

The Challenge: More RES Electricity Beyond 2020

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The European strategy in energy and environment & Bulgaria's RES mandatory national target for 2020

- Main objective the reduction of the domestic GHG emissions without disrupting energy security and competitiveness
- High RES exploitation and carbon free energy systems
- Energy efficiency improvement measures
- National mandatory target in Bulgaria 16% share of RES by 2020
 - Specific target 23.8% in RES heat by 2020 from 15.9% in 2005
 - Specific target 20.8% in RES electricity by 2020 from 8.4% in 2005

National Targets for 2020 must be achieved!

- “Action Plan” and further efforts from the stakeholders towards the goals for 2020
- **However, actions are needed:**
- Appropriate supporting mechanisms
- Simple and friendly legal framework and regulatory policies for RES applications
- Stable investment and economic environment
- For any change, a reasonable time in order the market be prepared, Uncertainty is a major barrier to investment
- Access and connection to the grid, at reasonable time and cost

Targets for 2020 is only the beginning

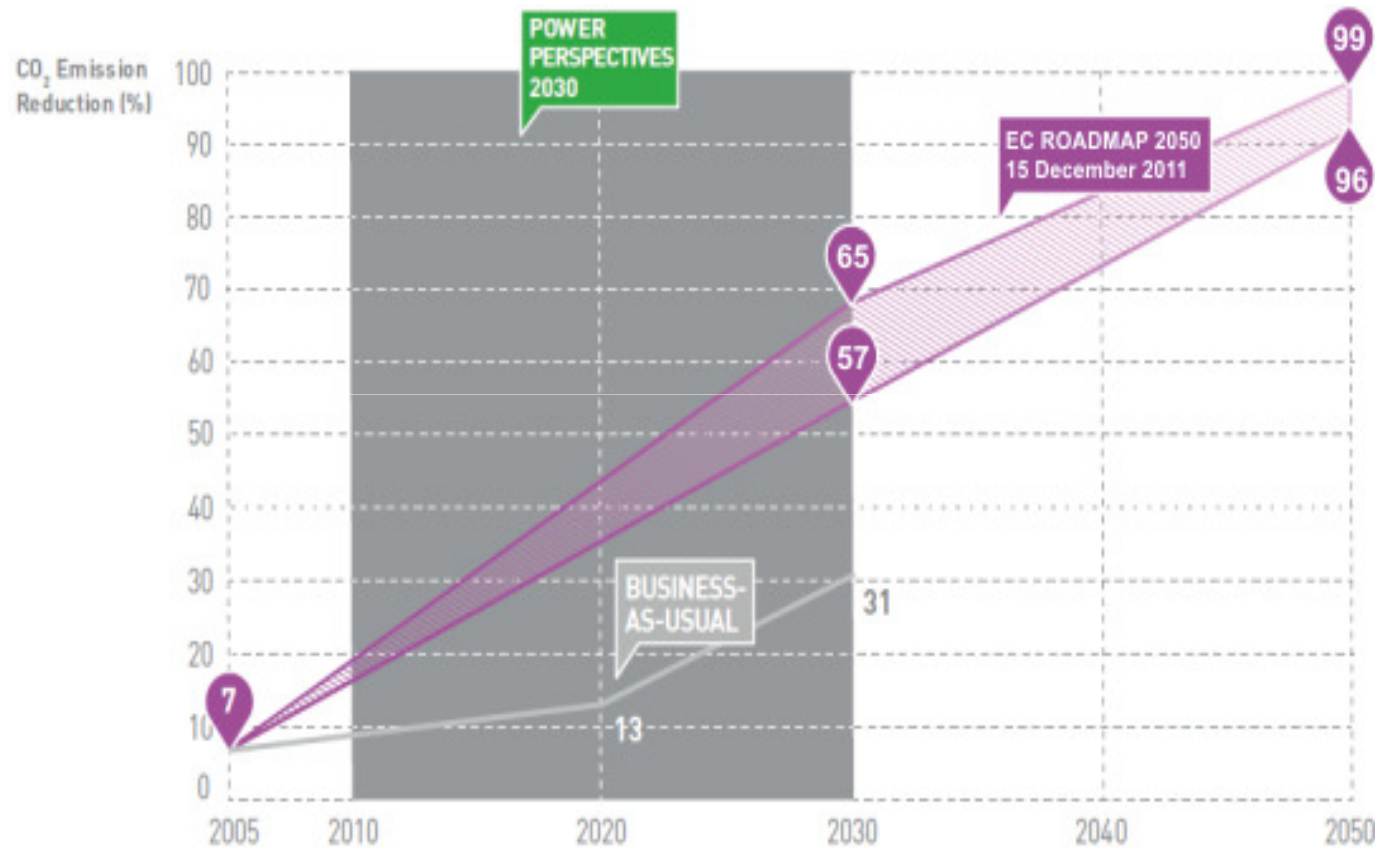
- Starting the integration of RES into the electricity networks for more RES penetration
- Challenges of technical innovations and skilled persons for more competitive energy
- Starting now to pave the way for the next more ambitious targets beyond 2020
- The journey to the future sustainable energy systems has begun with high RES penetration and improved energy efficiency

The EC Targets for 2030 and 2050 in the EU

“Energy Roadmap 2050” EC 15.12.2011

- Reduction of GHG emissions over 80% in energy by 2050
- A set of scenarios and studies investigate the pathways to achieve the target with high penetration of RES
- Electricity sector: almost carbon-free power generation by 2050 contributing in achieving the overall target of 80%
 - specific target over 95% by 2050
 - specific target 57% - 65% by 2030

Reduction of GHG emissions in the EU: Specific Targets in electricity by 2030 and 2050



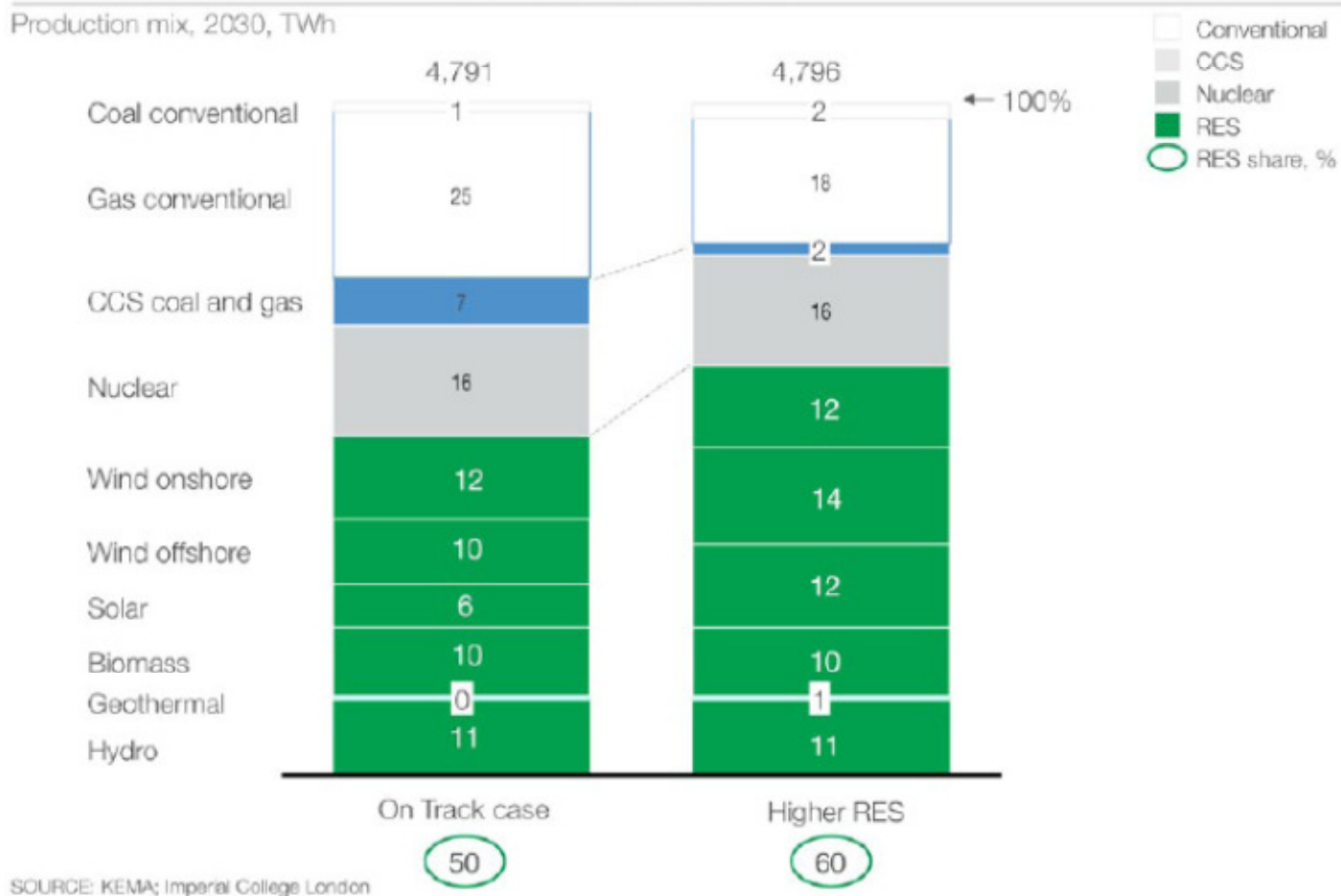
Towards reduction of GHG emissions over 95% in electricity by 2050

- Appropriate Mix of RES with high share, close to a dominated figure of 80% RES in the electricity gross final consumption
- Significant decrease of coal power generation plus CCS
- Decrease in nuclear power capacity in Europe is assumed by 2050
- Critical role of natural gas with flexible power generation plus CCS
- A detailed study by NREL in the USA: 80% RES share by 2050 is possible with flexible network
- Germany: acceleration of the country's shift to renewable energy with target of 35% RES power generation by 2020 and 80% RES by 2050
- Denmark: 100% RES for all energy needs by 2050

Possible scenario of RES mix with 80% share by 2050

80% RES in the electricity gross final consumption by 2050		
Energy Resources	Share (%)	Remarks
Wind onshore	15	Wind and solar PV represent the 49%
Wind offshore	15	
Solar PV	19	
CSP (solar)	5	
Geothermal	2	
Biomass & Waste	12	
Hydro	12	
Total RES	80	
Coal, Natural gas, Nuclear	20	with CCS systems

Scenarios of RES share by 50% and 60% in gross final electricity consumption by 2030



Transformation of the electricity sector with 80% RES share and over 95% reduction of GHG emissions by 2050

- Integration of 80% RES-e requires changes in electric system design and operations
- Detailed studies and appropriate RES mix, with almost 50% share of wind + solar PV
- Electricity storage systems, mainly by pump storage
- Flexible power generation, such as by large hydro and open cycle gas turbines with CCS
- Demand Side Management techniques (DSM), flexible loads
- Curtailment of power generation by wind and solar PV
- New and improved transmission lines and interconnections to balance decarbonised power and integrate el. markets (e.g. HVDC)
- Regulatory framework and effective tools for operation and management of the electricity system

Transition to the future networks of the 21st century

- Electricity with 80% RES: technically feasible and economically affordable to establish a decarbonised European power sector
- Integration of innovative technologies
- Specific studies, research, education
- Exploiting the network capacity by RES integration in distribution and transmission grids
- Huge investment in power generation, networks, interconnections, storage systems, flexible power generation
- Supporting measures by the states and facilitating for financing
- EU target and policy for 2030 should be expected soon
- Important of starting the transition now and providing a message to minimize the carbon intensive assets in the next decades
- A new challenge for Bulgaria

New challenge for Bulgaria: 80% RES in electricity

- The achievement of the 2020 target is a decisive step towards the target of 2050
- Starting now the specific studies for the RES mix, network and interconnections, storage, ancillary services
- The important role of DSO and TSO, integration of innovations into the networks
- The role of the public sector is critical in improving and facilitating the financing
- Steps for the regulatory framework and the single European market
- The route to the 2050 target requires serious work by all stakeholders for the expected benefits

Thank you!

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