

# The European Commission's science and knowledge service

## Joint Research Centre



# Monitoring private R&D investment in low-carbon energy technologies

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Energy, Transport and Climate Directorate**

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# The Joint Research Centre of the European Commission

The science and knowledge service of the European Commission, supporting EU policies with independent evidence throughout the whole policy cycle



Discover more about the JRC at <https://ec.europa.eu/jrc/en>

# Short Outline

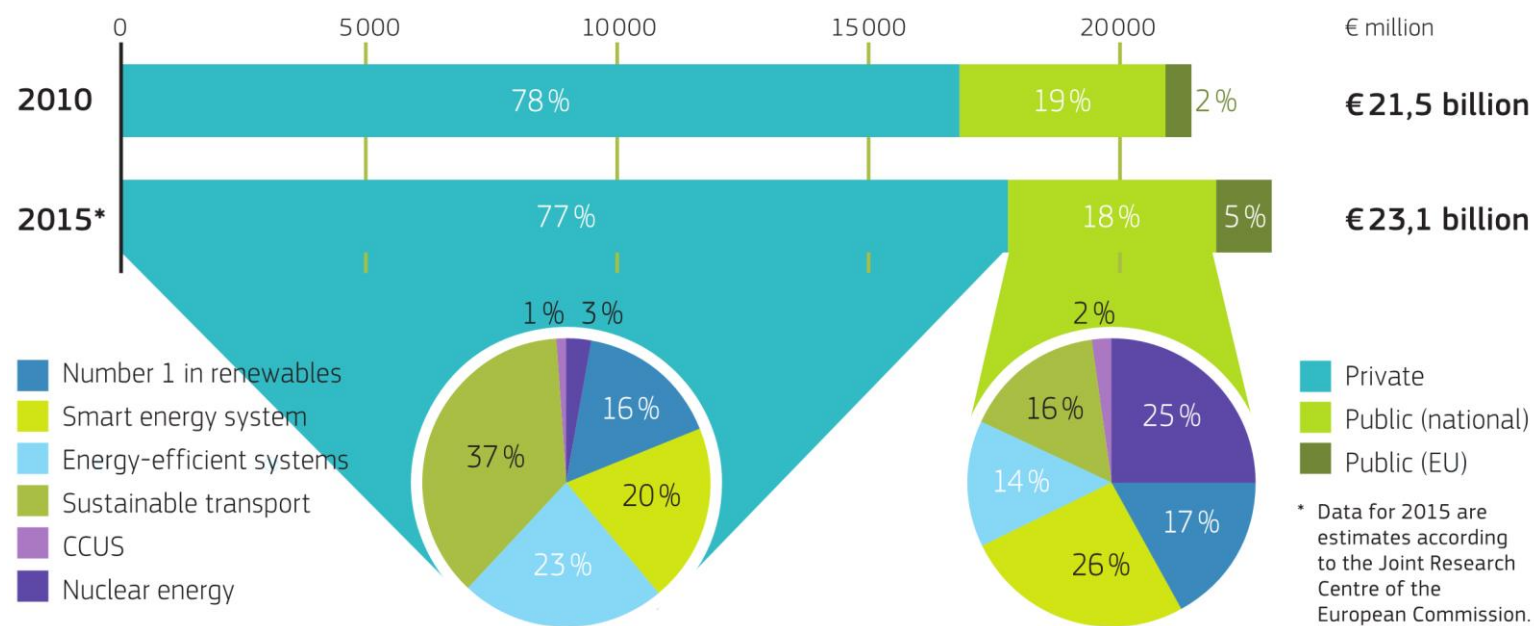
- The need to monitor private R&D investments
- Data sources and challenges
- Insights from MI Tracking Progress
- JRC analytical approaches
- Benchmarking – how do global numbers compare?
- Future work for JRC and MI Tracking

# The need to monitor private R&D investment

- Globally, the private sector accounts for over 2/3 of R&D investments
- Globally, the private sector accounts for up to 3/4 of R&D investments in low-carbon energy

Monitoring private R&D to:

- Support effective policy design, to coordinate, catalyse, promote and complement technology development



**Investment in the Energy Union / SET Plan R&I priorities in the EU**

Source: *The Strategic Energy Technology (SET) Plan - At the heart of Energy Research and Innovation in Europe*

# Data sources

- Company statements
- Surveys
- Grey literature – news
- Expert estimates
- Analytical approaches
- A combination of the above

# Challenges

- Varying obligation to report
- Confidentiality / competition
- Reporting at high level of aggregation
- Varying definitions
- Complex company structures

There is no reference / baseline for comparison

# MI Tracking Progress

Key messages  
from  
Malmö

- Monitoring private R&D investment is challenging. Accuracy not the end goal, but the investigation of trends.

## **SURVEYS**

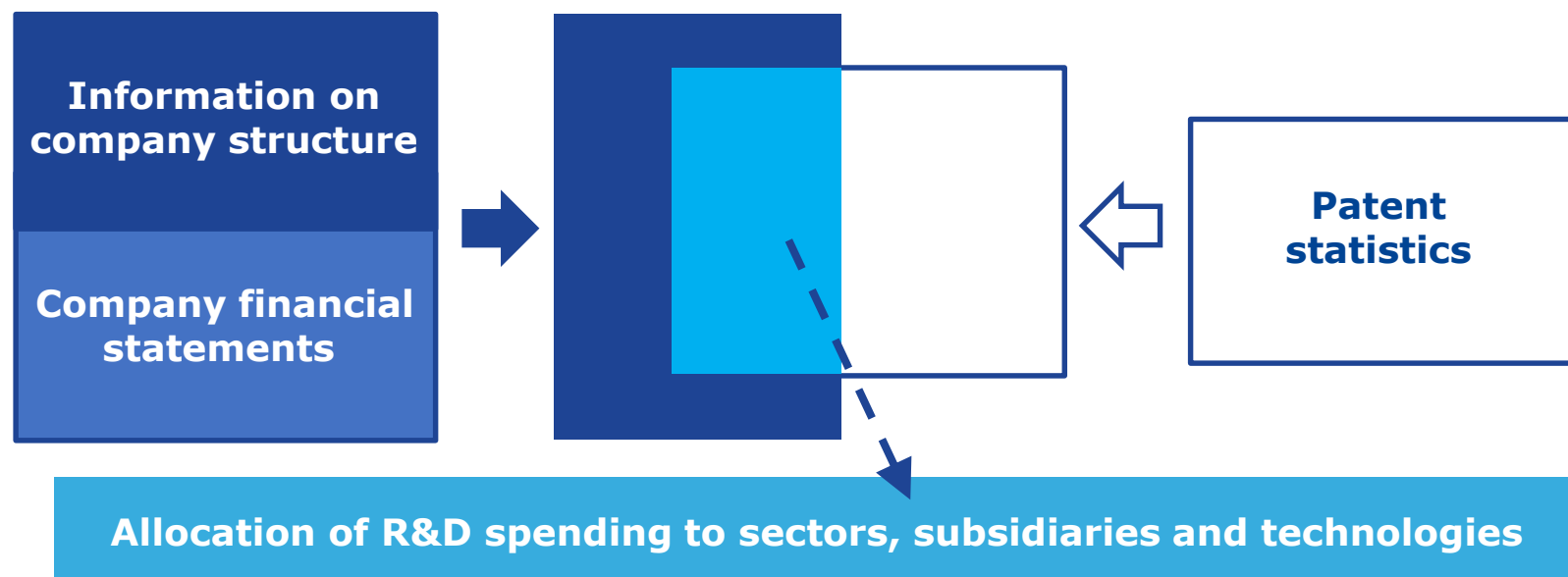
- Avoid introducing additional burden and (frequent) modifications of the questionnaires
- Response rates improve with an element of trust, beyond a legal obligation and/or a financial incentive
- Existing classifications not fit to inform on (low-carbon) energy; additional data is needed, careful design of surveys is crucial
- Financial and business reports may not disclose the real picture on private R&D expenditure

## **ANALYTICAL METHODS**

- JRC and others provide comprehensive analytical approaches; these are resource intensive and have a different perspective from national surveys – need to review and benchmark

# JRC analytical approaches to private R&D

## Combination of company data/patent statistics



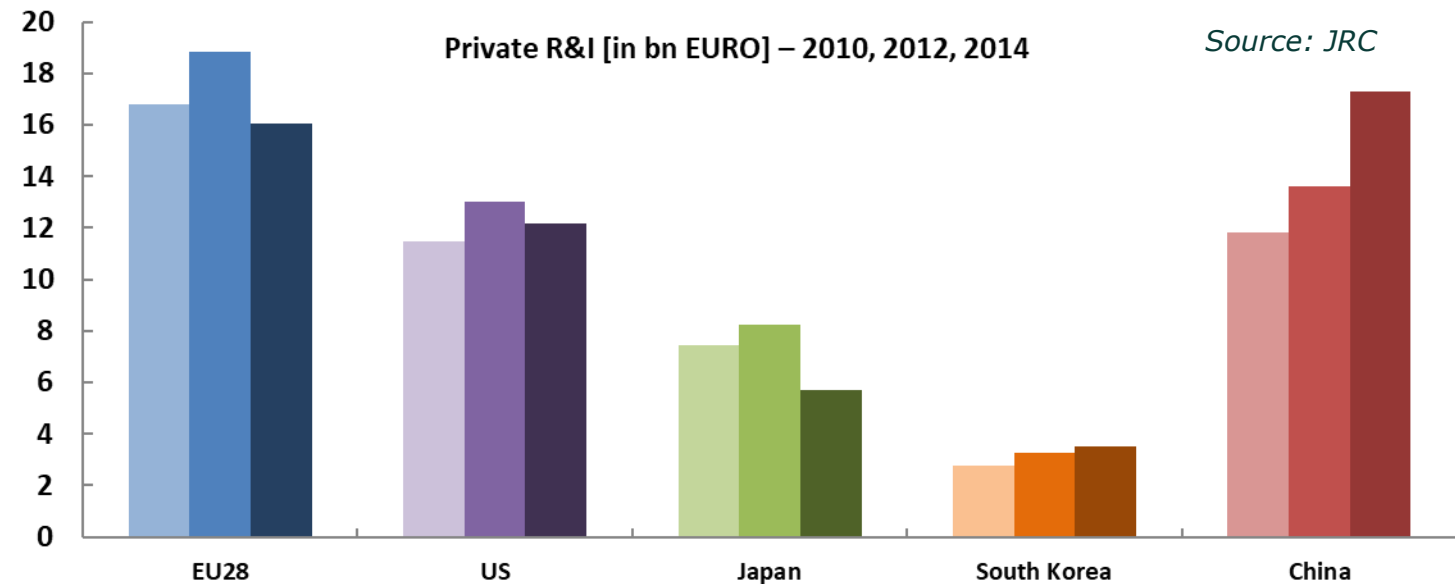
Source: JRC

The JRC uses the relationship between R&D expenditure and patenting trends to gain detailed insights on R&D investments in low-carbon energy technologies



# Existing work using patents as a proxy

- Established JRC methodology
- Based on patenting activity and financial information
- Considerable time lag – complete 2015/16 available shortly – simple estimates forward
- Results per country and technology sector



# Strengths

- Transparent
- Based on public or easily accessible datasets
- Globally applicable
- Provides information at a low level of aggregation
- Further analysis and insights

# Weaknesses

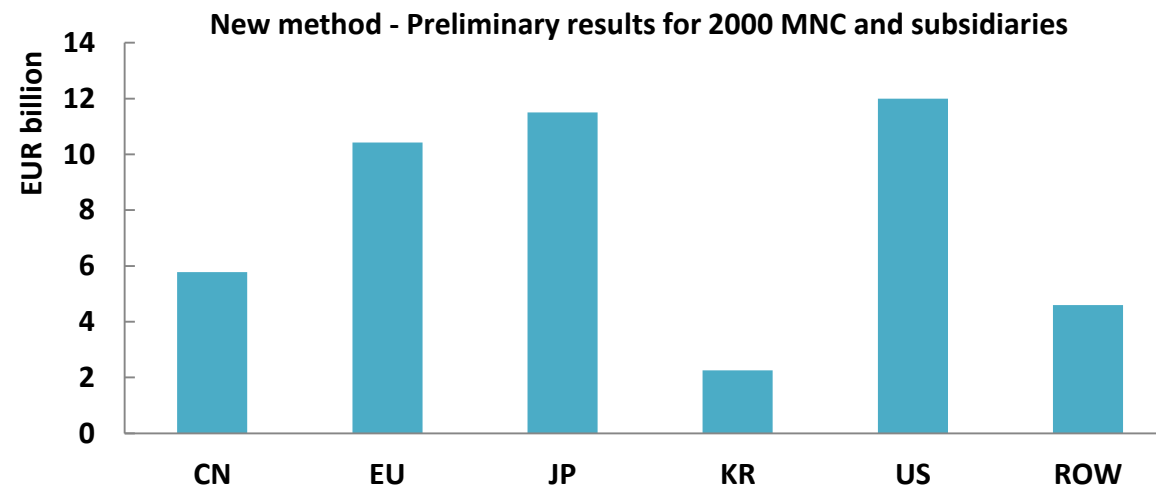
- Resource intensive
- Data processing requirements
- Time lag (patent statistics)
- Set of assumptions on:
  - patents
  - costs
  - geographical location

# Approach based on financial statements

similar  
work by :

UNEP/BNEF  
IEA

- Alternative JRC methodology
- Based on the description of activities of groups of companies on clean energy and financial information
- Reduced time lag – 1 year delay
- Results per country
- Results for Clean Energy - no technology resolution



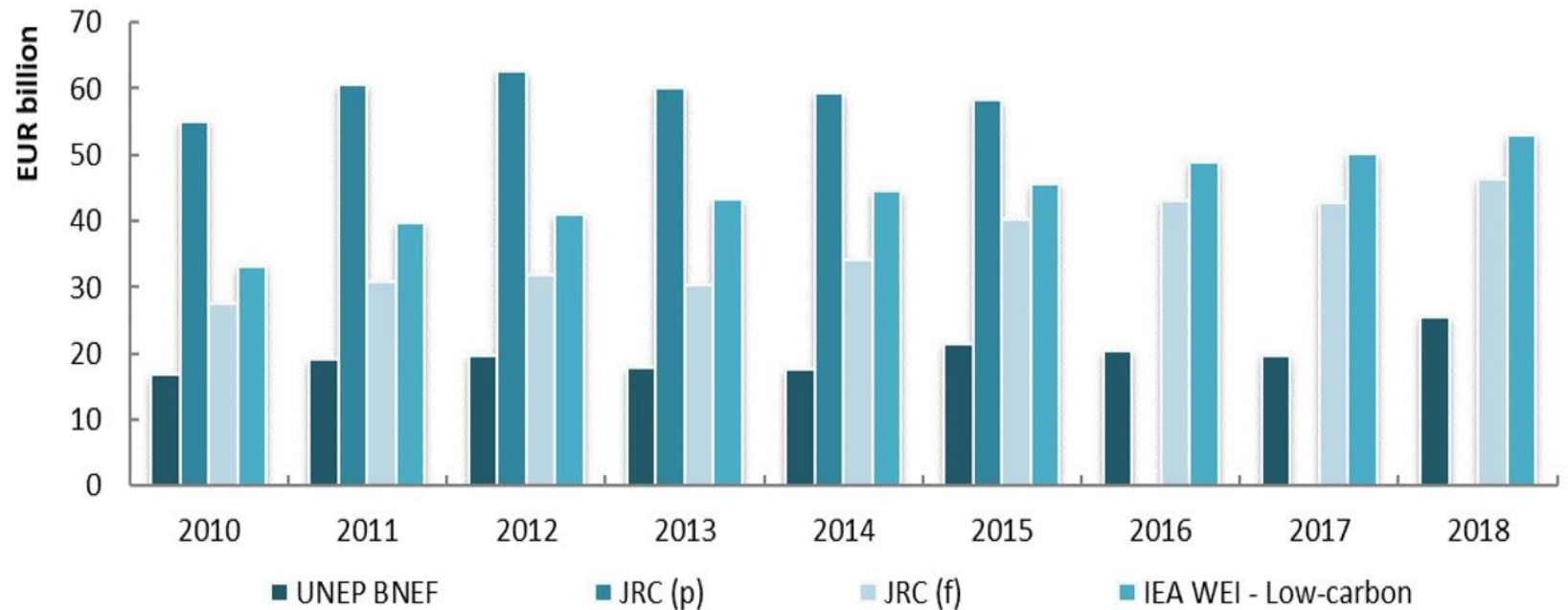
Source: JRC

An estimated  
46.5 EUR billion  
invested globally  
in 2018

# Bench- marking

How do  
analytical  
methods  
compare?

- No absolute baseline – comparing estimates
- Estimates refer to different samples – both in terms of number of companies and in terms of the technologies included
- Nonetheless, numbers are of the same order, and the differences can be put into context



Source: JRC, adapted from IEA & BloombergNEF/UNEP

# MI Tracking Progress

Next steps for the work stream on private R&D investment, building on the Workshop in Malmö

- Position paper on the existing state of play
  - Who provides estimates and how?
  - What is included / monitored?
  - How do the numbers compare?
- What is a workable solution?
- What else should we be monitoring?
- Follow-up workshop in 1<sup>st</sup> quarter 2020

***Please join us!***

# Additional information

## JRC R&I Monitoring

Fiorini A; Georgakaki A; Pasimeni F; Tzimas E. *Monitoring R&I in Low-Carbon Energy Technologies*, EUR 28446 EN, Publications Office of the European Union

Pasimeni F; Fiorini A; Georgakaki A. *Patent-based Estimation Procedure of Private R&D: The Case of Climate Change and Mitigation Technologies in Europe*, [SWPS 2018-06](#).

Reports available @



<https://setis.ec.europa.eu/related-jrc-activities/jrc-setis-reports>

## The R&I team:

A. Georgakaki, F. Pasimeni, S. Letout

**Tracking private investment in energy R&D**  
in the context of monitoring research and innovation in energy technologies

Monitoring innovation activities in low-carbon energy in the EU, such as public and private R&D investments, is essential for the assessment of progress towards a decarbonised energy system, in line with the Paris agreement. The European Commission's Joint Research Centre (JRC) in the context of its work in support of the Strategic Energy Technology Plan and the Energy Union has established competence in the field, through the development of in-house methodologies, continuous reporting, and collaboration with other prominent actors. These JRC activities, which have primarily supported the EU policy process, can become a starting point for monitoring private R&D investments at global scale in support of the tracking progress Mission Innovation workstream.

The JRC methodologies are fully transparent, and available through the JRC report [Monitoring R&I in Low-Carbon Energy Technologies](#) in the interest of sharing knowledge and best-practices. This allows stakeholders to review both the methodology used, and the outcomes published in regular intervals, such as in the 2017 edition of [Energy R&D financing and patenting trends in the EU](#); and trigger feedback and aid the further improvement of data collection, processing and evaluation mechanisms. Improvements to the methodology are continuously shared with the scientific community. The recently published working paper [A Patent-based Estimation Procedure of Private R&D: The Case of Climate Change and Mitigation Technologies in Europe](#) provides further details on the methodology and improvements that will shortly be published in a further JRC methodological report.

The JRC work in this area has been feeding into a number of policy documents, such as the [Strategic Energy Technology Plan implementation progress reports](#) and the annual [State of the Energy Union reports](#) and accompanying documents, such as country factsheets.

**JRC Mission**  
As the science and knowledge service of the European Commission, the Joint Research Centre's mission is to support EU policies with independent evidence throughout the whole policy cycle.

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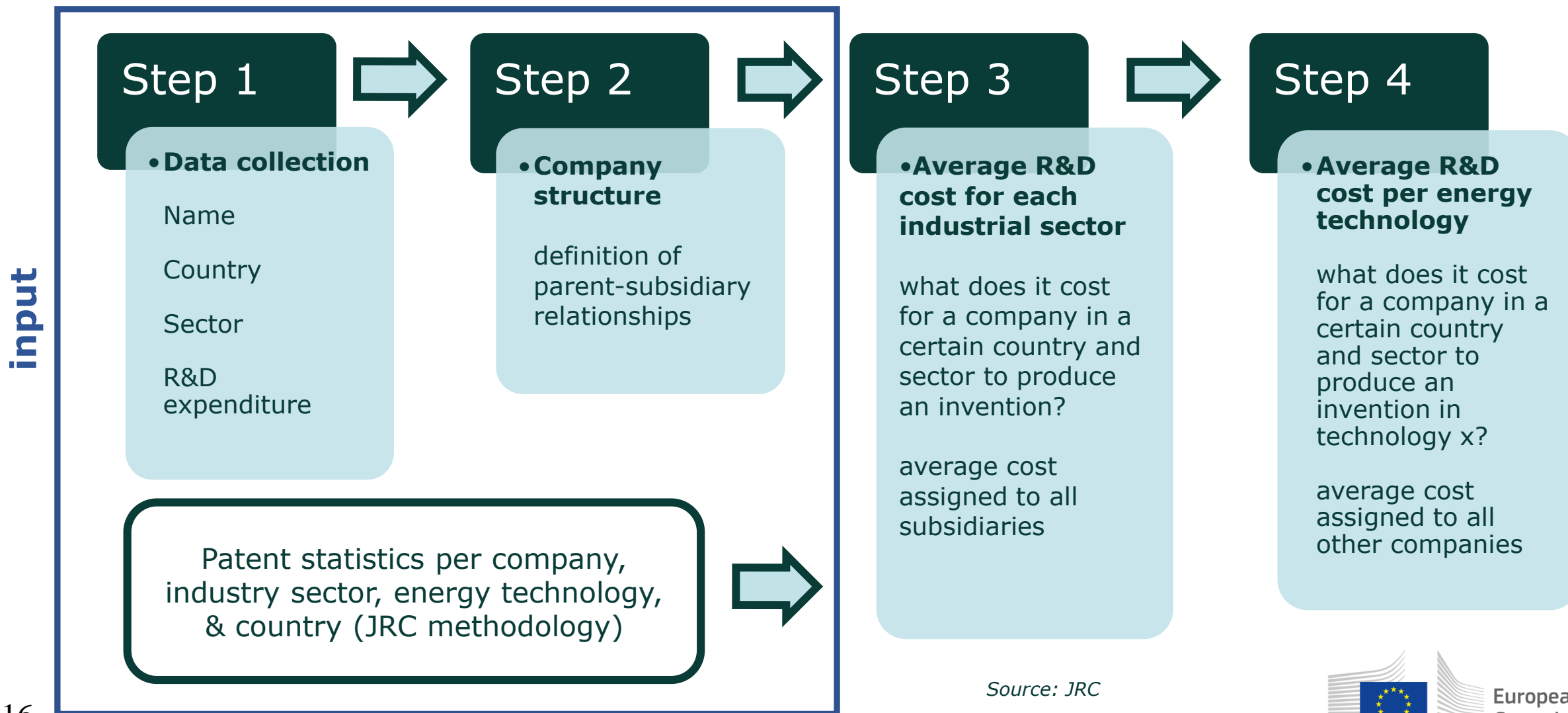
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Joint Research Centre  
EU Science Hub

# Thank you

## Any questions?

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# Private R&D: methodological steps



Source: JRC