11th SEEED
The key role of the Building Sector in Improving Energy Efficiency in SEE

Key Issues for Consideration

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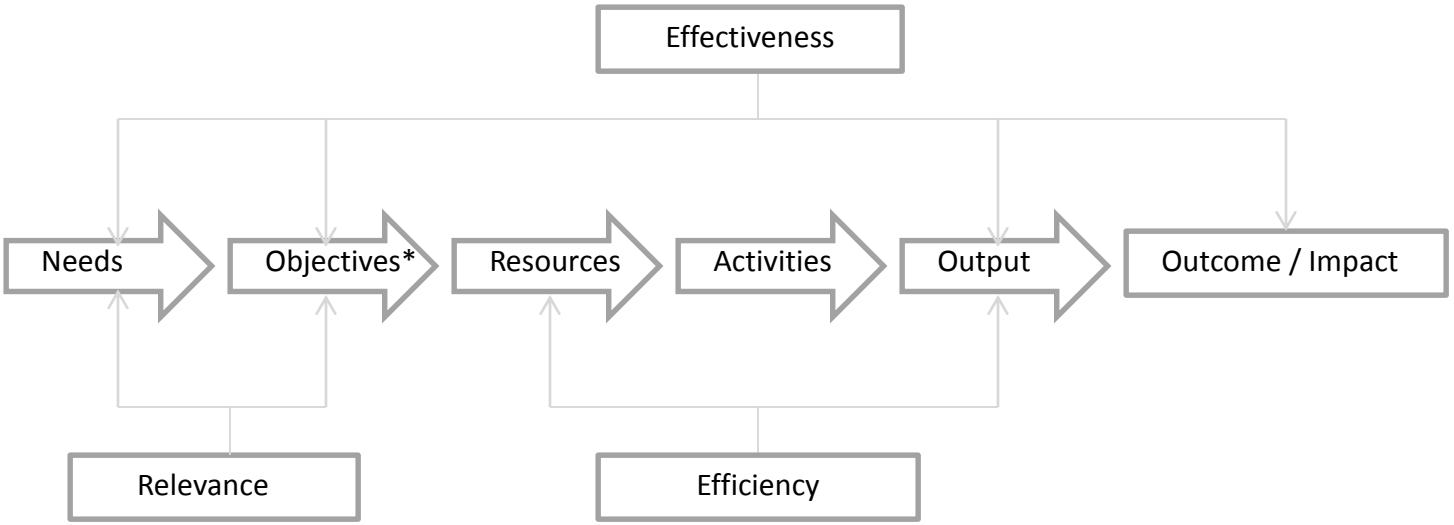
Basic definitions for resources utilization

Effectiveness, the ability to set proper objectives and achieve the smaller difference between them and the results (outputs, outcomes, impacts)

Efficiency, the ability to achieve higher outputs relative to available input (resources / means)

Sustainability, the continuation in the stream of benefits produced in the future



Relevance, the appropriateness of objectives to the real problems, needs and priorities of the intended target groups and beneficiaries that the strategy / policy / programme / project is supposed to address, and to the physical and general environment within which it operates

* Three levels of objectives are identified corresponding to impact (overall objective), to outcome (purpose), to output (products / services)

European Union (28) Targets for Saving of Total Primary Energy Supply for year 2020 and 2030, as percentage (%) of the expected respective supply		
Year	Target	Deviation from 2020 target in 2015
2020	20	3.2 % or 48 Mtoe
2030	32.5	
Intensify Energy Efficiency in the period 2020 – 2030 Make use of accumulated knowledge, experience, new skills, new technologies, new materials, new structures and capacities		Key issues to consider: -**Priority to Efficiency** against Supply -**Further development of policies and instruments** at EU and national level, tailoring them to particular needs -**Sector coupling** through renewable electricity -**Digitalisation**
Special attention to the building sector due to its high potential for energy efficiency and multi – benefits including combat against poverty		

Basic energy characteristics of Building Sector in Western Balkans

Energy consumption in buildings represents almost 50 % of total energy consumption(1)

Potential of savings from 20 % to 40 %
With highest potential of savings per sub-sector
in public sector, from 35 % to 40 %
in residential sector, from 10 % to 35 %

With the following order of magnitude of potential savings per end-use
- Space heating
- Lighting
- Refrigeration
- Appliances

(1) In **EU member states in SEE**, the final energy consumption in the residential and services sectors, as percentage of total final energy consumption (%), varied in 2015 from 32 % (Cyprus) to 48 % (Croatia) against **39 %** of EU average

Energy Affordability in the EU member states in SEE
Years 2005, 2014
Energy expenditure share in final consumption expenditure for the lowest quintile (%)

	EU28	GR	BL	RO	CY	CR	SL
2005	**7.1**	5.4	11.3	13.4	4.6	-	11.3
2014	**8.6**	7.4	14.2	15.0	4.4	-	14.9

Energy Affordability in the EU member states of SEE in 2014 **either above or below** the respective EU28 average

Deterioration of Energy Affordability in all the EU member states of SEE and in EU28 average, **with the exception of Cyprus**, between 2005 and 2014

In **Energy Community** countries, more than half of the population spends more than 10 % of its net income on energy despite low energy prices

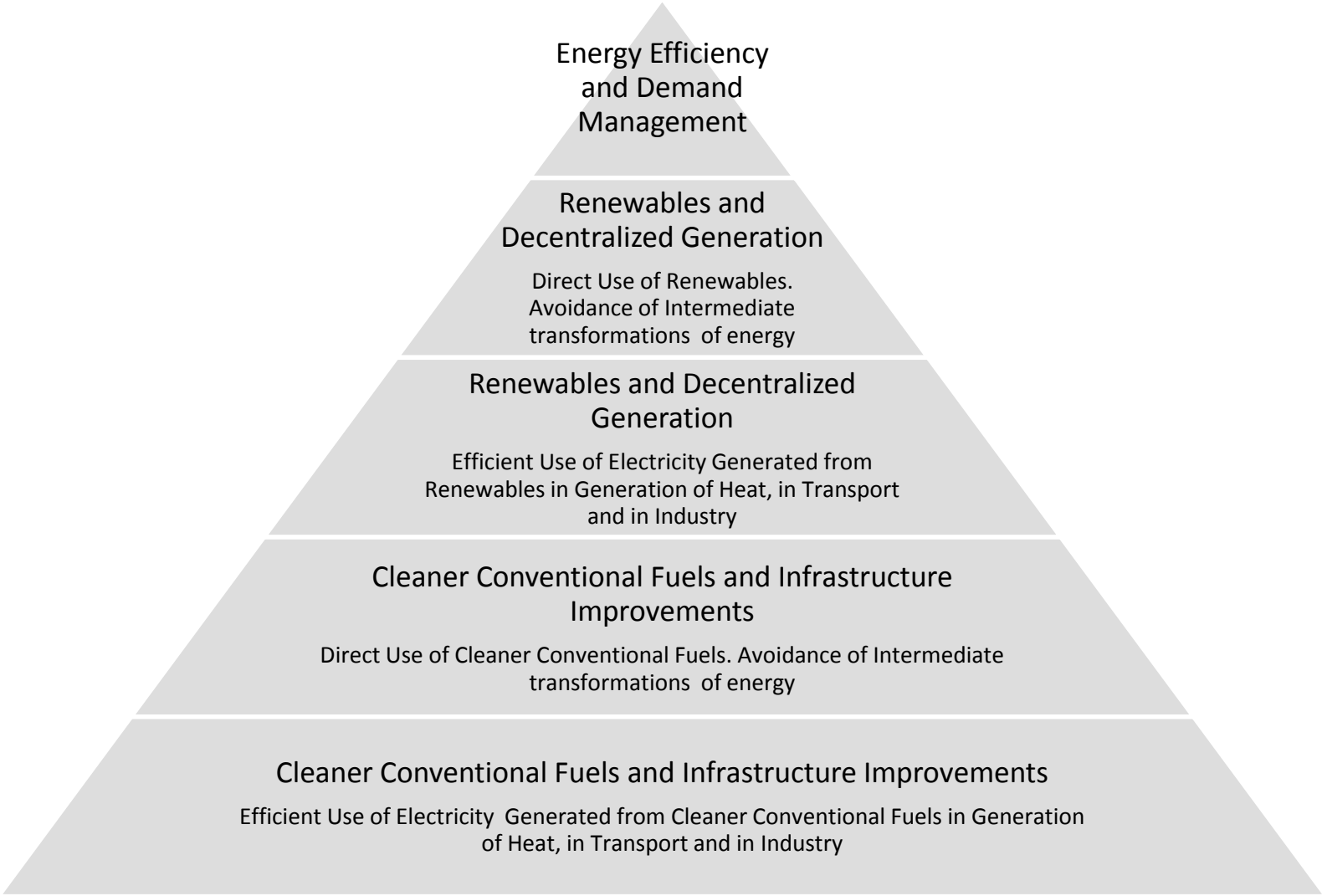
Inability to keep home adequately warm in the EU member states in SEE
Years 2005, 2015
Share of total population at risk-of-poverty (%)

	EU28	GR	BL	RO	CY	CR	SL
2005	**21.1**	30.3	79.0	46.0	51.3	18.9	6.6
2015	**22.7**	50.9	66.8	27.3	49.2	23.7	13.6

Inability to keep home adequately warm in all the EU member states of SEE in 2015 **above** the respective EU28 average, **with the exception of Slovenia**

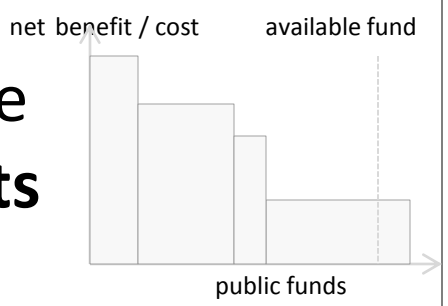
Either deterioration or improvement of Inability to keep home adequately warm in the EU member states of SEE between 2005 and 2015

Priority to Efficiency against Supply
Energy measures / projects / policies / strategies **Hierarchy**



Prioritization of energy measures, projects, policies and strategies with public support

- Initial categorization into obligatory and non obligatory
- **Preliminary** prioritization order: (a) energy efficiency and demand management (b) RES and distributed production (c) cleaner conventional fuels and infrastructure improvements
- Basic selection and prioritization criterion among **alternative** measures, projects, policies, strategies: maximization of long term net benefits for the country
- Due to scarce availability of public funds, their best allocation should be based on the higher value of **ratio of net benefits to costs for the country** up to their full utilization



The importance of cost – benefit analysis

Strong need for the states to develop the appropriate knowledge, skills, structures and capacities to deal with the execution of comprehensive **cost – benefit analysis**[(1)] for the respective countries concerned, regardless if it is about measures, projects, policies and strategies, regardless if it is about the whole energy sector or sub – sectors, such as buildings

It is not only the costs that matter but also the net benefits (benefits minus costs) and more importantly the **relative magnitude of net benefits to the costs.** The **standard** way of **calculation** and **expression** of the respective relation will be valuable for reasons of comparison.

The Energy Union Governance requirements, more specifically the formulation of **ten – year integrated national energy and climate plans**, starting from 2021, give another excellent opportunity to apply the methodology on prioritization.

(1), the meaning of cost or benefit is not strictly financial or economic. The dimensions of analysis addressed are multi - discipline

Development of policies and instruments at EU and national level Basic legal texts of European Union that concern Energy Efficiency	
1.	Energy Efficiency Directive 2012/27/EU
2.	**Energy Performance of Buildings Directive** 2010/31/EU and 2018/844/EU
3.	Energy Labelling Directive 2010/30/EU
4.	Energy Star Regulation Decision 2006/1005/EC (Labelling of energy performance of office equipment)
5.	ECO Design Directive 2009/125/EU (Environmental design of energy products)
6.	Tyre Labelling Regulation EC 1222/2009

All the legal texts with the exception of the 6th one are related to the energy performance of buildings, especially the 2nd one

In the framework of Energy Community, **transposition** of EU legal texts into **the Western Balkan** countries national legislation under various stages. Strong need for acceleration of transposition and application.

Basic characteristics of Energy Efficiency Directive (EED) 2012/27/EU

Overview

The 2012 **EED** establishes a set of **binding measures** to help the EU reach its 20% energy efficiency target by 2020. Under EED, all EU countries are required to use energy more efficiently at all stages of the energy chain, from production to final consumption.
In 2016 the Commission proposed an **update to the EED,** including a new **binding** energy efficiency target for 2030, which was finally agreed at 32.5 %, and **new measures** to update the EED to make sure the new target is met.

Specific measures and policies

1	energy distributors or retail energy sales companies have to achieve 1.5% energy savings per year through the implementation of energy efficiency measures
2	EU countries can opt to achieve the same level of savings through other means, **such as improving the efficiency of heating systems, installing double glazed windows or insulating roofs**
3	the public sector in EU countries should purchase energy **efficient buildings**, products and services
4	**every year, governments in EU countries must carry out energy efficient renovations on at least 3% (by floor area) of the buildings they own and occupy**
5	energy consumers should be empowered to better manage consumption. This includes easy and free access to data on consumption through individual metering
6	national incentives for SMEs to undergo energy audits
7	large companies will make audits of their energy consumption to help them identify ways to reduce it
8	monitoring efficiency levels in new energy generation capacities.

Basic characteristics of Energy Performance of Buildings Directive (EPBD) 2010/31/EU and 2018/844/EU

Overview

The 2010 **EPBD** and the 2012 **EED** are the EU's main legislative instruments promoting the improvement of the energy performance of buildings within the EU and providing a stable environment for investment decisions to be taken.

The Commission proposal for **an update to the EPBD** was adopted in 2018 (**Directive 2018/844/EU**). The update will help accelerate the cost effective renovation of existing buildings with the vision of a decarbonised building stock by 2050 and the mobilisation of investments. It also supports electromobility infrastructure deployment in buildings' car parks and introduces new provisions to enhance smart technologies and technical building systems, including automation.

The Commission also published a new buildings database – the **EU Building Stock Observatory** - to track the energy performance of buildings across Europe. In order to direct investment towards the renovation of building stock, the Commission also launched the **Smart Finance for Smart Buildings initiative**, which has the potential to unlock an additional €10 billion of public and private funds for energy efficiency and renewables uptake in buildings.

Basic characteristics of Energy Performance of Buildings Directive (EPBD) 2010/31/EU and 2018/844/EU

Specific measures and policies under the previous EPBD 2010/31/EU	
1	All new buildings must be **nearly zero-energy buildings** by 31 December 2020 (public buildings by 31 December 2018)
2	**Energy performance certificates** must be issued when a building is sold or rented, and they must also be included in all advertisements for the sale or rental of buildings
3	EU countries must establish **inspection schemes** for heating and air conditioning systems or put in place measures with equivalent effect
4	EU countries must set **cost-optimal minimum energy performance requirements** for new buildings, for the major renovation of existing buildings, and for the replacement or retrofit of building elements (heating and cooling systems, roofs, walls and so on)
5	EU countries must draw up **lists of national financial measures** to improve the energy efficiency of buildings.
Specific measures and policies under EED 2012/27/EU concerning directly buildings	
6	the public sector in EU countries should purchase energy efficient buildings
7	every year, governments in EU countries must carry out energy efficient renovations on at least 3% (by floor area) of the buildings they own and occupy
8	EU countries formulate long-term national strategy for the renovation of buildings , which is included in the National Energy Efficiency Action Plans

Basic characteristics of Energy Performance of Buildings Directive (EPBD) 2010/31/EU and 2018/844/EU

New specific measures and policies under the new EPBD 2018/844/EU

9	EU countries will have to establish stronger **long-term renovation strategies**, aiming at decarbonising the national building stocks by 2050, and with a solid financial component
10	A common European scheme for rating the **smart readiness of buildings**, optional for Member States, will be introduced
11	**Smart technologies** will be further promoted, for instance through requirements on the installation of building automation and control systems and on devices that regulate temperature at room level.
12	**E-mobility** will be supported by introducing minimum requirements for car parks over a certain size and other minimum infrastructure for smaller buildings
13	EU countries will have to express their **national energy performance requirements** in ways that allow cross-national comparisons
14	**Health and well-being of building users** will be promoted, for instance through an increased consideration of air quality and ventilation.

To help EU countries properly implement the Energy Performance of Buildings Directive and to achieve energy efficiency targets, the European Commission has established **practical support initiatives:** Concerted Action EPBD, Build Up skills, Build up Portal, The Energy Performance of Buildings standards (EPB standards), The Executive Agency for Small and Medium-sized Enterprises (EASME).
The EPB standards include a set of standards for a common methodology calculating the integrated energy performance of buildings, in accordance with the Energy Performance of Buildings Directive.

Primary Energy Intensity in the EU member states in SEE
Years 2005, 2015
In toe/mn € GDP 2010

	EU28	GR	BL	RO	CY	CR	SL
2005	**139.7**	133.4	587.6	334.7	144.7	207.2	210.9
2015	**113.3**	128.7	433.8	218.8	127.3	182.0	174.2

Primary Energy Intensity of all the EU member states in SEE in 2015 **above** the respective EU28 average

Improvement of Primary Energy Intensity in all the EU member states of SEE and in EU28 between 2005 and 2015

Specific Final Energy Consumption in the residential sector, climate corrected, in the EU member states of SEE
Years 2005, 2015
In koe/m²

	EU28	GR	BL	RO	CY	CR	SL
2005	**18.6**	14.1	11.2	29.2	8.5	23.6	20.0
2015	**15.2**	12.3	10.0	21.8	6.2	19.8	18.8

SFEC in the residential sector of the EU member states in SEE in 2015, **either above or below** the respective EU28 average

Improvement of SFEC in the residential sector in all the EU member states of SEE and in EU28 between 2005 and 2015

Specific Final Energy Consumption in the building sector in the Western Balkan countries and the EU28 in koe/m^2

	Residential	Public	Commercial
Western Balkans	8.7[(1)] – 22.4[(2)]	14.4[(3)] – 26.2[(4)]	14.7[(1)] - 32.8[(3)]
EU28, average	**14.8**	**24.1**	

(1), Montenegro, (2), Bosnia & Herzegovina, (3), Serbia, (4), Kosovo

SFEC in the building sector varies substantially from country to country in Western Balkans, **either above or below** the European Union, average

The variation of SFEC in the residential sector is more or less the same in the Western Balkan countries and the EU member states of SEE

Overview of the EU legislation on the energy performance of buildings

To cope with the requirements set by the EU climate change and energy targets and strategy, the **EU legislation on the energy performance of buildings has been in place and advancing over the last years**.

The legislation is **adequate** but new characteristics of the performance of new materials and technologies, and other improvements, are regularly incorporated into it allowing for the new characteristics to be tailored to particular needs of consumers .

The main challenge of the states of the SEE is, in general, the **application rate** of legislation, and possibly, the **enforcement rate** of it (and in case of the Western Balkan countries, in particular, the **transposition rate**). The increase of the respective rates is directly associated with the **size and quality of resources** allocated to the particular task.

The whole process is really supported if **good practices** are taken into account. These practices are followed for many years for the application of measures and policies by a large number of states, either European or from other parts of the world.

Examples of best practices concerning “Developing and Adopting State Energy Efficiency Programmes “, “Developing and Adopting Building Energy Codes”, “Implementing Building Energy Codes”, are given below:

Best Practices: Developing and Adopting State Energy Efficiency Programmes

Determine the cost-effective, achievable potential for energy efficiency in the country. Consider anyway non-energy benefits of energy efficiency programmes when reviewing cost-effectiveness
Start with low-cost, well-established programmes and efficiency investments, and build the programme over time
Assess the level and diversity of support for energy efficiency programmes. Engage key stakeholders (i.e. utilities, residential, commercial, and industrial consumers, municipalities, trade allies, and environmental groups) and experts collaboratively to help design the programme – including its administering organizations, funding, duration, and evaluation methods
Establish long-term policy direction and funding approach. Consider specific provisions to prevent the energy efficiency programme funds from being used for other purposes or to be comingled with general state budget funds. Make funding a minimum level, not a cap, on investment in energy efficiency
Ensure that the energy efficiency programmes serve the needs of diverse consumer classes and stakeholder groups. Managing efficiency programmes through portfolios allows programme administrators to match incentive types and programme features to different consumer types and market needs. Portfolios can evolve over time, from simpler and fewer incentive types early on to more feature-rich and diverse incentives and services later on
Determine the administering organization(s). The option include utilities, state agencies, or independent organizations. If utilities are selected to administer programmes, it is advisable to develop policies that align the utility business model with the goal of achieving energy efficiency.
Establish effective evaluation methods that build on proven approaches and are appropriate given the chosen programme design. Evaluation methods should be rigorous enough to estimate programme impacts and other benefits and simple enough to minimize administrative costs.

Best Practices: Developing and Adopting Building Energy Codes

Evaluate current situation and act accordingly. Evaluate current building energy code laws and options for implementation and enforcement. If there is no state energy code, if it is more than 5 years old, or if there is no evidence of consistent enforcement, it may be time to act:

- Analyze the benefits and costs of code adoption and implementation
- Talk with key stakeholders, including local officials and builders, to gauge their perspectives
- Assess resources for training and technical support for code officials, builders, designers, and installers
- Contact suppliers about availability of products

Get outside help. Tap building expertise and other resources from organizations, which are specialized in energy and buildings. Resources might include quantitative assessments of potential benefits, baseline building practice studies, legislative and regulatory assessments, training, and technical assistance for builders and code officials

Create a stakeholder process. Involve key stakeholders early and regularly. Include them in reviews of studies, proposed regulations, and other aspects of the process. This process increases the chances of code adoption and minimizes enforcement problems.

Best Practices: Implementing Building Energy Codes

Educate and train key audiences
Build strong working relationships with local building officials, home builders, designers, building supply companies, and contractors for insulation, heating and cooling equipment
Hold regular education and training sessions before and after the effective date of the new energy code requirements. Maintain an ongoing relationship with homebuilders and building officials associations, even between code change cycles. This encourages both understanding and trust and is an opportunity to share concerns
Provide the right resources, including: - An overview of energy code requirements, opportunities, and related costs and benefits - Basic building science concepts. Practical compliance aids can range from laminated information cards for simple prescriptive methods to software packages for performance-based codes - Information on how to inspect plans and site features for compliance - Whom to contact and resources for more information and technical assistance
Provide budget and staff for the programme. Assign staff personnel with appropriate training and experience to support the code adoption and implementation processes. Give them enough of a budget to do the necessary homework, involve stakeholders, and support implementation

Sector Coupling (SC)
The role of renewable electricity

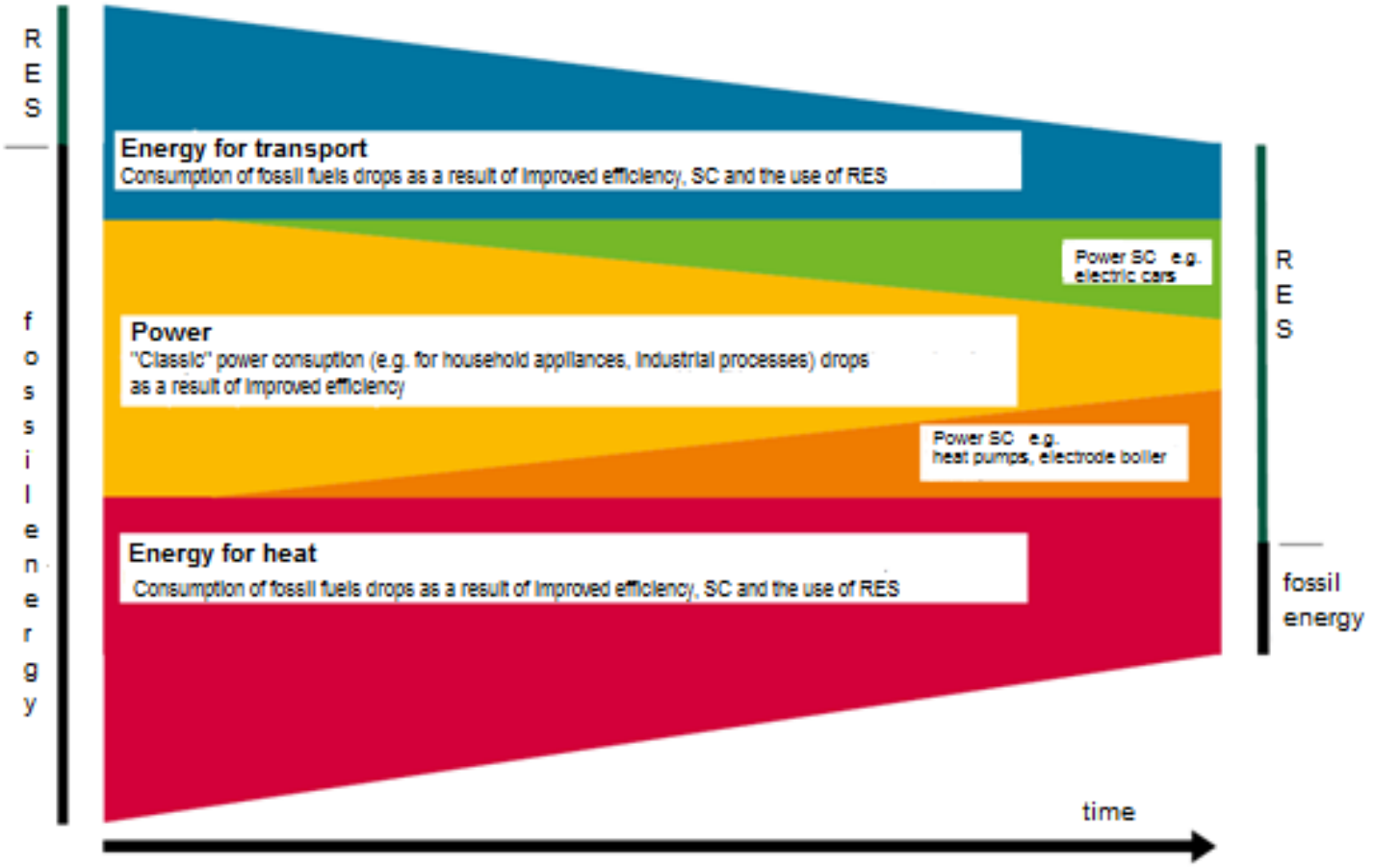
The decarbonisation of all the sectors require the use of electricity from CO_2-free renewable sources

For SC, primarily those technologies are used which efficiently convert electricity into heat, cooling or propulsion and therefore which replace as large an amount of fossil fuels as possible with the smallest amount of renewable power (e.g. heat pumps, electric cars)

SC offers cost-effective flexibility on the demand side to balance out the fluctuating supply of power from renewable energies

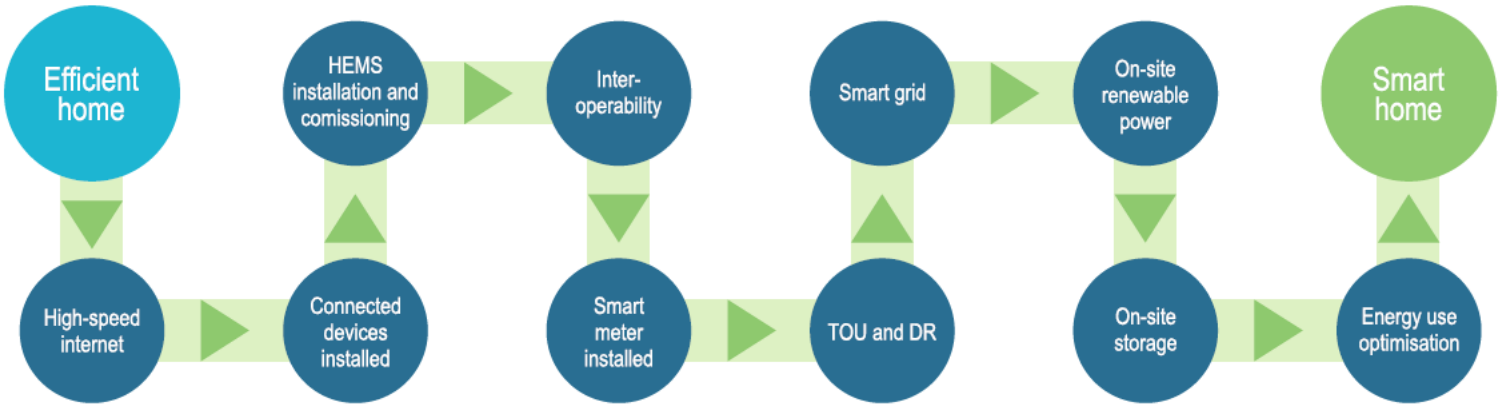
Each sector makes an appropriate contribution to the cost of decarbonisation

Illustration of Sector Coupling (SC) and energy consumption



Digitalisation
Digitalisation opens up new possilities for added value services and efficiency services
Digitalisation and the use of renewable energies alter the cost structure of energy generation. A long – term efficiency strategy must take this into consideration
Digitalisation contributes to balancing the demand for energy with a decentralised and volatile generation of energy
Connected devices form one component of the broad technology trend of digitalisation. A particular category in households may play a significant role in transforming the “**Efficient home**” to the “**Smart home**”. These devices may enhance the quality of life but they pose a risk regarding the increase of energy consumption. Therefore a strategy is needed to find the appropriate balance.

From Efficient Home to Smart Home: Preconditions



HEMS: Home Energy Management System
TOU: Time of Use
DR: Demand Response

Thank you for your attention

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