

OSCE Special Expert Meeting on Assessing the OSCE's Future Contribution
to International Energy Security Co-operation
Vilnius, 13 - 14 September 2010
Session 5: Additional measures to enhance energy security

PC.NGO/75/10/Rev.1
16 September 2010

ENGLISH only

Energy Strategy Centre
Mr. Dries Acke

ROADMAP 2050

A practical guide to a prosperous, low-carbon Europe

OSCE Special Expert Meeting

On Assessing The OSCE's Future Contribution To International Energy Security Co-
Operation

Vilnius, September 14th

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KEY STAKEHOLDERS WERE INVOLVED BY PROVIDING INPUT AND REVIEWING RESULTS

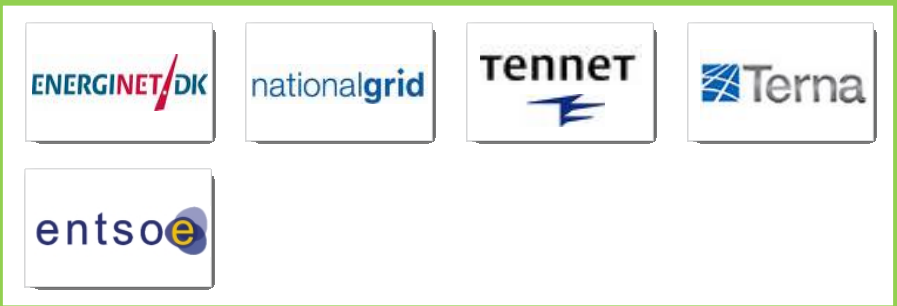
Core Working Group participants

Further outreach

Utilities



Transmission System Operators



Manufacturers



NGOs



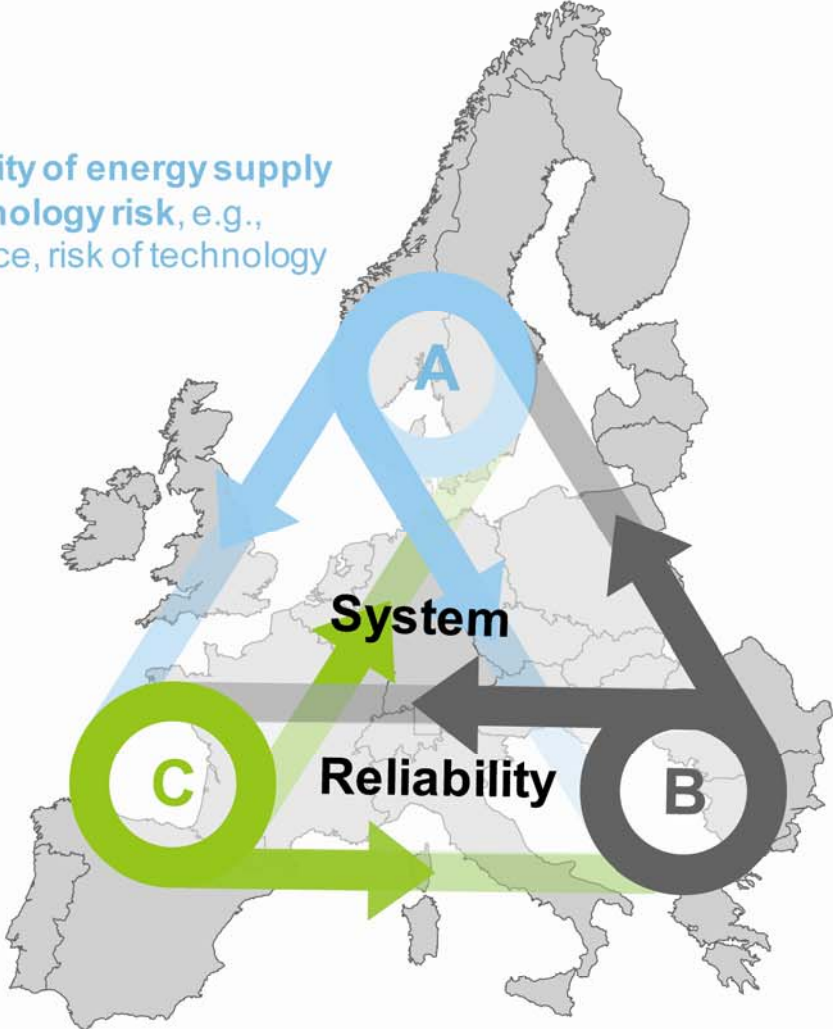
Plus 40 more companies, NGOs and research institutes



THE DECARBONIZATION PATHWAYS ANALYSED ARE SUSTAINABLE, TECHNICALLY FEASIBLE, AND HAVE A POSITIVE IMPACT ON THE ECONOMY

A. Security of energy supply and technology risk, e.g., self reliance, risk of technology failure

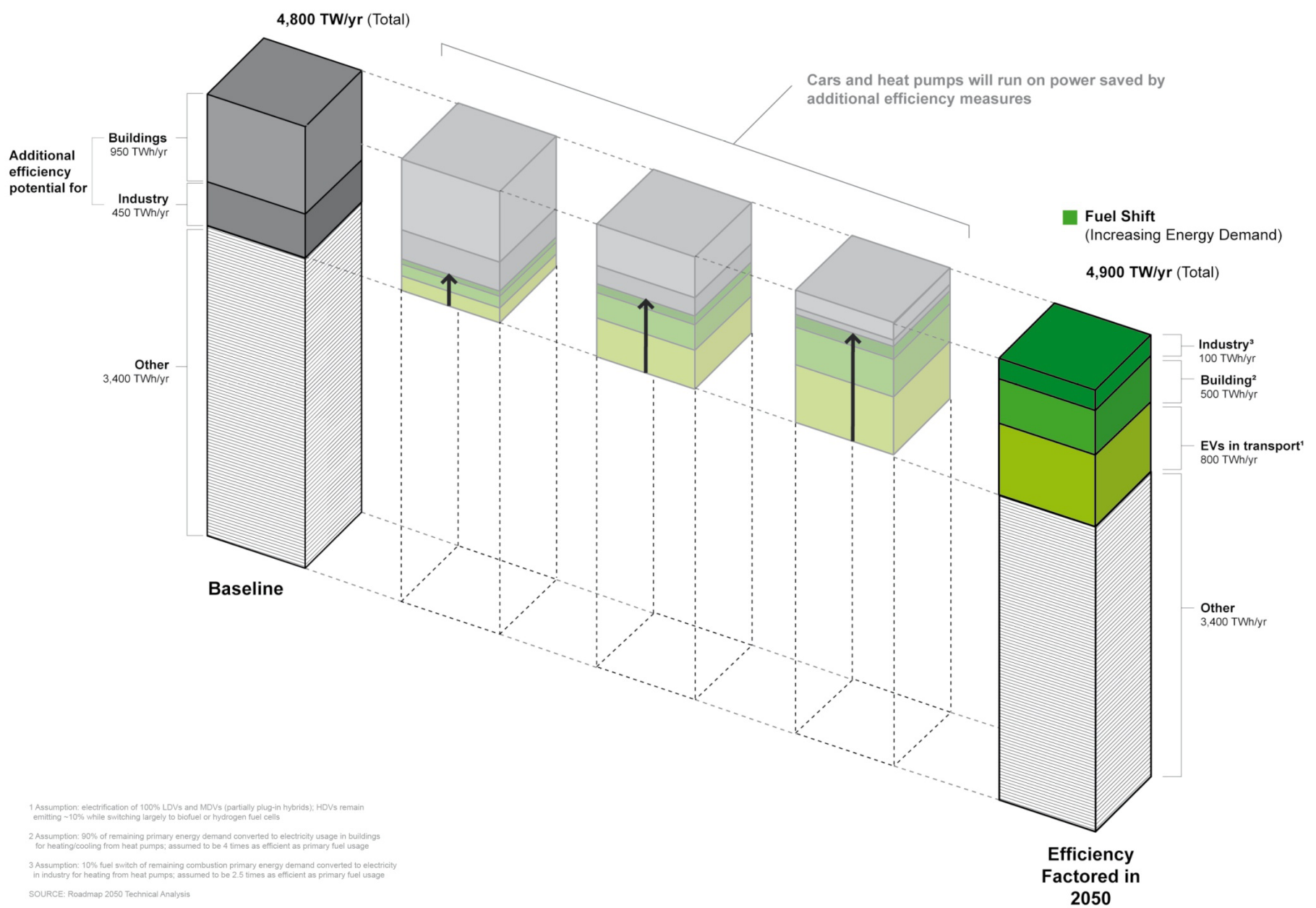
- Not assessed:
- Public acceptance
 - Change required
 - National energy policies



B. Sustainability e.g., greenhouse gas emissions, resource depletion

C. Economic impact e.g., cost of electricity, capital requirements

ENERGY EFFICIENCY & FUEL SHIFT GIVE OVERALL DEMAND

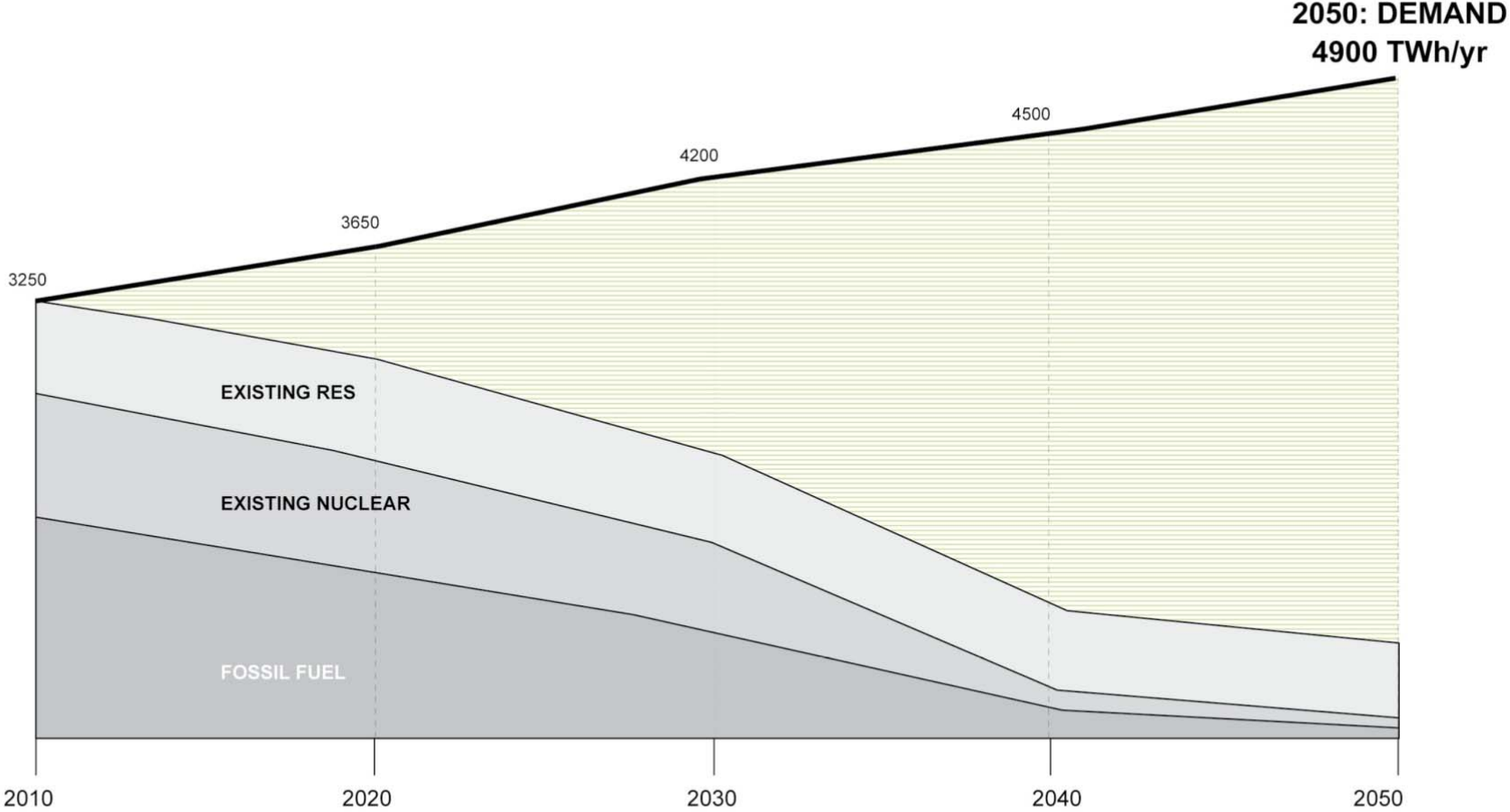


1 Assumption: electrification of 100% LDVs and MDVs (partially plug-in hybrids); HDVs remain emitting ~10% while switching largely to biofuel or hydrogen fuel cells

2 Assumption: 90% of remaining primary energy demand converted to electricity usage in buildings for heating/cooling from heat pumps; assumed to be 4 times as efficient as primary fuel usage

3 Assumption: 10% fuel shift of remaining combustion primary energy demand converted to electricity in industry for heating from heat pumps; assumed to be 2.5 times as efficient as primary fuel usage

ELECTRICITY DEMAND 2050 (EU-27 + Norway & Switzerland)

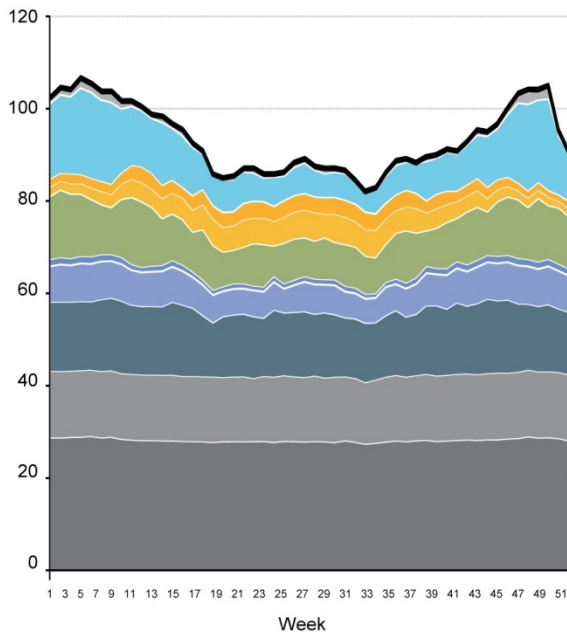


Note Existing capacity includes new builds until 2010

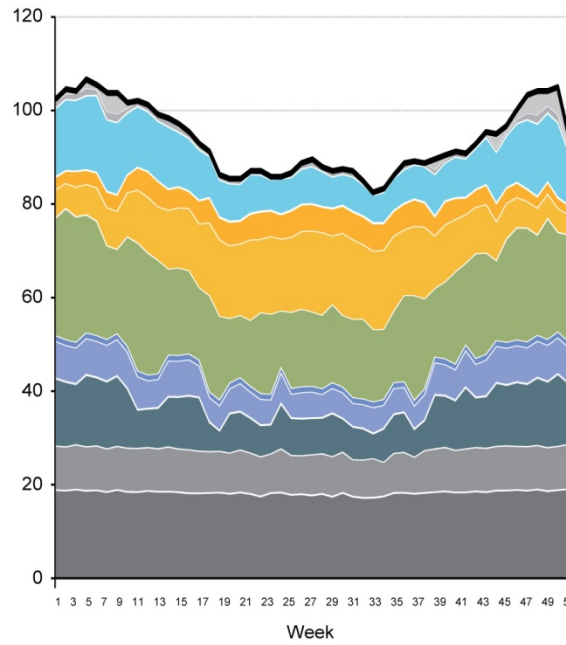
SOURCE: Roadmap 2050 Technical Analysis
(McKinsey Power Generation Model)

THREE SPECIFIC PATHWAYS MODELED INCLUDING BOTH GENERATION AND GRID COSTS

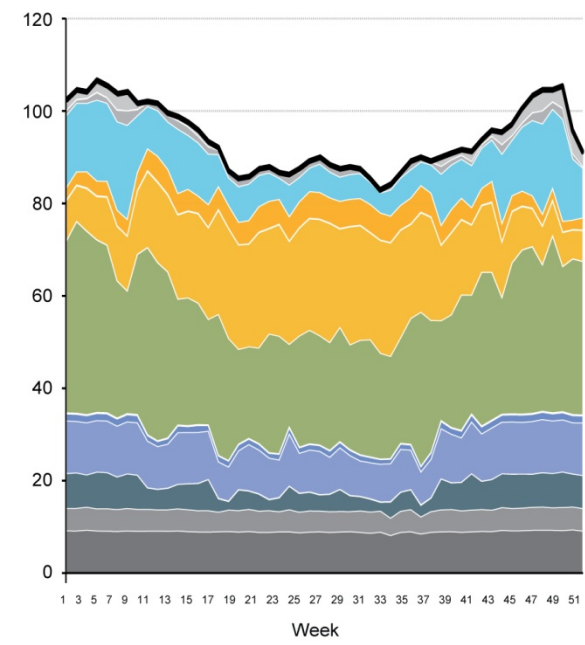
40% RES
30% CCS
30% nuclear



60% RES
20% CCS
20% nuclear

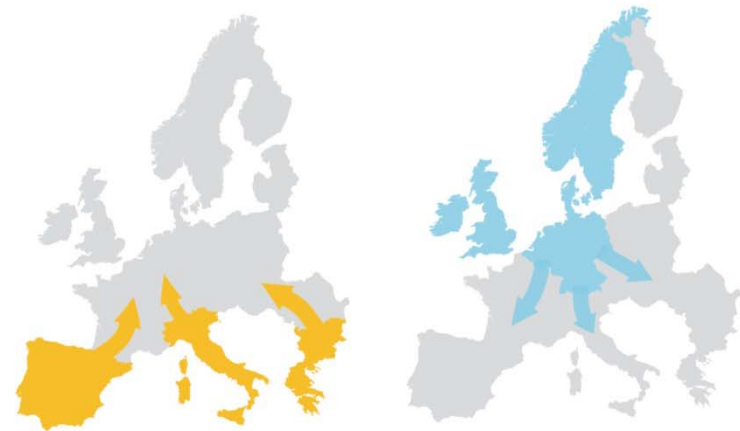
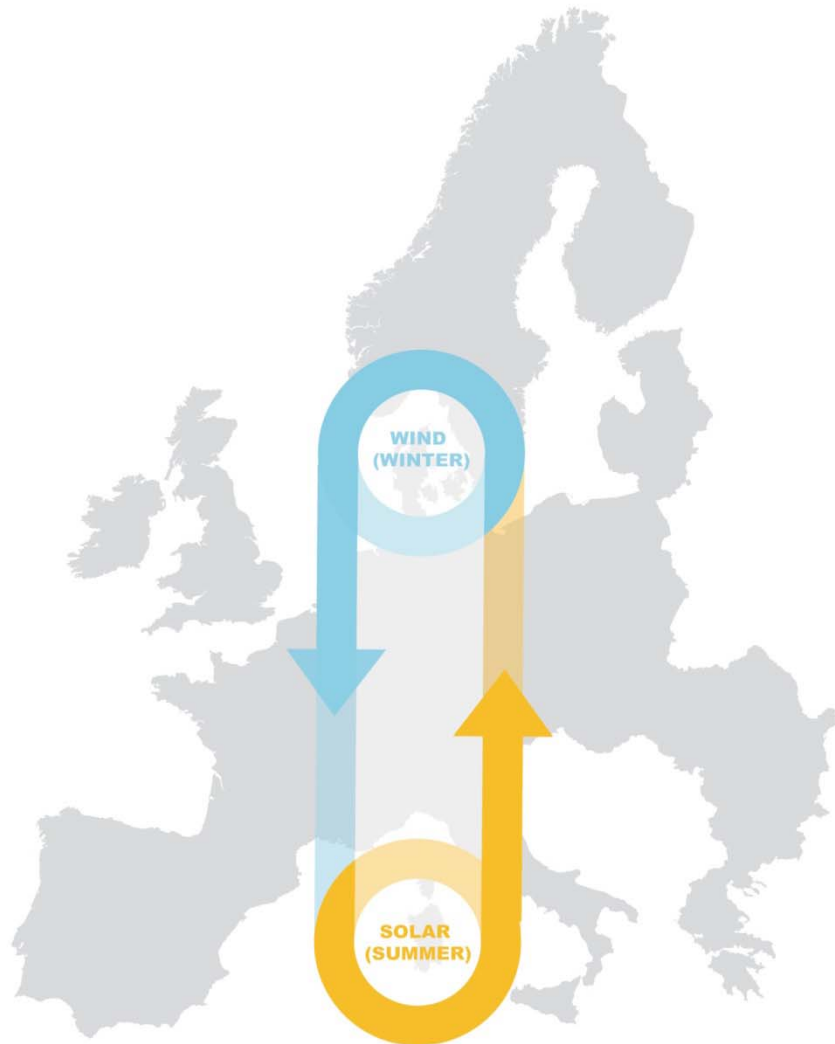


80% RES
10% CCS
10% nuclear

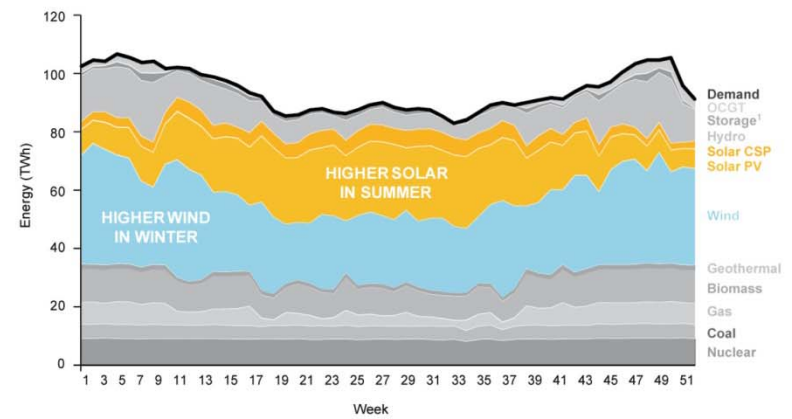


Energy production mix over the year, TWh per week

RES DIVERSITY CONTRIBUTES TO CONSISTENT SUPPLY



Overview of yearly energy balance, 80% RES pathway (TWh per week)

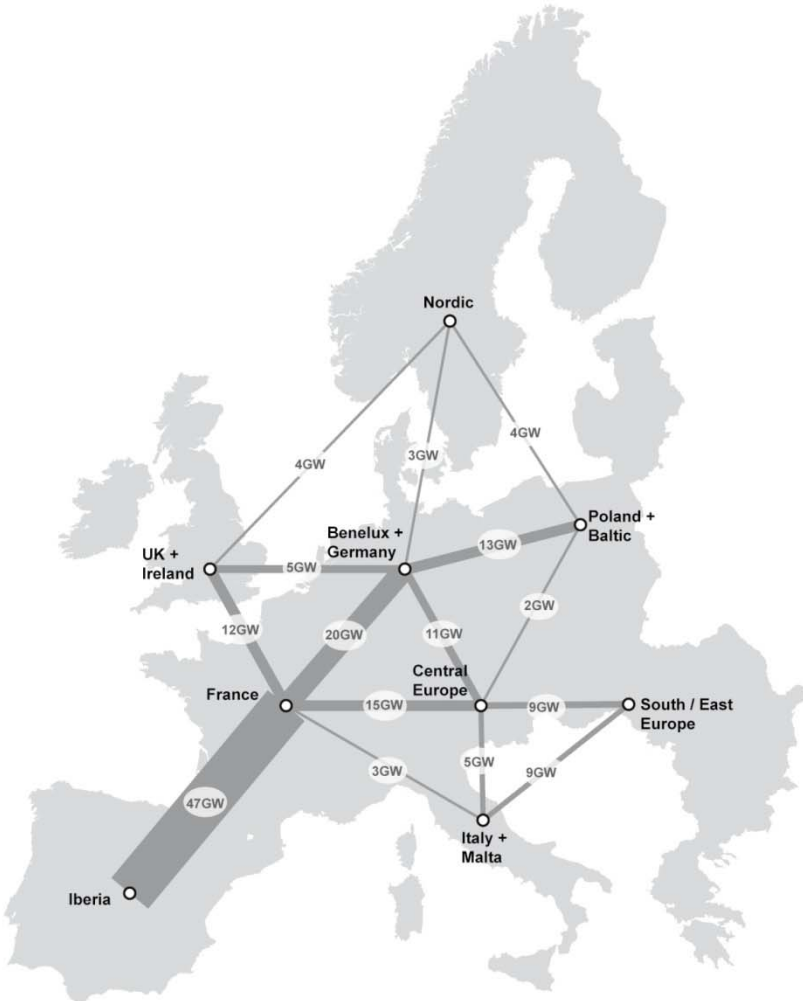


¹ Storage included in the model relates to the existing hydro storage available across the regions
SOURCE: Imperial College, KEMA, Roadmap 2050 Technical Analysis

INTER-REGIONAL TRANSMISSION REQUIREMENTS



2010
Existing Capacity



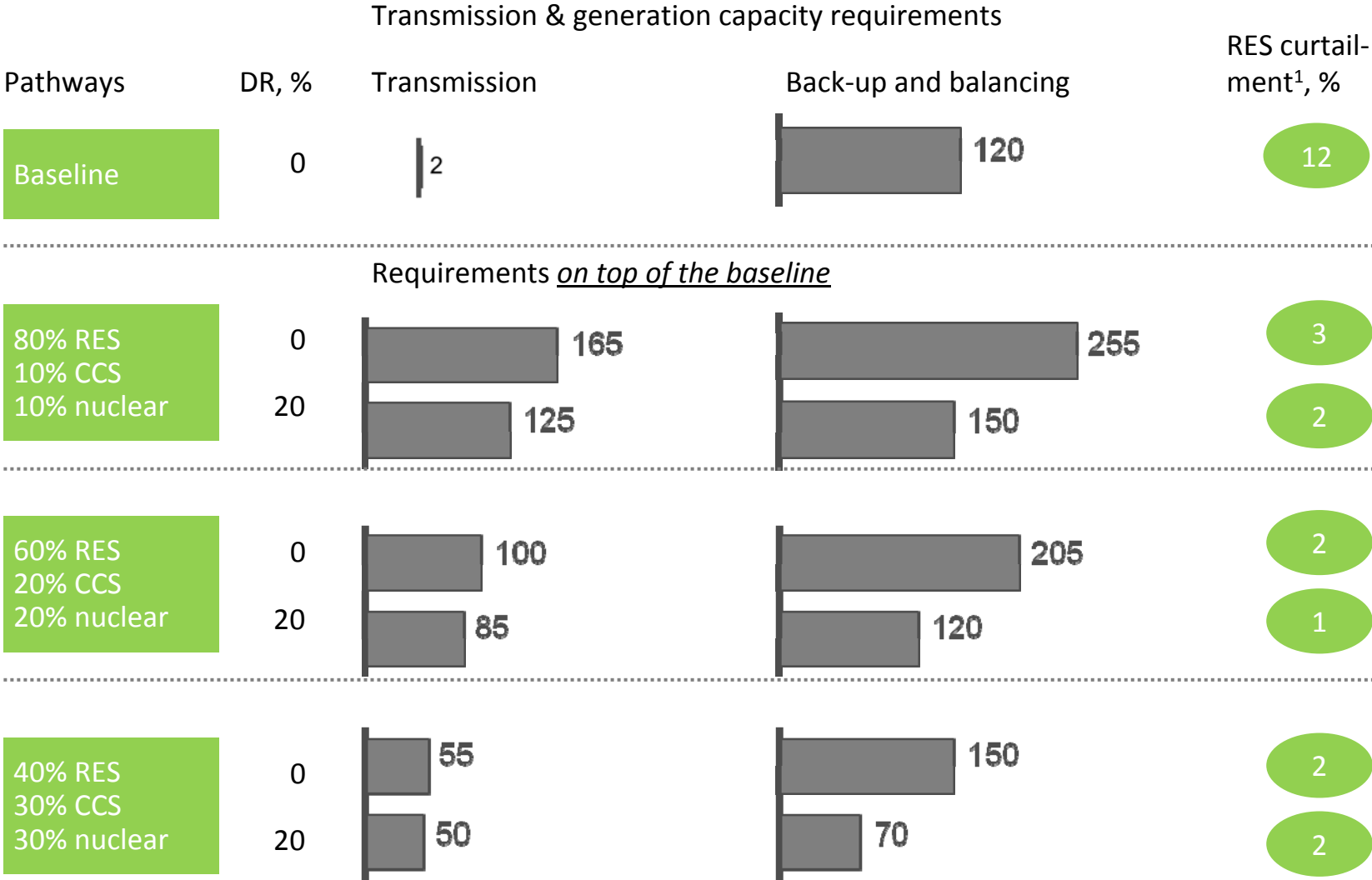
2050
Total Transmission Requirements
Assuming 80% RES & 20% DR¹



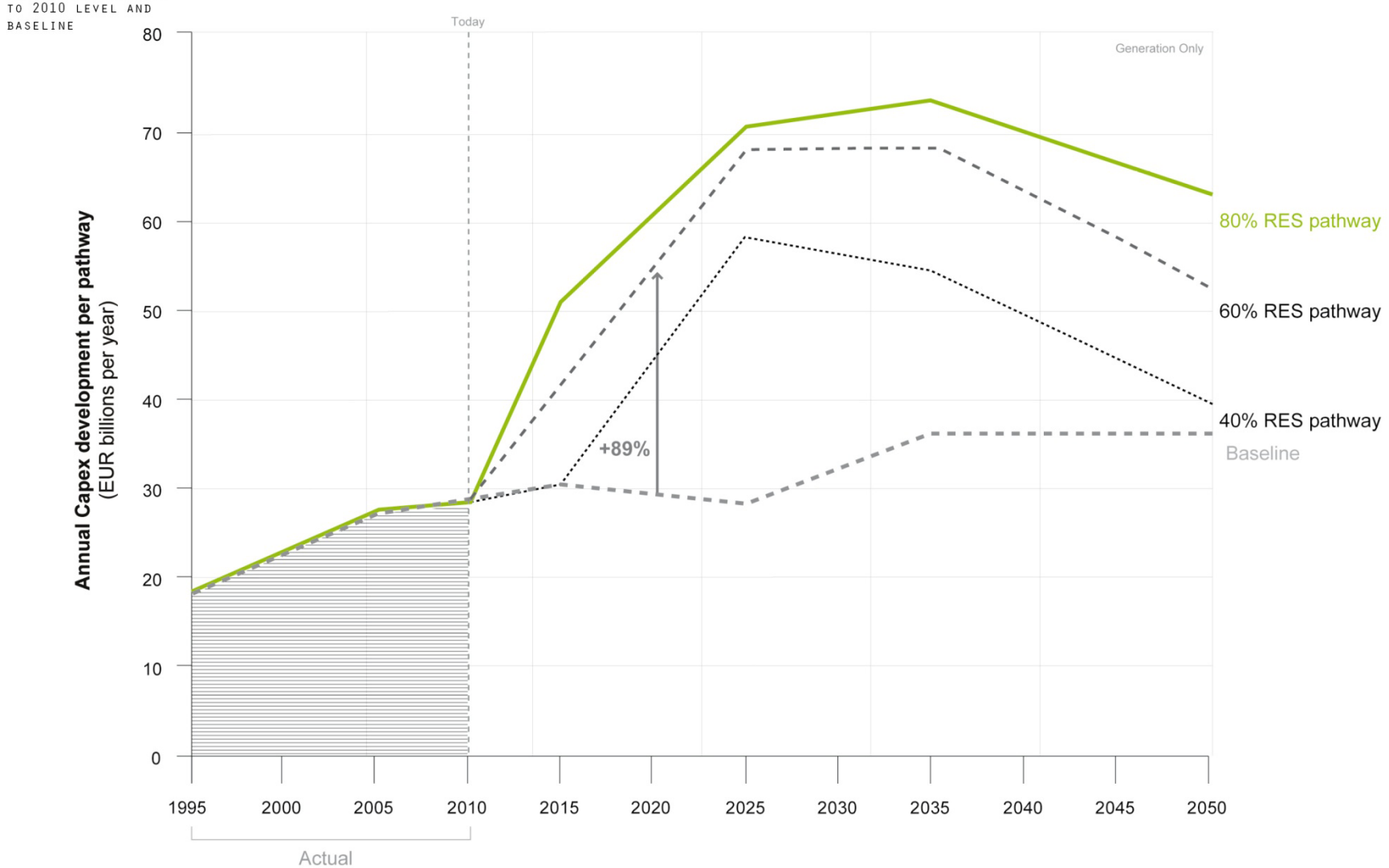
¹ Demand response as used in this paper refers to changing a customer's electricity demand in response to dispatch instructions or price signals through communications technologies. In the Volume 1 analysis, it is assumed that any such changes retained the total energy consumed within the day, that is, moved or shifted demand rather than reduced total daily consumption.
NOTE: Iberia-France link is challenging and maybe reduced by different solar/wind mix.
SOURCE: Roadmap 2050 Technical Analysis

CURTAILMENT IS KEPT LOW THROUGH GRID EXPANSION AND BACK-UP CAPACITY

2050, GW



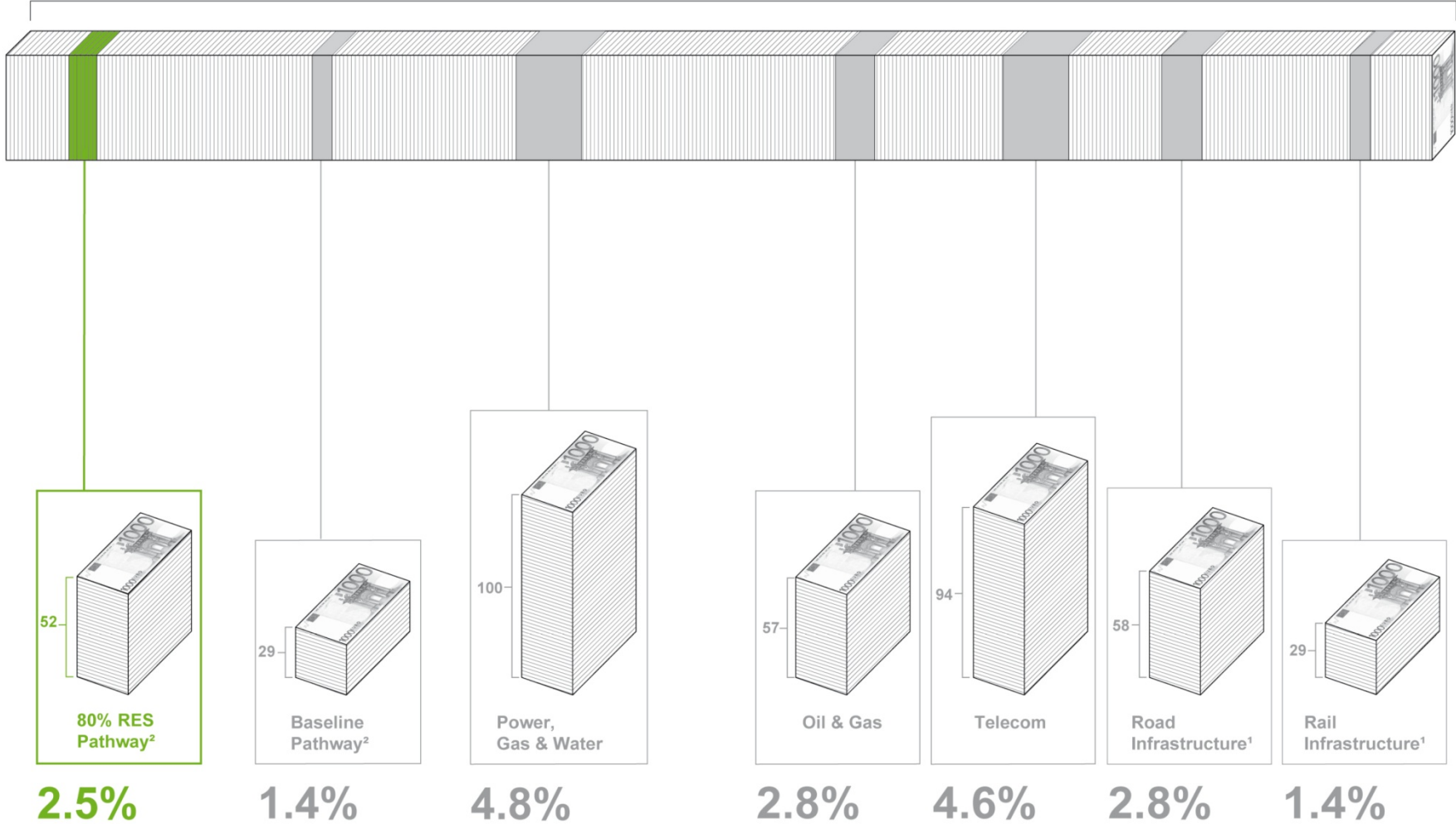
ANNUAL CAPEX DEVELOPMENT



A doubling of capital spend would be required over the next 15 years
 SOURCE: Roadmap 2050 Technical Analysis

ANNUAL COST COMPARED TO EU SPENDING

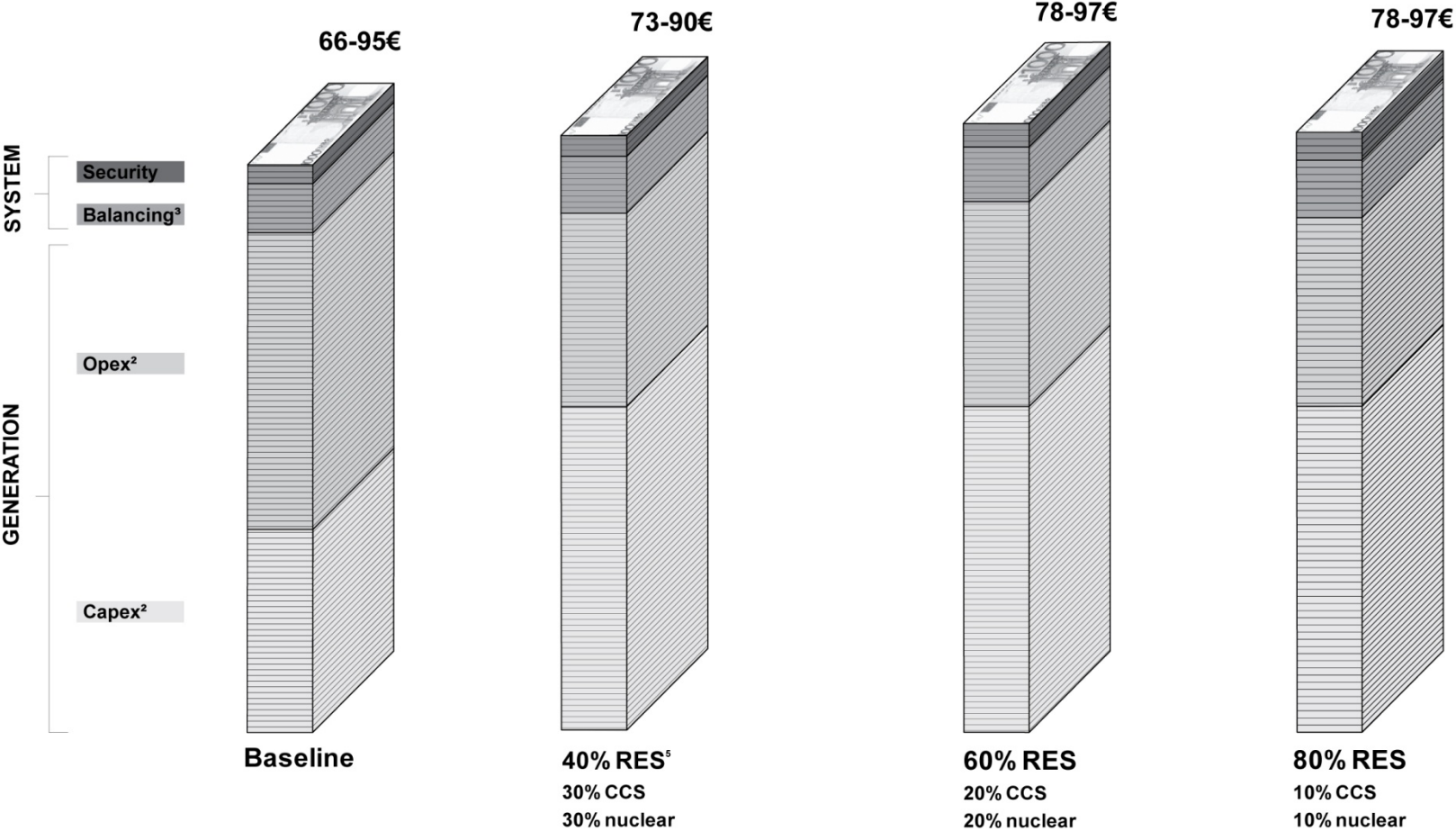
Total European Investments
2.059 Billion Euro



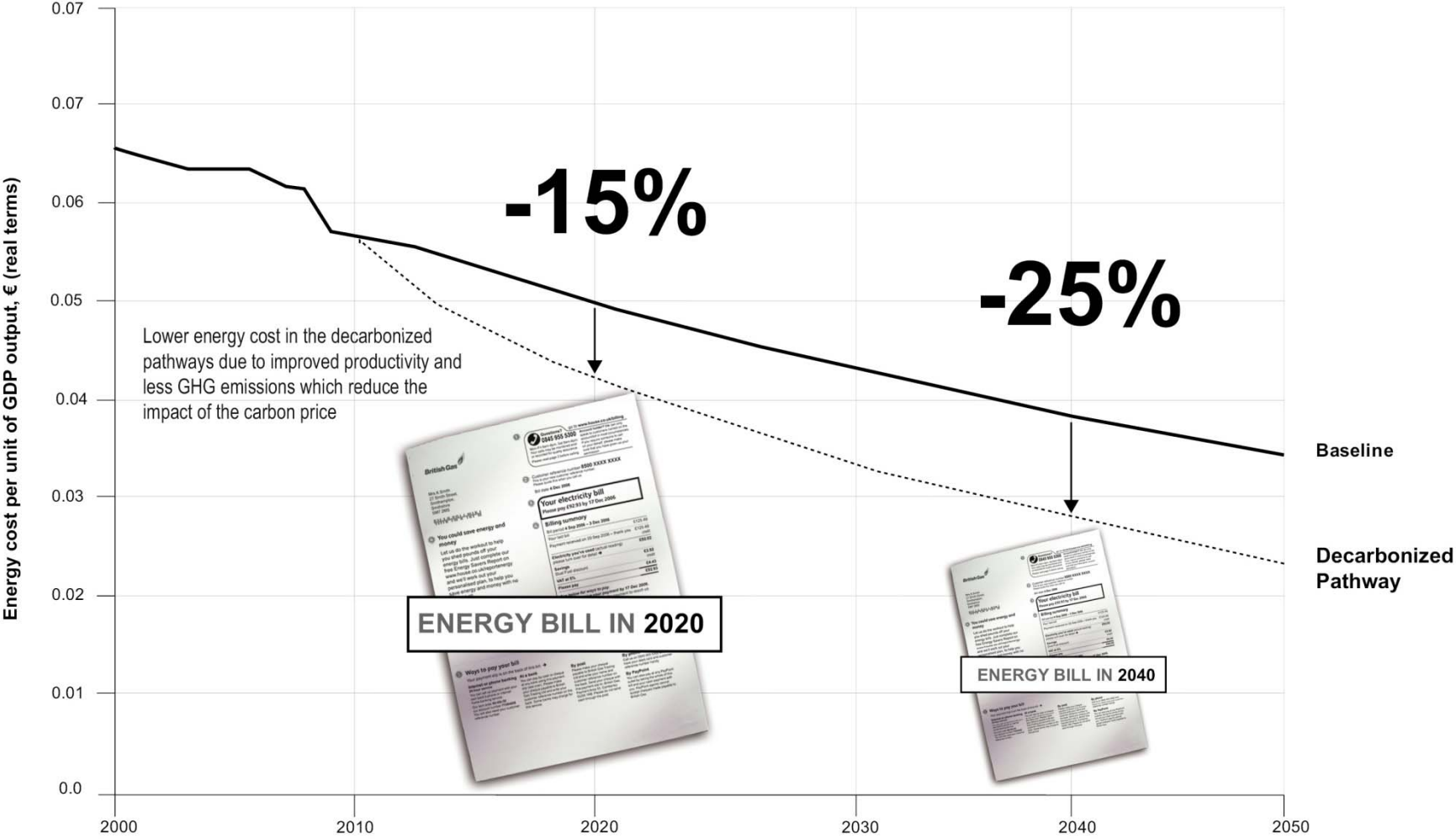
¹ Forecast for 2010 capex requirement not available for road and rail infrastructure investments; 2007 actual data is used instead
² Average yearly capex requirement from 2011 to 2020

COST OF ELECTRICITY

Average new built CoE from 2010 to 2050¹, EUR/MWh (real terms)



DECARBONIZING THE ECONOMY SAVES MONEY



NOTE: Energy prices are a weighted average of prices faced by consumers weighted by the shares of consumption of different fuels
 SOURCE: Roadmap 2050 Technical Analysis

What role for the OSCE?

- Managing interdependence
 - Early warning
 - Conflict prevention
 - Post-conflict rehabilitation
- Repository: Gap analysis & Best practices sharing
 - Regional cooperation: Gas and Electricity networks
 - Policies on Energy Efficiency & promotion of zero-carbon technologies
 - Optimizing investments

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Questions?

www.roadmap2050.eu

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