Climate and energy: where do we stand?

- Developments since the 2009 Energy and Climate change package

Impact of the financial crisis
Fall in private investment, tight financing conditions

- Renewable energy saw rapid cost decreases
Technologies are gradually becoming competitive
But large scale integration is a challenge

- Rising demand -> rising prices
By 2030, world economy set to double and energy demand to rise by 1/3

- Shale gas
US oil and gas production

- Ukraine
COP21 - Paris

- Fukushima
Some countries phase out nuclear power production
Looking to the future – Energy Roadmap 2050

• Basis: 20/20/20 objectives of the EU energy policy
• Roadmap 2050: Cutting GHG emissions until 2050 down to 80 – 95 % below the level of 1990
• The Energy Roadmap 2050: the basis for the elaboration of a low carbon 2050 strategy

  Supported by multiple **scenario** analyses, to show how to reach the 80 % / 95 % goal while at the same meeting other policy objectives (Competitiveness and Security of Supply)

  Containing robust assumptions for all possible scenarios
Fuel Ranges (primary energy consumption)

- RES
- Gas
- Nuclear
- Oil
- Solid fuels

2005
2030
2050
Major energy challenges in Europe

- Import Dependency
- Energy Prices
- Decarbonisation
- Technology mix

EE and RE at the core of the solutions for 2020 - 2050
2030 framework for climate and energy policies

-20% Greenhouse Gas Emissions
20% Renewable Energy
20% Energy Efficiency
10% Interconnection

≤ - 40% Greenhouse Gas Emissions
≥ 27% Renewable Energy
≥ 27%* Energy Efficiency
15% Interconnection

* To be reviewed by 2020, having in mind an EU level of 30%

New governance system + indicators
The Energy Union

The Energy Union aims to address the three objectives of *competitiveness, security of supply* and *sustainability*. Through a strong commitment by the EU institutions and the Member States to deepen integration, cooperation and coordination of both the external and internal aspects of energy policy.

The Energy Union should be based on five mutually reinforcing dimensions:

1. Supply security, based on solidarity and trust
2. A competitive and completed internal energy market
3. Moderation of energy demand
4. Decarbonisation of the EU energy mix
5. Research and innovation
Relevant Key Activities

- Strengthen European regulatory framework

- Sustainable energy security package, 2016
  - LNG and Storage
  - A decision on Intergovernmental Agreements in energy
  - Security of Gas Supply Regulation
  - Heating and Cooling strategy

- A new market design, 2016

- Renewables package 2016-2017
  - Self-consumption
  - Bioenergy sustainability
  - post 2020 RES legal framework

- Alternative fuels & integration of energy and transport sectors

- Initiative on global technology and innovation leadership on energy and climate
legislation review & revision in 2016

Rational: meet COP21 commitments and pave the way towards 2050

- Review Energy Efficiency Directive
- Review Energy Performance of Buildings Directives
- Review Renewable Energy Directive
- Market Design Initiative
- Energy Labelling & Ecodesign Directives
- EU Strategy for Heating and Cooling
- Smart Finance for Smart Buildings and Businesses
Electricity Market Design

The electricity market framework will be revised to better integrate renewables into the electricity system. This will include market arrangements:

• suitable for an interconnected EU-wide electricity market providing clear price signals for new investments and facilitating the further development of renewables;
• to promote regional cooperation and coordination on energy policies;
• to enable cooperation on development of renewables, including on support schemes;
• to provide a truly European dimension to security of electricity supply.
Electricity Market Design

The revision will develop further the markets with respect to:

• Efficient cross-border short-term markets.
• Long-term price signals to ensure sustainable investments.
• Infrastructure to ensure integrated internal market.
• Markets to integrate renewables efficiently and purposefully.
• Regional coordination of national policymaking.
• Improved cooperation between System Operators.
• Ensuring system adequacy and reliability
• Capacity markets – including cross-border CM.
A flexible and adaptive energy system

Smart Energy System

- Generation
- Demand
- Electricity, gas and heat networks
- Storage

Flexibility

ICT

Adaptability

Power generation
- Grid
- Storage

Demand management
- Transport; BEV, etc.

Prosumers
- Markets

Fuel switching
- Avoid lock-in

Adaptation of the gas grid
Investment needs in the energy system

Annual investments until 2030

- Energy Efficiency
- Power generation (incl RES and grids)

205 bn €

Annual EE investments until 2030

- Residential
- Tertiary
- Industry

108 bn €

Source: SPECIAL TASK FORCE (MEMBER STATES, COMMISSION, EIB) ON INVESTMENT IN THE EU
Natural gas is not antagonistic with the development of renewables

Gas-fired power stations support the integration of significant RES on the grid

- Flexible CCGTs and gas peaking units
- Fast start-up and ramp-up times,
- Large load range
- Privileged technology for load variability

The gas transport infrastructure can be used as an energy buffer for RES producers

- Unused wind/solar energy stored in the gas grid
- Power-to-gas conversion units
- Direct use of gas or reconversion in gas-fired units
- Several pilot plants currently developed in the EU
Key role of innovation to support the position of gas in the decarbonisation of the EU energy system
Low-carbon gas
Regulatory and policy considerations

- **Gas markets**
  - Gas quality standards (including the blending and bio-methane)
  - Certification system (=market) for low-carbon gas (industry, NG grid, mobility, etc.)
  - Compatibility of gas based solutions with the (electricity) market models
  - Potential impact of storage on the generation capacity market and integrated development of that market (including the various P2G/P2H2 applications)

- **Electricity markets**
  - Long term investment models for all technologies
  - Investigate capacity market schemes
  - Creation of an improved model for balancing and for demand side flexibility.
  - Discussion on pricing models and reforming the network tariff structures to take into account the increasing variability of generation.
  - Reinforce the governance framework, (incl. distributed generation (RE), storage, smart technologies, etc.).
Key considerations related to gas turbines

Gas turbines face several opportunities and challenges in the transition towards a low-carbon energy system:

1. Integration of vRE
   • Turbines can provide for backup capacity
   • Allowing integration of vRES
2. More products and bigger quantity of products on the electricity market
   • Adapt technical and market performance of turbines to provide high-value services
3. Compete with other conventional generation
   • Better suitability and lower emissions
4. Integrate seamlessly low-carbon gas
Thank You for Your Attention!

tudor.constantinescu@ec.europa.eu

http://ec.europa.eu/energy