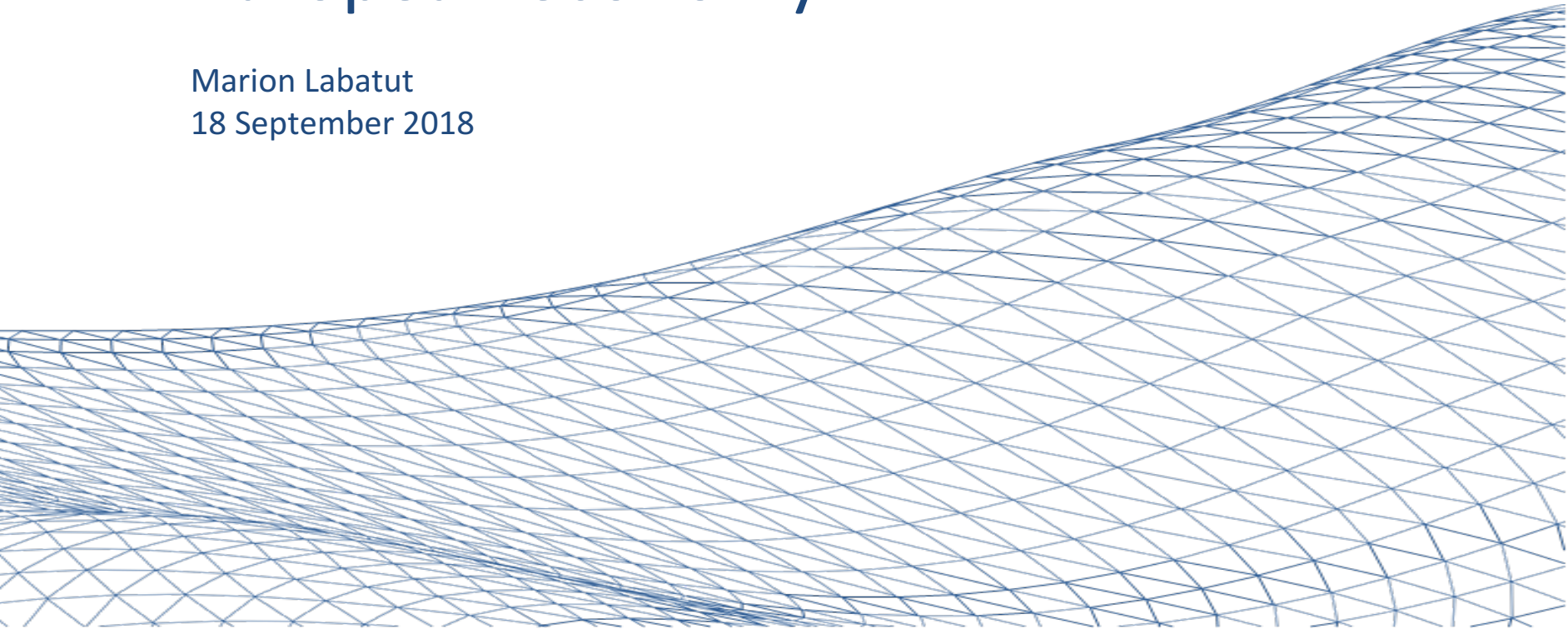


Decarbonization pathways

European economy

Marion Labatut
18 September 2018



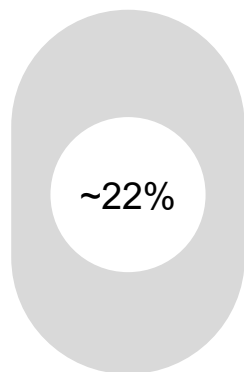
eurelectric designed 3 deep EU decarbonization scenarios



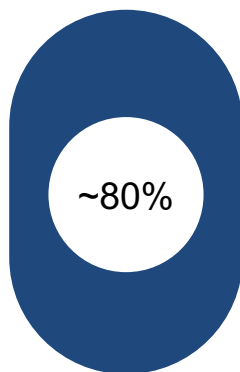
2015 - Baseline

2050 scenarios

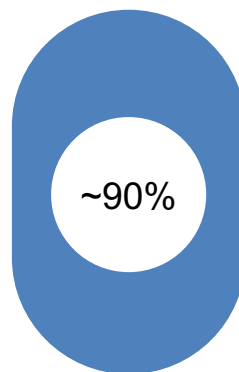
 **EU economy decarbonization achieved vs. 1990^{1,2}**



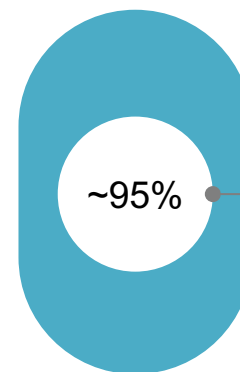
Scenario 1



Scenario 2



Scenario 3



Driving towards full EU economy decarbonization

4 underlying pre-requisites and drivers per scenario: level of ambition, technology development, consumer behavior and regulation

¹ Emissions out of scope are expected to contribute proportionally to the decarbonization effort required in each scenario

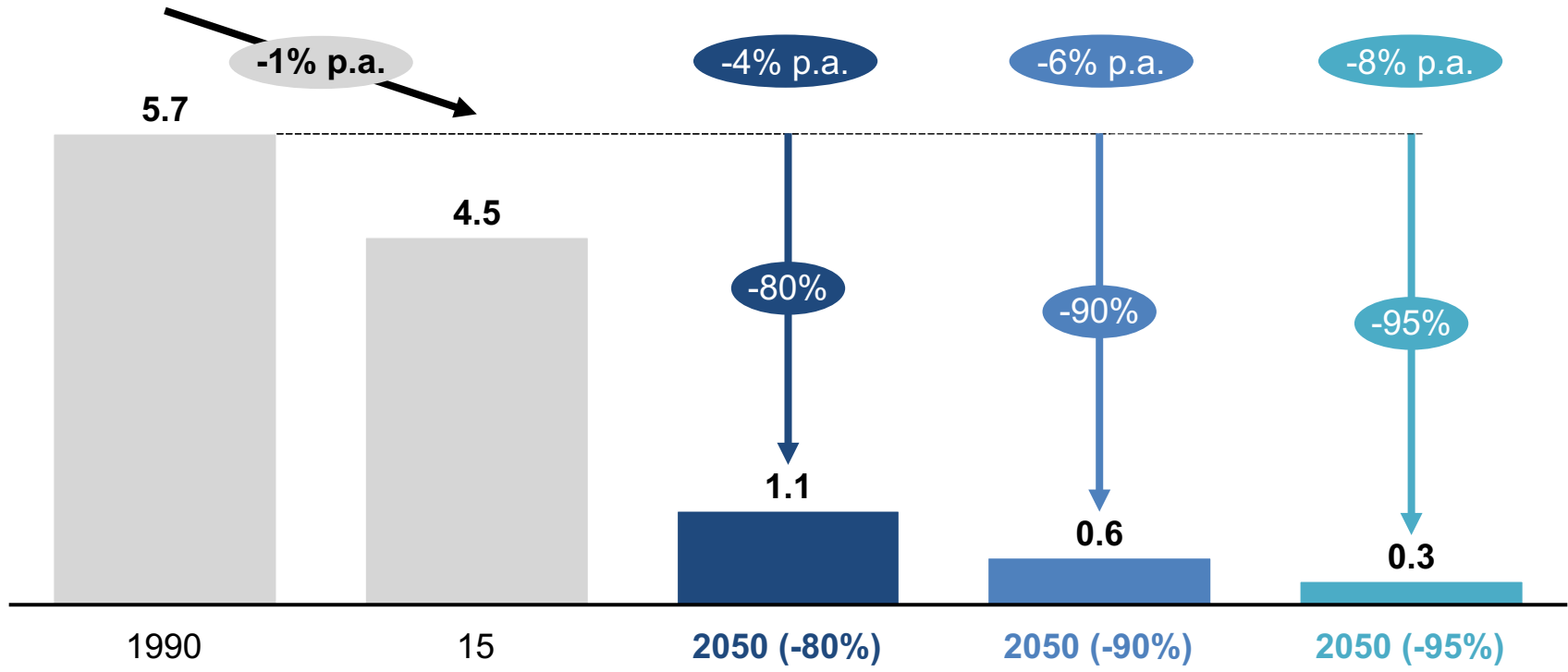
² Decarbonization will be different by sector depending on relative costs and available technologies, industry contributing least with below 80% of emission reduction in all scenarios

The 3 scenarios deliver unprecedented but necessary reductions in CO2 emissions

-x% p.a. Required annual emission reduction rate between 2015-2050 to achieve target

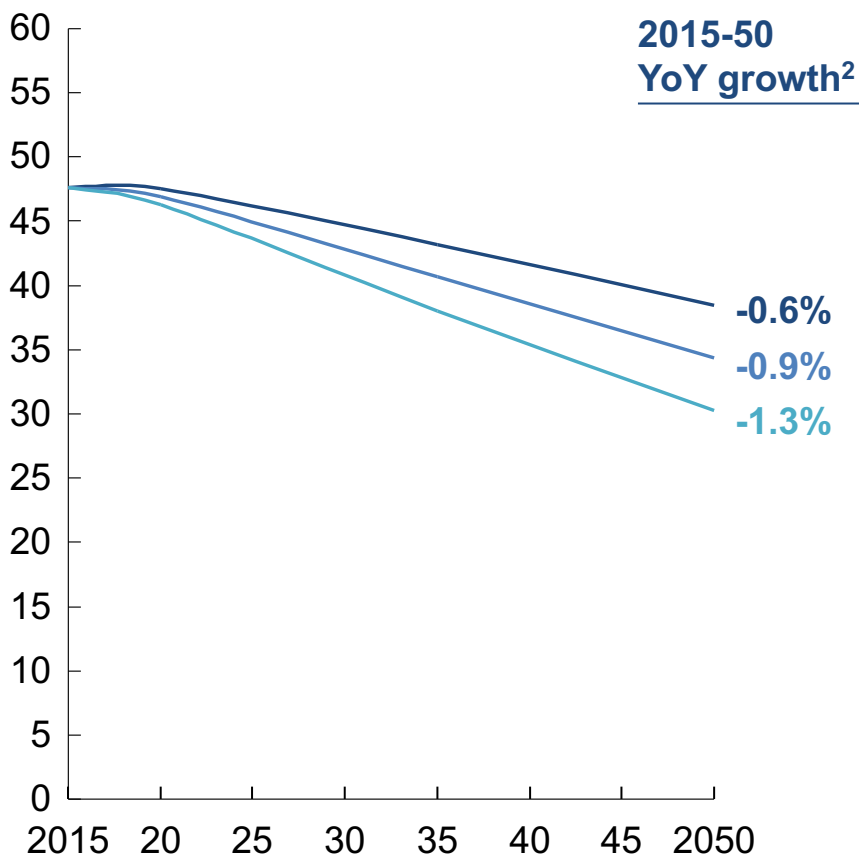
Total GHG emissions, EU¹
GtCO₂eq.

2050 scenarios
Scenario 1 Scenario 2 Scenario 3

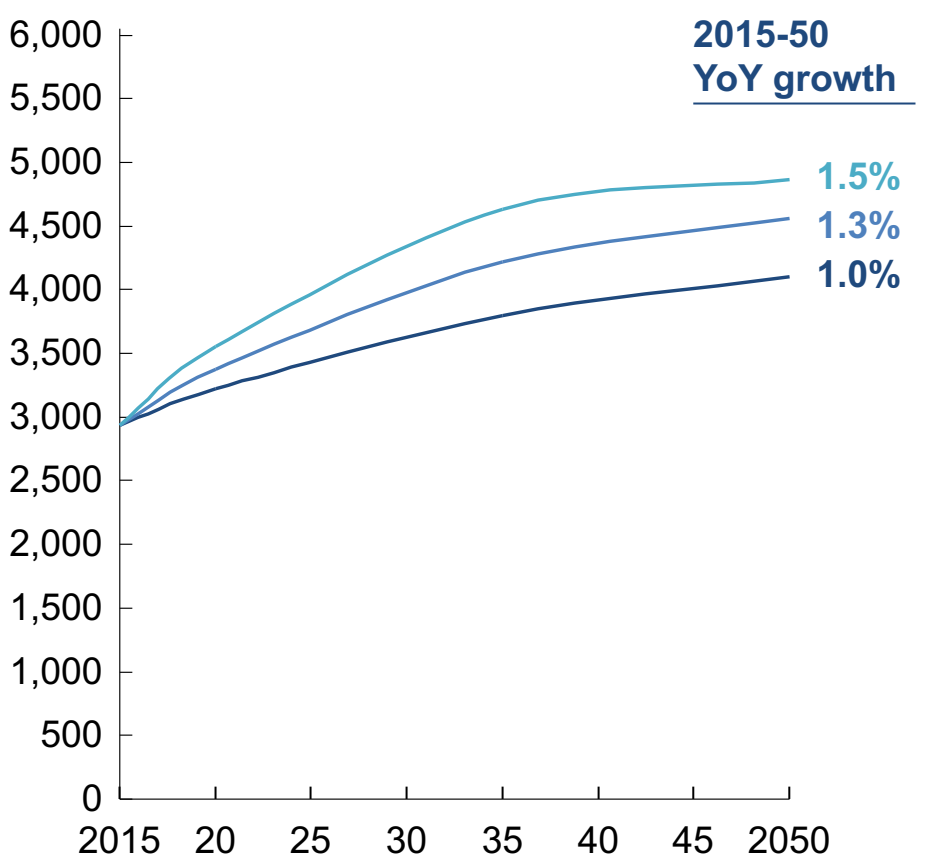


Energy efficiency drives down final energy consumption significantly, while yearly direct electricity consumption increases by 1.0 to 1.5%

Total Final Energy Consumption (TFC¹)
Exajoule



Direct electricity consumption in TFC¹
TWh



Scenario 1
Scenario 2
Scenario 3

¹ Includes 32 countries in scope: EU28 + EEA; ENTSOE report additionally includes Turkey and other Eastern European countries adding up to a total of ~3,300 TWh

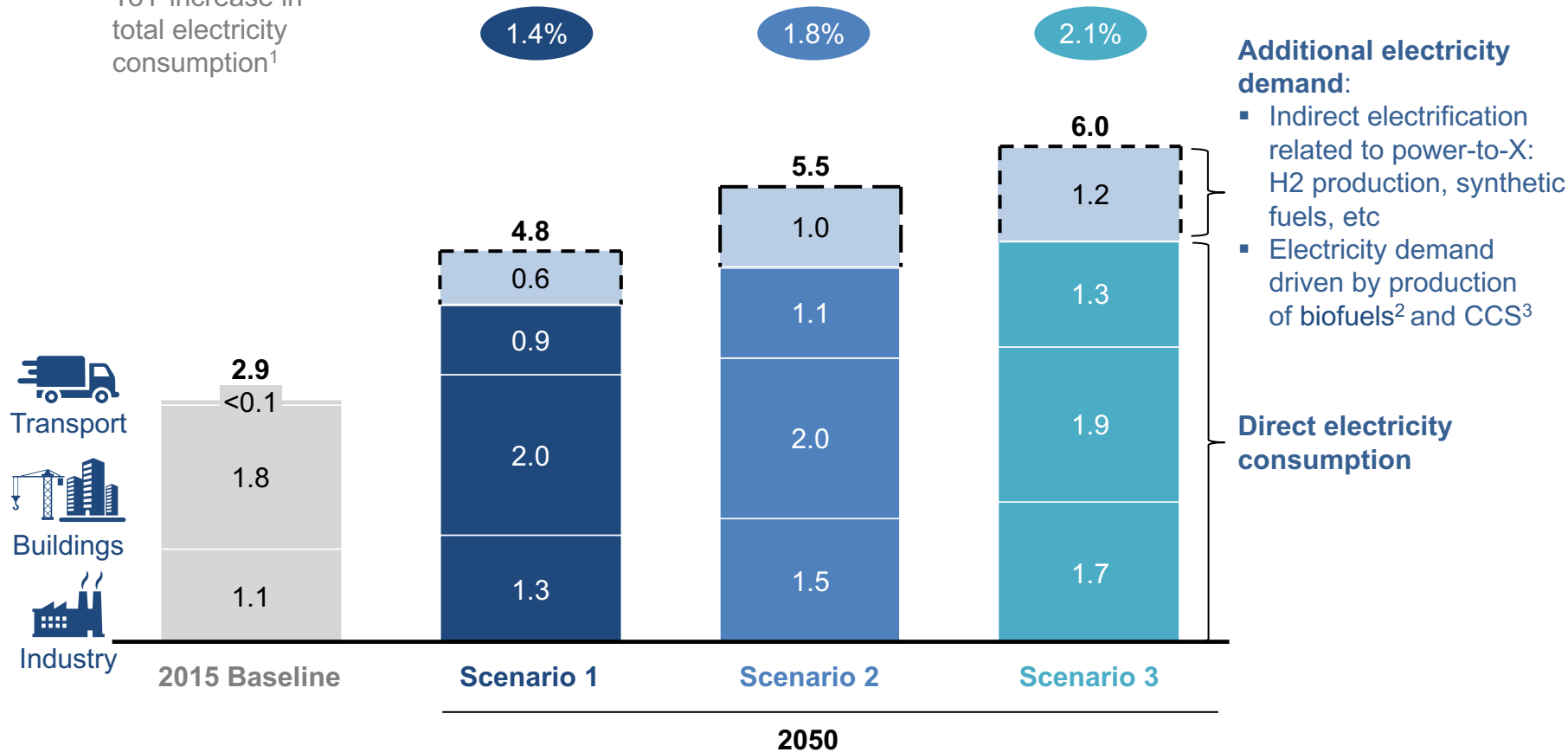
² Annual YoY TFC reduction adjusted to total GDP growth (as a proxy for increase in energy productivity) varies between 2% and 2.8% depending on scenarios

Strong electricity uptake in all sectors, with strongest increase in transport

Total electricity consumption

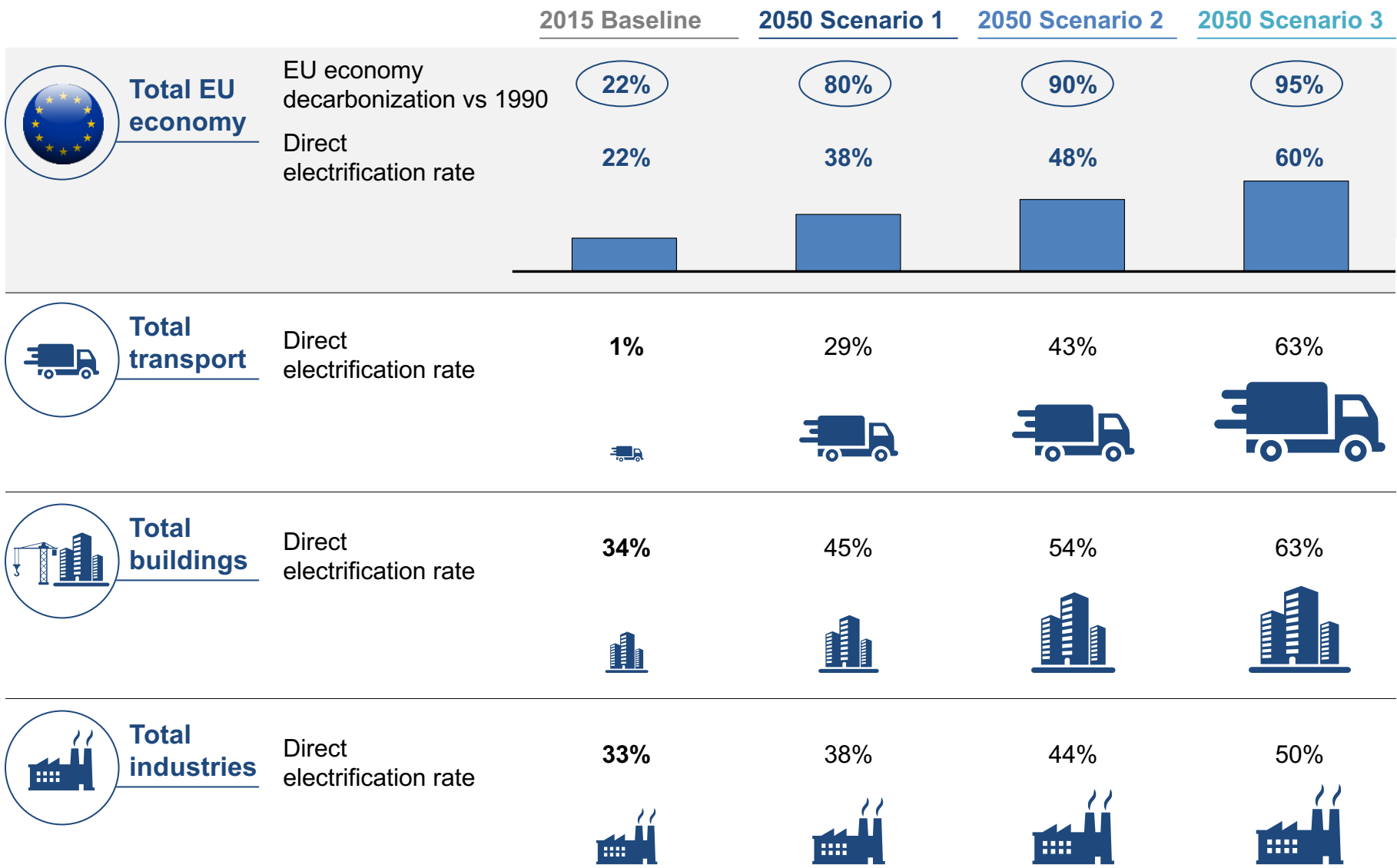
1,000 TWh

YoY increase in total electricity consumption¹



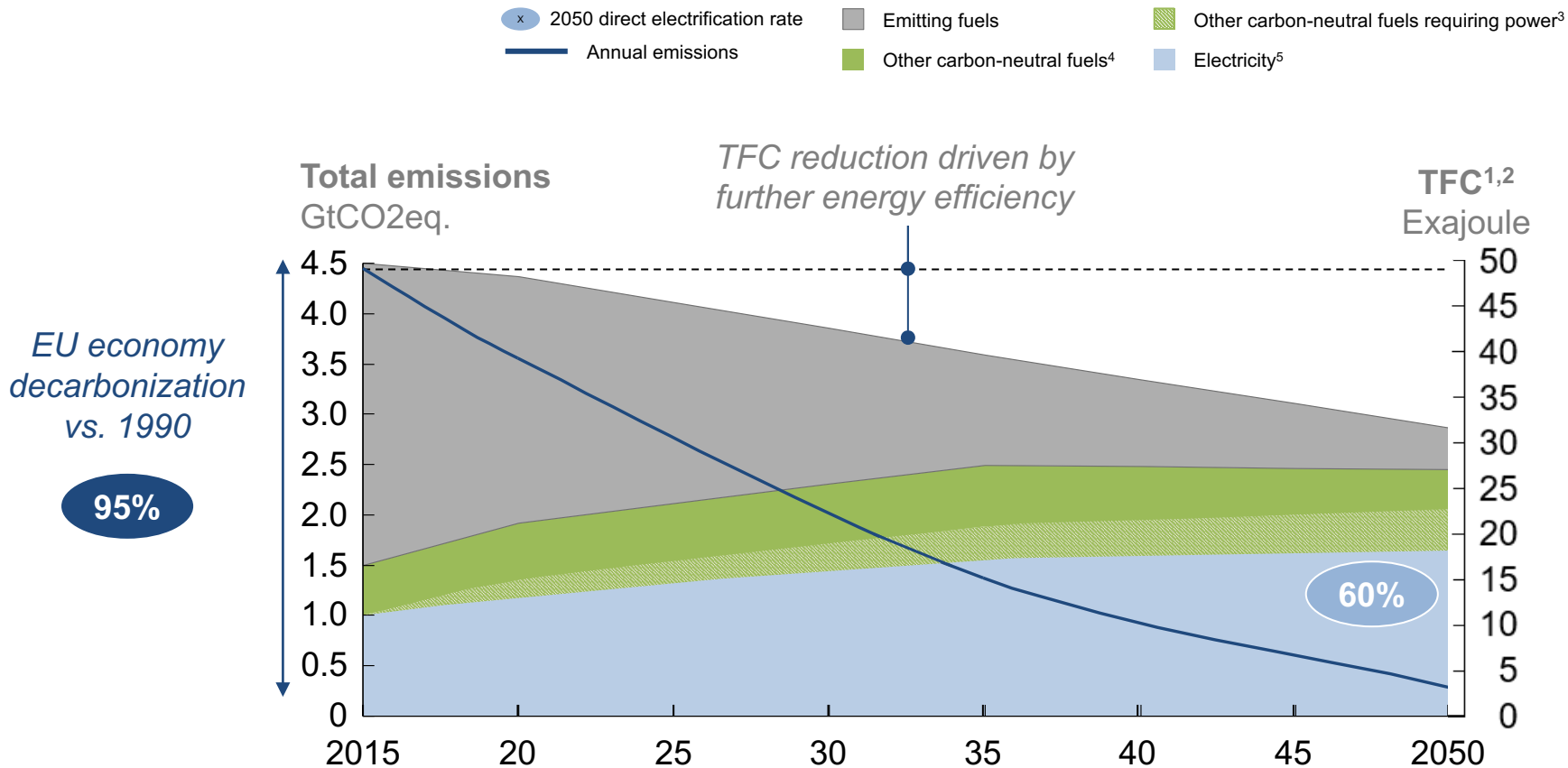
1 Includes both direct and indirect electrification (power-to-X) as well as electricity demand driven by production of CCS and biofuels
 2 Biofuels require feedstock as well as additional energy (either in form of thermal energy or power) for their production – see glossary
 3 Total CO2 abated through CCS: <200 Mt Co2; CCS may require technology improvement as well as increasing acceptability, e.g., for underground storage

Direct electrification results by scenario



95% decarbonization through strong electrification, energy efficiency, and support from other non-emitting fuels

Impact of electrification on Total Final Energy Consumption (TFC) and EU economy emissions



¹ Includes 32 countries in scope: EU28 + EEA; ENTSOE report additionally includes Turkey and other Eastern European countries adding up to a total of ~3,300 TWh

² Electricity consumption from transformation sectors not included; ³ Includes non-emitting fuels that trigger indirect electrification through power-to-X (H₂, synth fuels) as well as non-emitting fuels that trigger increased electricity demand to be produced such as biofuels; ⁴ Includes all other non-emitting fuels/sources such as geothermal, solar thermal, and others; ⁵ Direct electricity consumption