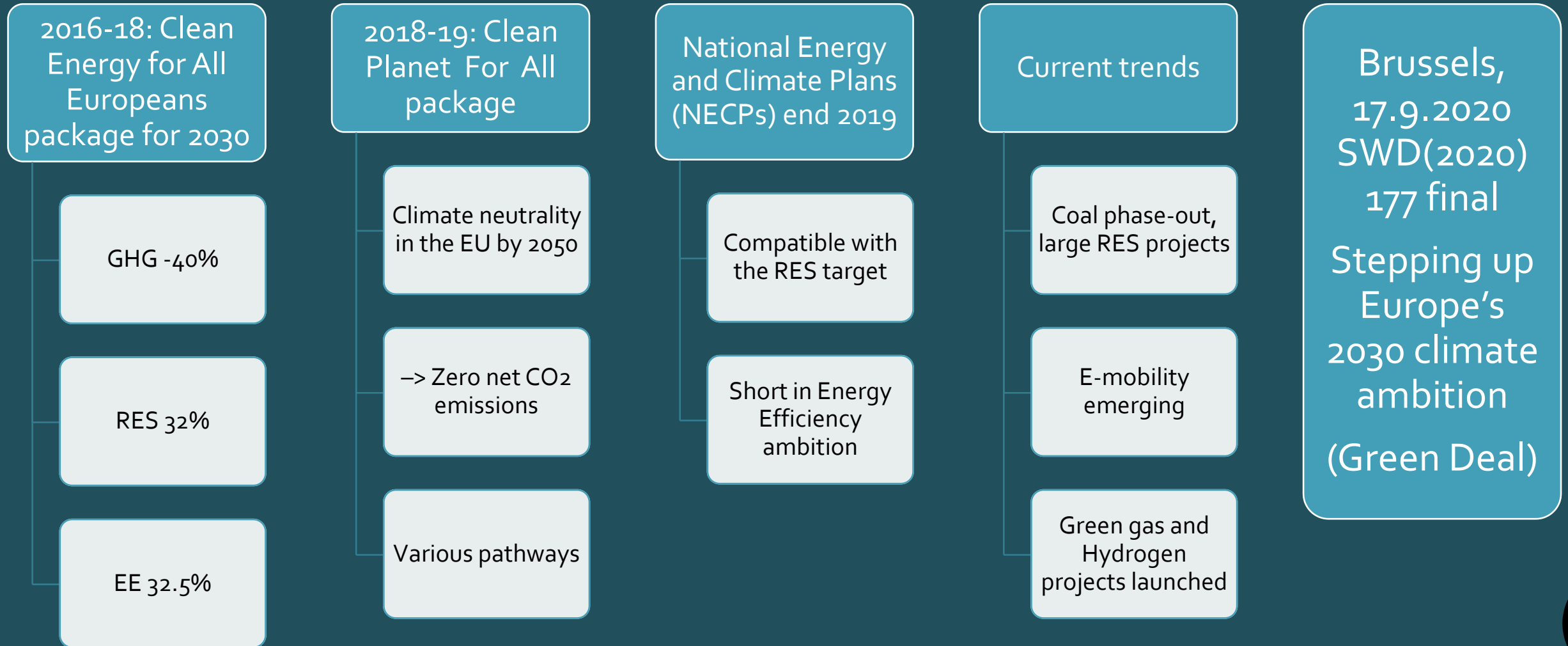


***PRIMES
MODEL
SCENARIOS
FOR THE
EU'S GREEN
DEAL***



*Pantelis CAPROS, E3Modelling, Professor at NTUA
30 September 2020*

Impressive legislative initiatives in the EU



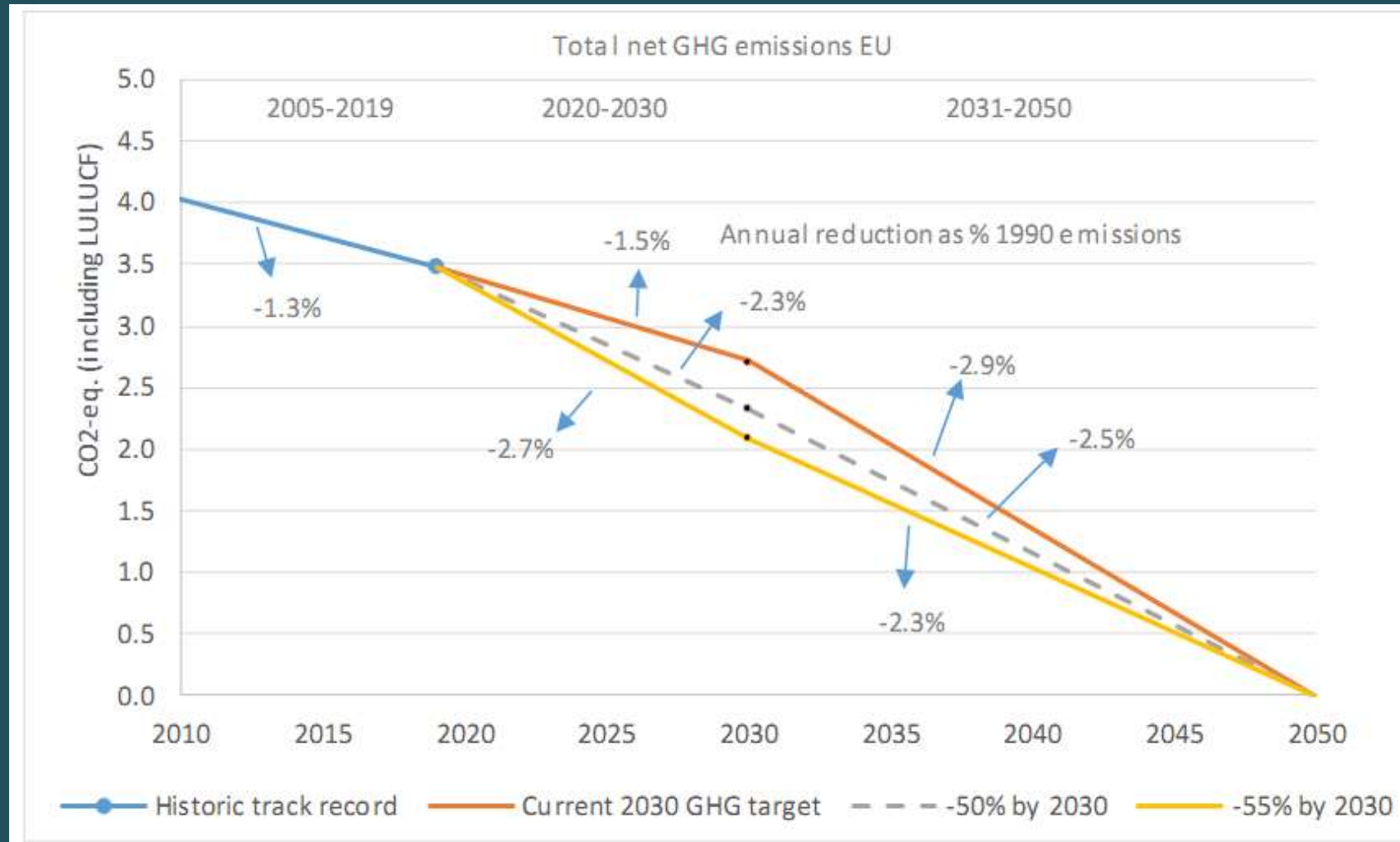
Stepping up Europe's 2030 climate ambition

The -40% GHG in 2030 is insufficient for climate neutrality by 2050

A -55% GHG in 2030 is recommended (-50% also assessed)

Four instruments

1. ETS - scope and MSR
2. Renewables
3. Energy Efficiency
4. Transport sector policy



PRIMES modeling Scenarios for the EC by E3Modelling SA

BSL: Baseline achieving the existing targets in 2030

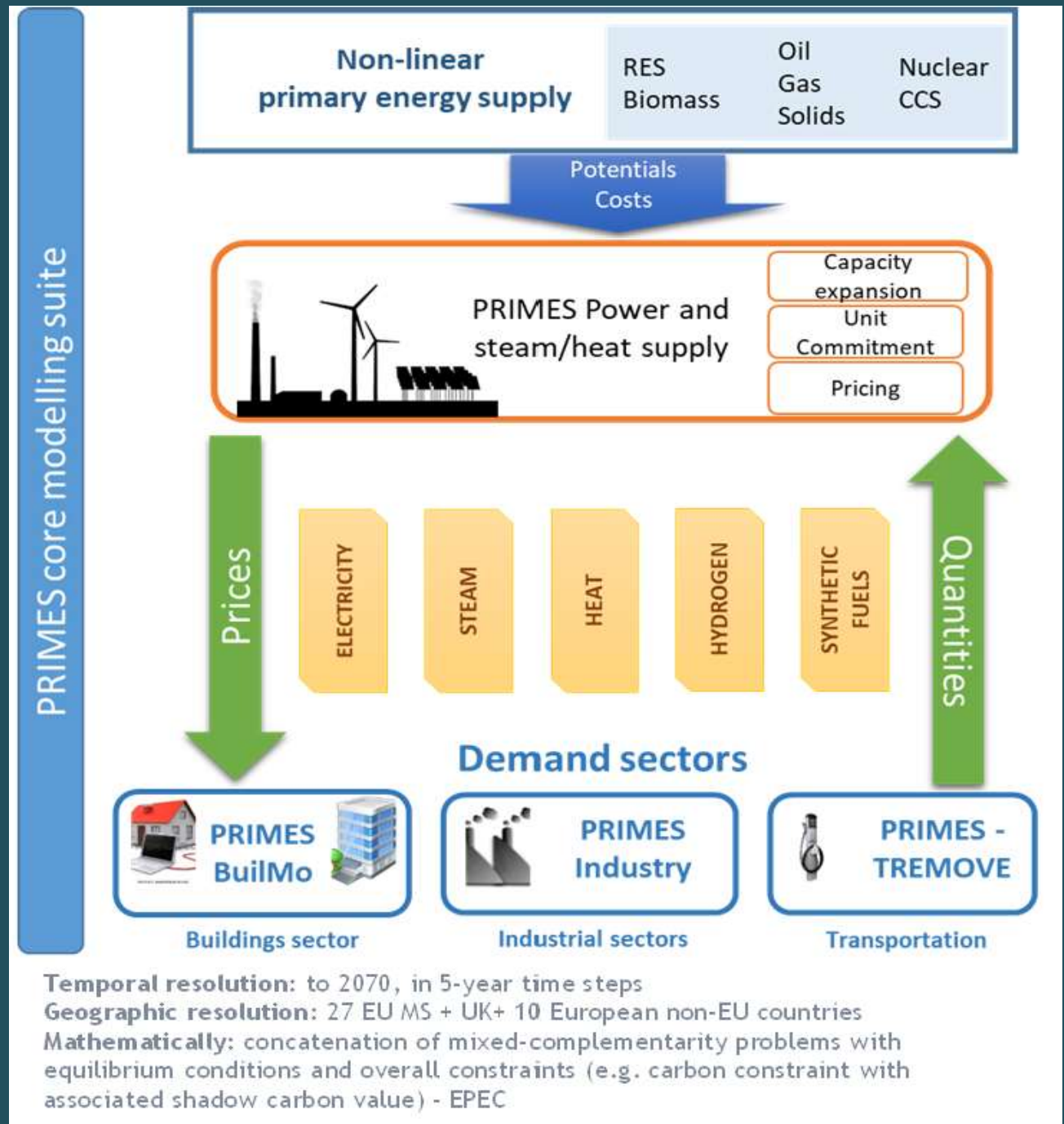
REG: Bottom-up policies and regulation for buildings, renewables and transport, while keeping ETS unchanged

CPRICE: Carbon pricing with extension of ETS to transport and buildings sectors combined with a few measures in transport sector

MIX: A mix of policy approaches, combining bottom-up and regulation with carbon pricing

ALLBNK: Same as MIX and additional fuel mandates for aviation and maritime sectors

Plus several variants



Stepping up Europe's 2030 climate ambition Targets

A 55% GHG target implies a significant rise in ambition for renewables and energy efficiency

The overall RES target has to go above 38% in 2030.

Energy savings, mainly in buildings and transport have to increase much above current national plans, which still lag behind previous targets

Primary energy savings are easier due to coal phase out and replacement by RES

Scenarios	GHG 2030	RES in 2030	FEC 2030	PEC 2030
BSL	-46.9%	32.0%	-32.4%	-34.2%
MIX-50	-51%	35.1%	-34.4%	-36.8%
REG	-55%	38.7%	-36.6%	-40.1%
MIX	-55%	38.4%	-35.9%	-39.7%
CPRICE	-55%	37.9%	-35.5%	-39.2%
ALLBNK	-57.9%	40.4%	-36.7%	-40.6%

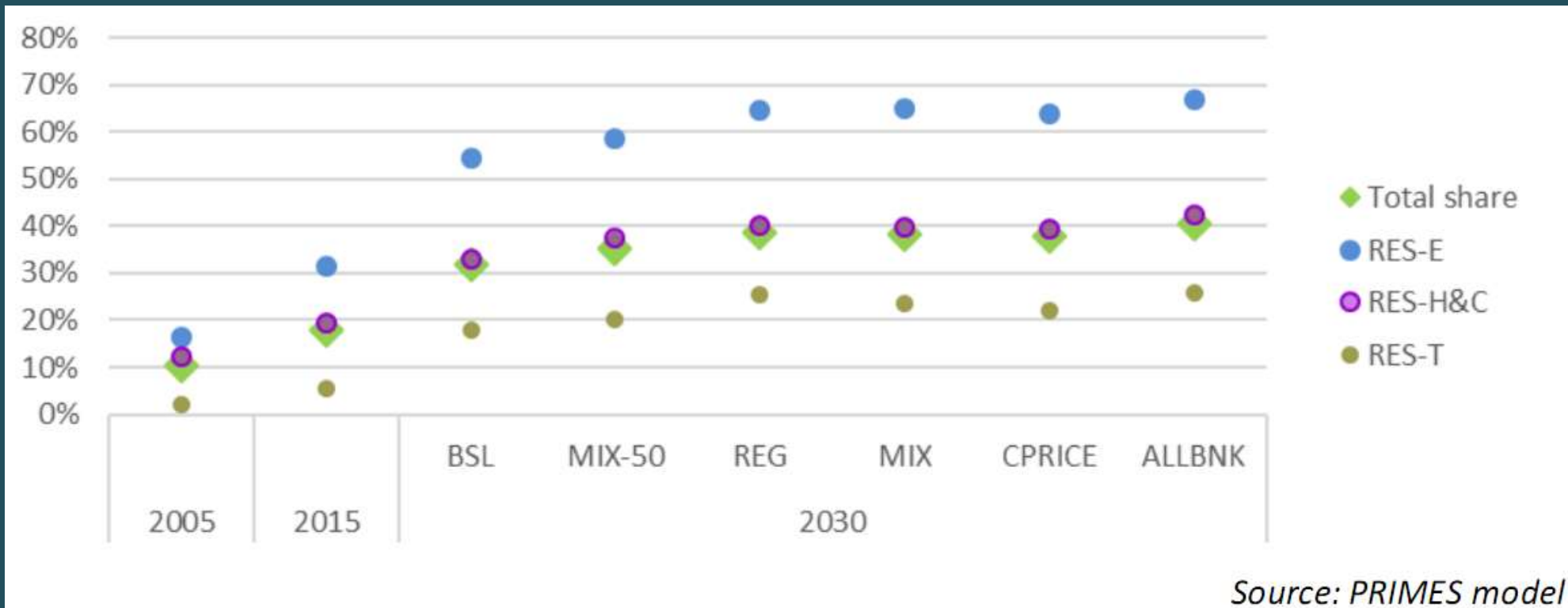
Stepping up Europe's 2030 climate ambition

Renewable shares

RES development has to accelerate in all sectors in the decade 2020-2030

RES-E has to be above 60%, RES H&C approaches 40% and RES-T 25%

These are more than double compared to current levels



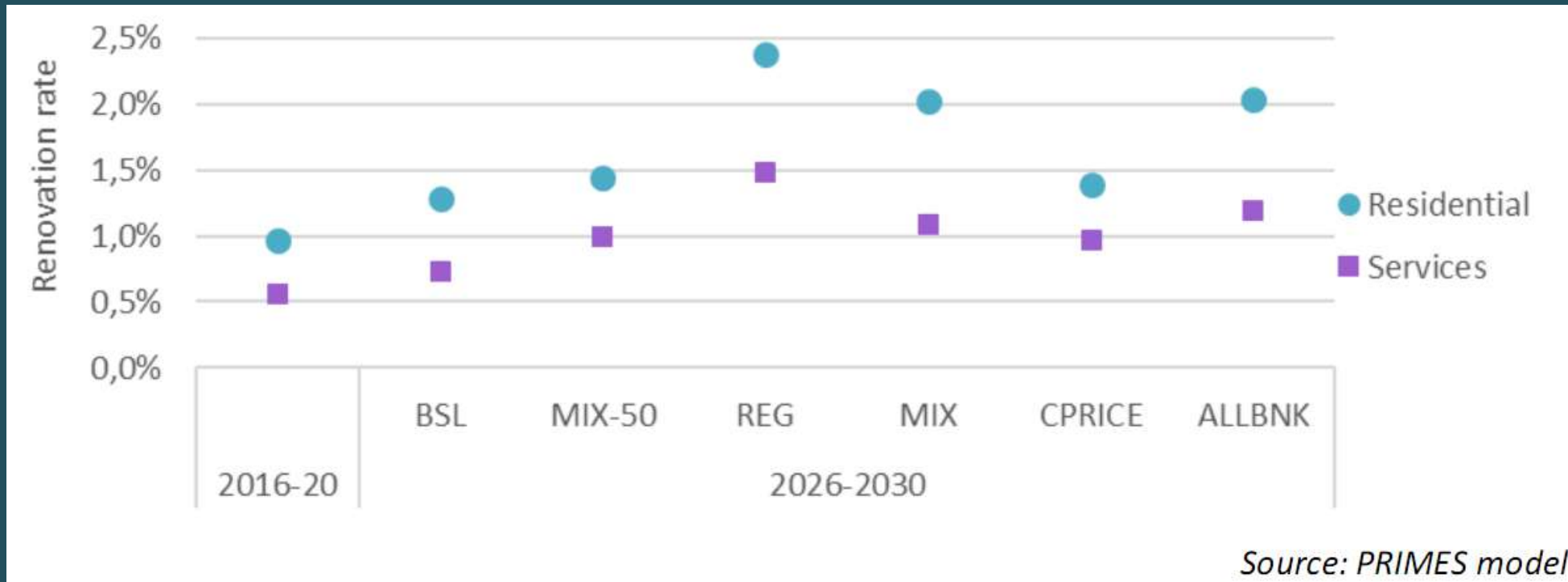
Stepping up Europe's 2030 climate ambition

Energy Savings in Buildings

Rates of renovation of old buildings will have to increase considerably

Also to shift from light to deep energy-related renovation

The renovation strategies submitted by the MS must be enhanced



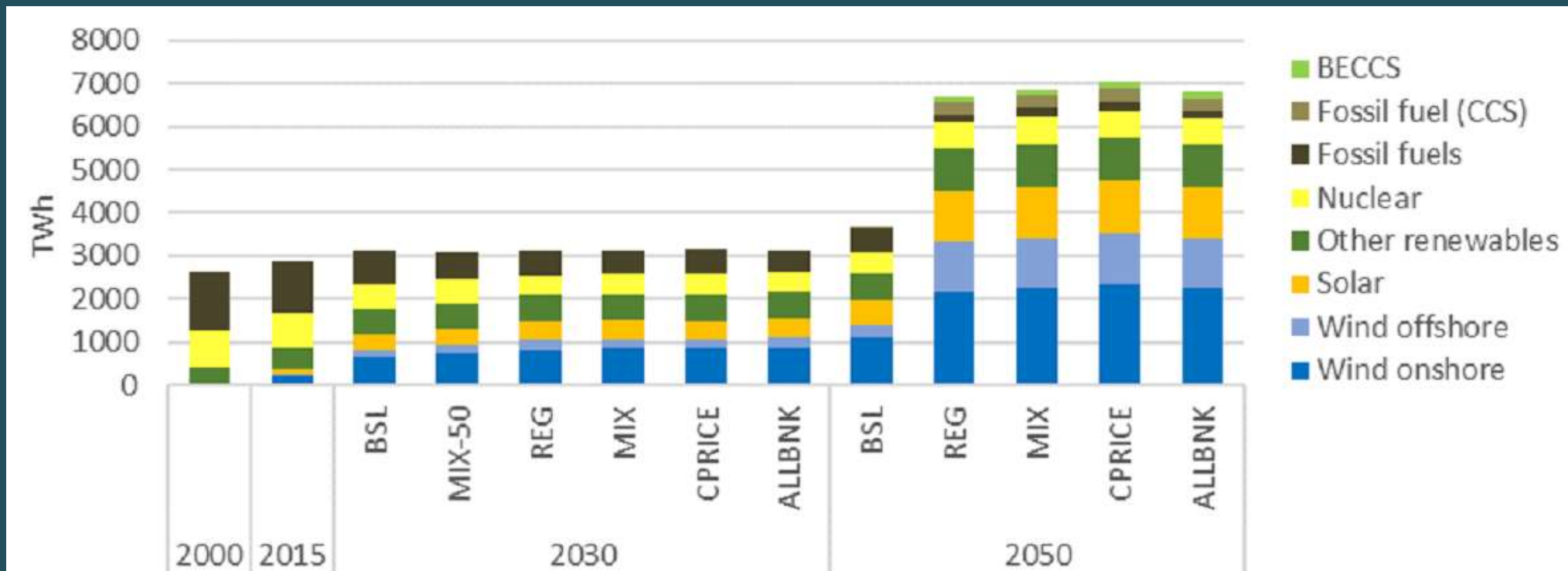
Stepping up Europe's 2030 climate ambition

Electricity sector

Electricity is fundamental – heat pumps and e-mobility electrify demand

In the long-term e-fuels decarbonize demand further and ensure storage

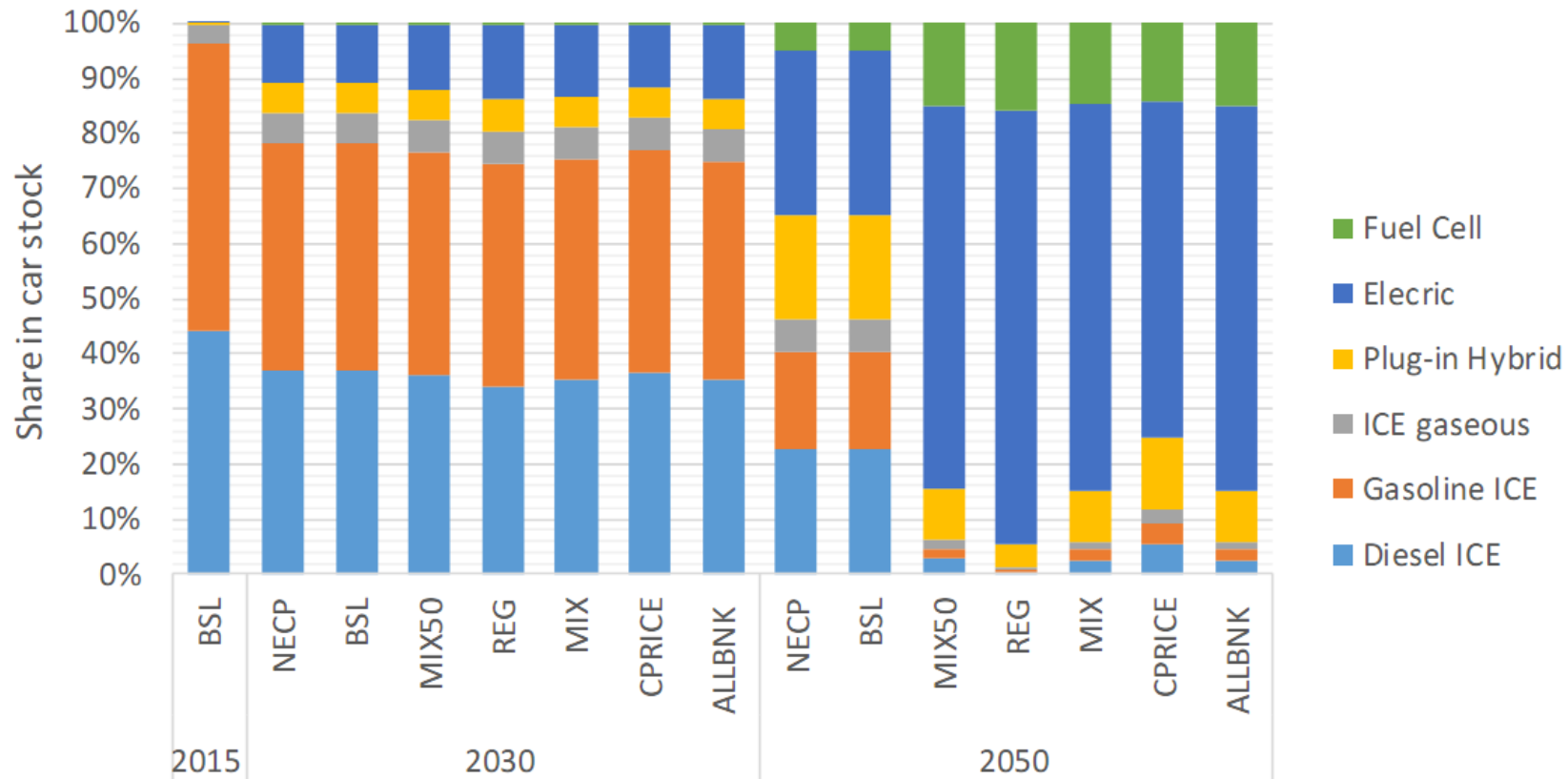
Generation relies on RES, with wind and solar increasing impressively



Stepping up Europe's 2030 climate ambition

Transport sector

Structure of car fleet in the EU



Source: PRIMES model

Transport sector restructuring combines:

- Strong penetration of electric vehicles
- Biofuels mostly advanced
- Gaseous fuels and hydrogen in specific segments
- Infrastructure development

Stepping up Europe's 2030 climate ambition

Energy System Costs

The increase in ambition is affordable, when measuring total energy system costs as % of GDP

ETS carbon prices need to increase and the MSR enhanced
Investment expenditures shall increase considerably
challenging financing for individuals and infrastructure

Scenarios	BSL	REG	MIX	CPRICE	ALLBNK
ETS price 2030	32	32	44	60	65
% of GDP 2021-2030	10.7%	11.1%	11.0%	10.9%	11.0%
% of GDP 2031-2050	9.9%	10.8%	10.8%	10.7%	10.7%
Investment bn. pa. 2021-2030	48.8	114.2	93.2	62.9	108.2
Investment bn. pa. 2031-2050	206.2	235.0	214.2	206.0	215.2

Stepping up Europe's 2030 climate ambition

Implications for the NECP of Greece

The NECP of Greece must be revised and include significantly higher ambition for renewables in all sectors

Integration of RES in electricity up to 85% is a challenge

Natural gas consumption to decline, but storage, bio-energy and hydrogen to emerge

The increased ambition is affordable also for Greece

Scenarios	BSL	REG	MIX	CPRICE	ALLBNK
GHG in 2030	-41.8	-51%	-51.4%	-48%	-53%
RES-share overall	35.7%	48.2%	48.4%	48.0%	50.4%
RES H&C	38.8%	52.2%	49.9%	49.6%	53.8%
RES-E	62%	83%	87%	86%	88%
RES-T	15%	31%	28%	25%	33%
Final energy (Mtoe in 2030)	15.3	14.3	14.5	14.4	14.2
Power generation from RES (GWh in 2030)	44.7	59.1	61.9	61.9	62.9
Avg. electricity price (EUR/MWh)	130	129	129.5	122	129.4