

smart+ en. ci+y



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SmartEnCity Network Webinar Feb 8th 2017 Facilitating energy transition at city level

Per Alex Sørensen & Simon Stendorf Sørensen
PlanEnergi
Jose Ramón López
Basque Energy Agency

TOWARDS SMART ZERO CO₂ CITIES ACROSS EUROPE
VITORIA-GASTEIZ + TARTU + SØNDERBORG



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691883

- Project funded under the **European Union's Horizon 2020** research and innovation programme
- Under the coordination of Fundación TECNALIA Research & Innovation, 35 partners from 6 countries
- To develop **strategies that can be replicated** throughout Europe in order to reduce energy demand and maximise renewable energy supply
- To develop a **systemic approach for transforming European cities** into sustainable, smart and resource-efficient urban environments in Europe
- **SmartEnCity Network** is being developed for European cities



- These webinars are for city planners, policy-makers, private companies, government, researchers etc.
- They are being carried out to share the knowledge of the SmartEnCity partners and attract members to the network
- All webinars available online at www.smartencity.eu

You can already re-watch webinar 1:
Strategic Energy Planning in countries and cities

online at

www.smartencity.eu

- ✦ Introduction to presenters and topic
- ✦ Part 1: Local energy transition process
- ✦ Part 2: Energy Balance tool
- ✦ Part 3: Effective collaboration: local and regional actors (Basque country)
- ✦ Questions and next webinars

- + Introduction to presenters and topic
- + Part 1: Local energy transition process
- + Part 2: Energy Balance tool
- + Part 3: Effective collaboration: local and regional actors (Basque country)
- + Questions and next webinars

PlanEnergi

Consultancy specialized in renewable energy (www.planenergi.dk)



Per Alex
Sørensen

- ✦ Bach. Sc. (energy planning)
- ✦ Working with energy planning in PlanEnergi since 1985
- ✦ Involved in Danish regional and municipal energy transition processes in Central Jutland Region and Ringkøbing Skjern (today's cases)



Simon
Stendorf
Sørensen

- ✦ Engineer M.Sc. (sustainable cities)
- ✦ Working with energy planning in PlanEnergi since 2014
- ✦ User of Energy Balance tool for several Danish regions and municipalities



EVE | Ente Vasco
de la Energía

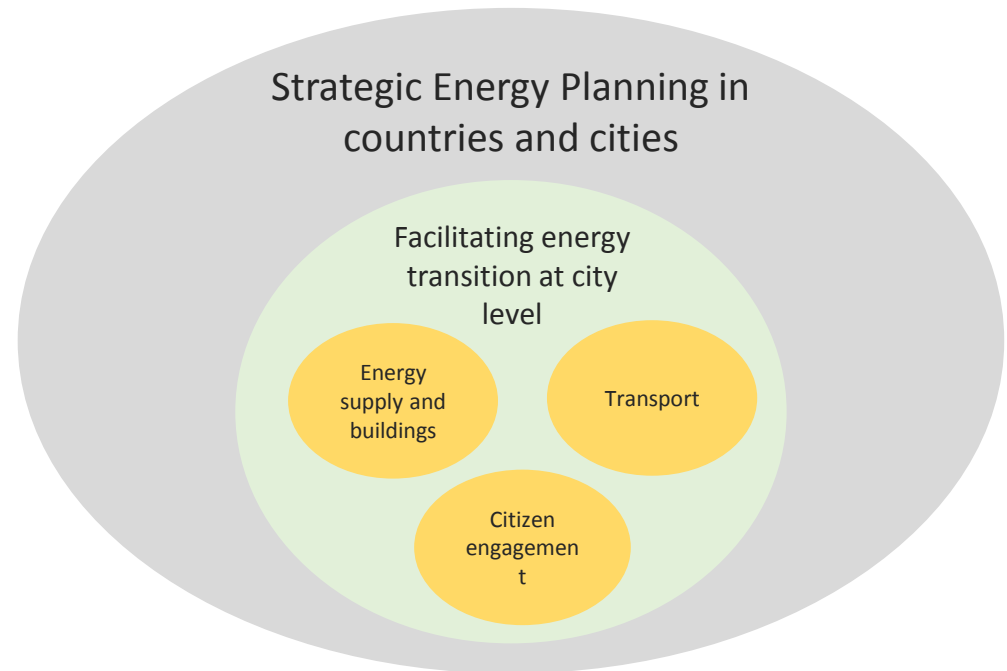
Basque Government's energy agency (www.eve.eus)



Jose
Ramón
López

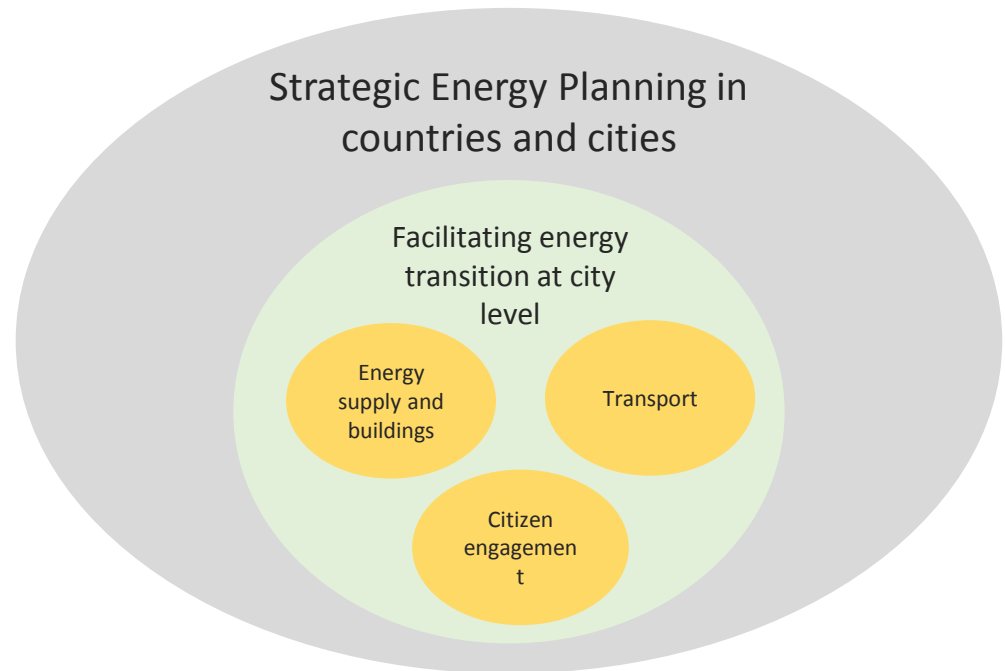
- ✦ Dipl. Engineer.
- ✦ Working with energy at Basque Energy Agency (EVE) since 2002
- ✦ Has taken part in numerous projects financed by the EC such as projects about energy efficiency and renewable energy sources

1. Strategic Energy Planning in countries and cities
2. Facilitating energy transition at city level
3. Energy supply and buildings
4. Transport
5. Citizen engagement





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Questions?

If you have questions please write them in the “Question box” and we will try to answer at the end of the webinar



- + Introduction to presenters and topic
- + **Part 1: Local energy transition process**
- + Part 2: Energy Balance tool
- + Part 3: Effective collaboration: local and regional actors (Basque country)
- + Questions and next webinars

+ Agenda

- From national level scenario analysis to local action plans
 - Examples:
 - Central Denmark Region
 - Ringkøbing-Skjern Municipality
- Overall questions to answer in the energy planning process

Part 1: Local energy transition process

- ✦ National analyses of ways to reach 100 % renewable energy in 2050
 - Problem: Very hard to translate these scenario reports into local action



Part 1: Local energy transition process

- ✦ Region - framework for local action – but without formal authority

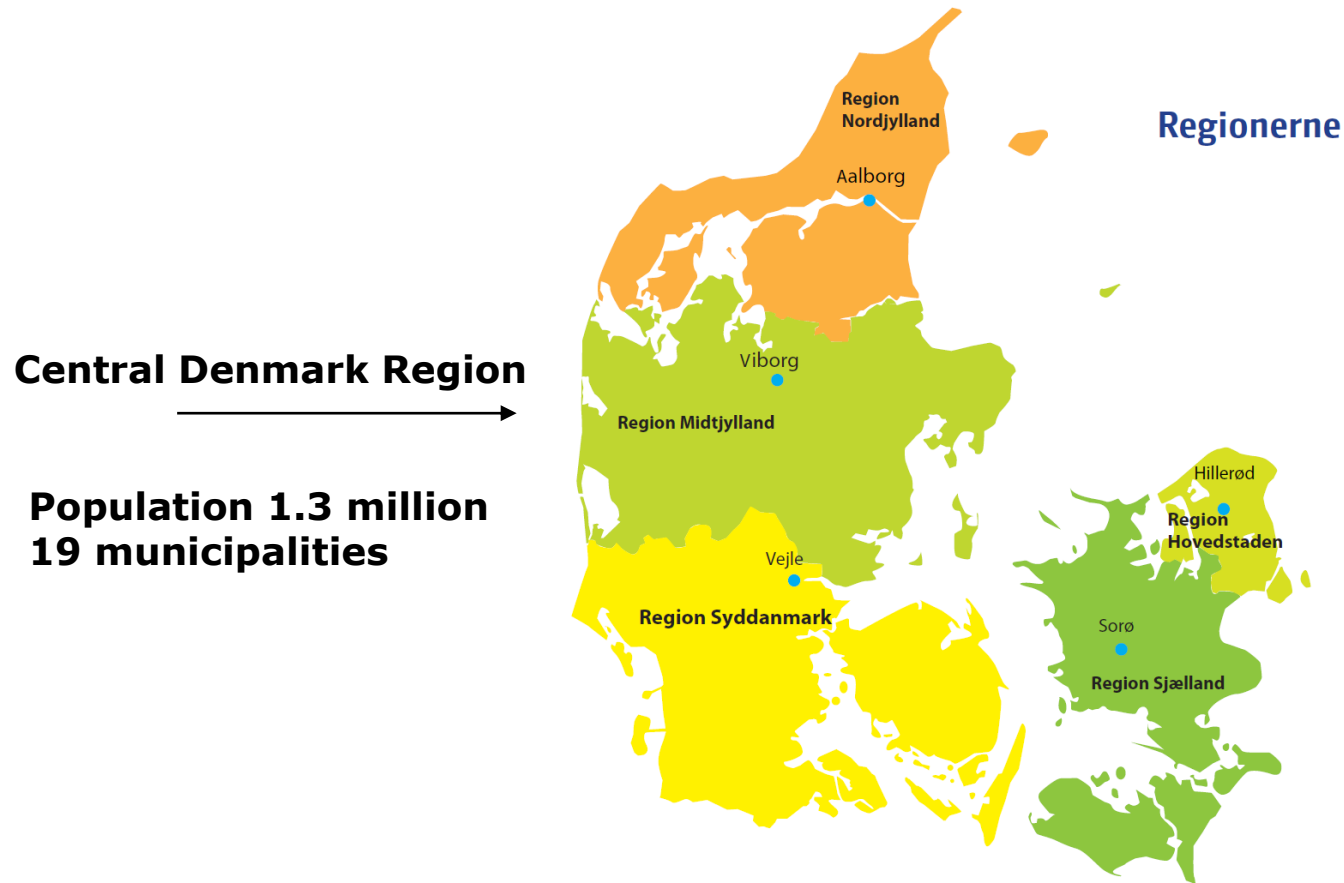


midt.energistrategi

Strategisk energiplanlægning
på tværs af kommuner og
aktører i Region Midtjylland

Part 1: Local energy transition process

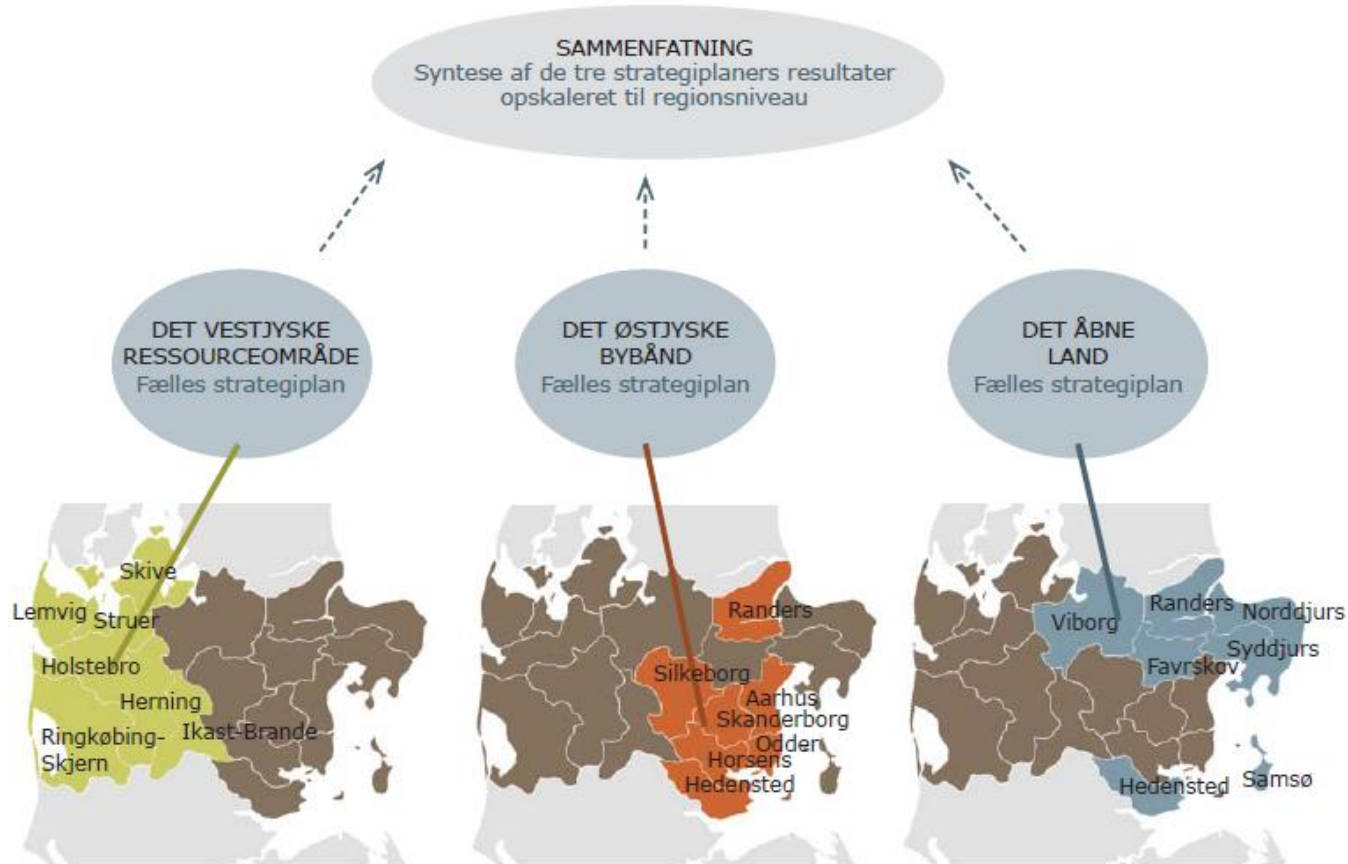
+ The Danish regions



- ✦ Project target for Central Denmark Region
 - To make all stakeholders and municipalities in the Central Denmark Region to work together towards common targets
 - Overall target is a flexible and energy efficient energy system based on renewable energy (50% in 2025). 33% was reached in 2015
 - To create (and keep) local work places within the energy sector by transforming money from imported fuels to local supplied energy systems

Part 1: Local energy transition process

✦ Strategic energy planning in Central Denmark Region



+ 7 FOCUS AREAS

1. Onshore Wind Power
2. Biogas from manure
3. Residual biomass from Farming & Forestry
4. Central Heating Supply of the future
5. Energy Efficient Housing
6. Energy Efficient Industry & Farming
7. Green Transportation

And scenario calculations in EnergyPLAN www.energyplan.eu

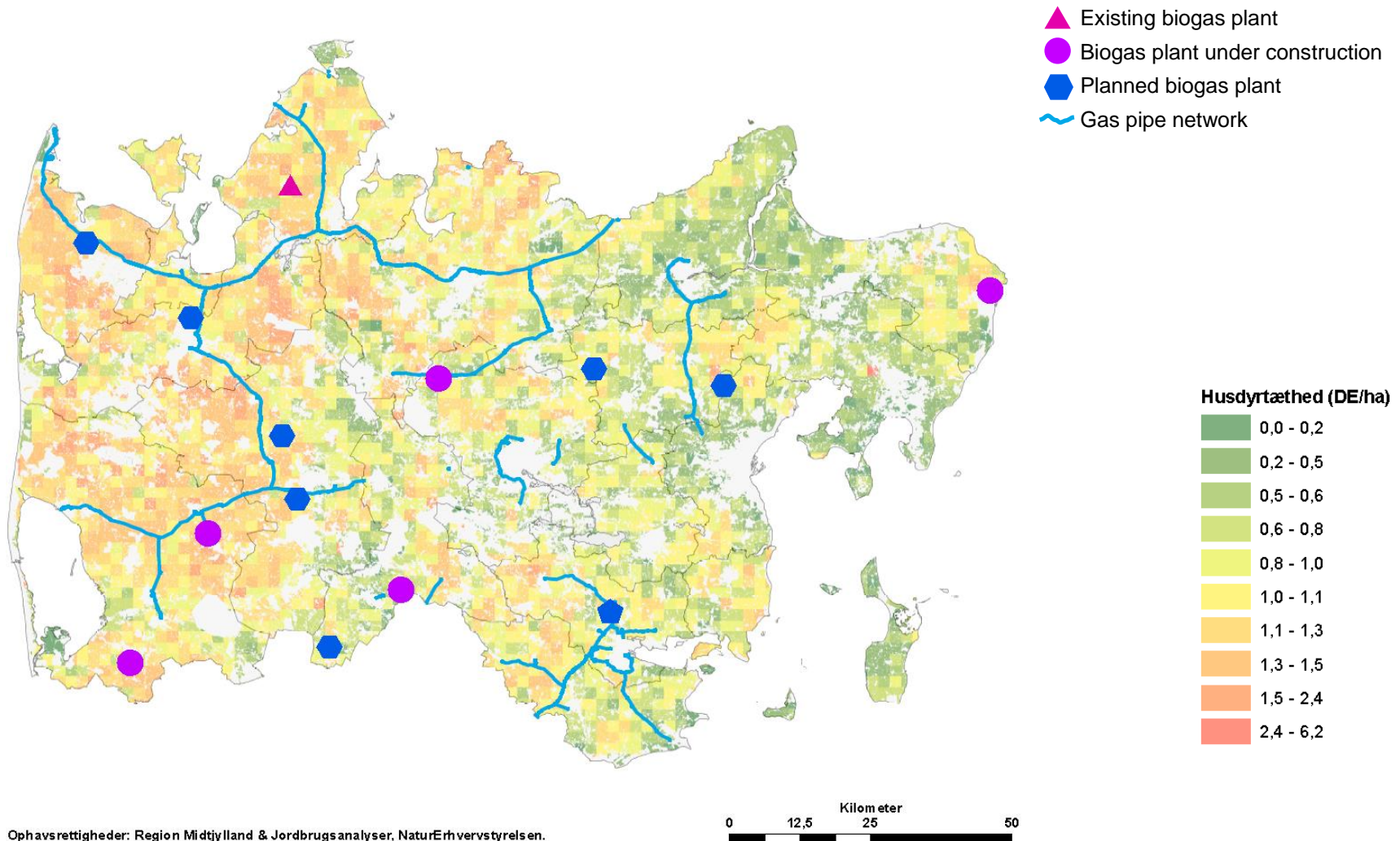
Part 1: Local energy transition process

+ Region Level example: Biogas



Part 1: Local energy transition process

+ Region Level example: Biogas



+ Region Level example: Biogas

- Target: 75 % of all manure is processed in a biogas plant
- More than 10 new large scale biogas plants
- New biogas plants should focus on biogas from manure and **waste products** from local industries and farming

Part 1: Local energy transition process

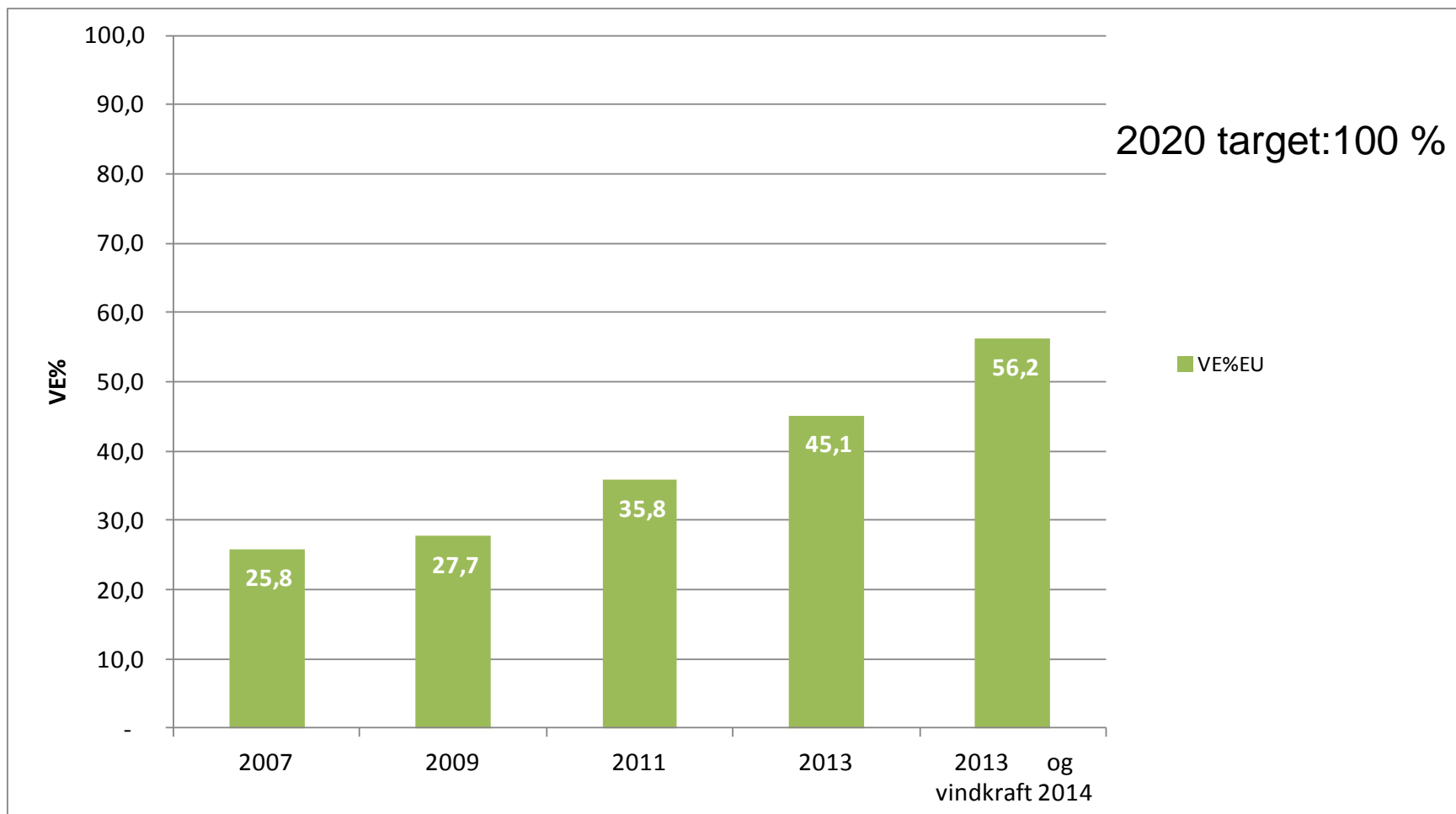
- ✦ Local action: Example Ringkøbing-Skjern municipality
- ✦ 1,495 km² 57,000 inhabitants



Part 1: Local energy transition process

+ Setting political target – Ringkøbing-Skjern Municipality

- Development in share of renewable energy



- ✦ **Ringkøbing-Skjern Municipality - Strategic energy action plan**
 - **Step 1:** Mapping status and local opportunities
 - **Step 2:** Getting stakeholder input and commitment
 - **Step 3:** Setting political priorities
 - **Step 4:** Making it happen!

- ✦ **Stakeholder workshops: Who were involved?**
 - ✦ Three stakeholder workshops to identify relevant local actions
 1. Local renewable energy resources
 2. Heat supply
 3. Energy savings and transport
 - ✦ Involved in stakeholder meetings
 1. Utility companies (gas, electricity and district heating)
 2. Local entrepreneurs (windpower, biogas, building owners)
 3. NGOs (The Danish society for Nature Conservation, Sustainable Energy)
 4. Local business (local energy council representatives)
 5. Politicians (there to listen!)

✦ Stakeholder workshops: The workshop process

✦ Note describing:

1. Status
2. Perspective (local, regional and national context)
3. Ongoing local actions
4. Questions:
 - Potential local actions – are they relevant?
 - Other relevant local actions?

✦ Group discussions

✦ Plenum summary of agreed relevant local actions

- ✦ **Political workshop: Relevant local actions to support our overall target**
 - ✦ Overall 2020-target: 100 % renewable energy
 - ✦ How can we reach the political target?
 - ✦ Workshop material showing potential local actions

✦ Political workshop: Example Biogas

- Possibilities from stakeholder workshops
 - Bioenergi Vest phase 1 expected to be implemented
 - Arla biogas expected to be implemented
 - Bioenergi Vest phase 2 expected to be implemented
 - Demonstration facilities regarding straw for biogas expected to be implemented
- Effect
 - Renewable energy : + 12,3 %
- What do you think of the suggested target (ambition level)?
 - To low, okay or to high?

✦ Prioritizing the effort

| Nr. | Focus area | Effect | Lower | OK | Higher |
|-----|---|---------------|-------|----|--------|
| 1 | 10 % reduction heat in buildings | 0,2 % | | | |
| 2 | 20 % of industry use of energy converted to renewables | 1,0 % | | | |
| 3 | 10 % reduction in energy use for road transport | 0,8 % | | | |
| 4 | From 40 to 60 % renewables for district heating | 4,7 % | | | |
| 5 | 2/3 of all individual oil boiler converted to renewables | 1,9 % | | | |
| 6 | Implementing existing wind turbine planning and finding room for additional 25-30 turbines | 22,0 % | | | |
| 7 | 3 large scale Photovoltaic plants on the way | 1,3 % | | | |
| 8 | Bioenergi Vest phase 1 and 2 and Arla | 12,3 % | | | |

- ✦ **How to make a local energy action plan?**
- Initial dialog within the administration
 - Why and how do we make the plan?
 - How do we ensure political ownership?
 - How do we ensure ownership among the important stakeholders?
 - How do we transform long term strategy into action today?
- Workshops with local stakeholders
 - Make a workshop note mapping local challenges and opportunities
- Workshops with politicians
 - Make the discussions systematic and simple!
- Political decision

Part 1: Local energy transition process

+ Questions? Please save them for the ending of the webinar!





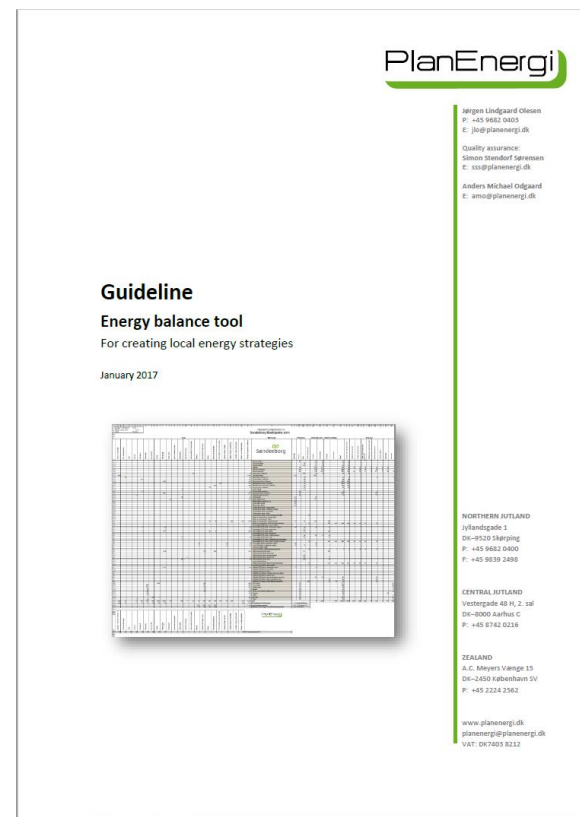
Overview of today's webinar

- + Introduction to presenters and topic
- + Part 1: Local energy transition process
- + **Part 2: Energy Balance tool**
- + Part 3: Effective collaboration: local and regional actors (Basque country)
- + Questions and next webinars



✦ Energy Balance tool in SmartEnCity

- Used to create diagnosis and baseline results for Sønderborg (and Asenovgrad)
- English guide will be available at www.smartencity.eu
- If you are interested in trying the tool please email sss@planenergi.dk



- ✦ **What is the Energy Balance tool**
- Excel tool using energy data from a geographically defined area to display the energy system performance within this geographic area

Part 2: Energy Balance tool

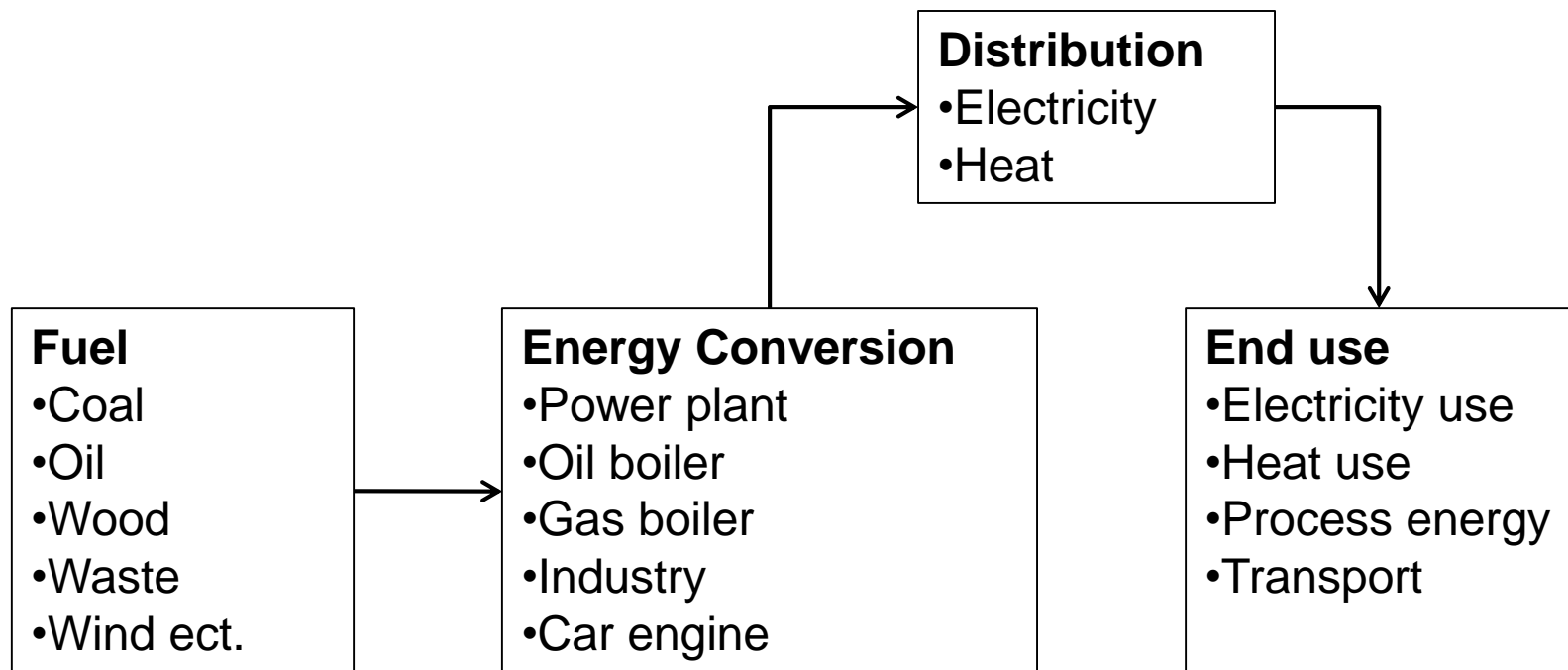
✦ What is the Energy Balance tool

- Excel tool using energy data from a geographically defined area to display the energy system performance within this geographic area

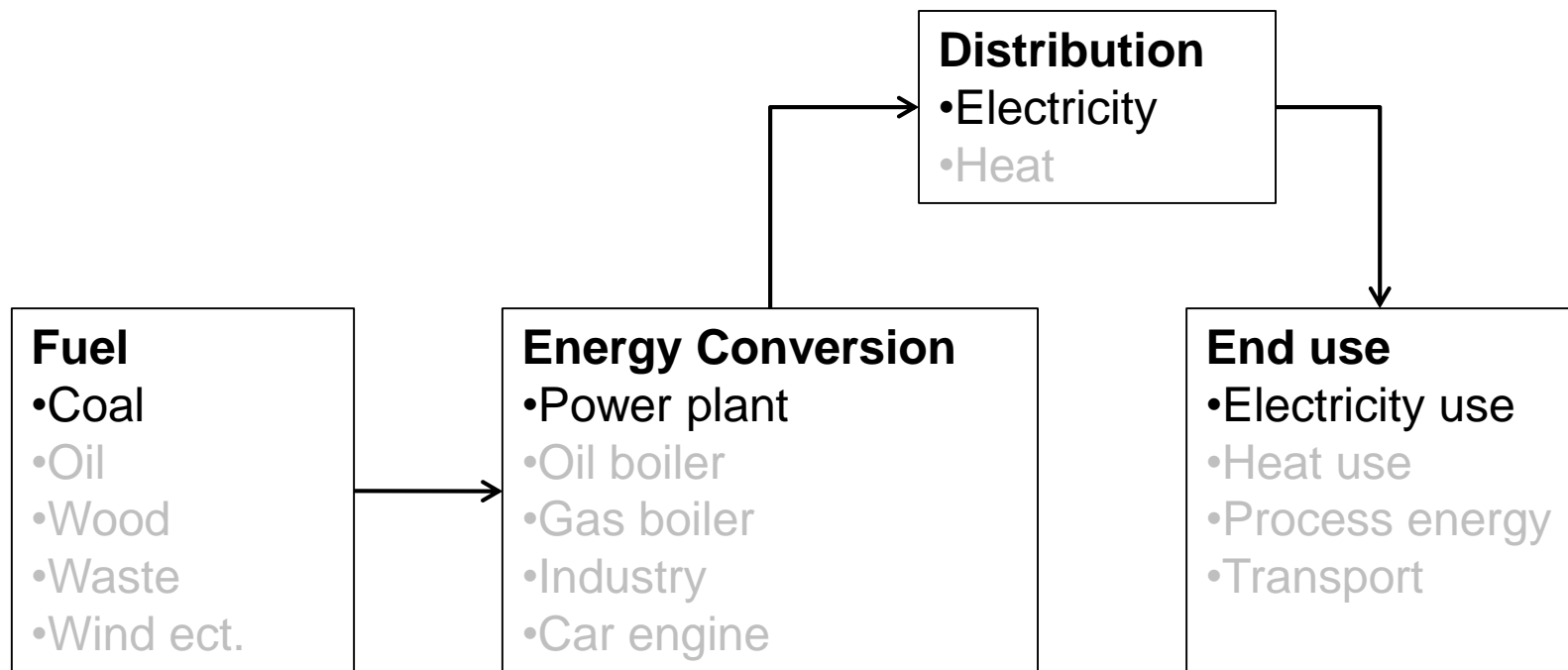
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|-------------------------------|--|-------------------------------|--|--|--|--|--|--|--|--|--|-----------------------------------|--|--|--|--|--|--|--|--|--|---------|--|--|--|--|--|
| Number of inhabitants: 74.937 | | Geographic Energy Balance for | | | | | | | | | | | | | | | | | | | | | | | | | |
| Efficiency elec. grid: 92 % | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Units: | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Fuel | | | | | | | | | | Electricity grid District heating | | | | | | | | | | End-use | | | | | |
| Import of electricity | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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✦ What is the Energy Balance tool

- Principle behind the energy balance



- ✦ What is the Energy Balance tool
- Principle behind the energy balance



+ What is the Energy Balance tool

- Results

Overall level e.g.:

- ✓ Primary energy use
- ✓ Renewable energy share
- ✓ CO₂ emissions

Detailed level e.g.:

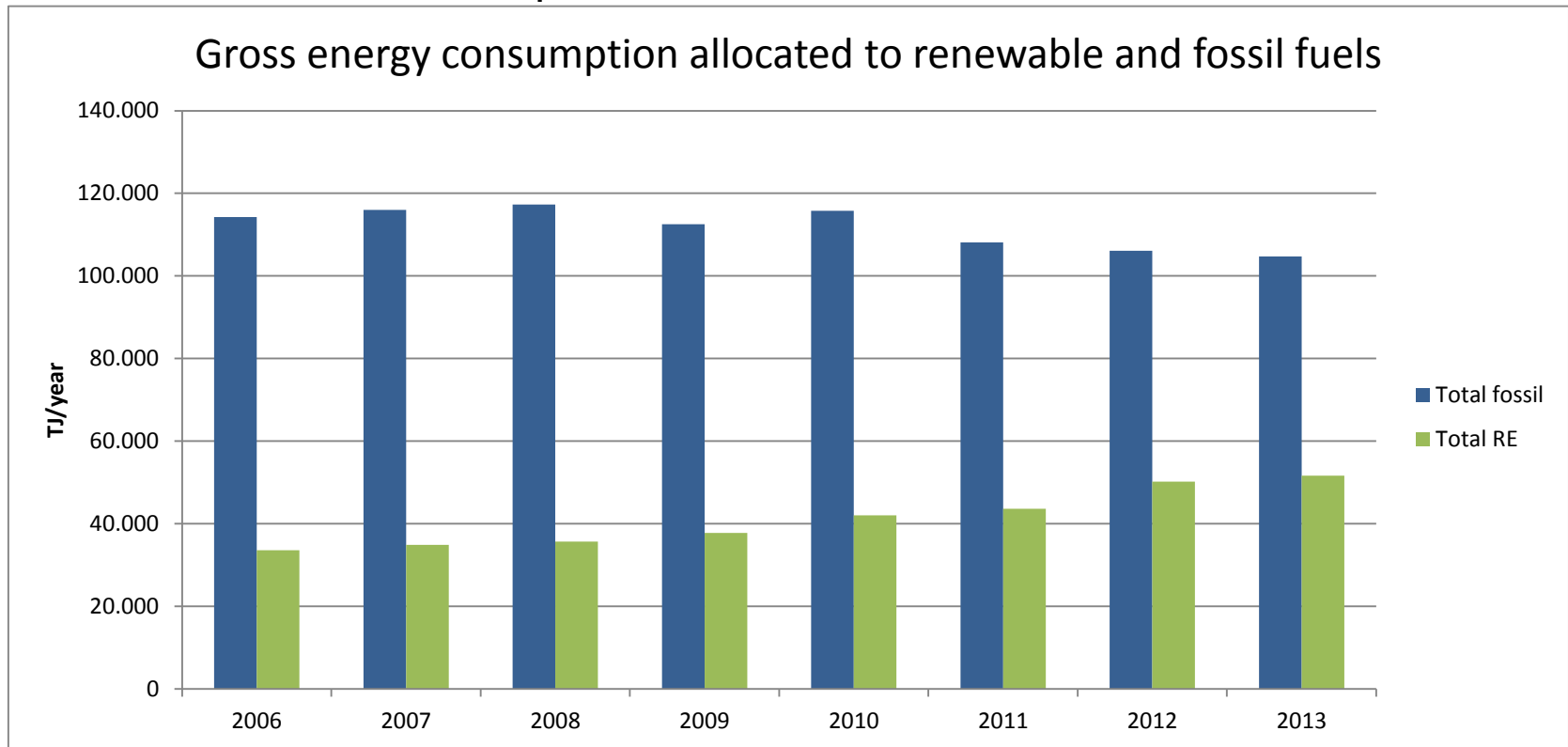
- ✓ Energy use in sectors
- ✓ Fuel use in heating sector
- ✓ CO₂ emissions in sectors

- ✦ **How is the Energy Balance tools used by Danish municipalities?**
 - This or other similar tools used in all Danish municipalities
 - This tool is used by all municipalities in 2 of 5 Danish regions and several other municipalities incl. Sonderborg

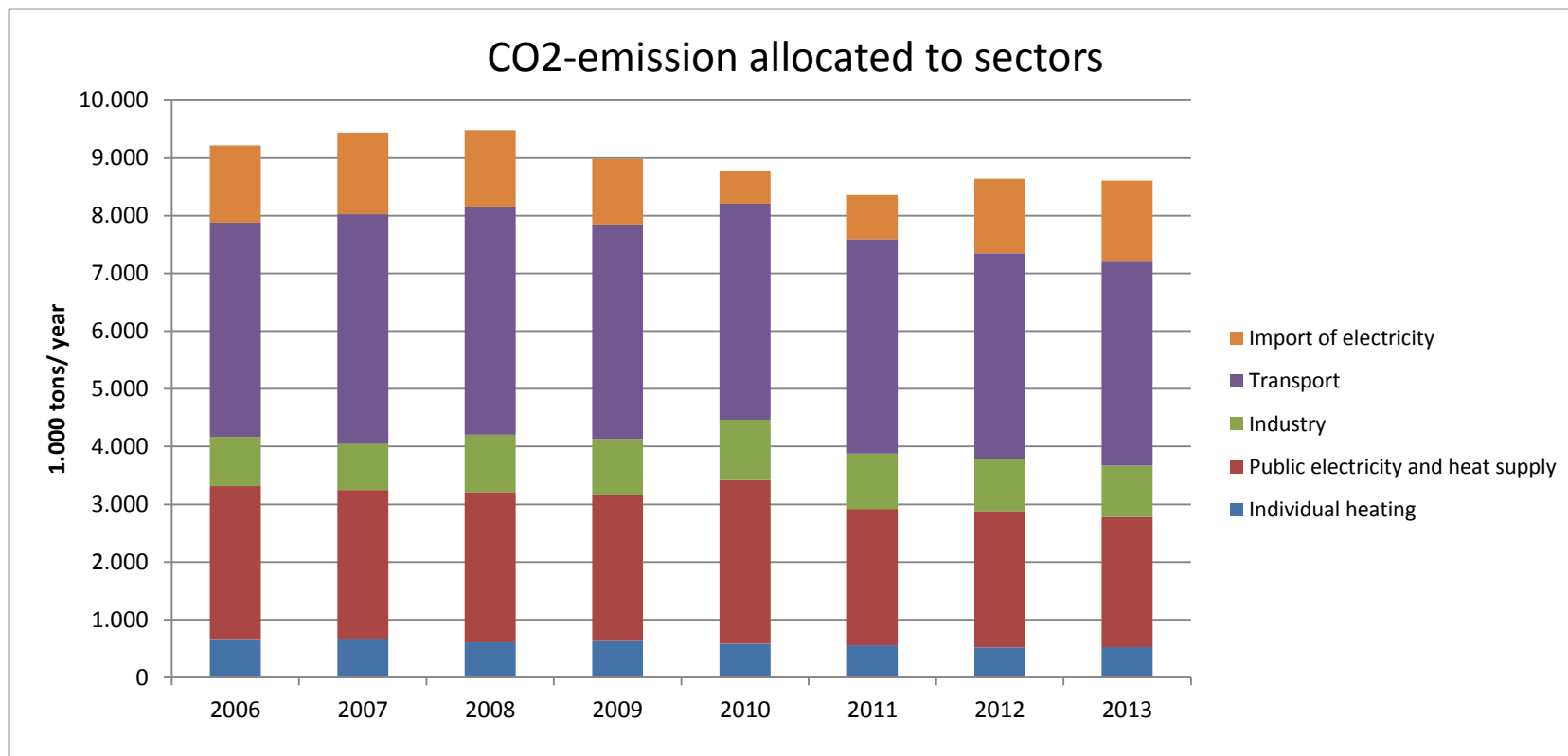
- ✦ **How is the Energy Balance tool used by Danish municipalities?**
- Used by municipal technicians to:
 - Create overview of local energy system (and report Baseline Emission Inventory for CoM)
 - Monitor development
 - Show major challenges
 - Discuss and prioritize actions
 - Make an energy action plan based on facts
- Elements that can support strategic energy planning in the city and strengthen the basis for politicians to act!

✦ How is the Energy Balance tool used by Danish municipalities?

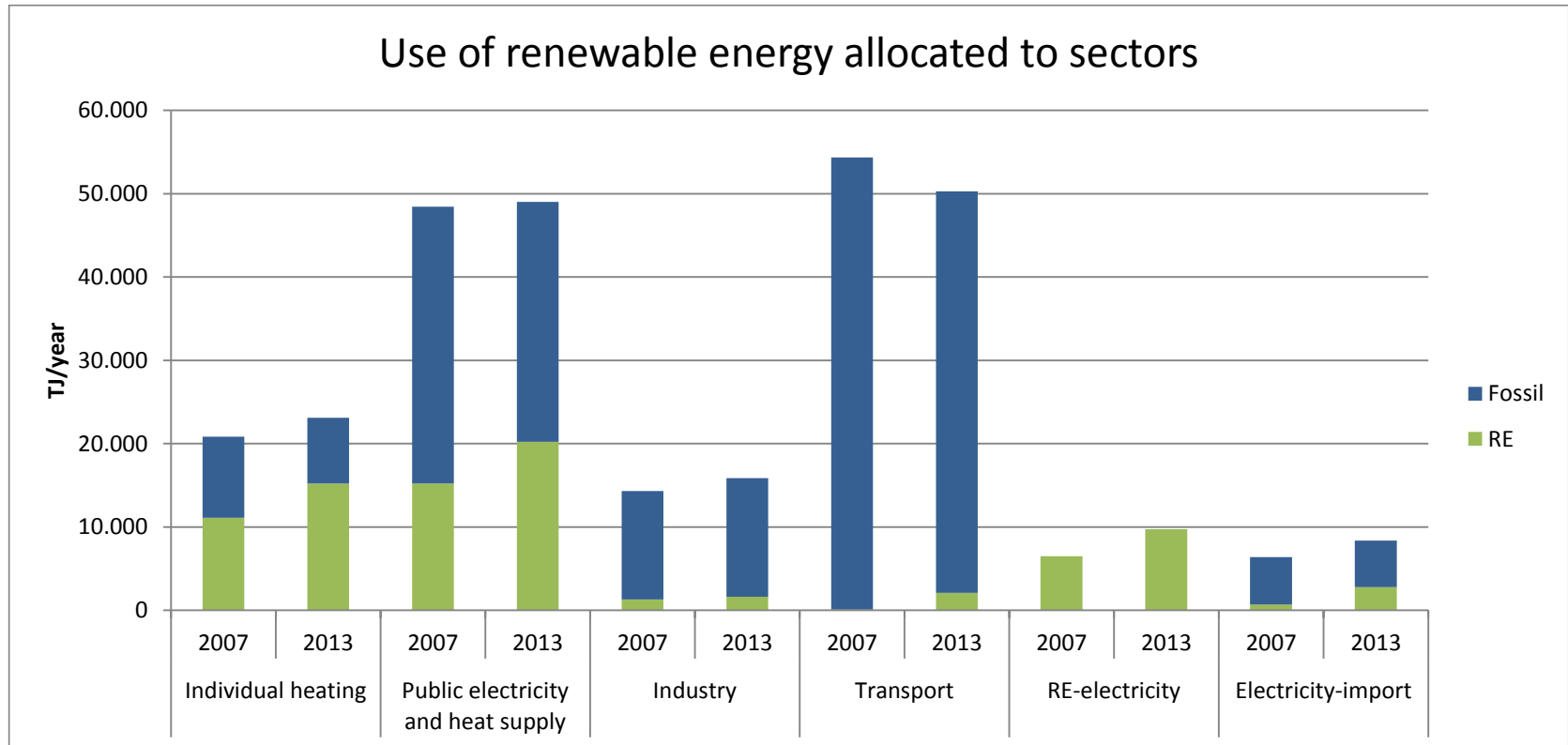
- To get an overview of local energy system
- To monitor the development



- ✦ **How is the Energy Balance tool used by Danish municipalities?**
 - To show the major challenges



- ✦ **How is the Energy Balance tool used by Danish municipalities?**
 - To show the major challenges



Part 2: Energy Balance tool

How is the Energy Balance tool used by Danish municipalities?

- Interact: discuss and prioritize actions

| Geographic Energy Balance for Sønderborg Municipality 2015 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|------------------|------|----------|-------------|-------------|----------------|--------|-------------|------------|----------------------|-------------|------------------|-----------------------------|--------|-------------------------|-------|--------------------|-----------------------------|-------------------------|---------------------------|-------------------------------|--------------------------|-------------------------------------|----------------------------------|---------|---------|-----------------------|----------|-------------|----------|-------------|-------|------------------------------|-----------------------|------------------------|-------------------------------------|----------------------------------|----------------------|----|-----|-----|--|
| Fuel | | | | | | | | | | Plant type | | | | | | | | | | Efficiency | | Electricity grid | | District heating | | End-use | | | | | | | | | | | | | | | | |
| Import of electricity | LPG and kerosene | Coal | Fuel oil | Heating oil | Diesel fuel | Jet fuel (JP1) | Petrol | Natural gas | Wind power | Hydro and wave power | Solar power | Geothermal power | Heat sources for heat pumps | Manure | Biogas and energy crops | Straw | Wood and woodchips | Wood pellets and wood waste | Organic waste, industry | Organic waste, households | Landfill, sludge, waste water | Waste, non-biodegradable | Energy consumption, observed | Electricity | Process | Heat | District heating grid | Ex plant | At consumer | Ex plant | At consumer | Total | Houses, incl. holiday houses | Public service sector | Private service sector | Trade sector (retail and wholesale) | Building and construction sector | Manufacturing sector | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Electric cooker | 44 | | | -60 | 56 | | | 24 | 24 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Electric hot water | | 90 | | -11 | 10 | | | 9 | 9 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Electric radiator | | 100 | | -47 | 44 | | | 44 | 44 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Lighting | 50 | | | -236 | 217 | | | 109 | 28 | | 25 | | 10 | | 19 | 0 | 16 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Electric compressor | 150 | | | -194 | 179 | | | 268 | 98 | | | | 33 | | 64 | 1 | 66 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Electric motor etc. | 85 | | | -1,116 | 1,027 | | | 873 | 155 | | 115 | | 31 | | 61 | 8 | 401 | |
| | | | | | | | | | | | | | | | | | | | | | | | | Heat pumps, individual | 14 | | 250 | | -10 | 9 | | | 23 | 23 | | | | | | | | |
| 1,466 | | | | | | | | | | | | | | | | | | | | | | | 1,466 | Electricity import | 100 | | | 1,466 | | | | | | | | | | | | | | |
| | 26 | | | | | | | | | | | | | | | | | | | | | | 26 | Gas cooker, process, etc. | | | | | | | 10 | 2 | | | | | | | | 6 | | |
| | | | | 110 | | | | | | | | | | | | | | | | | | | 110 | Oil-fired boiler, individual | | | | | | | 88 | 88 | | | | | | | | | | |
| | | | | | | | | 568 | | | | | | | | | | | | | | | 568 | Natural gas boiler, individual | | | | | | | 483 | 483 | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | 331 | | | | 331 | Wood pellets furnace, individual | | | | | | | 75 | | 248 | 248 | | | | | | | | |
| | | | | | | | | | | | | | | | | | | 299 | | | | 299 | Wood furnace and -stove, individual | | | | | | | 65 | | 194 | 194 | | | | | | | | | |
| | | | | | | | | | | | | | | | | | 58 | | | | | | 58 | Straw furnace, individual | | | | | | | 65 | | 38 | 38 | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | 7 | Solar heating | | | | | | | 7 | 7 | | | | | | | | | | |
| | | | | 10 | | | | | | | | | | | | | | | | | | | 10 | Oil-fired boiler, business | | | | | | | 90 | | 9 | | | | | | | 9 | | |
| | | | | | | | | 551 | | | | | | | | | | | | | | | 551 | Natural gas boiler, business | | | | | | | 90 | | 496 | | | | | | | 496 | | |
| | | | 4 | | | | | | | | | | | | | | | | | | | | 4 | Industrial boiler, business | | | | | | | 90 | | 4 | | | | | | | 4 | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Photovoltaics | 100 | | | | | 50 | | | | | | | | | | | | |
| | | | | | | | | | 137 | | | | | | | | | | | | | | 137 | Wind turbines, land | 100 | | | | 137 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Wind turbines, coastal (50 %) | 100 | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | Wind turbines, coastal (50 %) | 100 | | | | | | | | | | | | | | | | | |
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+ How is the Energy Balance tool used by Danish municipalities?

- To make an energy action plan based on facts
1. Make a list off potential actions
 - How far ahead should the strategy go? (2030?)
 - Take into account already adopted targets and actions
 - Find the relevant stakeholders for each action and make a list of prioritized actions
 2. What are the effects of the actions you have planned?
 - Insert the actions in the energy balance
 - Insert the effect of each action in the action scheme



Part 2: Energy Balance tool

+ Action scheme, electricity- and heat supply

| | Focus | Target/action | Stakeholders | Effect |
|------------|-------------------------------|---------------|--------------|----------------------------------|
| Efficiency | Electricity | | | RE %: CO ₂ - tons: |
| | Heating | | | RE %: CO ₂ - tons: |
| Conversion | Individual natural gas boiler | | | RE %: CO ₂ - tons: |
| | Individuel oil boiler | | | RE %: CO ₂ - tons: |
| Production | Wind and solar | | | RE %: CO ₂ - tons: |
| | New fuels at power stations | | | RE %: CO ₂ - tons: |
| | Other | | | RE %: CO ₂ - tons: |
| | Total effect | | | RE %: CO ₂ - tons: |

+ How is the Energy Balance tool used by Danish municipalities?

- To get an overview of local energy system(and report Baseline Emission Inventory for CoM)
- To show the major challenges
- To discuss and prioritize actions
- To make an energy action plan based on facts
- To monitor the development

+ Strengths and weaknesses about this Energy Balance tool

- Main strengths:
 - Easy to use and get useful results
 - Scenario possibilities
- Main weaknesses:
 - Need reliable data sources
 - Data collection is resource consuming

- ✦ **Important lessons about Energy Balance tools in general**
- Be realistic when it comes to collecting data
 - High complexity and large datasets are not necessarily better!
 - Some data will be easier to find than others. For instance in Denmark it is hard to find reliable data when it comes to the transport sector and individual heating with biomass
- Choose a transparent energy model that is not too complicated

+ More info or interest in trying the tool

- Please email sss@planenergi.dk

- + Introduction to presenters and topic
- + Part 1: Local energy transition process
- + Part 2: Energy Balance tool
- + **Part 3: Effective collaboration: local and regional actors (Basque country)**
- + Questions and next webinars

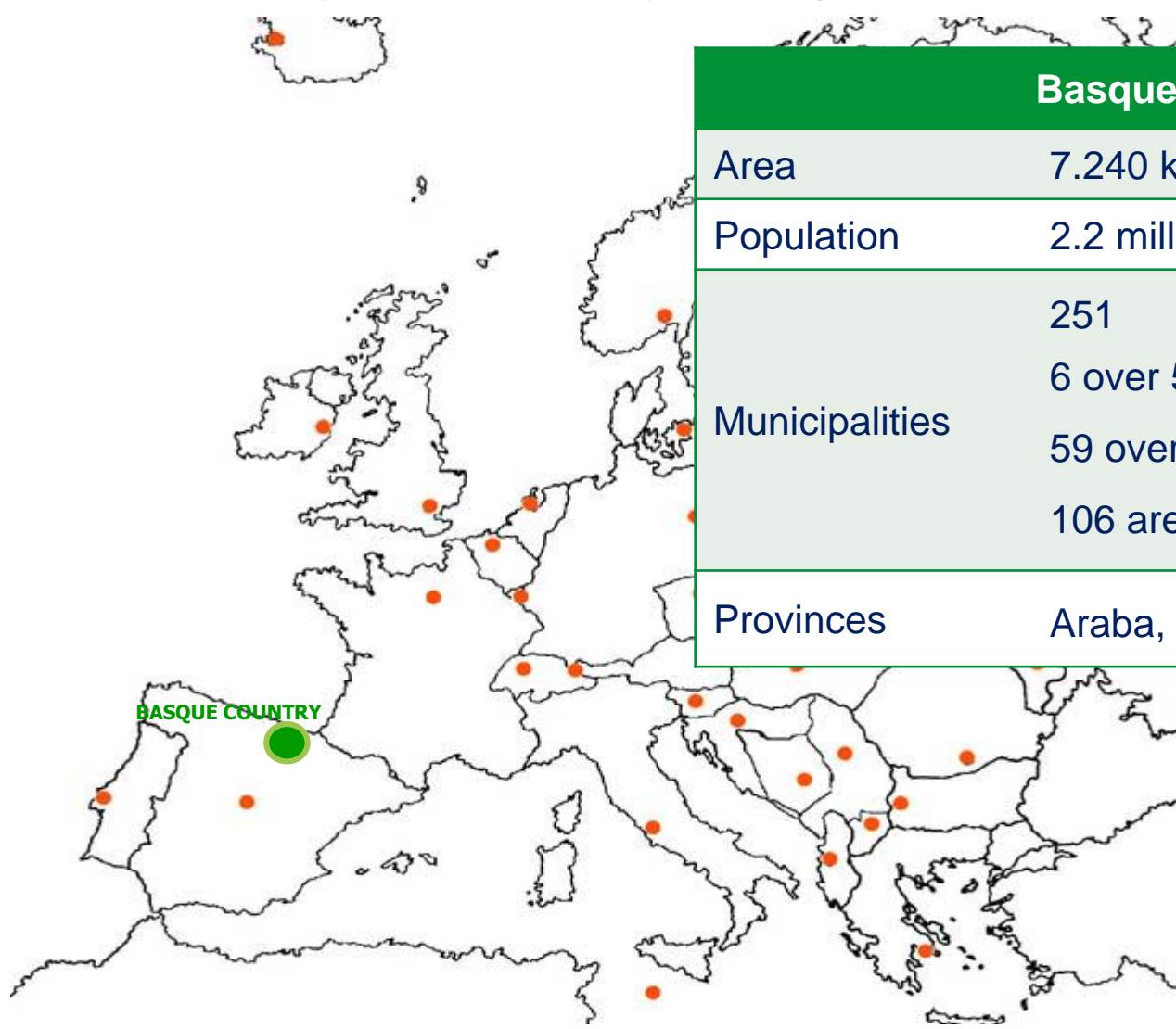


THE COVENANT OF MAYORS

Effective collaboration between local and regional actors, the Basque Country experience

Bilbao, 8th February 2017


The Basque Country in figures: administration



| Basque Country | |
|----------------|-----------------------------|
| Area | 7.240 km ² |
| Population | 2.2 million people |
| Municipalities | 251 |
| | 6 over 50,000 inhabitants |
| | 59 over 5000 |
| | 106 are less than 1,000 |
| Provinces | Araba, Bizkaia and Gipuzkoa |

Context: EVE's MISSION

1

- 
- EVE is the Basque Government's energy agency. Its mission is to:
- Propose energy strategies for the Basque Country, using criteria of supply security, cost competitiveness and sustainability.
 - Take part in developing these strategies and contribute to meet their targets.


MISSION

+



**SAVE ENERGY and SUPPLY ENERGY THROUGH RENEWABLE ENERGIES
IN OUR MUNICIPALITIES (20-20-20)**

2

- 
- COVENANT OF MAYORS:
- By their commitment, Covenant signatories aim to meet and exceed the European Union 20% carbon reduction objective by 2020. (20-20-20)



**SAVE ENERGY and SUPPLY ENERGY THROUGH RENEWABLE ENERGIES
IN EUROPEAN MUNICIPALITIES (20-20-20)**

EVE CoM Coordinator

Basque Energy Strategy 2030: in the long term the challenge is to achieve an increasingly sustainable and low-carbon energy system in terms of competitiveness, supply security, ...



OIL



Zero oil

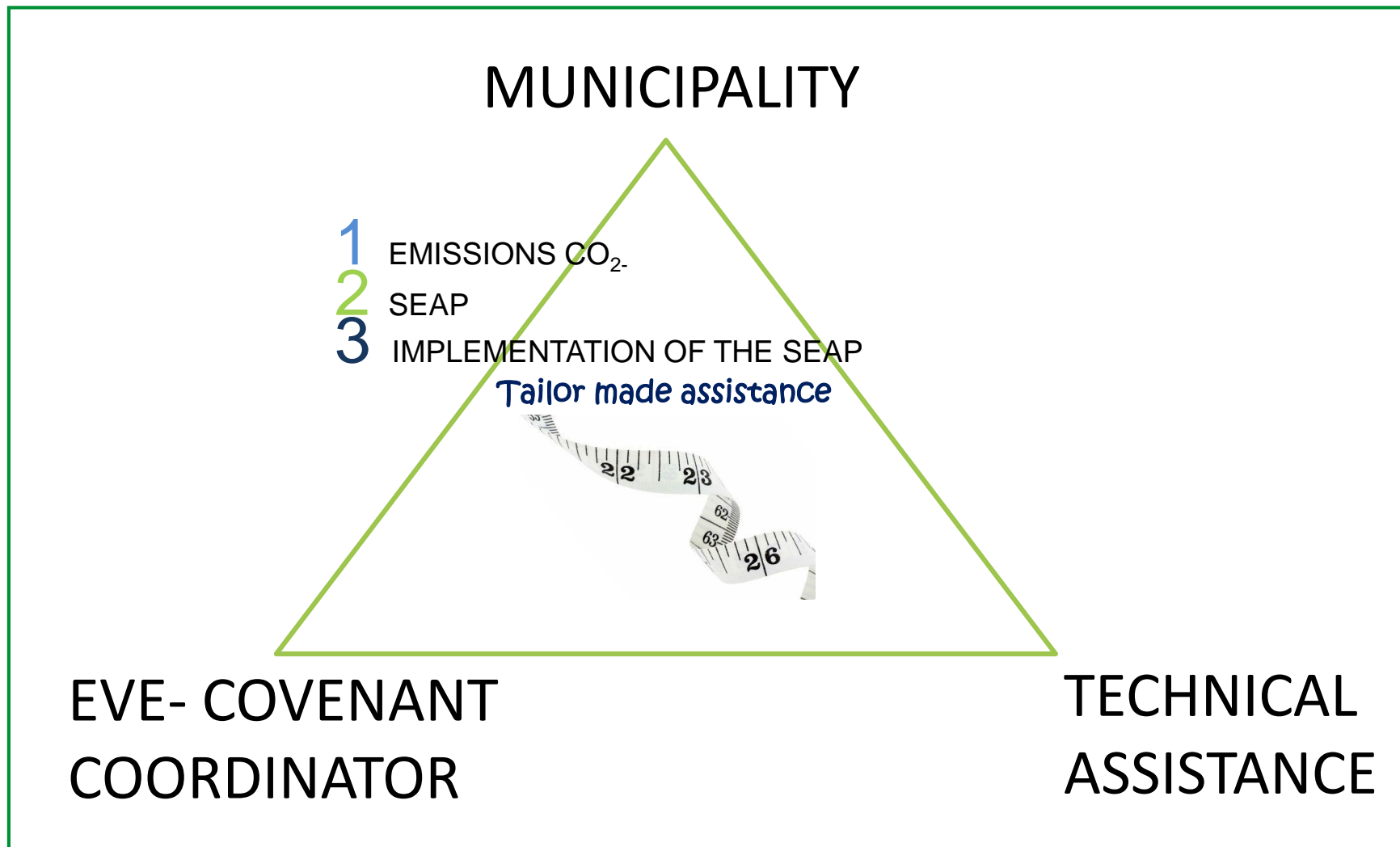
**Zero
fossil
fuels**

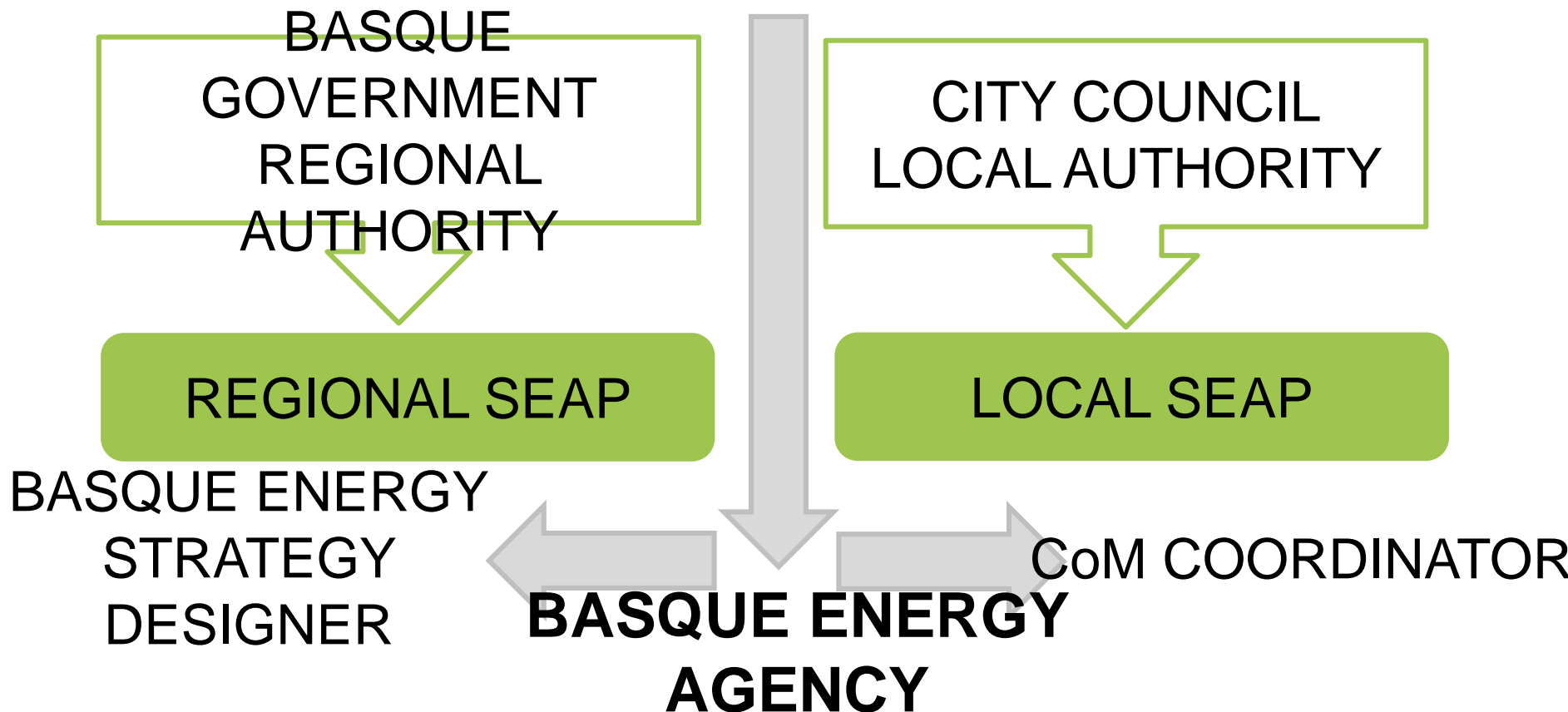
**Transition
towards
RES**

**Alternative
transport
systems**

**Industrial
policy for
the
energy
sector**

CoM. Main agents in the Basque Country





Model of cooperation:



ANALYSIS

Previous analysis in the town hall to join or not the Covenant of Mayors

1 ANALYSIS



OFFICIAL SIGNING OF THE COVENANT OF MAYORS

The Mayor, on behalf of the City Hall, signs the adhesion form that is sent by email to the Covenant of Mayors Office

2 SIGNATURE



ELABORATION OF SUSTAINABLE ENERGY ACTION PLAN

Identification of actions to be undertaken with technical, economic and investment analysis.

3 SEAP



IMPLEMENTATION OF THE SEAP

Implement the necessary actions to save energy and implement renewable energies

4 IMPLEMENTATION OF THE SEAP

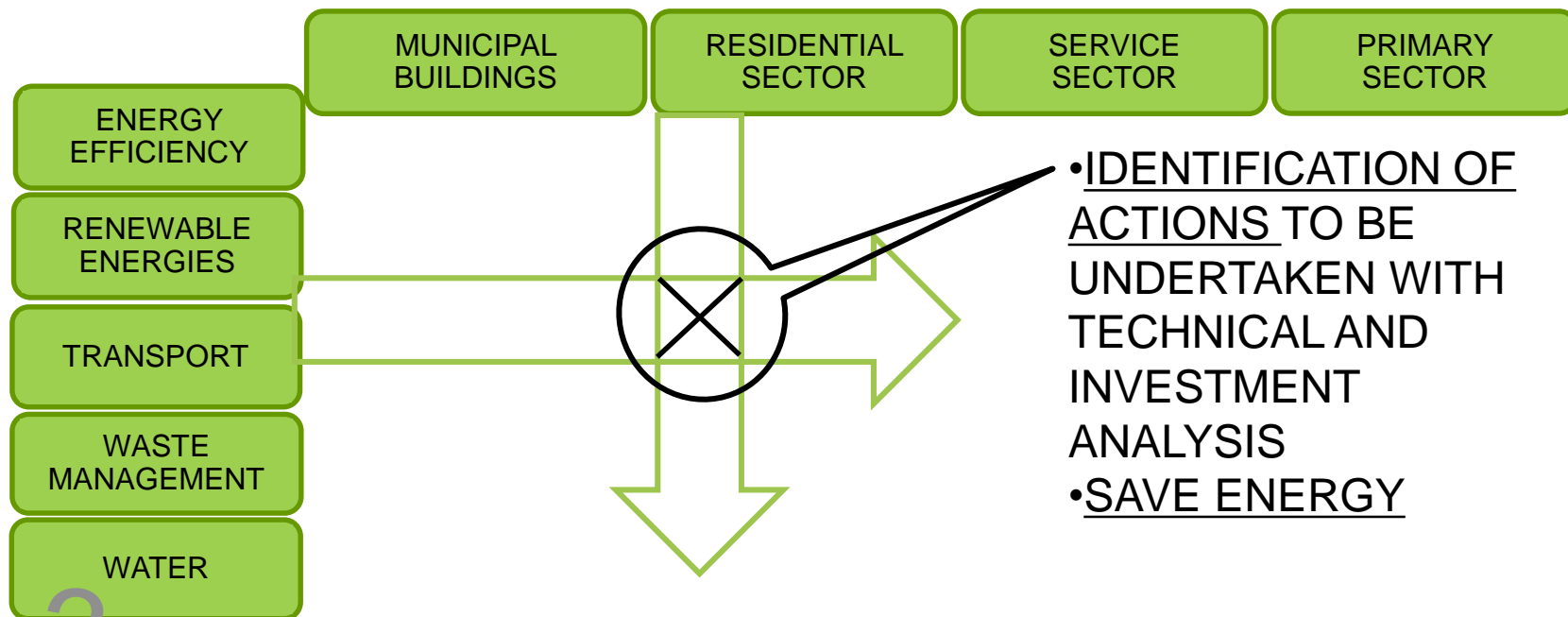
Model of cooperation:



ELABORATION OF THE SUSTAINABLE ENERGY ACTION PLAN

1 EMISSIONS CO₂

2 ENERGY ACTION PLAN SEAP:



3 IMPLEMENTATION OF THE SEAP

Model of cooperation:



IMPLEMENTATION OF THE SEAP -MONITORING COMMITTEE:

- GOVERNANCE
 1. LEADER: Mayor
 2. BOARD composed of politicians, technicians and EVE
 3. DECISION MAKER
- TECHNICAL WORK
 1. LEADER: technicians
 2. PRIORITIES
- MONEY
 1. SUBSIDY
 2. FINANCIAL SUPPORT: BANKS, FUNDS,...
 3. OTHERS: PPP,ELENA,JESSICA.....WHATEVER IMAGINE

50% OF THE POPULATION INVOLVED

More than 50,000 inhab

Donostia–San Sebastián

21 % CO₂

Vitoria-Gasteiz

26 % CO₂

Bilbao

31 % CO₂

Irún

30 % CO₂

10,000-50,000 inhab

Oñati

24 % CO₂

Basauri

33 % CO₂

Tolosa

23 % CO₂

Portugalete

25 % CO₂

Hondarribia

20 % CO₂

Mungia

23 % CO₂

Amurrio

27 % CO₂

Errenteria

20 % CO₂

Less than 10,000 inhab

Areatza

39 % CO₂

Abanto

22 % CO₂

Balmaseda

29 % CO₂

Usurbil

20 % CO₂

Muskiz

22 % CO₂

Güeñes

working

Ispaster

working



INDICATORS

SIGNATORIES:

19 municipalities

SEAPS submitted:

17/19 municipalities

ENERGY CONSUMPTION:

MUNICIPAL BUILDINGS: 3 al 5 %

RESIDENTIAL SECTOR: 19 al 27 %

SERVICE SECTOR: 12 al 14 %

TRANSPORT SECTOR: 60 al 65 %

PRIMARY SECTOR: 1 %

NUMBER OF PROJECTS:

MUNICIPAL BUILDINGS : 27 al 52 %

RESIDENTIAL SECTOR: 8 al 19 %

SERVICE SECTOR: 3 al 16 %

TRANSPORT SECTOR: 8 al 29 %

PRIMARY SECTOR: < 1 %



Eskerrik asko
Muchas gracias
Thank you very much

Joserra López
jrlopez@eve.eus



Overview of today's webinar

- + Introduction to presenters and topic
- + Part 1: Local energy transition process
- + Part 2: Energy Balance tool
- + Part 3: Effective collaboration: local and regional actors (Basque country)
- + Questions and next webinars





Thank you...questions?

Email: sss@planenergi.dk Twitter: @PlanEnergi



Join the SmartEnCity network



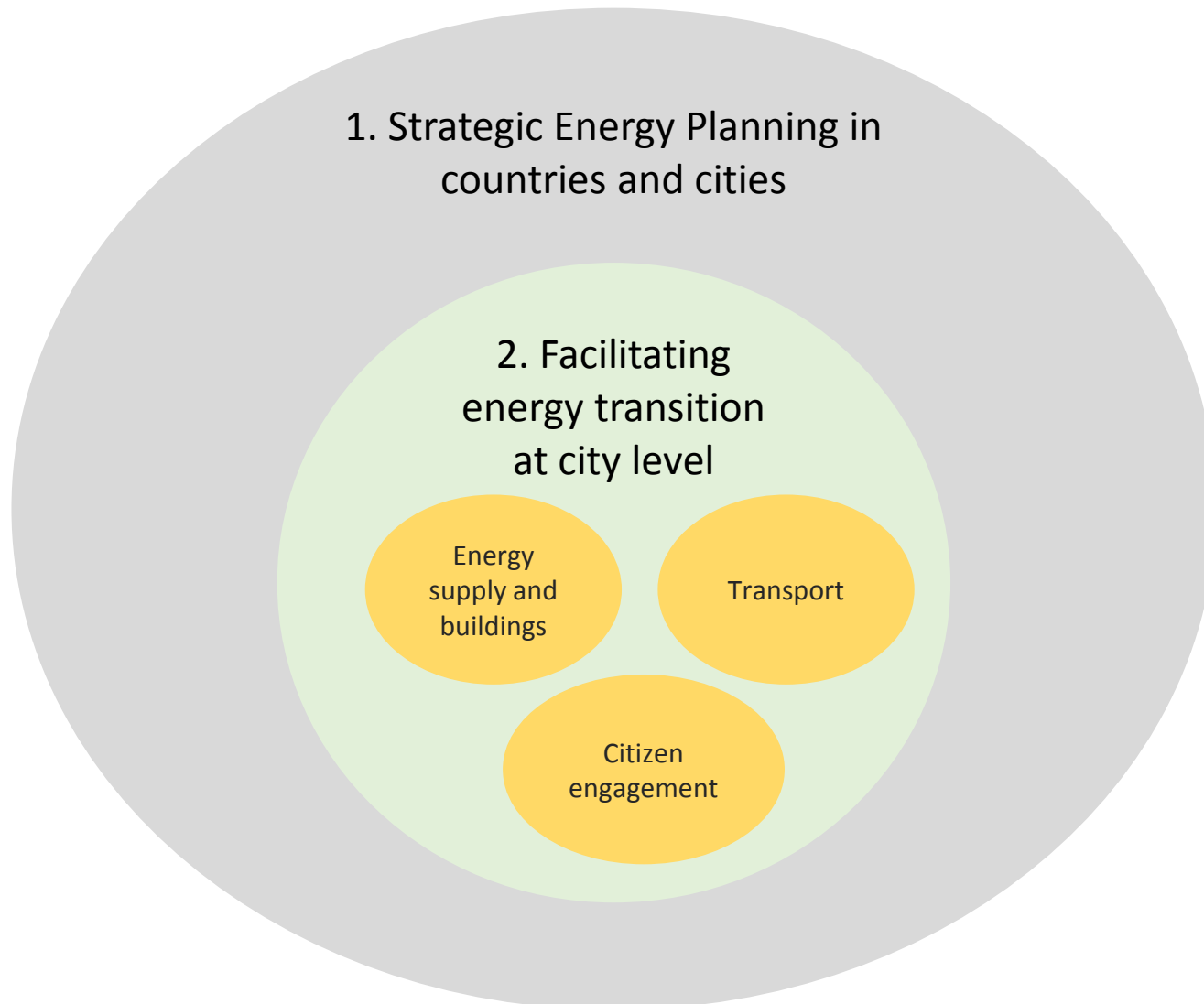
<http://smartencity.eu/network/>

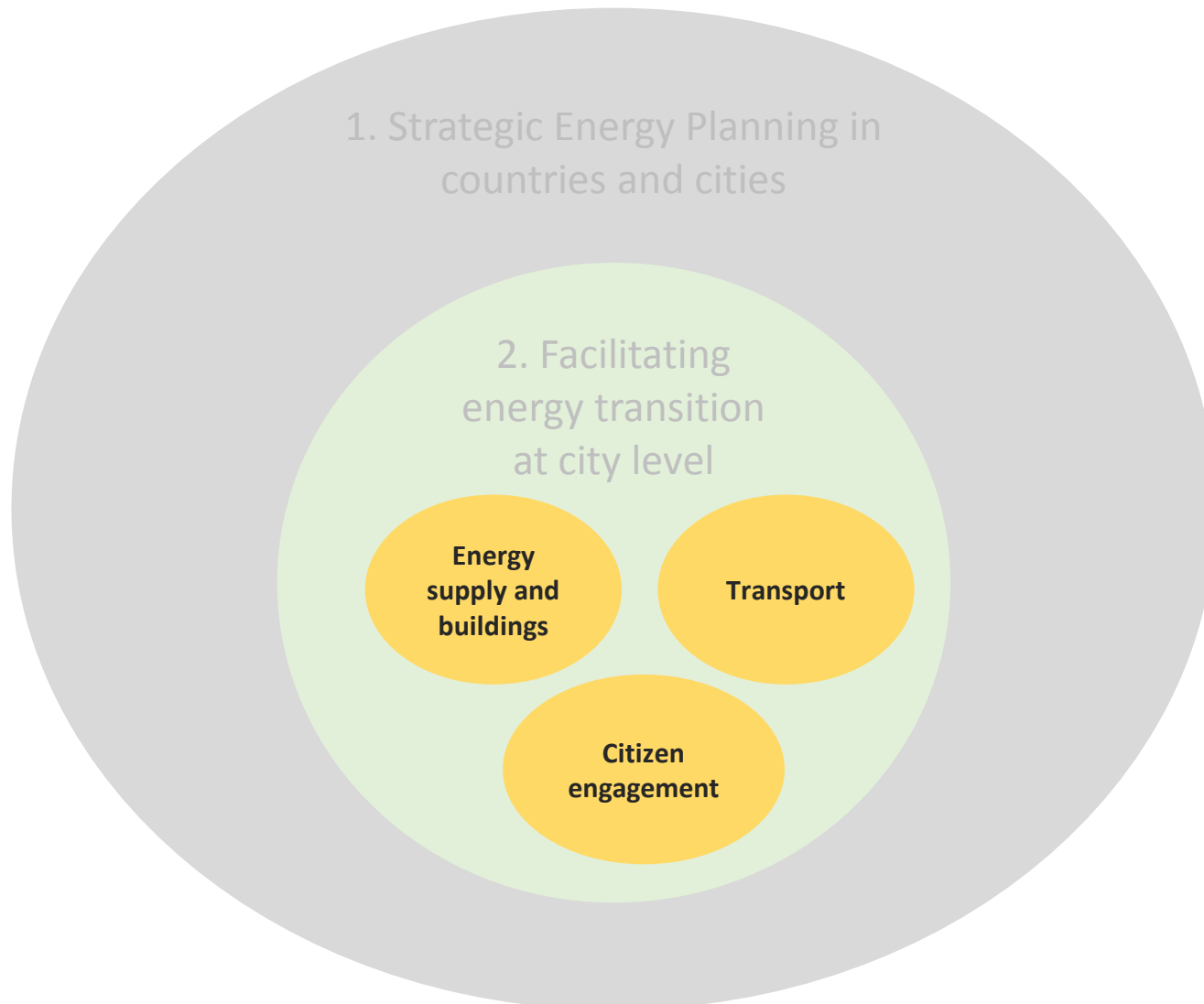
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Workshop for interested cities
Lecce, Italy
22nd February 2017

For more info:
www.smartencity.eu
under events

Thank you for joining &
see you!

SmartEnCity Network