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The institutional dimension of resource efficiency in a multi-level governance system

Implications for policy mix design

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1 Introduction

A recently finalised research project "Policy Options for a Resource Efficient Economy", funded by the European Commission, points to the need of innovative policy mixes for resource efficiency [1]. An essential output of this project was the development of quantitative headline targets for the environmental characteristics concerning the major categories material use and carbon emissions [2]. In order to accommodate future generations needs and global equal distribution as well as seriously combat climate change a target vision for Raw Material Consumption (RMC)[1] of 5 tonnes per capita and year (globally) was specified as to be achieved by 2050. In view of an average consumption of about 14 tonnes per capita and year today (see figure 1) in Europe, the vision is ambitious and indicates need for strong policy effort.

In 2011, the European Union had named resource efficiency as one out of seven flagship projects to pursue its so-called Europe 2020 strategy considering resource efficiency a top policy priority and the Roadmap to a Resource Efficient Europe at its core [3,4]. Since that time it also has been increasingly acknowledged that the use of resources is deeply interwoven with the use of energy [3,4] however with limited political and institutional consequences so far. Fossil fuels belong to the four main material categories that are used to calculate the resource use and the global and national resource productivities and it is clear that, for example, construction activities, cement production and the use of buildings are not only material but also energy intensive. Measures to increase resource efficiency or to reduce resource use therefore often directly impact energy use and CO_2 emissions in many ways [5,6].
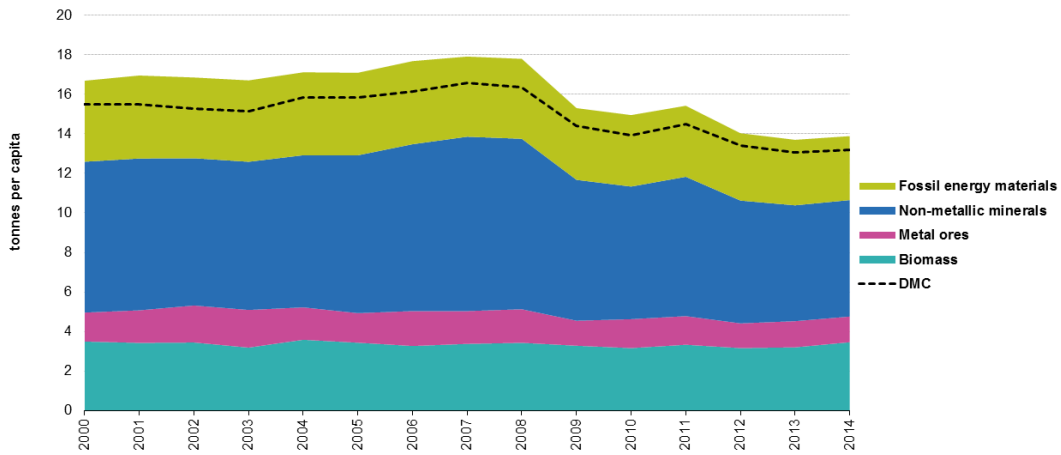
Source: Eurostat (online data codes: env_ac_mfa, env_ac_rme, demo_gind)

Figure 1: Raw material consumption (RMC) by main material categories, EU28, 2000-2014; Source: [7]

There is, of course, no single policy tool that would be able to address the challenges caused by the use of different resources, consisting of different problem structures,

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[1] RMC is based on raw material equivalents required for domestic consumption, including the raw materials that are embodied in traded products which are not considered in the indicator Domestic Material Consumption (DMC), which is commonly used at national scale. The difference between RMC and DMC is ca. 5% on average.

involving diverse actors and stakeholders pursuing different goals. Instead, many policy mixes at different governance scales are required to overcome the variety of barriers, take separate innovation stages into account, and effectively address national and global requirements.

Earlier studies have shown that the economic development and the resource use connexion is shaped by a complex interplay between informal constraints and formal rules and their enforcement mechanisms, environmental policies and systems of innovation [10-12]. More targeted analyses of resource efficiency policies and eco-innovation systems have also revealed the importance of the analysis of country-specific national governance patterns, structures and institutional developments [13-16]. Flanagan et al. highlight that policy makers, scholars and analysts alike increasingly focus on challenges stemming from policy complexity and point out that this shift in emphasis is exemplified by the uptake of the term 'policy mix' [17]. The uptake of this term in the current resource and energy efficiency research reflects that modern states are increasingly characterized by the dispersal of power, not merely upwards and downwards from the national level to supra- and sub-national actors, but also outwards to quasi-state and non-state actors.

Against this background the paper is guided by the following research question:

How can the interplay of institutions, governance levels and policy mixes be better integrated in the policy mix analysis and design?

The paper is based on (parts) of empirical surveys of 32 European countries observing the development of the institutional settings for the implementation of resource efficiency policies and policy mixes [15,16]. It further draws on qualitative studies investigating the status-quo of policy mixes [48,54,55]. The paper is structured as follows: Chapter 2 reflects on the analytical framework for policy mixes (rationale, essential characteristics, coordination challenges), and chapter 3 provides empirical results from the institutional and policy context in the field of resource efficiency and example countries (current policy status, mechanisms for stakeholder inclusion, multi-level issues). Based on these outcomes, conclusions are drawn in chapter 4 with regard to the research question and further need for research.

2 Analytical framework for policy mixes

The increased complexity of the policy processes virtually precludes any static-comparative analysis of instruments as if they were stable, discrete and independent units. Hence, single instruments can never be conclusively evaluated because their actual state is influenced by the fact that they always come in a mix, or more commonly, they are added to an existing mix. However, few studies have systematically explored interactions between different instruments, be it across time or across other dimensions of the policy process. Against this background, the paper especially focuses on the institutional dimension of policy mixes by taking the example of resource efficiency policy.

Institutional framework will be understood as a conglomeration of organisations and agencies, instruments and strategies, actors, target systems and arrangements/mechanisms for the interest-sharing and involvement of stakeholders. This understanding goes beyond North's interpretation of institutions as systems of formal laws, regulations, and procedures, and informal conventions, customs, and norms, that shape socioeconomic activity and behaviour by (simply) including the organisational outcome of those as analytical unit. Policies mixes, therefore, shall be understood as a specific orchestration of well-matched packages of elements and instruments within a given and evolving institutional framework. This is important because, as Foxon states, *"the complexity of the goals of politics as well as the loose and diffuse links between actions and outcomes make politics inherently ambiguous and mistakes difficult to rectify"* [18,p.3].

2.1 Rationale for resource efficiency policy mixes

The fundamental basis for any policy mix design has to be the question whether a mix is actually needed, i.e. if "*the environmental issue at hand is a 'single-aspect' or a 'multi-aspect' one*" [9,p.21]. While single-aspect environmental problems are characterised by only one relevant dimension or characteristic—for example, the total amount of a certain type of emission that can be combated with a specific filter technology—, the reality of resources and raw materials is a multi-aspect issue [8,9]. They

- are partially private goods, partially club goods, common pool resources and—like in the case of global climate—even public goods,
- underlie extreme informational constraints, knowledge and data gaps, concerning the interplay of the socio-industrial metabolism and the ecosystems (so-called resource nexus) and
- are subject to (often irrational) behaviour of the relevant actors and stakeholders guiding consumer choices as well as policy design.

Based on the concept of 'second-best' theory, Lipsey and Lancaster [19] emphasised that in such situations one instrument per market failure will be needed. *"For example, if the assumption about full information is invalid (while all the other assumptions hold), one instrument would be needed to address the environmental externality per se, and another instrument would be needed to address the information failure"* [9,p.22]. Thus—according to the 'Tinbergen Rule' and considering the multi layer issues of the resource challenge as a 'multi-aspect' environmental problem—a first-best optimum cannot be reached by applying only one instrument but a combination of several instruments—an 'instrument mix'—will be needed [8,9]. This is all the more true for the resource efficiency topic when one takes into account the cross-cutting dimension of resources as part of various policies fields (e.g., economic policy, fiscal policy, trade policy, environmental policy). Resource efficiency policy has to be seen as a prototype of a 'multi-aspect problem' of a kind that requires a mix of different instruments, policies and strategies at different governance levels.

2.2   Essential characteristics of policy mixes

In the following, we will reflect on an analytical framework based on Rogge and Reichardt that describes general characteristics of effective policy mixes [20-22]. These policy mix characteristics can be applied both to the overarching policy mix, but also to distinct elements or processes.

According to Rogge and Reichardt, the first key characteristic of policy mixes is a three-level consistency referring to *"how well the elements of the policy mix are aligned with each over, thereby contributing to the achievement of policy objectives"* [22,p.1626]. Ranging from the absence of contradictions to the existence of synergies within and between the elements of the policy mix, the single instruments in an instrument mix can be considered consistent when they work together to support a policy strategy. *"They are inconsistent when they work against each other and are counterproductive"* [23,p.396].

Such integrated analysis of instruments is rarely addressed in the literature [24-26]. This is particularly true for resource efficiency with its significant interactions and interdependencies between different natural resources, nations, governance levels and transnational value chains.

The second key characteristic of an efficient and successful policy mix is the coherence of the policy processes that aim to develop, implement and monitor the specific instruments. In contrast to the consistency with a focus on contents, the term coherence focuses on the process dimension and mechanisms [27-30]. Rogge and Reichardt here refer to the *"structural and procedural mechanisms, such as strategic planning, coordinating structures and communication networks"* [22,p.1626]. It also encompasses all policy processes across different governance levels—this specific aspect is of course of greatest relevance for resource efficiency policy mixes, which have to bring together and integrate especially the different on-going activities on the EU, member state and subordinate levels.

A third analytical dimension relevant for describing the nature of a policy mix and the perception of the addressed actors are credibility and stability [31-33]. The credibility of a policy mix refers to the extent to which the policy mix is believable and reliable [34]. Credibility may be influenced by a range of factors, such as the commitment from political leadership, the operationalization of targets [35], a consistent instrument mix, and the delegation of competencies to independent agencies [22]. Given the fact that radically increasing resource efficiency in Europe will require significant long-term investments, the credibility of a policy mix is a necessary precondition for businesses and economy as regards security of investments. In this way it is linked to the two dimensions described above because inconsistent and incoherent policy mixes send out mixed or wrong signals.

The fourth key characteristic is the comprehensiveness of a policy mix. This term refers to the " (...) *the degree to which the instrument mix addresses all market, system and institutional failures, including barriers and bottlenecks"* [22,p.1627]. Fol-

lowing Oates [36], all environmental policies derive their legitimacy from existing market failures: as long as human activities directly and indirectly harm the environment with potentially disastrous outcomes, policies to counteract such failures are legitimate. Acknowledging the systemic character of many challenges, recent discussion has shifted towards system failures [37] leading to more complex analyses on shared responsibilities between market participants and states. Institutional failures are however rather rarely addressed in literature [38]. They must be considered being strongly linked with policy processes [39-40].

A fifth characteristic earlier introduced by Howlett and Rayner [41] refers to the necessary congruence among instruments and (socio-economic) goals, or in other words, between context and design. A fundamental problem, for example, is the largely unquestioned role of economic growth as overarching economic goal in virtually all European Nations. Undifferentiated economic growth however has been recognised as contributing to stabilising resource consumption at a high level. Even decoupling successes do not lead to significant and necessary reductions in resource consumption [42-44], as called for by the International Resource Panel [45] and the results from the POLFREE project indicate [2].

The relations of those five main features of policy mixes are illustrated in the figure below.
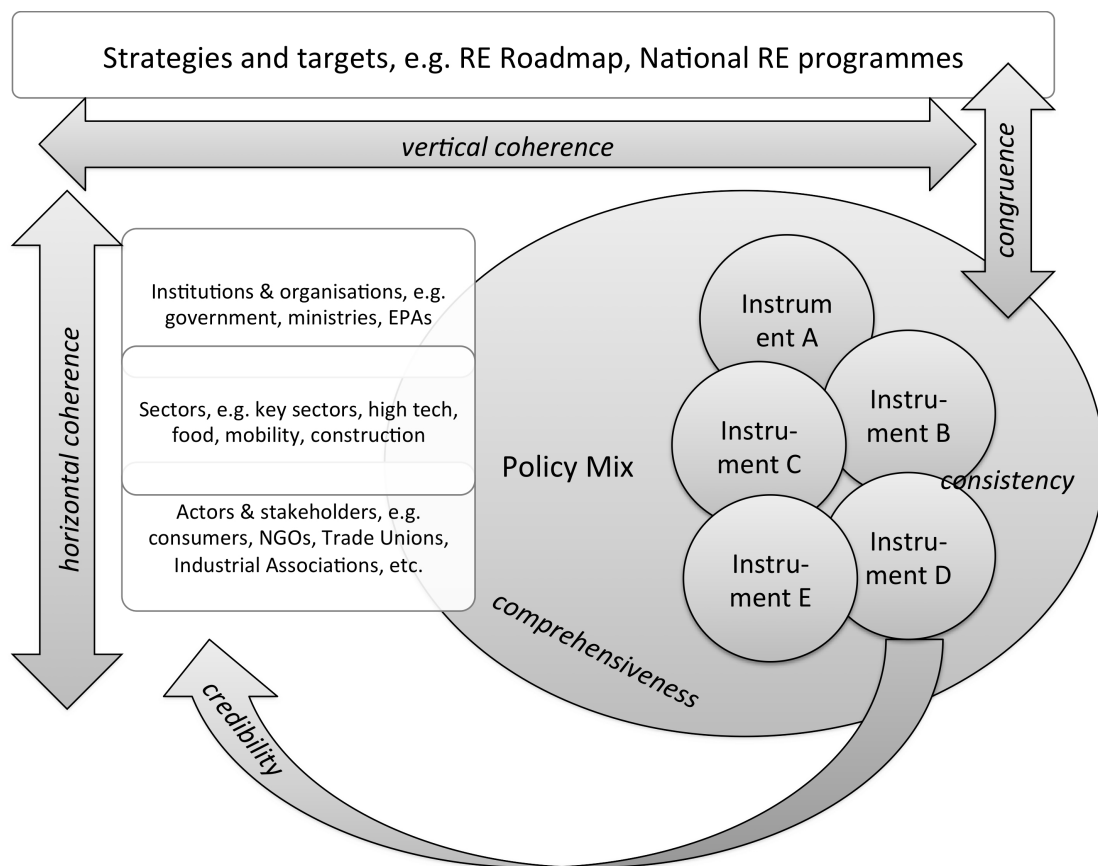
Figure 2: Relations of five main features of policy mixes; Source: Own illustration.

A crucial, but often neglected aspect in the context of policy mix development is the question of the <u>competences</u>, i.e., the allocation of responsibilities over several governance levels, between governmental departments and among a variety of actors and bodies that usually relate to a specific territorial entity while having to ignore cross-border effects. Who is ultimately accountable for the outcome and which mechanisms and structures are used to coordinate the specific governance area?

3 Institutions, stakeholder mechanisms and policies for resource efficiency in Europe

3.1 Material and method

This following section is based on empirical surveys of 32 European countries[2] in which, inter alia, the development of the institutional frameworks for the implementation of resource efficiency policies and policy mixes was explored [15,16]. The surveys are based on the evaluation of questionnaires with open questions regarding de-

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[2] comprising Albania, Austria, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Kosovo, Liechtenstein, Latvia, Lithuania, Macedonia, Netherlands, Norway, Poland, Portugal, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom

velopment, status-quo, implementation and institutional embedding of resource efficiency and related policies as well as best practice examples in the European countries. This paper focuses on the results of two questions concerning the institutional set-up to develop and implement resource efficiency polices and the process organised for stakeholder participation. The actors approached are dedicated experts of the national reference centres and focal points within the European Environment Information and Observation Network.

The interplay of institutional arrangements and policy mixes in the wake of the EU Roadmap has also been qualitatively assessed in a country comparison study [48] within the scope of the POLFREE project investigating developments and key concepts of resource use, resource productivity/efficiency, decoupling and eco-innovation for resource efficiency. In order to identify underlying factors for potential change, the report conducted an in-depth analyses of ten EU countries, representing different policy configurations concerning resource and waste management. To complement, this paper also draws on a study that explored some 'real world policy mixes' [54,55].

3.2 Current status of resource efficiency policy mixes in EU member states

Under the headline "Transforming the economy" the EU Roadmap described guidelines and milestones that formed a qualitative framework encouraging countries to develop specific policies and policy mixes [4]. As a communication, however, the Roadmap never entered a legislative status like directives. Some studies investigated whether and how the concepts could be operationalized [56] but this has not yet been done.

In general, a range of policy measures are available to promote resource efficiency:

- Regulatory instruments, such as resource caps, regulations on recycling, producer responsibilities, eco-design, mandatory targets, codes, standards, and certification for products;
- Economic instruments, including fiscal and financial incentives, such as eco-taxes and fees, direct funding, and public procurement;
- Research, development and deployment support measures, such as grants for R&D and piloting activities, R&D infrastructure, innovation vouchers, supporting innovation incubation, and R&D personnel;
- Information, education and networking support measures, for example, advising, training, direct support of activities of SMEs, customers, technology adopters, promotion of networking, providing information, and supporting public private partnerships, and
- Voluntary measures, such as performance labels and guarantees for products and services, or voluntary agreements and sectoral commitments [14].

Since the launch of the EU Roadmap in 2011 [4], all countries have taken action and implemented a wide array of national resource efficiency policies, but to varying de-

grees and with varying success. Economic and geological features often lead to country-specific political preferences and a path-dependent concentration on the respective competitive key sectors that have yet not been broken up (e.g., Germany - automotive). In addition, indirect or direct subsidies for resource-intensive sectors such as mobility and nutrition are quite common in many Member States. Regardless different development stages of resource efficiency agendas, a lack of congruence of policies and national objectives has become apparent, e.g., a division of strategies and responsibilities for resource efficiency action plans and other raw material initiatives with partial goal conflicts or poor coordination [48]. Although support programmes and financial incentives for industries are effectively implemented and successful in individual areas, the overall picture of policy processes is incoherent and implemented instruments are fragmented and often inconsistent. Green stimulus programmes, for example, tend to be more aligned to short-term economic objectives and mainly focus on energy efficiency and transport measures. The magnitude of green investments and eco-innovation still plays a niche role within the overall complex innovation policy of European Member States. A prevailing reluctance with regard to economic instruments seems to leave large potentials untapped. The current level of transposition of the 2020 milestones suffers from lack of specification of targets and prioritisation of sectors as regards resource efficiency measures [48].

Accordingly, most countries express a preference for policy mixes instead of single instruments to address the problems at stake [16]. Hence, they would combine regulatory, economic/financial and information-based instruments. Fedrigo-Fazio et al. investigated a number of so-called 'real world policy mixes' with evidence of success but different ways of orchestration. In most cases, a selection of instruments and sectors is addressed depicting tailor-made approaches for specific resources. Some of them show indeed impressing results: United Kingdom with its policy mix to reduce the use of aggregates, Japan's policy mix for domestic material use reduction as an example for a multi-sectoral approach and Sweden and Denmark for fossil fuels measures as examples for sectoral approaches and relative decoupling results. Further, absolute decoupling results between the use of specific resources and the economic development have been observed for Iceland (fish), Finland (forests), Portugal (industrial energy efficiency), Denmark (use of fertilisers), and Ireland (plastic bags) [54,55].

Austria outlined the guiding principles for using a mix of policy instruments as follows: " ... *strong regulatory instruments such as bans should mainly be applied when protection against hazardous substances is needed. In other cases, a combination of a carrot (financial, economic and market-based instruments as well as voluntary agreements) and a stick (regulations for limiting the effect of market participants who do not play by voluntary rules and for making inefficient behaviour expensive) approach is preferred. Information and motivation/awareness raising are necessary under all circumstances*" [57]. In contrast to the expressed preferences, policy mixes for resource efficiency are not yet common in the 'real world', they are rather the exceptional case.

3.3   Allocation of responsibilities for resource efficiency policies at national scale

The question about the relationship between policy mixes, understood as an orchestration of a package of elements within an institutional framework, understood as a conglomeration of organisations, actors, target systems, arrangements and mechanisms for the interest-sharing and involvement of stakeholders *and* instruments at different governance levels, must be considered complex. It is largely unexplored in the context of resource efficiency.

As a cross-cutting issue resource efficiency involves several domains and sectoral policy fields (e.g., economic, fiscal, environmental, spatial planning), and at least five policy levels (i.e., local/regional, federal, central/governmental, supranational and international level).

The responsibility is horizontally dispersed across a variety of institutions, primarily among those ministries directly responsible for priority resources or sectors (most frequently the ministries for environment, energy, economy, agriculture or construction). Also, transport, finance, forestry and industry ministries were reported to have responsibility in the area of resource efficiency. Frequently, a wide range of ministries is involved, often without clarity who is in the lead for the topic indicating a need to streamline arrangements to ensure effective use of institutional capacities, improve the consistency and comprehensiveness of policies across various fields, and avoid overlapping of responsibilities [16,48].

Vertical institutional arrangements and outcomes in the resource efficiency context have evolved in different ways, often driven by national and supranational governance preferences. They range from centralised (top-down) approaches, such as in France or Poland, to more decentralised (bottom-up) ones, as in Belgium and the United Kingdom. Many countries have further regional (subnational) and/or local institutions in place concerned with the issue resource efficiency. An overall resource efficiency mainstreaming cannot be observed yet.

However, the institutional frameworks and involved levels have been distinctly advanced and widened in recent years, but with a noticeably strong role for ministries which are dependent on policy cycles and frequent necessary re-formulation of what is regarded to be the most important national interests. In contrast to that prominent role in coordinating activities on the national scale, there are some examples of programmes and initiatives increasingly taking place at the country or province level (e.g. UK-Scotland, BE-Flanders) to be able to act more independently [16].

Figure 4 shows how countries organise their institutional structure to support resource efficiency.
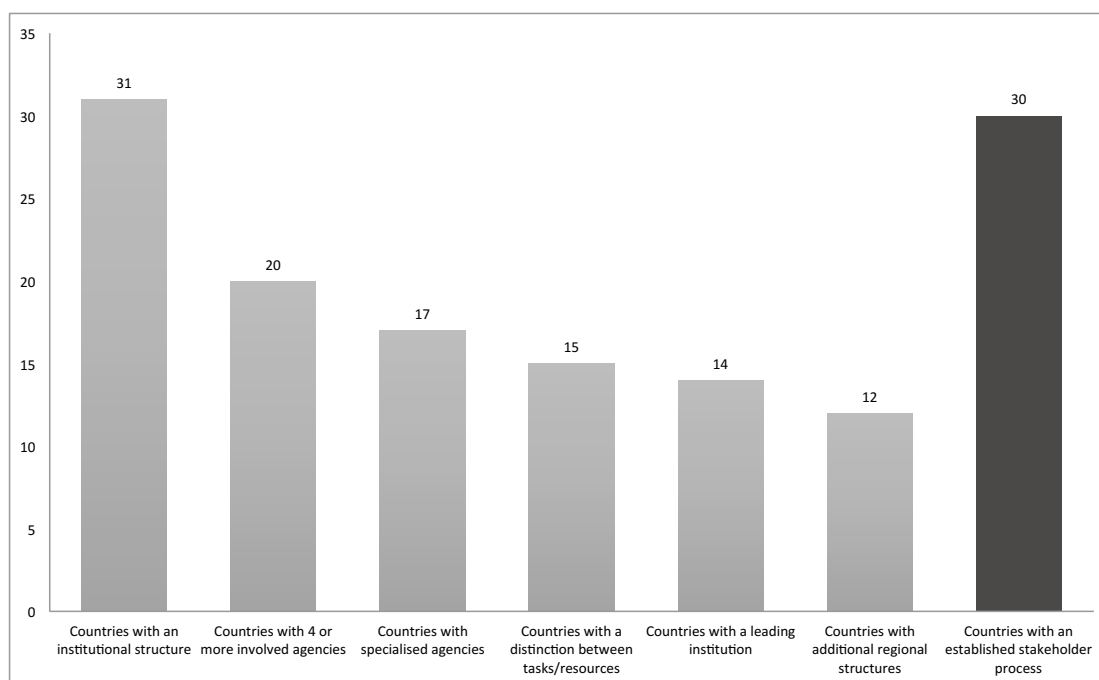
Figure 4: Forms of institutional set-ups according to different criteria; Source: Own compilation; used in a different form in [16,p.97]

Twenty countries have four or more ministries or agencies with responsibility for resource efficiency. This illustrates the multi-faceted nature of the topic, as well as, potentially, hinting at possible difficulties in ensuring policy coherence of processes. Fourteen countries have nominated one institution—typically at the ministerial level—to take the lead or the coordinating role at national scale, for example, England (United Kingdom) with a 'Resource Programme Steering Group' and Ireland, where the government set up a high-level cross-government committee to monitor the implementation of the strategy 'Our Common Future'. Specialised agencies which are responsible for certain types of resources or issues have furthermore been established in seventeen countries (e.g., Natural Resources Agency in Albania, Natural Resources Wales in the United Kingdom, public waste agencies such as Public Agency for Waste in Flanders, Belgium, The Waste and Resources Action Programme and Zero Waste Scotland, United Kingdom, as well as energy agencies in Albania, Macedonia, Portugal and Slovakia). In many countries, the environment agencies are in a supporting role to assist the lead or the coordination of draft policies or the provision of data and information on which the policies will be based (e.g., Austria, Croatia, Germany, Iceland, Ireland, Norway, Portugal, Serbia, Slovakia, Sweden and the United Kingdom) [16].

Some countries (e.g., Belgium, the United Kingdom and Germany) have further subsidiary institutions at the country level with a devolved responsibility for environmental matters. In the United Kingdom, for example, England, Northern Ireland, Scotland and Wales have own jurisdiction and policy plans as to resource efficiency, waste or recycling policies. In contrast, other countries (e.g., Germany and Serbia)

have dedicated institutions at the state or regional level (i.e., regional efficiency centres or cleaner production centres) but the overall responsibility for the theme remains central. There are also examples for specific institutions to assist business and industry in the implementation of resource efficiency projects (such as a Reference Centre on Circular Economy in order to assist small and medium enterprises (SMEs) in BE-Wallonia or the Material Efficiency Centre in Finland; Croatia and Serbia established national Cleaner Production Centres and Ireland a Clean Technology Centre at national scale). In a few cases, countries emphasised the role played by municipalities (Bulgaria and Latvia) at the local level and other counties (Croatia and Ireland) at the regional or county level. Serbia, for example, established a Network of Energy Managers of cities and municipalities, industries and public utility companies in order to increase energy efficiency in the production, transmission, distribution and resource efficiency of energy [16].

It is worth to note that the topics of energy and resource efficiency in most cases have separate policy frameworks (see table 1) and are therefore often managed by different institutions. For matters related to energy use and energy efficiency, it is quite typical that the ministry of economy or energy is responsible for the development of policies for energy supply, ensuring access to fuels and, where applicable, mining of fossil fuels while the ministry of the environment would be responsible for implementing the policies related to energy use [16].

While energy and resources have traditionally separate policy frameworks (which may be a distinct barrier for a better overall performance), countries seem to regard material and waste as being closer to one another. In terms of organisation and jurisdiction, however, waste management and waste prevention are not automatically linked to resource efficiency, as they require the involvement of different actors, capacities and governance levels, not to speak of instruments. Waste management and recycling constitute a policy field where responsibility for planning and implementation is usually delegated to regional, country, province or municipal governments. Countries with a substantial role for regional or local government in the field of waste management are Austria, Belgium, Bulgaria, Croatia, Germany, Ireland, Italy, Latvia, Netherlands, Norway, Portugal and Serbia [16,48]. It is a peculiarity that a 'super-ministry' for Natural Resources, Energy and Waste Management is rather unusual among European countries.

The institutional set-up for resource efficiency has tremendously evolved and diverged in recent years. The issue has benefited from the European and international resource efficiency initiatives but also from growing economic interest in the topic. However, the responsibilities and scope of existing institutional structures often remain unclear and vague and they continue to overlap in different ministries (see table below) which have to consider a broad portfolio of topics and interests in addition to resource efficiency themes. It also has to be stated that policy integration in terms of bringing the resource and energy efficiency issue together is not well-developed [15,16].

Table 1: Examples of countries with broad and narrow dispersion of responsibilities for resource efficiency policies

Countries	Ministries/ agencies involved *(lead bold)*	How many?	Lead	Separate frameworks for energy and resources
Germany	Federal Government, Federal Ministry of Economy and Energy, Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety, Federal Ministry of Education and Research, Federal Ministry of Food and Agriculture, Federal Ministry of Economic Development and Cooperation	5	Yes	Yes
Finland	Ministry of Environment, Ministry of Employment and the Economy, Ministry of Transport and Communications, Ministry of Agriculture and Forestry, Ministry of Finance	5	No	Yes
Netherlands	Ministry of Infrastructure and Environment; Ministry of Economic Affairs; Ministry for Foreign Affairs; and Ministry for Interior and Kingdom Relations	4	Yes	Yes
United Kingdom (Scotland)	Scottish Government; Scottish Environment Protection Agency; Zero Waste Scotland; Scotland's Enterprise Agencies	4	No	No
Norway	Ministry of Climate and Environment; Ministry of Trade, Industry and Fisheries; Ministry of Petroleum and Energy	3	Yes	Yes
Bulgaria	Ministry of Environment and Water, Ministry of Economy, Ministry of Energy	3	No	No
Czech Republic	Ministry of Industry and Trade; Ministry of Environment (waste)	2	Yes	Yes
Estonia	Ministry of the Environment; Ministry of Economic Affairs and Communications	2	No	Yes
Sweden	Swedish Environmental Protection Agency	1	Yes	No
Spain	Ministry of Agriculture, Food and Environment	>1	No	No

Source: Own compilation.

Against this background, it is noteworthy how centralisation and decentralisation processes occur under the very same EC strategic framework [58] and should be investigated with regard to the respective effectiveness. The diversity of institutional set-ups consequently implies a number of challenges to the implementation of resource efficiency policies and policy mixes, not to speak of the cross-country coordination of a resource-efficient value chain management or a cross-border management and trade of secondary raw materials. This will require further dedicated net-

works and mechanisms because the structures are so different from country to country.

3.4 Mechanisms for stakeholder inclusion for strategies and legislation

A few countries have set up dedicated committees or bodies, such as Our Sustainable Future, a cross-government committee in Ireland, which is chaired by the environment ministry including high-level representatives from all relevant government ministries. Another focused set-up is the Resource Programme Steering Group in England, led by the Department for Environment, Food and Rural Affairs which cooperates with WRAP (The Waste and Resources Action Programme), both internal governmental mechanisms. The Netherlands have developed a government-wide programme on circular economy in 2016 with close cooperation between at least four ministries, i.e., Infrastructure and the Environment (as the lead institution), Economic Affairs, Foreign Affairs, and Interior and Kingdom Relations.

Besides allocating competencies among ministries, environmental agencies and further subsidiary institutions and committees, most countries bring in actors and stakeholders for the development of resource efficiency initiatives and processes and/or procedures by using, for example, standard procedures for stakeholder consultation as common in the environmental policymaking. Other countries use new and innovative multi-stakeholder initiatives, for example, the Centre for Resource Efficiency in Sweden, the Flanders' Materials Programme in Belgium, the Green Economy Dialogue in Switzerland, the National Council for Ecological Transition in France, the Resource Programme Steering Group in the United Kingdom, the Green Growth Coalition in Portugal, and the Green Deal programme in the Netherlands [16].

Public consultation is also a tool that is becoming more prominent. Such process is usually organised and led by a specific ministry—in most cases the environment ministry—or an environmental agency which is responsible for consultations, workshops, seminars, hearings or dialogues. The stakeholders involved generally come from a wide spectrum of organisations including experts from government, business, academia, Non-Governmental Organisations (NGOs), trade unions, industrial associations, local and regional authorities, chambers of commerce, communities and sectors, depending on the task addressed and the stakeholder mechanism used. Examples where stakeholder involvement was carried out in a target-oriented manner include Austria (Resource Efficiency Action Plan), Czech Republic (Secondary Raw Materials Policy), Germany (ProgRess Resource Efficiency Programme), Liechtenstein (Action Plan on the Use of Recycled Concrete), Netherlands (Green Deal), Portugal (Green Growth Commitment), and the United Kingdom (Zero Waste Scotland). For the preparation of the first edition of the German Resource Efficiency Programme (ProgRess) [59], for example, discussions were organised with relevant experts and representatives of civil society, industrial associations and the Federal States. For the follow up programme, public participation was taken into account

through internet consultation for contributions from associations, civil society and the scientific sector [60].

In contrast, some countries set up specific working groups with a variety of stakeholders whose work does not specifically target resource efficiency as such, but addresses it as part of a broader theme, such as discussing (new) legislation or introducing a circular economy (e.g., Belgium, Bulgaria, Czech Republic, France, Ireland, Latvia, Liechtenstein, Poland, Serbia, Slovakia and Sweden). In Ireland, for example, a National Waste Prevention Committee includes a broad stakeholder group that meets periodically to provide strategic direction for the Environmental Protection Agency in implementing the National Waste Prevention Programme. In the Czech Republic, a working group was set up to develop the Secondary Raw Materials Policy. Another option is partnerships between stakeholders in value chains, like practiced in Denmark or the Netherlands. There are partnerships in the area of food waste, recycling, and the prevention of construction and packaging waste and specific value chain agreements for plastics and phosphate which are examples for voluntary agreements, or coalitions of stakeholders to work out a common solution that could play a major role in cross-country knowledge transfer. Rather than organised in task-specific ad hoc formats, most processes follow formalised procedures as applied for the development of legislative policy [16].

To sum, stakeholder involvement mechanisms in the area of resource efficiency are common and typically include experts from government, business, science, NGOs and consultants in environmental protection and resource conservation, but are organised quite differently from country to country, and a variety of new and original multi-stakeholder approaches have emerged in recent years. In connection with dedicated resource efficiency agencies and ministries those multi-stakeholder approaches can be assumed to be contributing to policy coherence [16].

3.5 Multi-level competencies for resource efficiency measures

The sections above highlighted a great variety of different organisational arrangements and forms at the national scale. In addition to this and as a cross-cutting issue, resource efficiency inevitably involves several policy domains and governance levels. Looking at the coherence of the processes in a system of multi-level-governance it shows that resource policy is relevant on five different levels: the global/international level, the European (i.e. supranational), the Member State (e.g. France or Estonia), the regional, state, country/county level (in Germany the states such as North-Rhine Westphalia, in Spain the autonomous communities such as Catalonia) and the municipal level (e.g. Berlin or Barcelona) [61]. Competencies however are differently allocated whereas the nation states are holding most or are part of most of those competencies in the action fields exemplified in the figure below.

	horizontal coherence													vertical coherence
	Eco-labels	Education	Extraction licenses	Financial support programmes	Green Public Procurement	Land use planning	Phase out EHS	Product bans	R&D/eco-innovation	Standards/ norms	Taxation/ ETR	Trading schemes	Waste managment/ prevention	
Global/ international														
Europe/ EU														
Nation states/ MS														
Regional/ federal														
Local/ municipalities														

leading role
supplementary role
minor role
no role

Figure 5: Multi-level competencies for (selected) resource efficiency measures indicated in [15,16]; Source: Own illustration based on [62]

Figure 5 also indicates different instruments that have been reported as being important for potentially effective policy mixes [15,16] have to be regulated at different spatial levels and different jurisdictions of frequently two to four levels while the design of policy mixes as such is (theoretically) assigned to the member states' national scale. This fundamental problem constraints and impedes the creation of a flawless mix of resource efficiency policies. While the figure seems to underline the strong role of national policies, in most cases at least one, sometimes two further levels also have competencies.

It thus also becomes clear why countries tend to improve the institutional coherence of a policy mix by ignoring important policy areas that could actually strongly influence the overall outcomes in terms of resource use, such as particularly resource-intensive industries or sectors) and why they accept the risk of reducing the consistency of the mix by limiting the scope of issues addressed (in order to avoid conflicts of interests with other governance levels).

The complex institutional coordination seems to be a big hurdle for a clear alignment of the national resource use systems towards resource efficiency and stronger sustainability at European level. A balanced coordination of stakeholders and industrial interests often has priority at national level but considerably slows down the process within the multi-level and cross-country appearance of the resource efficiency issue.

4 Conclusions and outlook

4.1 Consequences for the analysis of policy mixes

The analysis has highlighted the conceptual as well as practical challenges for the design and implementation of resource efficiency policy mixes. In contrast to the idea of a top down designed, consistent and coherent set of instruments, the actual policy

development often follows ad hoc coalitions, is dominated by the use of windows of opportunities and significant incoherence between specific aspects of resource efficiency, e.g. between resources, waste and energy related policy approaches. Nevertheless, the literature often treats policy makers as pure translators of theoretical rationales into action and neglects the capability of actors in relation to a fundamental policy change. Research often and inevitably remains focused on a superficial analysis of instruments (despite the supposed emphasis on the mix and interactions) and treats policy interactions as something to be designed away by better co-ordination.

The significant differences between the member states and their approaches in the field of resource efficiency underline that a stronger emphasis on the institutional set-up and the issue of competences could be useful in order to explain why many so-called policy mixes rather stay on the level of instrument mixes. A lack of strategic congruence and conflicts with overarching economic goals such as economic growth and the creation of jobs as *the* priority themes may contribute to this. Future research on policy mixes could, as a first step, benefit from an analysis on resource efficiency policies by a stronger focus on the actual competences of „policy mix" coordinators: Most of the analysed policy programmes address policy issues often far out of their responsibilities.

Whether the concurrency of short-term policies and frequently changing actors and stakeholders and mostly long-term institutional frameworks act as an obstacle to a more consistent implementation and wider diffusion of advanced and pioneering transition policies requires further research.

4.2 From "resource efficiency" to "circular economy"

As has been exemplified, the EU roadmap [4] vision of resource efficiency has entered several national programmes and laws since 2011 and encouraged many activities in European Member States aiming to contribute to a better resource efficiency. Particularly the programmatic and institutional level has remarkably advanced, while concrete policy mixes are limited in numbers. This policy process has recently been challenged by the introduction of the Circular Economy Action Plan in 2015 [63] which is not coupled to the Roadmap's milestone approach and the policy recommendations developed in the three areas mobility, food and buildings, but focuses on the "turning waste into a resource" approach and circularity issues in that context (e.g. food waste, construction and demolition waste).

With view to the governance levels involved, the institutional process initiated by the launch of the Resource Efficiency Roadmap has now to be translated into the Circular Economy Action Plan format, both addressing partly overlapping but not congruent actors and institutions. That means that differing governance levels and stakeholder groups are involved in this process, partly diverging target groups are addressed, and in most cases, quite different institutional arrangements and new policy mixes are required.

While the roadmap unfolded a comprehensive vision addressing key resource-intensive areas, the Circular Economy Action Plan is limited in its scope and vague in terms of instrumentation: apart from targets on waste, there are no binding or aspirational goals explicated. However, significant advances in resource efficiency towards a circular economy have to be based on a successful interplay and interaction of several factors such as congruent strategies and targets, coherent policy processes and institutional arrangements, consistent and comprehensive policy mixes which are first and foremost credible, reliable and inspiring for long term engagement of actors, enterprises and stakeholders.

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