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Challenges of data collection and management

Technical training on the Covenant of Mayors

JRC training for IUC contractors
and FPI Programme managers

Brussels

13-14 February 2017



**Covenant of Mayors
for Climate & Energy**

Joint
Research
Centre



- **Guiding principles of the CoM approach**
- **Challenges in data collection**
- **Overview of data quality**
- **Suggestions on data collection**
- **Data collection: tips from CoM experience**
- **Conclusions**

Guiding principles of the CoM approach

- **Scientific soundness** → knowledge of starting point (BEI)
- **Territorial approach**
- **Focus on FINAL energy consumption:**
 - In Buildings, equipment/facilities (and industries):
 - Municipal sector (exemplary role of the local authority)
 - Residential sector
 - Tertiary sector
 - Transport

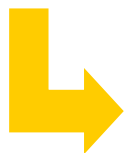
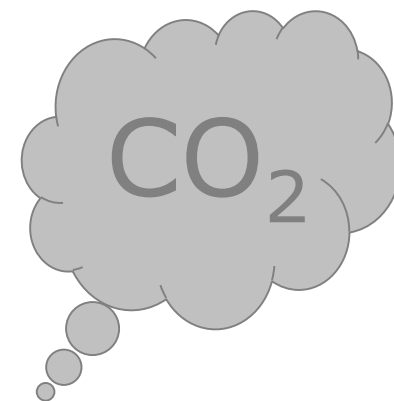


Actions on Energy Efficiency and
implementation of Renewable Energies



Bottom-Up *versus* Top-Down approaches

- Ideally a full **Bottom-Up** approach should be followed
- **Top-Down** approaches might not give an accurate picture of the municipality



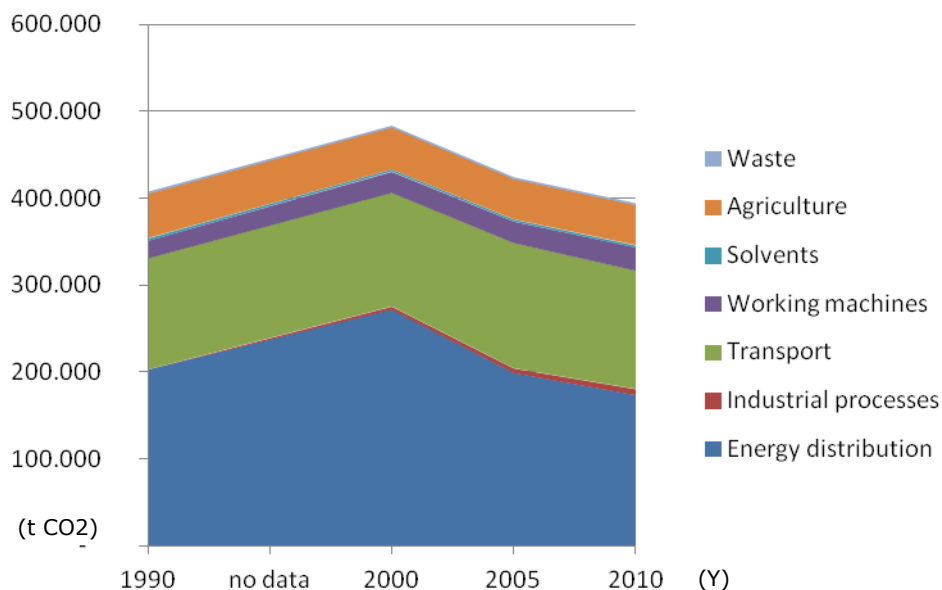
**Will the Monitoring
Emission Inventories
capture the results of
local actions?**



CHALLENGES IN DATA COLLECTION

Structure of national/regional statistical data

1. Activity sectors



Sweden

2. CoM sectors

- Municipal Buildings, equipment/ facilities
- Tertiary Buildings, equipment/ facilities
- Residential Buildings, equipment/ facilities
- Public lighting
- Industries (non ETS)
- Municipal Fleet
- Public transport
- Private and Commercial transport

CoM

An example of a German signatory, where is the issue..?

Legend of colours and symbols:

Green fields are compulsory Grey fields are non editable

A. Final energy consumption

Please note that for separating decimals dot [.] is used. No thousand separators are allowed.

Category	FINAL ENERGY CONSUMPTION [MWh]															
	Electricity	Heat cold	Fossil Fuels								Renewable energies					Total
			Natural gas	Liquid gas	Heating oil	Diesel	Gasoline	Lignite	Coal	Other fossil fuels	Plant oil	Biofuel	Other biomass	Solar thermal	Geothermal	
BUILDINGS, EQUIPMENT / FACILITIES & INDUSTRIES																
Municipal buildings, equipment/facilities		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tertiary (non municipal) buildings, equipment/facilities	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Residential buildings	Data	Data	Data												Data	Data
Public lighting		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Industries (excluding industries involved in the EU Emission trading scheme - ETS)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	2564000	856000	3617000	0	4475000	0	0	0	318000	0	0	0	0	0	0	1183000
TRANSPORT																
Municipal fleet	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Public transport	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Private and commercial transport	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Subtotal	138000	0	0	0	0	0	5360000	0	0	0	0	0	0	0	0	5498000
TOTAL	2702000	856000	3617000	0	4475000	0	5360000	0	318000	0	0	0	0	0	0	1732800

Municipal purchases of certified green electricity (if any) [MWh]:

0

Overview of data quality



- Energy consumption of buildings, vehicles, lighting systems and other facilities operated by **municipality** is usually adequately registered
- Energy consumption data in **residential & commercial** sector are of a poor quality
- Data on **Local Heat and Electricity Production** may be hard to find when plants are privately operated
- **Transport** sector estimations of emissions are based on statistics and very often outdated assumptions



Continue...

- Data reporting remains a major challenge for signatories and the level of details in the templates shows a certain country dependence
- For templates with a good level of details:
 - **Electricity** consumption and its split by Covenant sub-sectors are generally reported
 - When relevant, data on **Natural Gas** consumption are indicated, even though the split by Covenant sub-sectors can be more challenging
- Split by **Covenant sub-sectors** may be a challenge
- Energy consumption data in **Private/Commercial Transport** are usually challenging

We want to look at energy-related emissions 'cities' are 'fully accountable' for...

1. **Energy-related** ...some sectors are not the focus of the CoM!

- Food and consumer goods;
- Deforestation;
- Fugitive emissions...



Is the methodology and data allowing to evaluate emissions over time available?

2. **Full accountability...** e.g. how do we deal with electricity?

- The majority of the electricity consumed in municipalities is generally produced elsewhere;
- CO₂ emissions are accounted for using regional or national EFs which **should be kept constant** throughout the years;
- In case of local electricity production a **Local Emission Factor** should be calculated.

...and with sectors LAs cannot influence (Aviation, heavy industry)?

⇒ Generally to **be excluded**

Focussing on the TRANSPORT sector

Municipal and public transport

Private and commercial transport

- Traffic Monitoring Systems
 - Fuel sales within the territory
- *Corrections and data analysis are needed:*
- *Interurban transportation;*
 - *Vehicles registered in the territory;*
 - *Tourism?*



Data collection: tips from CoM experience



Projects co-funded under Intelligent Energy Europe Programme addressing the specific challenges in data collection for the Covenant signatories:

- **MeShaRtility project** (**M**ea**s**ure and **s**h**a**re data with utilities for the Covenant of MaYors), duration: April 2012- April 2015, target region: EU in general, specifically addressing 12 countries: Bulgaria, Croatia, Cyprus, Estonia, Germany, Italy, Latvia, Malta, Poland, Romania, Slovenia, Spain, <http://www.meshartility.eu/en/>

Summary report about good data sharing practices at EU level, 2015

The report can be downloaded from:
http://www.meshartility.eu/images/documents/pl/ICLEI_meshartility_report_EN_210x297_Screen_2.pdf



Data collection: tips from CoM experience



Projects co-funded under Intelligent Energy Europe Programme **addressing** the specific **challenges in data collection** for the Covenant signatories:

- **Data4Action project**, duration: March 2014- February 2017, target area: EU28, <http://data4action.eu>

Data4Action, aims to foster **win-win energy data exchange collaboration** models between public authorities and energy data providers moving from bilateral data exchange cooperation agreements **to regional «one-stop shop» data centres («Observatories»)**.

Data Access Guidebook for Sustainable Energy Actions Plans, 2016,

The report can be downloaded from:



<http://www.fedarene.org/wp-content/uploads/2017/01/576-Data-Access-Guidebook-rx15.pdf>



Centralized data collection at national level are facilitating data collection at local level

- Netherlands and Denmark have developed tools which provide energy and climate data per activity sector, broken down at least at municipal level.
- Cyprus Energy Agency has developed a tool which provides the local authorities with all the energy consumption information required in order to establish their CO2 inventory.
- The main aim of these tools was to assist the local authorities in implementing and monitoring local energy and climate action plans.
 - *Climate Monitor, Netherlands, since 2009,*
www.klimaatmonitor.databank.nl
 - *Municipal Carbon Inventory Tool, Denmark, since 2008,*
<http://www.ens.dk/undergrund>
 - *Cyprus Energy Agency website:*
http://www.cea.org.cy/app/CEA_energy.html





Covenant supporters play a key role in helping small and medium size local authorities to collect the data

- Energy data base of the province of Limburg:

The province of Limburg with partners established a data base containing the results of Baseline Emission Inventory, Renewable energy scan, Sustainable building scan and a Set of climate indicators prepared for each of the Limburg (44) municipalities. This was done to encourage municipalities to sign the Covenant of Mayors and draft up a SEAP (Sustainable Energy Action Plan). By doing this, the province of Limburg wants to reach their goal, set in 2008: becoming climate neutral in 2020" *

**Improving access to local energy data. Lessons learnt and recommendations from the meshartility project", 2015*
http://www.meshartility.eu/images/documents/D6.7_Final_brochure.pdf



Conclusions



- Energy consumption data has to be **relevant** to the particular situation of the municipality (**national averages will not** reflect in the subsequent monitoring inventories the effect of the actions implemented at local level!)
- The data collection process requires time and resources. Planning is crucial!
- **Sources** of data (see guidebook page 70)
 - **Invoices** (e.g. for the own buildings of the local authority)
 - Market operators (energy suppliers, **grid operators**)
 - **Ministries** (energy, statistics, environment), agencies, regulatory authorities
 - Surveys addressed to energy consumers

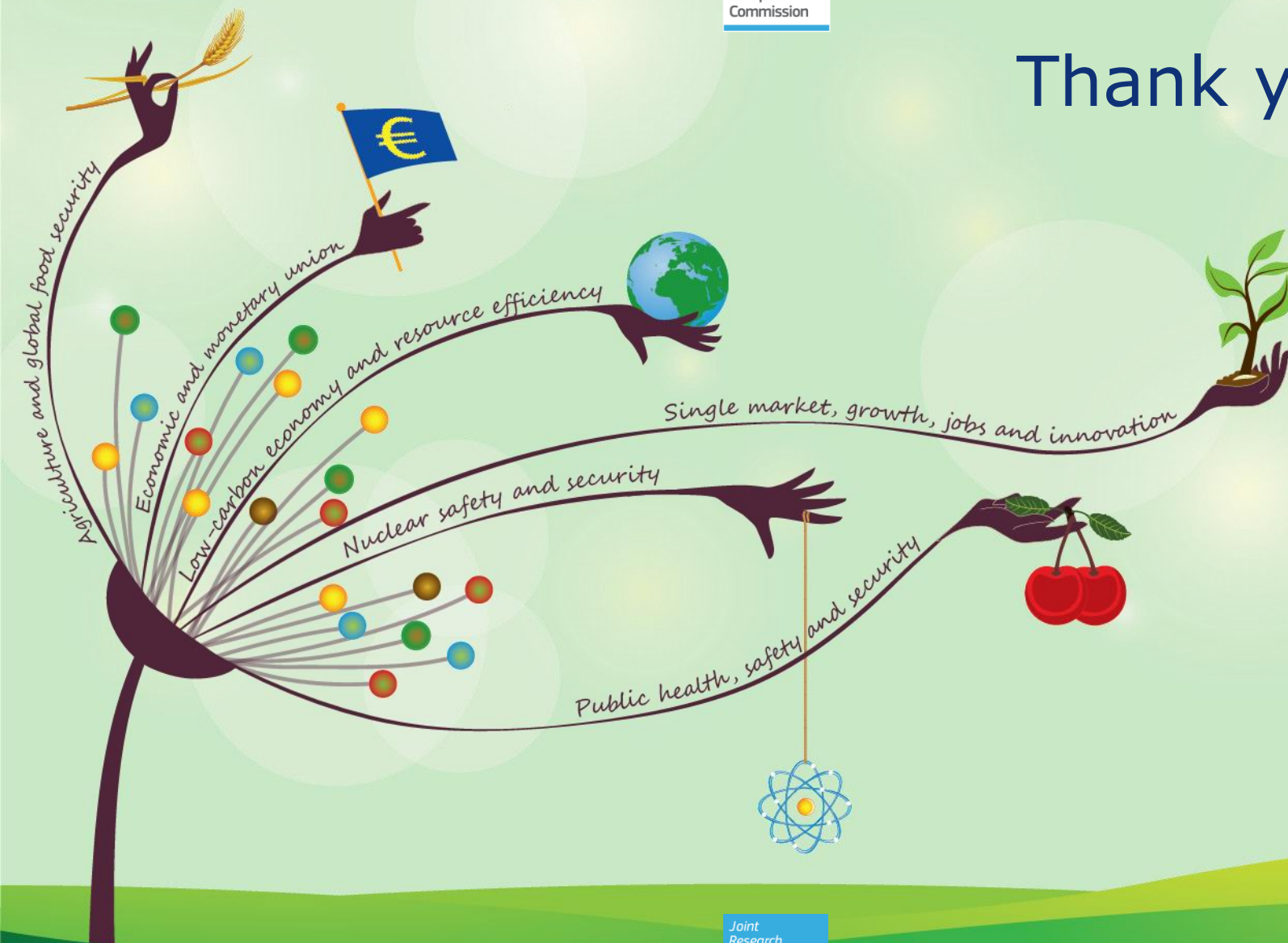




- Good quality and **reliable** data is essential
- The **availability** and **sources** of energy data are country/region dependent
- **Difficult** to assess the consumption of energy vectors that are **not distributed via a grid** (heating oil, biomass ...). Surveys are often required to complement this data.
- Importance of **utilities / energy suppliers / grid operators: they own the primary data !!!**
- **Territorial coordinators** (e.g. supporting structures) and other National/regional authorities can play a **key role** in collecting data and making it available to local authorities
- **Aggregated data** is not enough: need data for each energy vector, for community, for **each category of customer** (households, public sector, industry, services)
- Data related to **transport** and mobility: **difficult** to be estimated



Thank you!



Data management within the CoM: The Covenant of Mayors' reporting platform

The Covenant of Mayors extranet is a restricted area of the CoM website, accessible at:

http://www.covenantofmayors.eu/sign-in_en.html

It is used by:

- CoM Office to administer Signatories, Coordinators, etc.
- CoM Signatories to submit their SEAP/monitoring templates and documents, to connect and interact with members of the CoMunity, etc.
- JRC to check SE(C)AP/monitoring templates and documents and to update the analysis status

CoM Extranet

Signatories report information on:

- Overall Strategy
- Baseline Emission Inventory (and other EIs if relevant)
- Key actions of the SE(C)AP

*The online template includes an automatic integrated checking system allowing **real-time feedback** on errors or missing data*

Note: Online template's sections on adaptation to climate change will be made available in the course of 2017

JRC online verification tool

- When all the sections of the online template are filled in, extranet users can request an online check on the data by clicking on a button on the submission page
- When all the checks are run, the application produces an automatic report highlighting possible errors in the data



General categories of checks:

■ Completeness

■ Internal consistency

■ Comparison with default values

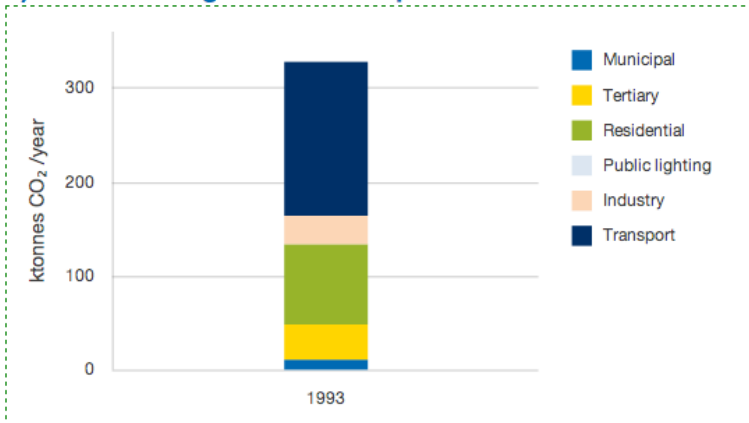
■ Correctness vis-à-vis Covenant methodological principles

Synthesis report on the public website

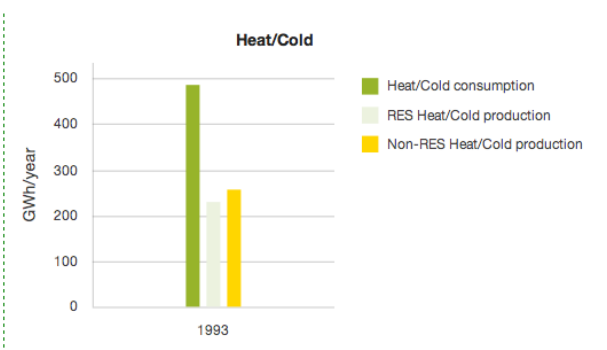
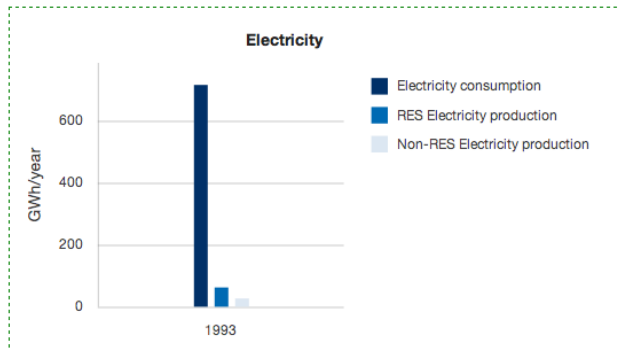
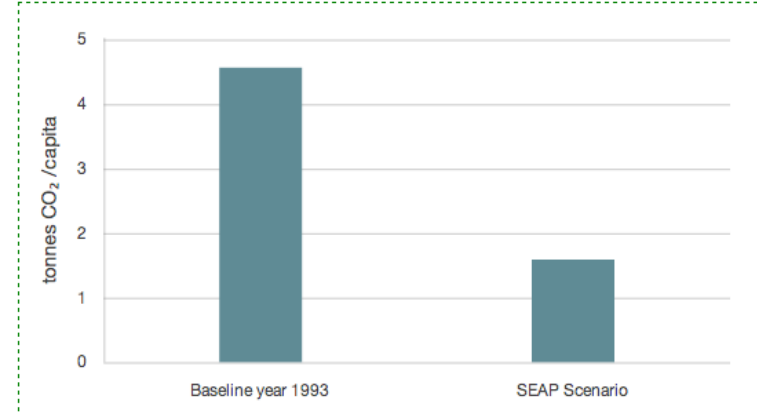


Emission factor	tonnes CO ₂ /capita	MWh/capita
IPCC	4.6	29.4

2) Greenhouse gas emissions per sector



7) Expected evolution in terms of greenhouse gas emissions



Methodologies and reporting frameworks: Covenant of Mayors and Compact of Mayors

CoM framework: Sectors covered



- **Four key sectors** should be accounted for in the BEI and targeted by SE(C)AP measures:
 - Municipal buildings & public lighting
 - Residential buildings
 - Tertiary buildings
 - Transport
- Other sectors can be included (e.g. non-ETS industries, waste and wastewater management)
- Others are explicitly excluded (e.g. ETS industries, AFOLU)

Note: the inventory is not meant to include all emitting sources

Emission inventories: Main principles



Covenant

- Genuine **bottom-up approach** (methodology developed ad-hoc for the Covenant)
- **Simplicity and flexibility:** the approach can be adapted to the specific situation of local authorities (city size, level of expertise, political mandate, etc.)
- Emission Inventories as a **tool** to support the deployment and monitoring of local energy and climate policies

Compact

- Methodology: Global Protocol for community-scale GHG emission inventories
- **Completeness of emission inventories** (incl. aviation, AFOLU, etc.)
- Collect and distribute **high quality information** that could motivate investors, corporation and governments to take bold climate action



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Emission inventories: Key concepts



Covenant

- Main focus on direct and indirect emissions associated with **energy consumption**
- Other direct emissions **can be accounted for** if in SE(C)AP

Compact

- Scope 1: All direct GHG emissions
- Scope 2: Indirect GHG emissions associated with the consumption of electricity/heat/cold
- Scope 3: all indirect emissions, occurring outside the territory of the inventory but induced by the activities occurring within the territory



Emission inventories: GHG included



Covenant

- Only CO₂ mandatory
- CH₄ and N₂O optional
- Reported in an aggregated manner (as CO₂-eq)

Compact

- Besides CO₂, the following gases can be included:
 - CH₄
 - N₂O
 - PFCs
 - SF₆
 - NF₃
 - HFCs
- Each GHG is reported separately (as CO₂-eq)





Covenant

Actions on **energy efficiency** and **distributed generation** are inserted via a dedicated form and described:

- area of intervention,
- policy instrument,
- level of decision,
- estimated costs,
- estimated impacts

Compact

Cities are not required to report on planned actions

CoM framework: State of play



- Approach followed by **>5,600 signatories** with a submitted SE(C)AP in the EU-28 and beyond, representing >197 million inhabitants
- The CoM methodology has been adopted by several Covenant Territorial Coordinators (CTCs) and Energy Agencies to develop **energy and emission databases**
- The CoM reporting framework provides added value in terms of collection of information on **local policies**

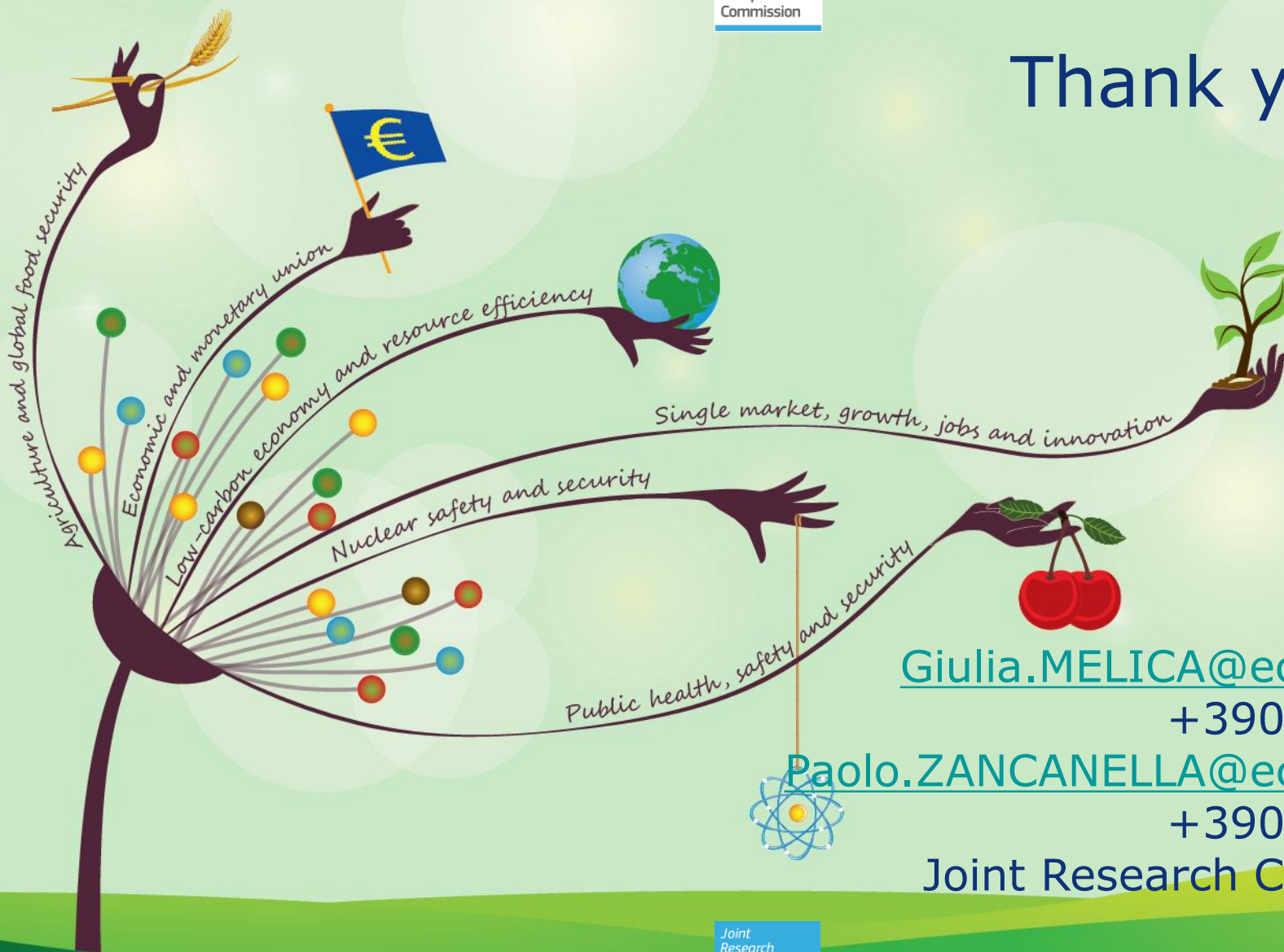
Needs

- Flexibility in the definition of priorities (mitigation / adaptation / access to energy) and of targets
- Flexibility in the definition of the scope (key sectors / optional sectors / sectors to be excluded)

Challenges

- Aggregating results, when different sectors are accounted for
- Suitable reporting framework
- Adapted data checking system
- Data privacy issues

Thank you!



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