Energy Roadmapping

CEESEN Training Macedonia

Andreas Karner
andreas.karner@conplusultra.com

ConPlusUltra Ltd
www.complusultra.com

Session 1: Energy Roadmapping

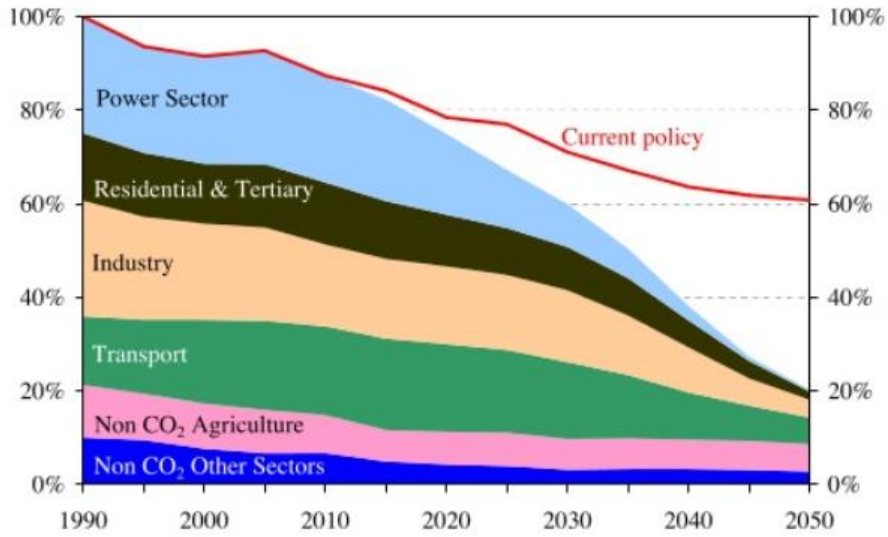
The Issue:

>> Transition to a Low-Carbon Economy

EU decarbonisation pathway for 2050

Main elements of the EU Energy Roadmap 2050:

- Reduction of energy sector emissions by 85% by 2050
- Energy costs rising until 2030, coming down thereafter
- 5 scenarios
  - ✓**energy efficiency**
  - ✓**diversified supply technologies**
  - ✓**high share of renewables**
  - ✓**delayed carbon-capture & storage**
  - ✓**no nuclear**
- RES more than 50% of supply



European strategic context

EU 2020 – A strategy for competitive, sustainable and secure energy COM (2010) 639

By 2020, at least 20% reduction in greenhouse gas emissions compared to 1990;
saving of 20 % of EU energy consumption compared to projections for 2020;
20% share of renewable energies in EU consumption, 10% share in transport.

EU´s 20-20-20 goals

European Council, October 2009

The EU is commited tp reducing greenhouse gas emissions to 80-95% below 1990 levels by 2050 in the context of necessary reductions by developed countries as a group.

EU´s decarbonisation objective

Roadmap for moving to a competitive low-carbon economy in 2050

COM(2011)112, 8 March

Roadmap to a Single European Transport Area

COM(2011)144, 28 March

Energy Roadmap 2050

COM(2011)885

The Energy Roadmap 2050 explores the challenges posed by delivering the EU´s decarbonisation objective while at the same time ensuring security of energy supply and competitiveness.

- Different scenarios of illustrative nature
- Uncertainty as major barrier to investment
- Seeking a long-term European technology-neutral framework to make national, regional and local energy policies more effective

Roadmap 2050 study

- Vol 1 – Technical and Economic Analysis
- Vol 2 – Policy Report
- Vol 3 – Graphic Narrative

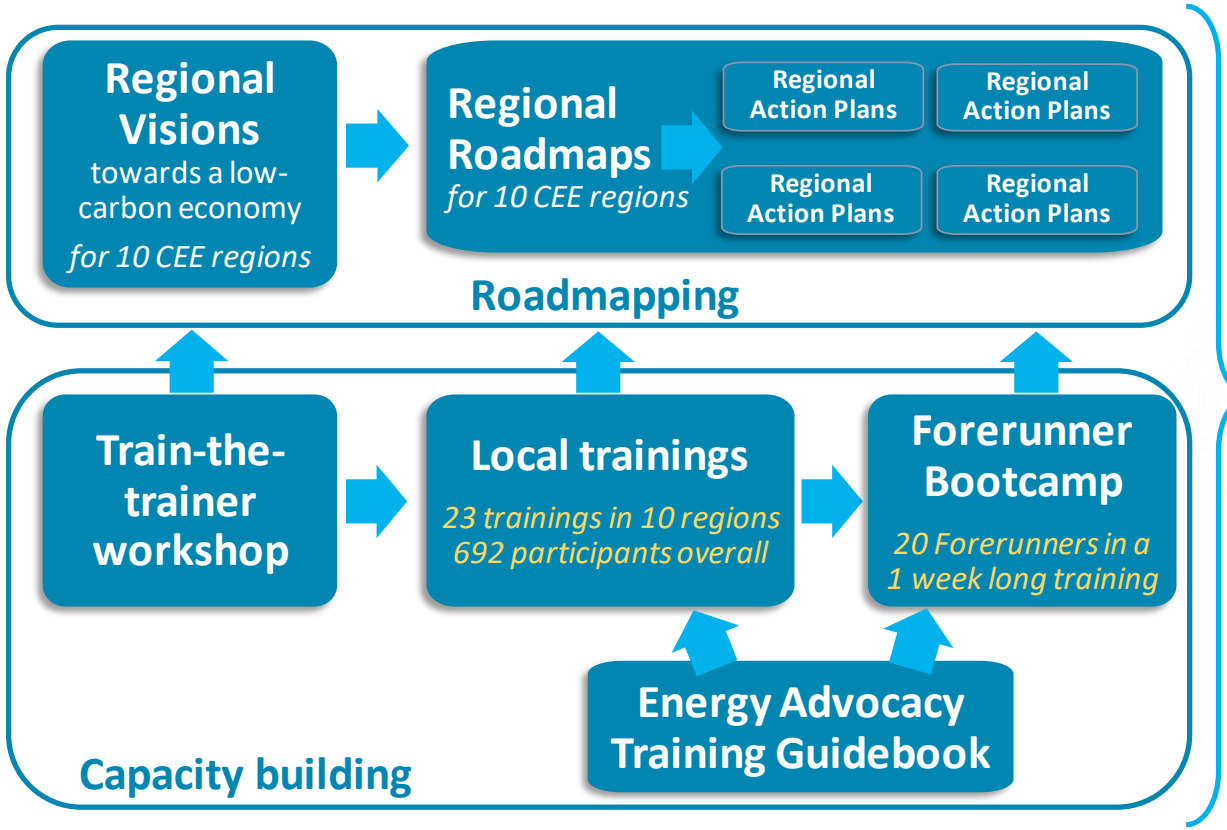
www.roadmap2050.eu

Energy Roadmap 2050 – Vision of „Eneropa“

Source: Roadmap 2050: A practical guide to a prosperous, low-carbon Europe

PANEL 2050 project

- Funded by European Union – Horizon2020 Programme
- Duration: 2016-2019
- 10 countries (EST, LV, LT, PL, CZ, MK, BG, RO, SL, AT)



CENTRAL EASTERN EUROPEAN SUSTAINABLE ENERGY NETWORK

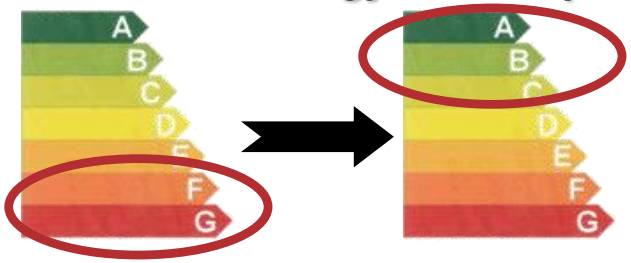
Definition of a „Roadmap“

- *A Roadmap is a strategic plan that lays out the steps a community/municipality/region will take to achieve specific outcomes and goals.*
- *It outlines these goals as well as related tasks in the short, intermediate and long term.*
- *An effective roadmap also includes measures to allow tracking of progress towards reaching the set goals.*

Why develop an energy roadmap?

- **Lots of opportunities and benefits expected** (from different angels)

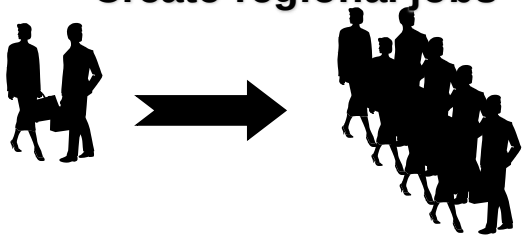
Reduction of energy consumption



Reduction of GHG-emissions

Use local resources

Create regional jobs



Energy autarky and security

Reduction of energy costs

Energy strategy roadmapping

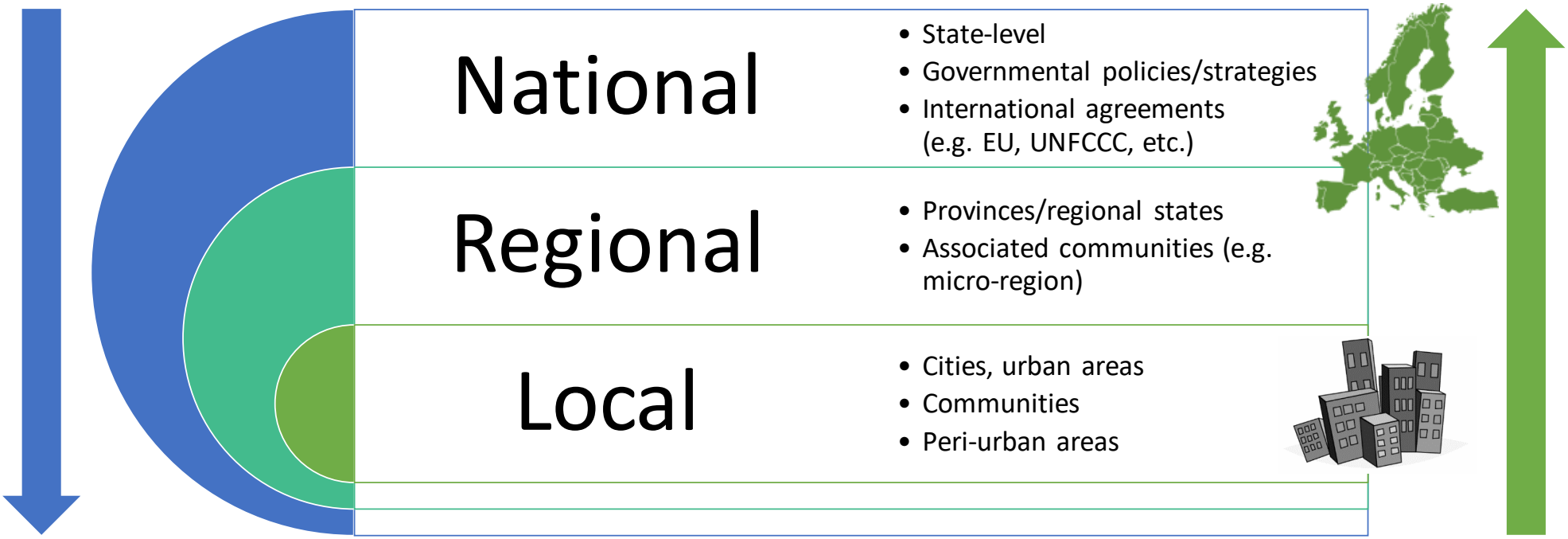
Energy strategies on national/regional/local level have the objective to

- Contribute to the realisation of (supra-)**national energy policies and strategies/targets (usually top-down)** and keep track on progress of their implementation
- **Develop a strategic approach** to reduce energy consumption, emissions and energy costs to contribute to energy autarky and/or security **(mainly bottom-up)**
- **Build awareness for energy topics** through leading by example and targeted awareness campaigns
- **Identify key stakeholders** and involve them in the process
- Provide a **framework for new/emerging energy technologies** to enter the market

➢ **Roadmapping is thus the evolving process of energy strategies on different administrative/organisational levels**

Levels of energy strategies

Top-down



Bottom-up

Integrative approach – encompassing all policy objectives and developing fields

Roadmapping at regional/local levels – main challenges

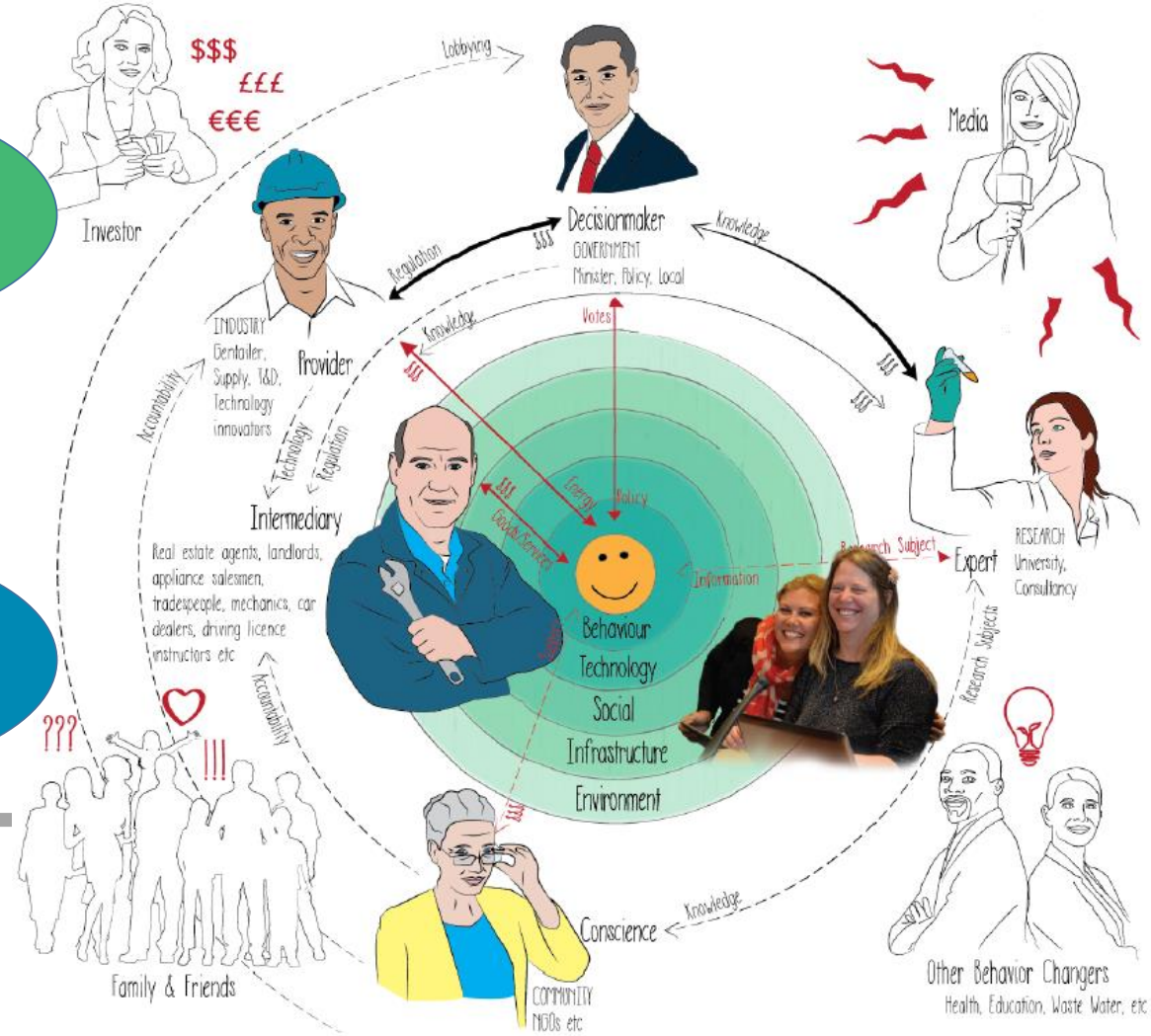
- **Involvement of all key stakeholders with regard to energy in the strategy development process (participatory approach)**
  - Regional and local actors shall be **involved from the beginning** in the planning and implementation process to guarantee success
  - Build on **existing local expertise and knowledge** is essential
- **Implementation of energy actions gets increased priority**
  - Policy planning and commitment of politics/administration shall result in a **focus on implementation rather than conceptualization only**
  - **Implementation should be made visible** for the population -> increased acceptance
- **Long-term orientation**
  - Establishing the **structures needed for the long-term implementation** (> 4-5 years)
  - **Involvement of regional actors** to ensure permanency

Opportunity: **Respond to the specific situation in the region** in accordance with other local and regional development strategies & plans

Involving decision-makers & stakeholders

Local Actors

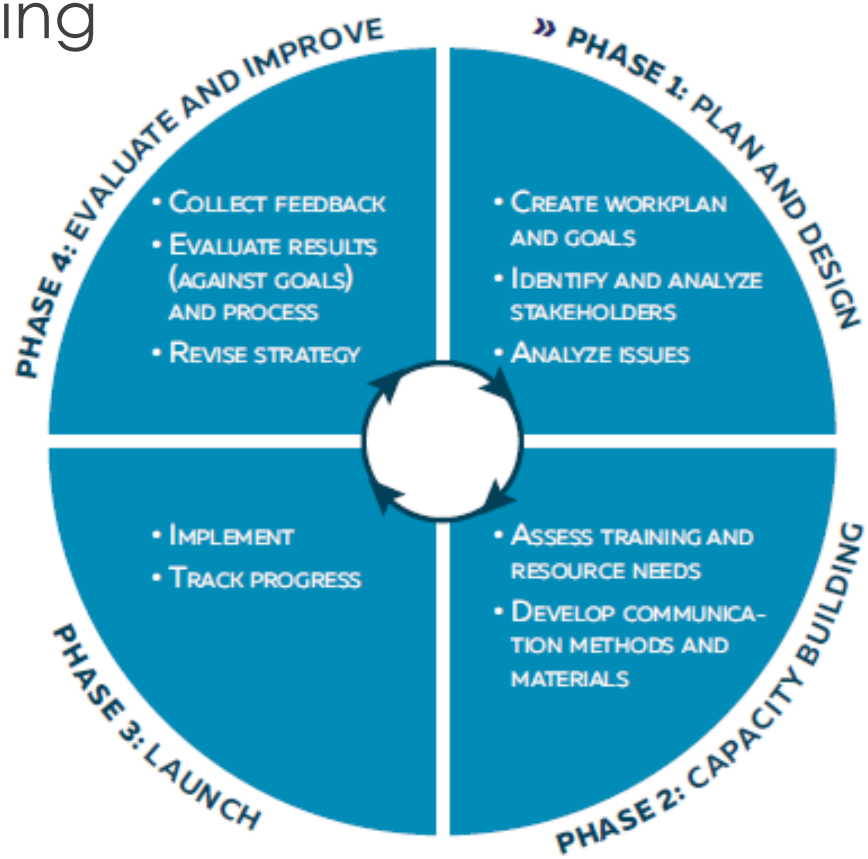
Stakeholders



Forerunners?

Stakeholder Engagement Process

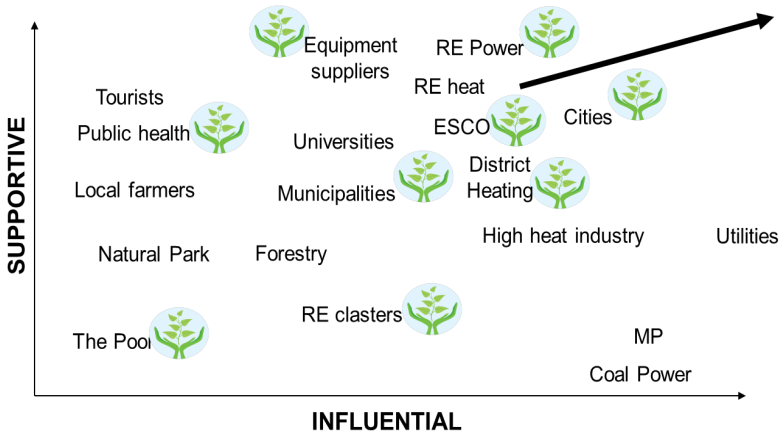
- **Good stakeholder engagement** is a formalised approach (process) – it is important to the success of energy roadmapping



Stakeholder Engagement Process

- Success story
  Energy transition in „Coal County”
  Borsod-Abauj-Zemplen and Heves – Hungary (HU)
- PANEL2050 has built new partnership based on shared interest

Stakeholder analysis Power mapping → Engagement → Partnership Pilot meaures



Insulation material producers

Boiler producers

District heating companies

Local municipalities

- Insulation
- Heating system retrofit
- Energy management plan

Communication as integrative part of the strategy process

- **Spread good practices**
  - Create **awareness**
  - **through continuous information** about implementation,
  - in local and regional media
  - and **lead by example**
- **Exchange of experience**
  - There are **many positive examples in the region**
  - **Each opinion** is important
  - **Each stakeholder** should be allowed to be involved in workshops / working group
  - **Exchange** with neighbouring municipalities

The Energy Roadmapping Process - Phases

Baseline

- Analysis of present energy status (energy and emission balances for different sectors)
- Identification of potentials, challenges and barriers

Vision

- Stating the development goal of the region / municipality / organisation
- Aim at development scenarios beyond business as usual

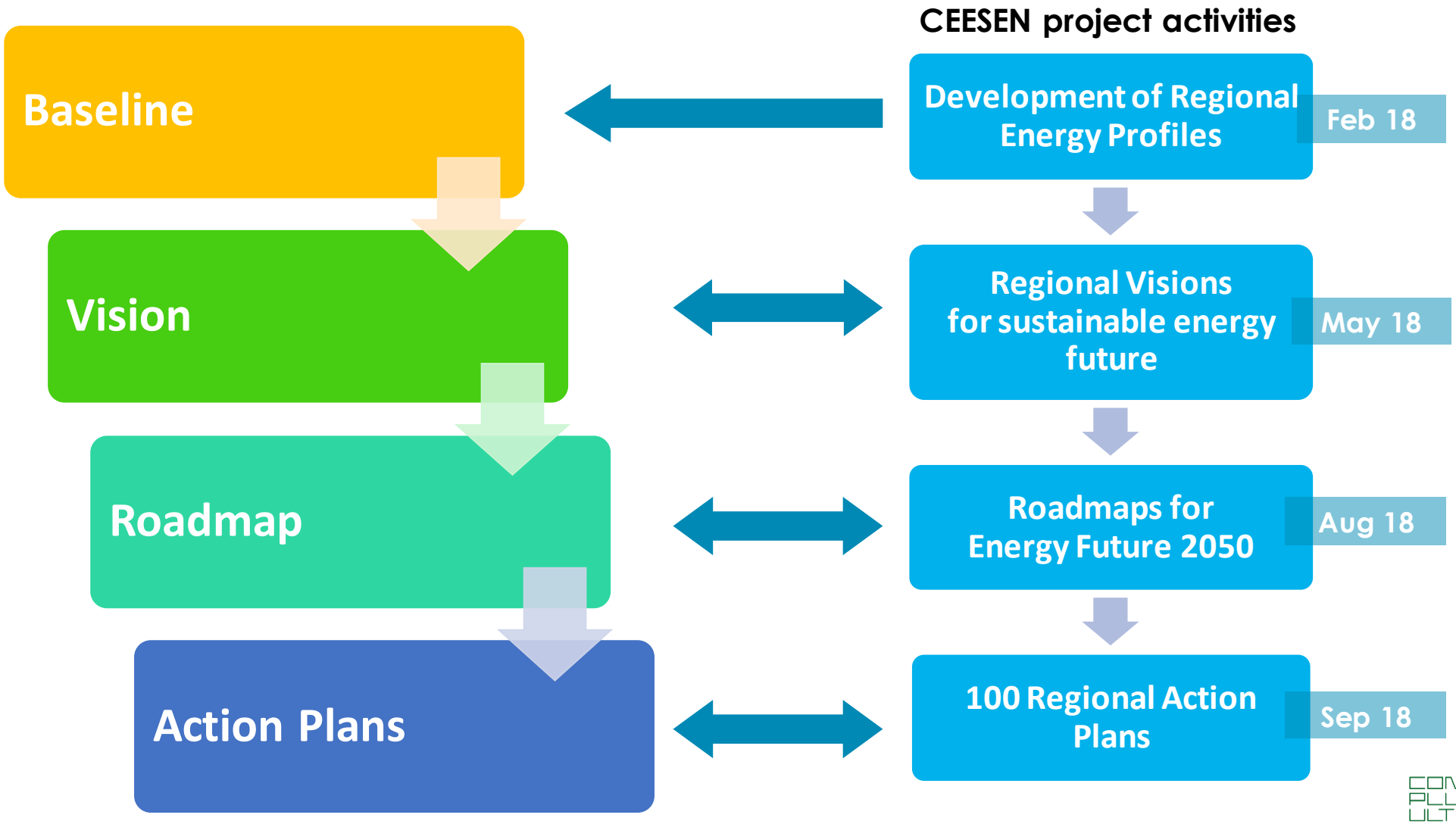
Roadmap

- Identify priority areas for reaching the vision
- Plot development scenarios and identify leverage points and required actions

Action Plans

- Concrete measures
- Answering what, who, how and when

The Energy Roadmapping Process - Phases



Baseline Analysis

Baseline

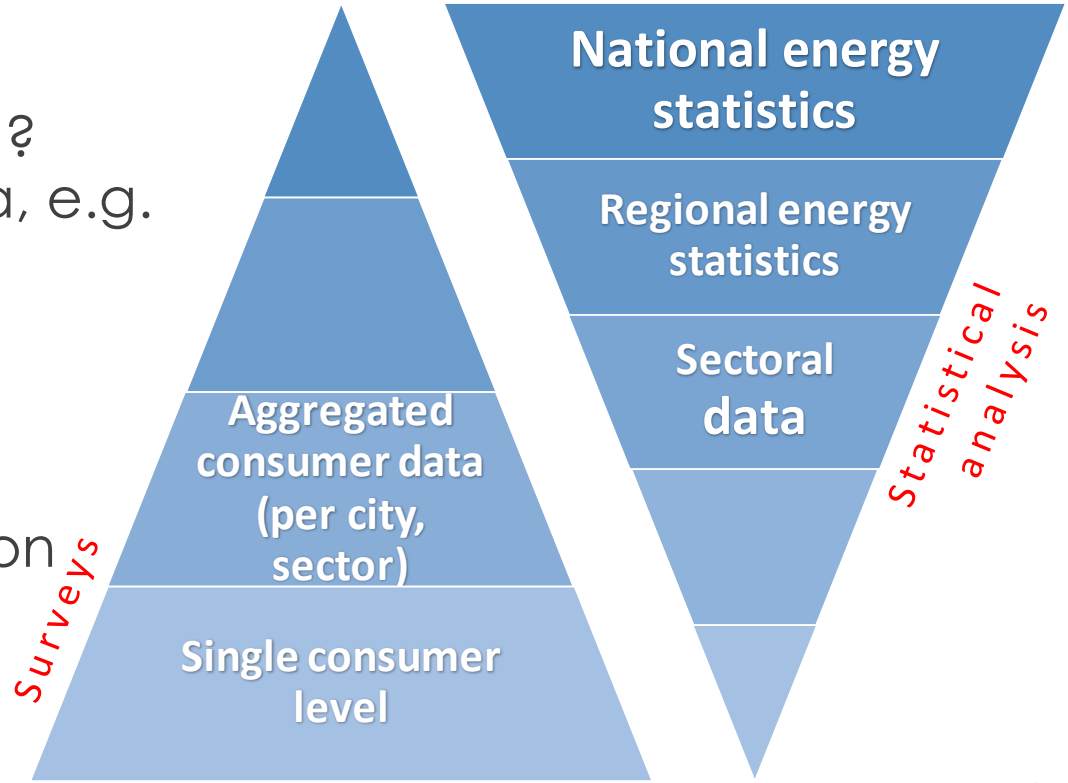
A comprehensive baseline needs an assessment of

- what currently exists and how it performs: **the state of energy production and consumption**
- why the end users use energy the way they do: **the driving forces of energy demand**
- what is stalling development at the moment: **the barriers which needs to be overcome**
- policy options and potential impact: **the response that new policies should enable**

Top down vs bottom up approach

Baseline

- Are national/regional/local statistics available and how accurate are they for my case?
- What other sources can be used? Which organisations collect data, e.g. municipal energy bookkeeping, energy providers, environmental NGOs
- Consider accuracy and collection effort

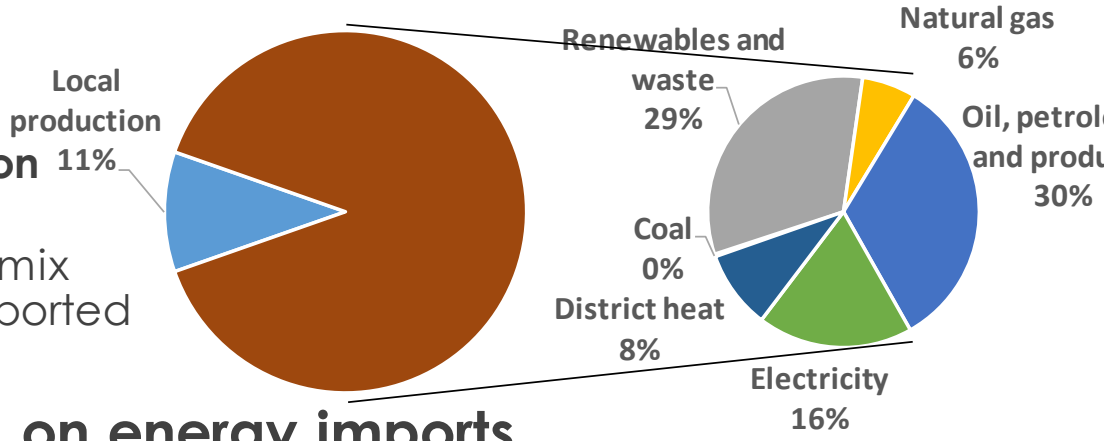


Energy data sources – Energy production

Baseline

Differentiate between

- **Local energy production facilities**
  - Conventional capacities –*fossil and nuclear power plants are mostly large scale and well documented by energy providers*
  - Renewable production capacities – *concentrate on large-scale commercial facilities*
- **National energy mix**
  - Influences **primary energy consumption** and **energy-related CO_2-emissions**
  - Identify which part of the energy fuel mix can be influenced locally and the imported share



Assess the energy dependencies on energy imports nationally and internationally

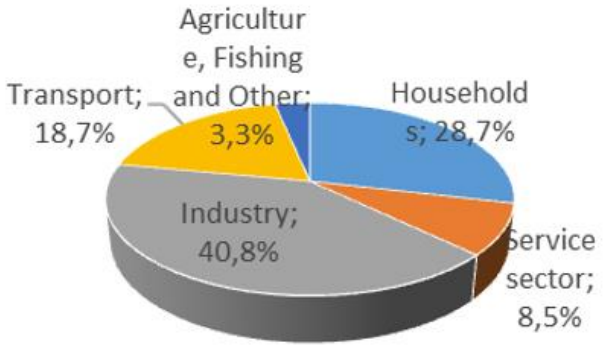
Energy data sources – Energy Consumption

Baseline

Example of good sources for energy data by economic sector

Final energy consumption

Households	• Household census • Buildings: Data from real estate market and housing corporations, census with year of construction • Heating systems: Data from chimney sweeper assoc., stat from network operators • Electricity: data from electric grid operator
Service sector	• Public services: Inventory of public buildings, energy bookkeeping statistic • Private services: census of enterprises, sector surveys, data from energy providers
Industry	• Census of enterprises • Sector surveys and benchmarks • Data from energy providers
Transport	• Traffic census • Car registration statistics
Agriculture and others	• Individual surveys



Final energy consumption per sector in the region Borsod-Abaúj-Zemplén and Heves (HU)

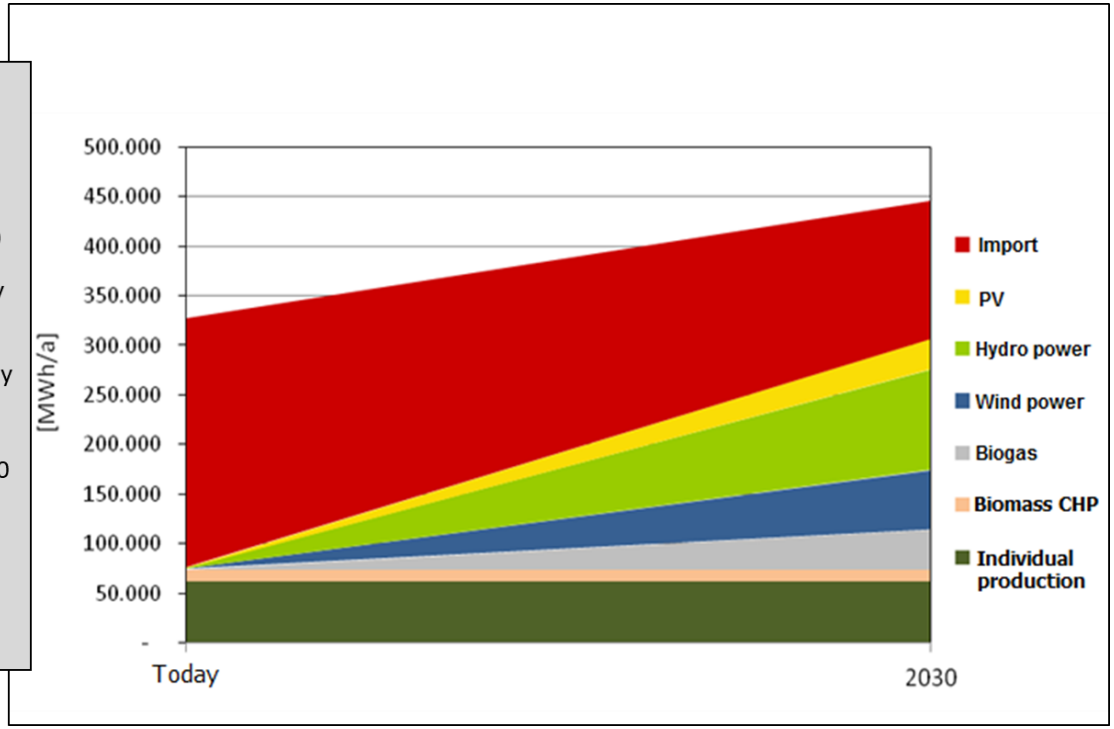
Visioning

Vision

- **Visioning:** the process of analysing future scenarios and identifying objectives
- **Energy scenarios** are used to compare several development paths and theirs quantitative impact on the energy consumption **in the future**

Targets:

- Reduce annual growth of el. consumption to 1,5 % until 2030
- 70 % self supply until 2030
- 100 % self supply not considering the industry sector until 2030
- Extension of renewable energy sources use



Creating an energy vision

Vision

Typical Visioning process

- Define core “visioning team”
- Define possible points of entry based on baseline analysis
- Plan different energy scenarios and projections for your region
- Test the scenarios with key stakeholder groups – involve all relevant entities (public authorities, industry representatives, researchers, NGOs, …) and get them on board
- Go for a consensus with your stakeholder groups

Example for vision statement on local level

Vision

- Smart City Klosterneuburg in Lower Austria
- City aims at getting from a low level of energy self-sufficiency to the point of being a Smart City

- Vision statement:

In 2050, the municipality of Klosterneuburg will still offer an exceptional standard of living. Its inhabitants' use of energy will have changed for the better since the year 2011. Energy will be utilized efficiently. The total energy consumption will be cut in half compared to 2012 . Regional and available renewable energy sources will determine the energy mix. Greenhouse gas emissions will be 85% lower than in 2011.

http://www.smartcities.at/city-projects/smart-cities-en-us/klbg-energy-en-us/

Roadmap development

Roadmap

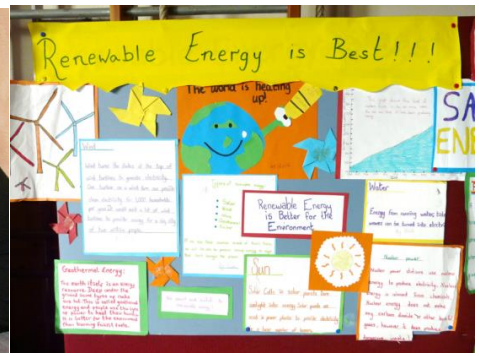
After establishing a common vision with your stakeholders the roadmap development phase can begin.

- Based on data analysis and expert judgement
- Broad stakeholder involvement is key
- **Define major directions to be followed**
- **Define priority areas in which to concentrate your actions**
- finally, be in line with initial defined **vision**

Various ways to keep stakeholders involved

Roadmap

- **Roadmapping exercise – it‘s all about public participation!**
- **Increases long-term commitment and implementation support**



Example Roadmap

Roadmap

Priority Projects	
Nr.	Topic
H 1	Energy coordinating group for the Region
P 2	Buildings, Equipment and Facilities
P 3	Transport
P 4	Local electricity production
P 5	Land use planning
P 6	Public procurement of products and services
P 7	Working with citizens and stakeholders

Example Roadmaps

Roadmap

- **Priority Sectors covered in the Roadmap**

Buildings, equipment & facilities	Transport	Local electricity production	Land use planning	Public procurement of products and services	Working with citizens and stakeholders
Introduction of solar thermal facilities in sports centers and municipal public buildings with high hot sanitary water demand	Progressive renovation of the City Council fleet by electric and hybrid vehicles	Installation of solar photovoltaic plants on roofs of public building	By-law on energy efficient new buildings	Introduction of energy efficiency criteria in City Council Tenders for services and infrastructure	Creation of staff allocated for SEAP development and energy saving actions
Energy audit of all public buildings	Ecodriving courses for City Council staff	Installation of internal combusion engines for the generation of electricity from biogas in the waster treatment plant (plant Oulja & Akreuch landfill).	Solar thermal by-law for new buildings	Requirement of solar thermal energy in all new city council facilities with hot sanitary water demand	20% emissions reduction commitment for citizens
Introduction of LED technology in conventional holiday lighting, public lighting and traffic lights	Tramway Rabat-Sale		Plantation of trees in parks, gardens and public land		Bicycle working group with stakeholders
Installation of presence detector systems in common spaces	Execution of a Sustainable Mobility Urban Plan		Maintenance of agriculture and forest land protected against urban development		Mobility working group with stakeholders
Installation of high efficiency lighting technology in future city council buildings	New taxis only hybrid, electric or with alternative fuels		Execution of an Urban Cycling Master PLan		Energy comity with stakeholders
Energy saving measures in fountains and park watering systems	Development of a bicing system				Car pooling program
Elaboration of an intenal regulation on energy efficiency of the City Council	Cycling lanes construction				Awareness campaigns for energy saving, ecodriving, promotion of renewable energy, use of sustainable mobility modes
Installation of water saving devices in the points of consumption of hot sanitary water	Tax reduction fo hybrid, electric or high efficiency vehicles				Green School Award Programme
Introduction of heat recovery in HVAC systems of public buildings with high power installed					Workshops on energy saving at home
Green Commerces Certification Program; shops, restaurants, hotels, shopping centers					Ecodriving courses for citizen
					Programme for the use of bicycle among students
					Energy Saving Family Award
					Energy Efficiency Commerce Award
					Cycle to work programme
					Actions and conferences programmed within the SURE project

One Roadmap – includes numerous Action Plans

Action Plans

Action Plan 1: Building rehabilitation programme

- Activities: assessment, improved design, tendering, award, implementation
- Responsible: Building management authority XYZ
- Implementation plan: 2017-2022
- Financing: Municipality x%, state grant x%, private sources x%
- Indicators: XX MWh thermal savings, XX MWh electric savings, XX t CO2

Action Plan 2: Electricity savings in homes

- Activities: Distribute energy meters, promote EE appliances, implement competition
- Responsible: Local utility, NGO, municipality support
- Implementation Plan: 2017-2018
- Financing: Municipality x%, utilities x%
- Indicators: XX MWh electric savings, XX t CO2

Action Plan 3: Renewable Energy Investments

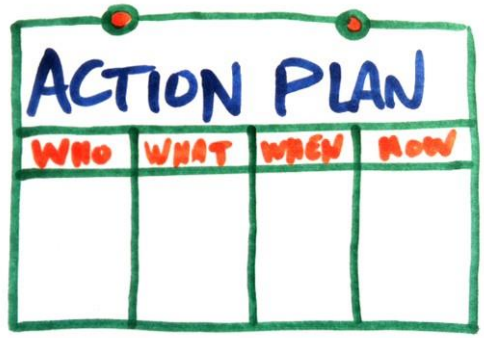
- Activities: bioenergy sources assessment, development of supply chains with local farmers, pilot installation, roll-out program for single-family houses/small businesses
- Responsible: Biomass association, Chamber of Agricult, Municipality, NGO
- Implementation Plan: 2018-2020
- Financing: national grants x%, local chamber x%, soft loans x%
- Indicators: XX projects implemented, XX MW new capacity installed, XX MWh of renewable heat provided from the region

etc.

What is an Action Plan?

Action Plans

An "**implementation programme**" – at least with a **set of defined actions** all aimed at the achievement of the roadmap goals.



Essential components:

- **Concrete actions** and a **prioritization** for their implementation
- with **"SMART" targets** and target indicators
- **Responsibilities** and definition of working groups
- A sufficient **time frame** for implementation and monitoring
- A plan for sufficient **budget** and specification of funding sources
- Don't forget about the **monitoring** and plan additional resources

Integrative approach encompassing regional priorities

Action Plans

Other disciplines to be considered:

- Environmental protection
- Natural resources management
- Mobility and freight traffic

Overarching principles:

- Political commitment
- Financial sustainability
- Social coherence

Thematic focus

Energy supply
- increase renewables' share

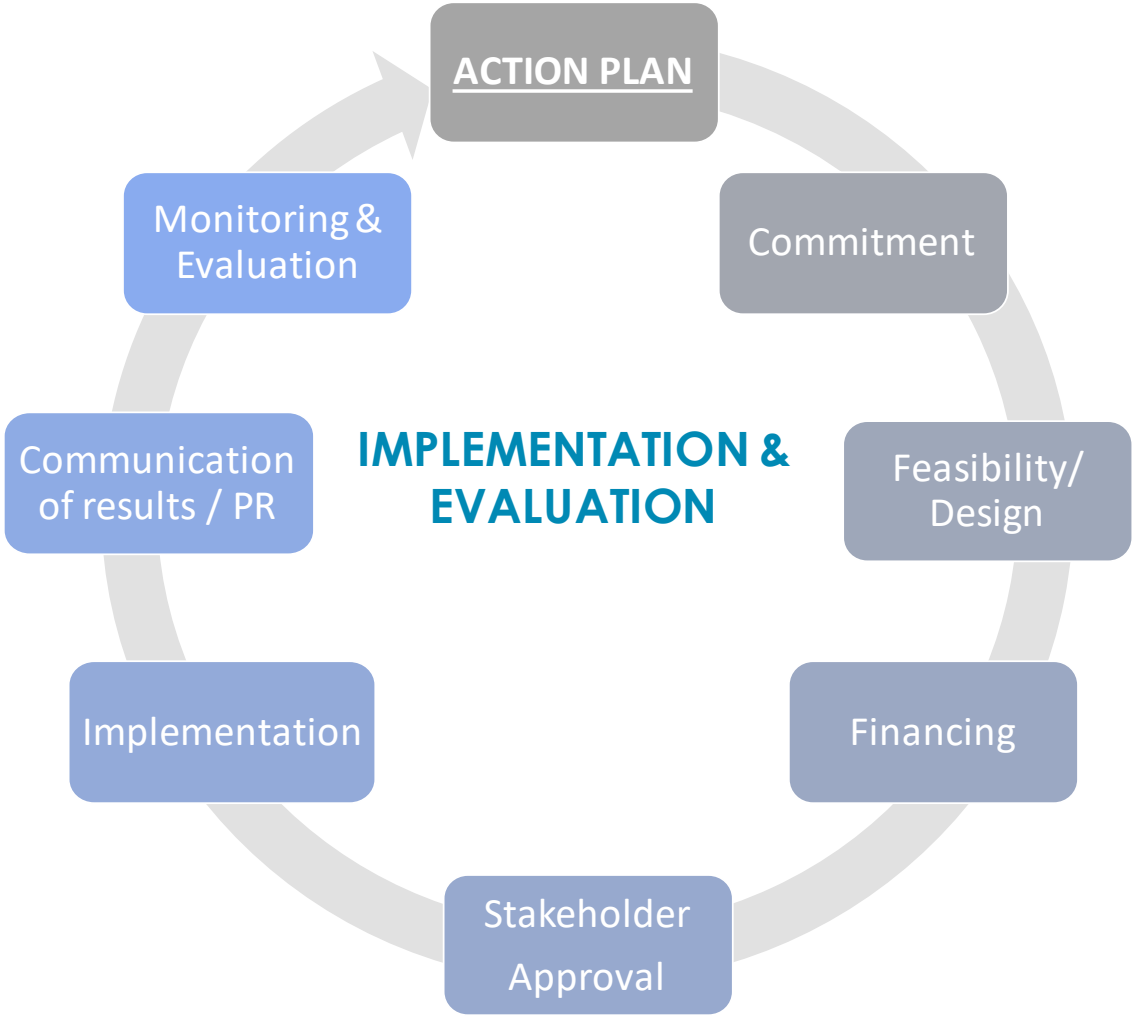
Energy efficiency
- buildings
- production
- transport

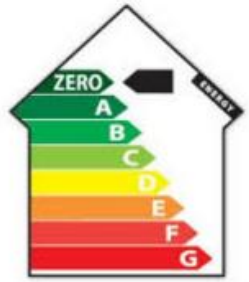
Awareness, communi-cation

Action Plan

Action Plan – focus on implementation

Action Plans





Public presentation – acceptance of Energy Roadmap and Action Plan

Action Plans


CEE SEN
BECOME PART OF
THE LOW-CARBON COMMUNITY
IN CENTRAL AND
EASTERN EUROPE
https://ceesen.org/
Join today
Learn about PANEL 2050

Session 2: Exercise Visioning

Aim of visioning workshops

Vision

- Establish a consensus on goals and targets
- Evaluate and verify assumptions (such as technology costs or performance metrics)
- Identify key technical and institutional barriers
- Define alternatives pathways to overcome barriers
- Define priorities for actions
- Develop implementation strategies and get implementing entities on board (public authorities, NGOs, business, …)

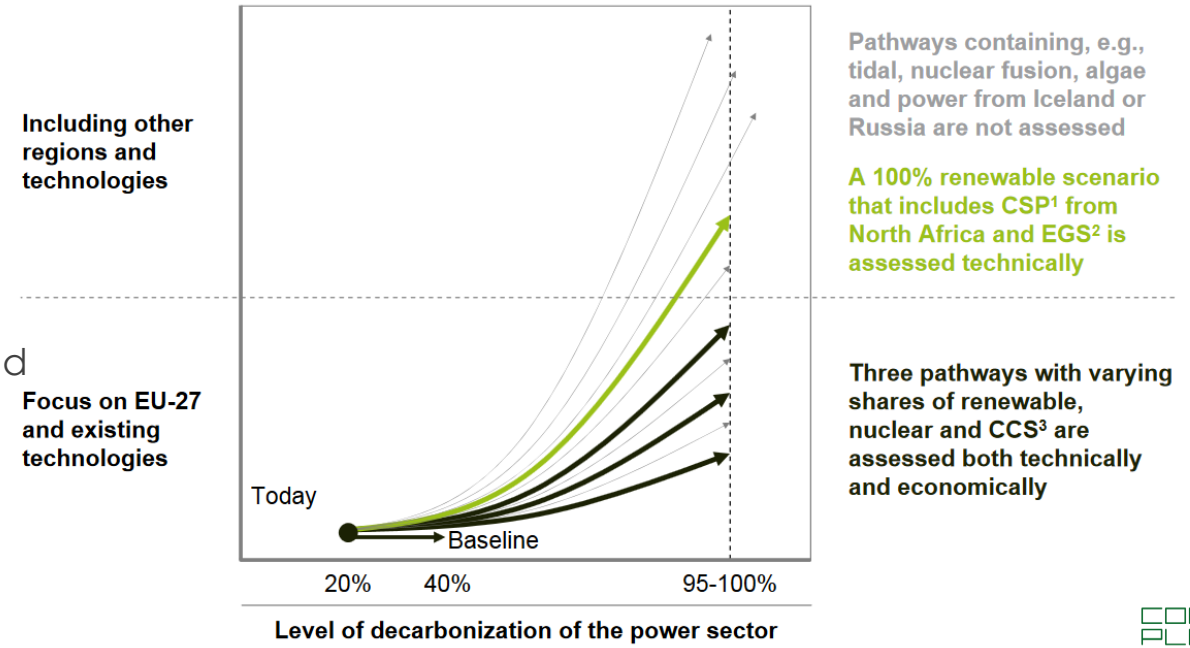
Roadmap 2050 Vision

Vision

- EU committed to reduce greenhouse gas emissions by **at least 80% below 1990 levels by 2050**. In support of this objective, the European Climate Foundation (ECF) initiated a study to plot the pathway from today to reaching the goal by 2050 – Roadmap 2050

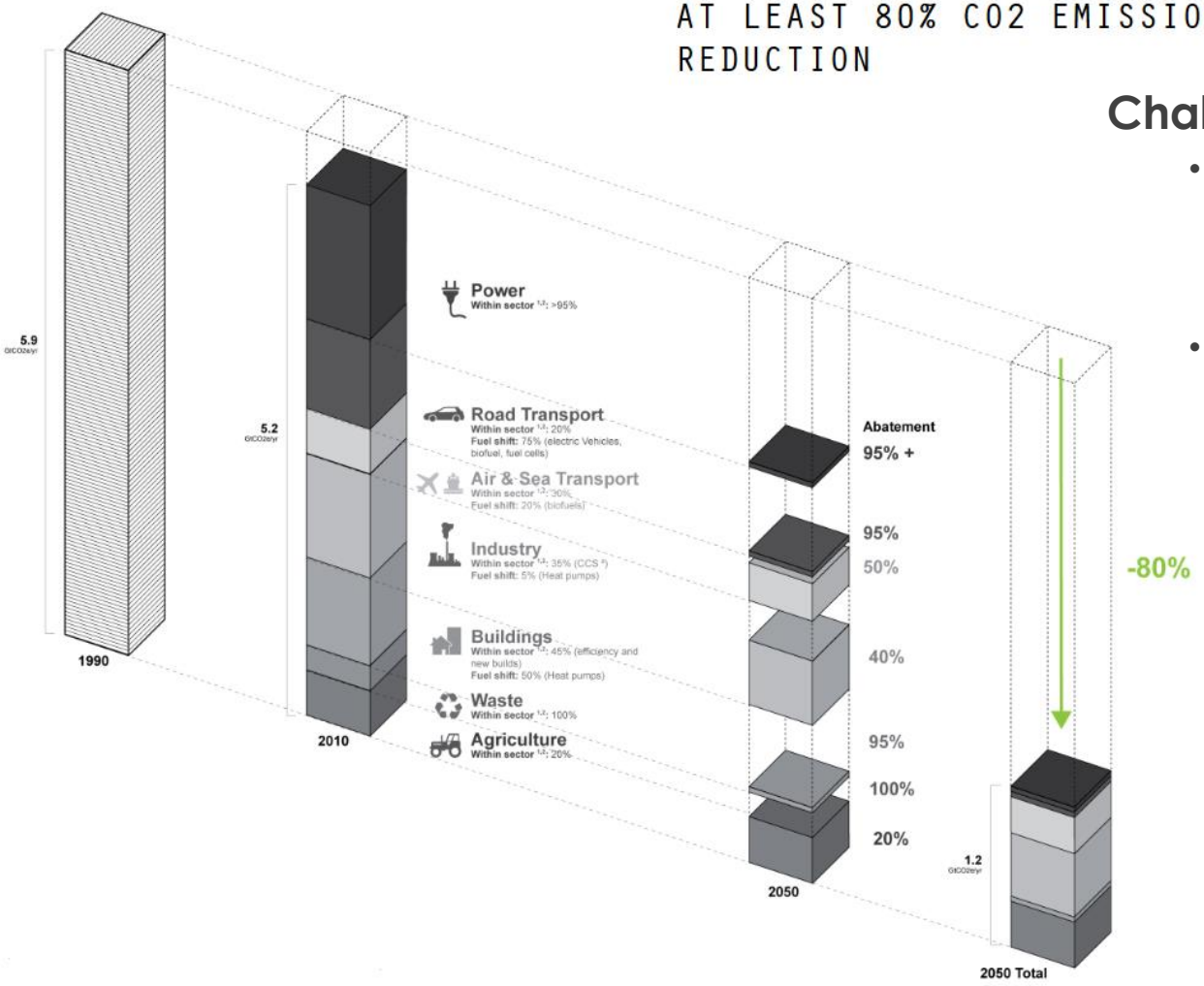
Vision: 80% reduction in GHG below 1990 levels by 2050 across the European economy

- without relying on international carbon offsets
- with at least the same level of service reliability as Europeans enjoy today
- which implies 95 to 100% decarbonized power sector



Roadmap 2050 Vision

Vision



Challenges – It needs a

- **transition** to a new energy system both in the way **energy is used** and in the way **energy is produced**
- **transformation** across all energy related emitting sectors, thereby moving capital into new sectors

Global: Sustainable Development Goals

Vision

Audiences for visioning workshops

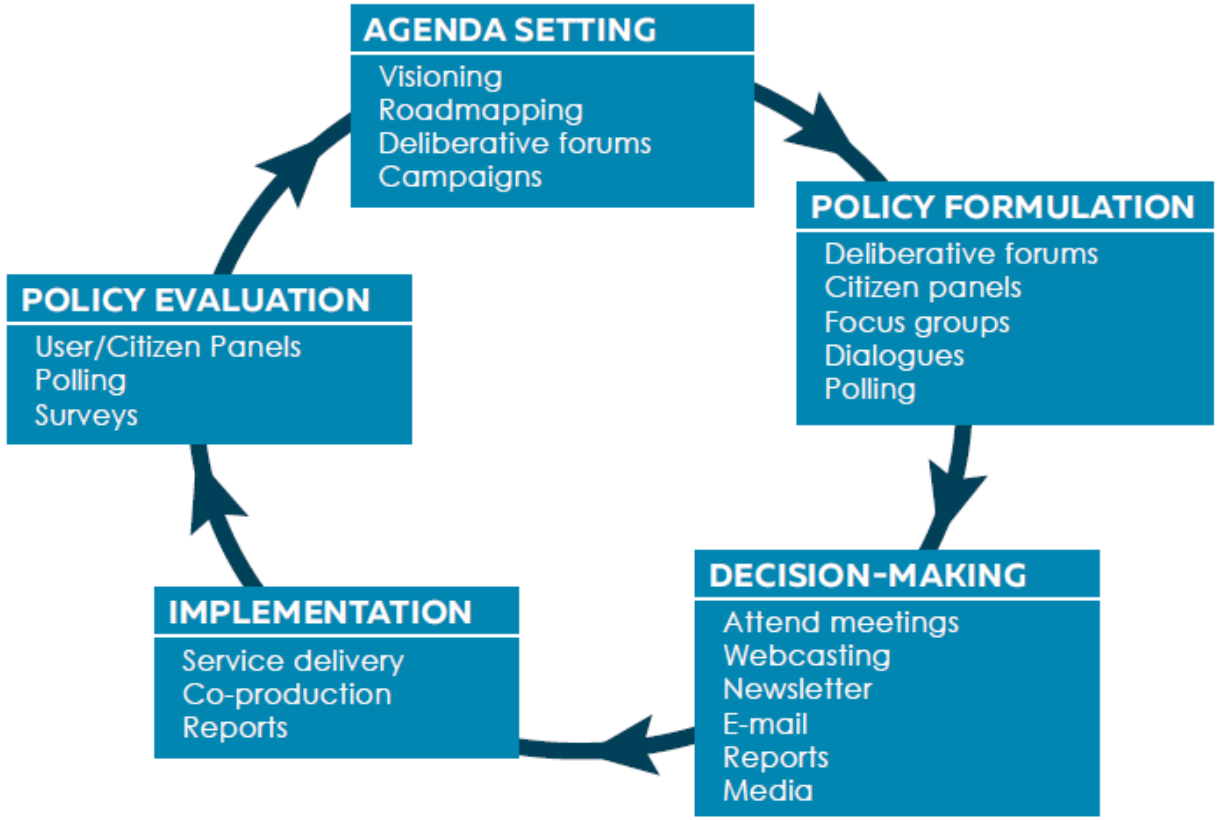
Vision

- **Regional government decision makers** for the sectors energy, environment, industry, infrastructure, regional development and economics
- **Utilities:** Energy producers, distributers, infrastructure providers and regulators
- **Energy sector decision makers:** particularly from industries that produce or consume large amounts of energy (e.g. electricity, natural resources, agriculture and energy-intensive industry)
- **Experts:** Scientific, engineering, policy, social science and businesses
- **NGOs** engaged in research and advocacy in low-carbon energy.

Implement stakeholder engagement

Vision

- **Engagement strategies should be established for primary stakeholders** to ensure that they are involved appropriately and most efficiently.
- This includes both **formal and informal forms of engagement**.
- **Regular interaction with stakeholders should take place at key points in the roadmapping process** or based upon some other relevant timeframe to ensure that they continue to be engaged.



Stakeholder involvement

Vision

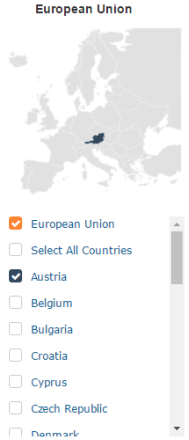
	Regional goverment	Energy producers	Energy consumers	Experts, R&D	NGOs
Phase 1: Planning and preparation	A	A	A	C	A
Phase 2: Visioning	A	C	C	A	C
Phase 3: Roadmap development	A	A	A	C	A
Phase 4: Roadmap implementation	A	A	A	C	A

A … active participation
C … consultation

Supra-Regional: e.g. EU Reference Scenario 2016

Vision

- **In the visioning process one has to consider the business-as-usual scenario**
  - **Interactive** graphs and maps from 2000 to 2050
  - Shows impact of current EU policies on energy and transport trends

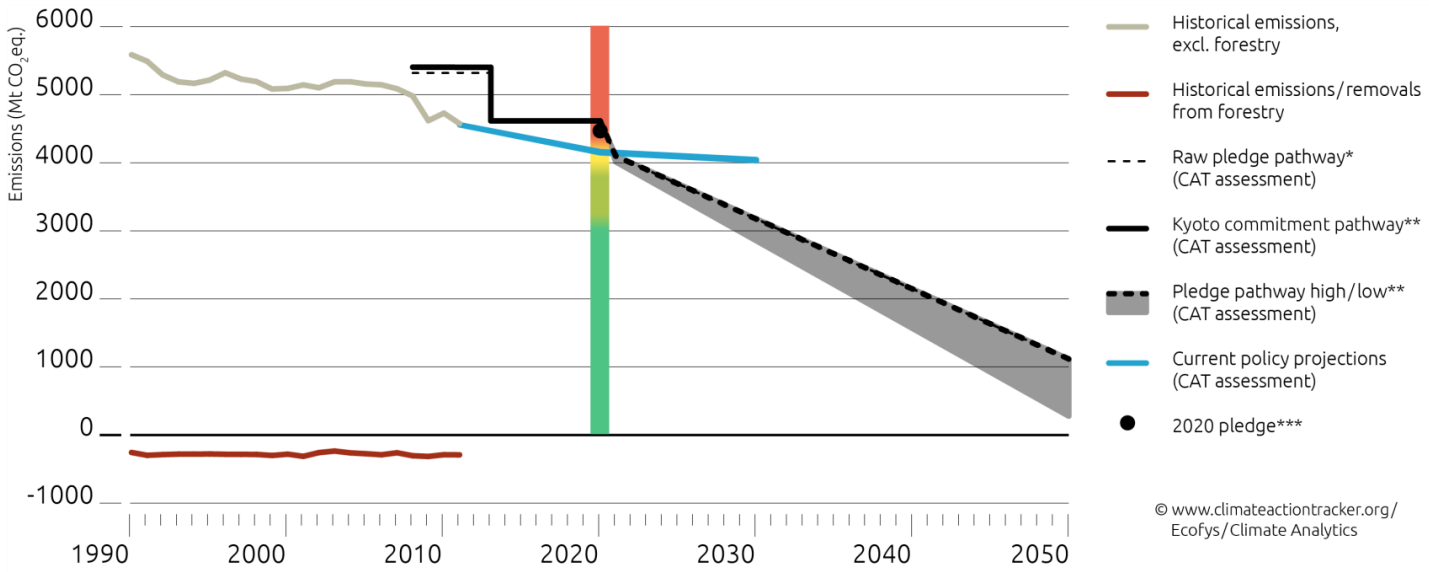


https://ec.europa.eu/energy/en/data-analysis/energy-modelling

Visioning – based on long-term scenarios

Vision

- **Backcasting & Forecasting - Deep Decarbonization Pathways**
  - Aim to help countries to pursue their national development priorities while achieving the deep decarbonization of energy systems by mid-century, consistent with the 2°C limit.



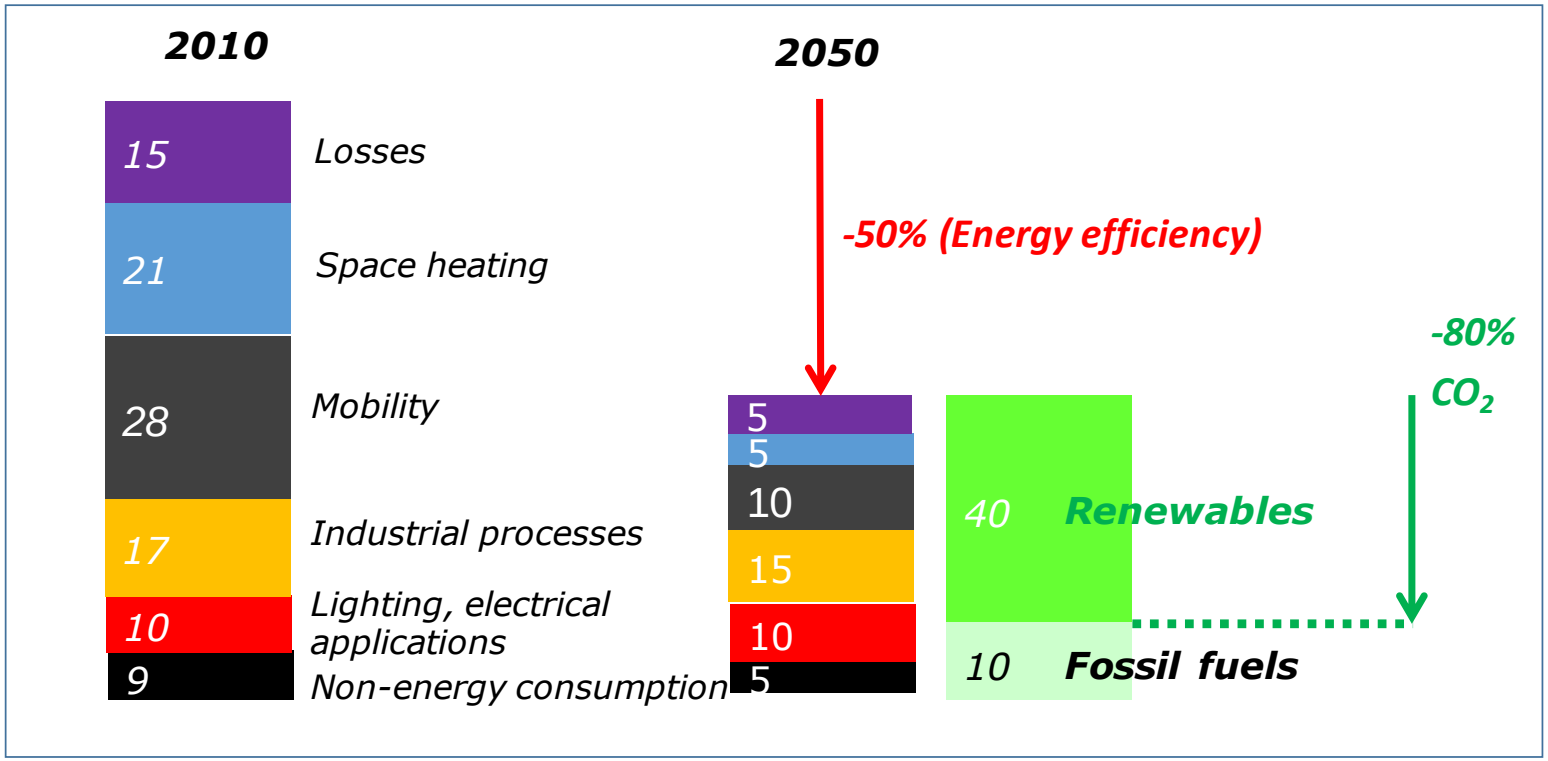
* Excl. LULUCF credits and debits, excl. LULUCF base year emissions accounting rules and without application of historical threshold on emissions allowances in 2020 under the Doha decision.

** Incl. LULUCF credits and debits, incl. LULUCF base year emissions accounting rules and application of historical threshold on emissions allowances in 2020 under the Doha decision.

*** Emissions level in 2020 resulting from unconditional pledge. This differs from the Kyoto commitment pathway as it depicts final 2020 levels whereas the Kyoto pathway considers the average level of emissions over the second commitment period (2013-2020).

Regional Scenario (until 2050)

- Optimise the balance of energy utilisation

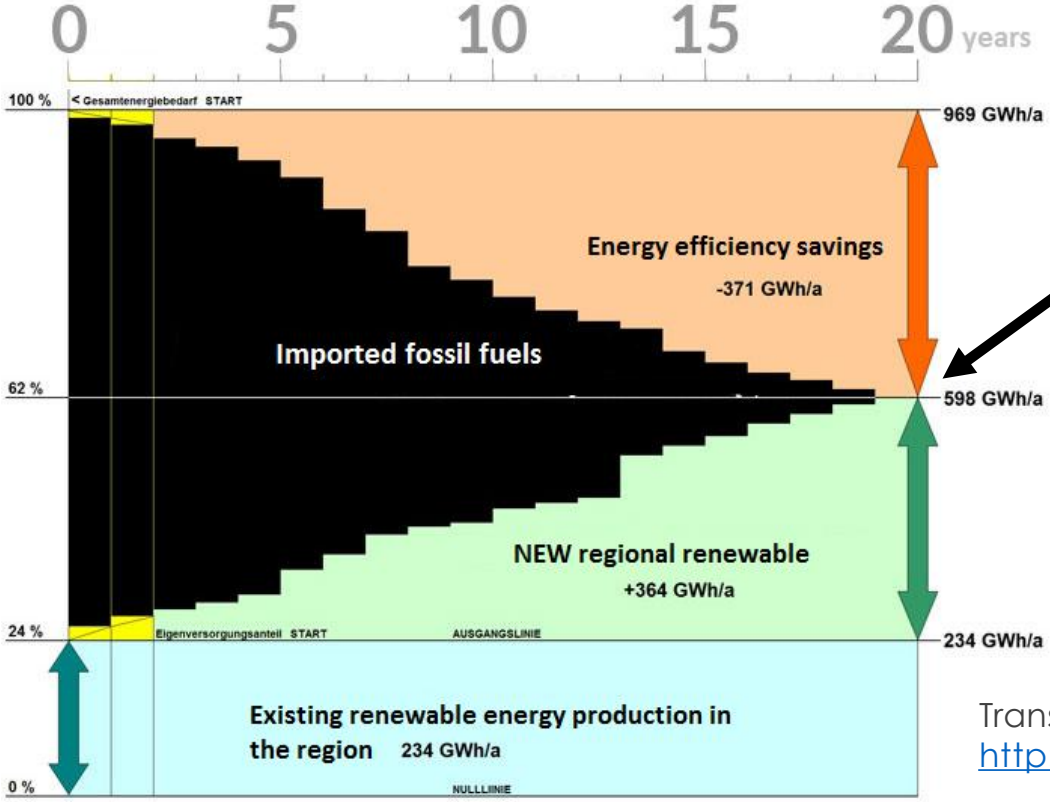


2050: reduce energy demand by 50% and reduce fossils to 20%

Example for vision statements on regional level

Vision

- **Model region in Austria (Thayaland)**
  - 15 municipalities
  - 1 climate and energy model region
  - 1Vision



- **Vision: Region is independent from imported fossil fuels by 2030**

<--Starting in 2010

Target value of the energy vision

Translated from
http://kem.thayaland.at/kem/

Example for vision statement on regional level (2)

Vision

Micro-Region Bucklige Welt-Wechselland in Lower Austria (25,000 inhabitants)

22 Communities signed a declaration “Regional Energy Vision”:

1. We want to continuously reduce the energy demand for heat, electricity or fuels (mobility) for all consumers (energy saving) while at the same time increasing energy efficiency.
2. We are committed to increasing the share of renewables in heat production to over 50% of regional energy needs.
3. We aim to increase our own generation of electricity from renewable energy sources by continuously expanding our existing potential and building wind, biomass (combined heat and power), solar (photovoltaic) and small hydropower generating facilities.
4. Overall, this should reduce CO2 emissions in the region by at least 25% by 2020 compared to 2005.
5. As a region in terms of energy efficiency and renewable energies, we want to be a role model for Lower Austria and neighbouring EU regions.
6. We want to support regional initiatives that provide an increased supply of energy products and services to companies in the region, thereby creating more value in the region.
7. We want to support initiatives in the area of electromobility in the region or other alternative forms of mobility, as well as the promotion of public transport.
8. We are committed to carrying out ongoing awareness-raising activities designed to increase the willingness to implement energy projects.

Visioning exercise

Creating common energy visions

- **Topic: Creating common energy vision for the North-East Region**

- **Objective: Develop in the working group statements of energy vision**

- **Output:** The developed energy vision has to …
  - Address the needs and objectives of the region for a long-term energy strategy
  - Define priority targets – based on political commitments and the results of the collective process
  - Contribute to existing energy and development targets of the region
  - Ideally fill the gap between existing policies and the overall goal of a regional low-carbon economy.

Визија 2050 за енергетска транзиција на СИПР

СИПР е Зелен регион кој обезбедува 40% енергија за потрошувачите од обновливи извори на енергија и има 30% намалена емисија на стаклени гасови во однос на 2016.

NEPR 2050 Energy Transition Vision

Northeastern Planning Region is a Green region that provides 40% of energy to consumers from renewable energy sources and decreases greenhouses gases emission by 30% in comparison with 2016.

Characteristics of a vision statement

For your vision statement answer the following questions:

- **What is the concrete (quantified) target for achieving the vision? What is the timeframe?**
- **Which barriers do you want to address with the vision? How will the vision help in overcoming the identified barriers?**
- **Synergies and goal conflicts: Apart from the energy sector, which other sector will be impacted or need to contribute?**
- **Who else should be involved in this process?**

Session 3: Developing a Roadmap

The Energy Roadmapping Process - Phases

Baseline

- Analysis of present energy status (energy and emission balances for different sectors)
- Identification of potentials, challenges and barriers

Vision

- Stating the development goal of the region / municipality / organisation
- Aim at development scenarios beyond business as usual

Roadmap

- Identify priority areas for reaching the vision
- Plot development scenarios and identify leverage points and required actions

Action Plans

- Concrete measures
- Answering what, who, how and when

Roadmap development

Roadmap

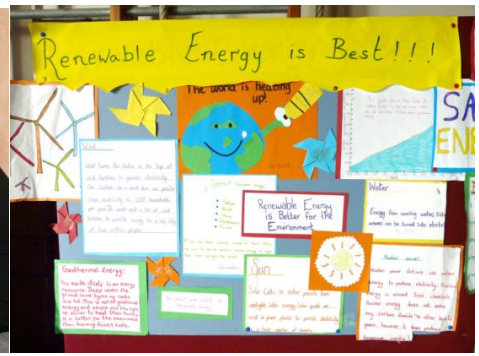
After establishing a common vision with your stakeholders the roadmap development phase can begin.

- Based on data analysis and expert judgement
- Again, broad stakeholder involvement is key
- **Define major directions to be followed**
- **Define priority areas in which to concentrate your actions**
- finally, be in line with initial defined **vision**

Various ways to keep stakeholders involved

Roadmap

- **Roadmapping exercise – it‘s all about public participation!**
- **Increases long-term commitment and implementation support**



Public participation process - benefits

Roadmap

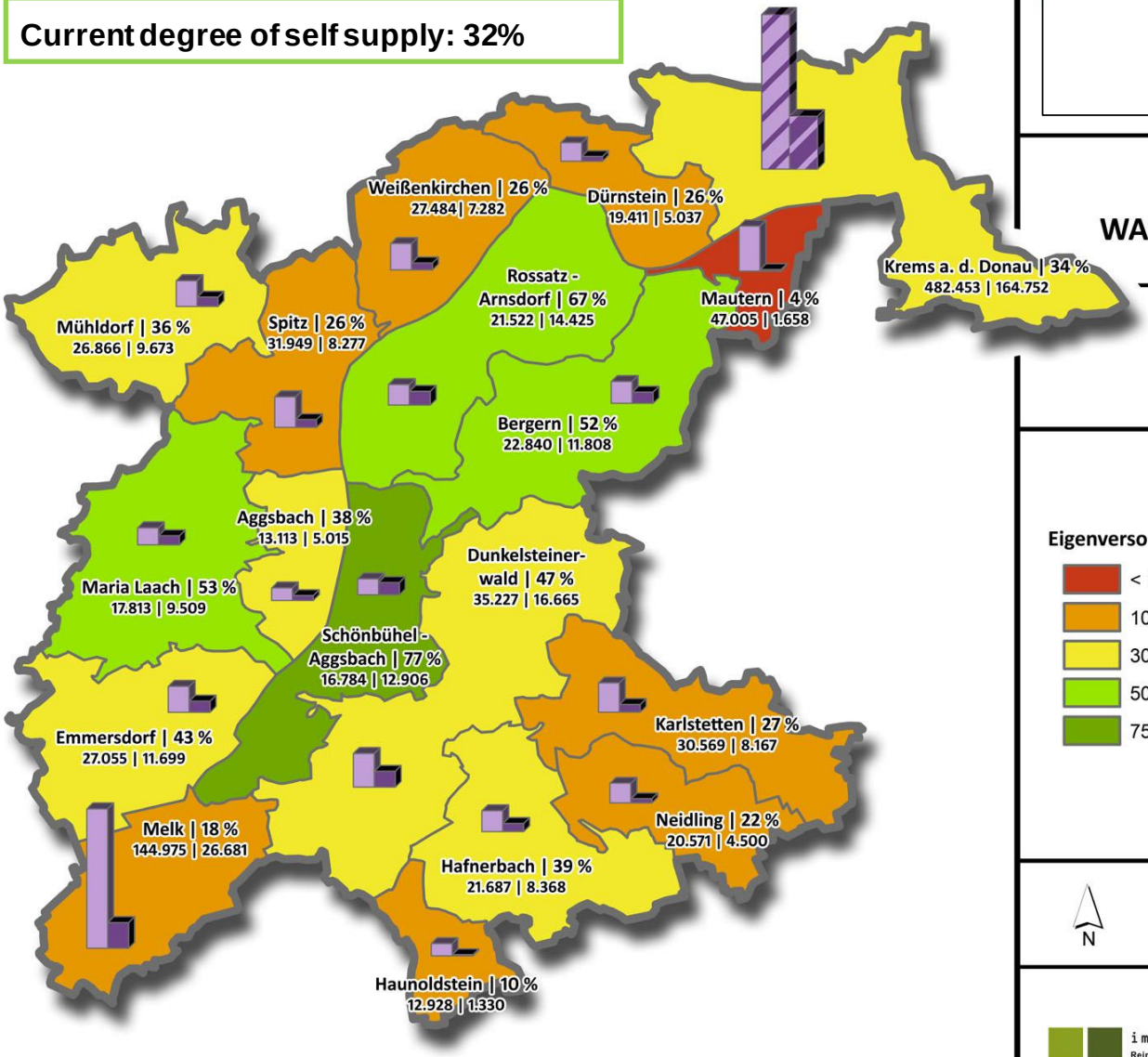
- Promote the **exchange of information and experiences**
- Foster the **comprehension for differing other opinions** and the coordination of interests
- Enhance the **quality and transparency of decisions**
- **Enhance the acceptance and traceability of decisions**, also of those whose social benefits will become evident only in the long run
- Strengthen the **identification of citizens and interest groups** with decisions, but also with the regions they live in
- Provide **broader bases of decision-making** for political and administrative decision-makers
- Create a broad approach to **opinion-forming**
- **Help avoid delays and extra costs in the implementation** of the policies, plans, programmes, and legal instruments, thereby optimising the use of resources.

Developing energy scenarios

Roadmap

- **Energy scenarios are used to compare several development paths and theirs quantitative impact on the energy consumption in the future**
- **Important conclusions gained from such scenarios are:**
  - No matter what development will actually be realised, there are guidelines (objectives) available for upcoming energy-related decisions.
  - Depending on the "energy vision", policy objectives of the municipality/region development scenarios can be compared and an optimal solution can be found.
  - Scenarios provide the basis for long-term decision-making considering future plans in "todays" decisions

Current degree of self supply: 32%



Energy demand & production HEAT

Leader-Region
WACHAU-DUNKELSTEINERWALD

Datengrundlage
Amt der NÖ Landesregierung, Geschäftsstelle für Energiewirtschaft
NÖGIS, Land NÖ

Eigenversorgungsgrad
- < 10 %
- 10 - 30 %
- 30 - 50 %
- 50 - 75 %
- 75 - 100%

ENERGIEBEDARF
(MWh/a)
- Wärme

ENERGIEBEREITSTELLUNG
(MWh/a)
- Wärme

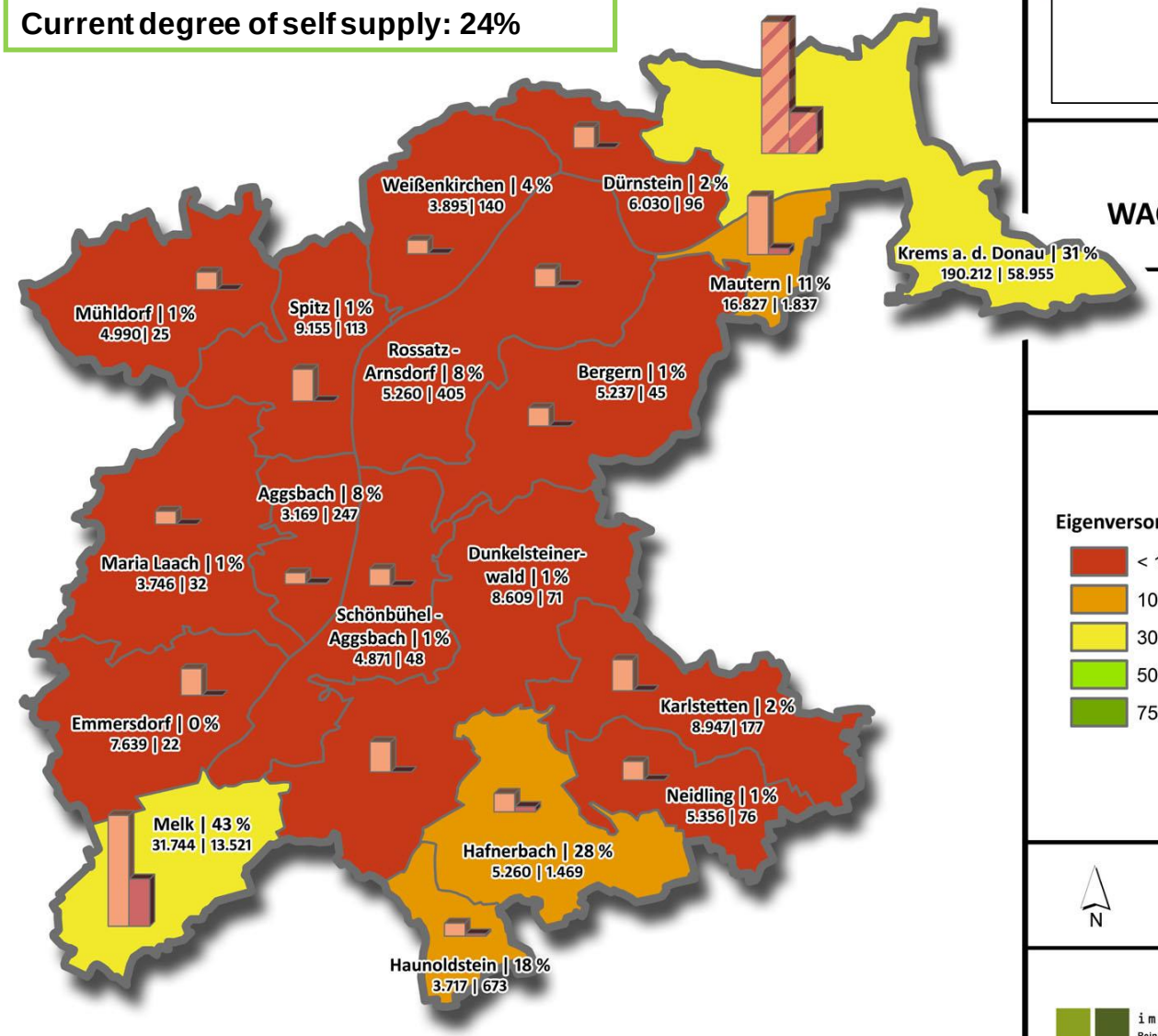
Verkleinerte Darstellung
(Faktor 3)

N

0 1 2 4 6 8 Kilometer

Planverfasser
im-plan-tat
Reinberg und Partner OG
im-plan-tat | Reinberg und Partner OG
Techn. Büro für Raumplanung, Tulln - Krems
Bearbeiterin: DI Manuela Holzer-Fragner

Current degree of self supply: 24%



Energy demand & production ELECTRICITY

Leader-Region

WACHAU-DUNKELSTEINERWALD

Datengrundlage

Amt der NÖ Landesregierung,
Geschäftsstelle für Energiewirtschaft
NÖGIS, Land NÖ

Eigenversorgungsgrad

- < 10 %
- 10 - 30 %
- 30 - 50 %
- 50 - 75 %
- 75 - 100%

ENERGIEBEDARF
(MWh/a)

Strom

ENERGIEBEREITSTELLUNG
(MWh/a)

Strom

Verkleinerte Darstellung
(Faktor 5)

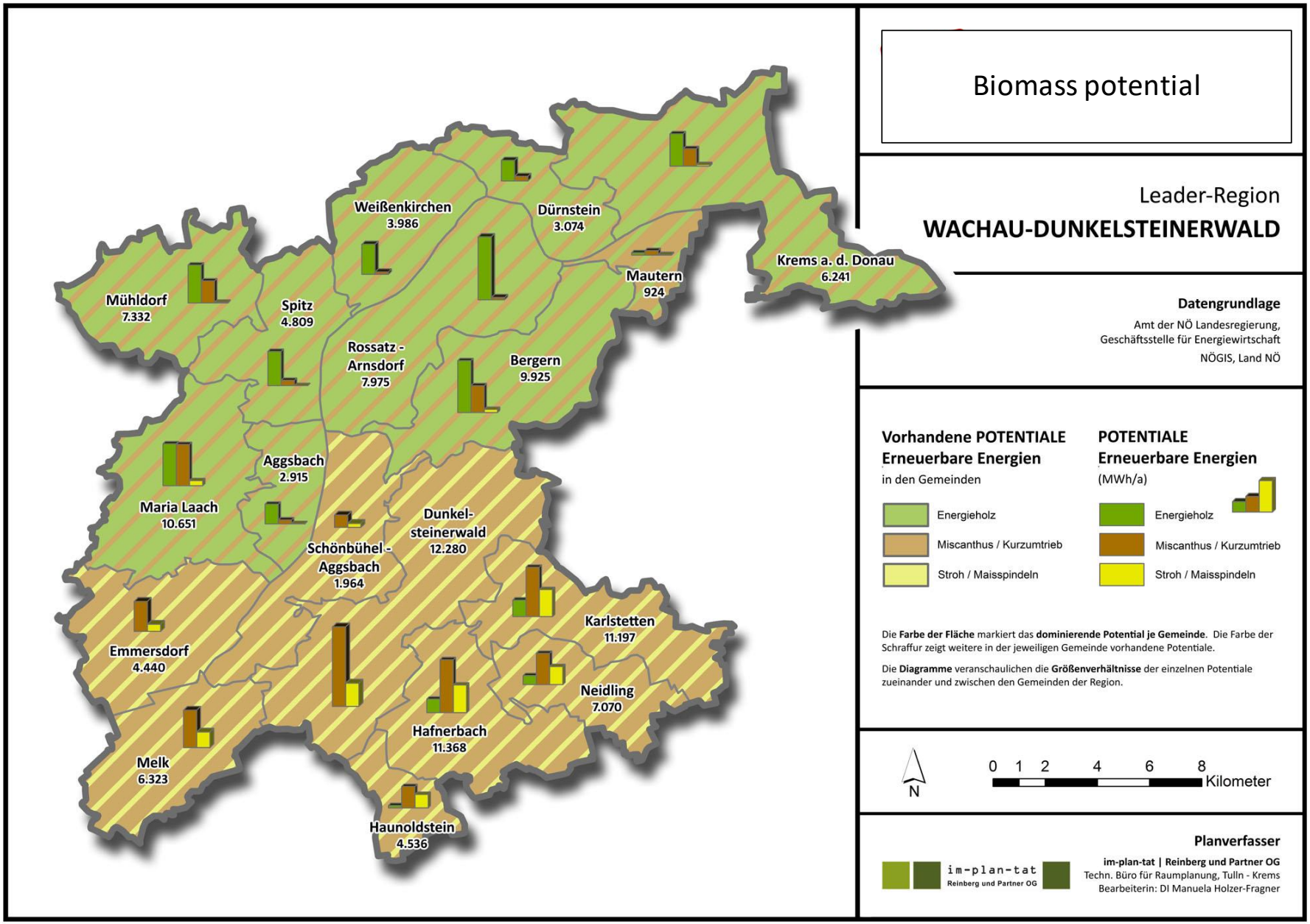
N

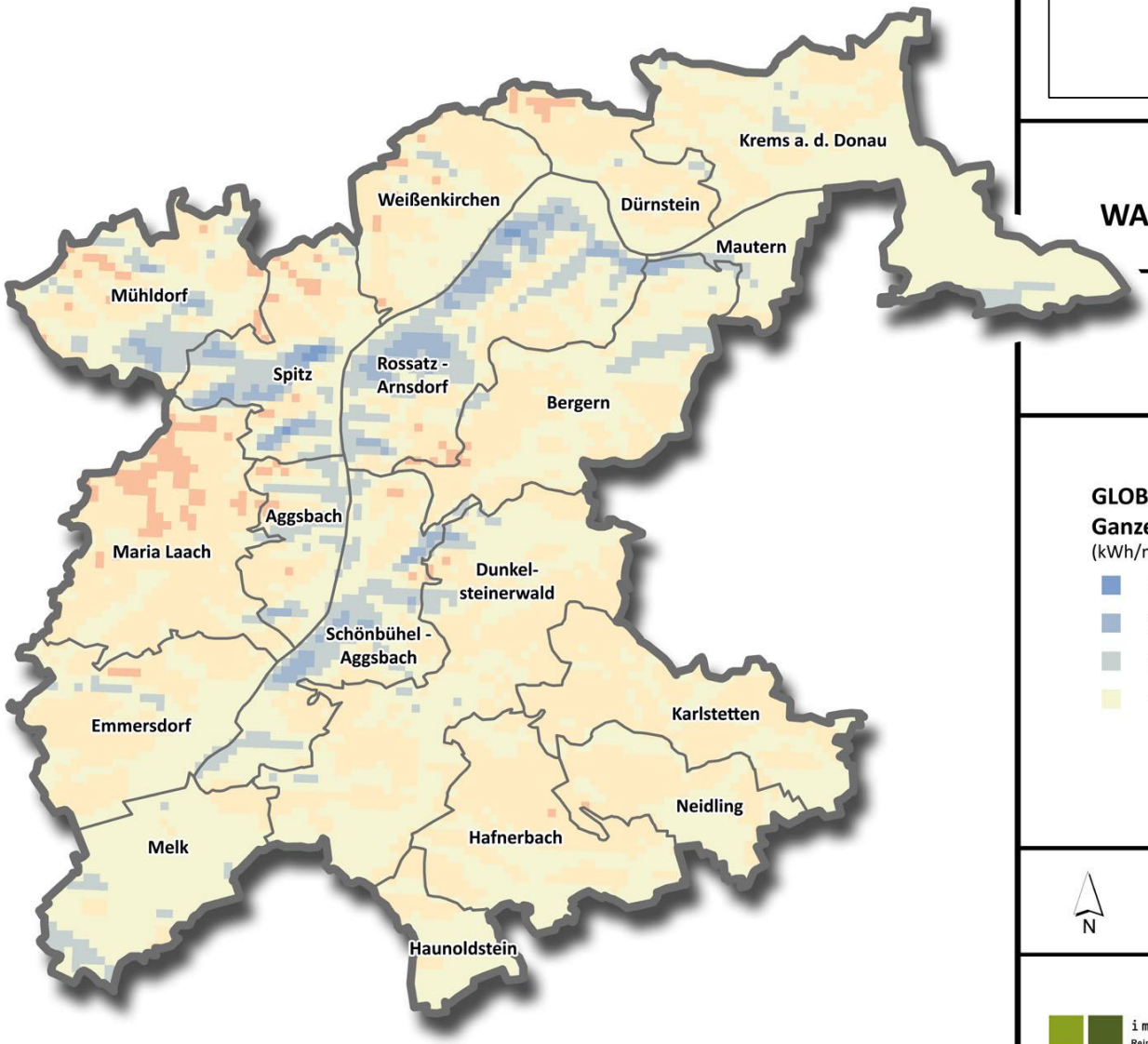
0 1 2 4 6 8 Kilometer

Planverfasser

im-plan-tat
Reinberg und Partner OG

im-plan-tat | Reinberg und Partner OG
Techn. Büro für Raumplanung, Tulln - Krems
Bearbeiterin: DI Manuela Holzer-Fragner


Biomass potential
Leader-Region
WACHAU-DUNKELSTEINERWALD
Weißenkirchen
3.986
Dürnstein
3.074
Krems a. d. Donau
6.241
Mautern
924
Mühldorf
7.332
Spitz
4.809
Rossatz -
Arnsdorf
7.975
Bergern
9.925
Aggsbach
2.915
Maria Laach
10.651
Dunkel-
steinerwald
12.280
Schönbühel -
Aggsbach
1.964
Karlstetten
11.197
Emmersdorf
4.440
Neidling
7.070
Hafnerbach
11.368
Melk
6.323
Haunoldstein
4.536
Datengrundlage
Amt der NÖ Landesregierung,
Geschäftsstelle für Energiewirtschaft
NÖGIS, Land NÖ
Vorhandene POTENTIALE
Erneuerbare Energien
in den Gemeinden
Energieholz
Miscanthus / Kurzumtrieb
Stroh / Maisspindeln
POTENTIALE
Erneuerbare Energien
(MWh/a)
Energieholz
Miscanthus / Kurzumtrieb
Stroh / Maisspindeln
Die Farbe der Fläche markiert das dominierende Potential je Gemeinde. Die Farbe der Schraffur zeigt weitere in der jeweiligen Gemeinde vorhandene Potentiale.
Die Diagramme veranschaulichen die Größenverhältnisse der einzelnen Potentiale zueinander und zwischen den Gemeinden der Region.
N
0 1 2 4 6 8 Kilometer
Planverfasser
im-plan-tat
Reinberg und Partner OG
im-plan-tat | Reinberg und Partner OG
Techn. Büro für Raumplanung, Tulln - Krems
Bearbeiterin: DI Manuela Holzer-Fragner



Solar potential

Leader-Region

WACHAU-DUNKELSTEINERWALD

Datengrundlage

Statistik Austria
Shuttle Radar Topography Mission (SRTM)
NÖGIS, Land NÖ

GLOBALSTRAHLUNG
Ganzes Jahr
(kWh/m²)

701 - 800	1.101 - 1.200
801 - 900	1.201 - 1.300
901 - 1.000	1.301 - 1.400
1.001 - 1.100	1.401 - 1.500

N

0 1 2 4 6 8 Kilometer

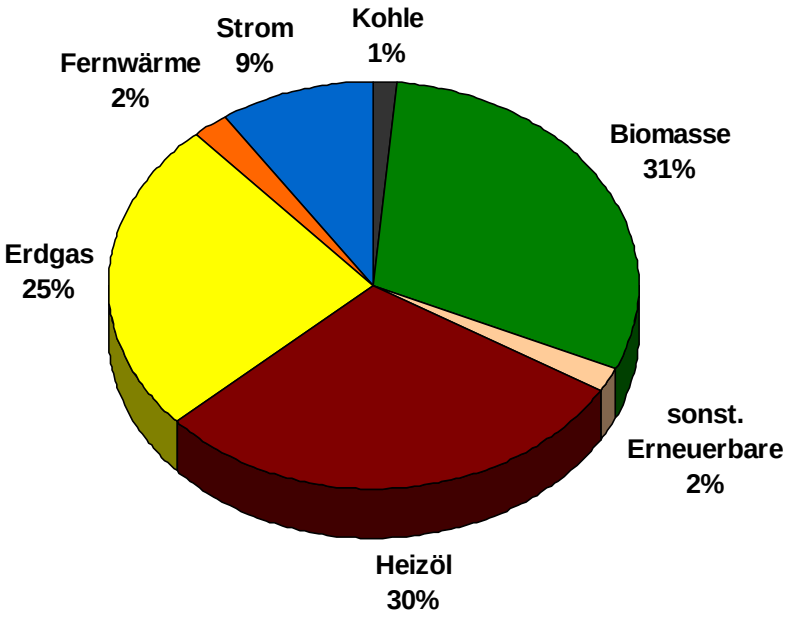
Planverfasser

im-plan-tat
Reinberg und Partner OG

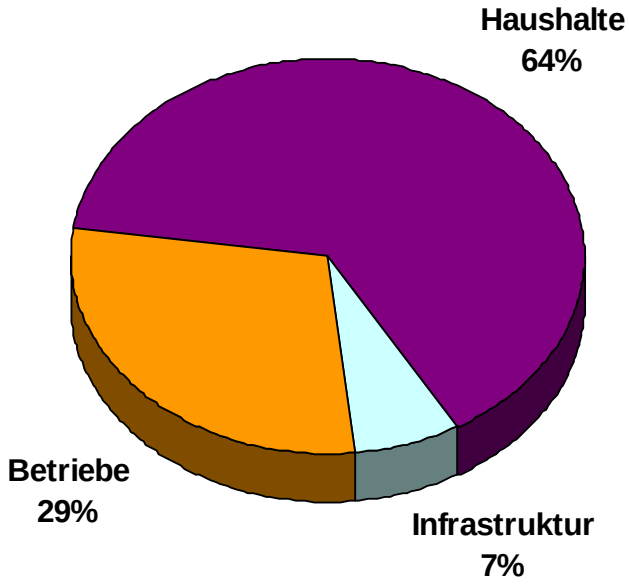
im-plan-tat | Reinberg und Partner OG
Techn. Büro für Raumplanung, Tulln - Krems
Bearbeiterin: DI Manuela Holzer-Fragner

Regional Energy Balance – Heat demand

Final energy demand – fuel types



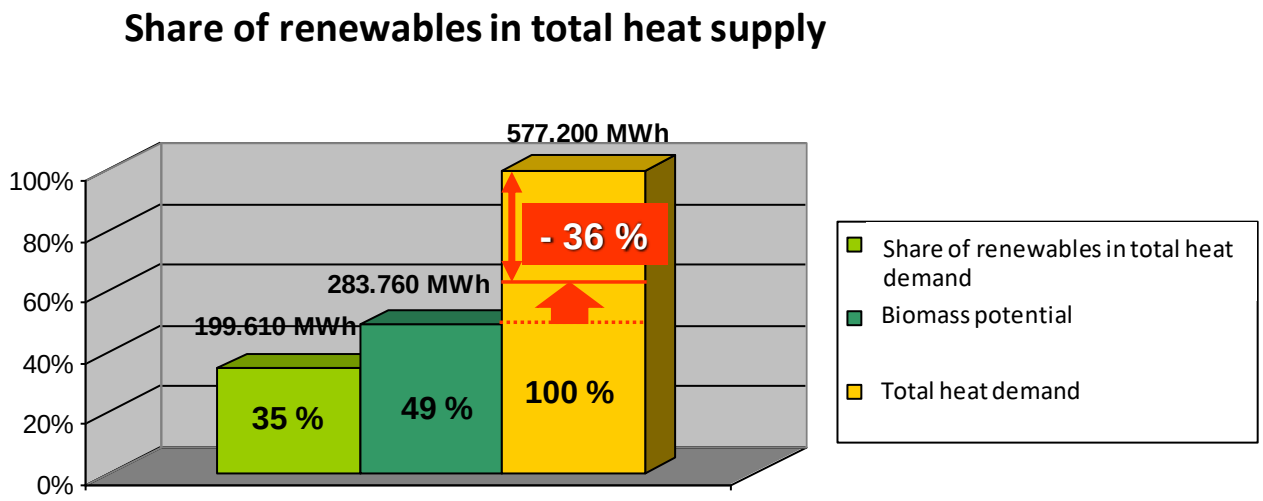
Final energy demand - sectors



Total heat demand: 577,187 MWh
CO_2 emissions: 107,605 t
CO_2/capita: 3.1 t

Renewable energy potentials - Biomass

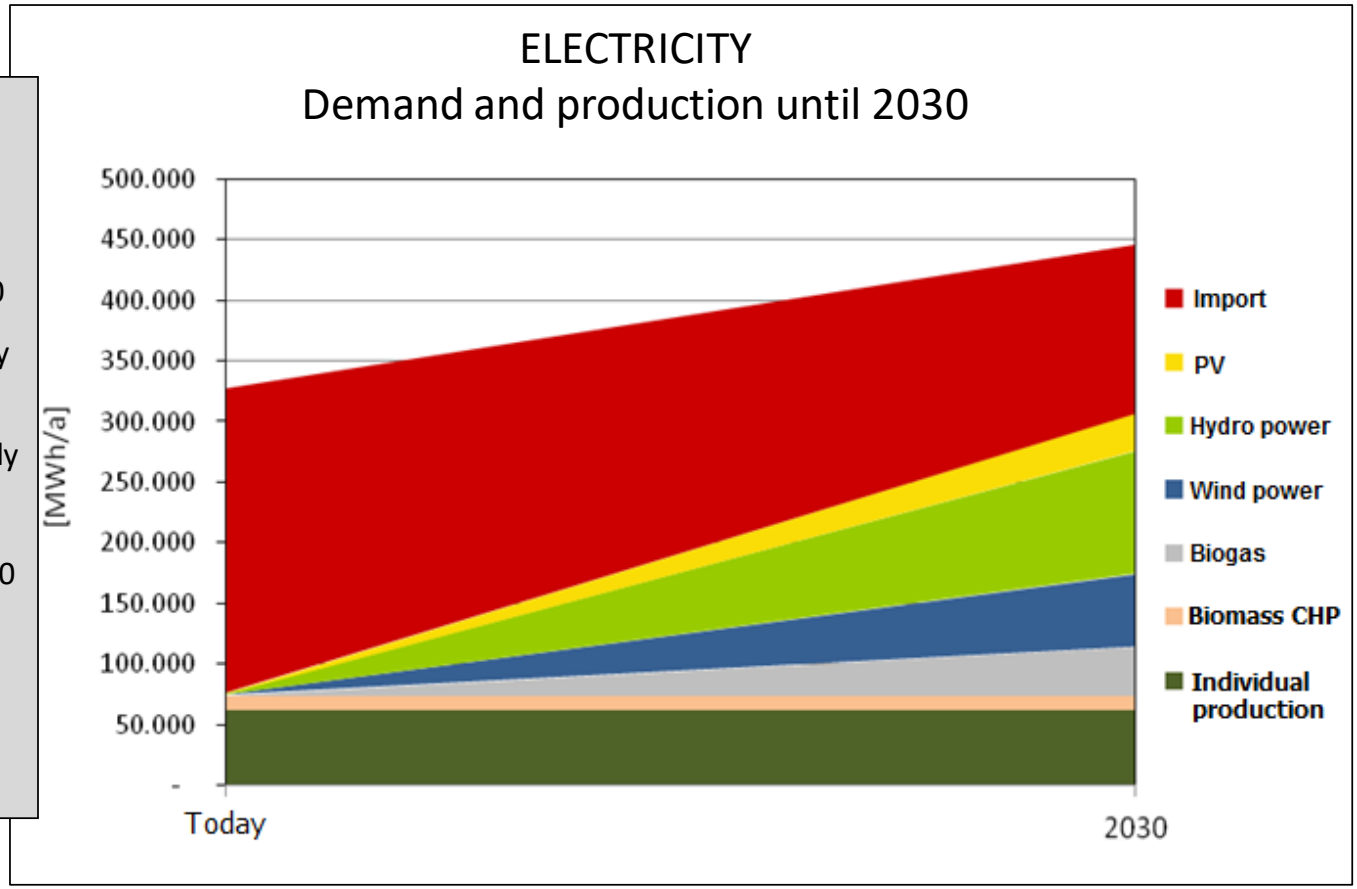
- Additional biomass potential in the region: **+14%** - approx. 84,000 MWh (approx. 4,000 biomass boilers à 15 kW)
- CO_2-emission reduction considering current energy mix: **15,000 t (-14%)**



Electricity supply – today and in future

Targets:

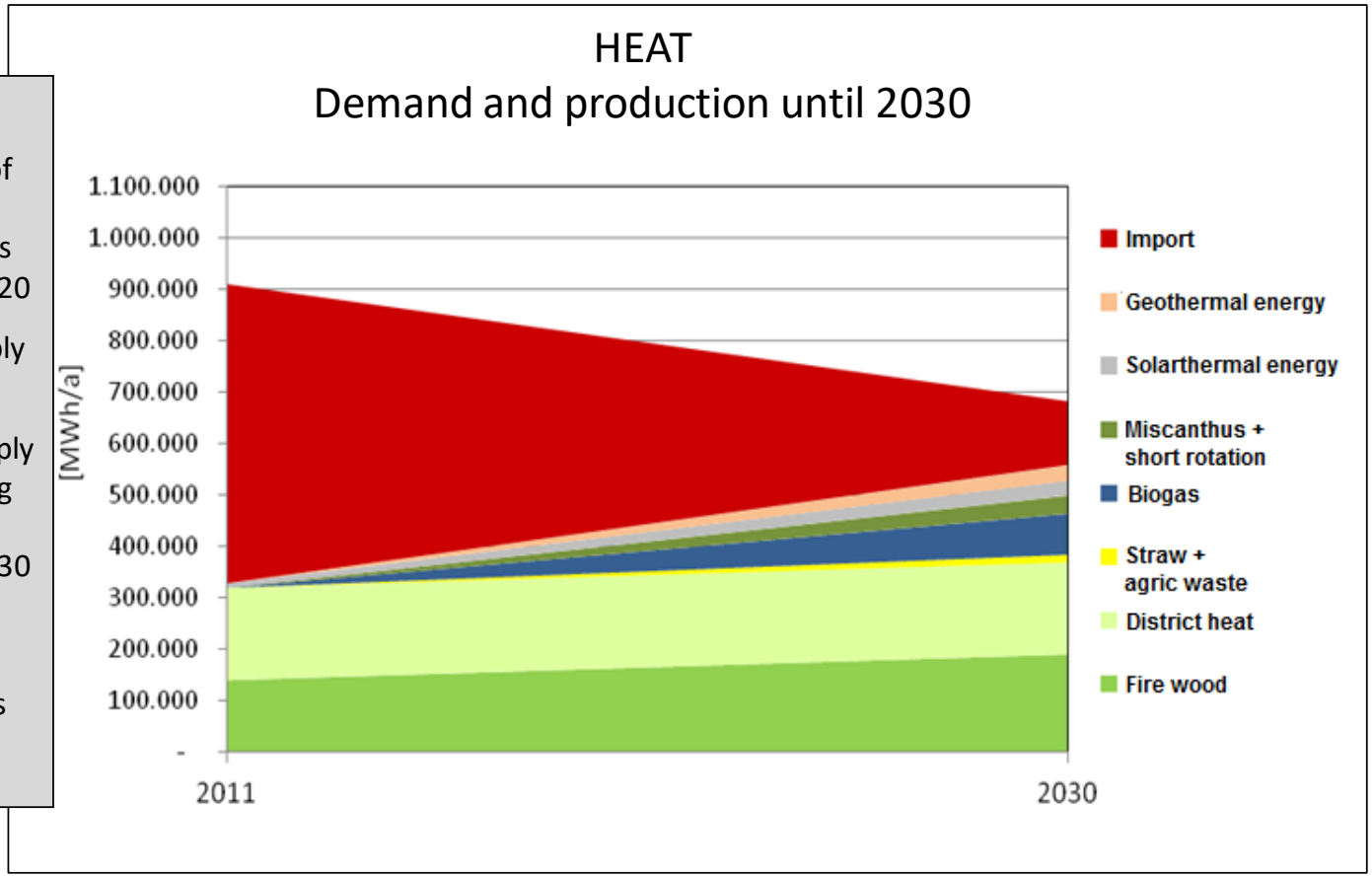
- Reduce annual growth of el. consumption to 1,5 % until 2030
- 70 % self supply until 2030
- 100 % self supply not considering the industry sector until 2030
- Extension of renewable energy sources use



Heat supply – today and in future

Targets:

- Increase rate of building refurbishments to 3 % until 2020
- 75 % self supply until 2030
- 100 % self supply not considering the industry sector until 2030
- Extension of renewable energy sources use



Region summary - NEPR

Description:

- A mainly rural area in South Eastern Europe with 180,000 inhabitants
- The national development strategy has the primary goal to enable energy independence, reduce conventional fossil fuel utilisation and sustainable energy development.
- The region is economically the most underdeveloped planning region in the country. Its share in the national GDP is only 5.5%.
- Most of the local businesses (91%) are practically micro enterprises with a low accumulation of power and the main purpose to ensure the economic existence of its founders and employees. The whole region has only 86 larger enterprises.
- The region has almost no own electricity production capacity installed.

Potentials:

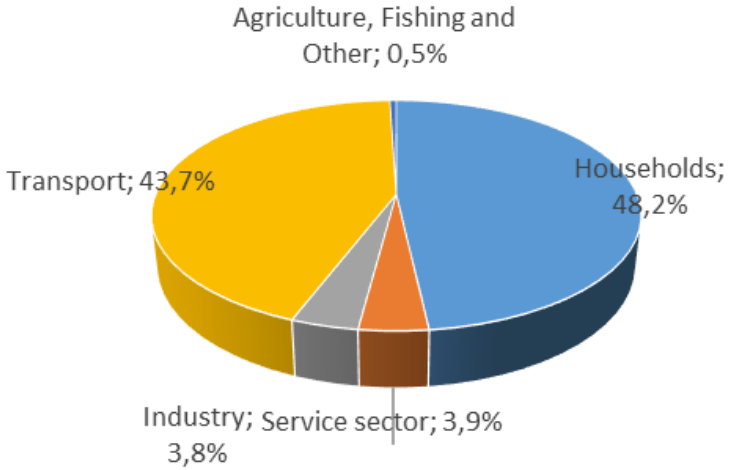
- Potential has been identified in the region for the use of renewable energy sources. Locations have been identified for the construction of small hydro power plants.
- Solar energy can be exploited across the whole region throughout most of the year.

Barriers and challenges:

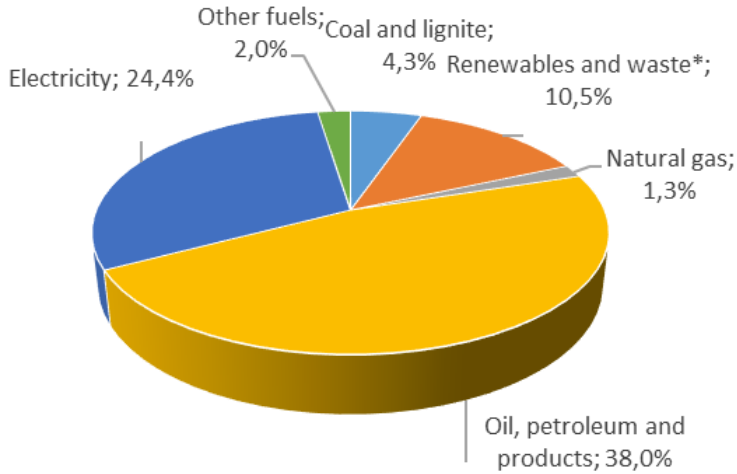
- Low investment in the energy sector and a lack of interest in sustainable energy development in general.
- Limited institutional knowledge in the region for facilitating and implementing a transition to a low carbon economy
- No adequate tariffs for renewable energy production.

Region summary - NEPR

Share of economic sectors in final energy consumption



Energy mix in final energy consumption



Final energy consumption:	990 GWh
Final energy consumption per cap:	5,600 kWh/cap (EU average 25,000 kWh/cap
Energy intensity:	2.300 kWh/1,000 EUR GDP (EU average 880 kWh/1,000 EUR GDP)

Region summary - NEPR

Strengths	Weaknesses
• No electricity production capacity installed • Geographic position • Transit gas system • Municipal Public utilities for gas distribution	• Public awareness building • Low utilisation of the RES • Availability of relevant energy data • Limited institutional knowledge for low carbon economy
Opportunities	**Threats**
• High potential of regional RES • Available financial resources worldwide • New technologies for EE • Regional initiatives for EE • Establishment of PPP • Regional REN production • Policy Support for reaching energy and climate goals • EE Potential Households • EE Potential Private Sector & Industry • EE Potential Transport	• Climate changes • Political influence • Lack of financial resources for EE measures • Negative demographic trends •

Which are the priority areas for the Roadmap?

- **Energy efficiency priority areas**
  - Households
  - Industry
  - Public buildings
  - Public lighting
  - Transport sector
  - Financing and business models
- **Renewable energy priority areas**
  - Bioenergy
  - Wind
  - Solar
  - Geothermal
  - R&D
  - Financing and business models

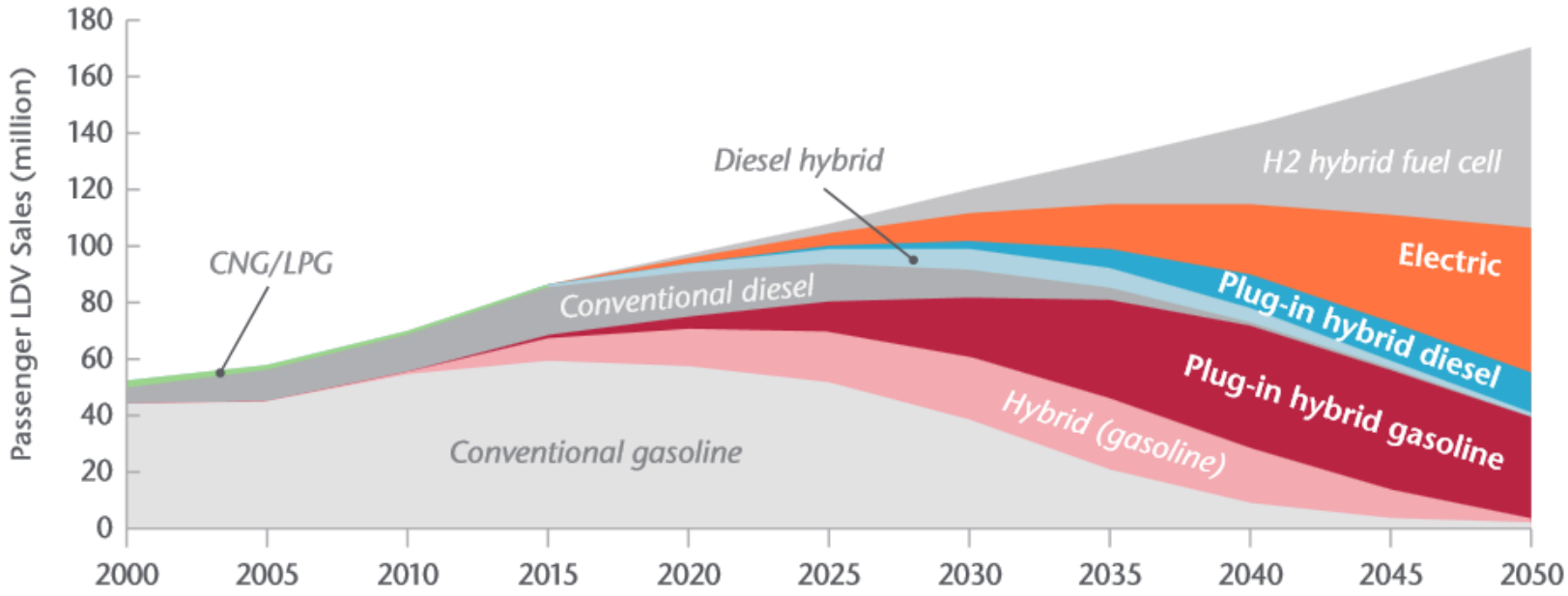
… depending on the regional challenges and barriers which need to be addressed as well as regional potentials.

Example Roadmaps

Roadmap

IEA Electric and Plug-In Hybrid Vehicle Roadmap

- **Vision**: industry and governments should attain a combined electric/plug-in hybrid vehicle sales share of at least 50% by 2050
- **Development scenario:**

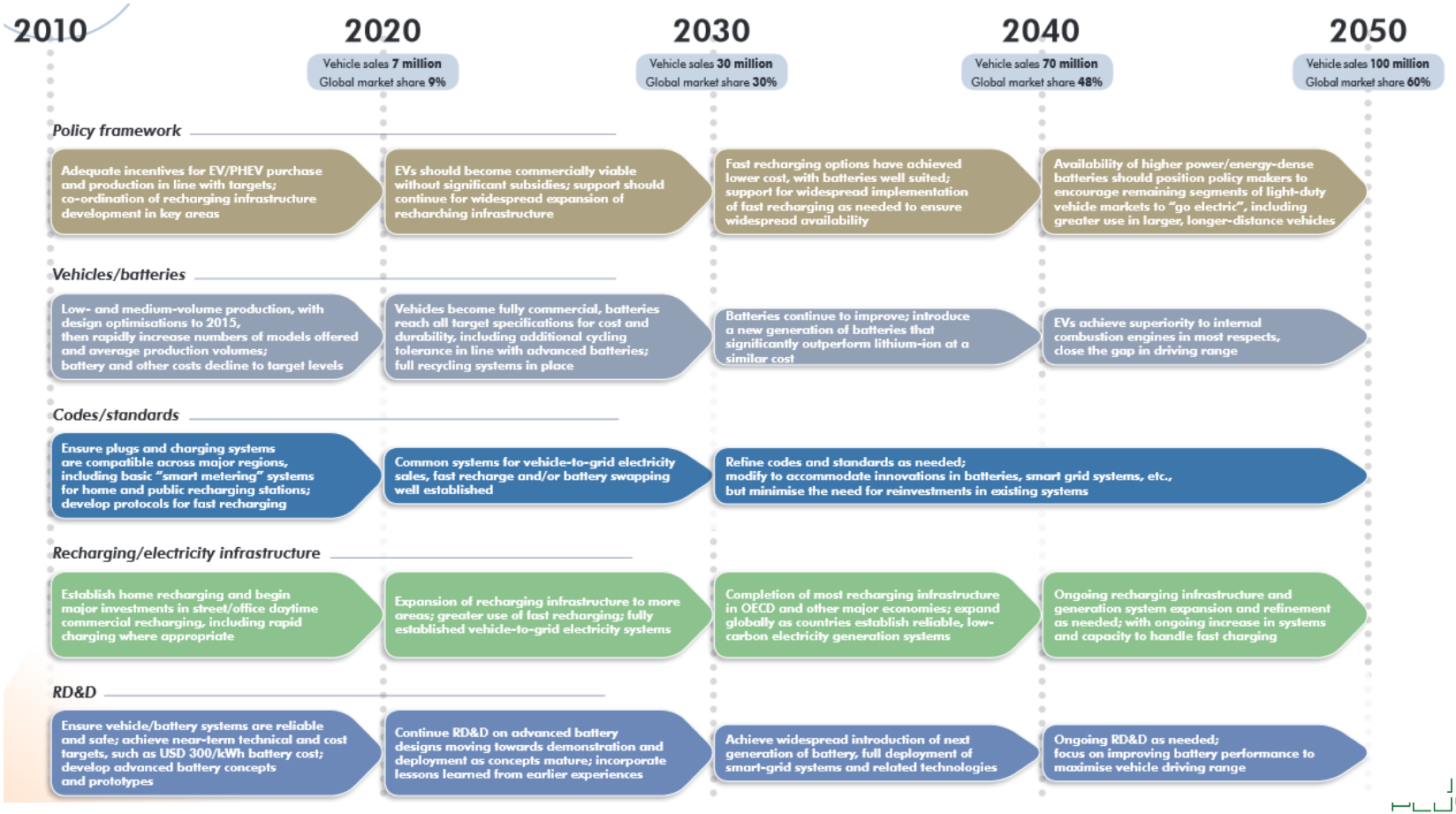


Example Roadmaps

Roadmap

IEA Electric and Plug-In Hybrid Vehicle Roadmap

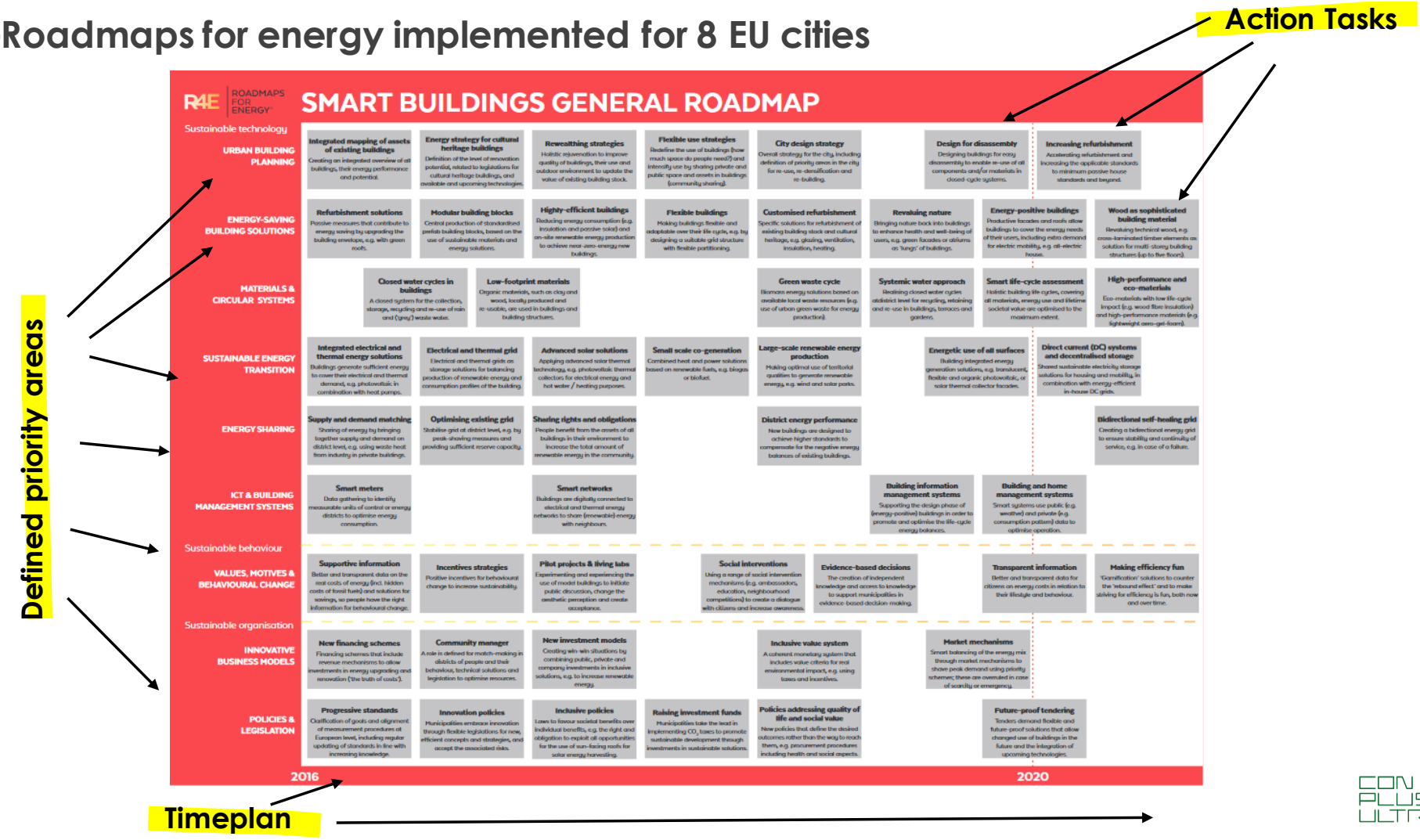
- **Roadmap**



Example Roadmaps

Roadmap

R4e –Roadmaps for energy implemented for 8 EU cities



Example Roadmap

Priority Projects	
Nr.	Topic
H 1	Energy coordinating group for the Region
P 2	Buildings, Equipment and Facilities
P 3	Transport
P 4	Local electricity production
P 5	Land use planning
P 6	Public procurement of products and services
P 7	Working with citizens and stakeholders

Example Roadmaps

- **Priority Sectors covered in the Roadmap**

Buildings, equipment & facilities	Transport	Local electricity production	Land use planning	Public procurement of products and services	Working with citizens and stakeholders
Introduction of solar thermal facilities in sports centers and municipal public buildings with high hot sanitary water demand	Progressive renovation of the City Council fleet by electric and hybrid vehicles	Installation of solar photovoltaic plants on roofs of public building	By-law on energy efficient new buildings	Introduction of energy efficiency criteria in City Council Tenders for services and infrastructure	Creation of staff allocated for SEAP development and energy saving actions
Energy audit of all public buildings	Ecodriving courses for City Council staff	Installation of internal combusion engines for the generation of electricity from biogas in the waster treatment plant (plant Oulja & Akreuch landfill).	Solar thermal by-law for new buildings	Requirement of solar thermal energy in all new city council facilities with hot sanitary water demand	20% emissions reduction commitment for citizens
Introduction of LED technology in conventional holiday lighting, public lighting and traffic lights	Tramway Rabat-Sale		Plantation of trees in parks, gardens and public land		Bicycle working group with stakeholders
Installation of presence detector systems in common spaces	Execution of a Sustainable Mobility Urban Plan		Maintenance of agriculture and forest land protected against urban development		Mobility working group with stakeholders
Installation of high efficiency lighting technology in future city council buildings	New taxis only hybrid, electric or with alternative fuels		Execution of an Urban Cycling Master PLan		Energy comity with stakeholders
Energy saving measures in fountains and park watering systems	Development of a bicing system				Car pooling program
Elaboration of an intenal regulation on energy efficiency of the City Council	Cycling lanes construction				Awareness campaigns for energy saving, ecodriving, promotion of renewable energy, use of sustainable mobility modes
Installation of water saving devices in the points of consumption of hot sanitary water	Tax reduction fo hybrid, electric or high efficiency vehicles				Green School Award Programme
Introduction of heat recovery in HVAC systems of public buildings with high power installed					Workshops on energy saving at home
Green Commerces Certification Program; shops, restaurants, hotels, shopping centers					Ecodriving courses for citizen
					Programme for the use of bicycle among students
					Energy Saving Family Award
					Energy Efficiency Commerce Award
					Cycle to work programme
					Actions and conferences programmed within the SURE project

Roadmapping exercise

Developing Regional Energy Roadmap

- **Topic:** Practising regional energy roadmap development according to the defined vision statement

- **Objective:** Develop an outline of a roadmap which prioritises the region's energy needs in the medium- to long-term.

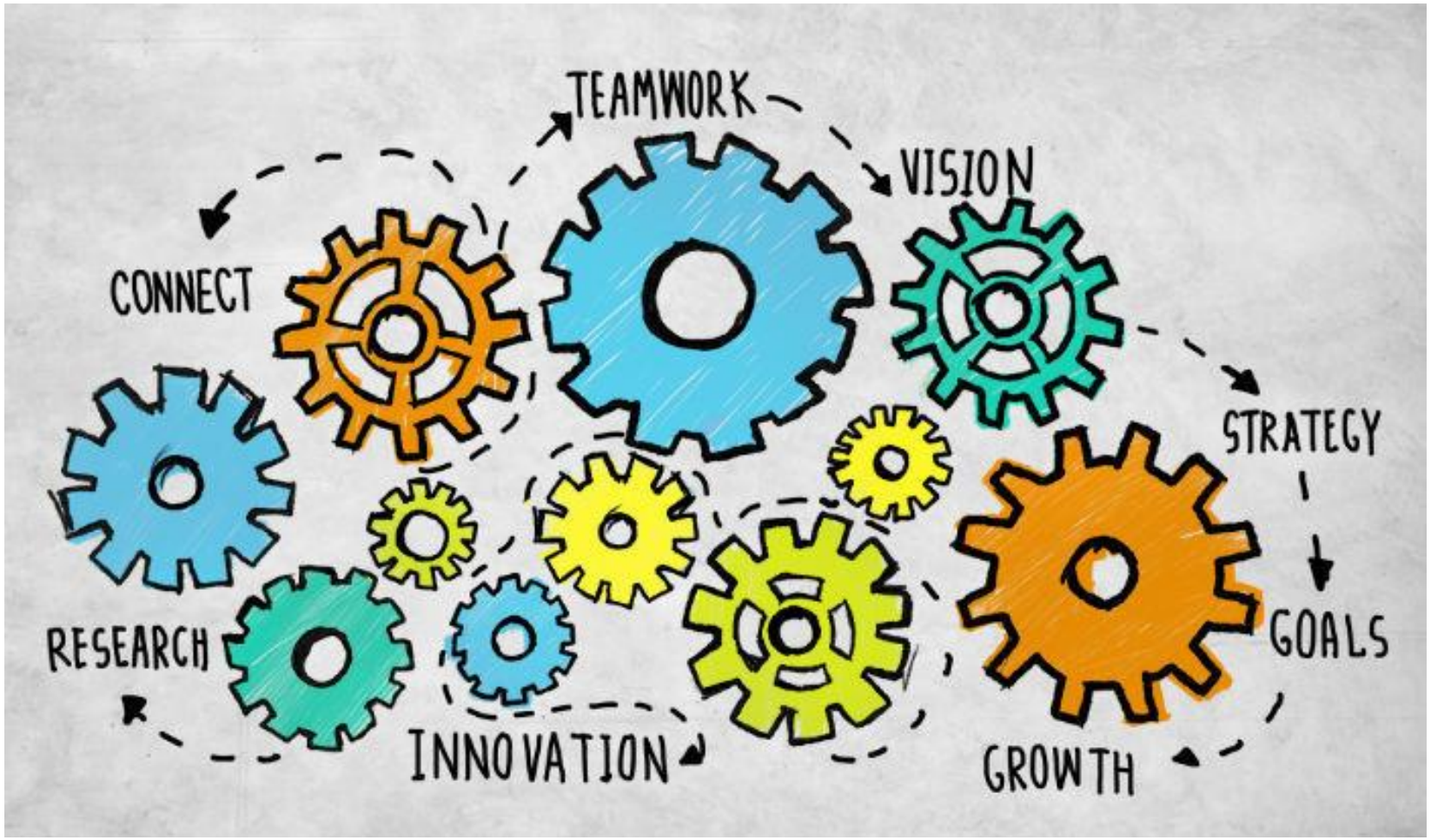
- **Output:** outline of an energy roadmap stating priority areas to achieve the defined vision

Leading questions for roadmap development

The roadmap presentation should answer the following questions:

- What are the main priorities of the roadmap?
- Which energy-using sectors are to be covered?
- What technologies will be used to challenge the low-carbon society?
- What will be policy needs?
- How will the implementation of roadmap be financed?

Exercise Roadmapping - Let's get to work!



Session 4: How to develop an Action Plan

The Energy Roadmapping Process - Phases

Baseline

- Analysis of present energy status (energy and emission balances for different sectors)
- Identification of potentials, challenges and barriers

Vision

- Stating the development goal of the region / municipality / organisation
- Aim at development scenarios beyond business as usual

Roadmap

- Identify priority areas for reaching the vision
- Plot development scenarios and identify leverage points and required actions

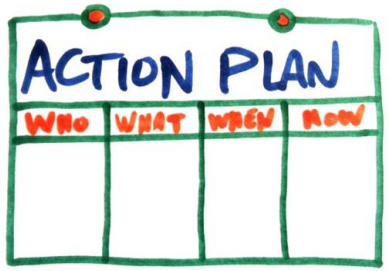
Action Plans

- Concrete measures
- Answering what, who, how and when

What is an Action Plan?

Action Plans

An "**implementation programme**" – at least with a **set of defined actions** all aimed at the achievement of the roadmap goals.



Essential components:

- **Concrete actions** and a **prioritization** for their implementation
- with **"SMART" targets** and target indicators
- **Responsibilities** and definition of working groups
- A sufficient **time frame** for implementation and monitoring
- A plan for sufficient **budget** and specification of funding sources
- Don't forget about the **monitoring** and plan additional resources

One Roadmap – includes numerous Action Plans

Action Plans

Action Plan 1: Building rehabilitation programme

- Activities: assessment, improved design, tendering, award, implementation
- Responsible: Building management authority XYZ
- Implementation plan: 2017-2022
- Financing: Municipality x%, state grant x%, private sources x%
- Indicators: XX MWh thermal savings, XX MWh electric savings, XX t CO2

Action Plan 2: Electricity savings in homes

- Activities: Distribute energy meters, promote EE appliances, implement competition
- Responsible: Local utility, NGO, municipality support
- Implementation Plan: 2017-2018
- Financing: Municipality x%, utilities x%
- Indicators: XX MWh electric savings, XX t CO2

Action Plan 3: Renewable Energy Investments

- Activities: bioenergy sources assessment, development of supply chains with local farmers, pilot installation, roll-out program for single-family houses/small businesses
- Responsible: Biomass association, Chamber of Agricult, Municipality, NGO
- Implementation Plan: 2018-2020
- Financing: national grants x%, local chamber x%, soft loans x%
- Indicators: XX projects implemented, XX MW new capacity installed, XX MWh of renewable heat provided from the region

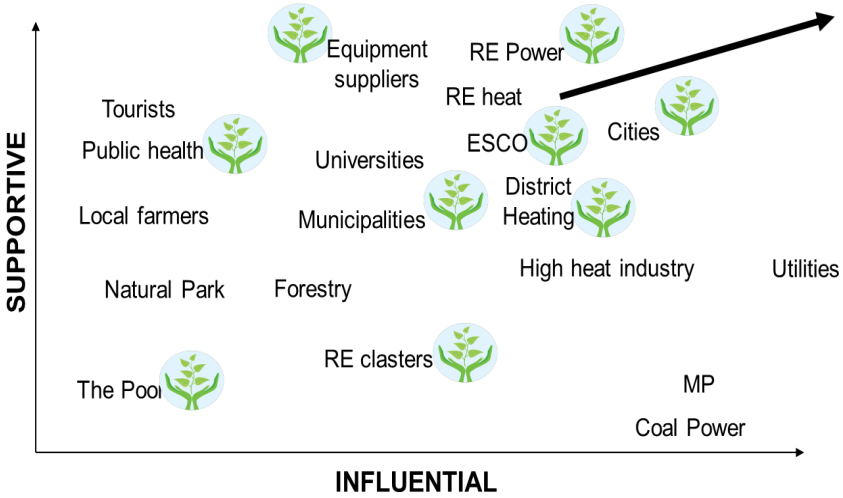
etc.

How do the Action Plans for NERP look like?

Which stakeholders do we need?

Priority topcis (under discussion)

Partnership Action Plans



Energy efficiency Buildings

Energy efficiency Transport/Industry

Renewable energy buildings

Renewable energy transport industry

- Project teams
- Technologies
- Policies
- Financing sources

Integrative approach encompassing regional priorities

Action Plans

Other disciplines to be considered:

- Environmental protection
- Natural resources management
- Mobility and freight traffic

Overarching principles:

- Political commitment
- Financial sustainability
- Social coherence

Thematic focus

Energy supply
- increase renewables' share

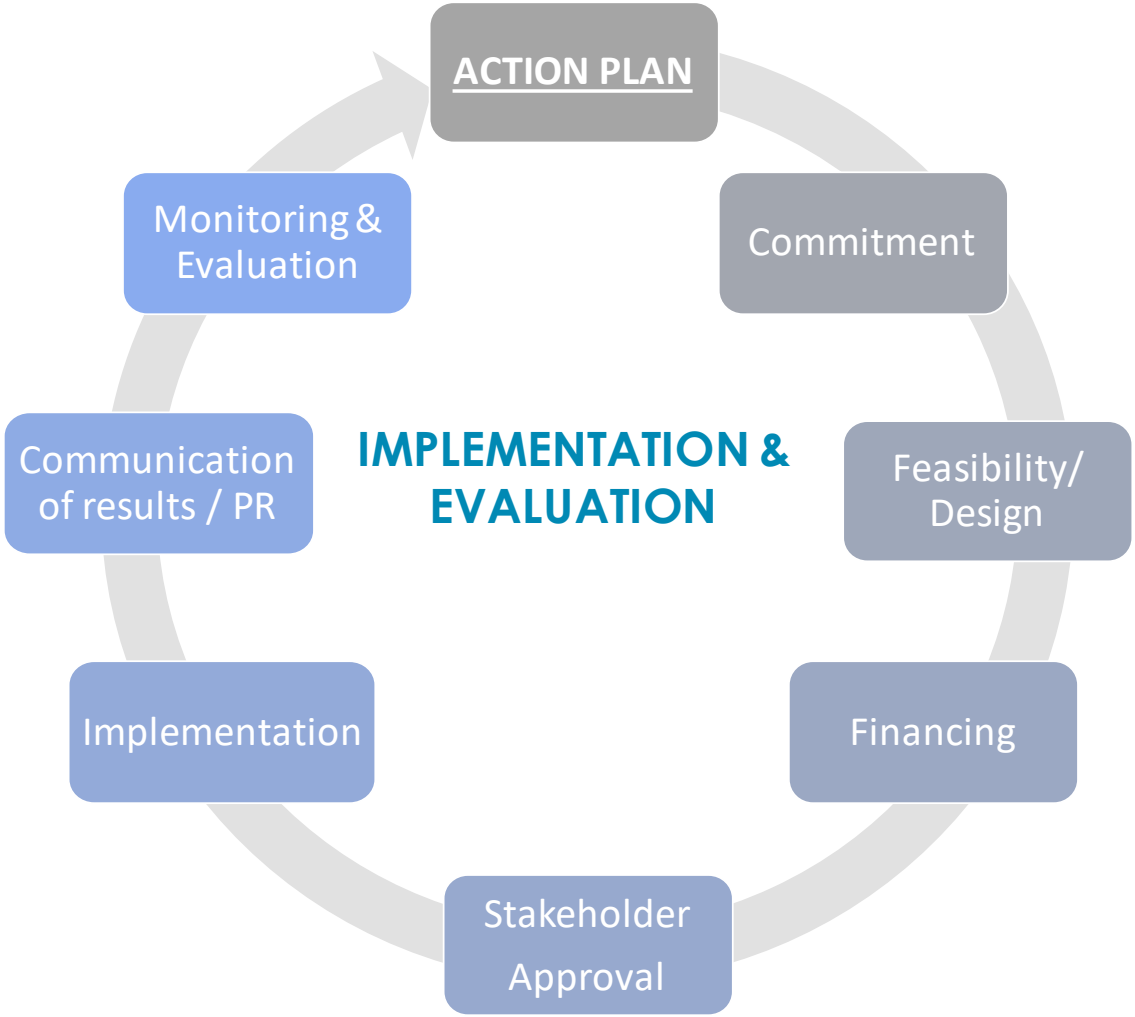
Energy efficiency
- buildings
- production
- transport

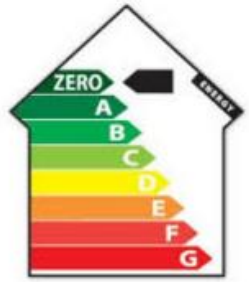
Awareness, communi-cation

Action Plan

Action Plan – focus on implementation

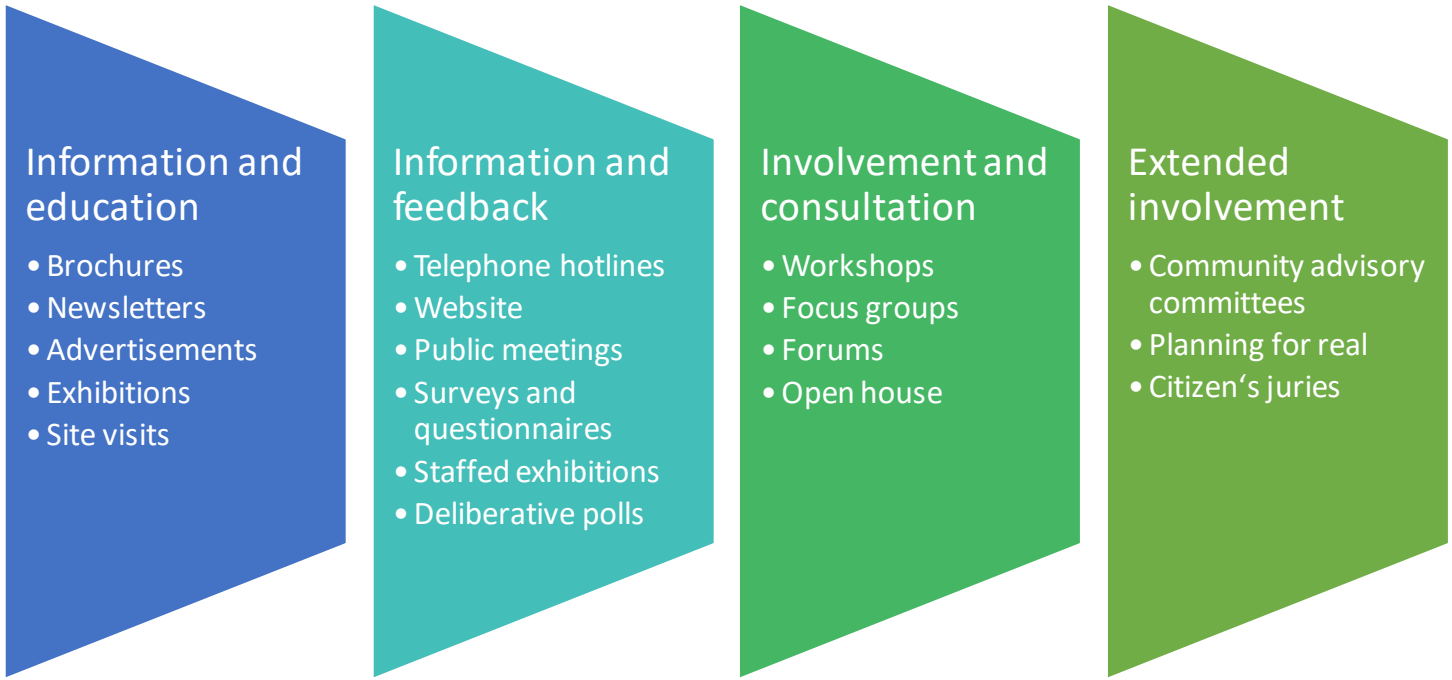
Action Plans





How to engage in stakeholder participation

- **Participation can be obtained through a variety of methods and techniques**, and it may be useful to make recourse to a (professional) animator as a neutral moderator.
- Different levels of participation and tools may be considered:



Example Action Plan

- Key actions, responsibilities, dates, costs and energy benefits

1. Define priority sectors

...on	KEY actions/measures per field of action	Responsible department, person or company (in case of involvement of 3rd parties)	Implementation [start & end time]	Estimated costs per action/measure	Expected energy saving per measure [MWh/a]	Expected renewable energy production per measur	Expected CO2 reduction per measure [t/a]
BUILDINGS, EQUIPMENT /							
Municipal buildings, equipment/facilitie	Introductio... city council... 5 facilities ...ters and ...er demand.	ADEREE PROMASOL II Programme	2012-2013	170000MAD-15000EURO/building	275	275	95
	Energy auditing of all public buildings of the City Council of Salé. Implementation of the measures recomended	ADEREE. Délégation de l'Union Européenne auprès du	2012	12000MAD-1000EUROS/building	14	0	10
	Substitution of conventional traffic lights by LED traffic lights		2012-2013	3200MAD-281EUROS/traffic light block			
	Installation of presence detector systems in common spaces of City Council Buildings		2012	1700MAD-EUROS/detector			
	Installation of high efficiency lighting technology in the future city council buildings	City Council of Salé		0			
	Energy saving measures in fountaints and parks watering systems	City Council of Salé		...000MAD - 25000EUROS			
	Elaboration of a internal regulation of energy efficiency of the City Council. It fixes the use of a minimum energy efficiency of new equipments and equipments to be substituted.	City Council of Salé		0	70	0	242

2. Define key actions: step-by-step

3. Who is responsible?

4. Think about realistic time plan!

5. What will be the effects (energy consumption, CO2 reduction)?

Implementation & Evaluation

Action Plans

Identify financing opportunities

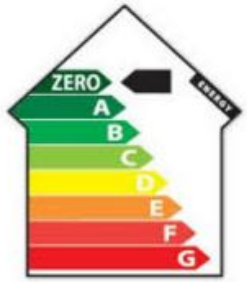
- European Structural and Investment Funds
- National funding programs
- Private sector investment
- Alternative financing schemes:
  - On Bill Financing
  - Energy Performance contracting
  - Soft Loans, guarantees
  - Crowdfunding
  - Green Municipal Bonds

Implementation & Evaluation

Action Plans

Success factors:

- Start project **implementation as soon as possible** - use initial enthusiasm
- **Present benefits/profits** of energy savings and REN production (financial, regional economy) and generate awareness
- **Inform target groups and actors** on a regular basis about progress and results
- Get people to identify with the topic - **"our project"**
- Plan **regular meetings** of project stakeholders
- **Monitor success of individual projects** concerning their effectiveness and actual savings generated



Action Plans

- **Some MYTHS and TRUTHS:**

If you can't measure it, you can't improve it.
(Peter Drucker)

Without data you are just another person with an opinion.
(W. Edwards Deming)

The most important things cannot be measured.
(W. Edwards Deming)

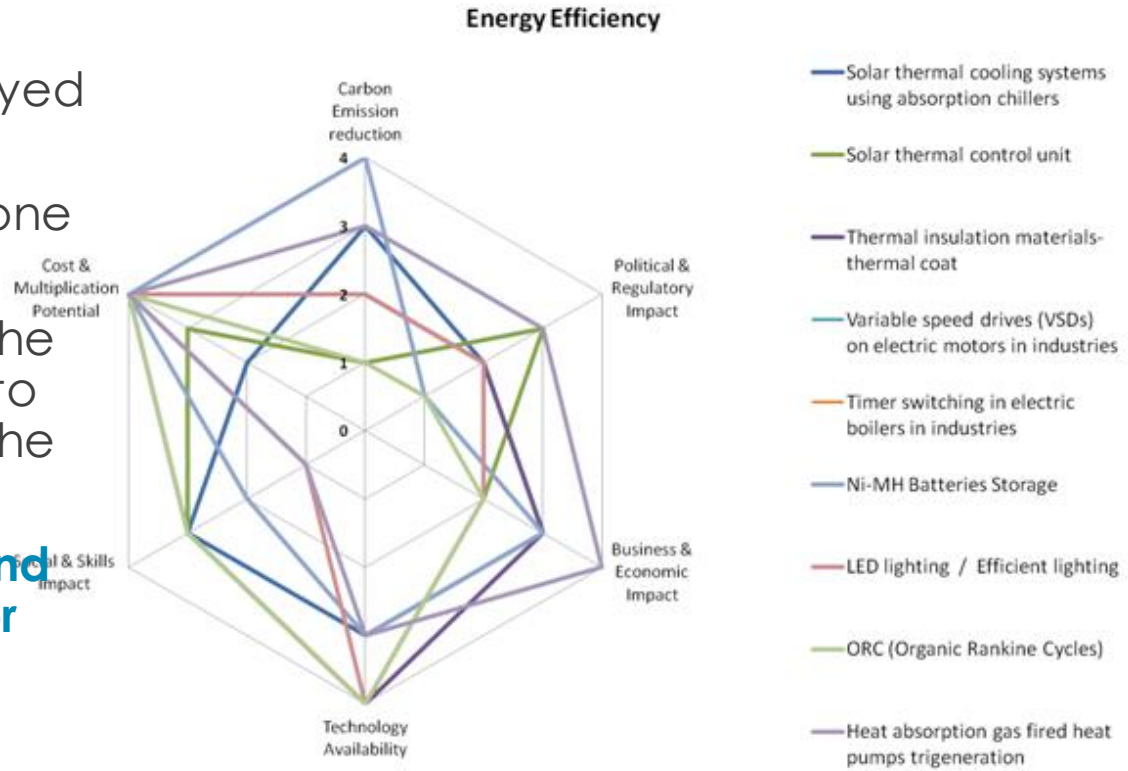
- **NEVERTHELESS keep in mind:**
  - **Don't forget about monitoring**
  - **the „M" in „SMART"**
  - **evaluating the progress of achievement of the Action Plan**
  - **Find out about benefits achieved AND**
  - **Communicate them!**

Energy monitoring & evaluation

Action Plans

Presentation and visualisation of results

- **Potentials depending on several influencing factors** can be displayed in the form of a radar chart.
- Each side of the star represents one **influencing variable.**
- The distance from the centre to the border of the star is proportional to the influence of the variable on the overall potential.
- **Final presentation of Roadmap and Action Plans = STARTING EVENT for the Implementation!**



Source: Climate technologies (2016), http://www.climatechnologies.eu/project

Action Plans exercise

Action Plans as Implementation Strategy

- **Topic:** Action Plans providing implementation strategies for the regional energy roadmaps

- **Objective:** Turn your vision into an action plan describing the way the region will meet its energy visions and objective targets through a set of detailed action steps that describe how and when these steps will be taken.

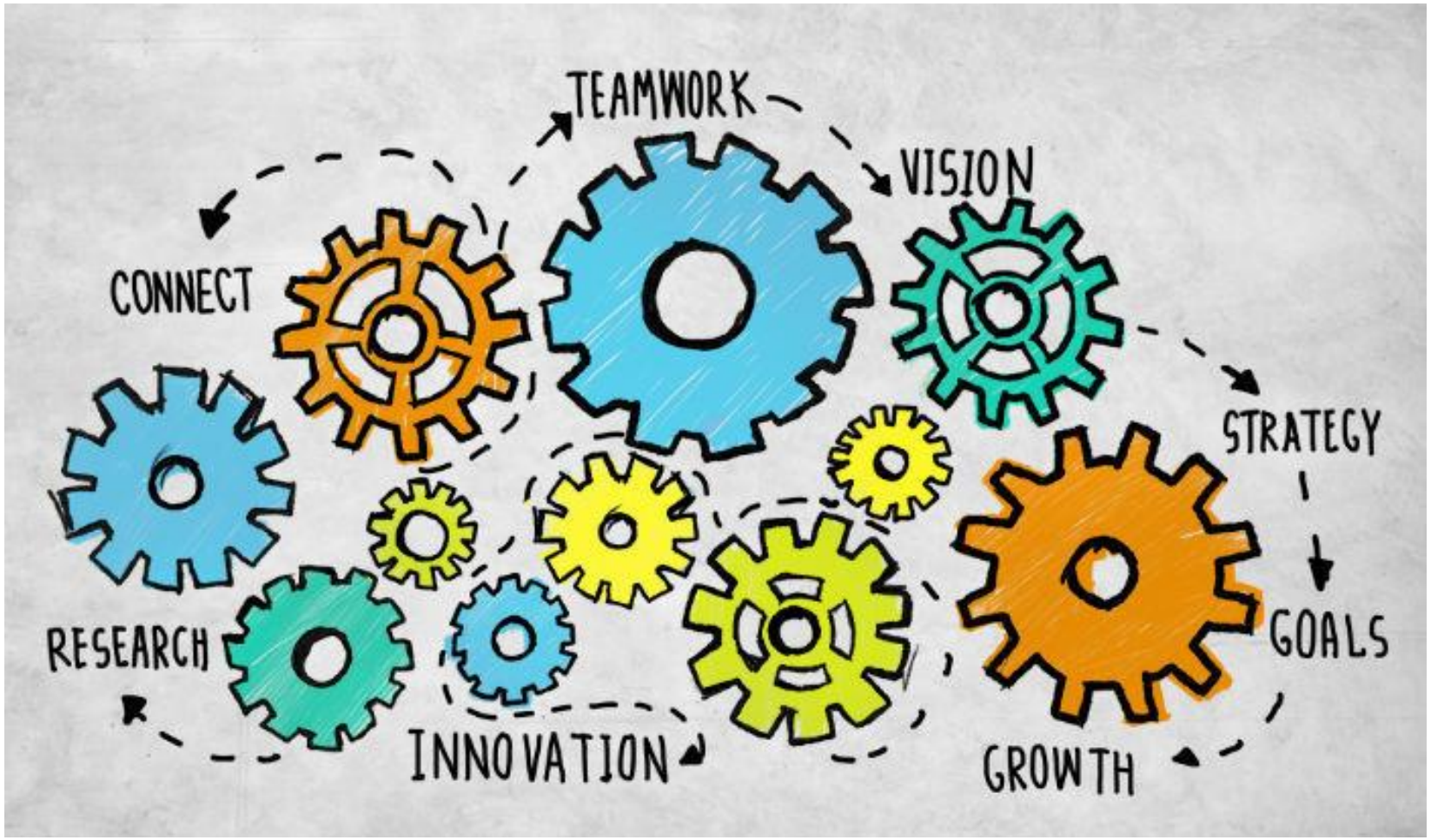
- **Output:** 1-2 Action Plans (out of total 10) contributing to the identified roadmap priority areas

Leading questions for Action Plan development

The Action Plan should be developed around the following questions

- **How will concrete actions look like? With target/monitoring indicators and time frame.**
- **Who will be the target groups for the action?**
- **Who has to be involved as implementing parties?**
- **Which strategies should be used to ensure funding?**
- **How could a monitoring strategy look like?**

Exercise Action Plans - Let's get to work!



Conclusions

- **Next steps**
  - Forming of core group on regional level for Roadmap development
  - Development of draft Roadmap
  - Select areas for prioritising Action Plan
  - Development of Action Plans in selected topics
  - Final presentation of Roadmap and Action Plans and Launching Event for the Implementation of Action Plan