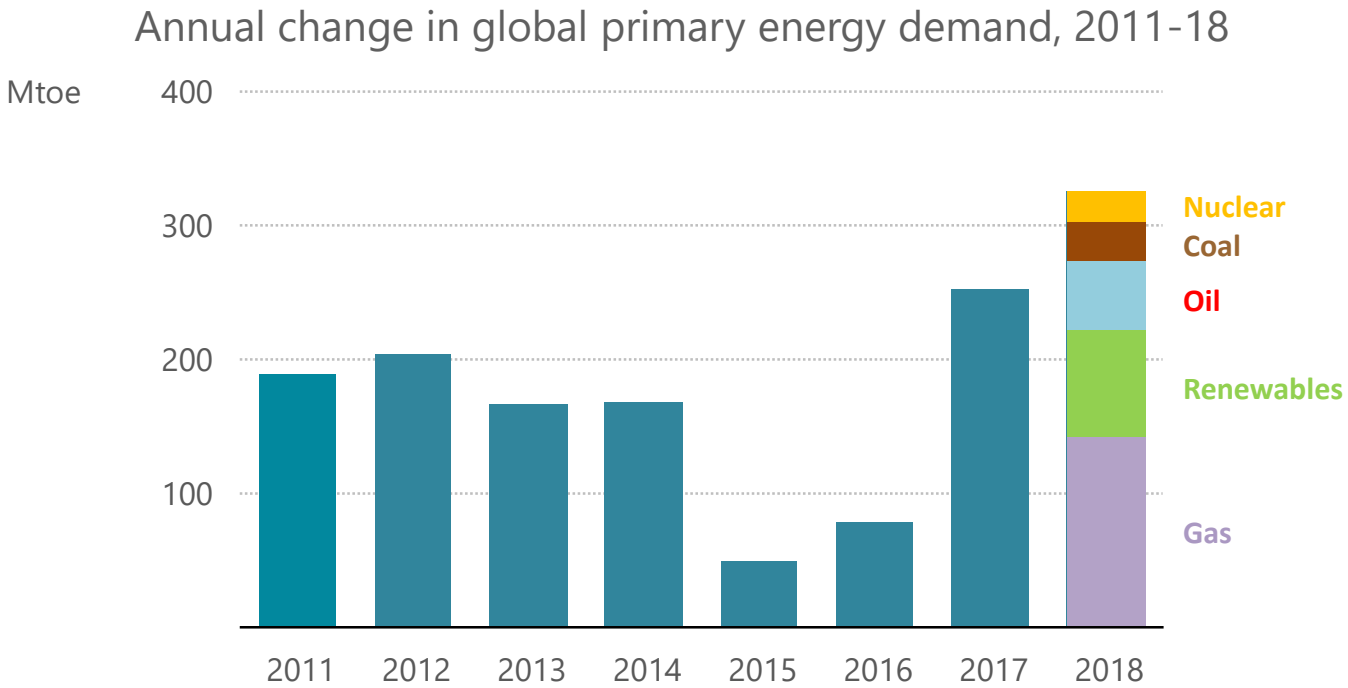
World Energy Outlook 2018

Amsterdam, 15 May 2019

Laszlo Varro
Chief Economist

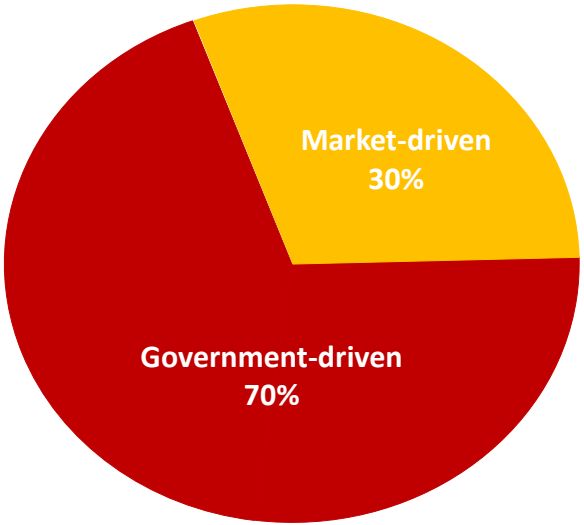
2018 – a remarkable year for energy



Global energy demand last year grew by 2.3%, the fastest pace this decade, an exceptional performance driven by a robust global economy, weather conditions and moderate energy prices.

Our energy destiny rests with governments

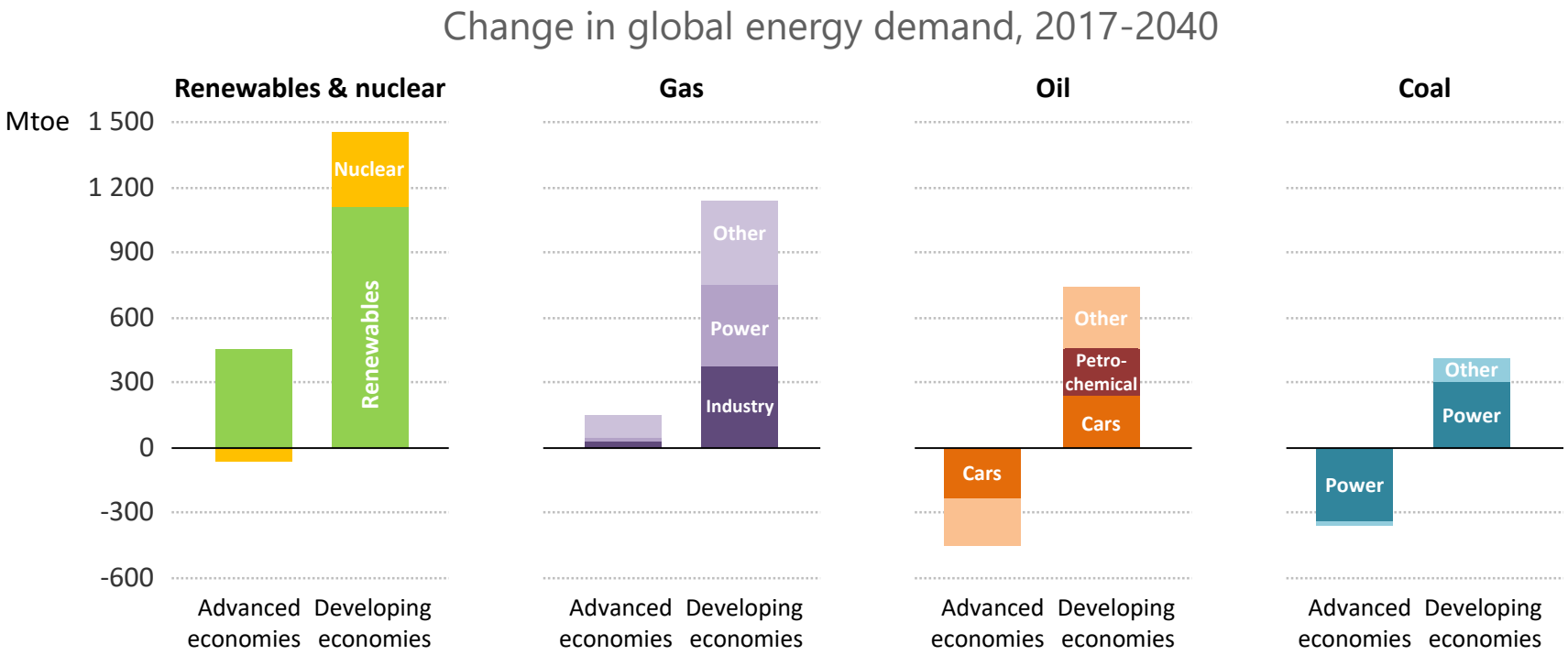
Total investment in energy supply to 2040:
$42.3 trillion



More than 70% of the $2 trillion required each year in energy supply investment either comes from state-directed entities or receives a full or partial revenue guarantee

Source: World Energy Outlook 2018

Fuelling the demand for energy



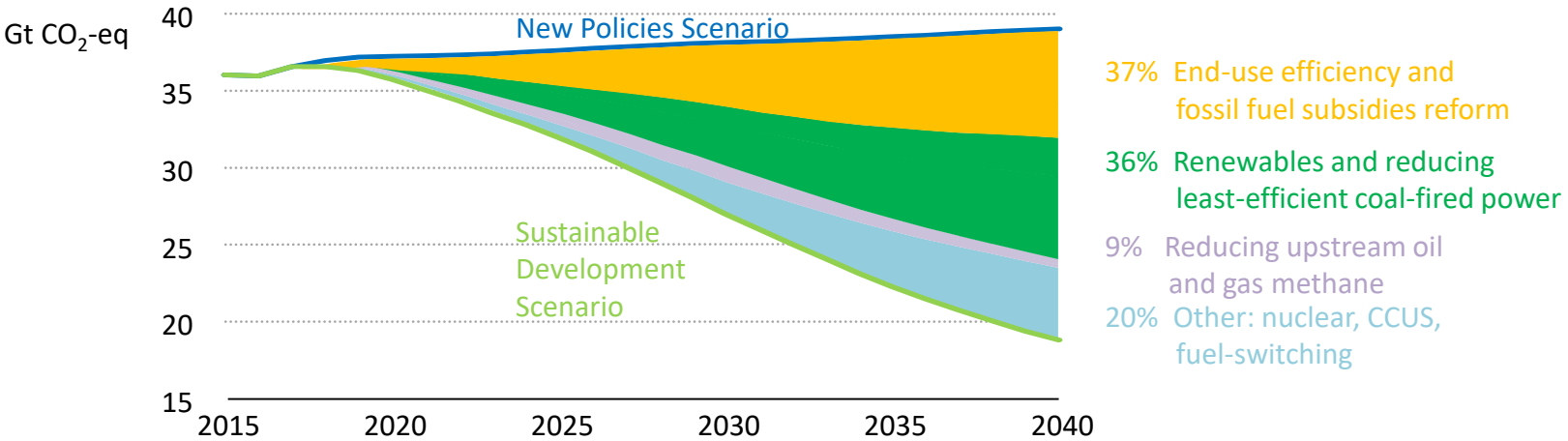
The increase in demand would be twice as large without continued improvements in energy efficiency, a powerful tool to address energy security & sustainability concerns

Source: World Energy Outlook 2018

From New Policies to Sustainable Development

World Energy Outlook 2018

Contributions to emissions reduction in the Sustainable Development Scenario

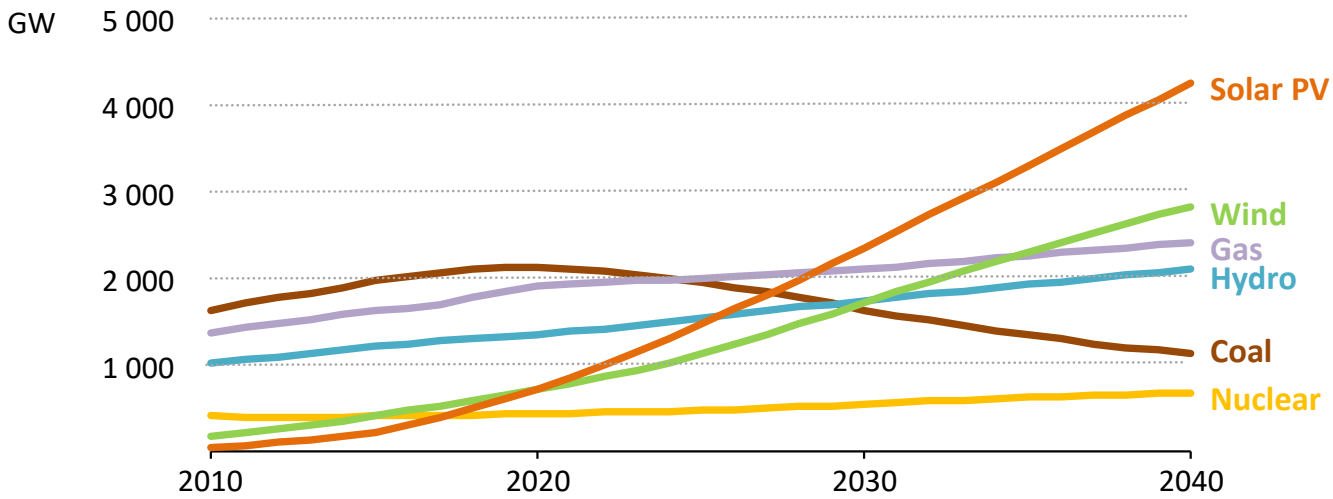


Improved energy efficiency and accelerated renewable deployment are the most important steps in the transition.

Renewable deployment: the taste of things to come

World Energy Outlook 2018

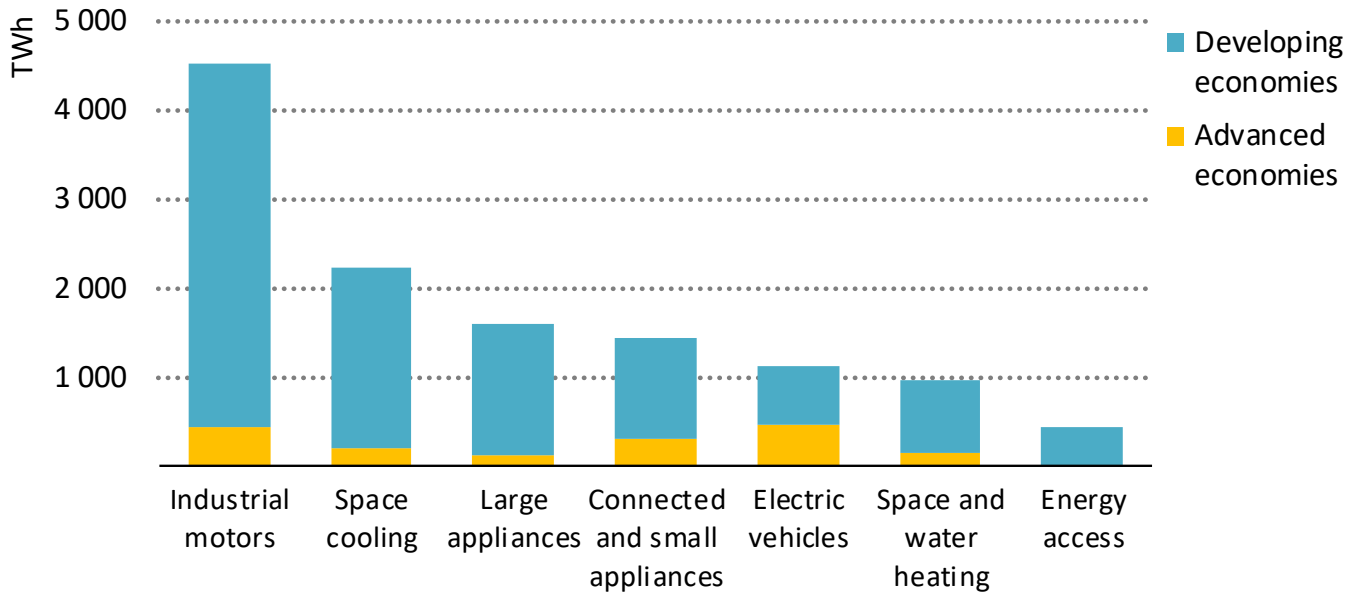
Total power generation capacity in the Sustainable Development Scenario



Annual low carbon electricity deployment would need to scale up by a factor of 2.5 in the Sustainable Development Scenario

Drivers of electricity demand growth

Electricity demand growth by end-use and region in the New Policies Scenario, 2017-2040

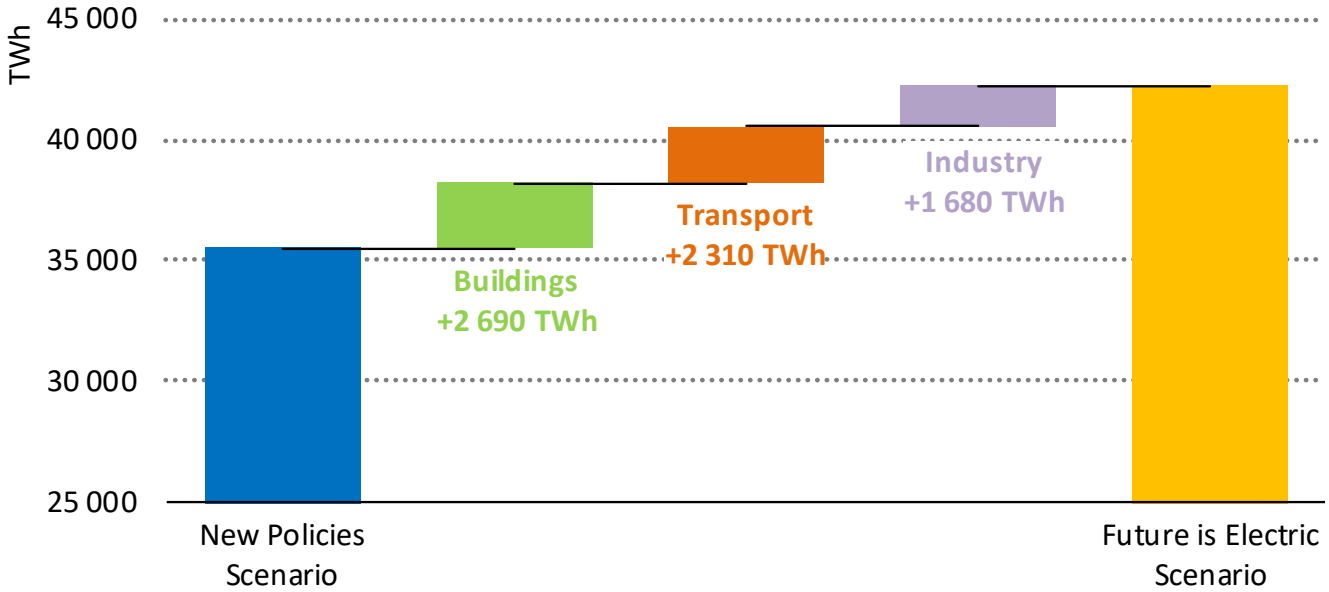


Industrial motors account for a third of the world's appetite for increased electricity while providing electricity access to an additional 680 million people accounts for only 3%

Source: World Energy Outlook 2018

What if the "future is electric"?

Change in electricity demand by sector in the Future is Electric Scenario relative to the New Policies Scenario, 2040



The largest total demand increase in the Future is Electric Scenario is in buildings, due to the combined impact of electrification of heat, digitalization and electricity access

Source: World Energy Outlook 2018

Bringing electricity to the transport sector

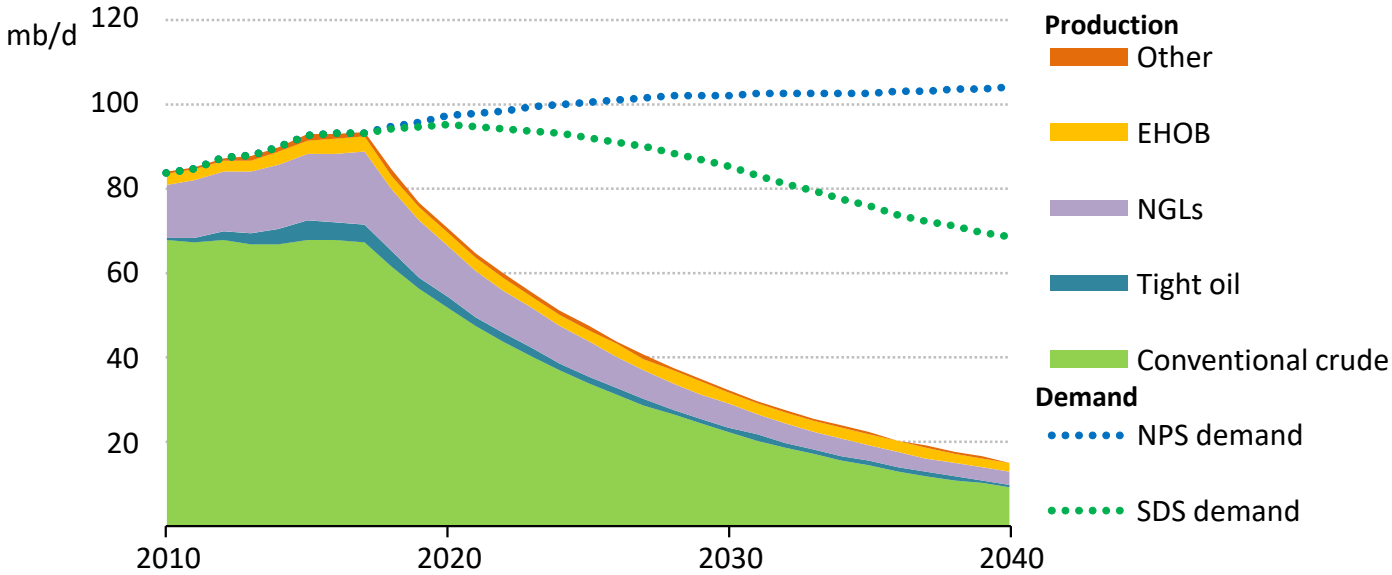
Electrification of cars

Hydrogen and electro fuels for heavy vehicles

Modal shift to electrified railways

Decline rates and investment needs

Oil production with no new investment from 2018 and demand in the New Policies and Sustainable Development Scenarios



With no new investment, global oil production would halve by 2025: an average loss of nearly 6 mb/d every year

Source: World Energy Outlook 2018

Gas: the three big questions

The resilience of heating and industrial demand

Coal to gas switch in Asia and its impact through LNG

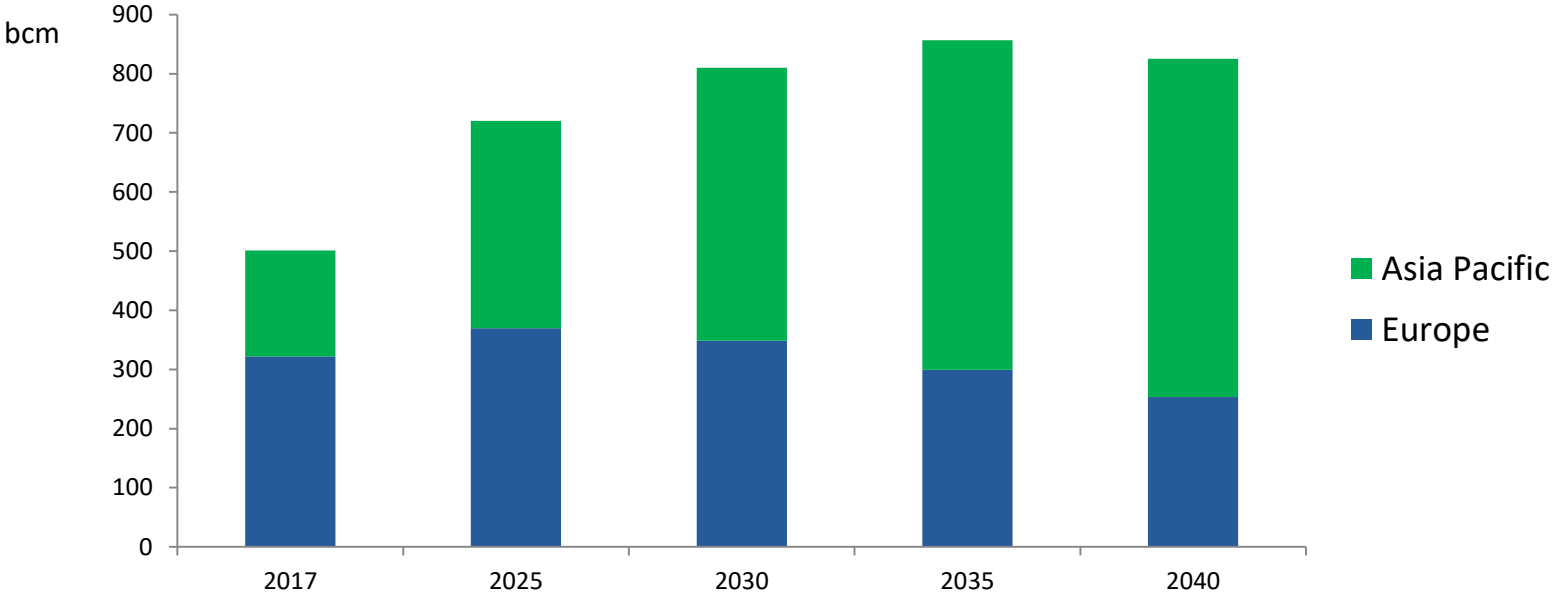
The role of gas in a high renewables power system

Gas remains a major energy source on a low carbon pathway but after 2030 itself becomes high carbon

LNG trade expands during the energy transition but competition with existing pipelines is fierce

World Energy Outlook 2018

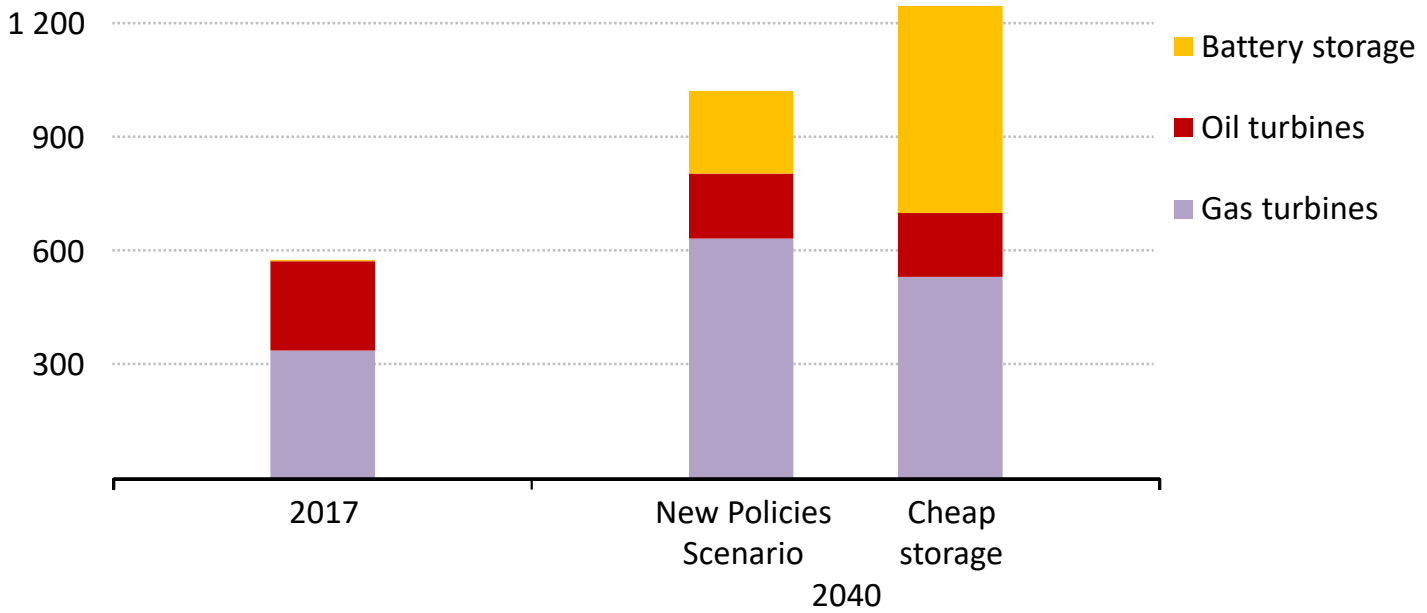
Long distance LNG imports to Europe and Asia in the Sustainable Development Scenario



New LNG capacity is needed in SDS
but cost efficiency and flexible business models are essential

What if battery storage systems become very cheap

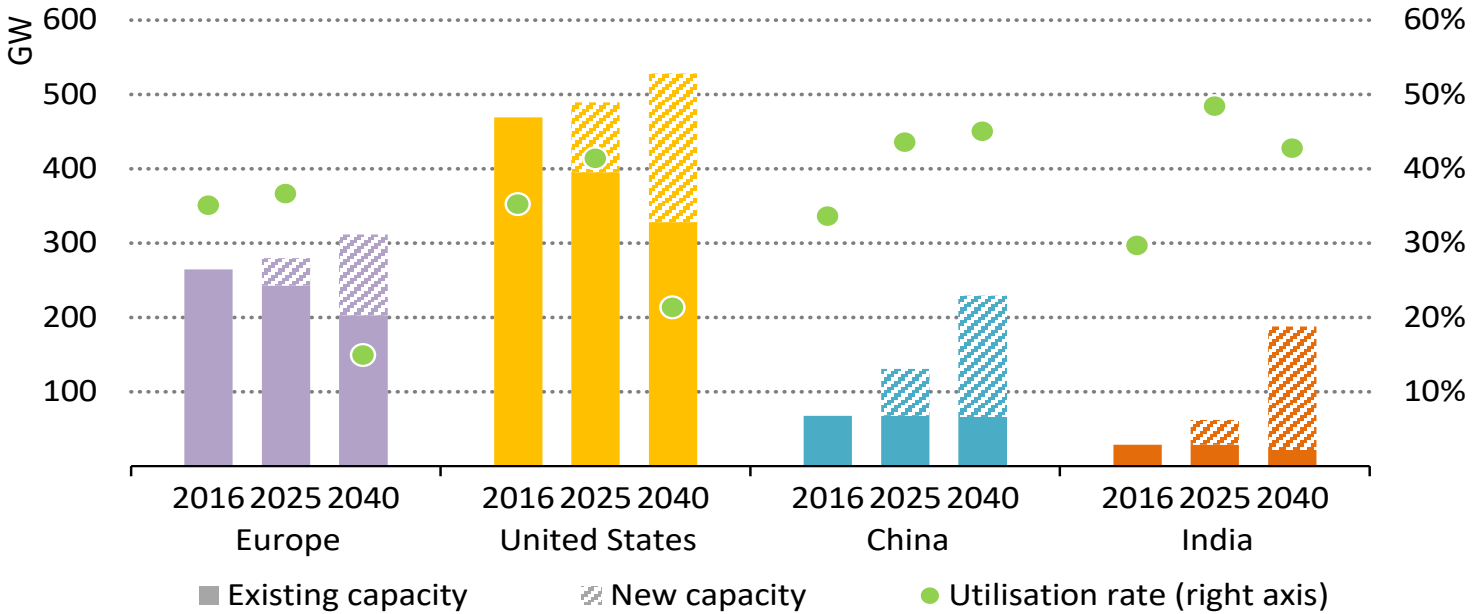
Peaking capacity by technology in 2017 and 2040, New Policies Scenario and cheap storage Case



Second-use batteries together with further BOS cost reductions would greatly increase battery storage competitiveness, which becomes the biggest peaker technology by 2040

Gas capacity remains essential for electricity security

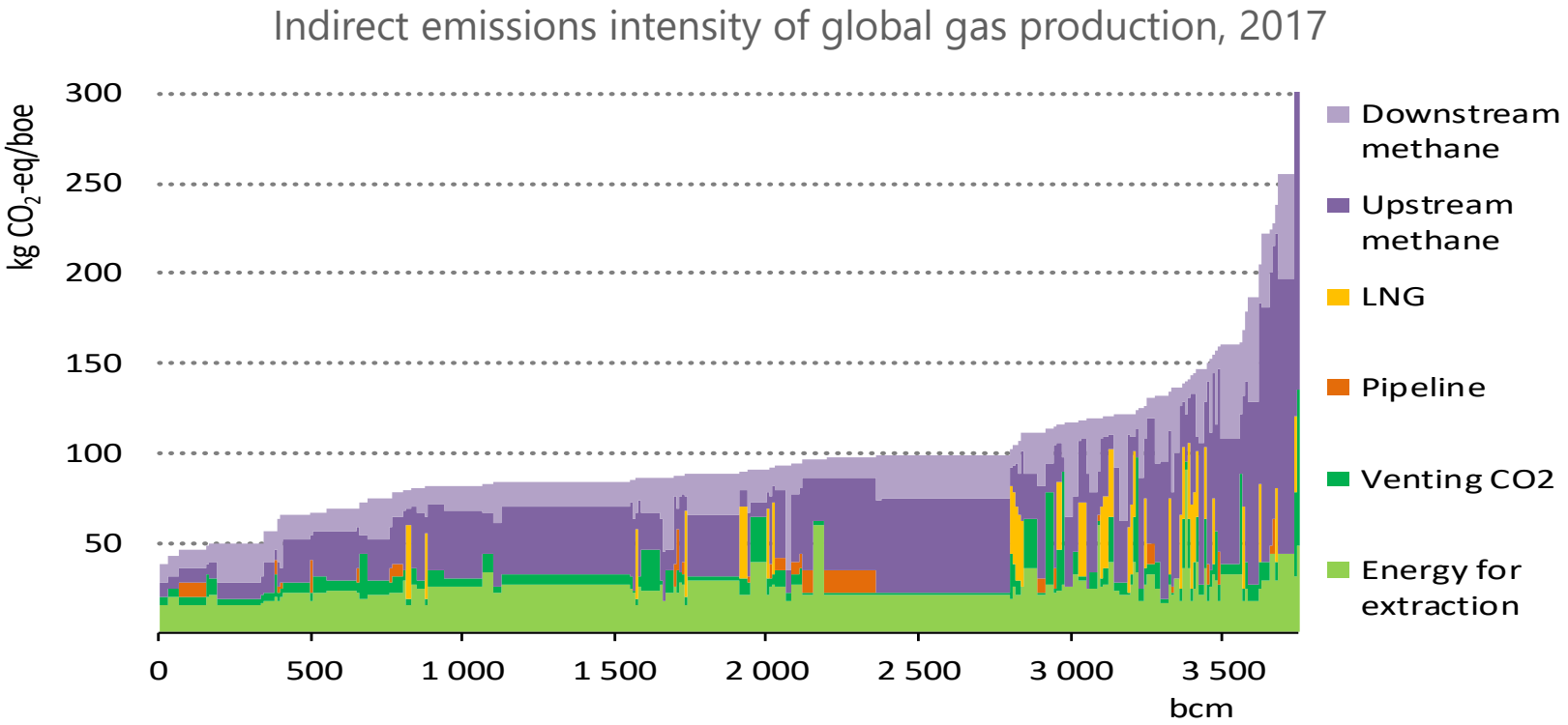
Natural gas-fired capacity and average utilisation rates in selected regions in the Sustainable Development Scenario



There is a need for new gas capacity but power sector burn declines in both US and Europe as gas is used with a low load factor for flexibility

Methane leakage: a key sustainability task for the industry

World Energy Outlook 2018



Leak detection and vapour recovery systems offer low and even negative cost emission reduction opportunity, monitoring and measurement is essential

Gas without CO_2

Don’t use fossil carbon: biogas, electro H2 or PtG WITH bio CCUS or air capture

Take out the carbon upstream: hydrogen production from gas with CCS

Take out the carbon downstream: retrofit gas plants with CCS

Some form of CCUS is indispensable for the sustainable future of natural gas

World Energy Outlook 2018

iea.org/weo