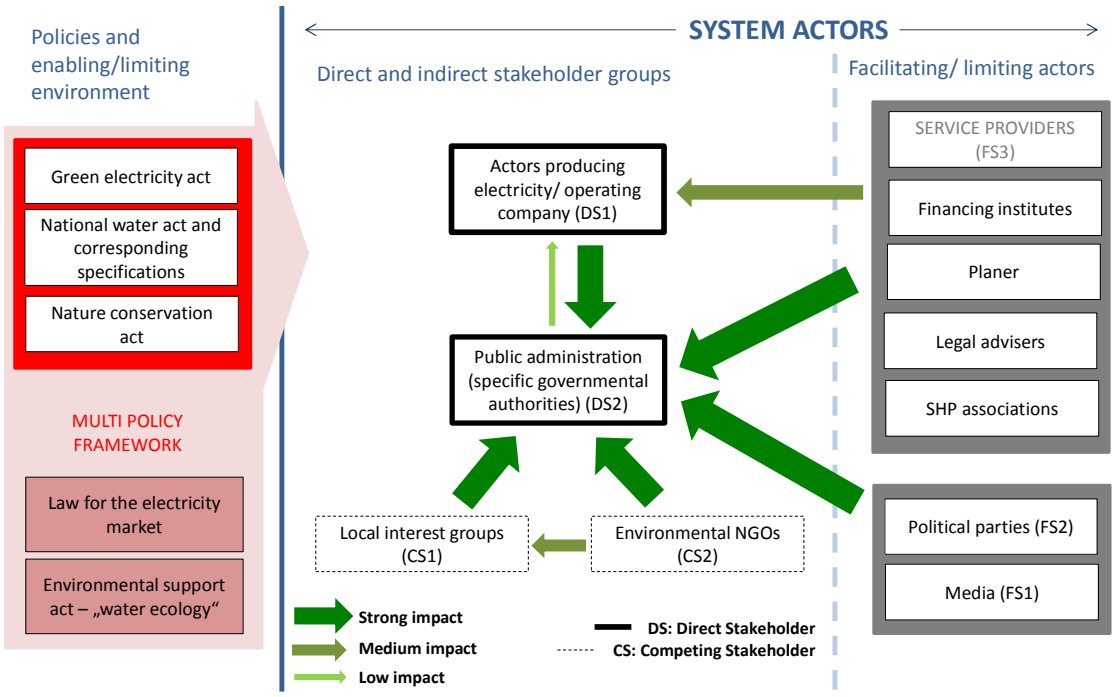

Figure 2. Multi policy framework – system map for hydropower decisions in Austria

The system map aims to display the policy instrument interaction that arises at the public administration that has to give the permission for a new hydro power plant. The system map was first based on a literature review and then discussed and validated with stakeholders. As a main result of the multi policy framework in the context of small- and mid-sized hydropower decision-makings in Austria, the public administration/ specific governmental authorities is/are exposed to enormous pressure from all sides. This affects the desired outcome of the individual policy instruments when they are part of the policy mix but also contributes to a large legal uncertainty in Austria and high transaction cost in some cases. Meeting all policy instruments targets is however, in case they are contradicting, impossible in practice. In Slovenia on the contrary policy interactions related to hydropower decisions are less accentuated, as Slovenia – in order to avoid the violation of EU directives – is more restrictive with hydropower permissions. Also contextual factors can be important for how accentuated the interaction is, e.g. at current low electricity prices far less hydropower plants will seek for permission than expected and possible policy instrument conflicts will arise less frequently.

Asses the relative importance of system factors and factor groups for the deviation of expected and observed performance of policy instruments (Step 8)

Table 4. Impact of context factors and interactions on water/nature protection and RES expansion in AT/SI

	Austria		Slovenia	
Policy targets	Water/nature protection	RES expansion	Water/nature protection	RES expansion
System Context factors				
Policy Context factors				
Policy interactions				

Both countries are not on track to reach targets for RES (hydropower) expansion as well as nature (especially water) protection. As table 4 shows the reasons strongly differ between Austria and Slovenia as the respective EU directives are transposed in different legal, institutional, administrative and socioeconomic circumstances. In Austria the policy conflict related to hydropower permission has been identified to be quite larger accentuated than in Slovenia also due to the fact that a lot of hydro potential is already exhausted. In some cases this led to high transaction costs caused by legal disputes. For the implementation of the WFD also implementation and context factors has a stronger negative impact in Austria than in Slovenia and as a result in Slovenia nature (water) protection is on a better track however also not resulting in the overall desired outcome. But also the hydropower expansion is significantly impacted by contextual factors: Responsible for the slow and halting development of hydropower expansion in both countries has currently been the low electricity price that doesn't allow to recover the costs as well as the economic recession and corresponding lack of funds and administrative bottlenecks in the case of Slovenia. This is reinforced by increasing awareness of biodiversity which decreases motivation to invest in HPP.

The comparison between Austria and Slovenia showed how differently policy instruments perform that are based on the same EU directives. Some of the problems that led to a lower effectiveness could be avoided at the level of EU policy design. In the case of hydropower expansion for example more guidance on EU level on how to handle possible policy interactions at the national level would be of help to avoid possible conflicts and give more certainty to investors compared to the current system of ex-post prosecution of offenses against EU legislation on a case by case basis.

Conclusions

This paper has introduced a new methodological approach to assess the performance of policy instruments, creating and operationalizing the concept of efficacy of policy instruments besides the established concepts of effectiveness and efficiency. Efficacy, as defined in this paper refers to the anticipations that policy makers held prior to the implementation of a policy or policy instrument about the mechanisms through which the policy or policy instrument would bring about its desired effects. Based on two examples the paper showed the important role of contextual factors and policy interactions for the transposition of EU directives into national legislation and the performance of corresponding policy instrument: Many of them were not sufficiently considered in policy design, neither on EU or national level and significantly reduced effectiveness and efficiency. The paper illustrated with the cases of hydropower expansion in Austria and Slovenia how different the legal, institutional, administrative and socioeconomic circumstances are that impact the

effectiveness and efficiency of policy instruments, and that some of the national framework conditions are critical for the achievement of EU policy targets. The paper also showed that inconsistencies of policy targets at the European level can lead to problematic policy interactions at the level of national decision makers and trade-offs in environmental target achievement and that contextual factor can reinforce these. Only a systematic understanding of the mechanisms that affect effectiveness and efficiency of policy instruments at the national level can help to understand, to what extent these were induced by EU policy making and how to improve the efficacy of national and European environmental policy.

References

Den Hertog L, Stross S 2011. Policy Coherence in the EU System - concepts and legal rooting of an ambiguous term. Paper presented at the CEU Universidad San Pablo (Madrid) conference on 'EU as a global power', April 2011.

Karoline S. Rogge, and Kristin Reichardt, 2013. Towards a more comprehensive policy mix conceptualization for environmental technological change: a literature synthesis. Working Paper Sustainability and Innovation No. S3/2013. Karlsruhe: Fraunhofer ISI.

Luis Mundaca, Lena Neij, 2009. A multi-criteria evaluation framework for tradable white certificate schemes. Energy Policy 37, 4557-4573.

Pascal Gautier, (2004), "Horizontal Coherence and the External Competences of the European Union", European Law Journal 10(1), pp. 23-41.

Popi Konidari, Dimitrios Mavrakis, 2007. A multi-criteria evaluation method for climate change mitigation policy instruments. Energy Policy 35, 6235-6257.

Harmelink M. Lars Nilson, and Robert Harmsen 2007: theory based evaluation of 20 energy efficiency instruments

Sorrell S., Harrison, D., Radov, D., Klevnas, p., Foss, A. (2008). “White certificate schemes: Economic analysis and interactions with the EU ETS”. Energy Policy 37: 29–42

Tuerk Andreas, Eise Spijker, Niki Artemis Spyridaki, Jenny Lieu, Wytze van der Gaast, Christian Sartorius, Karoline Rogge, Daniel Steiner, Dorian Frieden et al. 2012 The 3 E methods. APRIASE project report D2.2

Fruhmann Claudia and Andreas Tuerk 2014: The impact of hydropower generation on river basins in Austria

Gubina, Andrej; Prilan, Blaž; 2014: The impact of hydropower generation on river basins in Slovenia