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2018 Outlook for Energy: A View to 2040

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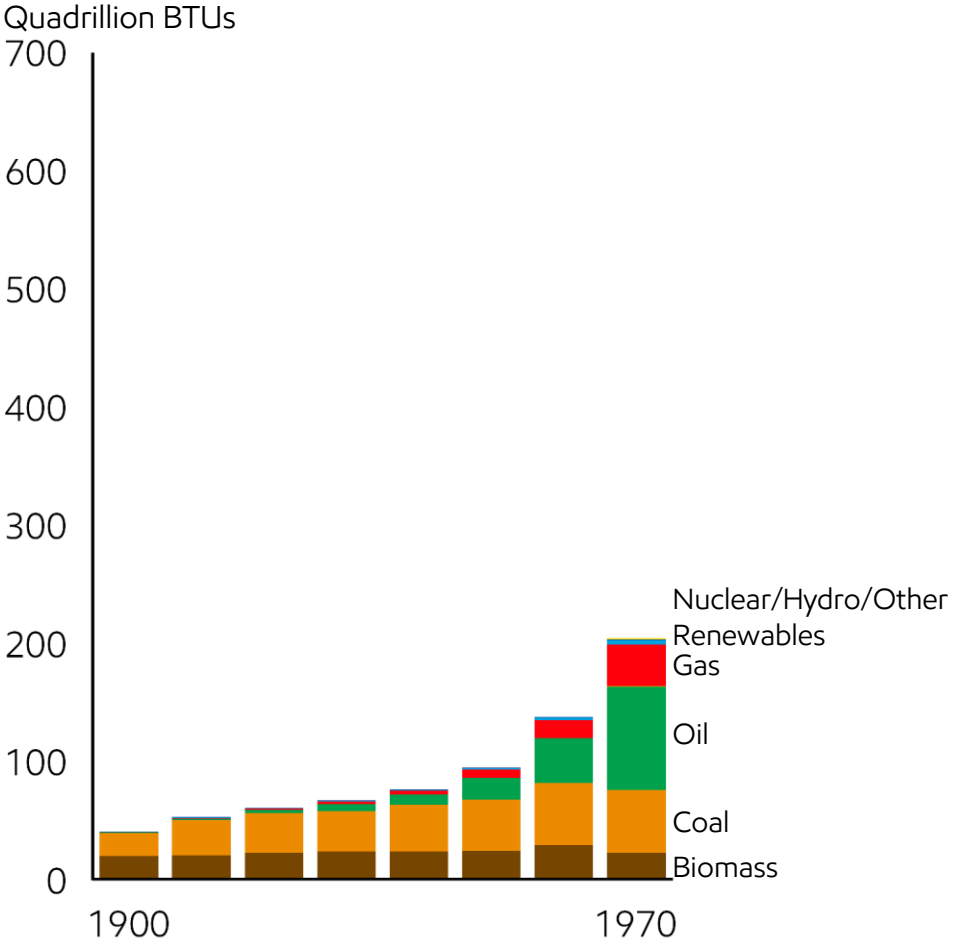
The Outlook for Energy includes Exxon Mobil Corporation's internal estimates and forecasts of energy demand, supply, and trends through 2040 based upon internal data and analyses as well as publicly available information from external sources including the International Energy Agency. Work on the report was conducted throughout 2017. This presentation includes forward looking statements. Actual future conditions and results (including energy demand, energy supply, the relative mix of energy across sources, economic sectors and geographic regions, imports and exports of energy) could differ materially due to changes in economic conditions, technology, the development of new supply sources, political events, demographic changes, and other factors discussed herein and under the heading "Factors Affecting Future Results" in the Investors section of our website at www.exxonmobil.com.

Energy evolution reflects technology, scale & complexity

Global primary energy demand



Source: Smil, Energy Transitions (1900-1960)

50 years ago…

- Energy demand accelerating
- Oil surpasses coal to gain #1 share
- Seatbelts mandated in all new cars
- Ford Mustang - top seller in the U.S.
- Boeing revealed the revolutionary 747
- HP introduced the 1st desktop computer
- Polaroid camera – digital imaging pioneer
- Offshore oil production – max water depth
  - 1968: ~400 feet (now ~12,000 feet)
- U.S. refineries
  - 1968: 282 (now ~135, +65% capacity)
- U.S. GDP per capita <50% of today's level

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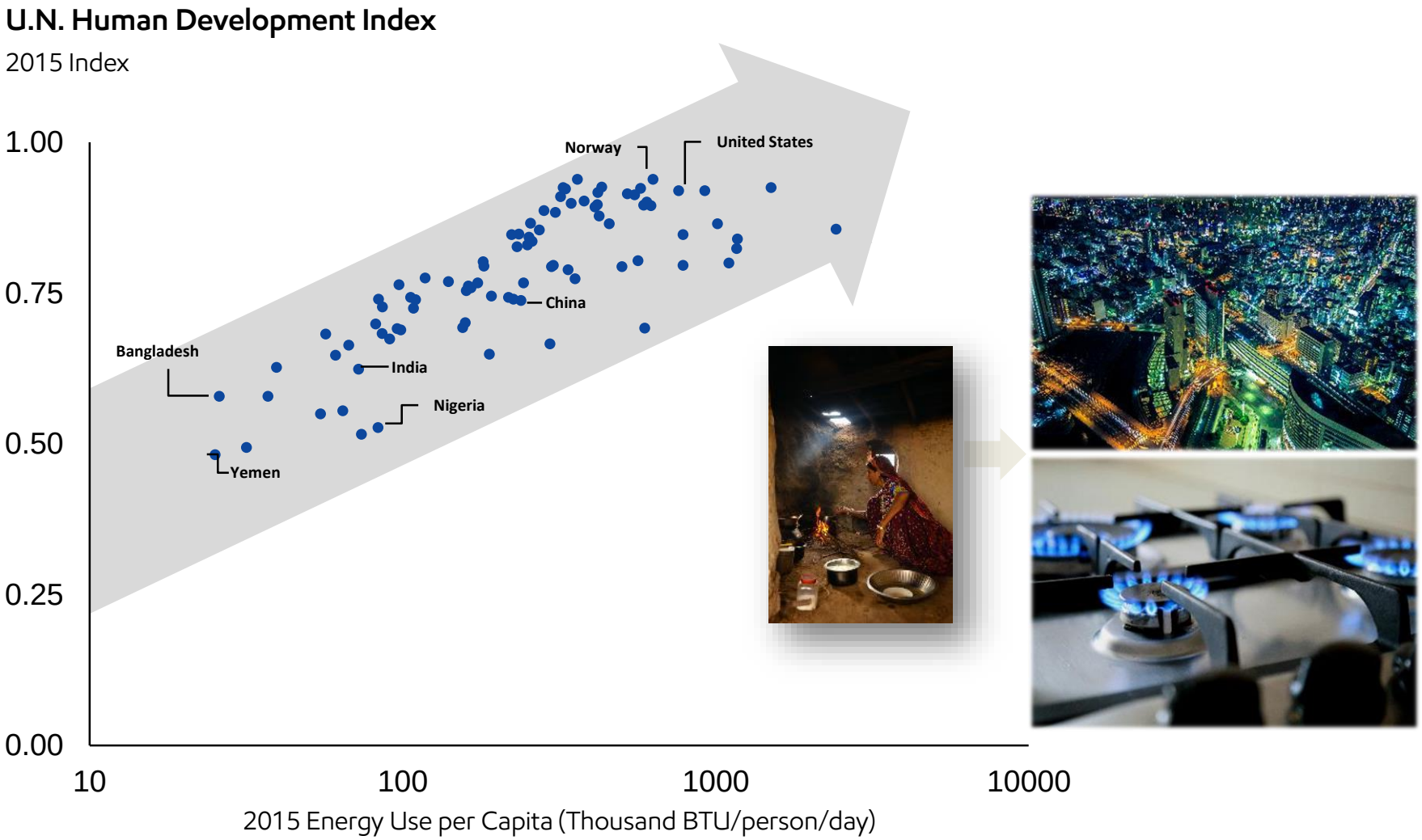
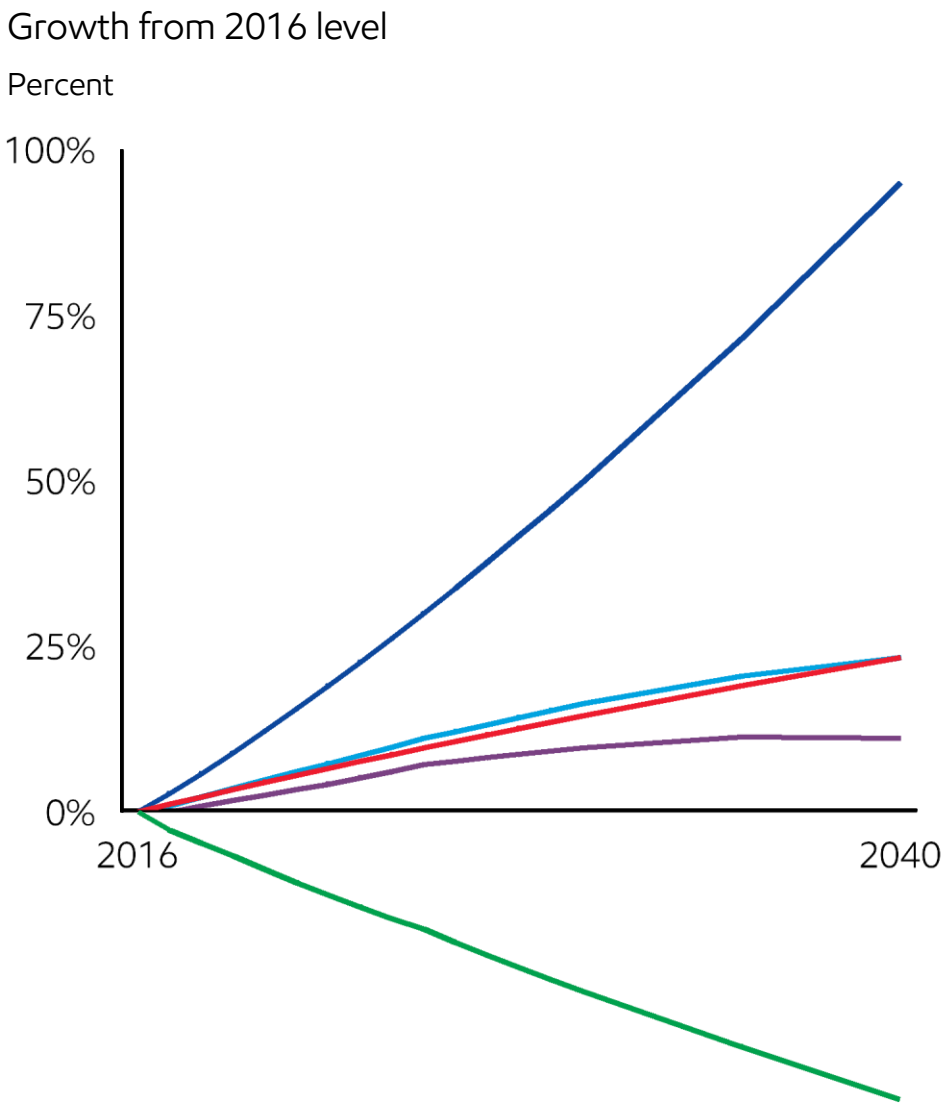
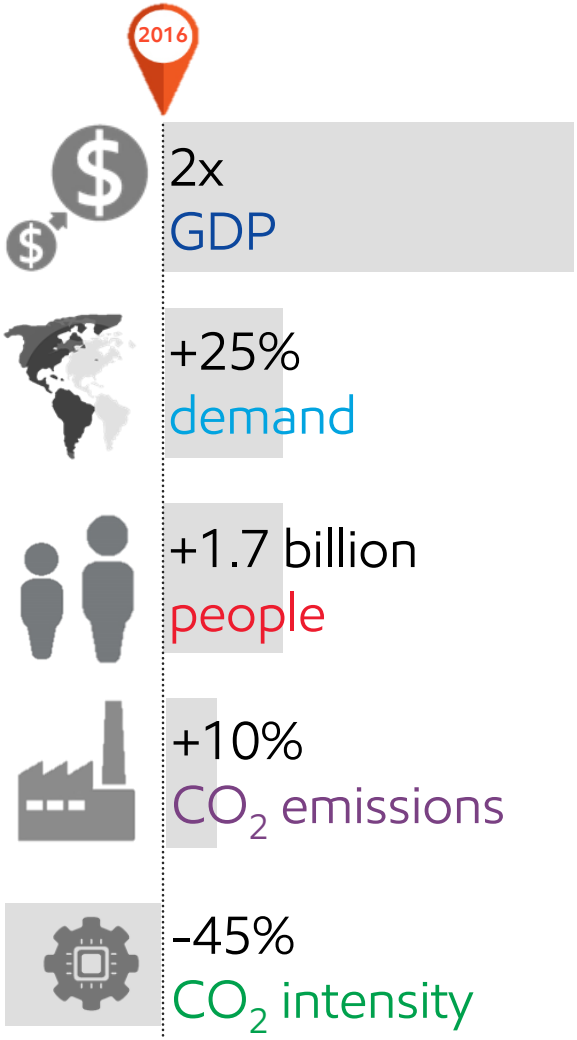
Energy Fuels Human Development



Source: United Nations, ExxonMobil estimates

Global trends continue to evolve





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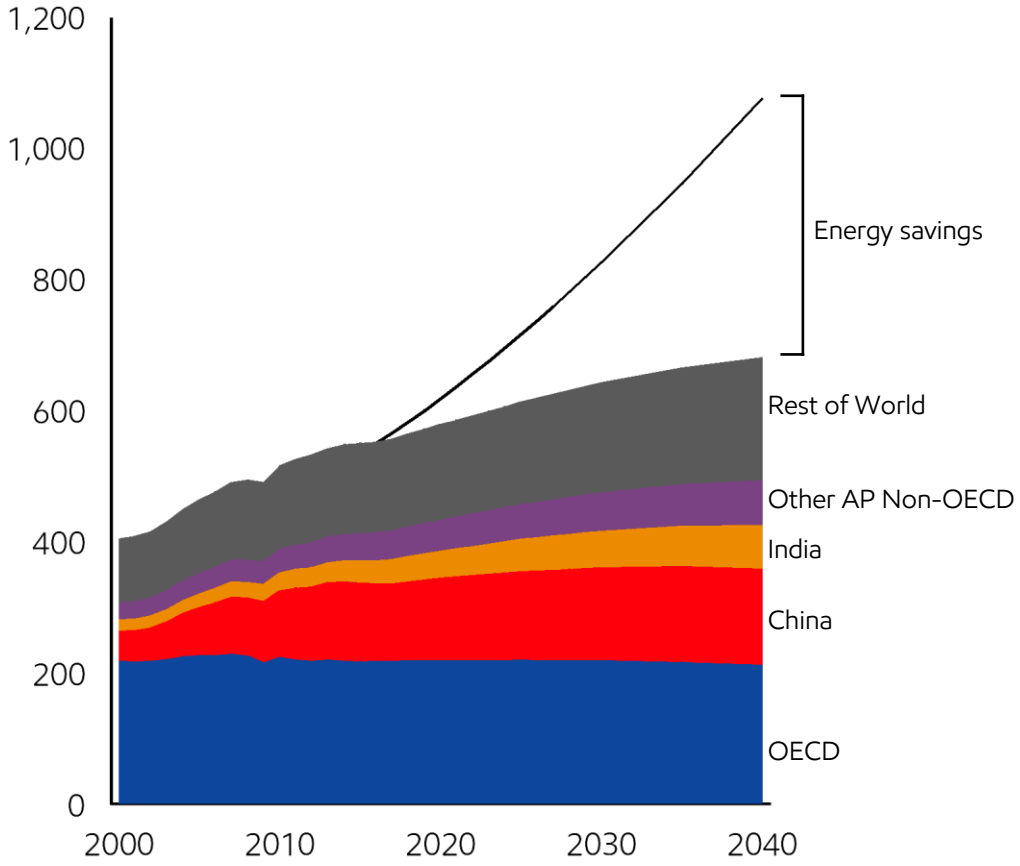
Global efficiency limits demand growth

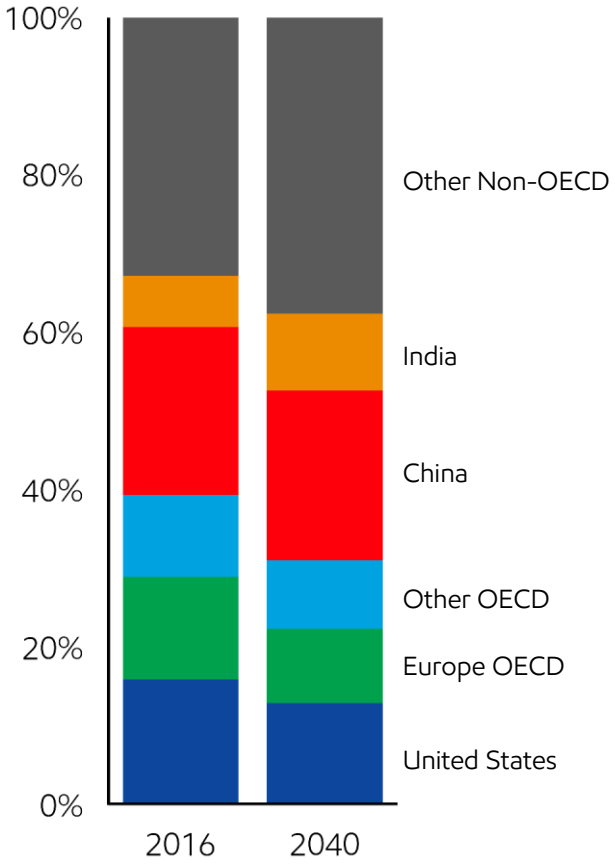
Energy demand

Quadrillion BTUs



Share of primary energy demand by region

Share of Quadrillion BTUs



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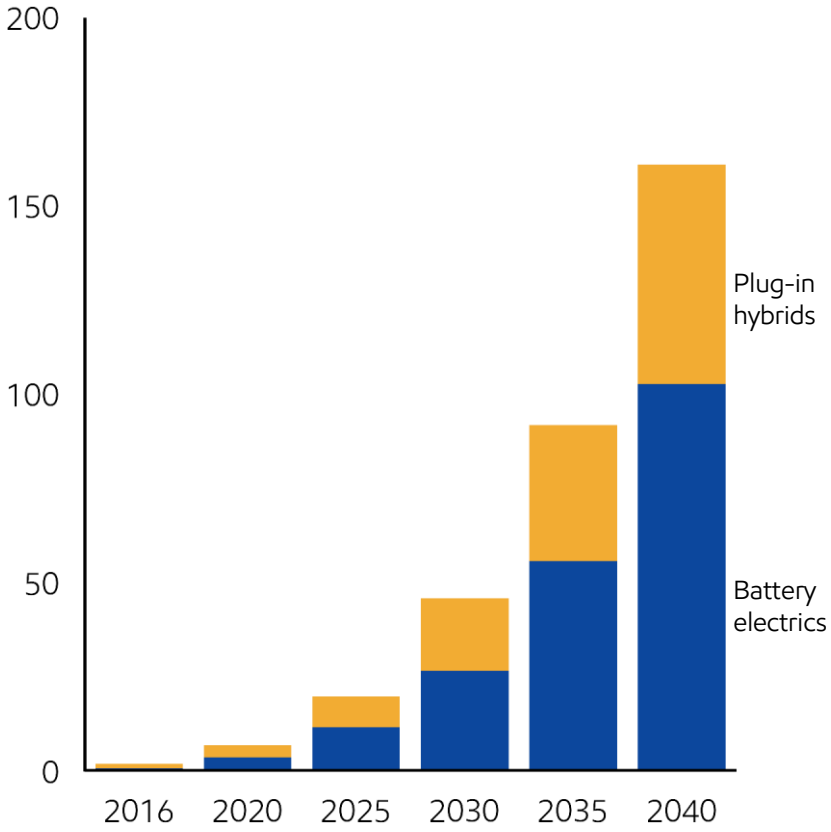
Policy and consumer choices impact demand

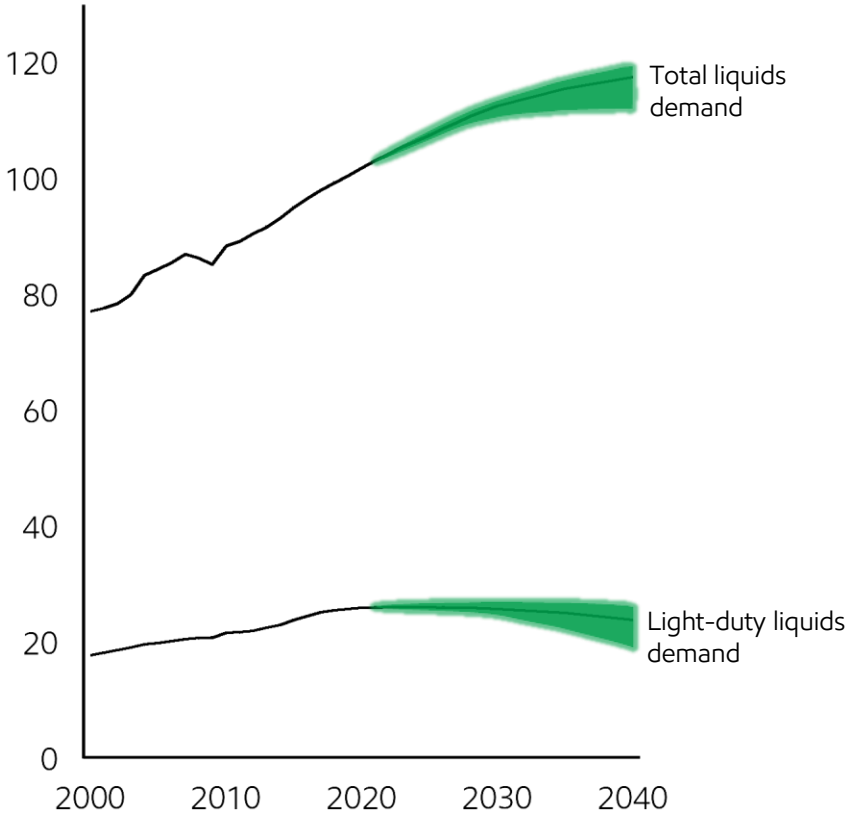
Electric vehicles grow rapidly

Million cars



Liquids demand remains resilient

MBDOE



Shaded ranges are indicative of potential shifts in demand relative to base *Outlook*

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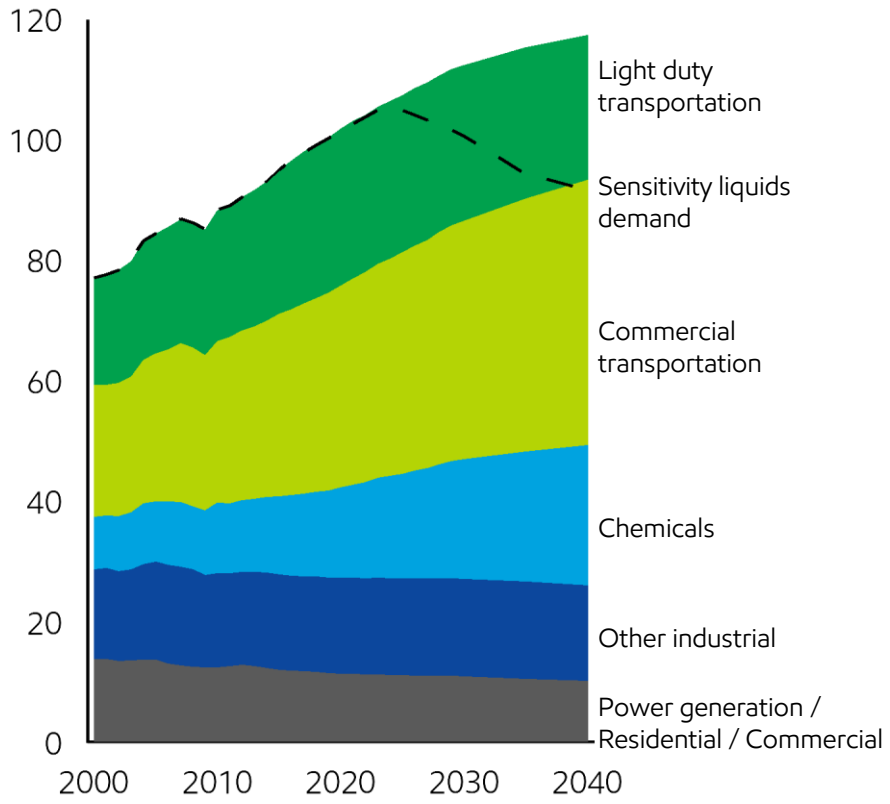
Hypothetical electric vehicle sensitivity

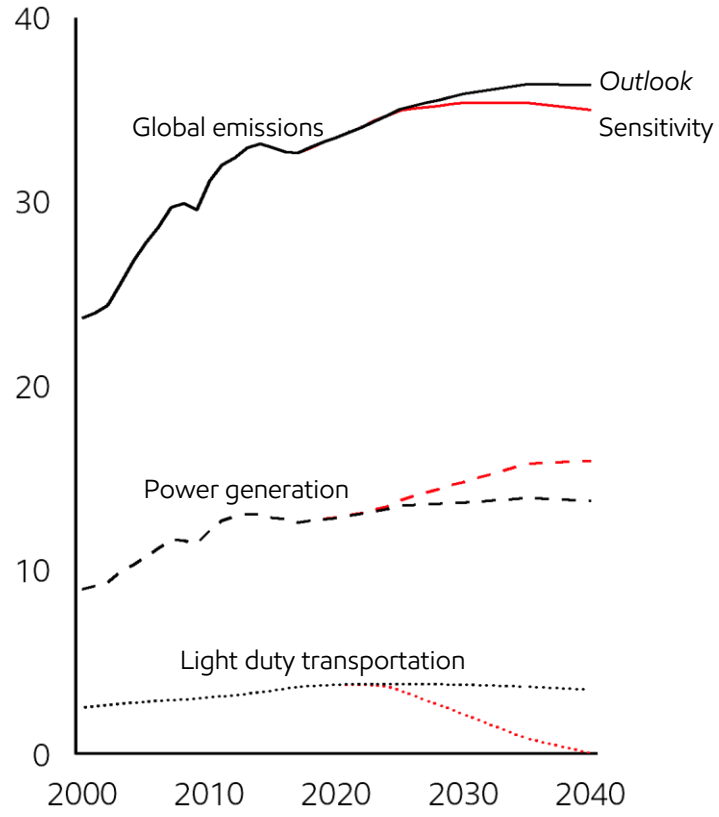
Liquids demand by sector

MBDOE



Energy-related CO_2 emissions

Billion tonnes



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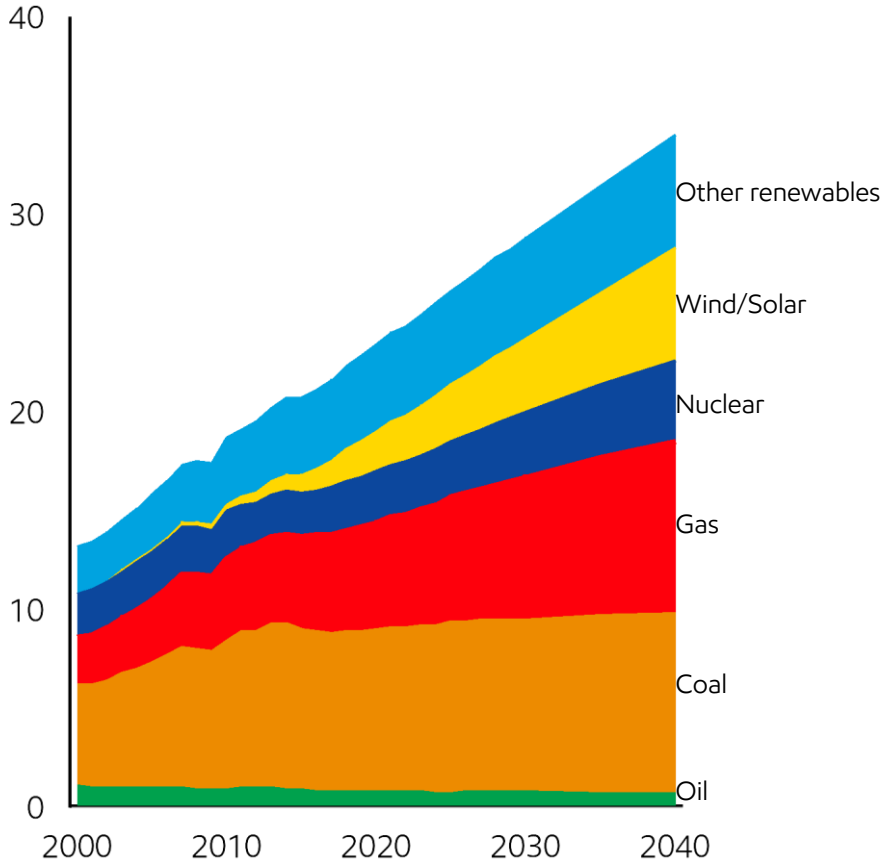
Electricity demand grows and sources shift

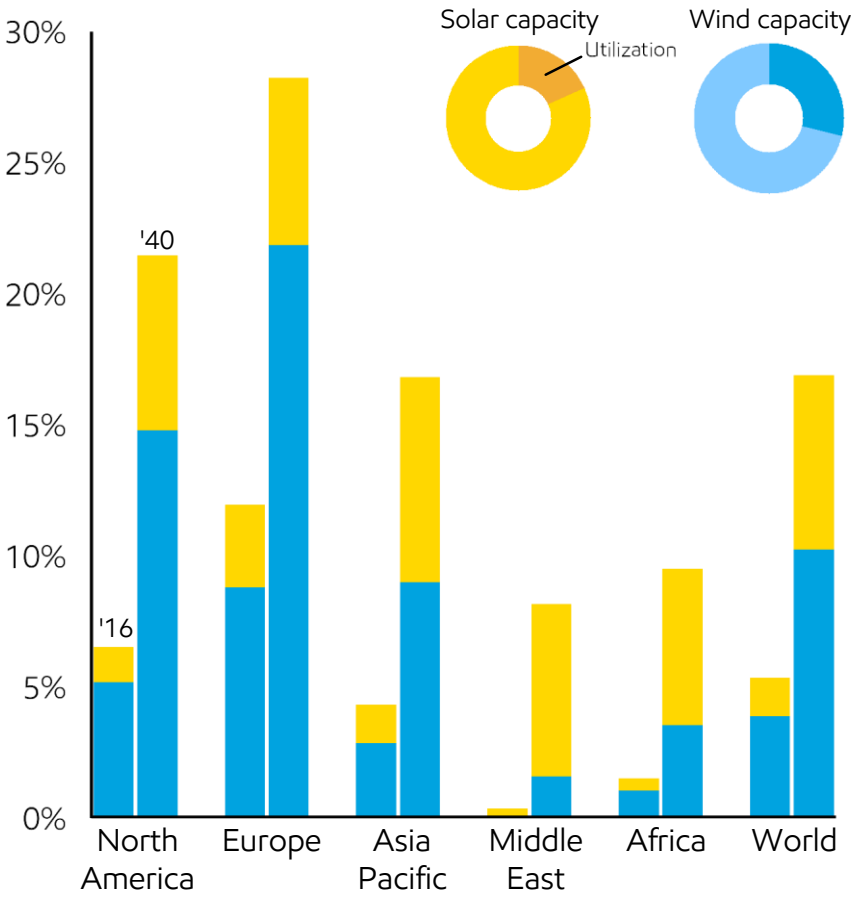
Electricity sources shift

Thousand TWh



Wind / Solar share of delivered electricity

Share of TWh



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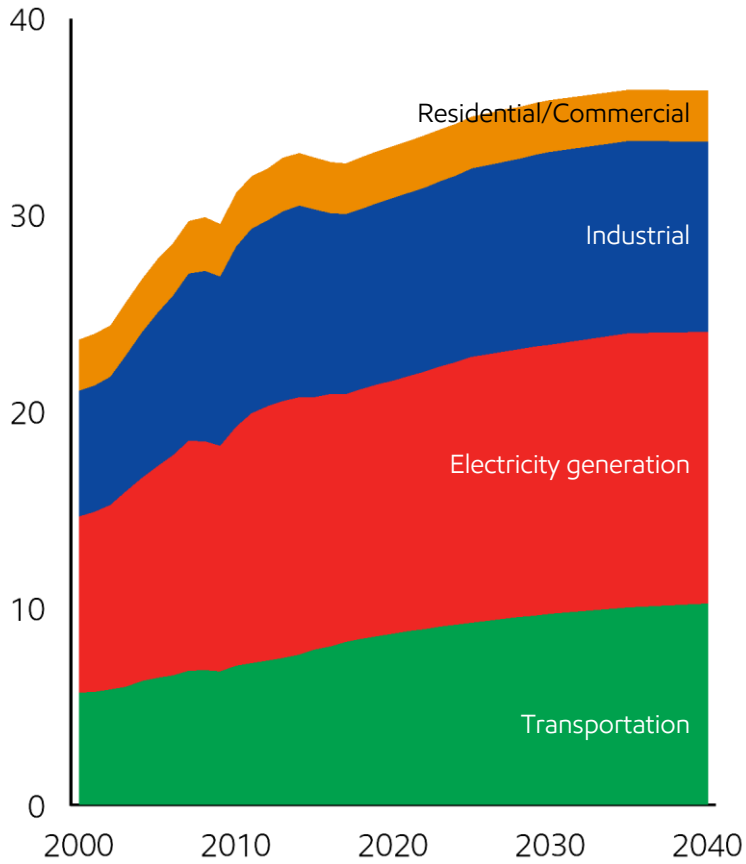
Energy-related CO_2 emissions

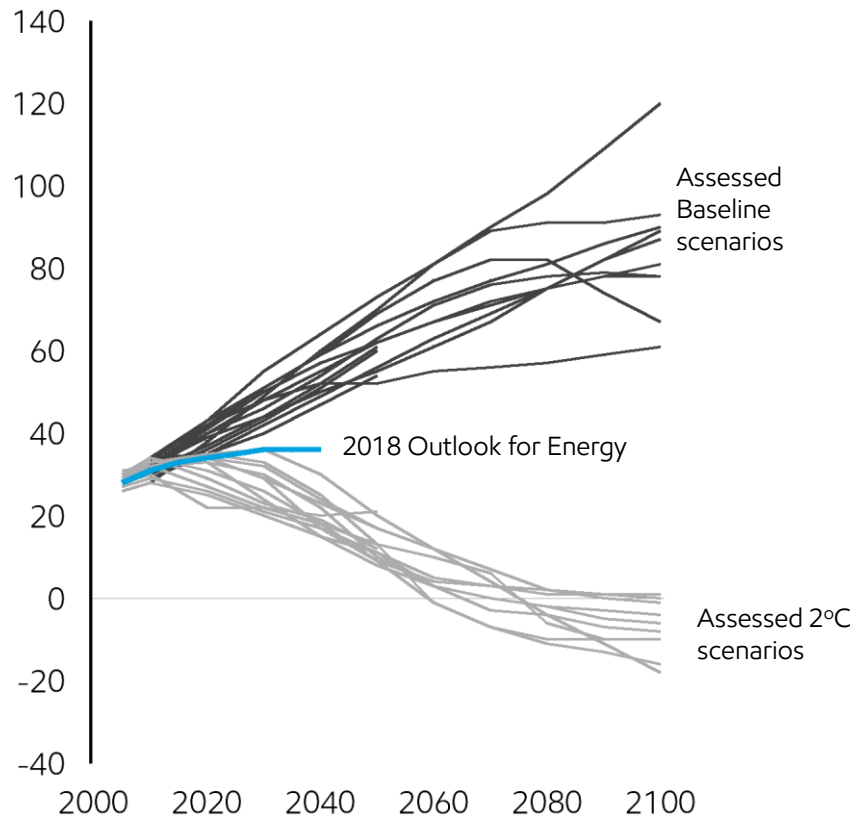
Energy-related CO_2 emissions by sector

Billion tonnes



Global energy-related CO_2 emissions

Billion tonnes



Baseline and 2°C scenarios based on Stanford EMF27 full technology scenarios
EMF27-FT cases include CO_2 emissions from energy and industrial processes

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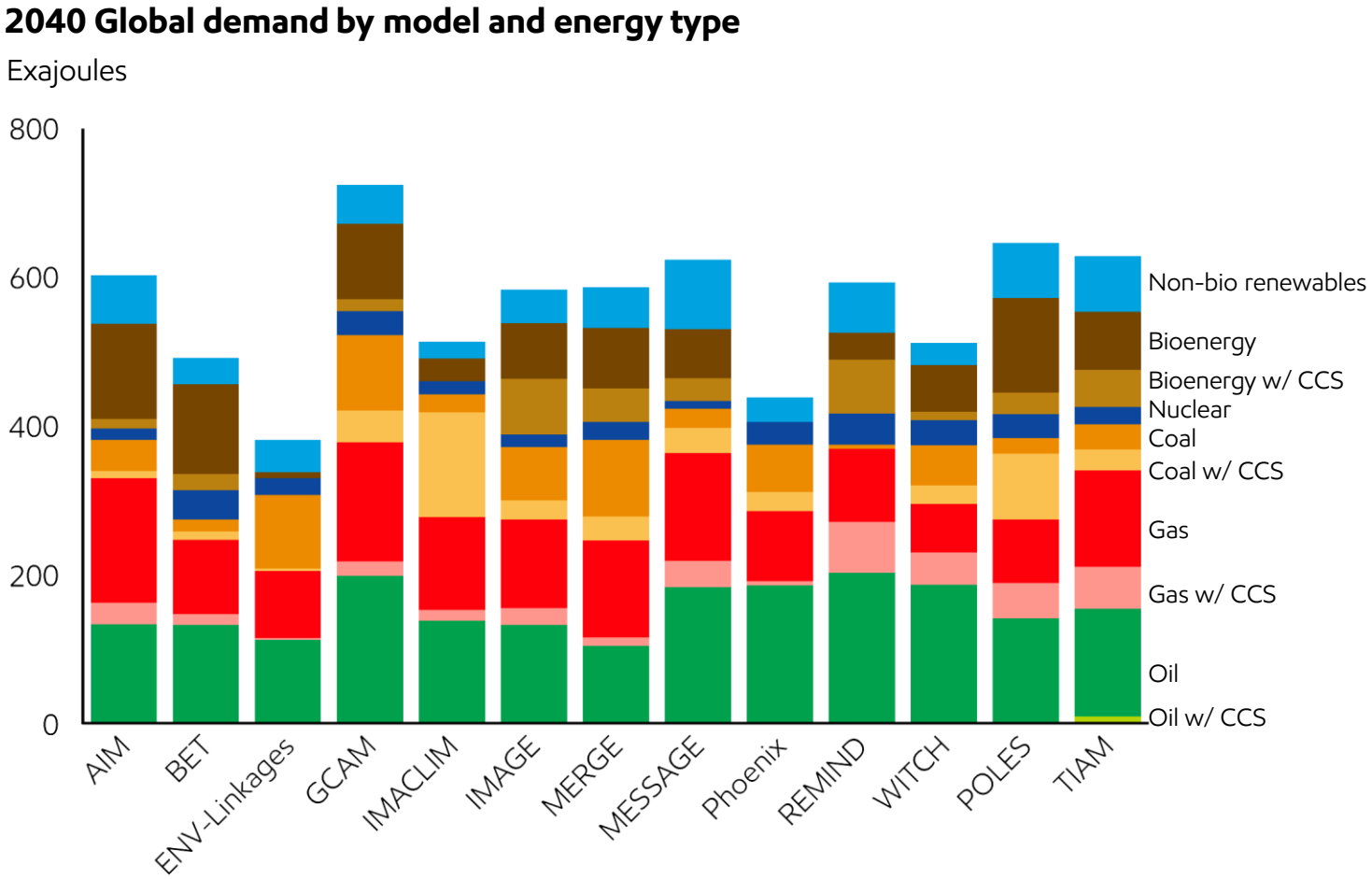
Assessed 2°C Scenarios: 2040 global energy demand



Based on EMF27 full technology / 450 ppm scenarios (Assessed 2°C Scenarios)
EMF27 full technology scenarios data downloaded from: https://secure.iiasa.ac.at/web-apps/ene/AR5DB

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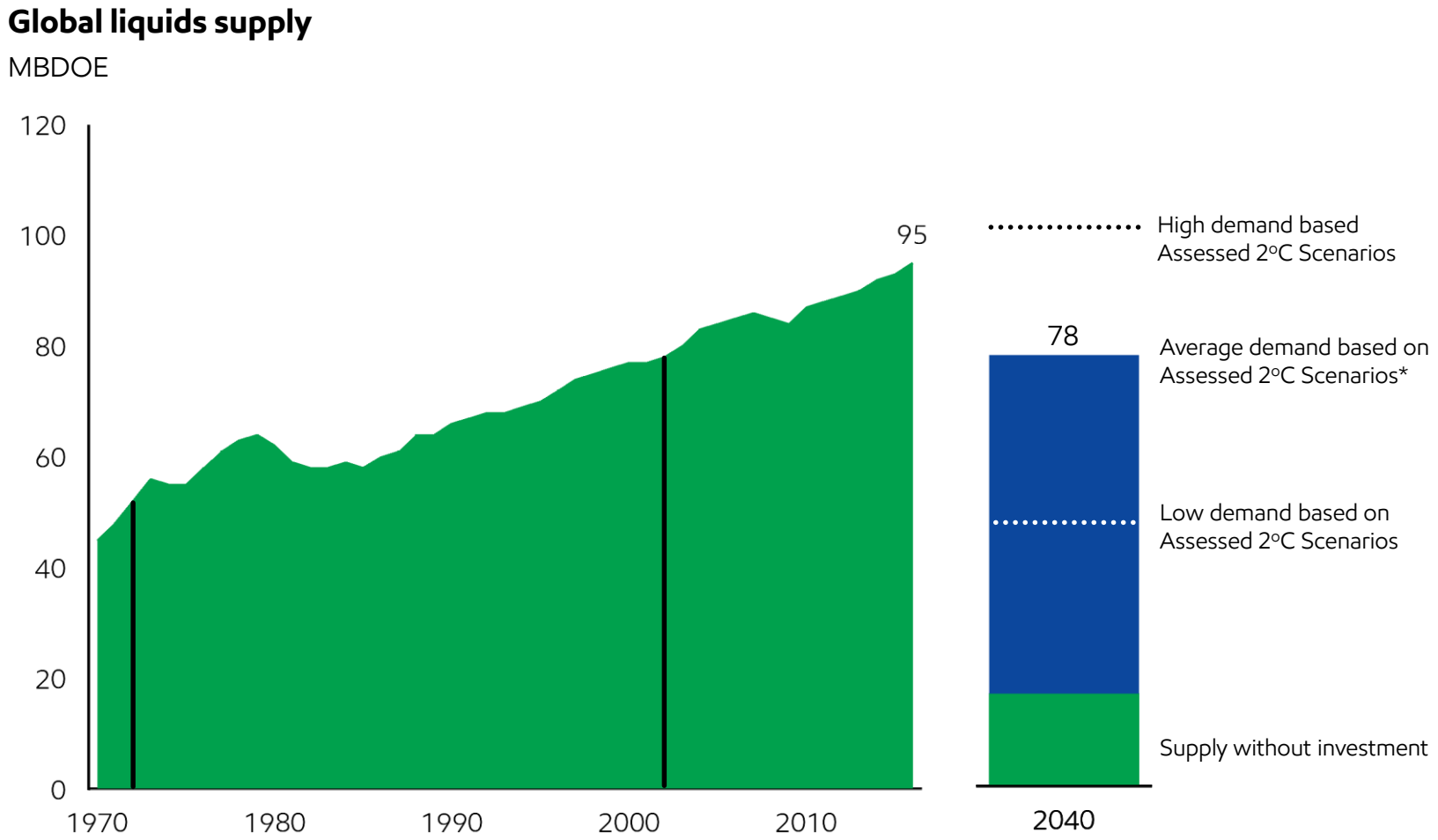
Significant investments needed to meet demand



Excludes biofuels
**Average demand is based on the average of the Assessed 2°C Scenarios' oil and natural gas growth rates*

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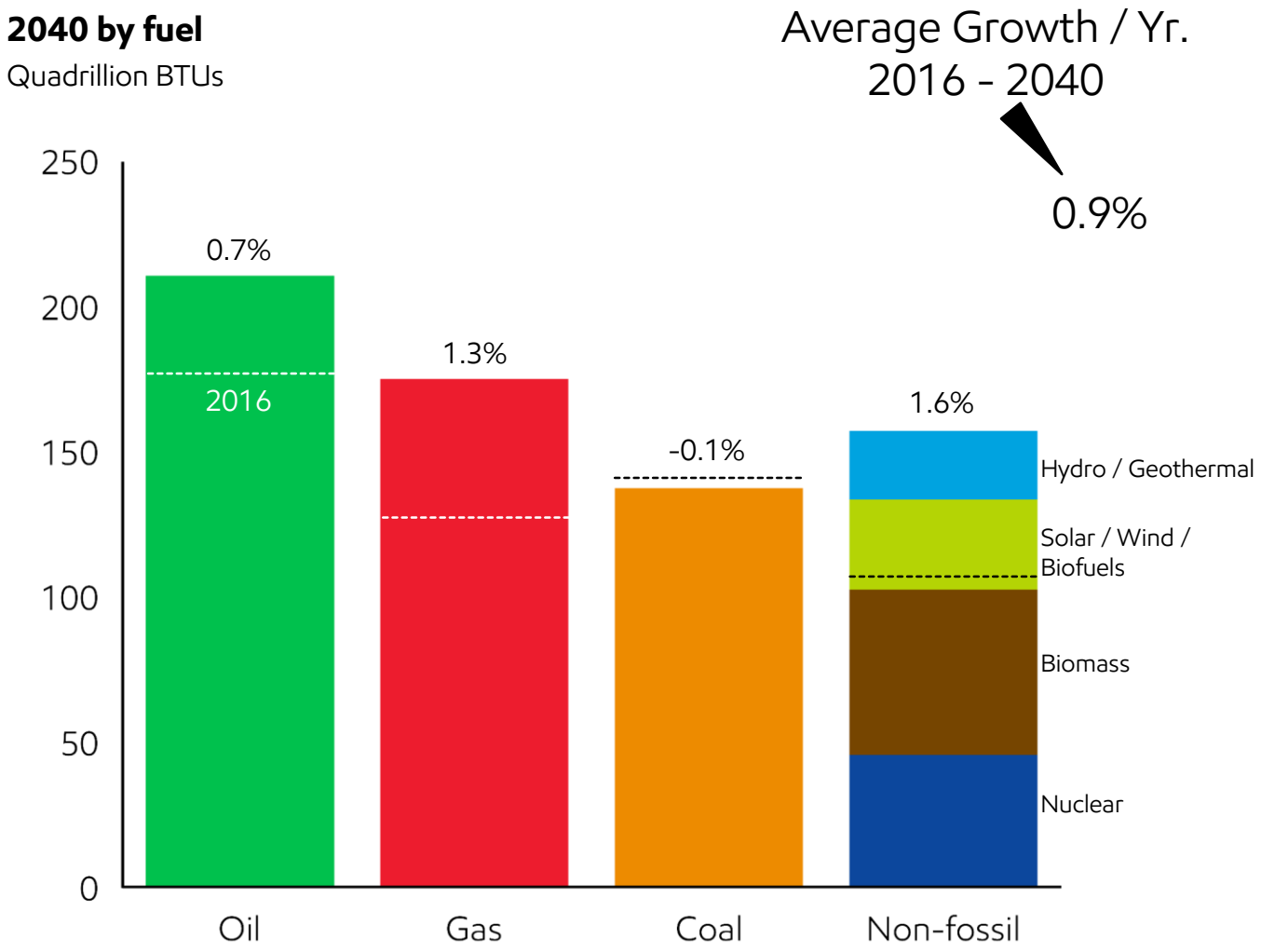
Global Demand



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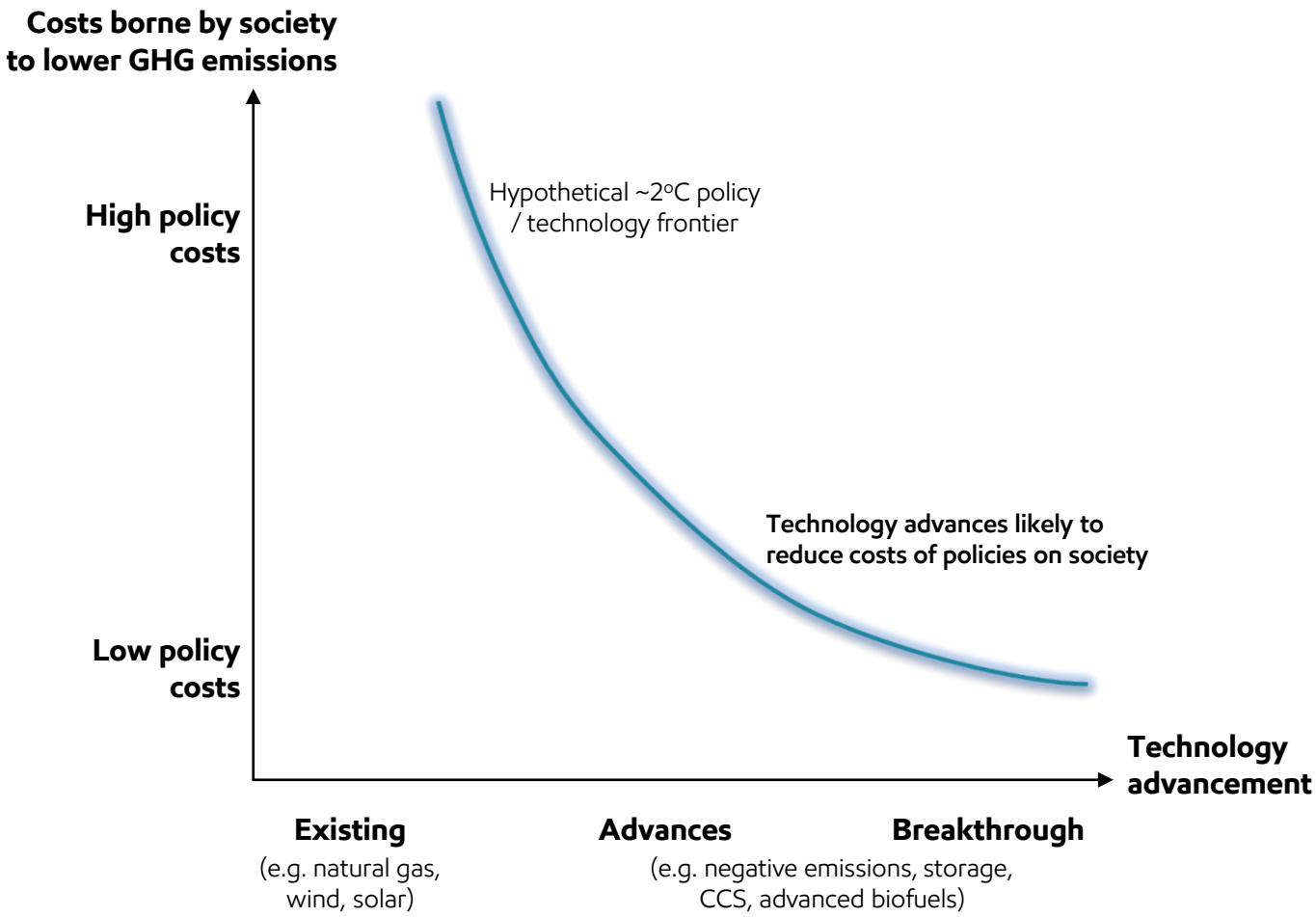
Technology key to reducing societal costs of 2°C pathway



Policy / Technology matrix is illustrative only

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Unique R&D model

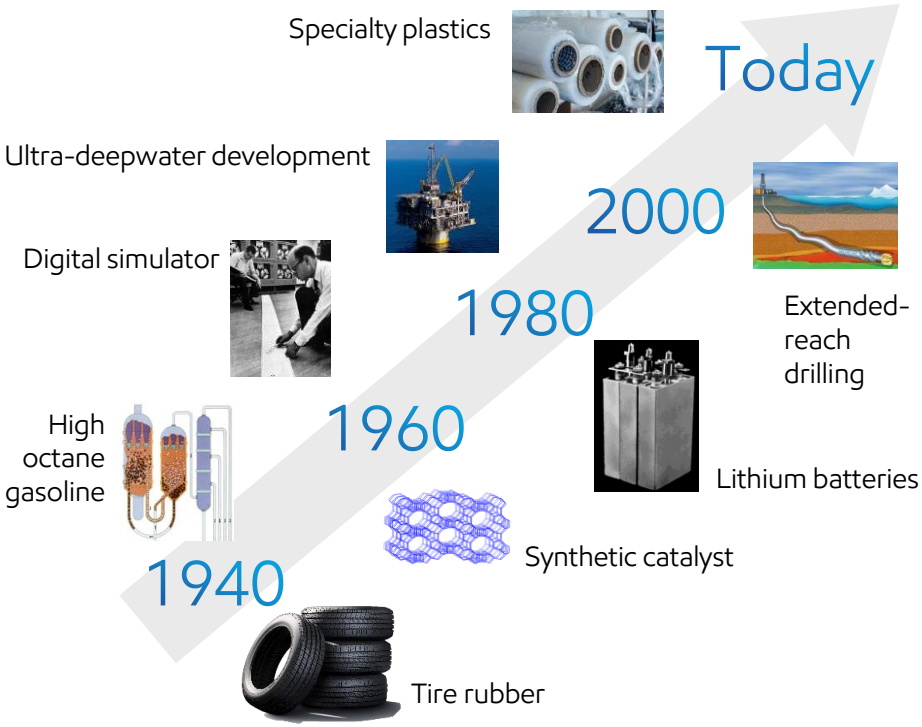
Science-based fundamentals

Process Technology
Catalyst, low-emission processing, scale-up

Upstream Research
Efficient resource capture, development and production

Chemicals Technology
Advantaged feedstocks, improved processes and products

A history of innovation



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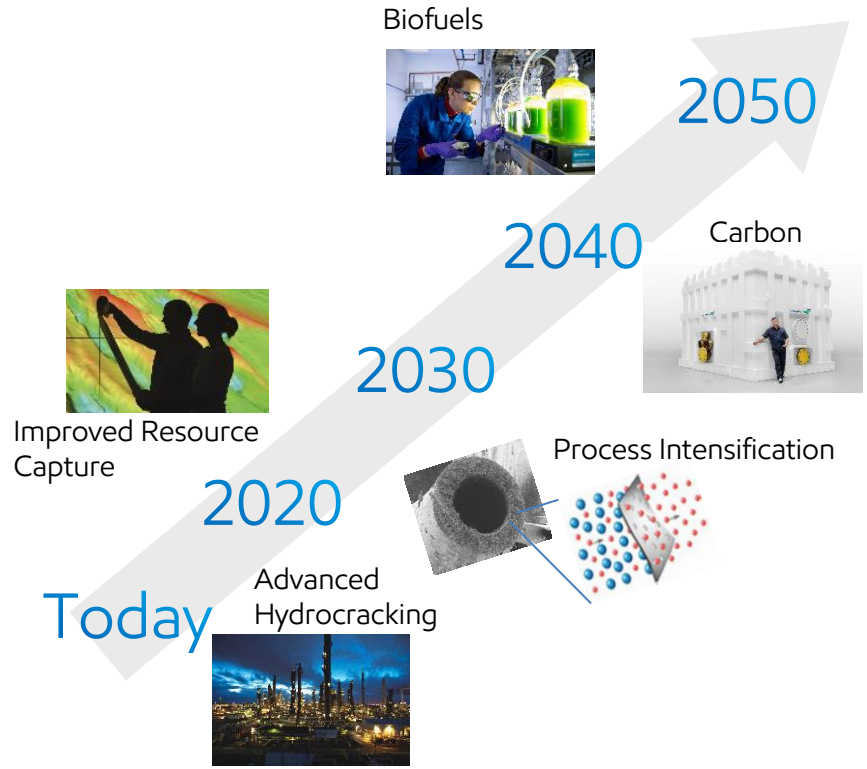
Technology is the foundation for the future

Near-term
Advantaged technology delivery

Mid-term
Industrial processes with lower emissions

Long-term
Biofuels, CCS



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Low emissions transportation with advanced biofuels

Today's approach: Small scale, competes with food and water

Our research: Large scale, global solutions, non-competitive with food and water

Near term step: 10,000 BPD by 2025

Sunlight + CO_2 + H_2O + Photosynthesis = Biofuels

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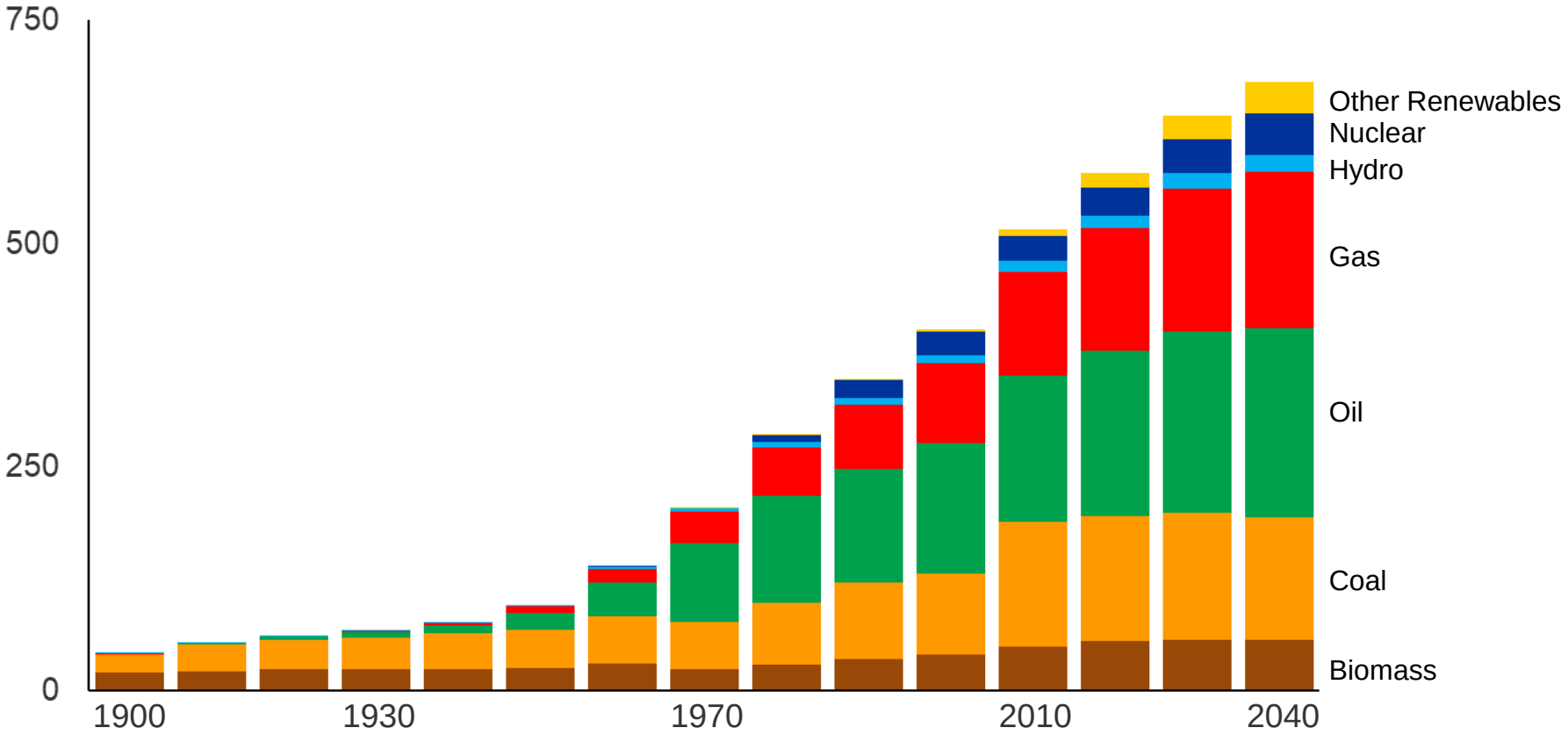

Source: Smil, Energy Transitions (1900-1960)

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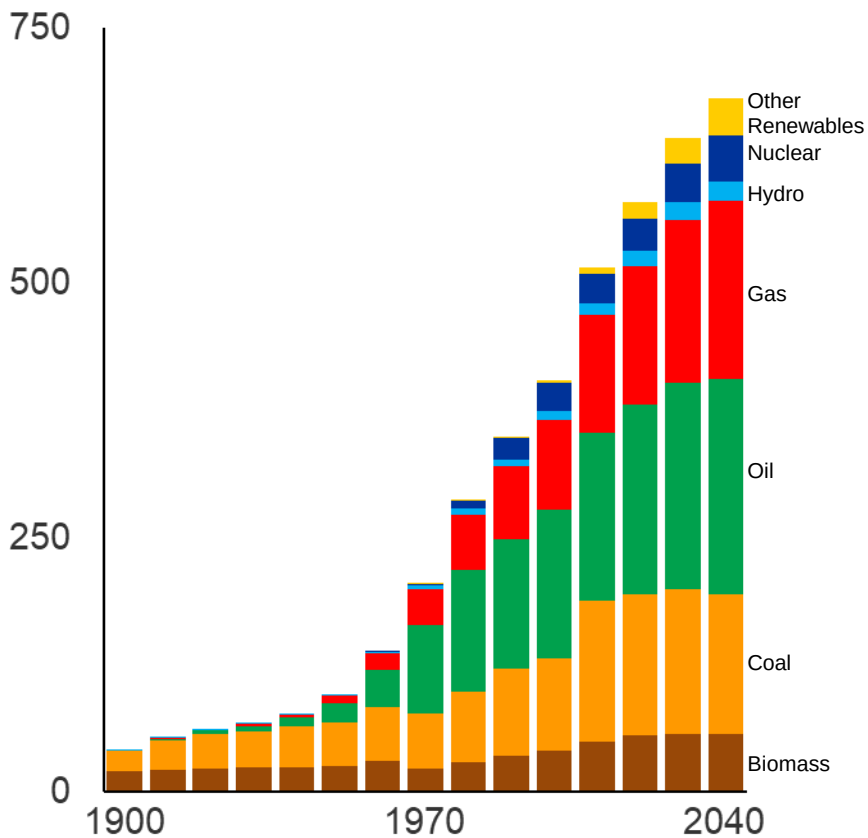

Source: Smil, Energy Transitions (1900-1960)

Outlook to 2040:

- Invest ~$21 trillion in oil and gas, ~$15 trillion in upstream
  - Tight oil, deepwater, oil sands supplies up >100%
  - Unconventional gas up ~100%
- Expand wind/solar electricity by ~400%
- Boost efficiency at 2x pace since 2000
- Advance technologies to reduce emissions (e.g. CCS)
- Accelerate adoption of digital enablers to boost productivity and value

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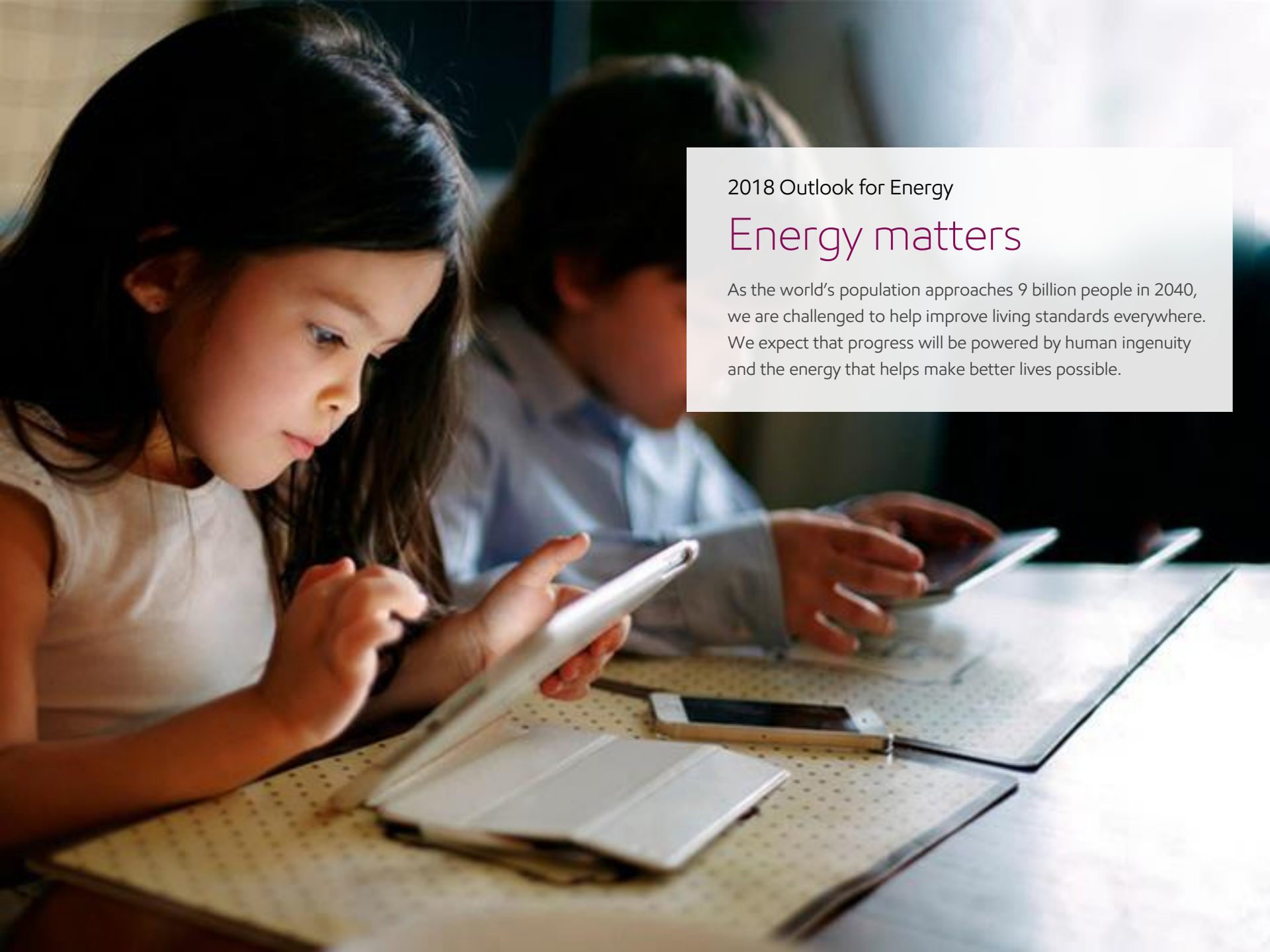

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Energy matters

As the world's population approaches 9 billion people in 2040, we are challenged to help improve living standards everywhere. We expect that progress will be powered by human ingenuity and the energy that helps make better lives possible.

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