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IMEAS *position paper*

The multidimensional approach to low-carbon energy transition

February 2018

Alice Gorrino, Roberta Roberto e Daniele Russolillo

IMEAS POSITION PAPER

THE MULTIDIMENSIONAL APPROACH TO LOW-CARBON ENERGY TRANSITION

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Authors
Alice Gorrino[1]
Roberta Roberto[2]
Daniele Russolillo[3]

1 Fondazione per l'Ambiente - Torino
2 Agenzia Nazionale per le Nuove Tecnologie, l'Energia e lo Sviluppo Economico Sostenibile (ENEA)
3 Formerly Fondazione per l'Ambiente - Torino, currently Institute for European Energy and Climate Policy

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ABSTRACT

The current short paper aims at explaining the approach of the Alpine Space IMEAS - Integrated and Multi-level Energy models for the Alpine Space - project (co-financed by the European Regional Development Fund through the INTERREG Alpine Space programme) to tackle what in literature is known as the "policy silo" problem, which is even more complicated when applied to low-carbon energy planning, strategies implementation and monitoring. Supra-national governments (as the EC), national and local governments, agencies, international, national and local private groups of interest can make a great difference to support building local economically viable and sustainable communities. Nevertheless, these actors can not make a difference if policies or strategies are fragmented at the different institutional levels of implementation or if the objectives are not harmonized or missing at some levels and the actors already cited do not communicate with each other. In times of large opportunities made possible by advanced and cheaper technology solutions, the innovation stream is usually blocked by non-technological problems such as missing incentive alignments and poor information flow amongst actors.

IMEAS intends to analyse the silos that pertain to low-carbon energy transition, studying each silo and highlighting where the critical issues, barriers or opportunities exist, to ensure integration. A definition of silo is proposed, as well as a classification of multi-dimensional integration that goes beyond the classic multi-level governance known in literature by policy makers and practitioners. The preliminary analysis of multi-dimensional and multi-actor initiatives (case studies) in three Countries in the Alpine Region is reported.

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1.INTRODUCTION/CONTEXT

1.1 The policy-silo problem in low-carbon transition society

The transition to a low-carbon society implies a thorough rearrangement of economic and policy approach for the adoption of different energy strategies. In EU context, several measures have been explored to achieve the climate and energy targets set on the share of renewables in energy consumption, the energy savings and the cut in greenhouse gas emissions[1].
Of course, to achieve the de-carbonization targets, strategies and roadmaps at all territorial levels have to deal with a wider and integrated vision that comprehends environmental strategies like *increasing forestation and reforestation in developing countries* [1], preservation of biodiversity, increasing of the air quality, etc.
As currently known in literature, the issues in implementing such strategies are related to the fragmentation of policy and the difficulties in engaging the stakeholders into a complex and integrated process rather than the lack of technologies [2, 3, 4, 5, 6, 7].
In this context, the multi-level governance (MLG) approach is traditionally the first attempt to govern complexity and generate a systemic approach, and it has been identified from the EU as able to face the low-carbon energy transition.
While the first and traditional MLG[2] approach emphasizes a hierarchical and vertical structure among actors, other definitions of MLG underline the complexity of the relationships among actors involved in the decision making process.
Hooghe and Marks [8], for example, define MLG as "*multiple [and interconnected] tiers at which governance takes place, typically differentiating between administrative units (e.g. cities, states, countries) where governments are the central governing authority*" or "*networks between public and private actors across levels of social organizations*".
To stress the importance of the relationships among actors, Khan [9] refers to Network governance, as the "*governance based on mutual interactions between a variety of independent actors, each with their own motives, who come together to solve a common problem".* Network governance is playing an increasingly important role in climate politics, and in low carbon transitions, in fact it usually "*refers to a shift from traditional hierarchical governance forms where the state is the regulator, to looser forms of governance where private actors such as business and NGOs increasingly participate in policy making*" [9].
Both MLG, with its broader definition, and Network Governance stress the importance of the connections among actors involved in the process and the difficulties for the policy makers in

[1] https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2030-energy-strategy
[2] The EU Committee of the Regions defines MLG as a *coordinated action by the European Union, the Member States and regional and local authorities according to the principles of subsidiarity, proportionality and partnership, taking the form of operational and institutional cooperation in the drawing up and implementation of the European Union's policies.*

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creating a collaborative process among actors with different aims and societal missions. To describe the fragmentation of actors involved in a low carbon transition process, the term "silo" is often used to classify such actors into categories.
Sometimes, *the term "arena"* is used *as a synonym of "silo"* to investigate the importance of the integration among different "*energy cultures"* (energy efficiency, renewable energy, demand response and climate change) when an energy efficiency programme is developed [10].
In other cases "silo" is used to identify group of actors working in specific areas of interest *(e.g. in employment offices, economic development agencies, local training institutions) following different objectives and working to different time scales* [11]. The above mentioned study states that albeit government intervenes in a multitude of ways at the local level, these interventions are rarely coordinated effectively, often because of lack of collaboration and communication between actors belonging to the same or to different "silos", made of either public or private or mixed stakeholders. Hence problems arise when lack of connections characterizes the silos both internally (i.e. among stakeholders belonging to the same silo) and externally (among actors belonging to different silos). "*Such divisions are often taken for granted, blamed on historical working relationships ("it has always been like that") and organizational cultures ("they don't work like we do"). However these divisions come at a cost. The issues and challenges facing communities at the local level are often complex, and require a holistic approach to be resolved*".

1.2 The EU Strategy for the Alpine Region context

The above described policy-silo problem in the transition to a low-carbon society is also faced in the strategy of the Alpine Space Macro-region[3].
A 'Macro-regional strategy' is an integrated framework endorsed by the European Council to address common challenges faced by a defined geographical area relating to Member States and third countries located in the same geographical area which thereby benefit from strengthened cooperation contributing to achievement of economic, social and territorial cohesion[4].
In Europe there are four macro-regional strategies: the EU Strategy for the Baltic Sea Region (EUSBSR, 2009), the EU Strategy for the Danube Region (EUSDR, 2010), the EU Strategy for the Adriatic and Ionian Region (EUSAIR, 2014) and the EU Strategy for the Alpine Region (EUSALP, 2015).
The EU Strategy for the Alpine Region, addressing territories in 7 Countries[5] (Austria, France, Germany, Italy, Liechtenstein, Slovenia and Switzerland), has as its main mission the promotion and the *enhancing of the attractiveness and competitiveness of the Alpine Region* by promoting and ensuring the interactions between the regions that are part of the area.

[3] The definition of "macro-region" developed during the preparation of the European Union Strategy for the Baltic Sea Region and then commonly adopted is "an area including territory from a number of different countries or regions associated with one or more common features or challenges"
[4] http://ec.europa.eu/regional_policy/en/policy/cooperation/macro-regional-strategies/
[5] http://ec.europa.eu/regional_policy/sources/cooperate/alpine/eusalp_alpine_space_alpine_convention.pdf

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The approach adopted for the implementation of this strategy, as underlined in the mission statement, is *a cross-sectorial and multi-level governance* where *the priority areas and specific objectives should reflect genuine commitment to working together to achieve common solutions to challenges or unused potential*[6]. EUSALP addresses three Thematic Policy Areas[7] and a cross-cutting Thematic Policy Area on Governance and Institutional Capacity with the objective of creating a sound macro-regional governance model for the Alpine Region to improve cooperation and coordination of action in the Region.

This kind of approach, characterized by the interaction between different actors coming from different sectors, is also evident when specific objectives of the Action Groups (the drivers for the implementation of the strategy, from now on cited as AGs) are concerned.

The development of *an effective research and innovation ecosystem* is the goal of AG1 that proceeds, first, with the *identification of the key strategic sectors* to better exploit synergies in the strategic sectors of the Alpine Space. Also AG2, meant *to increase the economic potential of strategic sectors,* acts with a *cross-sectorial and multi-level governance* approach. In fact, it aims, above all, at *developing new value chains with enterprises from different sectors* and *bridging the gap between different policies*. In this context, the promotion of energy efficiency and renewable energy - the goal of AG9 - is not a stand-alone topic but it is implicitly connected also to the other AGs' topics.

It seems clear that a broad systemic approach is needed to realize EUSALP. IMEAS is focused on building such a systemic approach within its objective related to low-carbon energy planning, whose validity indeed aims to go beyond the Alpine region. IMEAS indeed addresses the 9th action of EUSALP aiming to make the Alpine Space area a model region for energy efficiency and renewable energy. It also has a cross-cutting nature, aiming at adopting the approaches developed within the Thematic Policy Area on Governance and Institutional Capacity.

2. THE IMEAS APPROACH TO ESCAPE THE DISCONNECTED SILOS

The main aim of the IMEAS project is to develop a consistent methodology and a practical guidance for the creation and implementation of integrated energy roadmaps based on multi-level approaches to climate change mitigation, energy innovation potentials, economic structures and control of energy plans.

In this regard, IMEAS will provide specific tools and guidelines. Among them the IMEAS

[6] https://www.alpine-region.eu/mission-statement

[7] 1st Thematic Policy Area on Economic Growth and Innovation (with the objective of fair access to job opportunities, building on the high competitiveness of the Region); 2nd Thematic Policy Area on Mobility and Connectivity (with the objective of sustainable internal and external accessibility to all); 3rd on Environment and Energy (with the objective of a more inclusive environmental framework for all and renewable and reliable energy solutions for the future)

Stakeholders' Network Model (ISNM) which can be used to describe the networks of public and private actors involved in the low carbon transition process, taking into account the relations among them and the incentives behind their decisions. The ISNM will describe the network of stakeholders and will give guidance to align their incentives and therefore to promote cooperative processes.
The first step of the modelling process consists of identifying the stakeholders involved in a low carbon energy transition process and their mapping.
Starting from the definition provided by Freeman and McVea [12], a stakeholder can be defined as *any entity with a declared or conceivable interest or stake in a policy concern*. Within the ISNM, the stakeholders are the nodes of the network (see Figure 1 a) and they may be either actors (e.g. local government), institutions (e.g. municipal council), functions (e.g. technical officer) or a single player (e.g. Mayor of the Municipality) (see the definitions in the Glossary section).
To categorize the stakeholders and to analyse their incentives, each of them is located in a specific silo, where "silo" is a container including stakeholders with a similar societal mission, working in the same policy arena[8]. In Figure 1 a, the colour of the nodes corresponds to a specific silo.
To represent the silos, vertically shaped boxes divided into different governance levels are shown in Figure 1 b): the top of the silo represents the EC level and the bottom represents the local government, while the intermediate levels are structured according to the governance levels of each specific country[9].

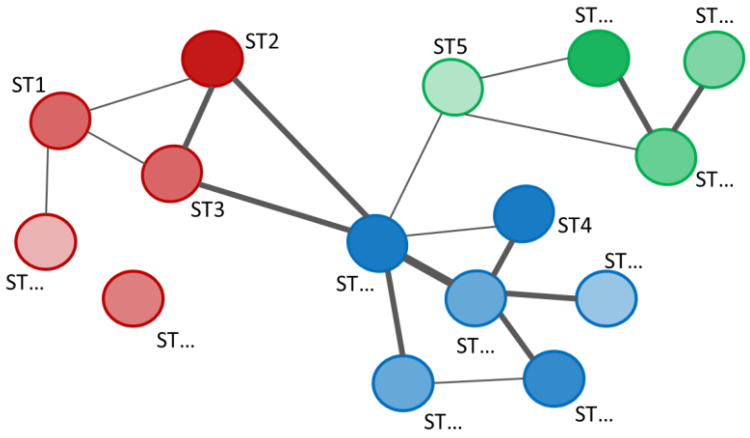

Figure 1 a. Example of stakeholders' representation within the IMEAS Stakeholders' Network Model. The stakeholders (ST1, ST2 …STn) represent the nodes of the network and their colours represent their belonging to a silo

[8] Generally a stakeholder belongs to a unique silo, however few exceptions may occur, and therefore sometimes the same stakeholder may belong to more than one silo (i.e. a regulatory authority for electricity, gas and water, that belongs to both energy and water silo).
[9] See http://ec.europa.eu/eurostat/web/nuts and [links to be added] for more information on the EU statistical representation of territorial units and governance levels

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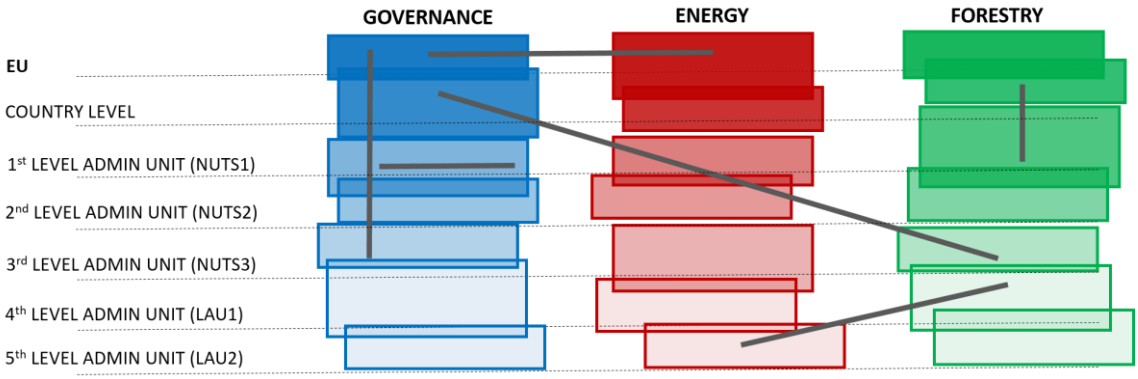

Figure 1 b. Example of silos' representation together with the levels of governance and the connections within the same silo (intra) and between different silos (inter)

Several silos have been identified as representative to model a low carbon transition process, namely governance, energy, building sector, active civil society, forestry, etc. The complete list of the identified silos together with their societal mission and the related actors is shown in Annex I.
To get an insight on the adopted approach it is worthwhile to introduce a few of them here:

- the "governance silo" includes stakeholders involved in: administration and management of communities and territories, administration and management of services, development and implementation of the budget (i.e. government, public agencies, associations, etc. from EC level to the local one);
- the "energy silo" includes stakeholders whose societal mission is the production, transmission and distribution of energy and related services, the management of energy systems/processes, energy saving, support of renewable energy (i.e. energy systems producers, fuel extraction and transformation companies, transmission and distribution companies, authorities, etc.);
- the "building sector silo" includes stakeholders whose societal mission is the production of goods and services for buildings, construction of buildings, building designing, urban planning, building selling/renting/buying, building maintenance/refurbishment, building management, definition of technical standard for the building sector
- the "transport silo" includes stakeholders whose societal mission is the production of goods and services for transport, construction and management of the infrastructure, planning, development, management, regulation of transport, assuring the mobility of people and goods and their security;
- the "environment silo" includes stakeholders whose societal mission is the study, monitoring and protection of biodiversity/ecosystems/air quality, emissions reduction systems and technologies, soil quality and decontamination processes, water quality and decontamination processes, water quality protection.

To model the cooperation between stakeholders, the connections among them are represented and

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classified into the following categories:

- Horizontal link: link at the same institutional level within one and the same silo;
- Vertical link: link at different institutional levels within the same silo;
- Trans-sectoral link: link between actors belonging to different silos whatever are their levels;
- Transnational link: link between actors whose silos are located in different countries whatever are their levels;
- Multi-dimensional link: horizontal, vertical, trans-sectoral and/or transnational links.

The IMEAS silo approach differs from the sectoral approach found in energy statistics and some terminology is used in a slightly different significance (see for example IMEAS' definition of the "building sector silo" in Annex I). The sectoral approach is functional to build sound representations where the physical flows are well explained and coherent with the whole system and to quantify energy flows (i.e. energy production, conversion, demand, losses, etc.). The IMEAS silo approach is indeed related to the identification of the actors, the network governance and the mechanisms that can trigger integration and hopefully better outcomes for policy making and planning and for cross-sectoral low-carbon results. The aim is a paradigm shift needed by the multidimensional approach cited before and such that the traditional energy balance indicators (primary sources, final uses, etc.) or the ones typically related to traditional sustainability goal setting (energy savings in buildings/transport/etc., RES-E, RES-T, etc.) are not suitable.
The energy balances are, in fact, the basis for statistics and for goal-based scenarios that describe the territorial energy systems, from a local to a global scale, through the representation of the commodities and energy flows (accounted for as primary and secondary sources in the total energy supply, production, imports, exports, losses) and of the final energy consumption in the various economic sectors (industry, transport, residential, other, non-energy use sector).
The sectors of the traditional sustainability goal settings, linked to specific measures, on the other hand, are related to the planned goals to be achieved in a certain timeframe, e.g. a certain share of energy from renewable sources in heat and electricity production[10].

Moreover, the approaches traditionally used when discussing energy policies and strategies usually involve energy stakeholders and technicians only, with sectorial expertise, while IMEAS silo approach aims at investigating a larger number of potential actors and governance levels that are involved in the sustainable energy roadmaps in a trans-sectoral perspective.

[10] As an example, consider the case of a biomass-fired DH system. From a "silo approach" point of view the initiative is represented through the investigation of the connections between stakeholders from the governance, energy, environment and active civil society silos on a comprehensive MLG perspective. Considering a "sectoral approach" the initiative can be represented through its contribution to CO_2 emission savings and increased share of RES.

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3. THE IMEAS APPROACH: PRELIMINARY STRUCTURING OF MULTI-DIMENSIONAL/MULTI-ACTOR INITIATIVES

The IMEAS silo approach intends to bring about better planning capacity and policy making, underpinned by a strong network governance. An evidence-based path requires to understand what is already happening on the territories, trying to extract lessons learned, highlighting barriers and successful implementations from the point of view of multi-dimensional (cross-links among silos) integration.
Replicability and up-scaling of successful cases must be the final goal of the case study analysis.
The analysis of real cases is therefore essential to study the mechanisms among actors involved in energy planning and implementation processes, taking place mainly at local level.
The analysis of real initiatives is an on-going process, consisting in gathering information from the stakeholders and structuring them in a preliminary format (as reported in Annex II). The final aim of this work is to analyse real initiatives by identifying the key stakeholders, the type of the relationships among them, investigating their interests and needs, clarifying what really influenced the success or the failure of the initiative, in order to provide general and replicable understanding of the processes.
To study the initiatives, a first set of information is requested:

- Name of the initiative
- Original objectives of the initiative (e.g. carbon savings, air quality, energy savings etc.)
- Duration
- Location
- Silos involved, according to the list in Annex I
- Governance levels (e.g. EU, Country level, first level administrative units, second level administrative units, third level administrative units, upper local administrative units, lower local administrative units[9])
- Types of link (see definitions given before, i.e. horizontal, vertical, trans-sectorial, transnational)
- Main mechanisms that triggered the integration, e.g. Primary legislation (national level), Energy sector regulatory decisions by the national regulatory agency, Secondary legislation (regional or sub-regional acts), Municipal regulation, Voluntary agreements, Data platforms, Communication campaign, Technical support for Municipalities, etc.
- Description of the initiative containing the information of how it took place, which were the stakeholders involved, if any obstacles were encountered during the development of the initiative, what are the output of the process (e.g. new collaborative framework, platform for data sharing, software, guidelines, etc.

In ANNEX II a selection of three preliminary case studies is presented, coming from three different countries belonging to the Alpine Space territories.
The first results will be used to start implementing the IMEAS Stakeholders' Network Model, as represented in Figure 1 a. Further information will be asked to deepen the analysis of real cases, and other case studies will be analysed.

4. NEXT STEPS

What has been presented in this position paper is the first step that will lead to the publication of the White Book "*The IMEAS Stakeholders' Network Model and its transnational relevance*" in 2019. The report will match the evidence-based investigation with other further insights in stakeholders' network governance. The FIELD methodology of Becchis et al. [13] will be adapted to the low-carbon energy planning and implementation strategies to design the IMEAS Stakeholders' Network Model. The ISNM will present a very deep investigation of the actors involved in the process (starting from the list in ANNEX I) by giving a further classification in sub-groups (Institution, Function, Player), to better analyse the incentives and the interests of each category and clarify how these can affect the success of the initiative.
The ISNM will also analyse the typology of relationships among stakeholders and the information flows among them to identify what really leads to collaborative processes or, on the other hand, which mechanisms stand in the way of a multi-stakeholders low carbon transition initiative.
The White Book and other material (e.g. a repository with the case studies analysed) will be available through the IMEAS Community web Platform, online from October 2018 (www.imeas.eu).
Stakeholders interested in collaborating with IMEAS consortium are welcome to provide case studies. The following guiding questions can be used to identify relevant initiatives:

- Is the case study a result of integrated actions?
- Is it possible to clearly understand that some of the "silos" involved in the case study have been collaborating with each other, through connections amongst the actors of such silos?
- On what basis (legal, voluntary, etc.) was the collaboration/integration triggered?
- Is multi-level governance a term usually associated to the storytelling of the successful case study?
- Does the case study have characteristics that could potentially lead to replicability and scaling-up?

CONTACTS

Further Information about the project, whose leading partner is ENEA (the Italian National Agency for New Technologies, Energy and Sustainable Economic Development) can be found on the project website at http://www.alpine-space.eu/projects/imeas.

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In case of interest, please contact the IMEAS Project Manager (roberta.roberto@enea.it) and the Partner leader of the Stakeholder Network Model activities (alice.gorrino@fondazioneambiente.org).

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GLOSSARY

- **Governance**: the process of coordination among multiple actors, groups and institutions to reach collective goals in fragmented, competitive, multi-level policy environments
- **Stakeholder:** any entity with a declared or conceivable interest or stake in a policy concern. The range of stakeholders relevant for analysis varies according to the complexity of the reform area targeted and the type of proposed reform. Stakeholders can be of any form, size and capacity. They can be individuals, organizations, or unorganized groups. Within the IMEAS Stakeholders Network Model, the stakeholders are categorized into four groups: Actor, Institution, Function and Player.
  The stakeholder is represented in the Stakeholders' Network model as Actor, Institution, Function or Player depending on what is interesting for the initiative
- **Actor:** a group of people (both organized and unorganized) or a legal entity, public or private, established by political processes which have legislative, judicial or executive authority over other institutional units within a given area. Within the IMEAS Stakeholders' Network Model, the actor is the first level of the stakeholders' grouping
- **Institution**: it can be any type of organized corporation or society that pursues a particular purpose in a systematic manner, following certain rules and procedures. It may be private and designed for the profit of the individuals composing it, or public and non-profit. Within the IMEAS Stakeholders' Network Model, the Institution is the second level of the stakeholders' grouping
- **Function:** the role that an individual or a group of people play inside an Institution. Within the IMEAS Stakeholders' Network Model, a function is the third level of the stakeholders' grouping
- **Player:** an individual that plays a role in the IMEAS Stakeholders' Network Model. Within the ISNM, a player is the fourth level of the stakeholders' grouping
- **Silos**: set of **actors** with a similar societal mission, working in the same policy arena
- **Horizontal link**: link at the same institutional[11] level within one and the same silo
- **Vertical link**: link at different institutional levels within the same silo
- **Trans-sectoral link**: link between actors belonging to different silos, whatever are their levels
- **Transnational link**: link between actors from silos located in different countries, whatever are their levels
- **Multi-dimensional link**: horizontal, vertical, trans-sectoral and transnational links
- **Multi-dimensional approach**: approach that promotes the creation of multi-dimensional links
- **Sector:** the term "sector" has a different significance for different stakeholders. Here it is

[11] *Institutional* here is conceptualized in a broad sense relating to an organization (either public or private, or a public-private partnership - PPP) and generally referring to the geographical scope of the organization/public body.

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understood in a broad sense that includes the traditional economic and energy sectors (i.e. building, manufacturing, transport, etc.)

- **Sectoral approach:** approach that addresses one single sector
- **Cross-sectoral/Trans-sectoral**: initiative/approach involving more than one sector or silo

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ANNEX I –SILOS TABLE

silos	*societal mission*	*actors of the silo*
Active civil society	manifest interests and will of citizens, e.g. on environmental protection, consumer protection, etc.	Associations; Citizens; Committees
Agriculture and aquaculture	Production of goods and services for agricultural cultivation of land such as raise of crops, feed/breed/raise of livestock for food, material, feed, biofuels, drugs and other products used to sustain and enhance human life	Machinery manufacturers; Farmers; Agronomists; Agricultural businesses; Agricultural chamber; Authorities; Consortia; Associations; Consumers
Building sector	Production of goods and services for buildings, construction of buildings, building designing, urban planning, building selling/renting/buying, building maintenance, building refurbishment, building management, technical standardization	Construction companies; Furniture industries; Building materials producers/installers; Technical systems producers/installers; Craftsmen; Architects and engineers; Real estate agency; Building managers; Social housing organisations; Authorities; Landowners; Households; Tenants
Consultancy	Provide expert advice in a specific field	Agencies; Companies
Education	Provide education to children and grownups	Universities; Schools; School board members; Other educational facilitators; Students
Energy	Production, transmission and distribution of energy and related services, management of an energy system/process, energy saving, support of renewable energy	Energy systems producers; Fuel extraction and transformation companies; Transmission and distribution companies; Authorities; Consortia; Agencies; Service providers; ESCOs; Energy managers
Environment (biodiversity, climate, air/soil/water quality)	Study, monitoring and protection of biodiversity/ecosystems/air quality, emissions reduction systems and technologies, soil quality and decontamination processes, water quality and decontamination processes, water quality protection	Agencies; Consortia; Companies
Finance	Management, creation and study of money, banking, credit, investments, assets and liabilities that make up financial systems, and the study of those financial instruments. Ensure that economy works, intermediaries between depositors and borrowers	Banks; Brokers; Agencies; Investors
Forestry	Creation, management, conservation and protection, utilization of forests and associated resources to produce materials, bio-fuels, environmental and human benefits. Sustainable biomass production	Forest owners; Farmers associations; Certification and verification bodies; Logging and timber companies; Forestry doctors; Tourism services; Authorities; Consortia

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silos	*societal mission*	*actors of the silo*
Government	Administration and management of communities and territories, administration and management of services involving different sectors (waste, water, energy etc.), development and implementation of the budget	Government; Public agencies; Associations of regions/municipalities/territories; Committees/commissions; Political parties
Health	Provide medical and healthcare goods or services to treat patients with curative, preventive, rehabilitative, and palliative care, medicinal and other products used to sustain and enhance human life	Manufacturers of medical products and equipment; Hospitals; Clinics; Health care providers (doctors, nurses, home healthcare and nursing, etc.); Pharmaceuticals and biotechnology companies; Health organizations; Medical association; Health insurance providers; Patients
Production of other goods and services	Planning, production and distribution of goods and services not included in the silos listed above	Manufacturers; Designers; Distribution companies; Agencies; Consumers
Research	Discovering new knowledge about products, processes, and services, and then applying that knowledge to create new and improved products, processes, and services that fill market and societal needs	R&D centres; Agencies; Consortia; Companies
Transport	Production of goods and services for transport, construction and management of the infrastructure, planning, development, management, regulation of transport, assuring the mobility of people and goods and their security	Manufacturers of vehicles; Construction companies (for the infrastructure); Infrastructure owners and managing companies; O&M companies and operators; Authorities; Transport management companies (private/public, for the transport of people and goods, country/local level); Consumers.
Waste	Production of goods and services for waste infrastructure, waste planning, collection, disposal, management and transformation of wastes (re-use/recycling)	Waste management companies; Re-use and transformation companies; Authorities; Consortia; Waste producers (residential, commercial and industrial sectors)
Water	Production of goods and services for water infrastructures, construction and management of the infrastructure (water pipes etc.), planning, developing, distributing, managing and regulating water resources, providing drinking and non-drinking water, providing sewage services and wastewater services to different set of users (residential, commercial and industrial sectors), water filtering and purification, conducting chemical analysis	Construction companies; Producers/installers of sewage systems; Country/local authorities; Consortia; Water management companies; Consumers of water; Producers of waste water

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ANNEX II – CASE STUDIES

Case study 1 : EBO (Online Energy Report)
Country: Austria

Name of the initiative	**CO_2 savings through Online EBO (Online Energy Report) in Austria**
Main objective	CO_2 savings
Duration	From 2001
Location	Austria (Voralberg, Tyrol, Styria)
Silos involved	Government + Building sector + Energy
Governance Levels involved	- Second level admin. units (Regions) - Third level admin. units (Group of Districts) - Lower admin. units (Municipalities)
Type of integration	Vertical (MLG), horizontal, transectoral
Main mechanisms that triggered integration	- Voluntary Agreement - Data platform
Description	The so called e5 programme (known in the rest of the EU as the European Energy Award) has been running on a voluntary agreement base since 2001 in Vorarlberg, Austria. The programme experienced an increasing number of participating municipalities willing to contribute to sustainable energy policies and urban development through the rational use of energy and increased use of RES. The e5 programme promotes high horizontal participation among municipalities, in fact a skilled e5 manager supports the municipality officers to develop ideas and connects teams belonging to different municipalities to develop similar plans. Data monitoring and verification at the beginning was analyzed by municipalities and local agencies through simple spreadsheets that soon showed great limits to share results effectively and perform detailed analysis: a specialized software was needed and EBO was chosen. EBO is an electronic tool to record the physical and monetary flows of heat demand, electricity and water consumption on a yearly level, indeed the evaluation helps decision makers to recognize and optimize the energy demand of public buildings. The EBO platform is made of a facility management tool and an evaluation system for climate data. Every community pays an activating fee depending on its size (from 714 to 1.529 €) and also a yearly fee (from 357 to 510€). In the beginning, about 6 to 8 communities were using EBO. Today, 1.000 buildings are constantly evaluated in the EBO platform, belonging to 56 communities in Vorarlberg, 19 communities in Tyrol and 7 communities in Styria. All the municipalities that agreed on the e5 programme are currently on EBO and even non-e5 municipalities wanted the EBO. Outreach is relevant, e.g. 80% of Vorarlberg's inhabitants currently live in a municipality that uses the EBO. The usage of the platform and the analytics that show results in form of rankings, triggered a virtuous competition among communities that usually decide some form of renovations (e.g. public schools) because they felt they were underperforming compared with others. Moreover also utilities felt obliged to realize solutions (e.g. public street LED lighting) to be listed, and shared, in EBO analytics rankings.

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Case study 2 : ENERCLOUD+
Country: Italy

Name of the initiative	**Enercloud+**
Main objective	- Energy management - Capacity building for municipal technicians
Duration	From 2012 to 2016 as Enercloud From 2016 as Enercloud+ (updated version)
Location	Online webtool http://www.sistemapiemonte.it/cms/pa/ambiente/servizi/874-enercloud
Silos involved	Government + Building sector + Energy
Governance Levels involved	- Second level admin. units (Regions) - Third level admin. units (Provinces) - Lower admin. units (Municipalities)
Type of integration	Horizontal, Vertical (MLG)
Mechanisms that triggered integration	- Voluntary agreement - Free Data platform - Communications campaigns - Technical support for Municipalities
Description	ENERCLOUD+ is a tool for monitoring the energy consumption of buildings and public lighting systems, based on reading the bills. Originally born as Enercloud, Enercloud+ is meant to be an improved version. The development of the system was promoted by the Province of Torino (Italy) in 2011-2012, to provide a practical instrument to the Municipalities. Since the tool is a cloud instrument, it has been developed by an ICT research centre (ISBM), a spin-off of the Politecnico of Torino. The initiative starts from the awareness that the lack of a structured system of energy accounting in use by Public Administrations is an element of criticality that translates into excessive energy consumption and economic costs. The solution envisaged is the recording of consumption from the bills for each municipal user on ENERCLOUD+, which returns easy-to-understand synthetic reports by identifying target parameters and values and identifying potentially abnormal situations. ENERCLOUD+ impementation and management process involves and connects several stakeholders. First, there is a link between Region and Municipality, since the funds supplied by the Region (ERDF) are conditioned by the activation, at the municipal level, of a monitoring system which should highlight and certificate the effective increase in energy efficiency of the awarded buildings. ENERCLOUD+ service can be used by the Municipalities to perform this requested task. Municipalities are also encouraged to use ENERCLOUD+ in order to improve their energy behavior looking at the solutions adopted by other institutions, since ENERCLOUD+ provides a benchmarking analysis that allows to compare the results of different actors. The process of data collection is also performed by different actors: 1) the energy providers (which provide the energy consumption data with the bills), 2) the Municipalities (which exploit the energy data in bills to identify their inefficiences), 3) the Region (which provides technical assistance and coordinates the initiative), 4) the Regional Public Procurement Company - SCR (which has the role of standardizing the formats of energy bills for a more effective data exchange - between beneficiaries and energy providers). The upload of data is facilitated by the harmonization of the databases formats; thus, the data flow between the energy provider database and the Enercloud+ format for uploading, is simplified. The data uploaded in the web-tool are visible only to the Municipality and to the upper levels; the Municipality accepts thee conditions as it is using the service voluntarily. All the uploaded data refer to the municipal facilities; the citizens are not directly involved. ENERCLOUD+ provides also the so called energy signature, giving the possibility to understand which soft or hard interventions can be implemented to reduce the energy consumption. At the beginning the system was tested by few Municipalities (the most active at regional level in the Covenant of Mayors framework). In January 2017, 86 Municipalities in the Region were using the service. About 1,000 buildings were uploaded and monitored, in some cases with a certain regularity, in others for a specific aim and a limited timeframe..

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Case study 3: Elaboration of an energy- and CO_2 balance
Country: Germany

Name of the initiative	**Elaboration of an energy and CO_2 balance in Germany**
Main objective	Knowledge on energy consumption and inference of suitable measure
Duration	2015
Location	County of Oberallgäu, Germany
Silos involved	Government + Waste + Energy + Transport
Governance Levels involved	- Third level admin. units (County) - Lower admin. units (Municipalities)
Type of integration	Vertical (MLG), horizontal, transectoral
Main mechanisms that triggered integration	- Voluntary Agreement - Data platform
Description	The process consists of data mining, data preparation, data evaluation and data visualization. Data need to be gained from energy providers, chimney sweepers, fuel traders, sewage plants, large and industrial enterprises, statistical a nd funding databases, other large-scale consumers, e.g. hospitals, swimming pools, retirement homes, sewage plants. Elaboration of a report and data interpretation. There is no legal basis, except the selfcommitment of communities to protect the environment, to save energy, to climate protection etc. Balances can follow two basic principles: based on territorial data or on causer data. The territorial principle considers all consumptions within a spatial territory, while the causer principle considers all consumptions of inhabitants of a spatial territory no matter where the consumption happens (e.g. mobility in foreign countries). In Germany, basically two software tools are commercially available: EcoRegion (a Swiss tool) and the Klimaschutzplaner. Some energy agencies or other service companies developed and apply own tools. Data sources, data quality and data homogeneity differ greatly, depending on country and state. Inhabitant and funding statistics need to be gained from databases. All other data need to be gained by complex surveys among the actors listed above. . In Bavaria, interactions between different governance levels concerning energy balances can be mainly observed on the lower levels. In some cases counties elaborate balances which include the community level, as well. Also regional balances could include the county level. The state or district level usually does not integrate one of the lower levels. More interactions can hardly be seen in Bavaria. In North Rhine Westphalia the EnergyAgency. NRW finances energy balances for all of its municipalities. Energy balances contain results on all traditional energy-relevant sectors, thus the results are valuable for all sectors (and silos). Consequently, energy balances have some potential on cooperation among some silos. However, in many cases the different primary energy sectors compete with each other (e.g. oil, gas and wood combustion), thus interactions are often difficult to handle. For decision makers in municipailities, for planners and for energy providers the results often give relevant information and pave the way for designing future energy provision systems.

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