The Societal Challenge on Energy in Horizon 2020

CLORA - Brussels
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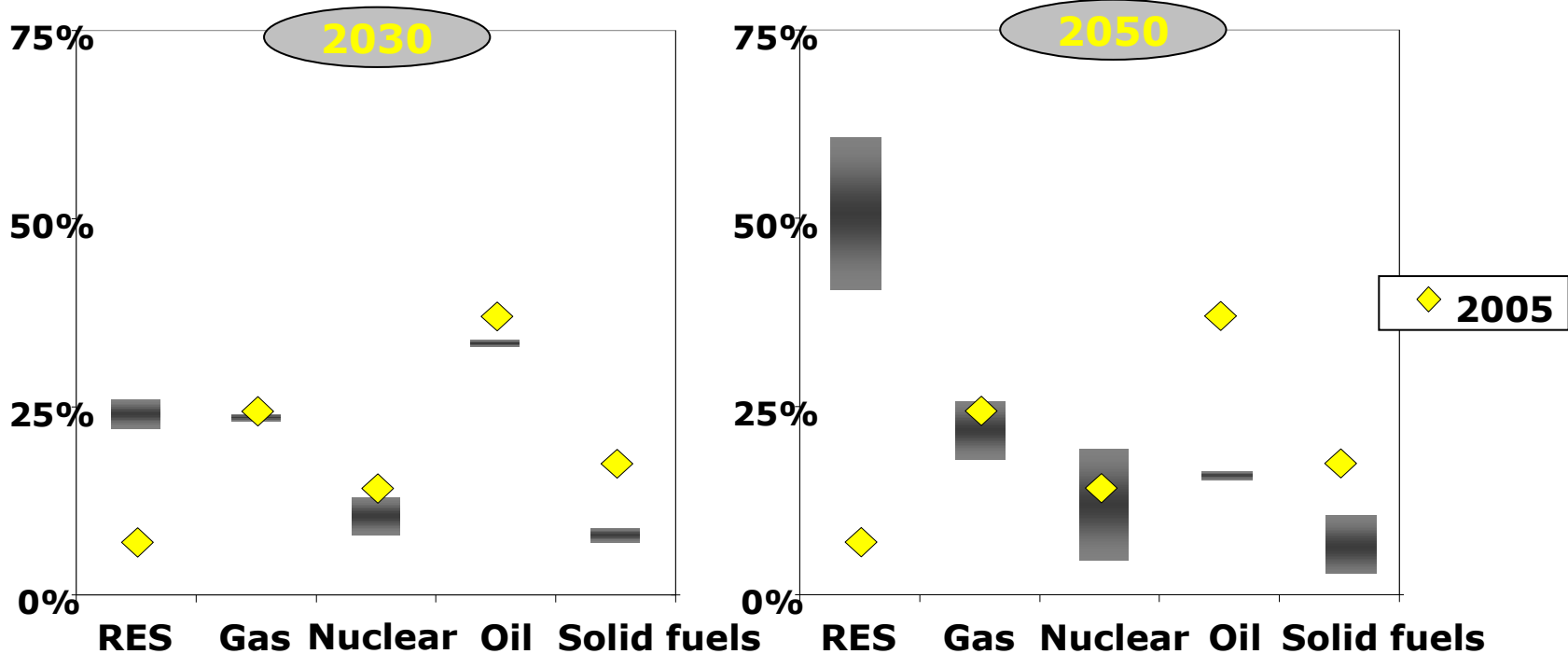**DG Research & Innovation**
European Commission

EU Energy Policy

- *Europe 2020 – five ambitious objectives to be reached by 2020 - employment, innovation, education, social inclusion and climate/energy*

- *Energy 2020 - A strategy for competitive, sustainable and secure energy*
  1. Achieving an energy-efficient Europe;
  2. Building a truly pan-European integrated energy market;
  3. Empowering consumers and achieving the highest level of safety and security;
  4. Extending Europe's leadership in energy **technology and innovation**;
  5. Strengthening the external dimension of the EU energy market.

- *Energy Roadmap 2050 - a basis for developing a long-term policy framework (cutting GHG emissions by 80-95% by 2050)*
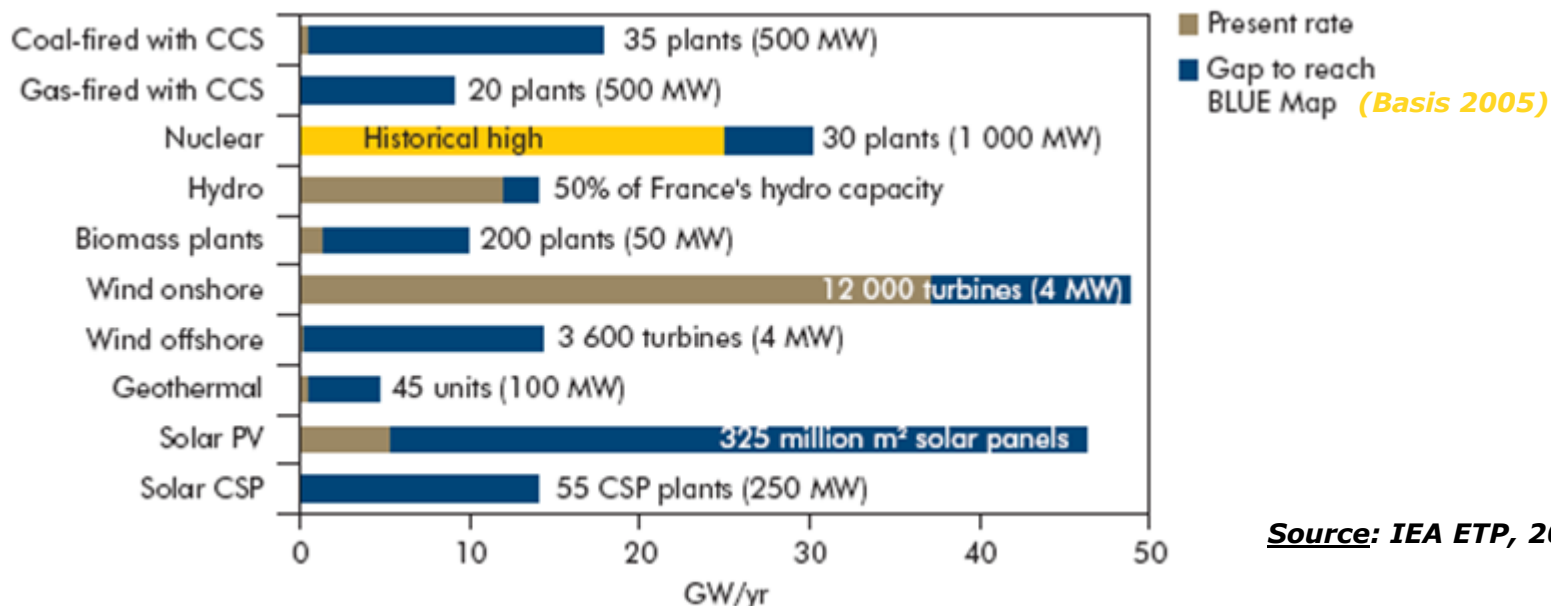
EU Energy Roadmap 2050

Primary EU energy consumption in %

2030

75%

50%

25%

0%

RES   Gas Nuclear   Oil Solid fuels

2050

75%

50%

25%

0%

◆ **2005**

RES   Gas   Nuclear   Oil Solid fuels

➔ **need for a wide range of new generations of energy technologies to achieve the transition to a sustainable and secure energy sector**

Global level

Need for much more annual capacities in the electricity sector to reduce global energy-related CO2 emissions by 50% in 2050 (BLUE Map scenario):

Present rate

Gap to reach BLUE Map *(Basis 2005)*

Coal-fired with CCS	35 plants (500 MW)
Gas-fired with CCS	20 plants (500 MW)
Nuclear	Historical high — 30 plants (1 000 MW)
Hydro	50% of France's hydro capacity
Biomass plants	200 plants (50 MW)
Wind onshore	12 000 turbines (4 MW)
Wind offshore	3 600 turbines (4 MW)
Geothermal	45 units (100 MW)
Solar PV	325 million m² solar panels
Solar CSP	55 CSP plants (250 MW)

GW/yr

Source: IEA ETP, 2010

➔ **for emerging technologies more than 40 times the current annual rate of investment needed at a global scale.**

SET Plan

- ***The SET-Plan*** *adopted in November 2007 is the technology pillar of the* <u>*EU's energy and climate change policy*</u>

- **Objective:** *EU world-wide industrial leadership in breakthrough solutions that are fit for purpose to the EU 2050 vision*

- **Strategy:** *Joint efforts between EU, MSs, Industry and Research Community to accelerate the development of low carbon technologies leading to their market take-up*
  - ➔ a Research and Innovation chain approach - from ideas to market
  - ➔ and a supply chain approach - from materials to system integration and energy services

Where are we ?

- ***European Industrial Initiatives operational*** *on Wind, Solar, CCS, Electricity Grids, Sustainable Nuclear and Bio-energy*

- ***Joint Technology Initiative*** *on Fuel cells and Hydrogen*

- ***13 Joint Programmes of the EERA on*** *Wind, PV, CSP, Storage, Grids, CCS, Geothermal, Ocean, bio-energy, materials for nuclear, Advanced materials and processing, Fuel cells and Hydrogen, Smart cities*

- ***Smart Cities and Communities Initiative***

- ***Energy Education and Training Initiative***

- ***SETIS***

Which priorities?

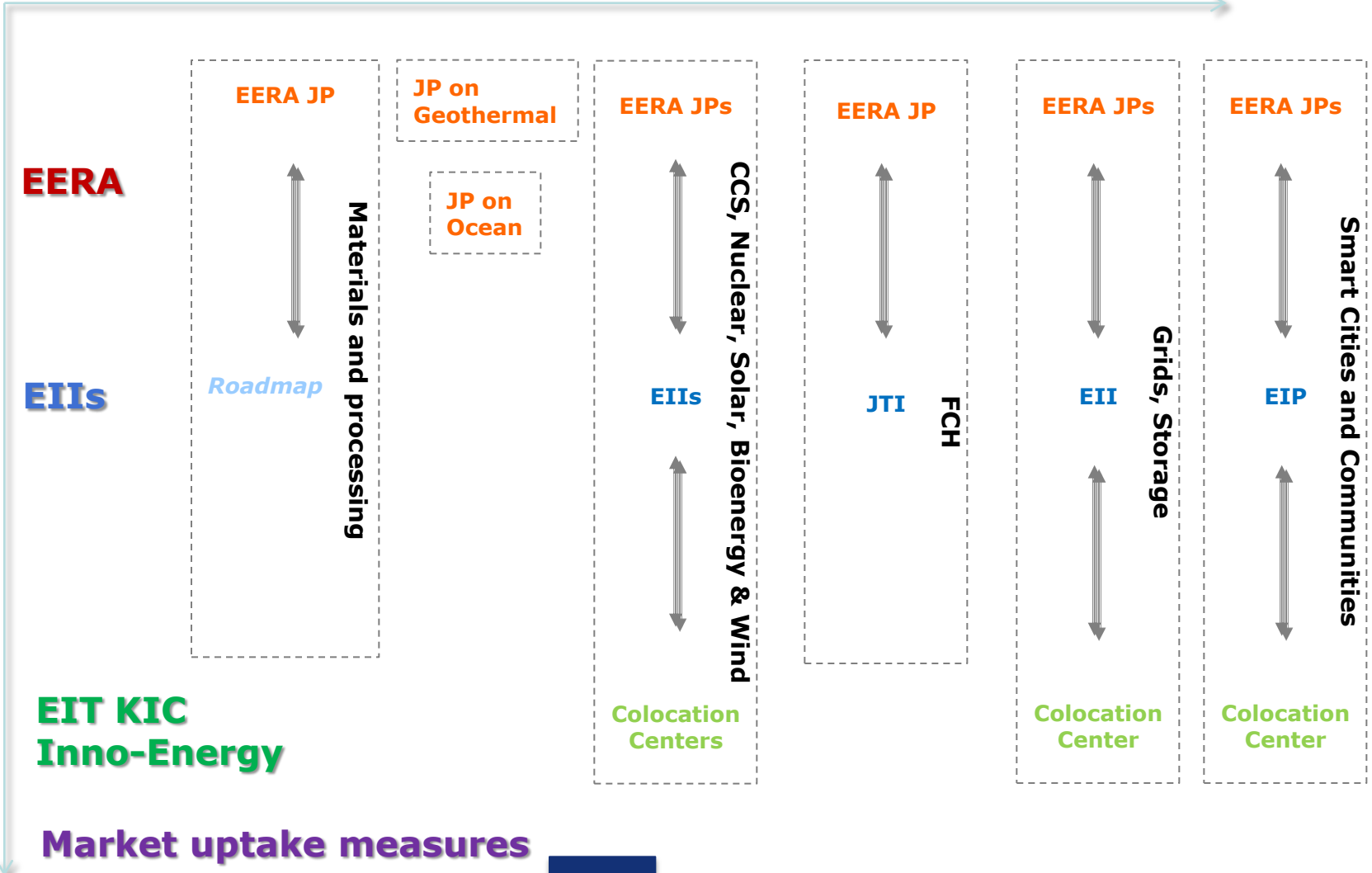**Materials**

energy systems

From ideas

Proof of concept

EERA

Pilots

EIIs

First of a kind

Innovation Services

EIT KIC Inno-Energy

To market

Market uptake measures

EERA JP

JP on Geothermal

JP on Ocean

EERA JPs

EERA JP

EERA JPs

EERA JPs

Roadmap

Materials and processing

EIIs

CCS, Nuclear, Solar, Bioenergy & Wind

Colocation Centers

JTI

FCH

EII

Grids, Storage

EIP

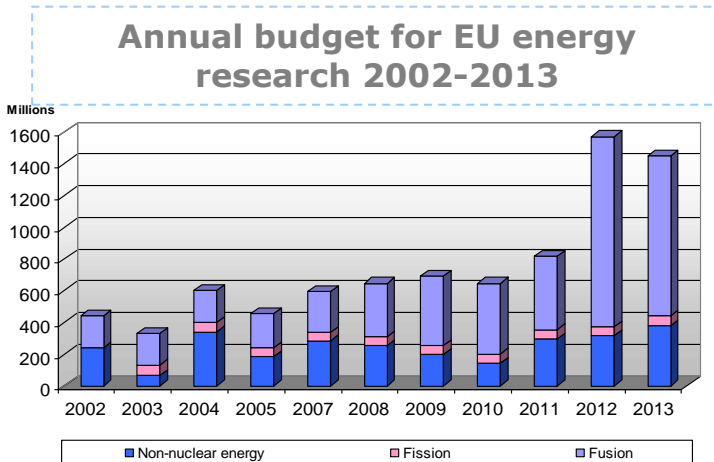**Smart Cities and Communities**

Colocation Center

Colocation Center

State of Play

- **The SET Plan has changed the way energy research is performed in Europe:**

  - Moving towards Joint Actions between EC and MSs such as ERA-NET+ on bioenergy, up-coming ERA-NET+ on wind, ERA-NET on solar energy.

  - MSs taking leadership to synchronise their calls 'Berlin model'.

  - Proposals in FP7 WP 2013 to support Integrated Research Programmes.

- **Increased EU support to Energy research (FP6, FP7 and Horizon 2020):**

Annual budget for EU energy research 2002-2013

Horizon 2020 proposal:

- ***EUR 6.5 bn*** *(current prices) for the challenge 'Secure, Clean, and Efficient Energy' for 2014-2020*

- *EUR 1 bn for fission and fusion activities + EUR 0.7 bn (JRC) for 2014-2018 (ITER financing not part of H2020)*

- **But not enough... need for partnerships to pool resources (estimated from 3B€ to 8 B€/year public & private to reach the 2020 SET Plan objectives)**

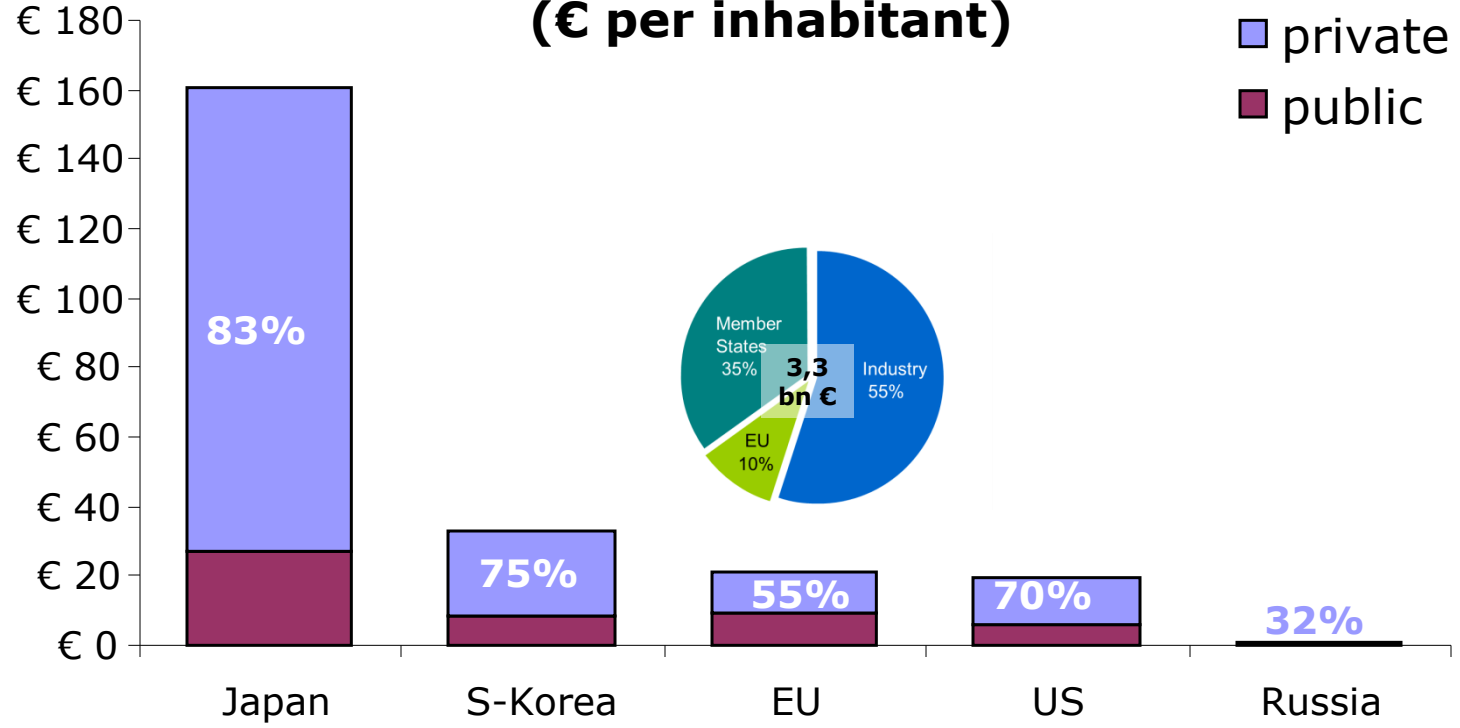- **Horizon 2020 can catalyse this change**

EU in the international context

**R&D expenditure in energy in 2007
(€ per inhabitant)**

Legend: private, public

Bar chart values:
- Japan: 83%
- S-Korea: 75%
- EU: 55%
- US: 70%
- Russia: 32%

Pie chart: Member States 35%, Industry 55%, EU 10%, 3,3 bn €

Energy in Horizon 2020

Key challenge 'secure, clean and efficient energy` (1)

- **Objective:** to make the transition to a reliable, sustainable and competitive energy system, in the face of increasingly scarce resources, increasing energy needs and climate change.

- **Broad lines of activities:**

  (1) Reducing energy consumption and carbon footprint by smart and sustainable use;

  (2) Low-cost, low-carbon electricity supply;

  (3) Alternative fuels and mobile energy sources;

  (4) A single, smart European electricity grid;

  (5) New knowledge and technologies;

  (6) Robust decision making and public engagement;

  (7) Market uptake of energy innovation.

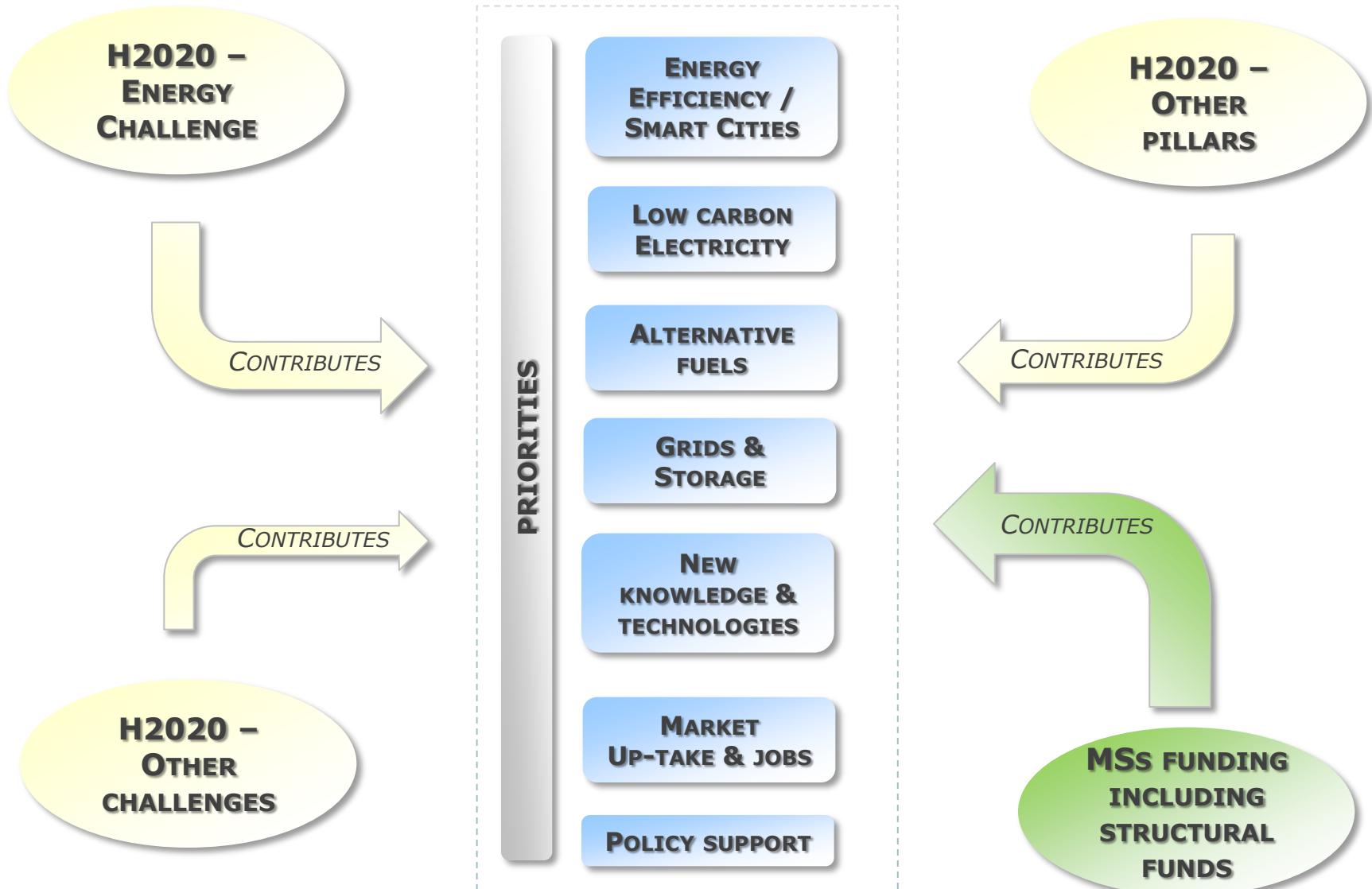# Key challenge 'secure, clean and efficient energy' (2)

- **Support the implementation of the SET-Plan:**

  SET-Plan roadmaps, implementation plans and governance structure

- **Partnering with European stakeholders important to share resources and implement jointly:**

  Existing EIIs may be turned into formalised PPP (case by case basis)

  Support may be given, including with MSs, to alliances of public research performers, in particular, the EERA (IRP)

  International coordination actions shall support the SET-Plan

- **SETIS mobilised to develop, together with stakeholders, KPIs**

- **Improve coordination of relevant Union Programmes, initiatives and policies** (e.g. Cohesion policy and the ETS mechanisms)

Key challenge 'secure, clean and efficient energy' (3)

Complementarities and cross-cutting actions:

- Energy research and innovation to be implemented across the Horizon 2020

- Strong synergies needed with the other societal challenges as well as with the other parts of Horizon 2020 such as 'Excellence Science' and 'Industrial leadership'

- A strong link with the EIT needed to expand the knowledge, competence and innovation base and to accelerate the diffusion of low-carbon technologies into national research, education and innovation systems

Which resources?

PRIORITIES

- Energy Efficiency / Smart Cities
- Low carbon Electricity
- Alternative fuels
- Grids & Storage
- New knowledge & technologies
- Market Up-take & jobs
- Policy support

H2020 – Energy Challenge → *Contributes*

Contributes →

H2020 – Other challenges

H2020 – Other pillars → *Contributes*

MSs funding including structural funds → *Contributes*

European Commission

Summary

Key messages

- Importance of research to meet the Energy Challenge (new technologies, system integration, large-scale demos)

- Importance of an efficient & solid organisation at EU level (SET-Plan, partnerships, international cooperation)

- Pool ressources and decrease fragmentation

- Need to reach a critical mass of public ressources (MS + EC) and industrial investments to match the efforst made by Europe's major competitors

Thank you for your attention!