

The Dutch Energy Transition: Cost or Opportunity?

Arnout de Pee

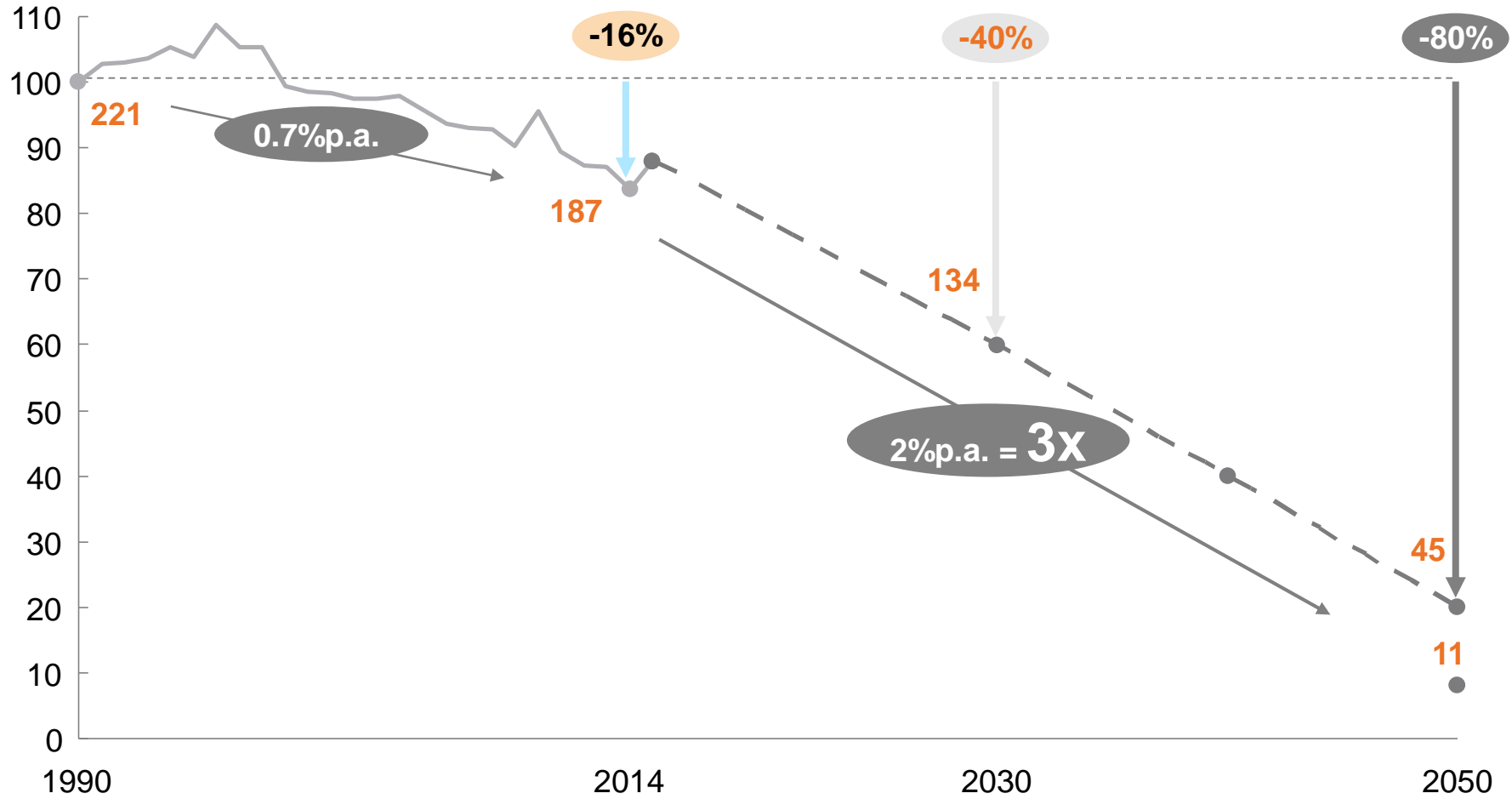
May 1, 2018 | Kivi



To achieve 2050 ambition of GHG emission reduction of 80%, the Netherlands would need to accelerate with factor 3 from 2014

CO₂ equivalent emission, % change as of 1990

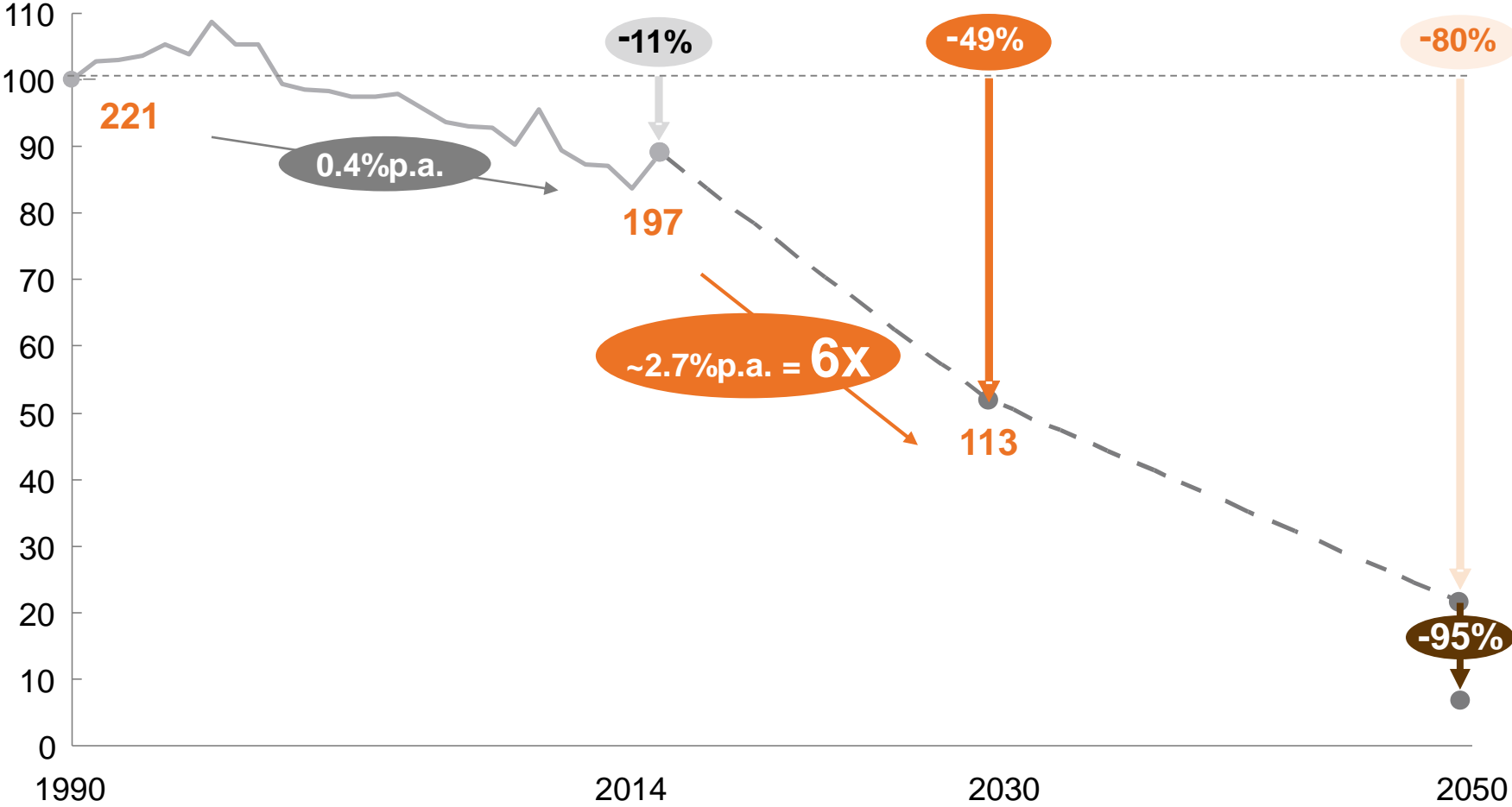
XX: Absolute CO₂ Mt equivalent emission



New target – need to accelerate even more.....!

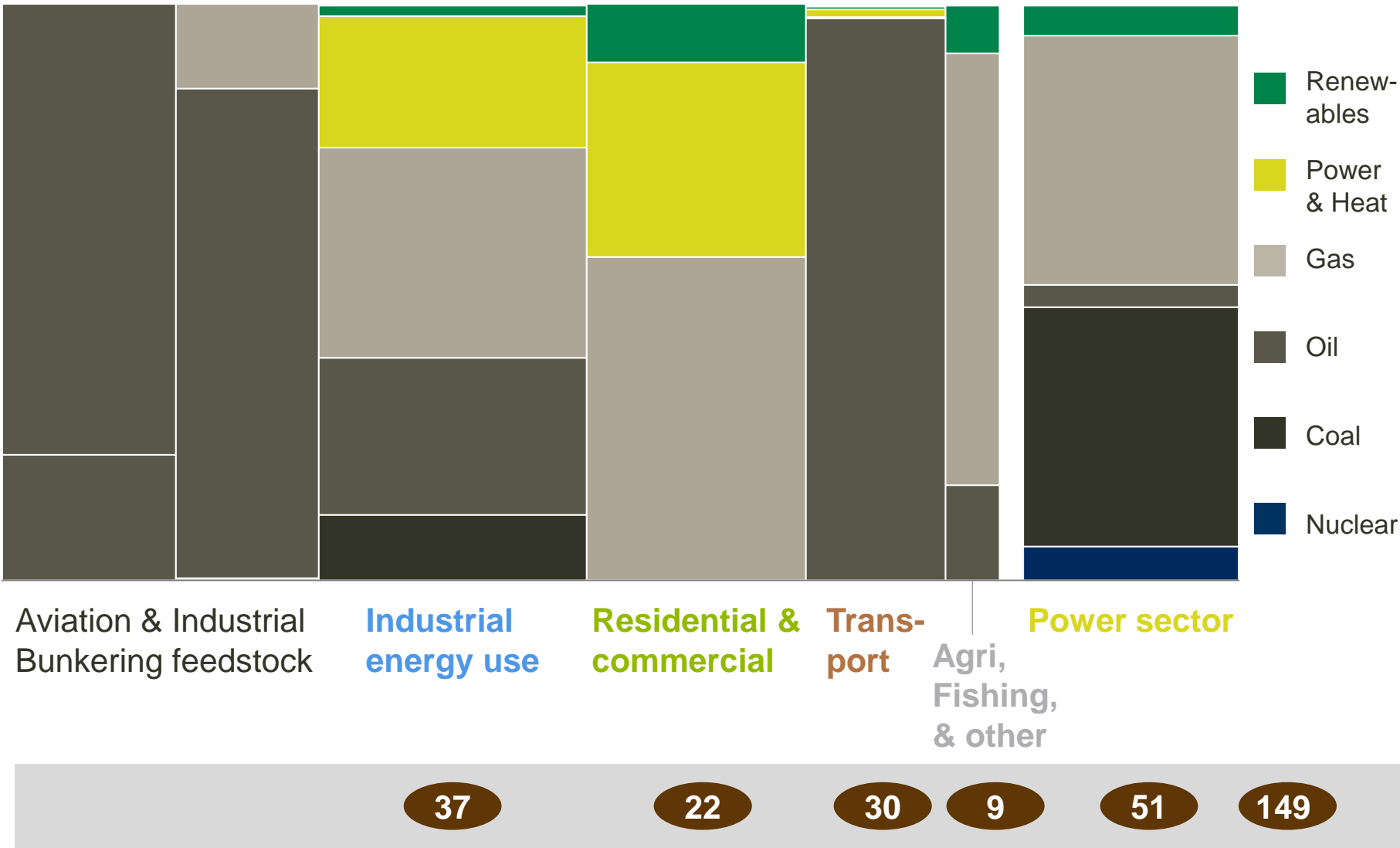
CO₂ equivalent emission, % change as of 1990

XX: Absolute CO₂ Mt equivalent emission



Emissions of our current energy system

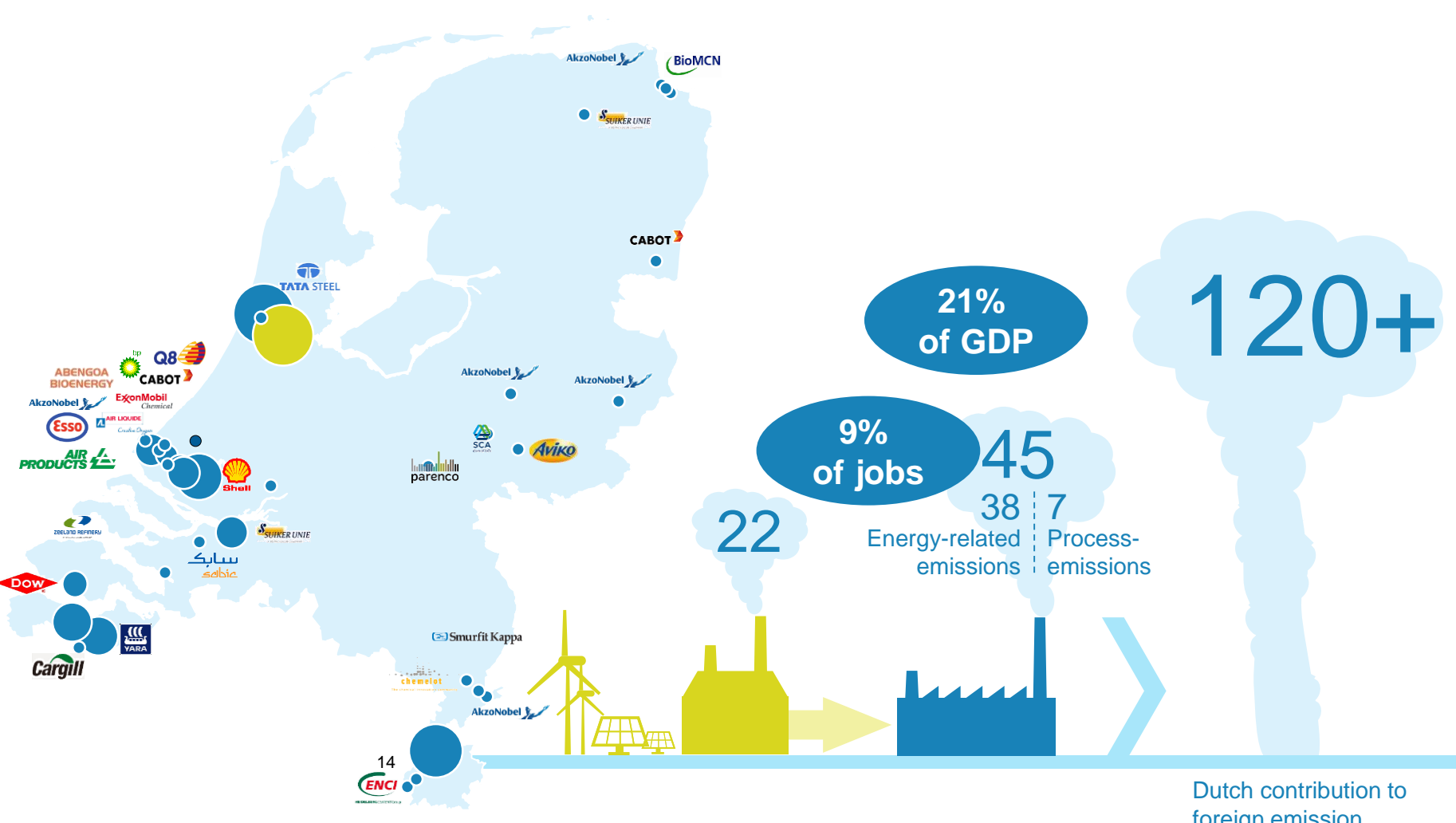
CO2 emissions, 2014, CO2e, MTon



SOURCE: Centraal Bureau voor de Statistiek (2014), "Energiebalans" and "Energieverbruik" databases, National Inventory Report 2016

Industry: An economic power house and 67 Mton industrial CO₂ emissions

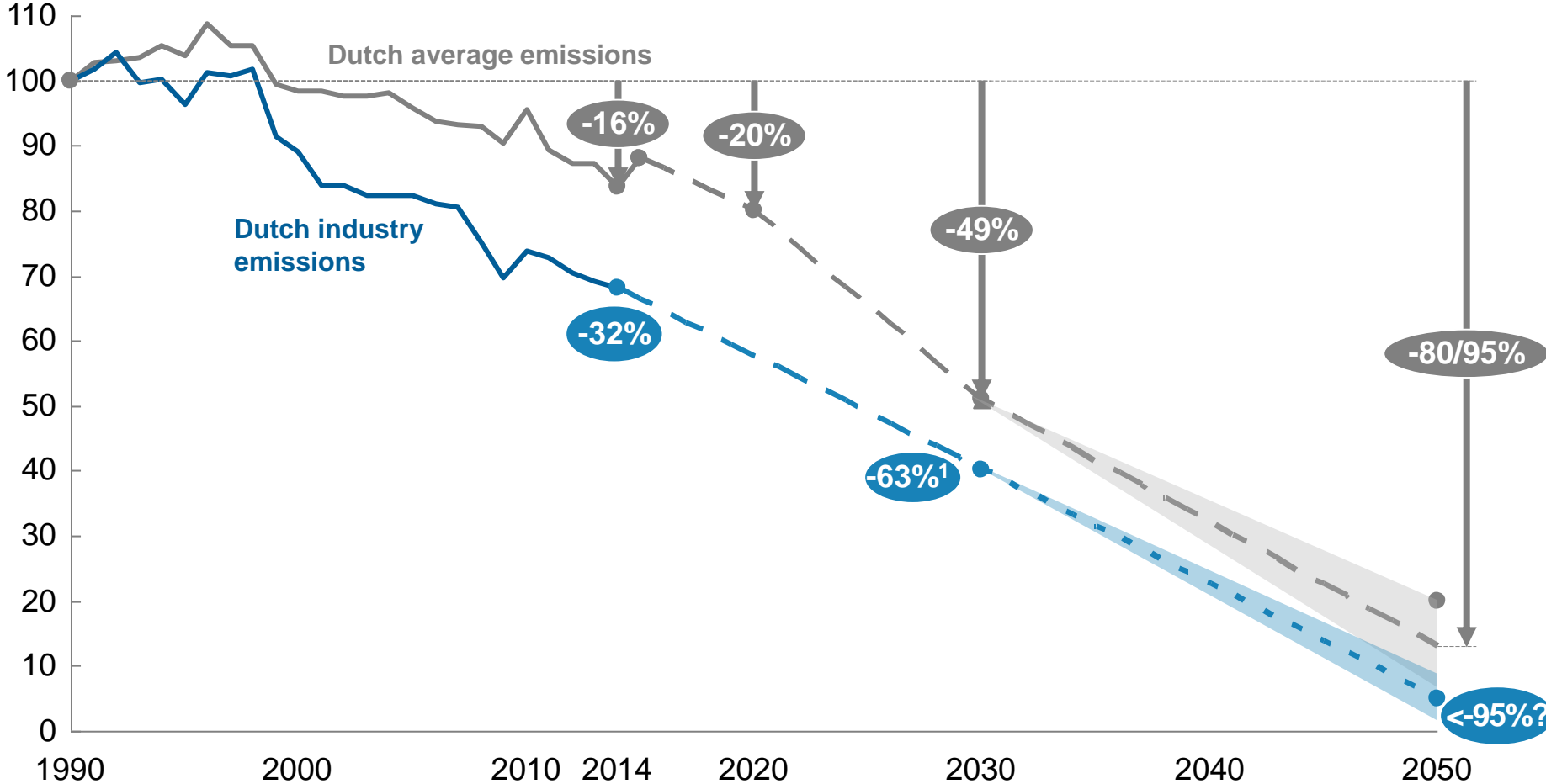
● Industrial facility ● Dedicated power plant ● 0,1 Mton CO₂



SOURCE: PRTR Netherlands, National Inventory Report 2016 – data for 2014

Faster decarbonisation than average – pace must be maintained

CO₂ equivalent emission, % change as of 1990

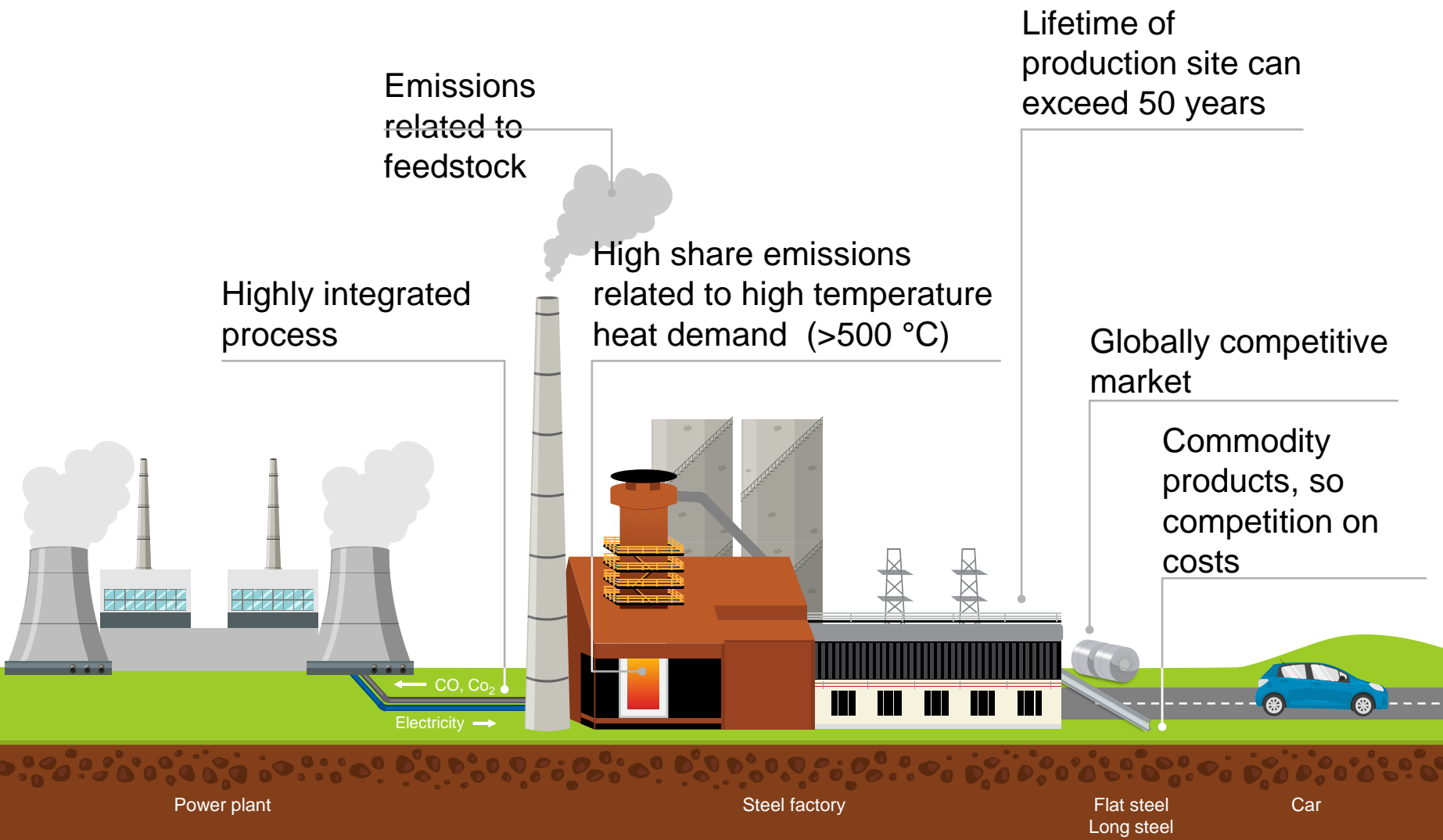


¹ 22 MtCO₂ less than 2015 emissions, as outlined in the "Regeerakkoord"

Bron: CBS, National Inventory Report (1990-2014), team analysis

Why are these hard to abate sectors?

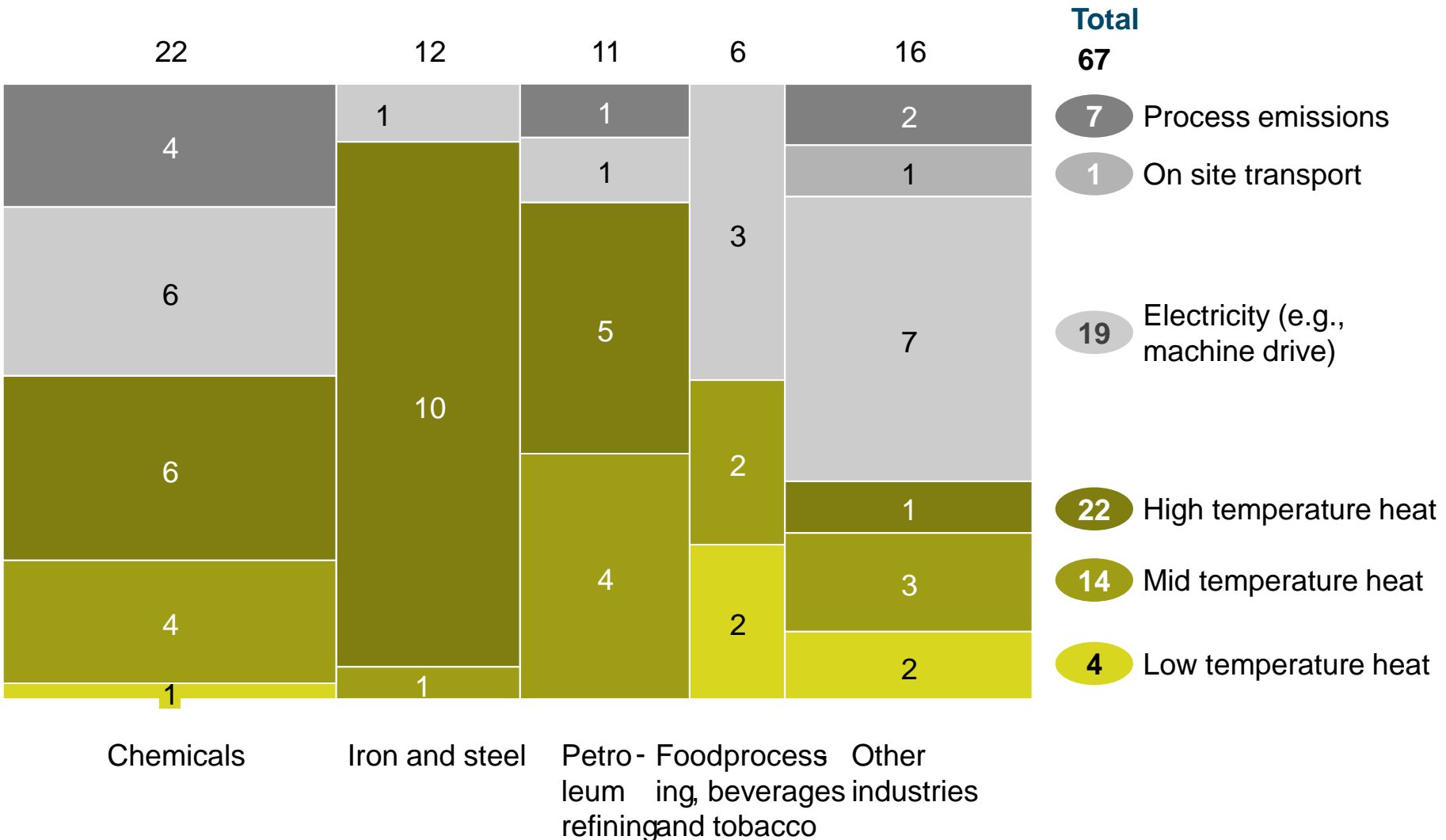
Steel process example



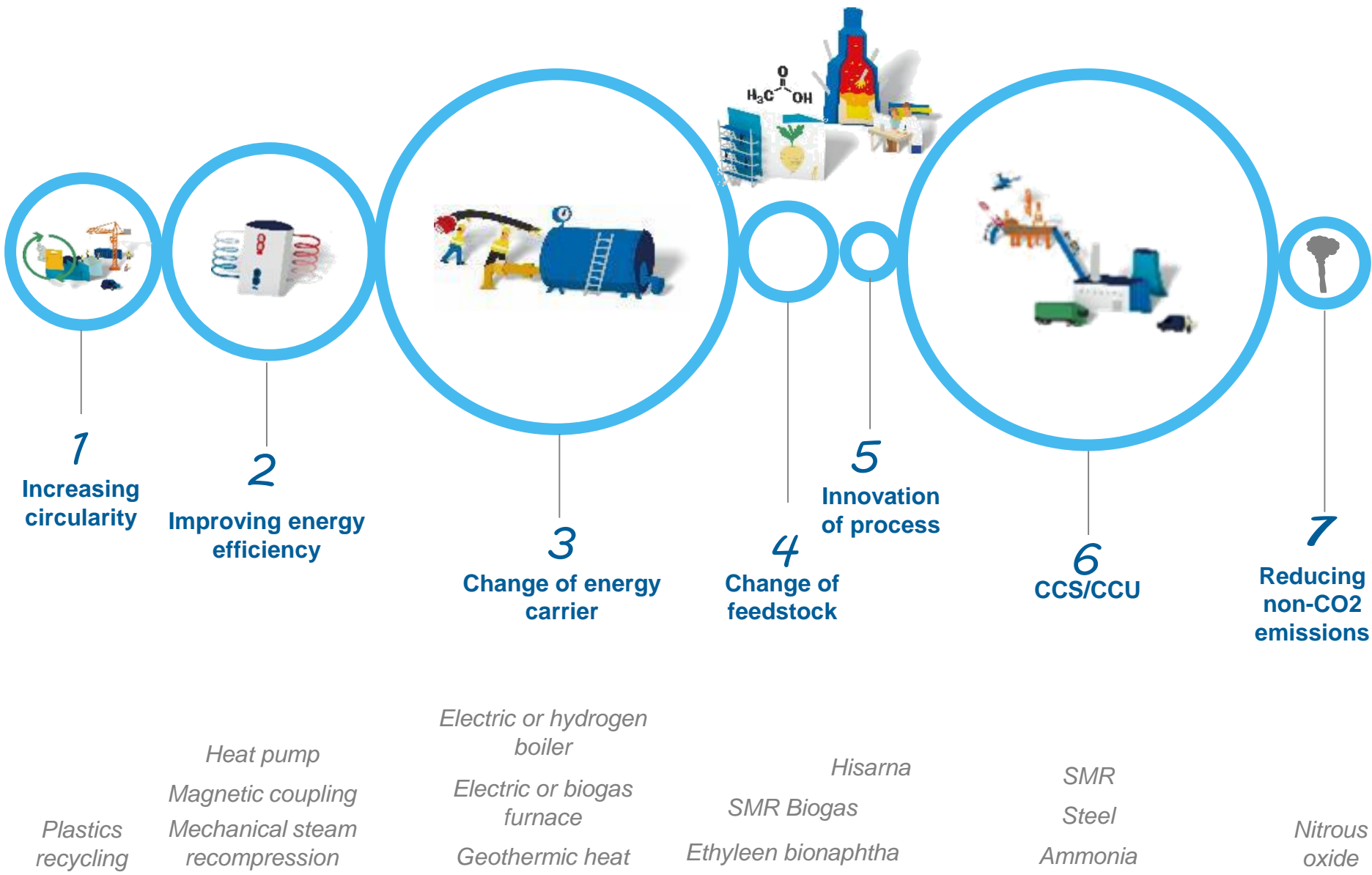
This is a heat transition

Emissions per sector

Estimated Mton CO2/yr, 2014



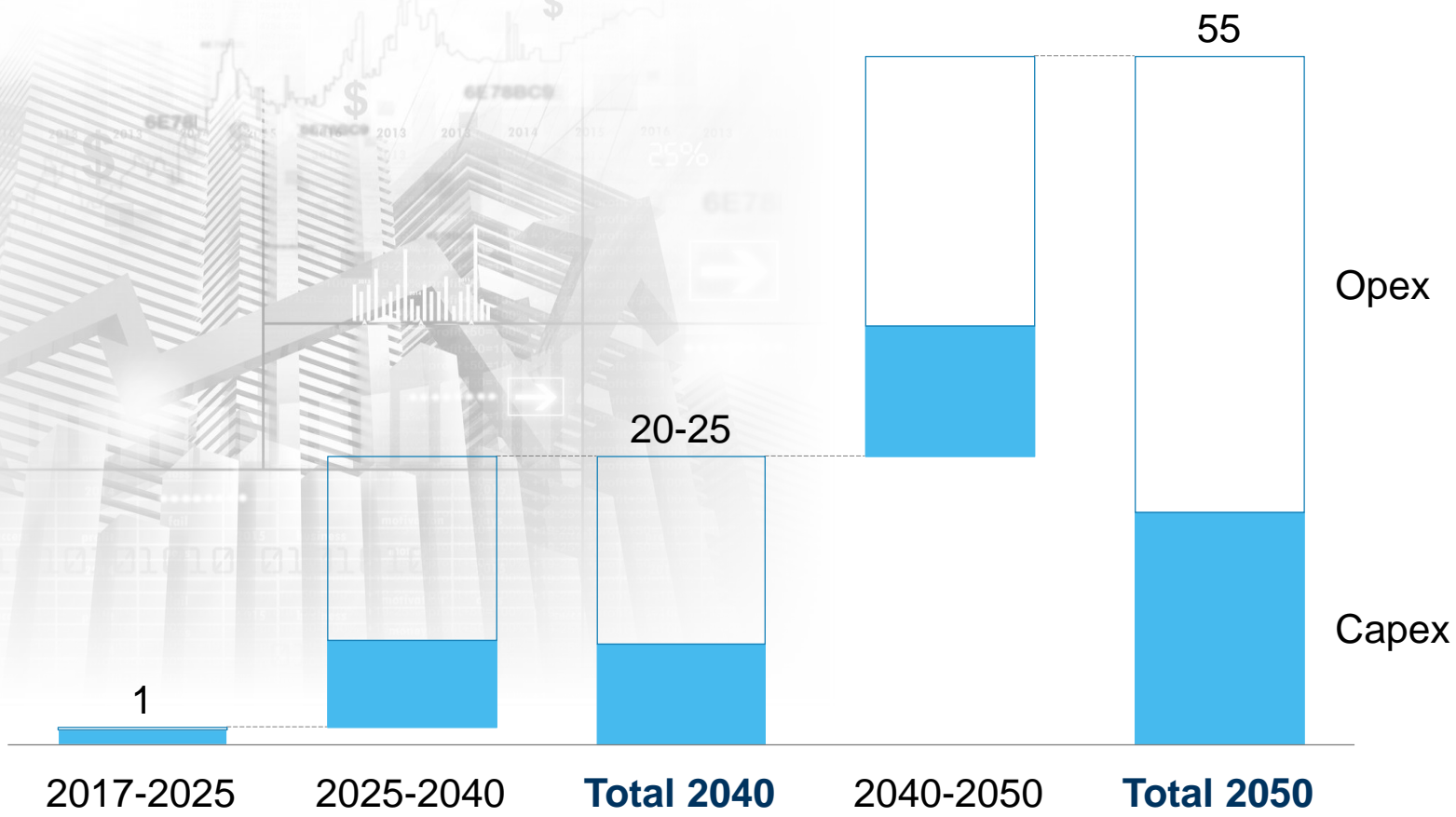
Seven ways to move industrial decarbonization forward



Under current commodity prices, it would cost EUR 55 billion to reduce industrial emissions with 80% compared to 1990

Capex and cumulative opex

EUR billion; 2020-2050



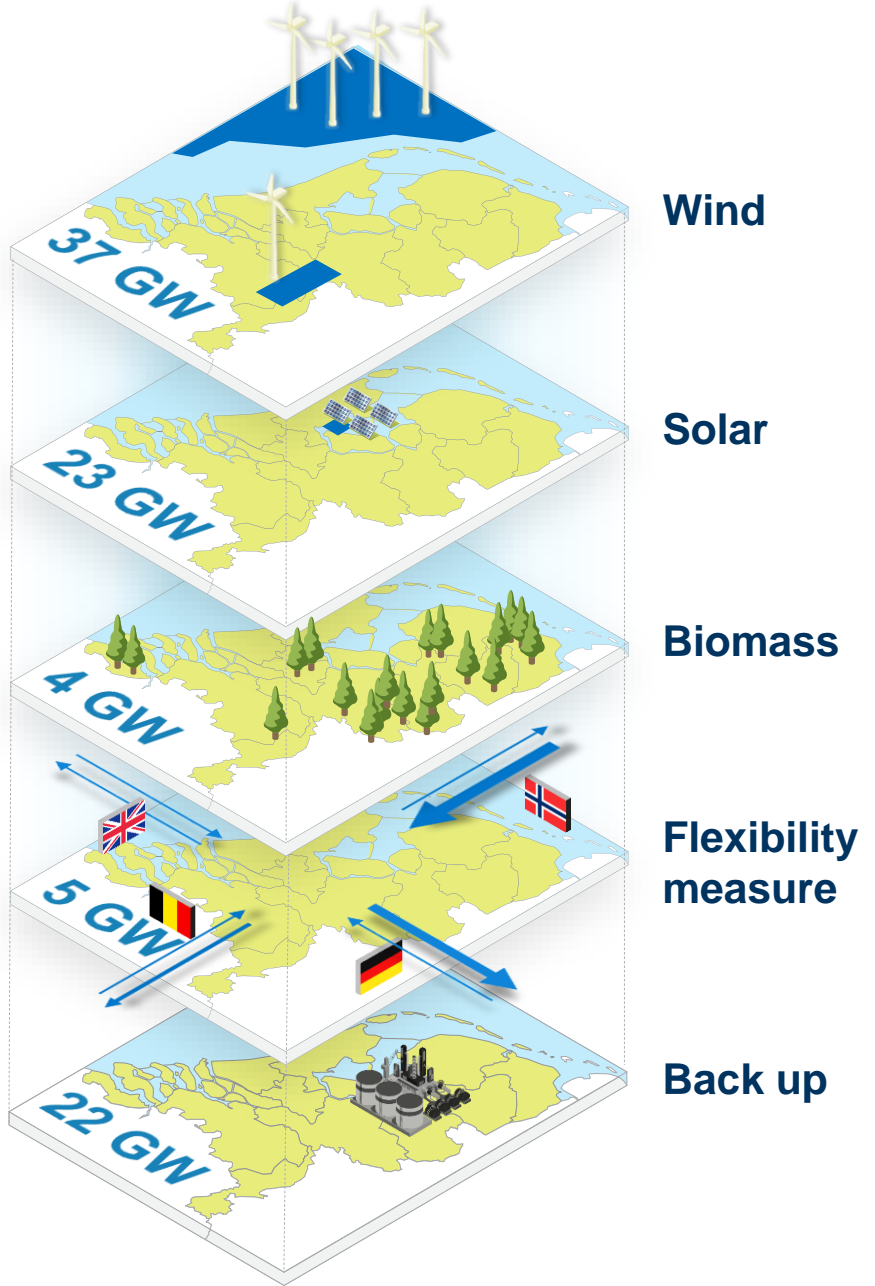
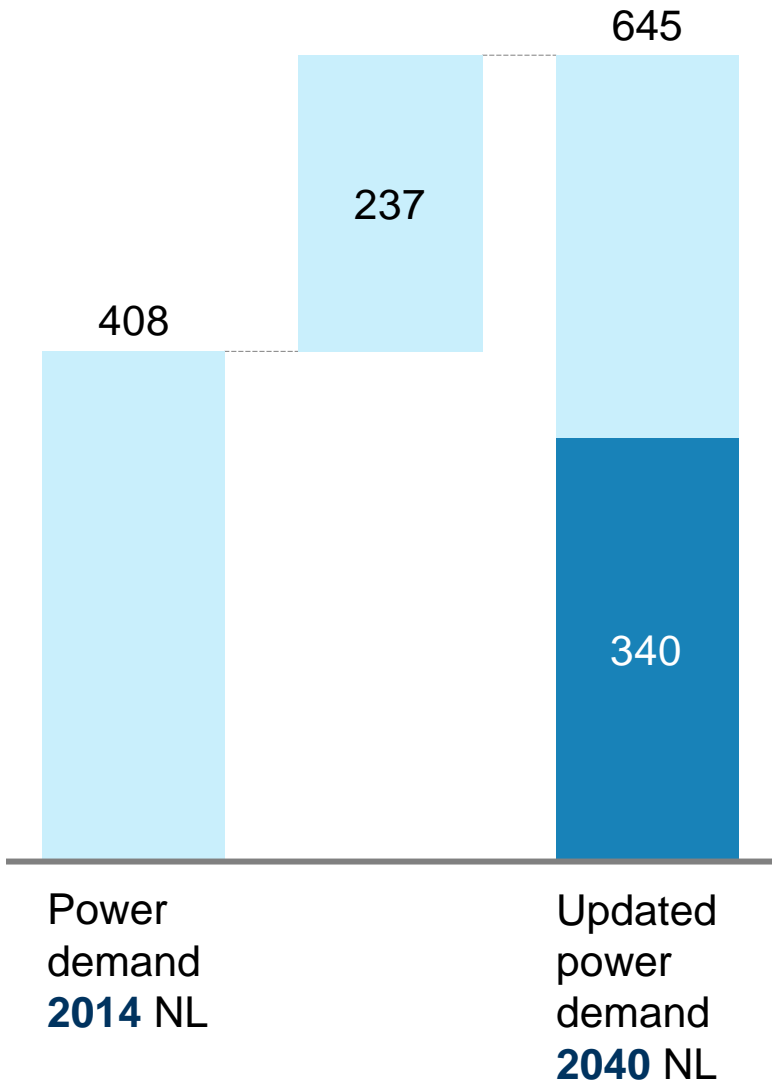
Implied cost
EUR/tn CO₂

~80 - 100

~120 - 170

More power demand – and a magnitude more renewables

Estimated change in power demand
PJ 2040

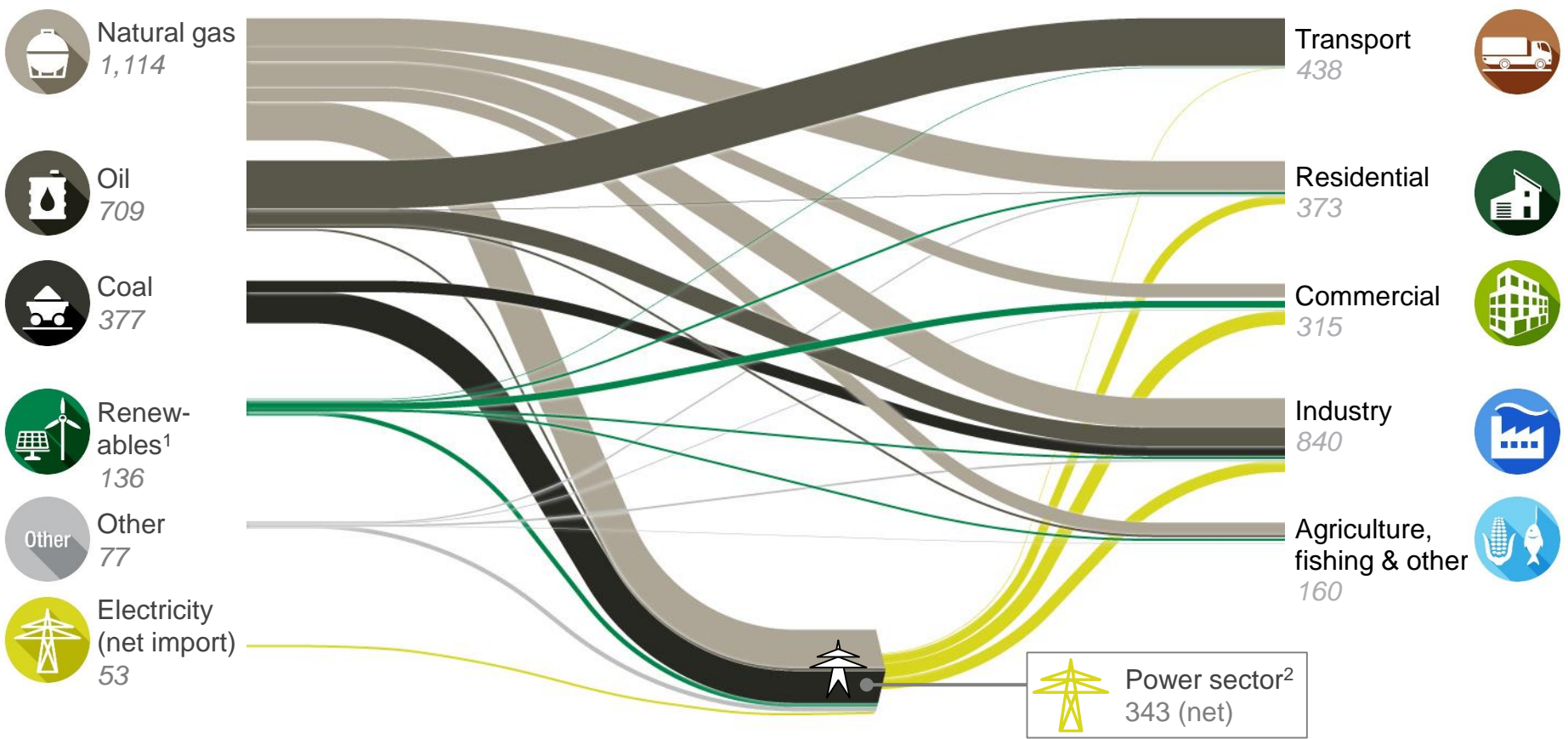


From a fossil based system.....

Netherlands energy demand in 2014; flow between energy sources and sectors, PJ

Energy sources

Sectors



1 Includes: hydro, geothermal, solar, wind, and biomass

2 Only includes net use for central power production (320 PJ) and transmission and distribution losses (23 PJ); energy sector own use (e.g., oil consumption in refining is included in industry)

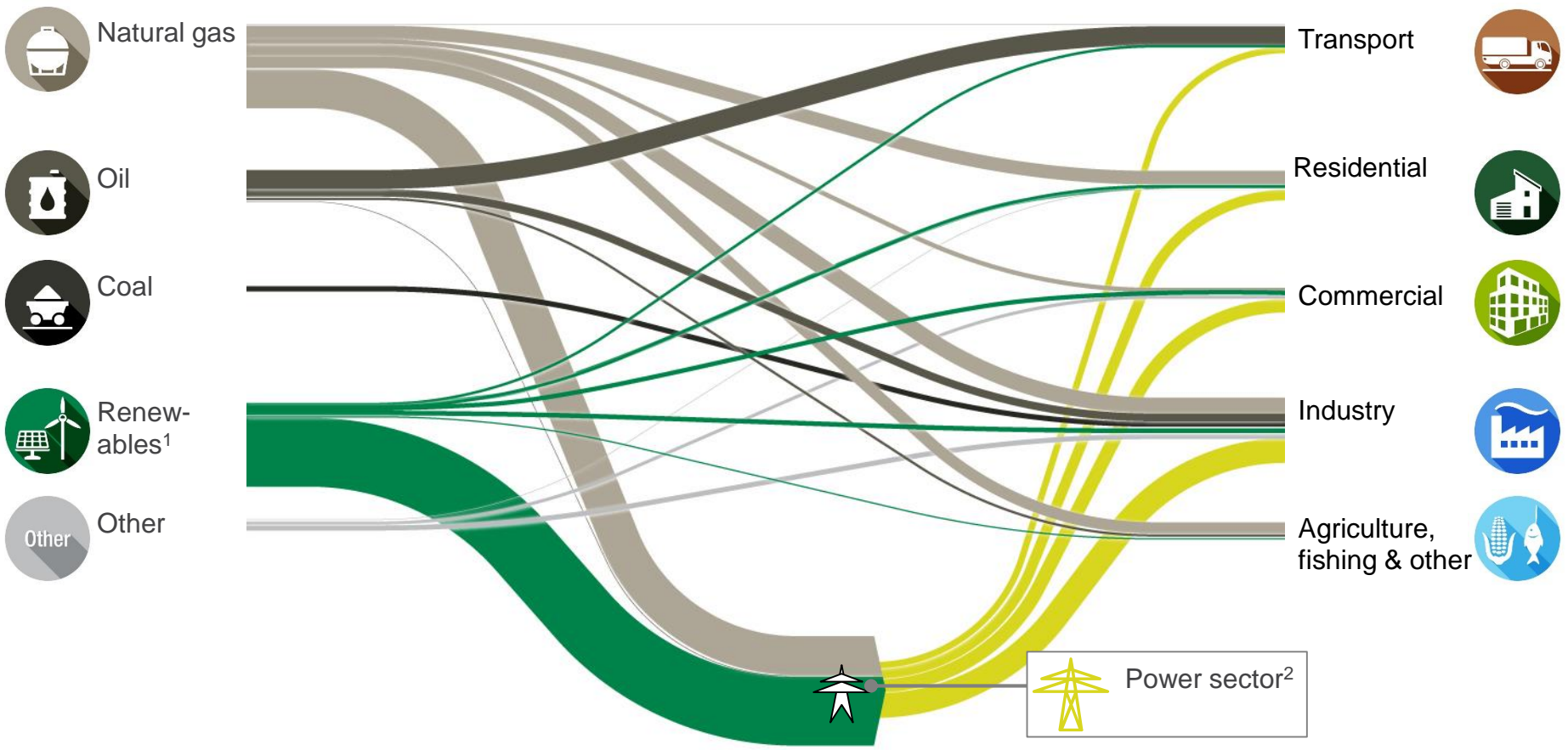
SOURCE: Centraal Bureau voor de Statistiek (2014), "Energiebalans" and "Energieverbruik" databases

....to a system based on Renewables

Netherlands energy demand in 2040; flow between energy sources and sectors, PJ

Energy sources

Sectors



1 Includes: hydro, geothermal, solar, wind, biomass, and hydrogen

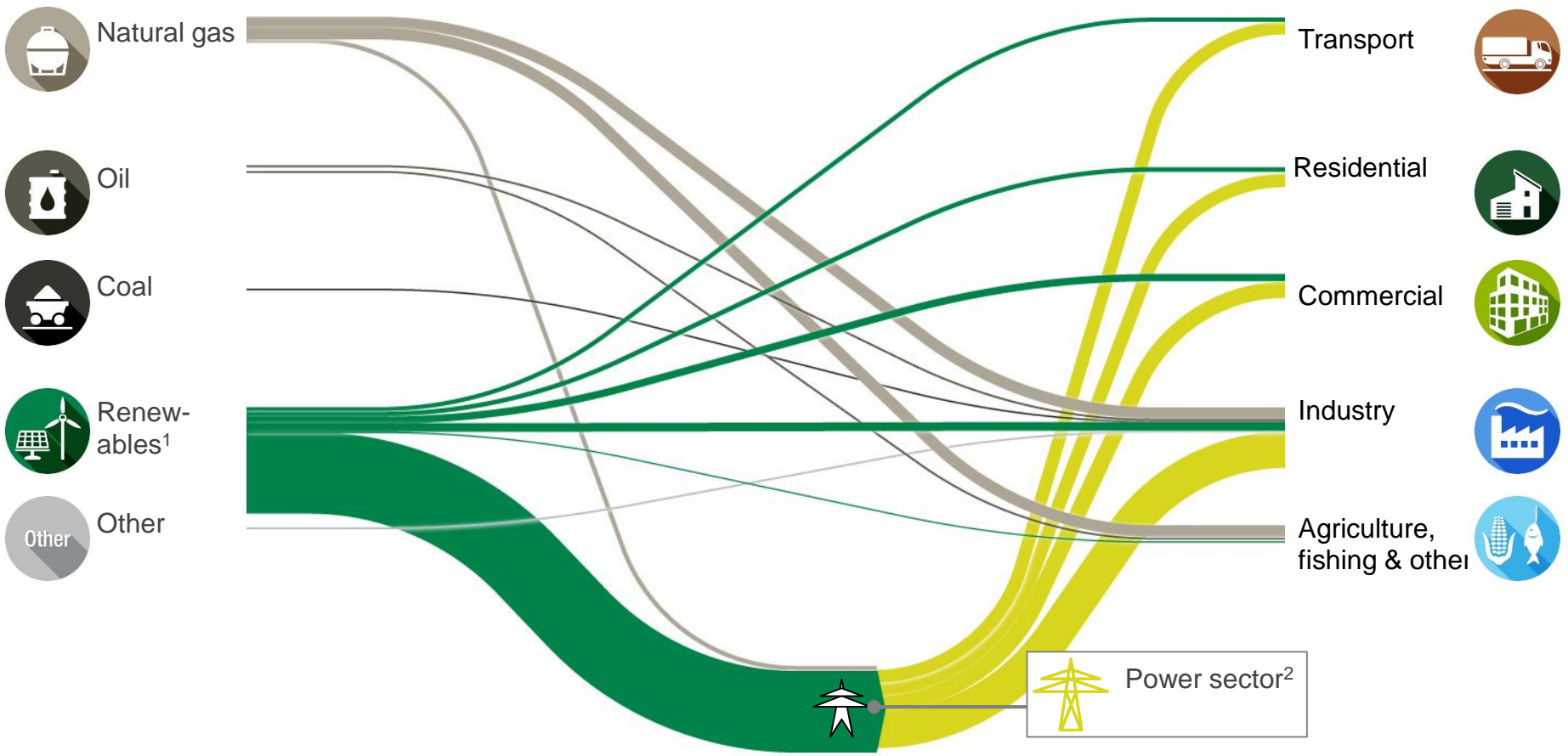
2 Includes net biomass use (94 PJ), gas use (111 PJ) and own use and transmission and distribution losses

When striving for 80% reduction by 2040 the role of renewables increases further

Netherlands energy demand in 2040; flow between energy sources and sectors, PJ

Energy sources

Sectors



1 Includes: hydro, geothermal, solar, wind, biomass, and hydrogen

2 Includes net biomass use (94 PJ), gas use (37 PJ), and own use and transmission and distribution losses

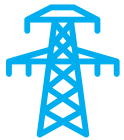
Using our current strengths, we can become frontrunner in global energy transition and attract new economic activity



Heavy industry transformation and CCS/U



Offshore wind



Integrating renewables into the system



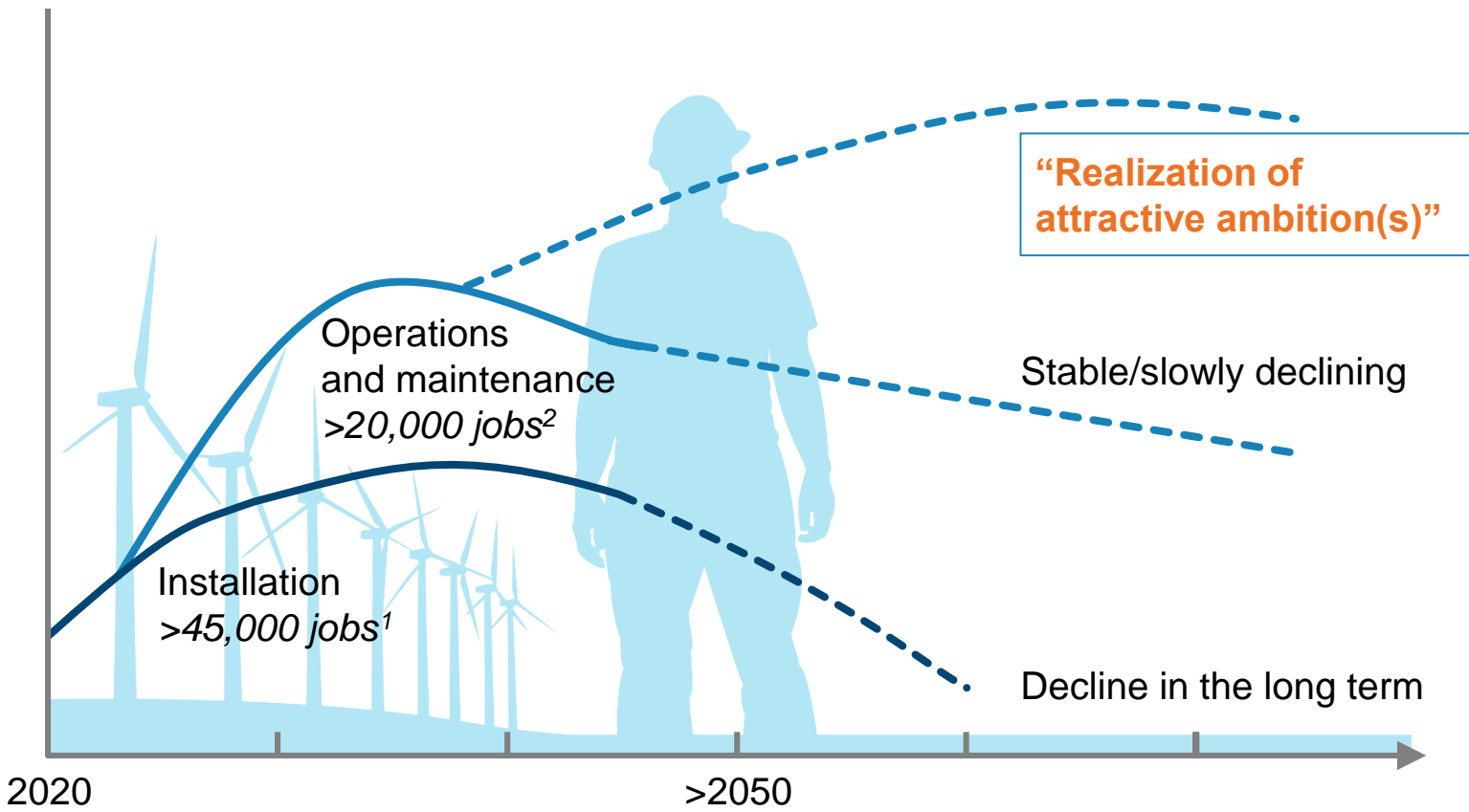
Sustainable building heating



'New' transport

- Alternative feedstock configurations with innovative processes and technologies.
- CCS/U with depleted gas fields and dense, connected infrastructure
- Programmatic wind build out in the North Sea capturing benefits of scale – with new fit-for-purpose supply chains
- Integrating renewables (conversion – storage – transport), building on strong chemicals industry, extensive transport sector, dense networks and connection with industry
- Small- and large-scale technology conversion to portfolio of new solutions
- Systems for integrating multiple transportation modes, zero emission busses, autonomous driving and other zero-carbon forms of transport

Potential job creation: the “real” long-term impact should come from realized ambitions



1 Includes installation of wind offshore, solar PV, improving insulation and replacement of heating equipment; alternative reference: Energieakkoord investment of ~ 3.3 EUR billion/year for a short period is expected to lead to 15,000 extra jobs. Applying similar logic to 10 EUR billion/year investment also gives 45,000 extra jobs/yr. Highest impact expected from installation of offshore wind, followed by building insulation

2 Delta between employment in renewable power generation and fossil generation, corrected for installation job increase. Changes in other sectors not included in this number

