Innovation in the Energy Sector: Which technologies do we need after 2030 and which policies do we need now?

15th IAEE European Conference 2017
"HEADING TOWARDS SUSTAINABL ENERGY SYSTEMS/ EVOLUTION OR REVOLUTION?"

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Research and Innovation

Outline

- Initial objectives - The 2008 Energy and Climate Change Package
- A Policy Framework for Climate and Energy from 2020 to 2030
- Vision and Objective - The 2050 Roadmap
- The Energy Union – Clean Energy for all Europeans

Initial objectives

- The 2008 Energy and Climate Change Package

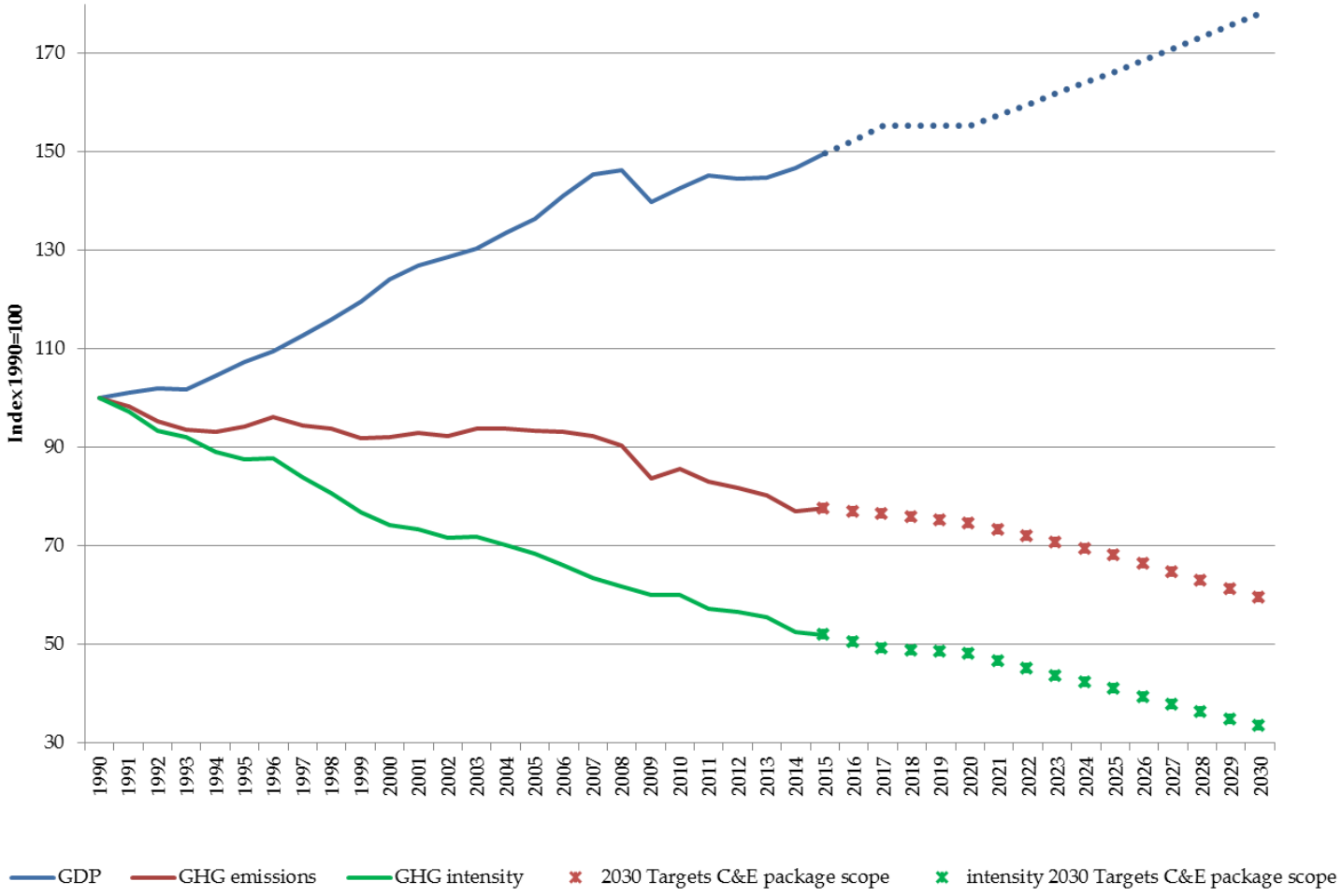
The Energy and Climate Change Package

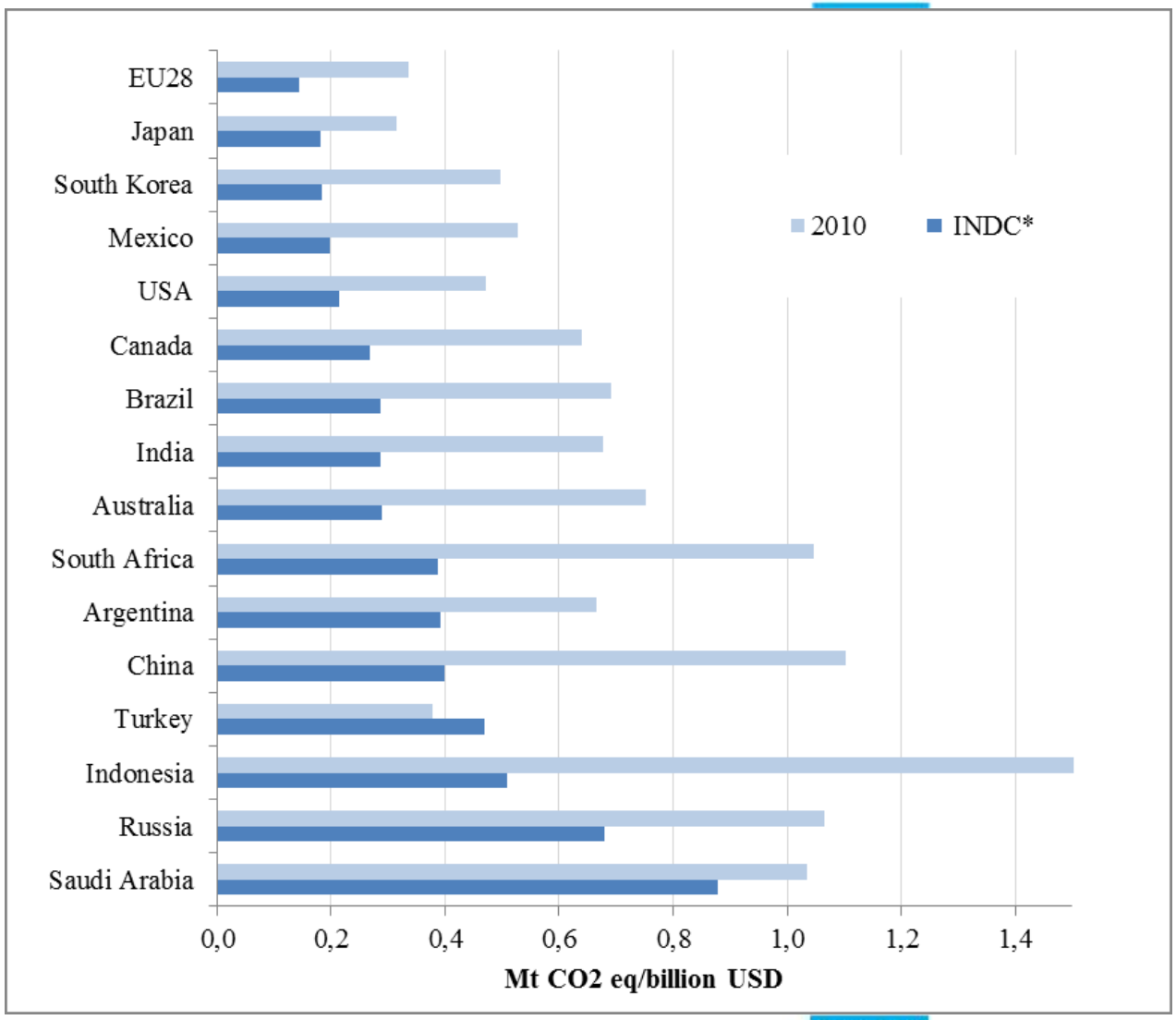
Adopted at the end of 2008:

20% GHG emissions in 2020, compared to 1990 (legally binding)
ETS sectors, and non-ETS sectors
20% share of renewables by 2020 (legally binding)
20% more energy efficiency by 2020
+
The CO2 Geological Storage Directive
+
Inclusion of CCS in the ETS phase III

= The legal framework for a carbon constrained economy, a low carbon growth

The EU is gradually decarbonising

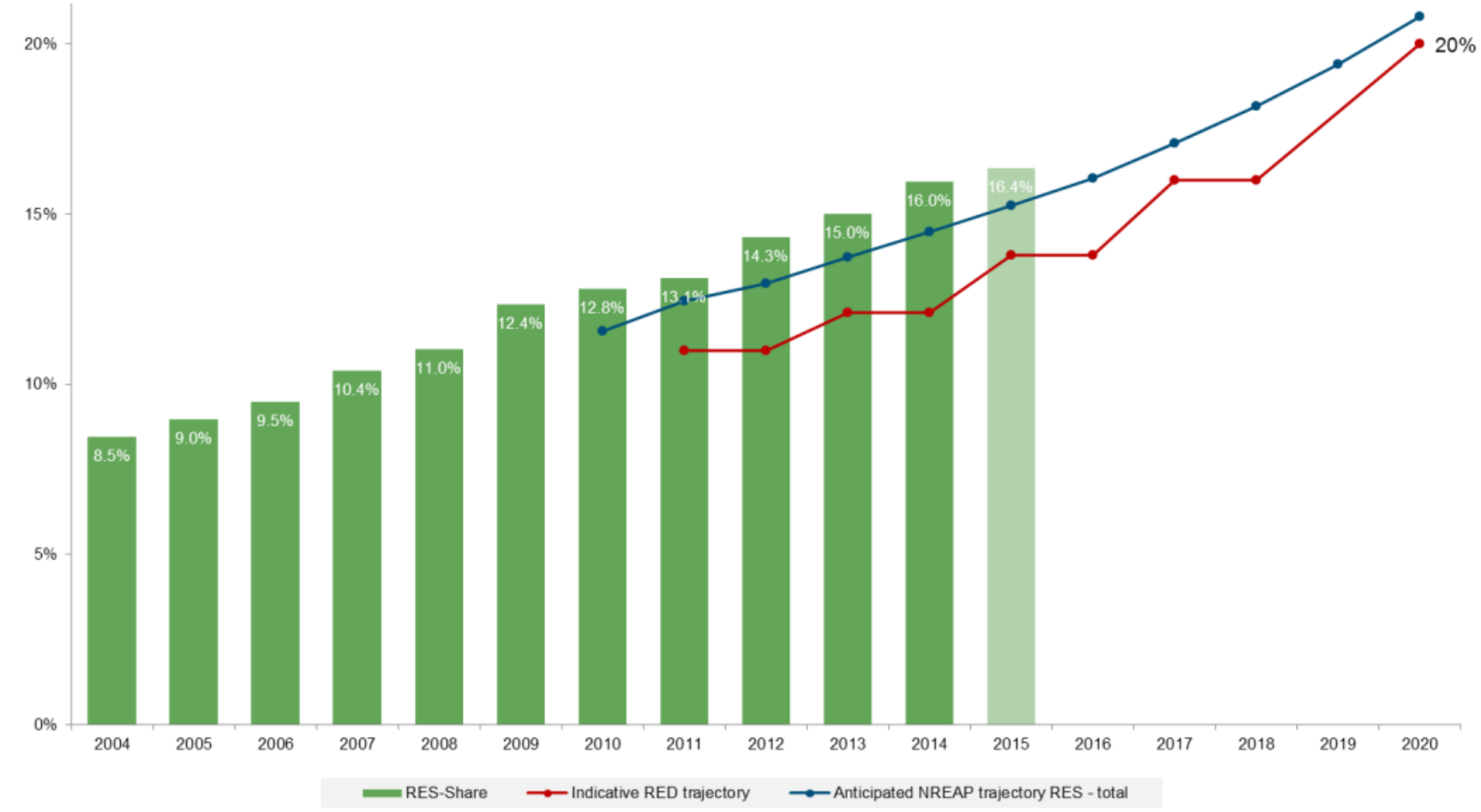




GHG emissions intensities (MtCO2 eq/billion USD)

European Commission

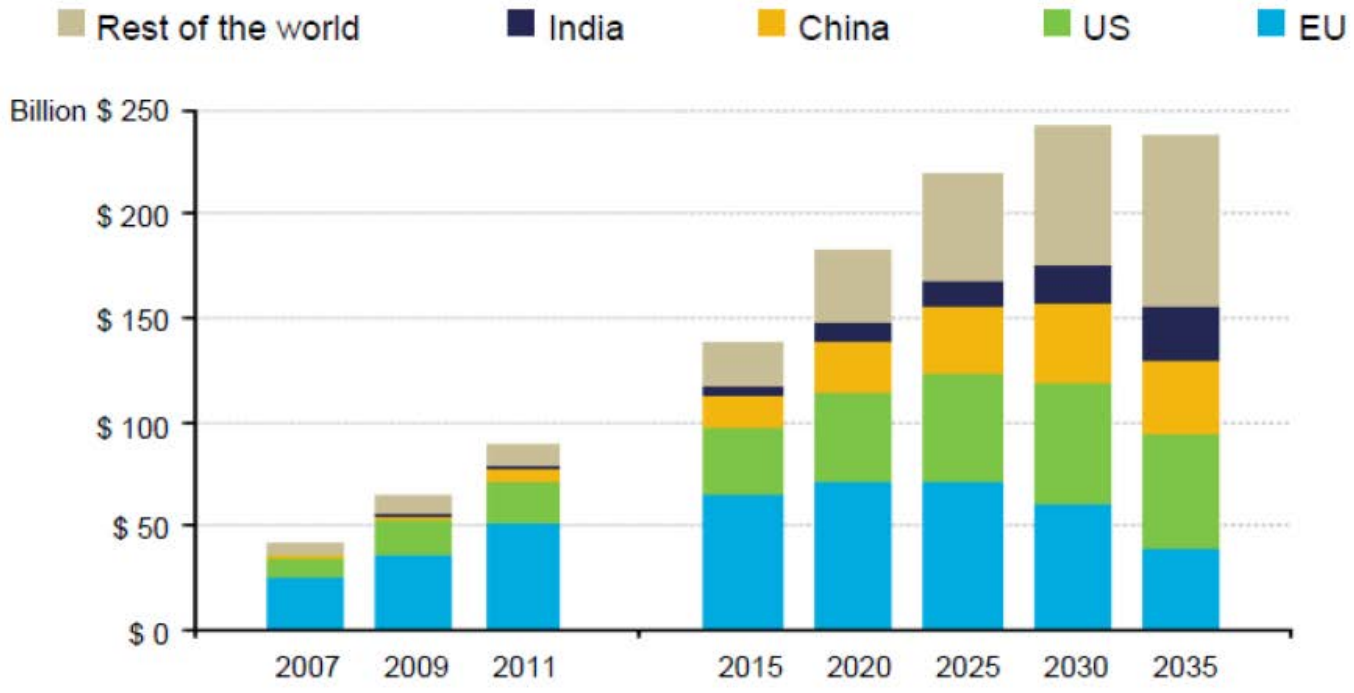
Renewable energy shares in the European Union vs. Renewable Energy Directive and National Renewable Energy Action Plan Trajectories



European Commission

Support for renewable energy is increasing across the world, with the EU still leading in 2011. Total subsidies amount to USD 88 billion, 1/6th of fossil fuels subsidies.

Global renewable subsidies by region



Source: International Energy Agency

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A Policy Framework

for Climate and Energy from 2020 to 2030

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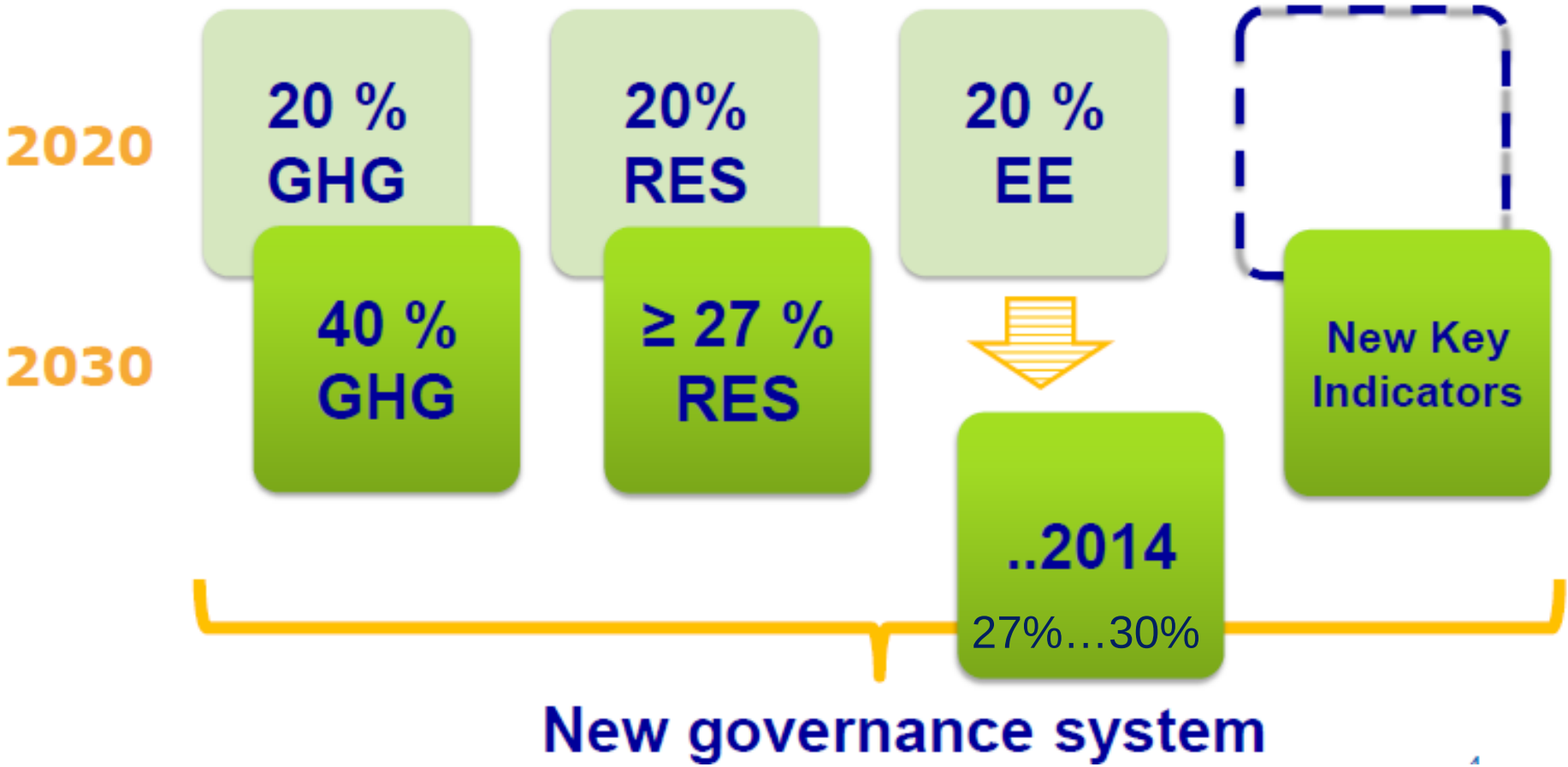
2030 Framework – the Structure



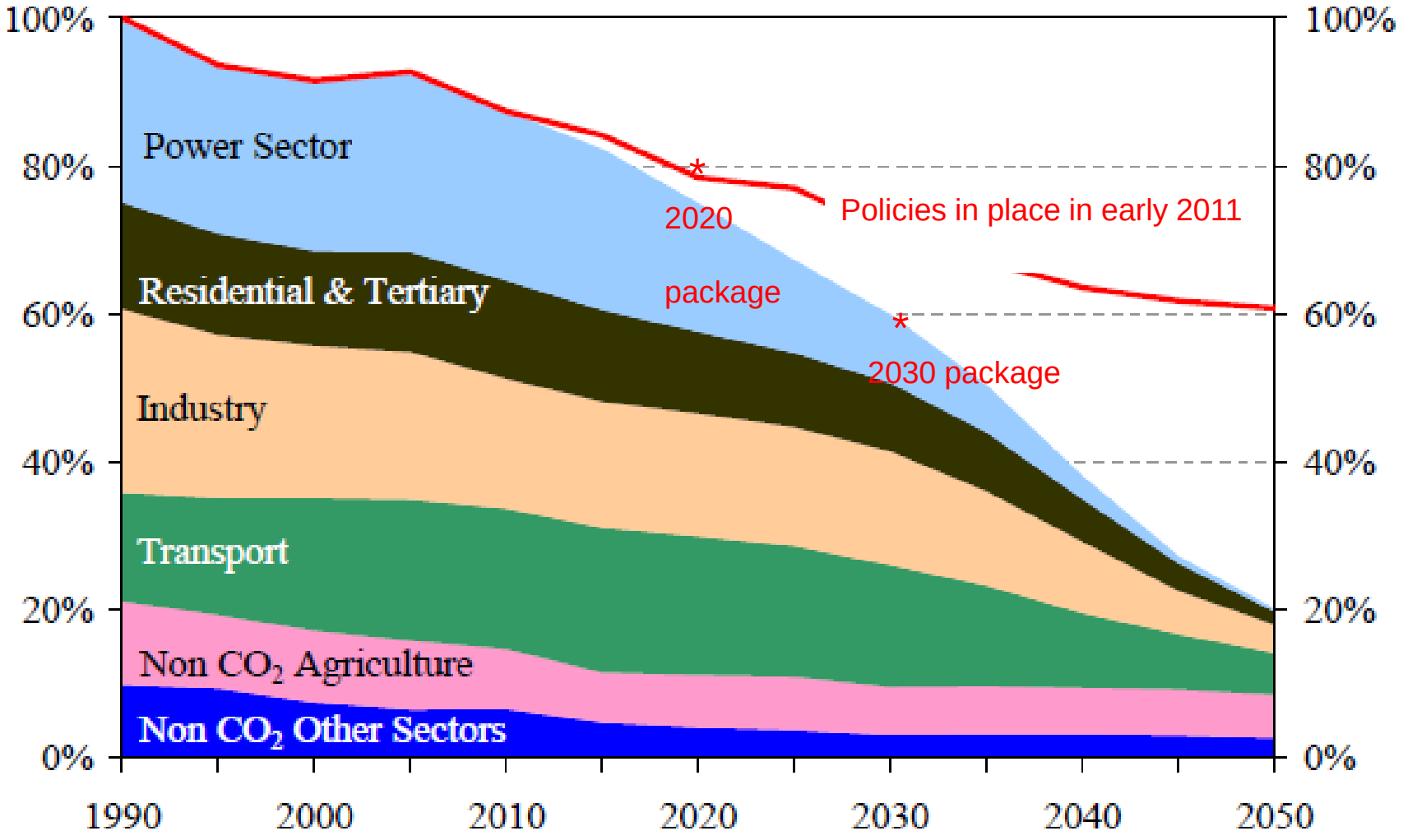
Vision and Objective

- The 2050 Roadmap

Energy Roadmap 2050 – COM(2011)112

- Reduction of energy sector emissions by 85% by 2050
- Energy costs rising to 2030, coming down thereafter
- 5 scenarios
  - high efficiency
  - diversified supply technologies
  - high RES
  - delayed CCS (not commercial by 2030)
  - no nuclear
- RES more than 50% of supply in all scenarios
- CCS providing 20-30% of GHG reductions in 2050

A Sectorial Approach



Deep Decarbonisation Pathways – a research and innovation initiative

Require a societal / holistic approach
a lot more than just technologies
- behavioural issues
- public information / acceptability / engagement

A totally new system is required, even the 2020 objectives are already putting the existing system under stress (capacity markets, etc)

Often run out of range of existing models

A R&I topic by nature, to feed into future policies design

A High Level Panel of 9 personalities to advise Commissioner Moedas, delivering a report, end of 2018.

Towards an Energy Union
– Clean Energy for all Europeans

The "Winter Package" - Clean energy for all Europeans

- A set of 8 legislative proposals plus several Communications and other papers
- Title "Clean Energy for All Europeans" – every words is important (Paris Agreement, Citizens, inclusiveness)
- 1000 pages, more than 25 documents
- An attempt to move to an EU-wide Energy Union compatible with the Paris Agreement

The Greenhouse Gas Emissions Target

-40% domestic EU emissions in 2030 compared to 1990, when policies in place would deliver -32%

The ETS sectors would deliver -43% compared to 2005, by increasing the yearly linear reduction factor from -1.74% to -2.2% after 2020

The non-ETS sectors would deliver -30% compared to 2005 with a "burden sharing agreement" between the Member States, reflecting their capacities, probably based on GDP per capita, like for the 2020 objectives

No conditional target to the international climate negotiations, but rather the possibility to allow access to international credits

The "Winter Package" - Clean energy for all Europeans
Renewables

No longer experimental for several technologies, mainstream for some, PV and on-shore wind at or close to grid parity, even with low wholesale prices, so could play in the market

- Phasing out of some support schemes
- Common set of principles to design new support schemes, including opening to suppliers from neighbouring countries
- Faster and more flexible markets (from trading for the next day to intra-day trading)
- Gradual end of the priority dispatch, with exceptions (existing RES, small RES, etc)

Transport: fuels to include 1.5% (2021) to 6.8% (2030) of low-C biofuels (advanced biofuels, not in competition with food)

The "Winter Package" - Clean energy for all Europeans

Fossil fuels and capacity mechanisms

- Capacity mechanisms allowed
- But only in last resort, after looking at other solutions and cross border solutions
- Open to cross-border participations
- Environmental standards: only if CO_2 < 550 gr/kWh, so ok for gas, not for coal

Cooperation

- More power to ACER (agency for the cooperation of energy regulators) (Ljubljana)
- Creation of a European network of DSOs (like for TSOs) to push inter alia smart grids

The "Winter Package" - Clean energy for all Europeans

Citizens at the center

- More and more prosumers
- Hence definition of their basic rights
- Authorised to sell excess electricity to the grid, "without disproportionate procedures and charges that are not cost effective"
- Able to choose and change suppliers (like other consumers)
- Right to a smart meter to take part in DSM
- Call to define "independent aggregators" to help them

The "Winter Package" - Clean energy for all Europeans

Big Numbers and Governance

- 27% RES confirmed
- 30% efficiency, up from 27% of the Oct 2014 Council
- National Energy and Climate Plans drafted in 2018, final in 2019, progress reports from 2021 every 2 years, will be reviewed, name and shame exercise, best practice sharing, plus EU actions if it is not enough
- Plus review of the energy efficiency in buildings Directive

Process

- A lot of things to agree upon, Council, Parliament
- Probably at least two years to finalise
- Big negotiation issues: 30% efficiency, environmental standard of capacity mechanisms, ACER, governance in general (2 years energy and climate plans, etc)
- Hence many possible tactics and need to maintain coherence and equilibrium

Accelerating Clean Energy Innovation – COM(2016)763

4 key thematic priorities in Horizon 2020 Work Programme:

Funding Energy, Science & Technology

and

its market adoption

- Decarbonising the EU building stock by 2050

- Strengthening the EU leadership in renewables

- Developing affordable and integrated energy storage solutions

- E-mobility and more integrated urban transport systems

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In Conclusion

The EU energy policies are based on the three interdependent pillars: security of supply, competitiveness and sustainability;

The EU has equipped itself back in 2008/9 with a coherent energy and climate package to face those challenges, with clear objectives for 2020;

We are now extending this approach, learning from the past, to 2030, in order to provide visibility to the actors;

Beyond this, a real holistic / systemic / societal approach is required.

The objective is clear : deep decarbonisation by 2050, fully consistent with the Paris Agreement

THANK YOU FOR YOUR ATTENTION

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