

22° Convegno Annuale, Sezione Componentistica d'Impianto ANIMP

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ASSOCIAZIONE NAZIONALE DI
IMPIANTISTICA INDUSTRIALE



SEZIONE
COMPONENTISTICA
D'IMPIANTO

ENERGY INDUSTRY GLOBAL MARKETS FORECAST

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Agenda

MARKET CONTEXT

OUTLOOK ON INVESTMENTS

FOCUS ON OPEX

IMPACT ON THE VALUE CHAIN

Evolving perceptions over the last 2 years

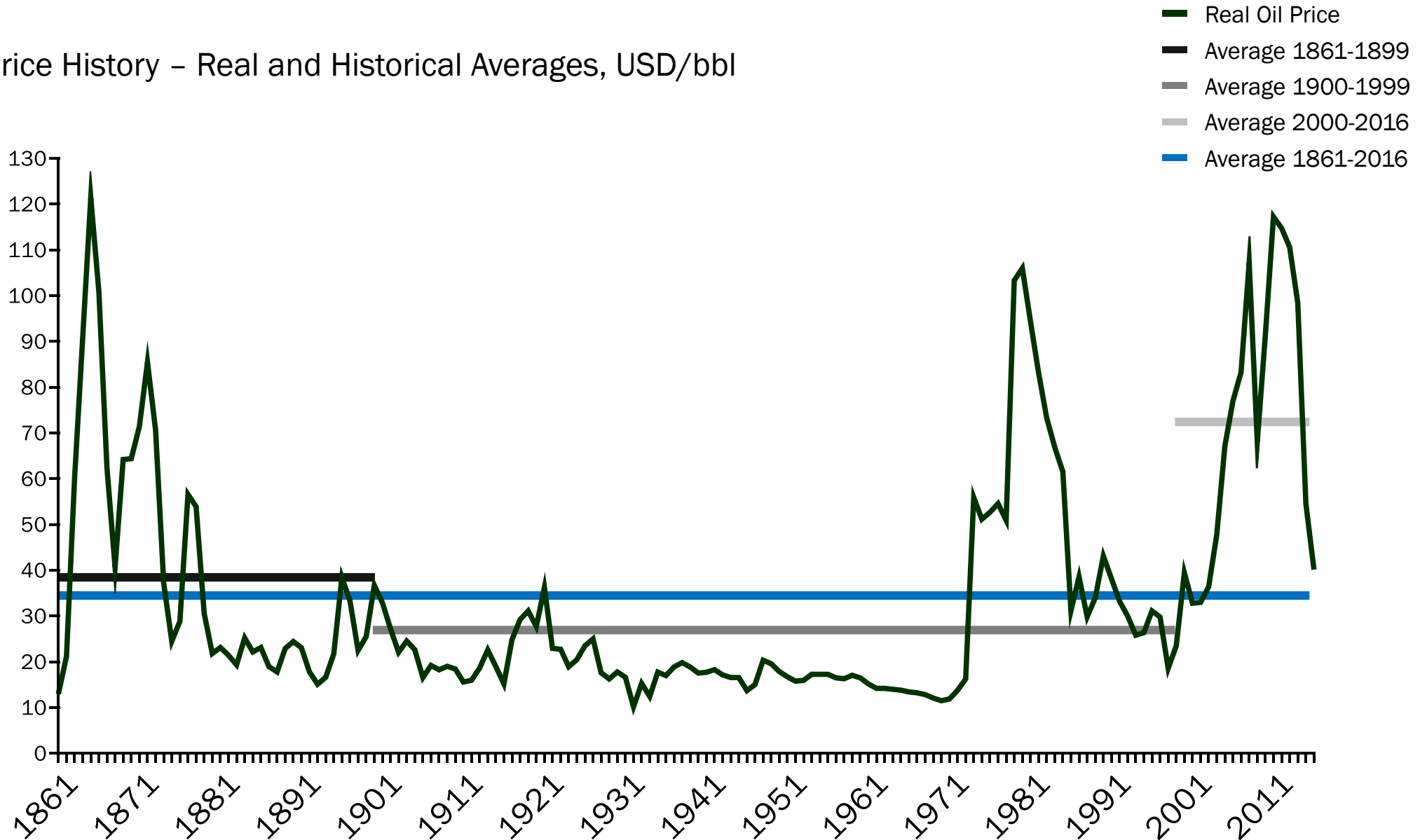
”Quick rebound”

”Lower for longer”

”New normal”

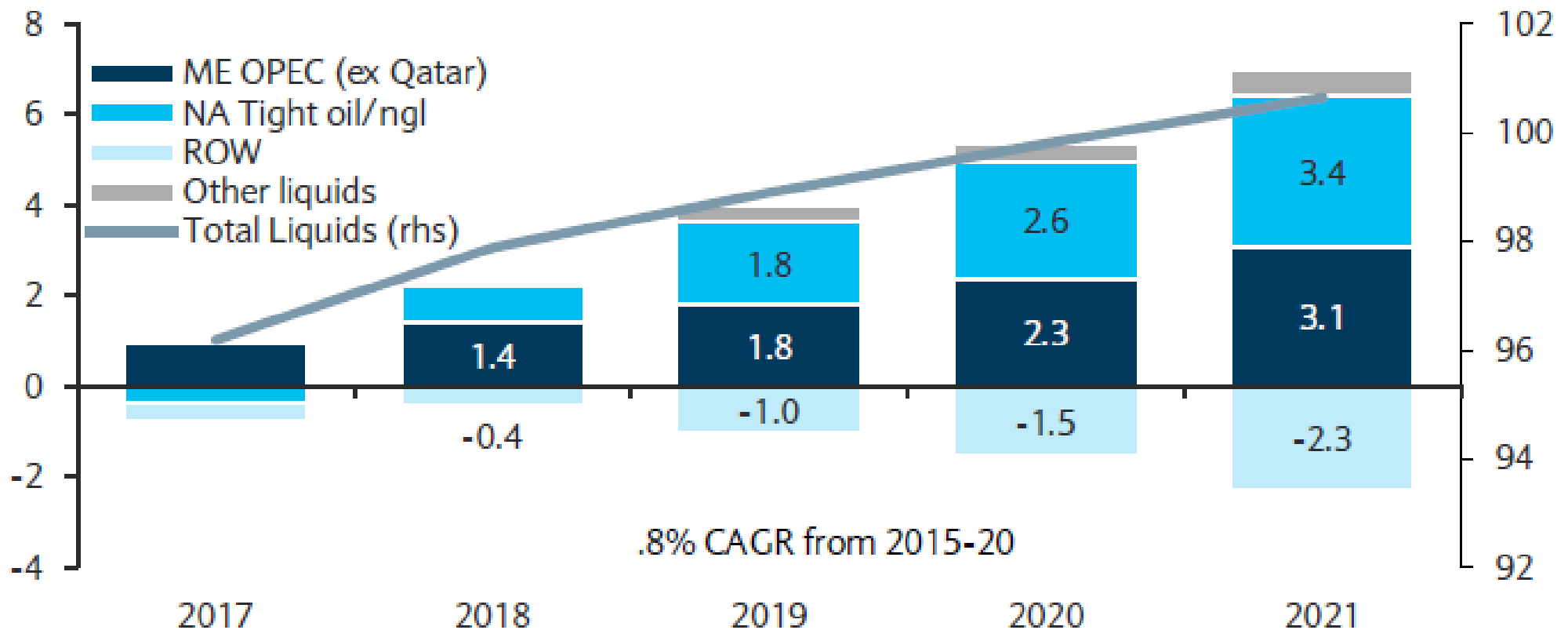
“Feast-and-famine” alternating scenarios have characterized our industry throughout its history

Oil Price History – Real and Historical Averages, USD/bbl



We have moved from "energy scarcity" to the age of "energy abundance"

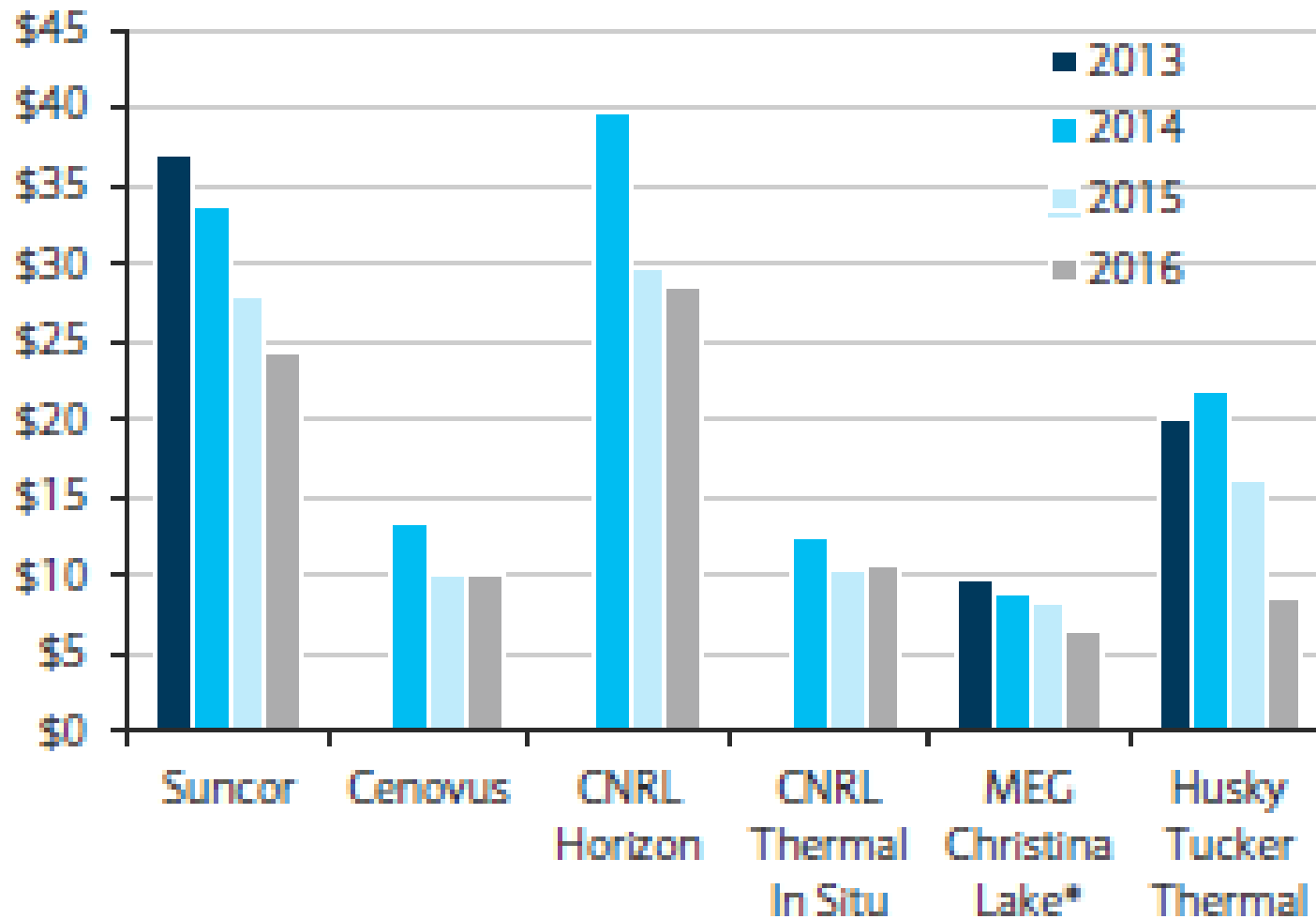
Cumulative Supply Growth from 2016 (mb/d)



More than 6 mb/d of new supplies offset declines in the rest of the world. Half those new supplies come from North American Tight liquids

Not only US shale gas and tight oil producers have become more competitive (mostly), but also the high-cost Canadian oil sands operators have improved their competitive position dramatically

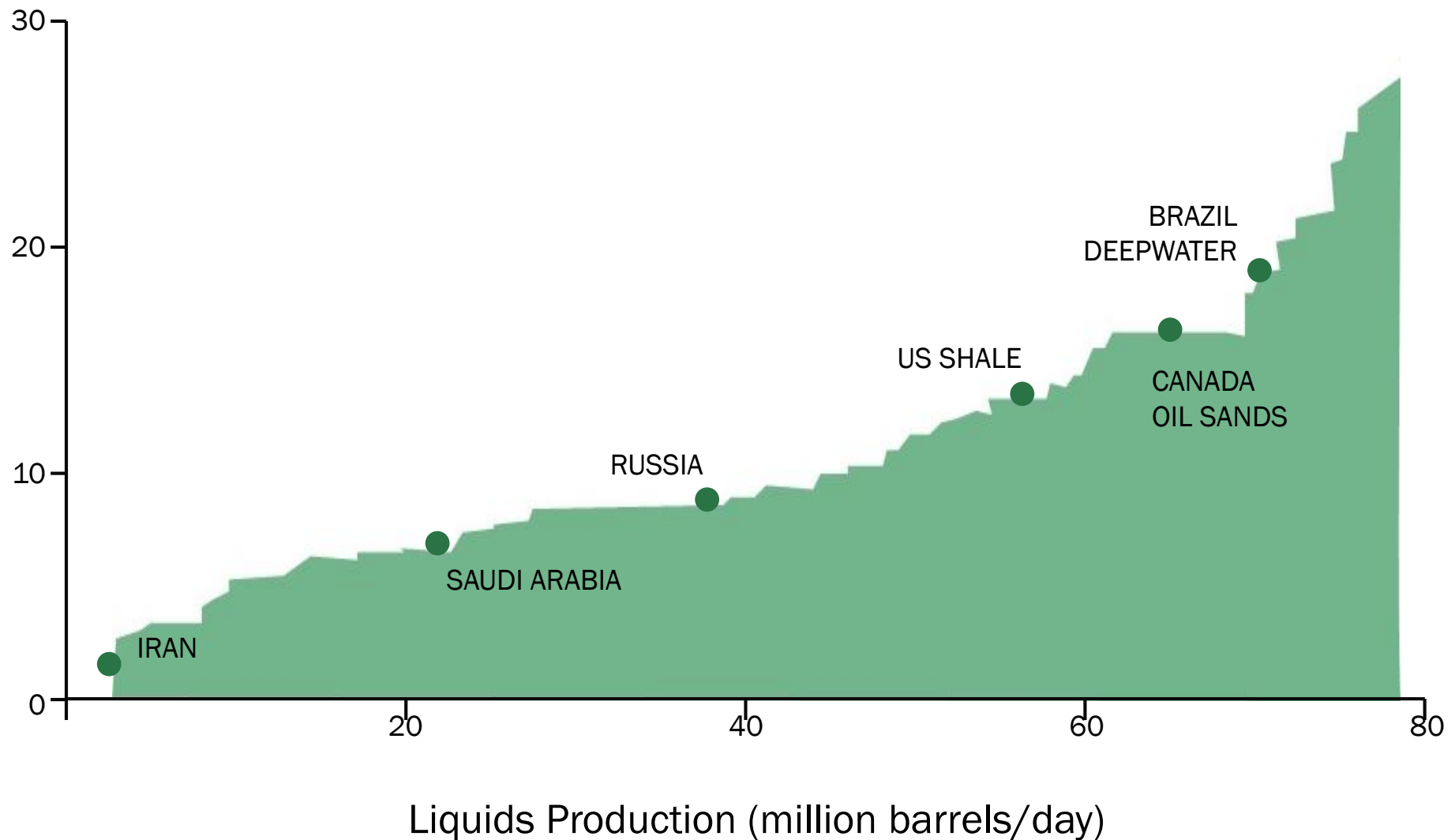
Operating costs per bbl for Canadian producers



Note: 2016 represents forecast. MEG costs are ex. Energy OPEX.

Some players have really low production costs

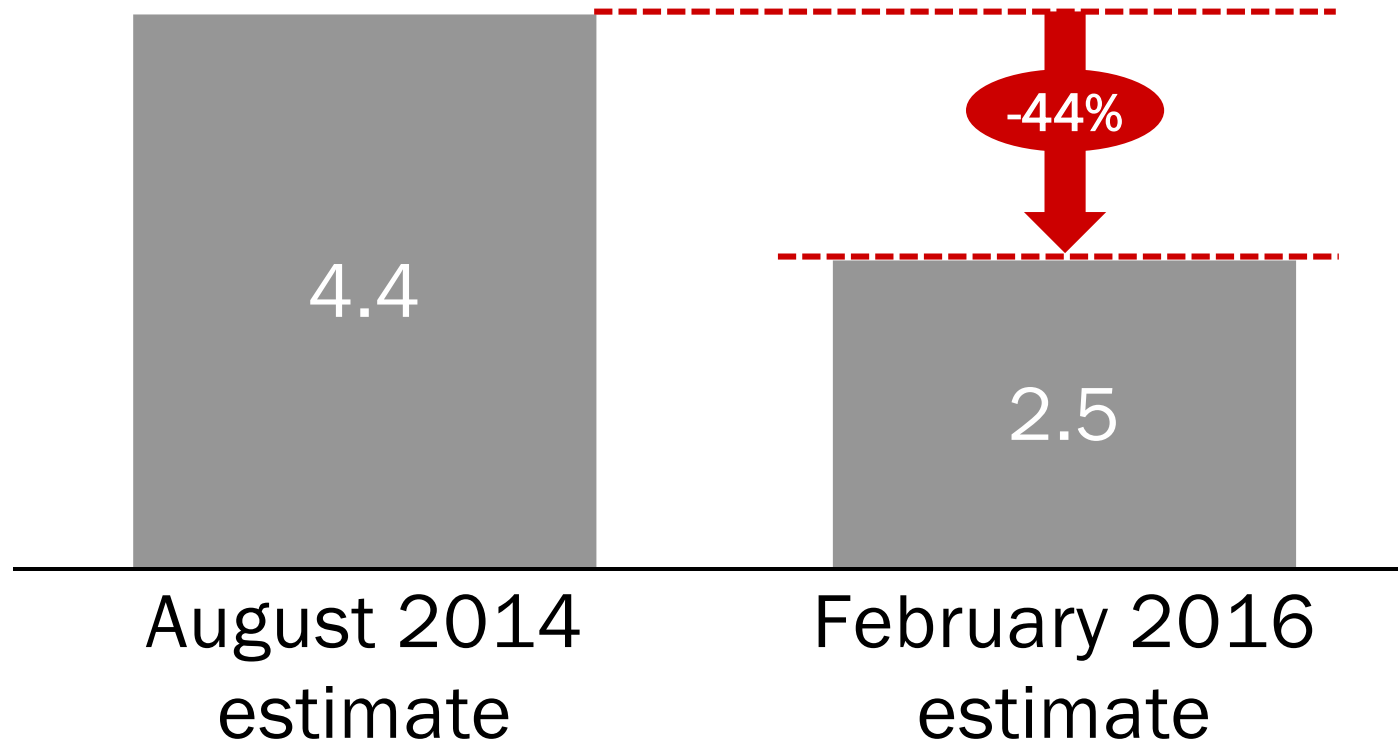
Cash cost of oil production (2015, USD/bbl)



Note: includes royalties
Sources: The Economist, Wood Mackenzie, Citi Research, press clippings

The Oil&Gas abundance has caused a dramatic fall in new CAPEX, particularly in Upstream

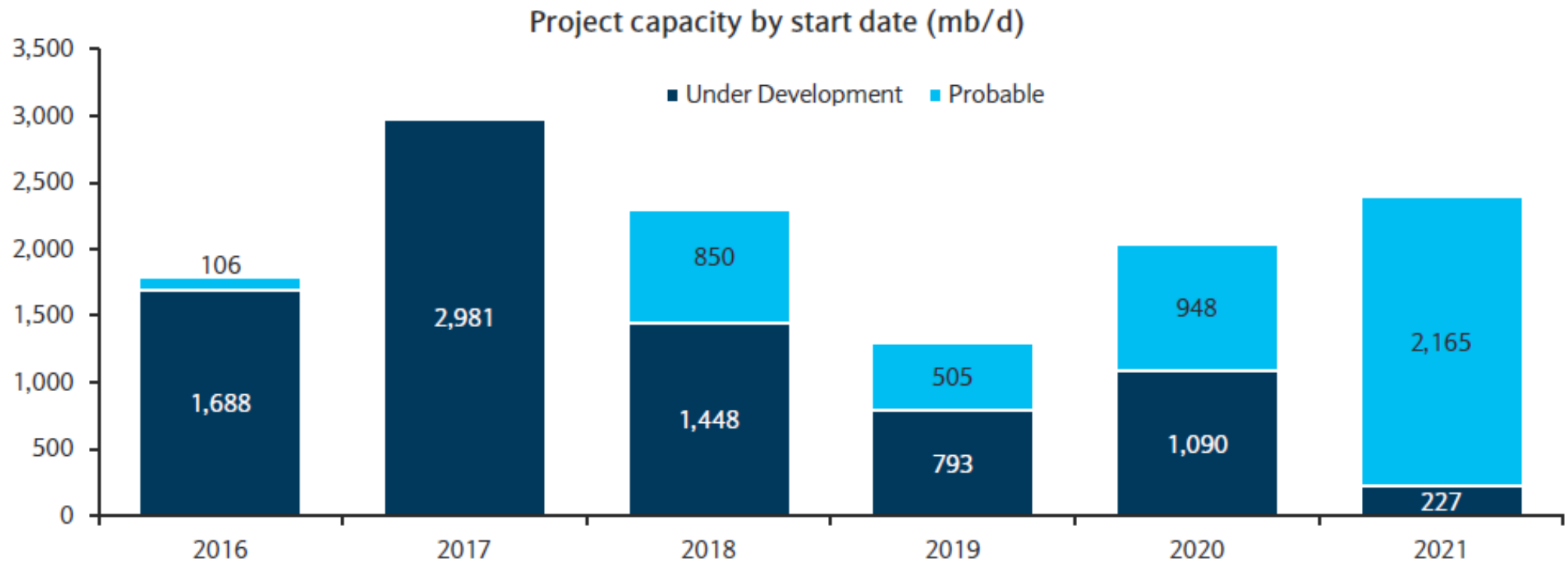
Total global Upstream Oil&Gas CAPEX '15-'19, Trillion USD



An estimated \$2 Trillion in “lost” global upstream spending during 2014-2019 period

Project delays... or cancellations?

More than 3.5 mb/d of projects set to come online between 2019-2021 have yet to receive a final investment decision



What next?

”Rebalancing”

”Gradual increase in
investments”

”Upward bound”

”Preparing for
the upturn”

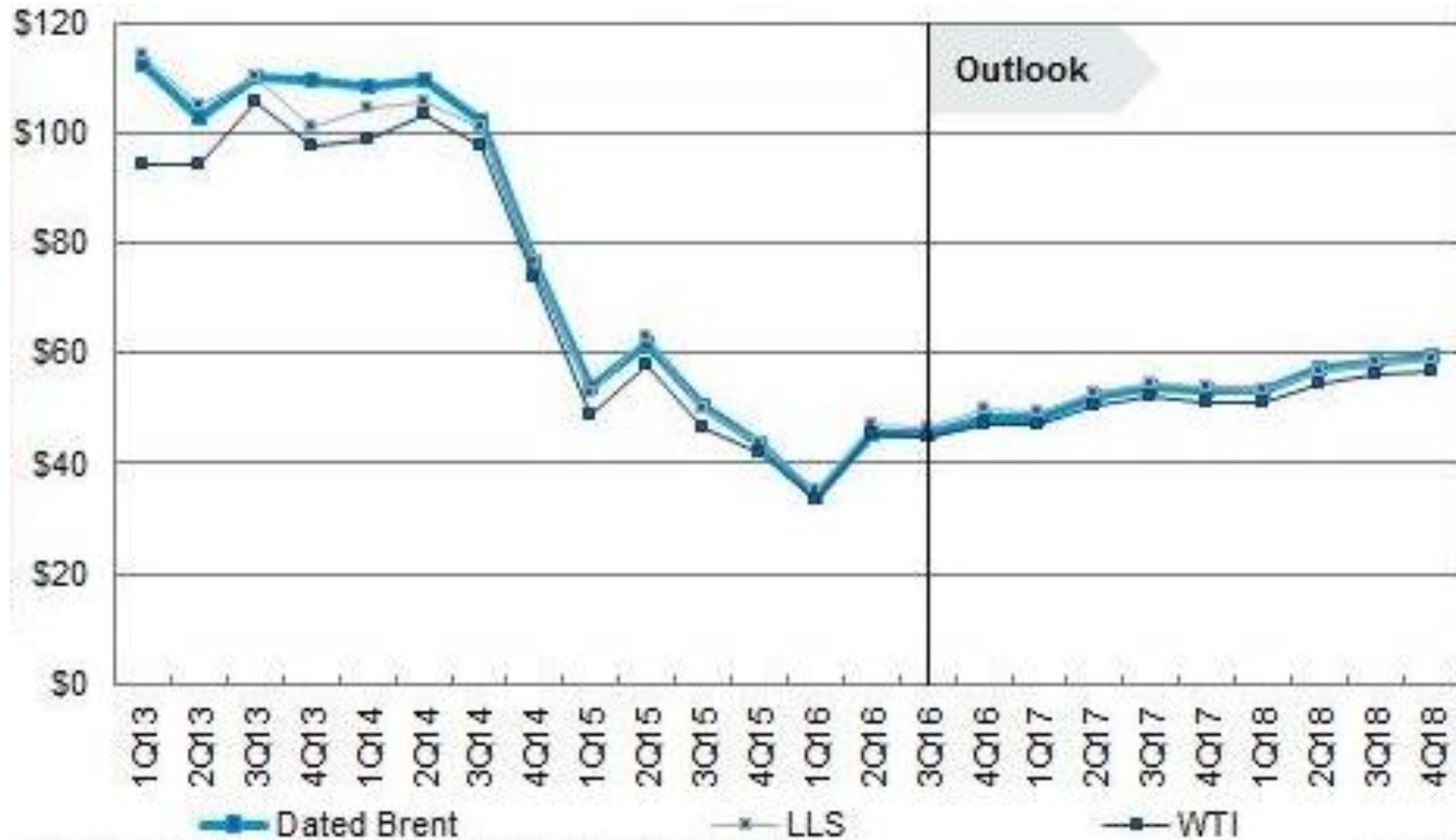
But:

At significantly lower costs ...

... in a substantially changed market environment

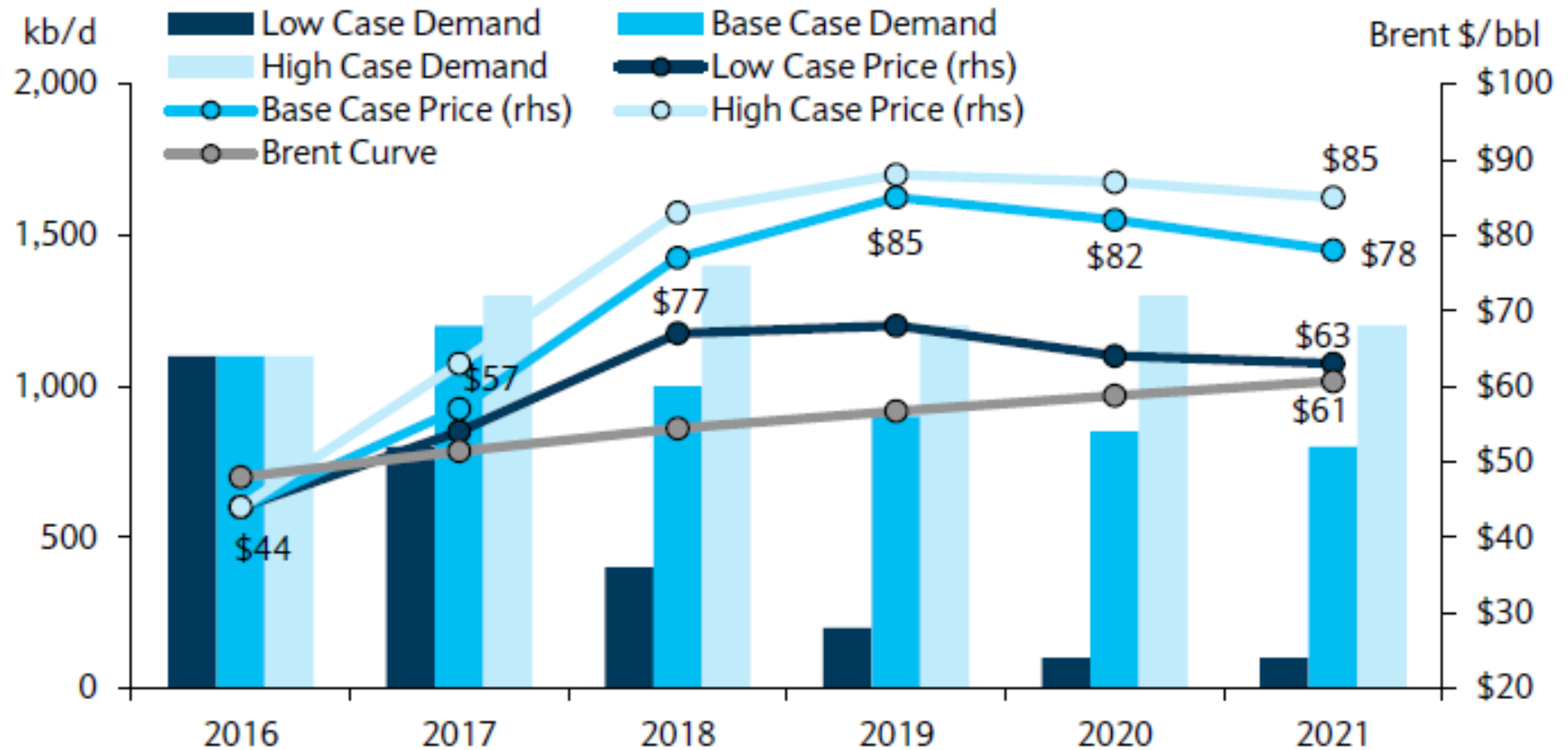
In the near future, most operators expect a gradual oil price increase to ~60 \$/bbl by 2018 ...

Brent quarterly average price per barrel



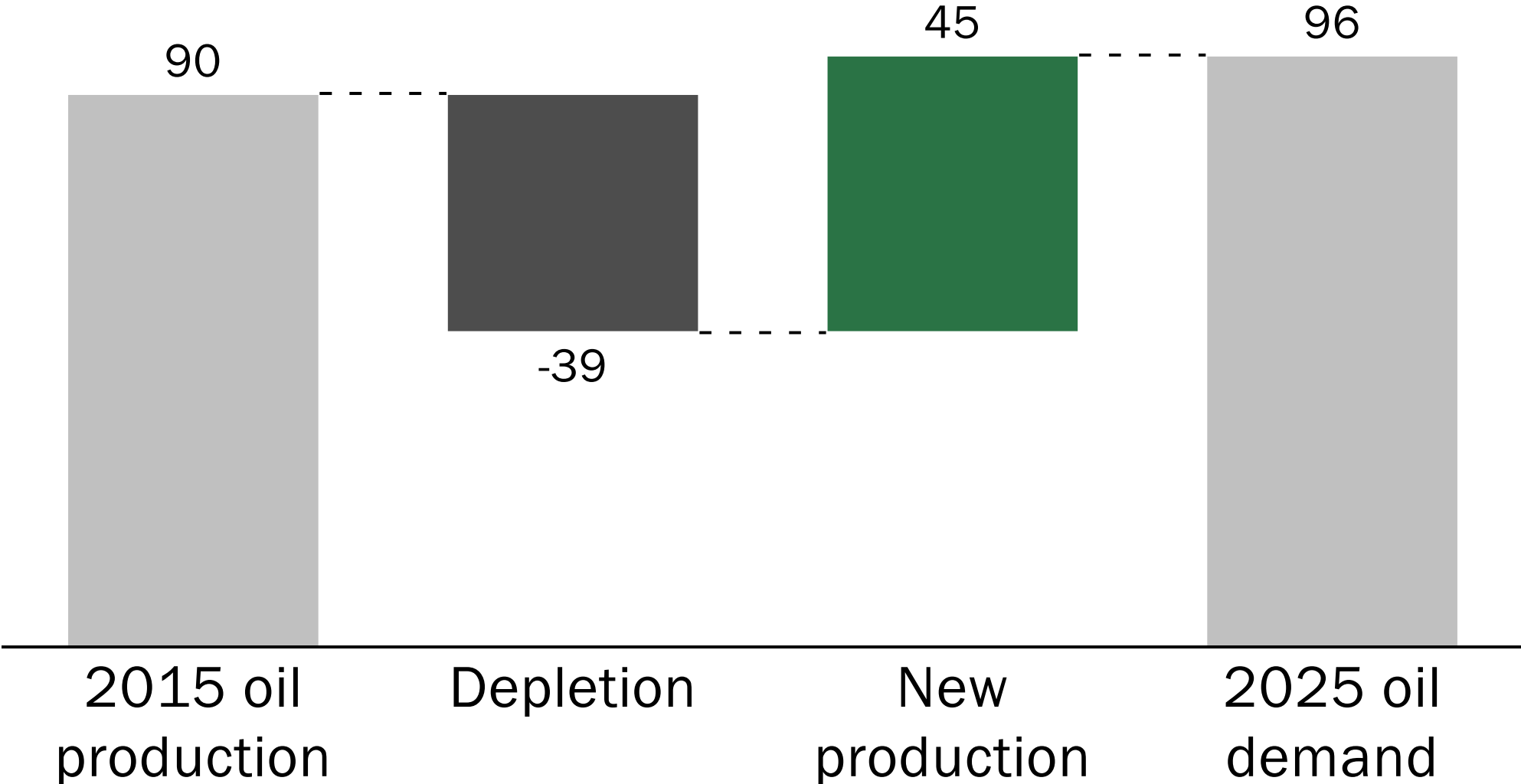
... and ~70 - 80 \$/bbl by end of decade

We expect Brent prices will reach \$85/b by 2019, a year sooner than previously forecast



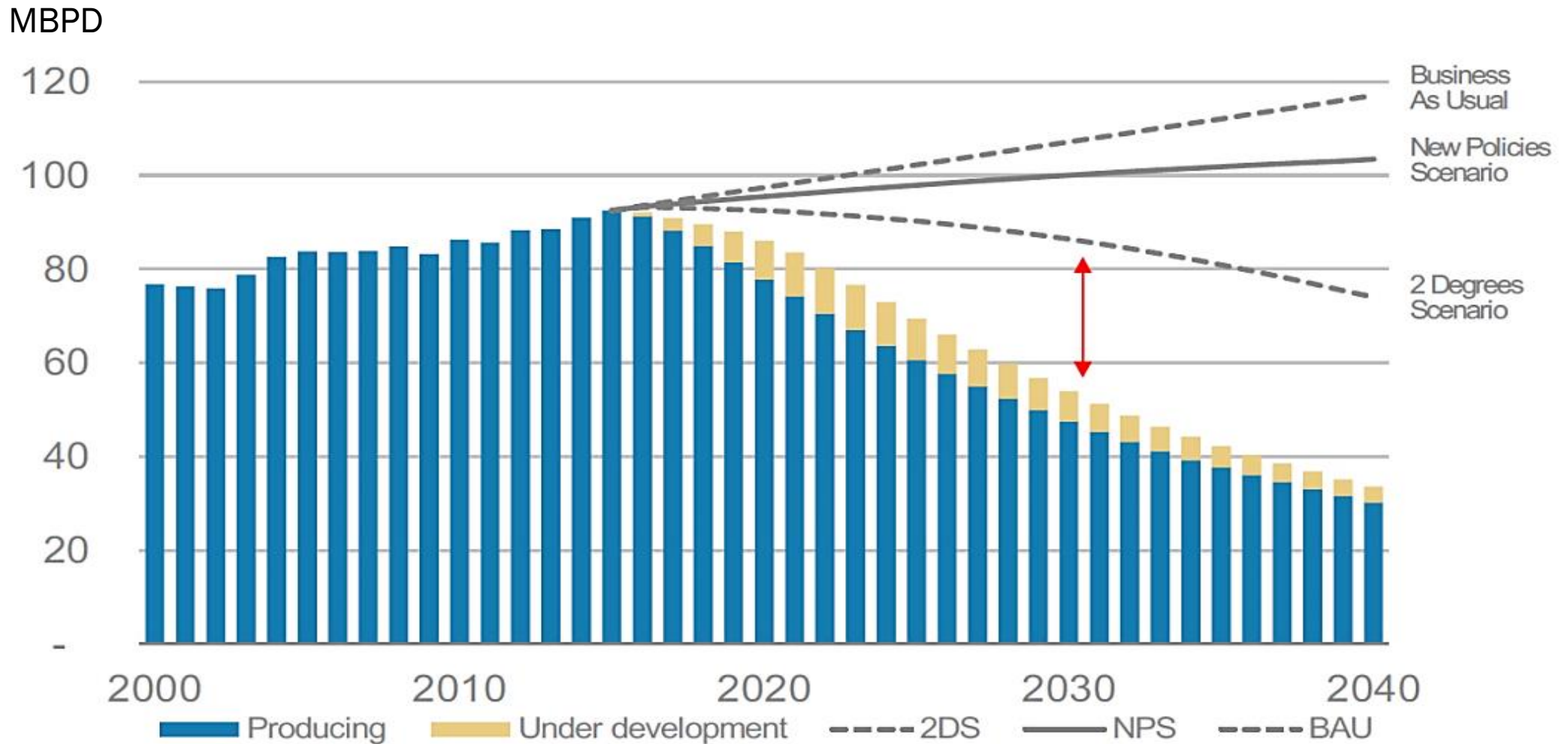
New CAPEX will be mainly required to maintain the Oil base production

OIL: Base production from current fields, demand, and implied depletion and new production need (MBPD)



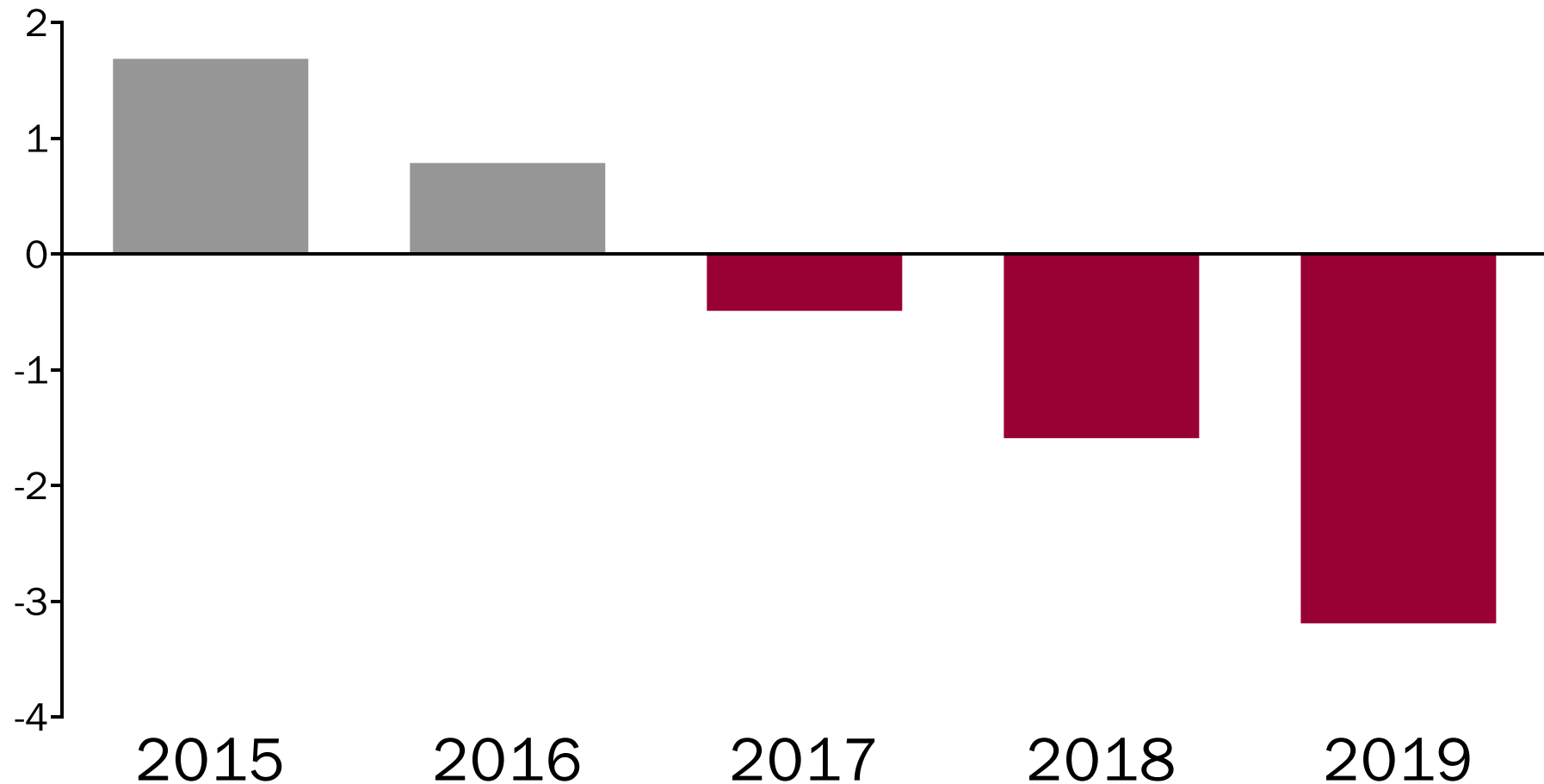
Note: assumes 5.5% depletion rate for oil fields
Source: SupplHi analysis on BP Energy Outlook 2015 and Galp Energia "Capital Markets Day 2015"

Depletion requires new investments even to maintain production



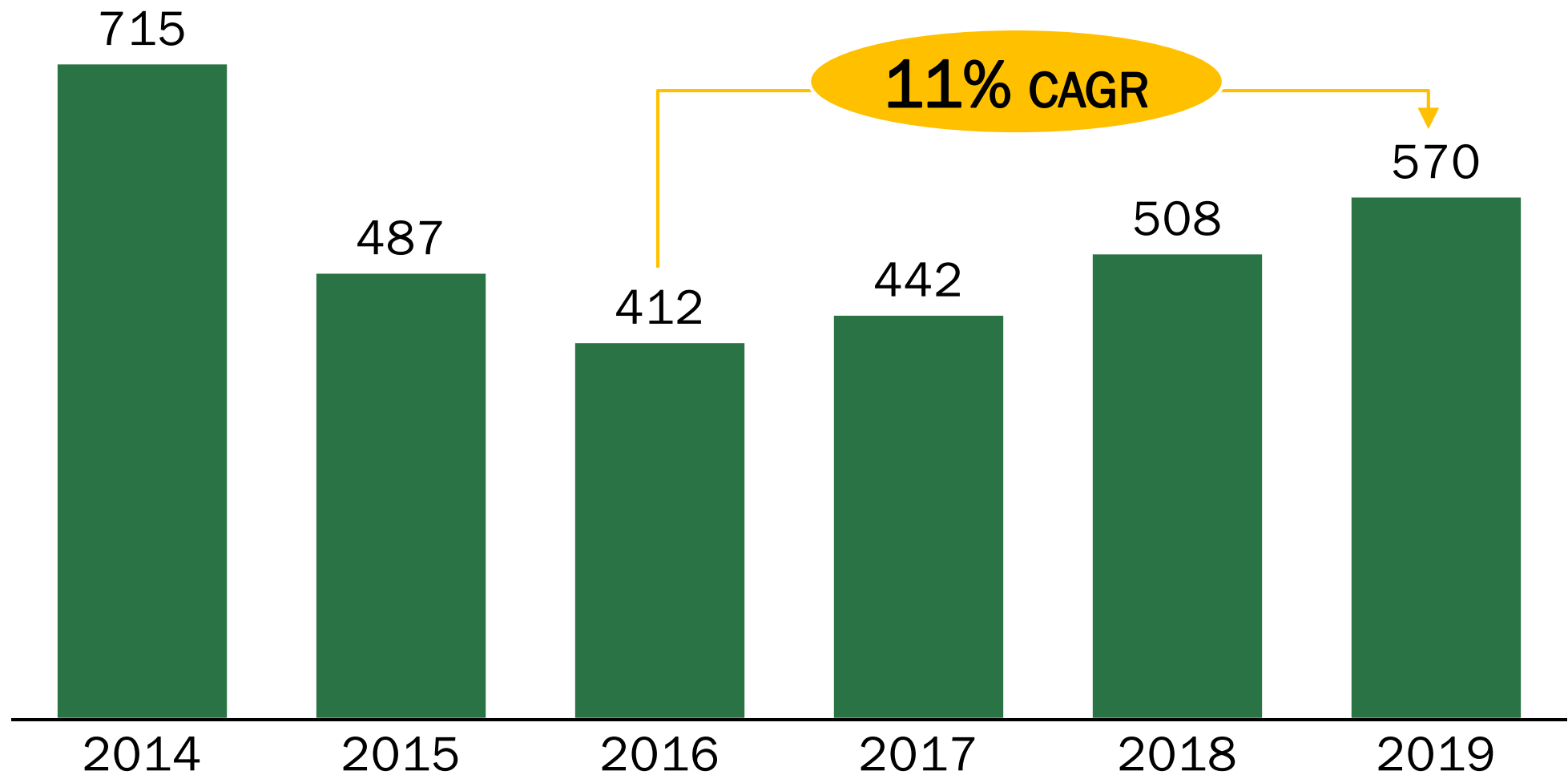
Shortly, there could be an Oil production deficit

Implied Oil market surplus (deficit) based on existing projects



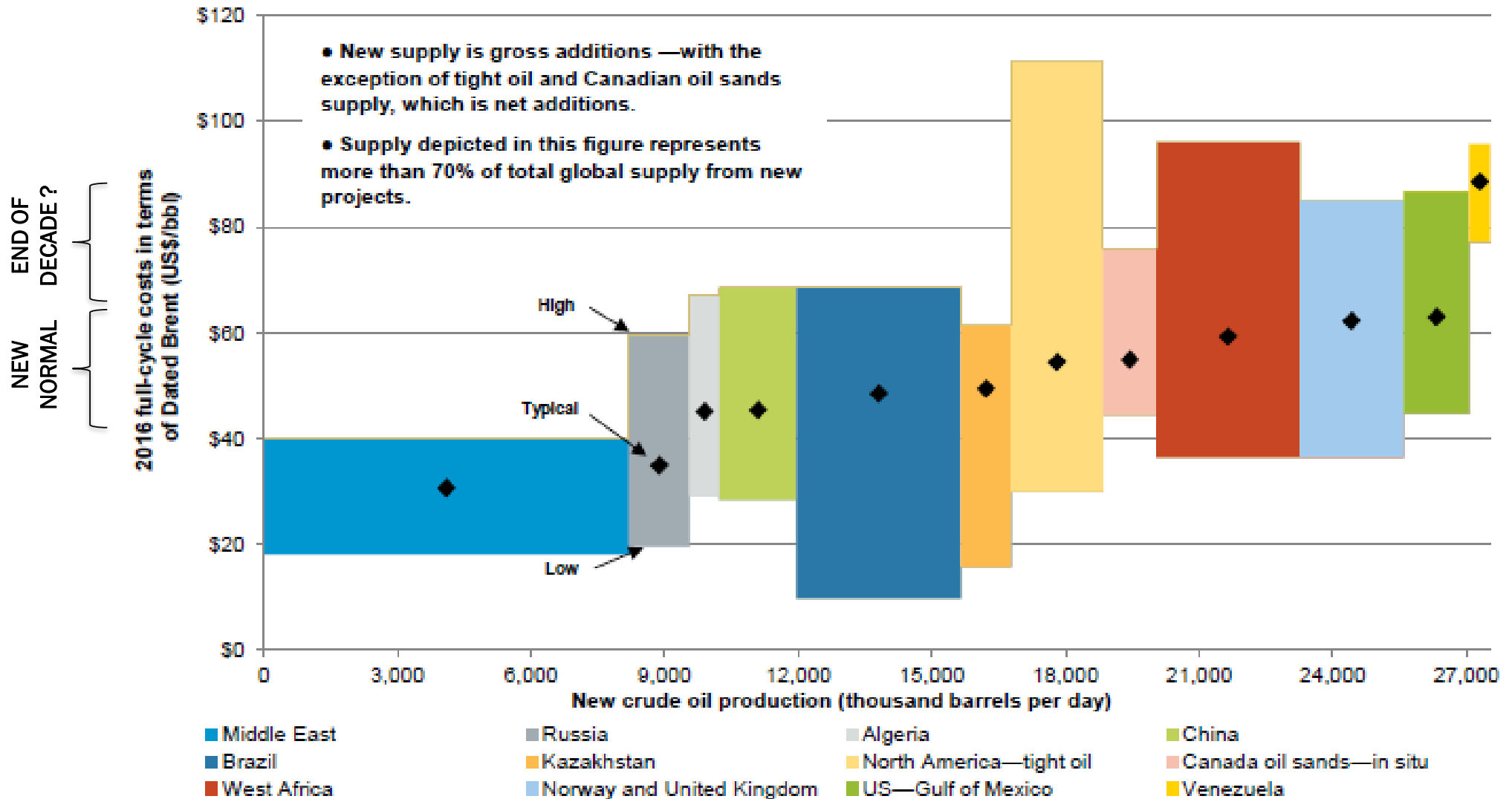
CAPEX investments to resume gradual growth in 2017

Upstream CAPEX forecast, USD B

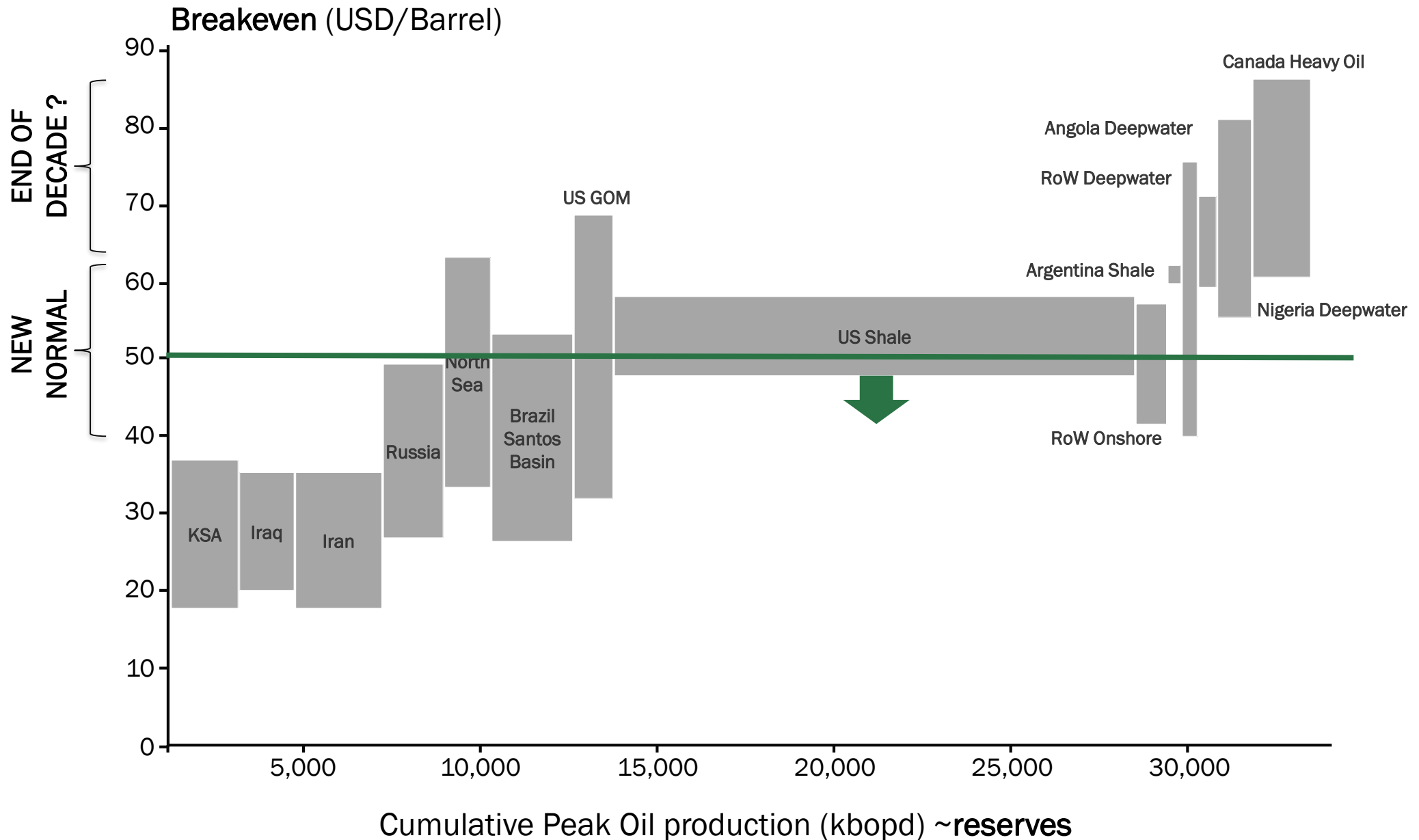


Only lower-cost projects will see the light (Cost curve by market)

Indicative cost curve of global crude oil supply from new projects in select areas to 2030



US shale today is the “swing” producer, driving the market rebalance (*Cost curve by reserve*)



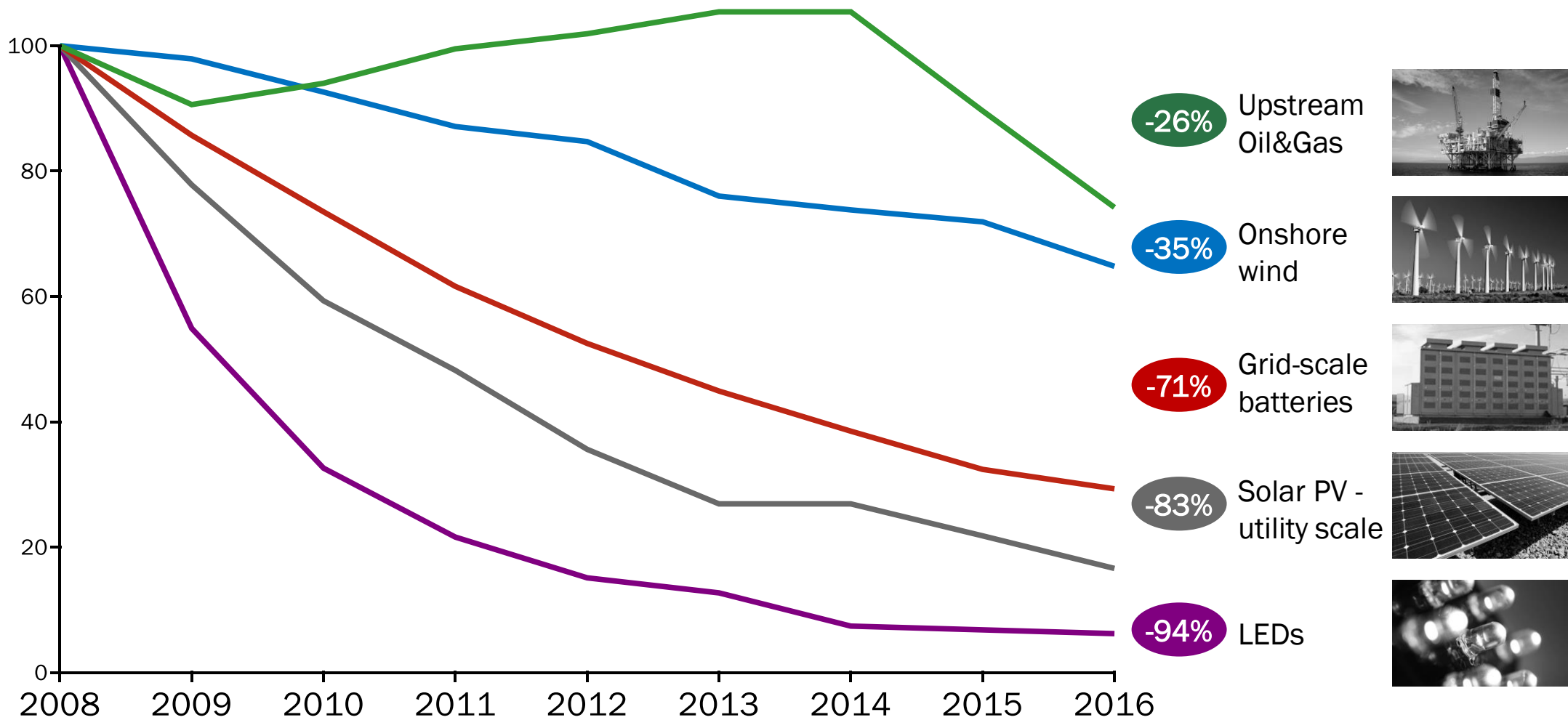
Therefore, drastic cost-reductions for new projects are needed

- An **18-22 % cost deflation** has materialized by 2016, but there are **inflationary pressures** for costs to rise again by the end of decade
- **Further supply chain savings** based on ‘squeezing’ the service sector are possible, but probably limited
- **Major structural supply chain** improvements are needed to:
 - Lower costs further
 - Improve reliability and quality and reduce risk



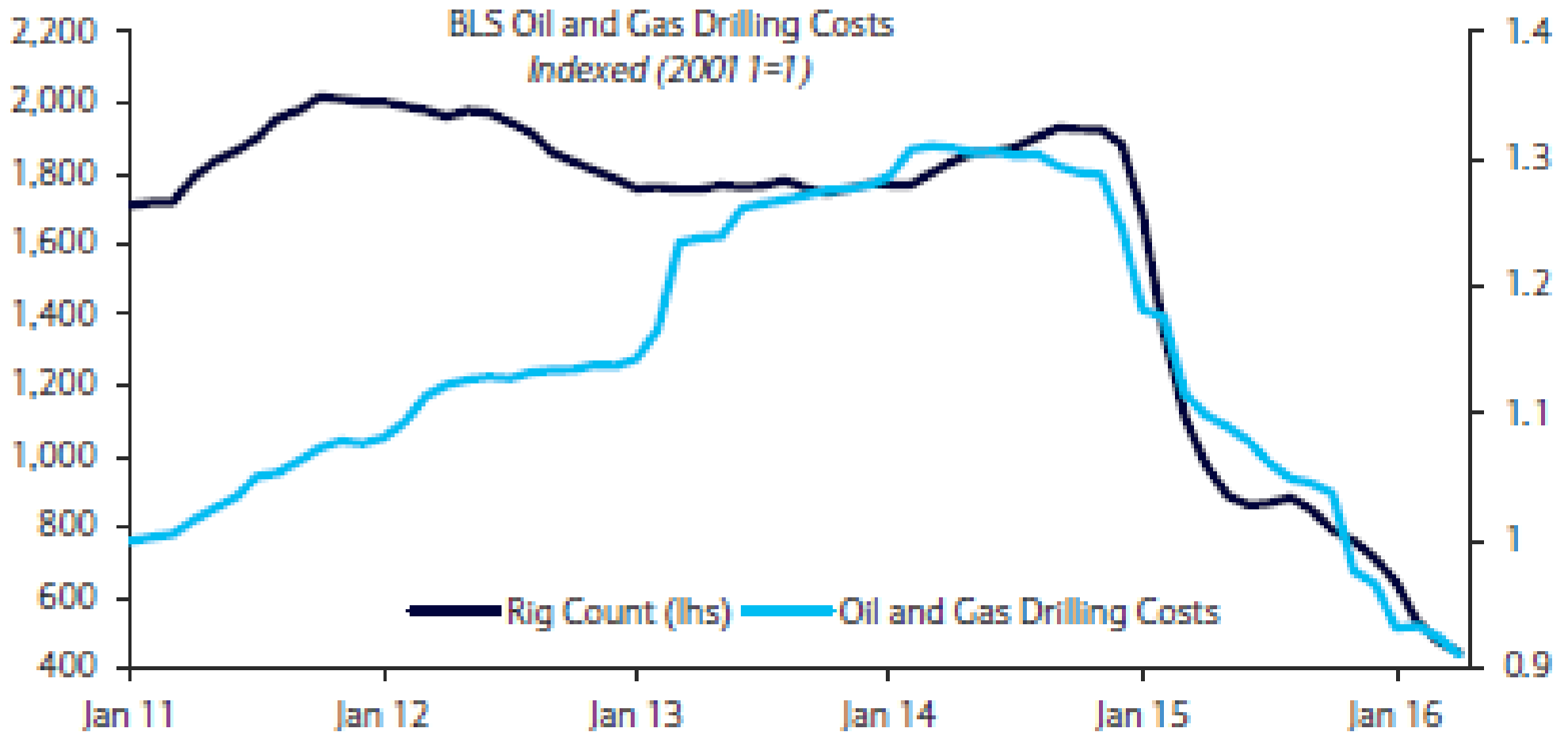
Our industry has been the most resistant one to reduce costs

Cost developments across the Energy spectrum, indexed 2008



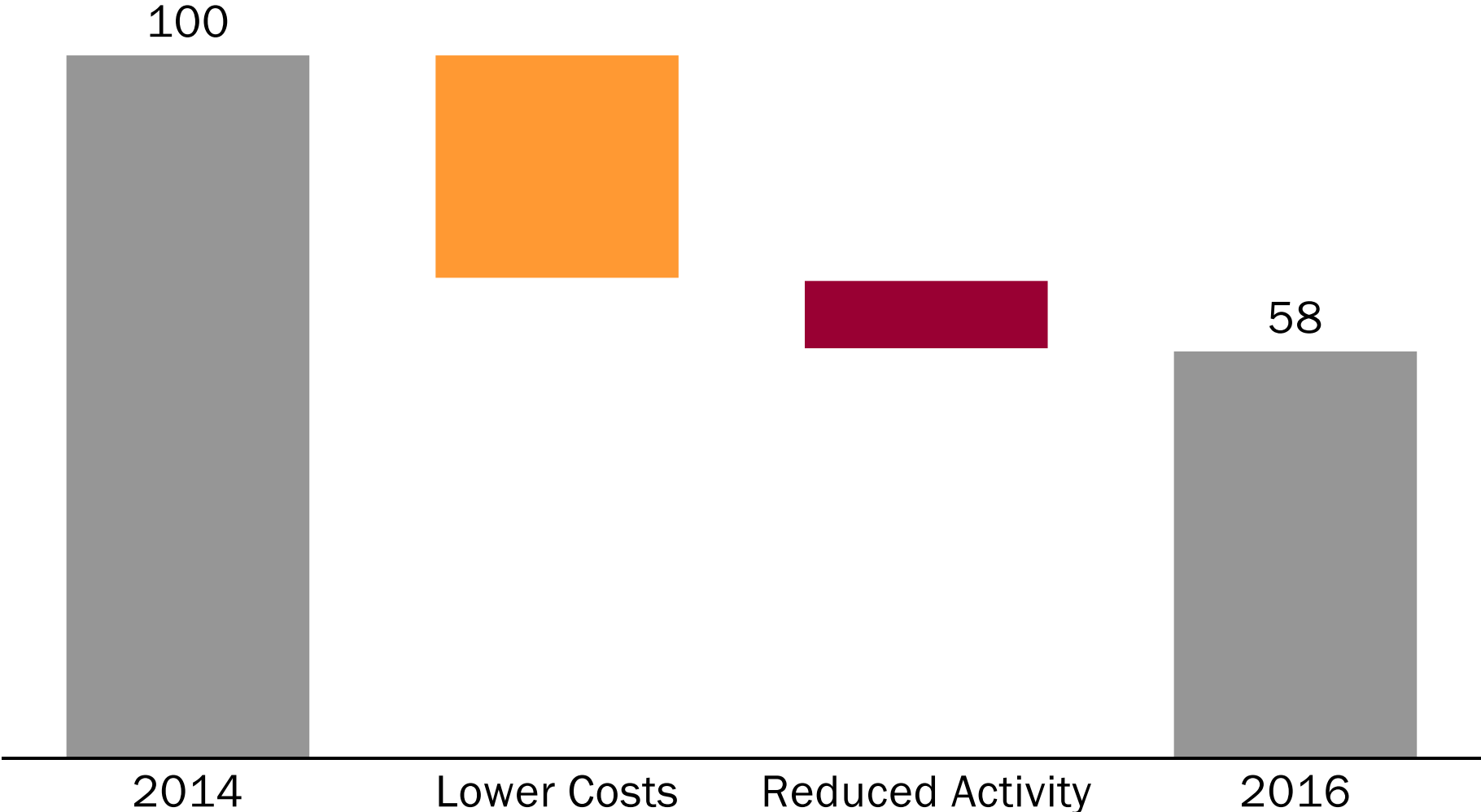
Lower prices are possible

Oil and gas drilling costs have declined at least 30% since prices began declining in 2014

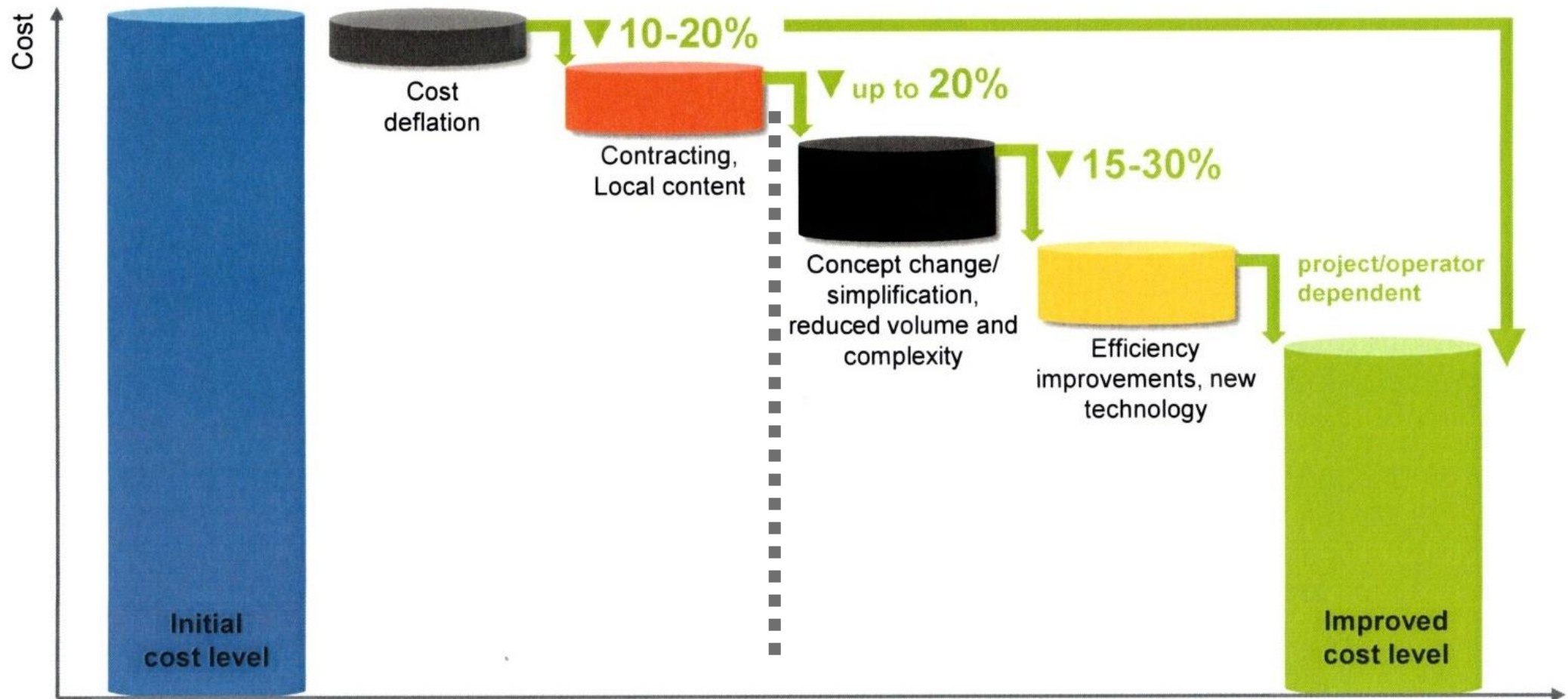


Lower costs were the largest contributors to lower CAPEX in global Upstream

Impact of cost deflation and reduced activity on global Upstream investment, base 100 in 2014



Further reductions will originate primarily from improved designs and technologies



Note: % reduction estimates deduced from announced efforts (both realised and unrealised) by operators and contractors. They are not reflective of what can be achieved.

Energy supply-and-demand: More-of-the-same... but very different!

Geopolitics

Steady demand
growth

Environmental
awareness and
new policies

Role of
Governments

Efficiency
gains

Technology
breakthroughs

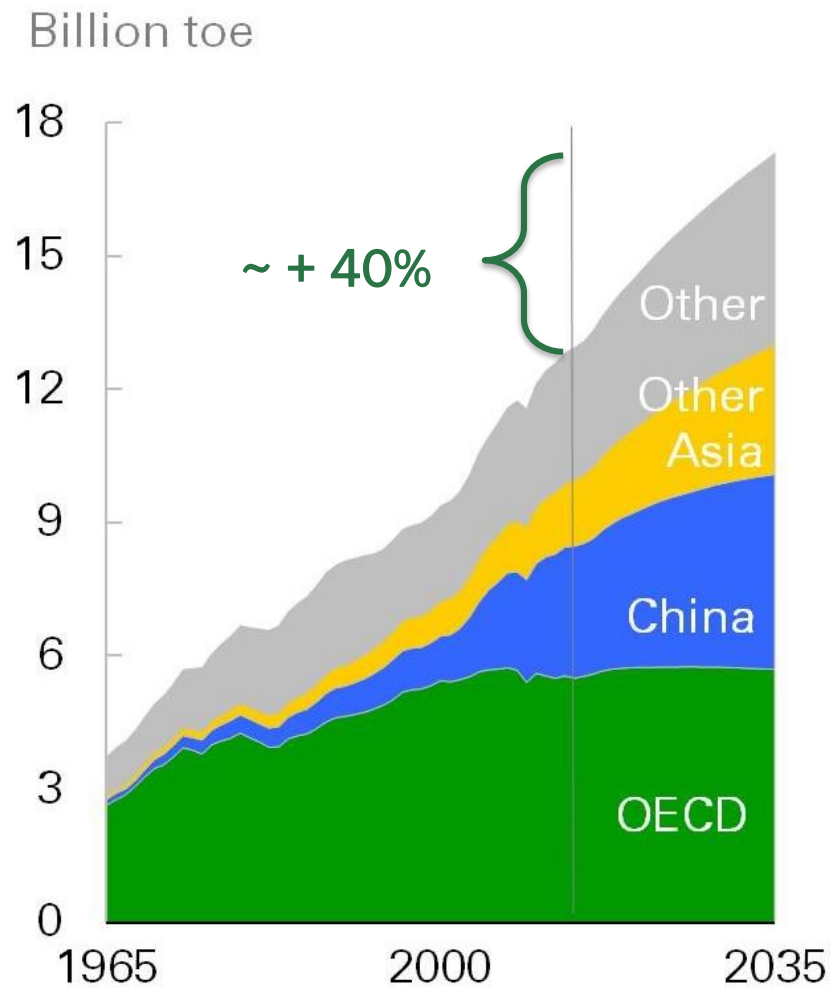
Lifestyle
changes

More reserves
to come into
play

Iran

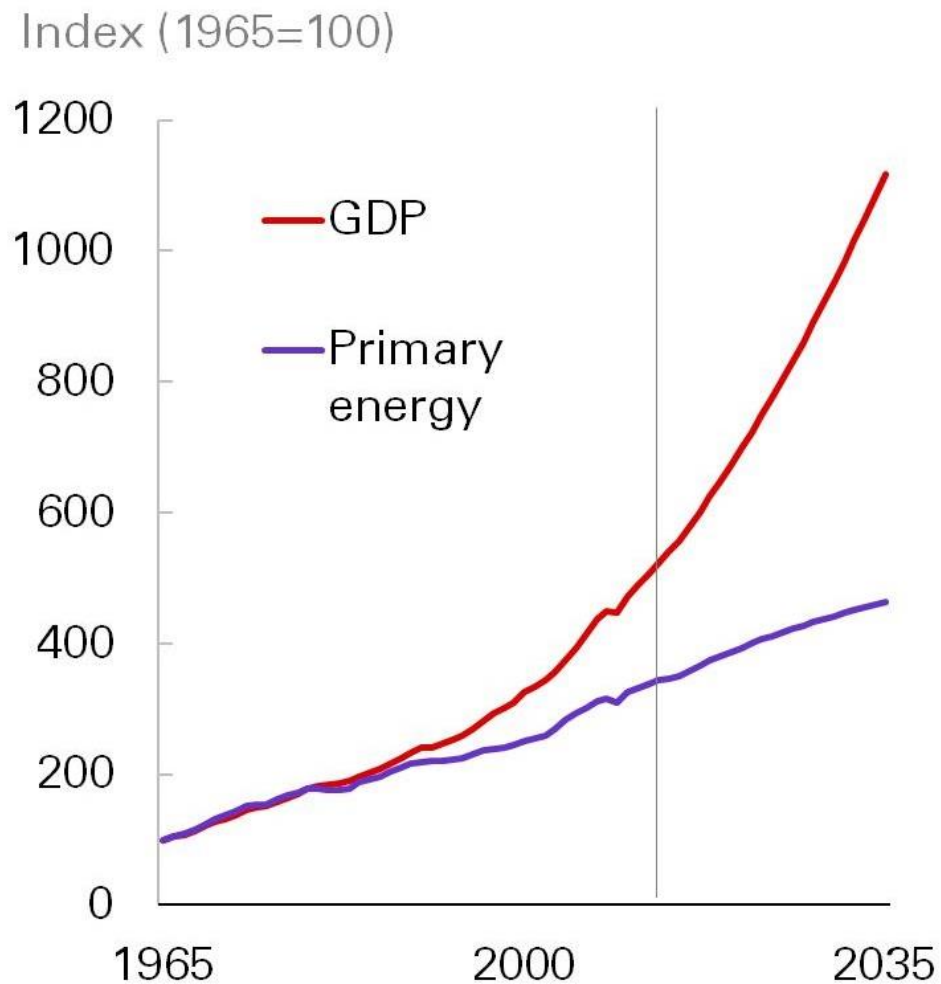
Growth in world economy continues to require more energy

Consumption by region

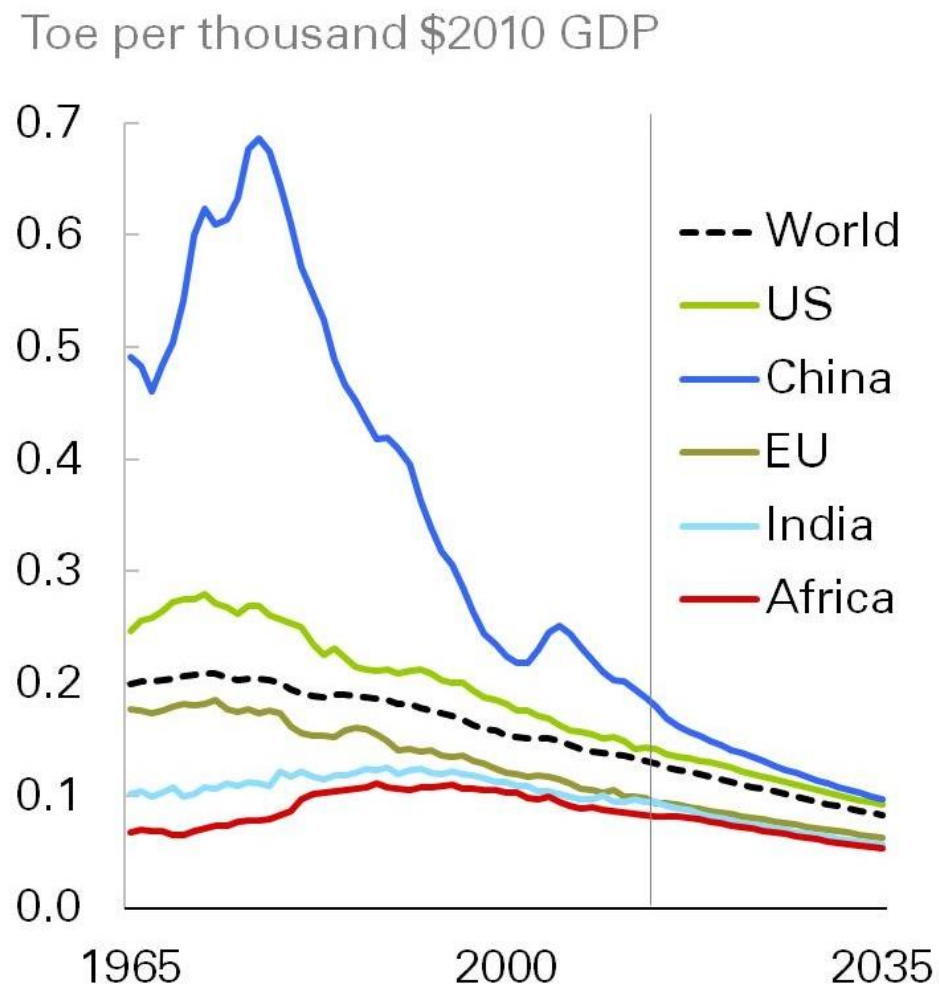


But energy usage is more efficient

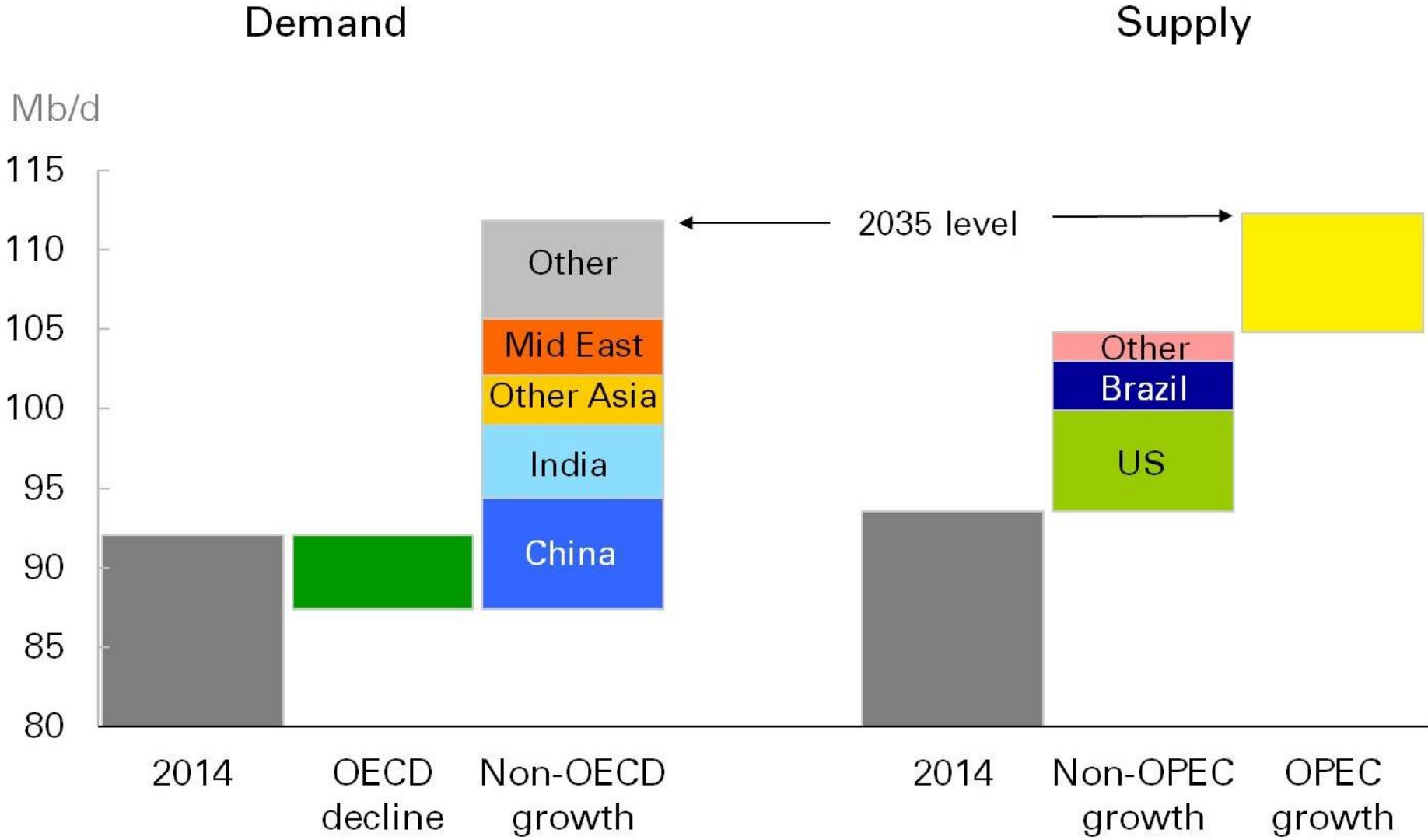
World GDP and energy demand



Energy intensity by region

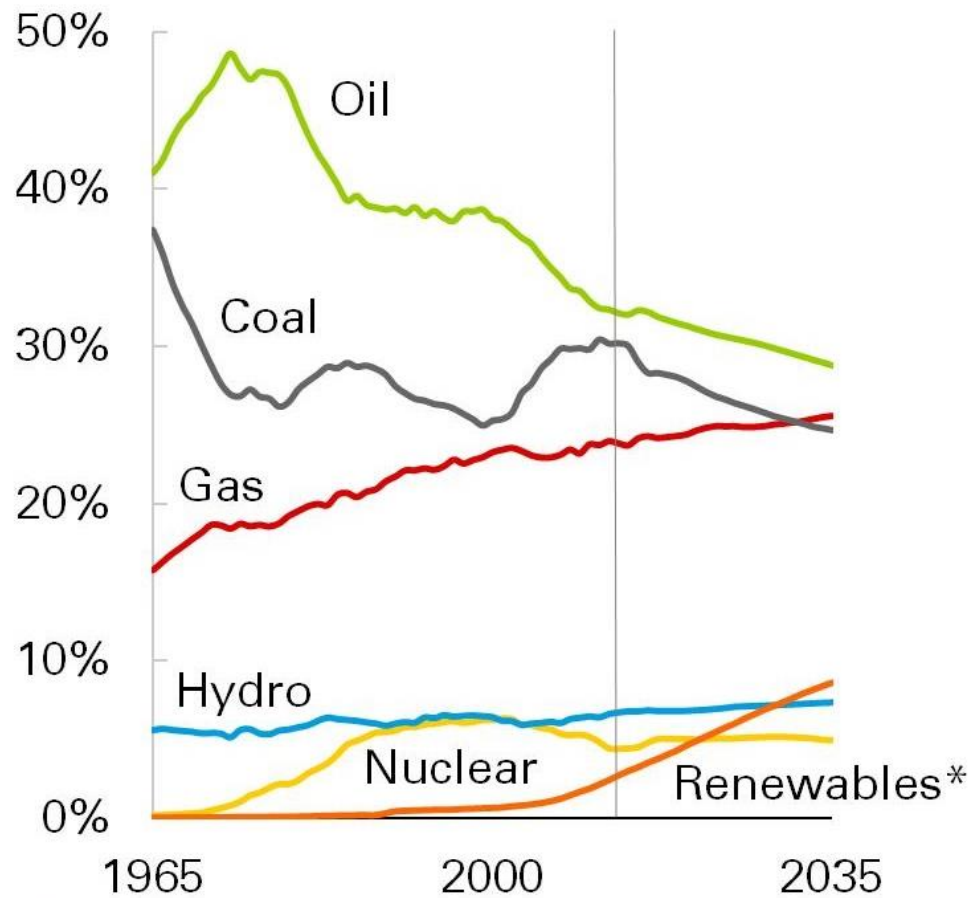


Strong growth in Asia is the main driver in increased oil demand



The fuel mix is changing significantly

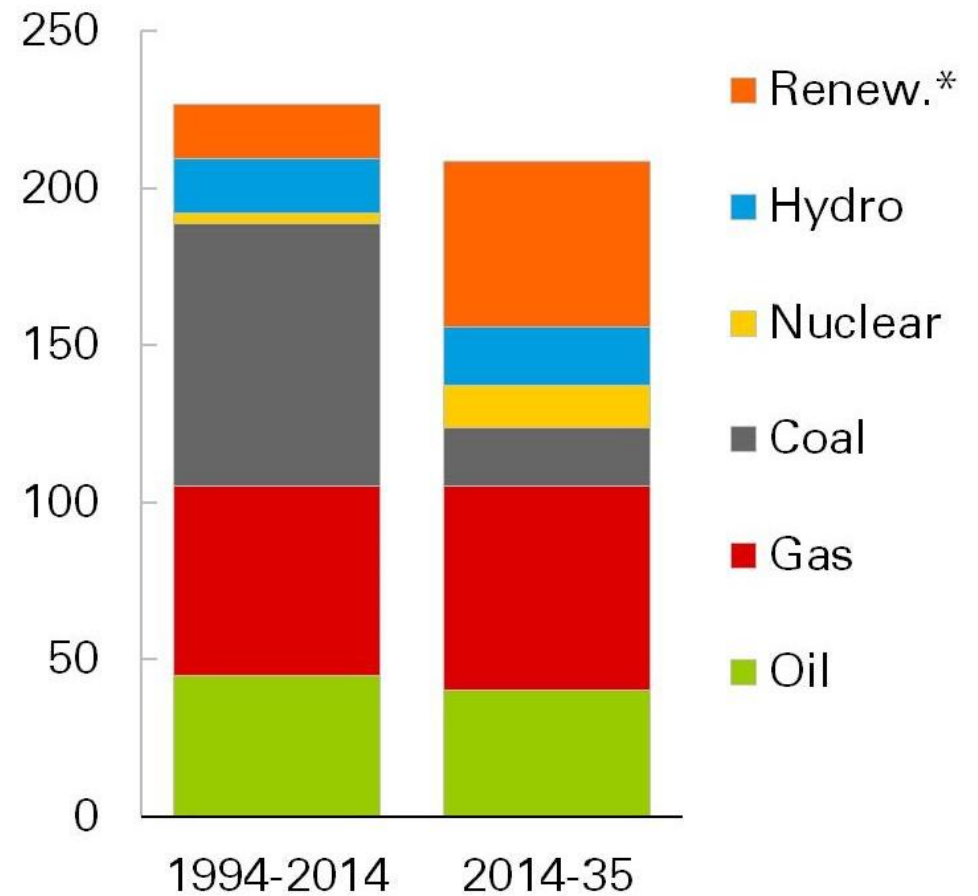
Shares of primary energy



*Includes biofuels

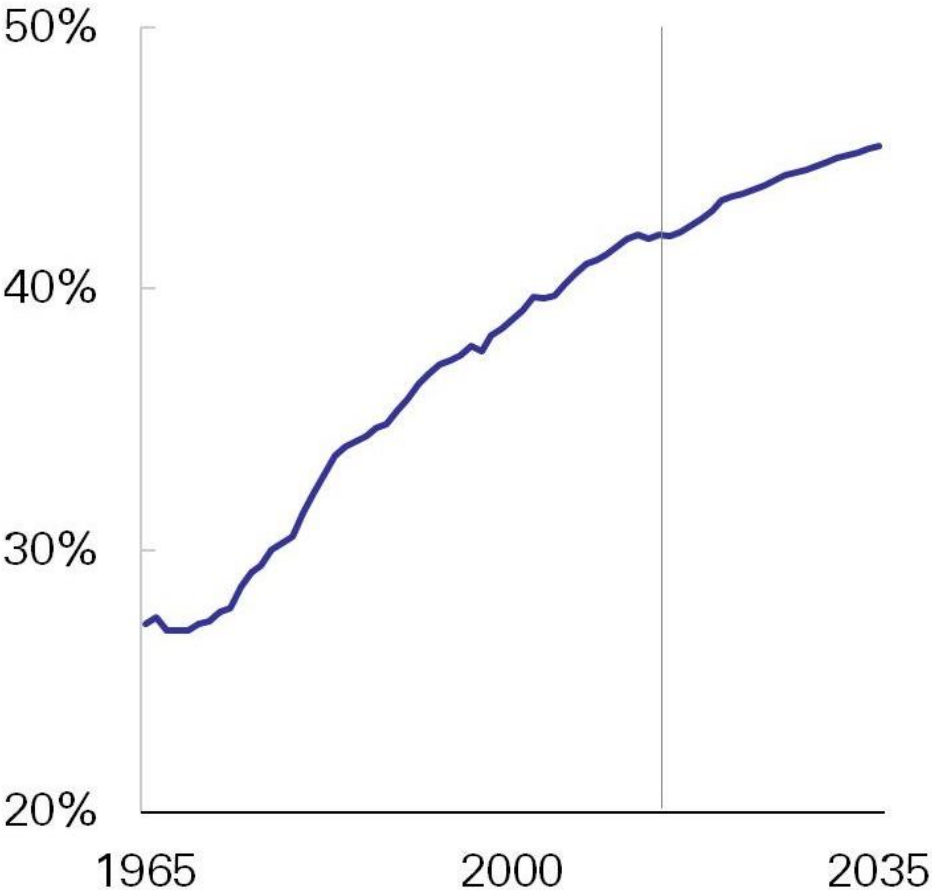
Annual demand growth by fuel

Mtoe per annum

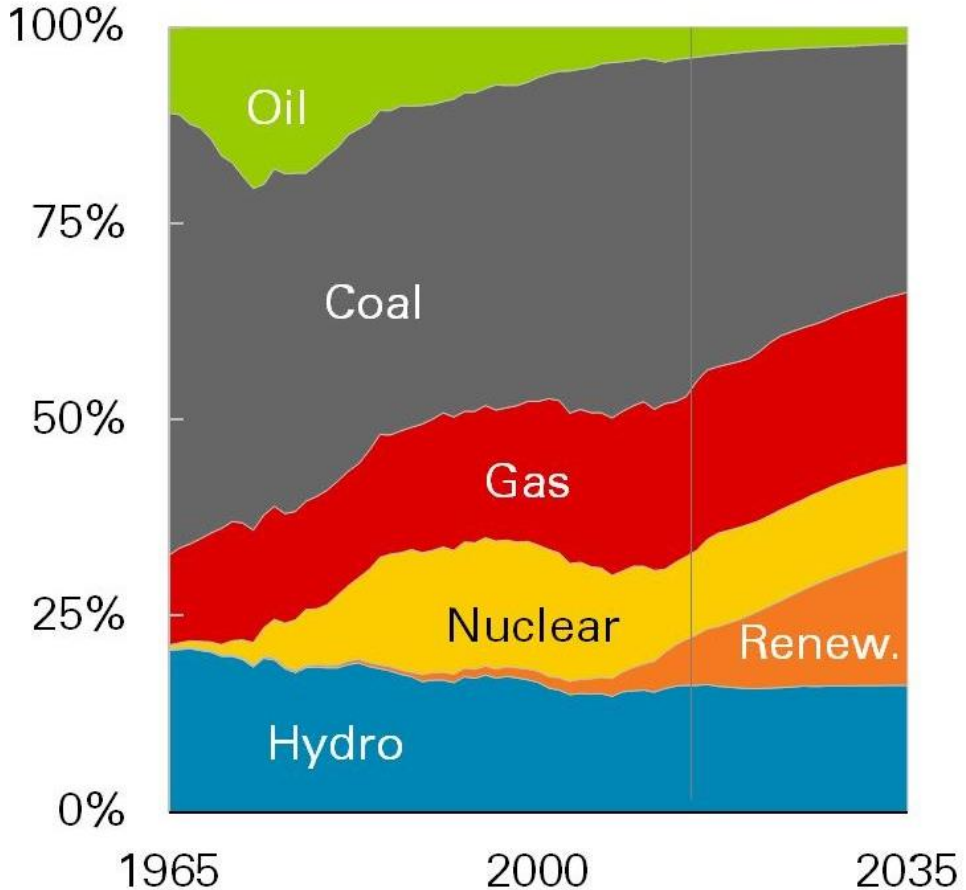


Much of the growth in energy usage is for Power generation

Inputs to power as a share of total primary energy

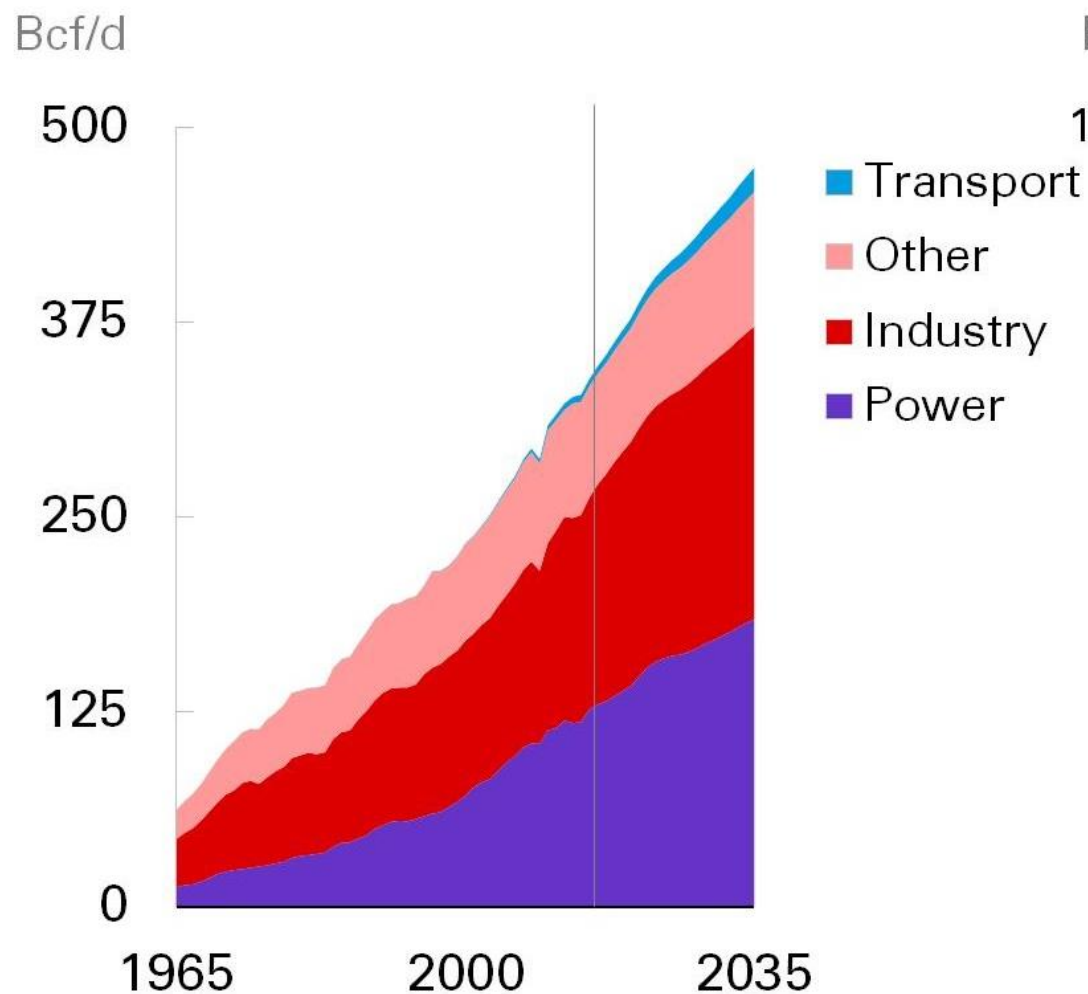


Primary inputs to power

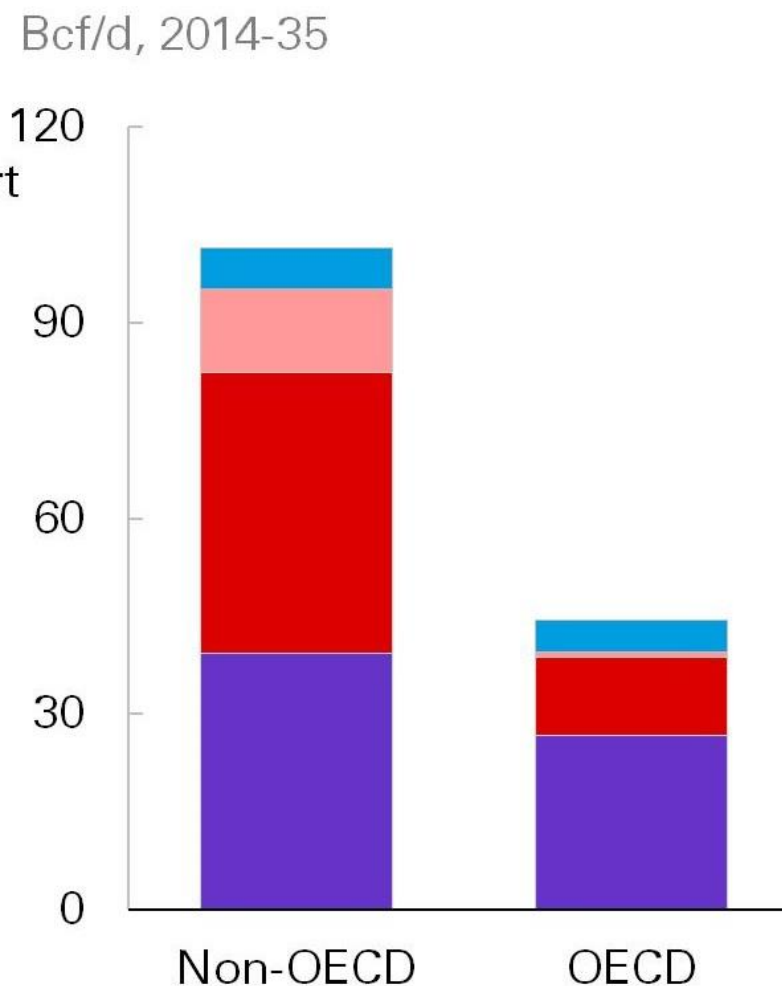


Demand for Natural Gas to continue growing strongly

Demand by sector

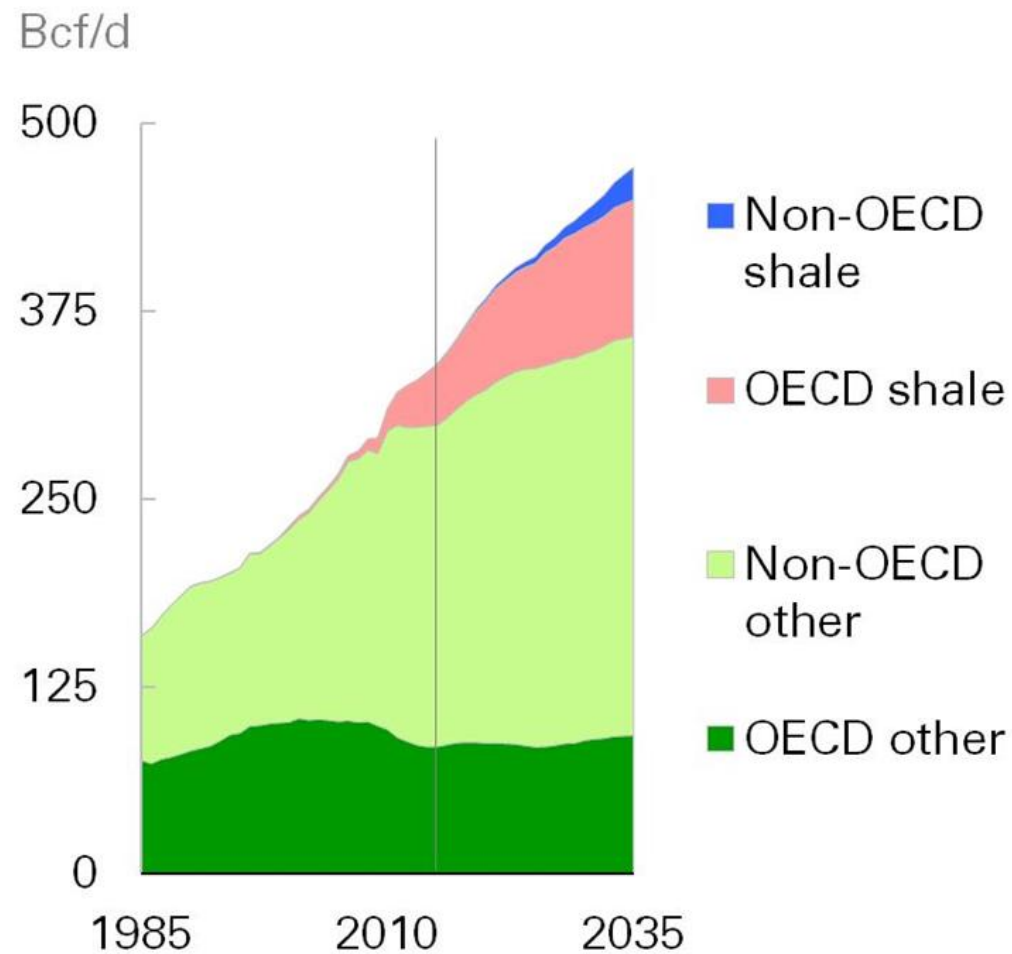


Demand growth by region



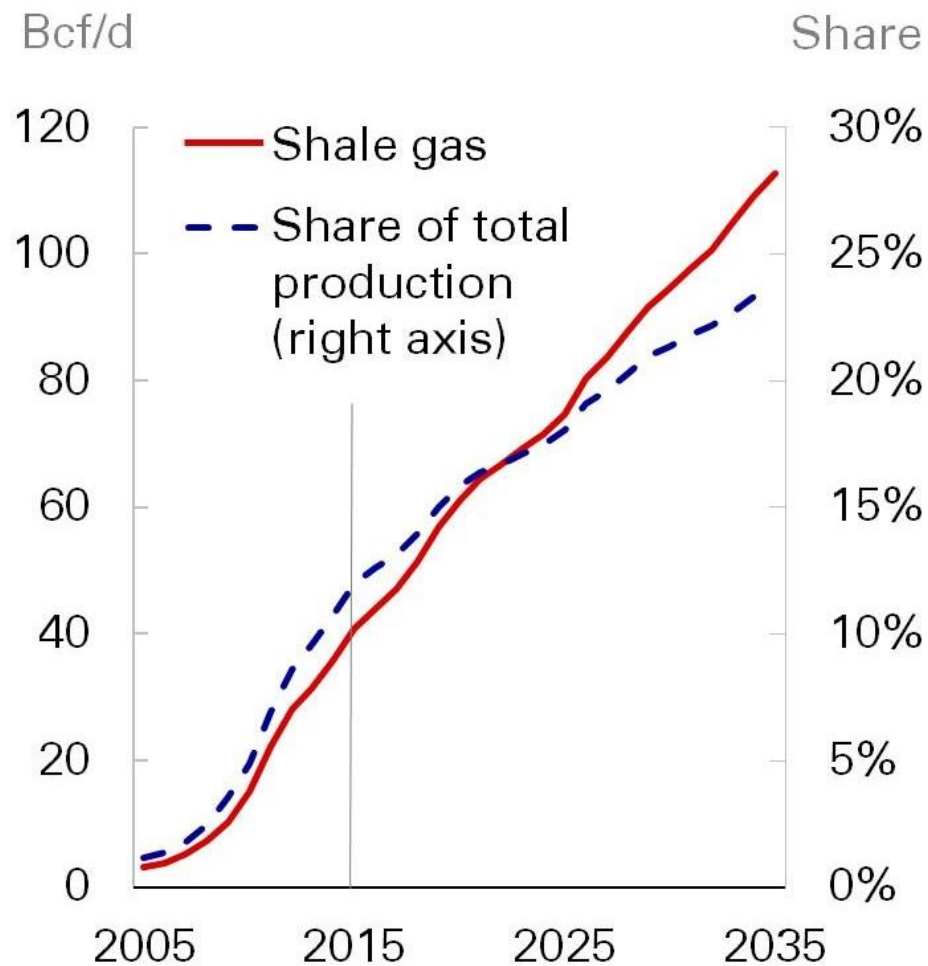
Global supplies of natural gas to grow robustly

Gas production by type and region

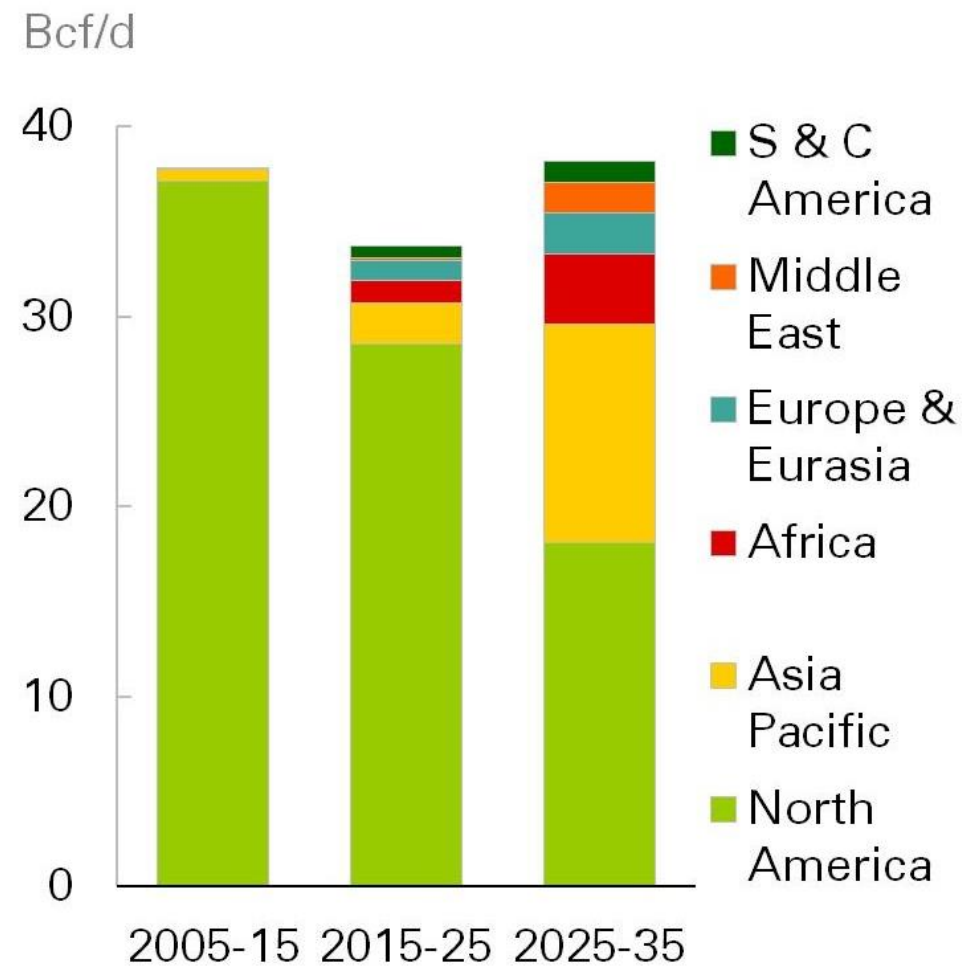


Shale Gas production to continue to expand rapidly ...

Global shale gas production



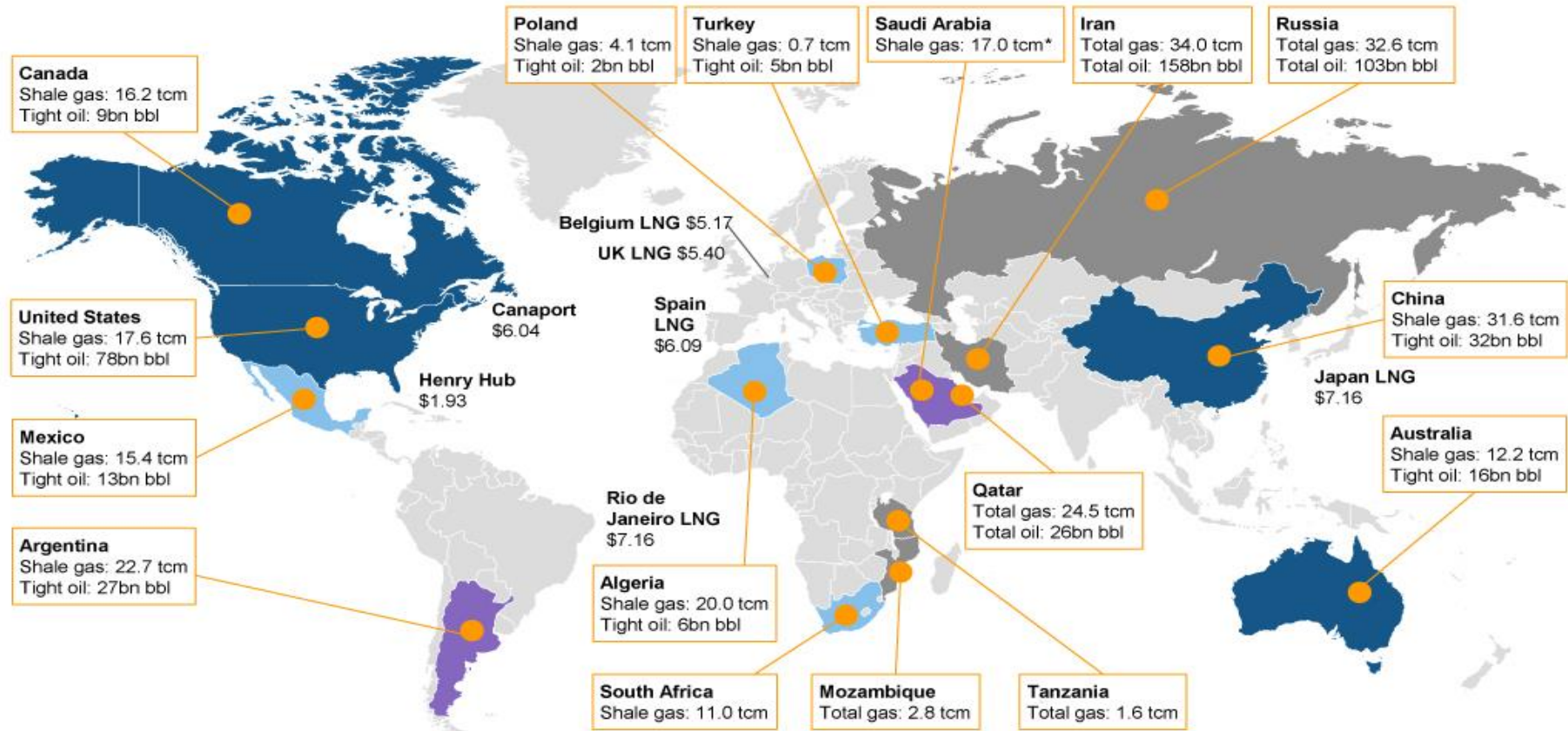
Ten year increments by region



... with cheap Shale expected to become a global phenomenon

Unconventional gas, a global phenomenon

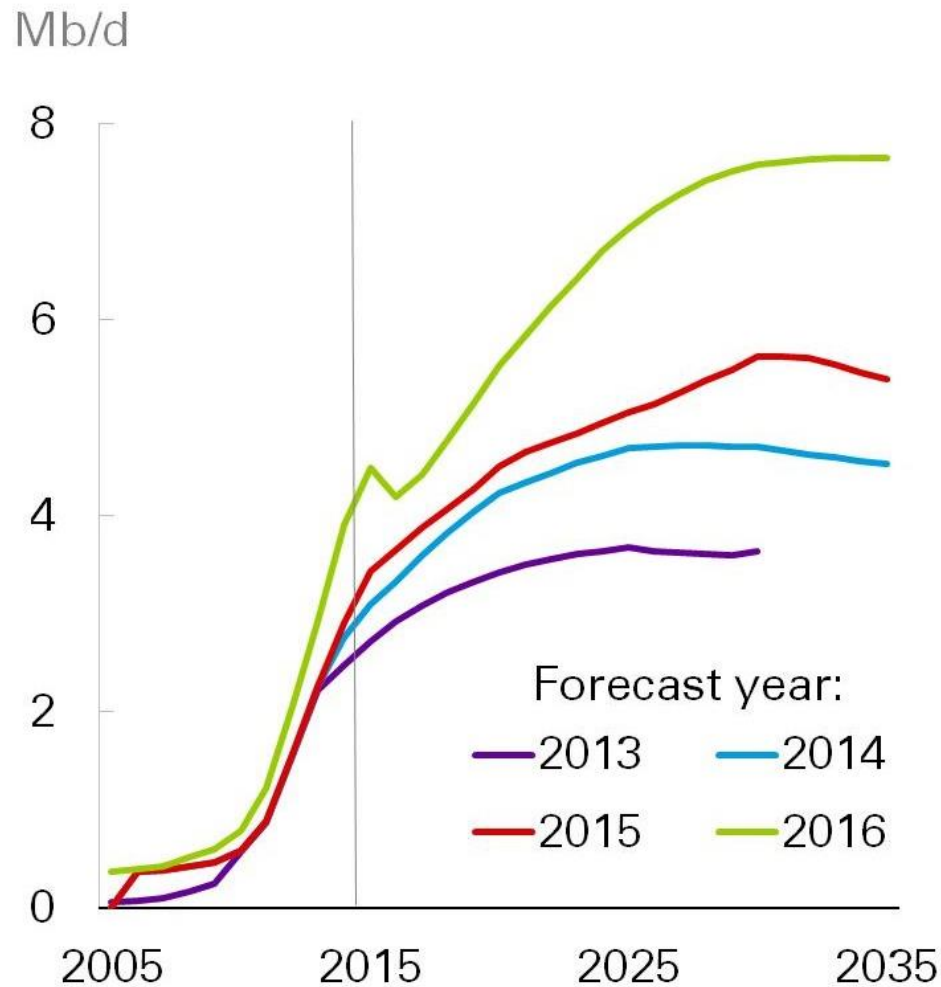
Despite the uncertain price environment, unconventional gas has become a global phenomenon with new supplies coming from Australia, China and New Frontier countries.



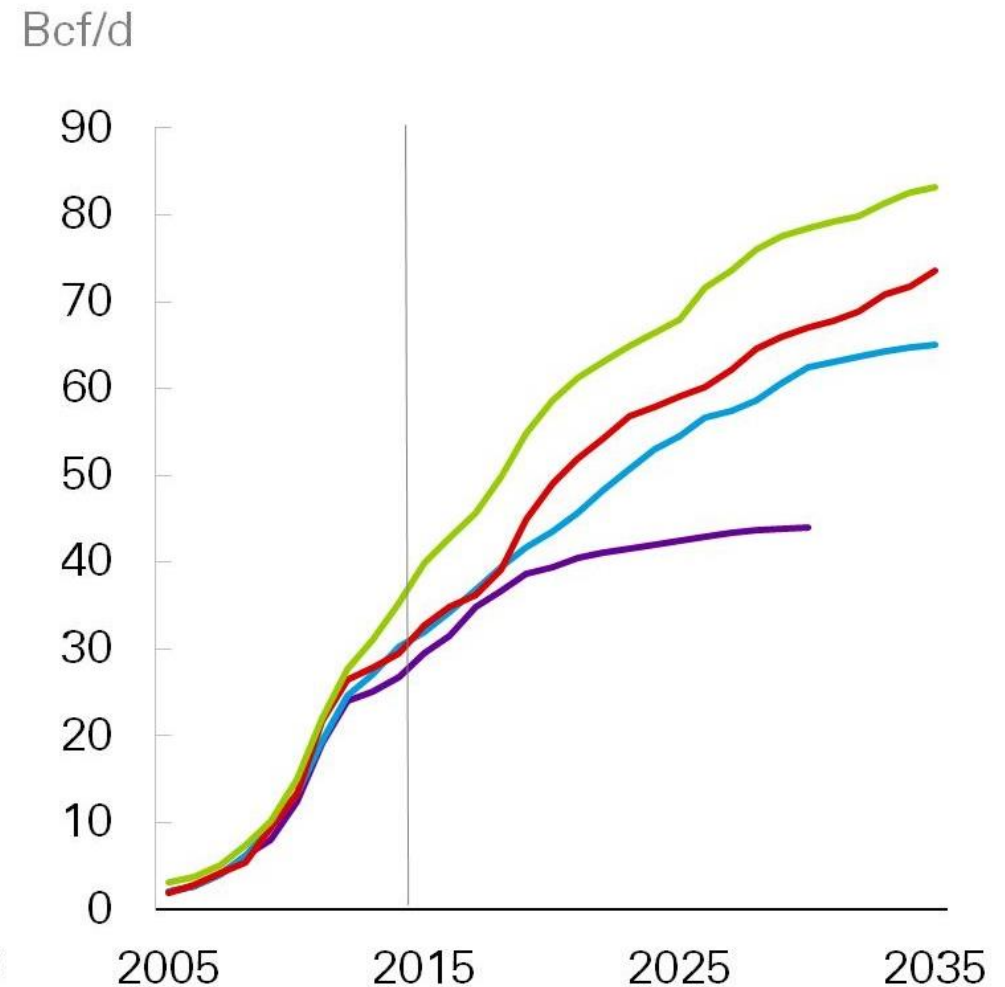
- Current unconventional gas producer
 - Planned unconventional gas production by 2020
 - Potential new frontier for unconventional gas
 - Potential new supplies of conventional gas
- *Estimate

The outlook for US Shale has been revised up repeatedly ...

US tight oil forecasts

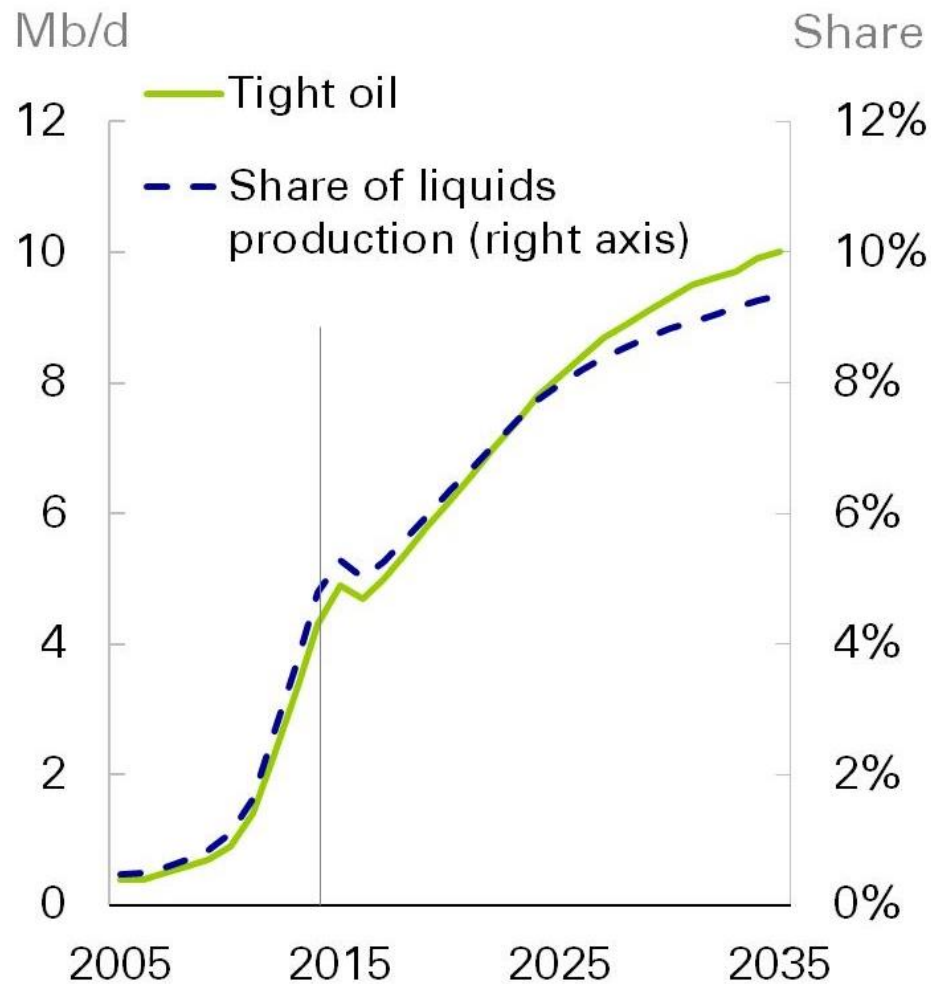


US shale gas forecasts

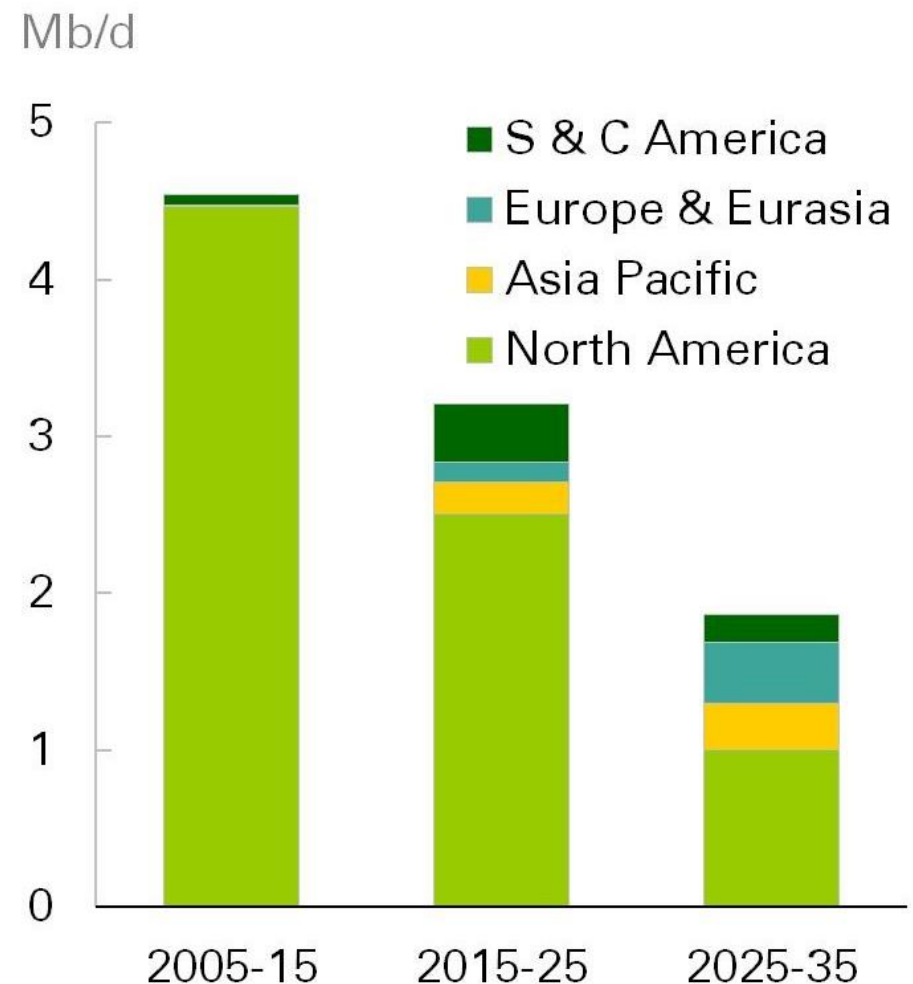


... although the global growth in Tight Oil will gradually slow

Global tight oil production

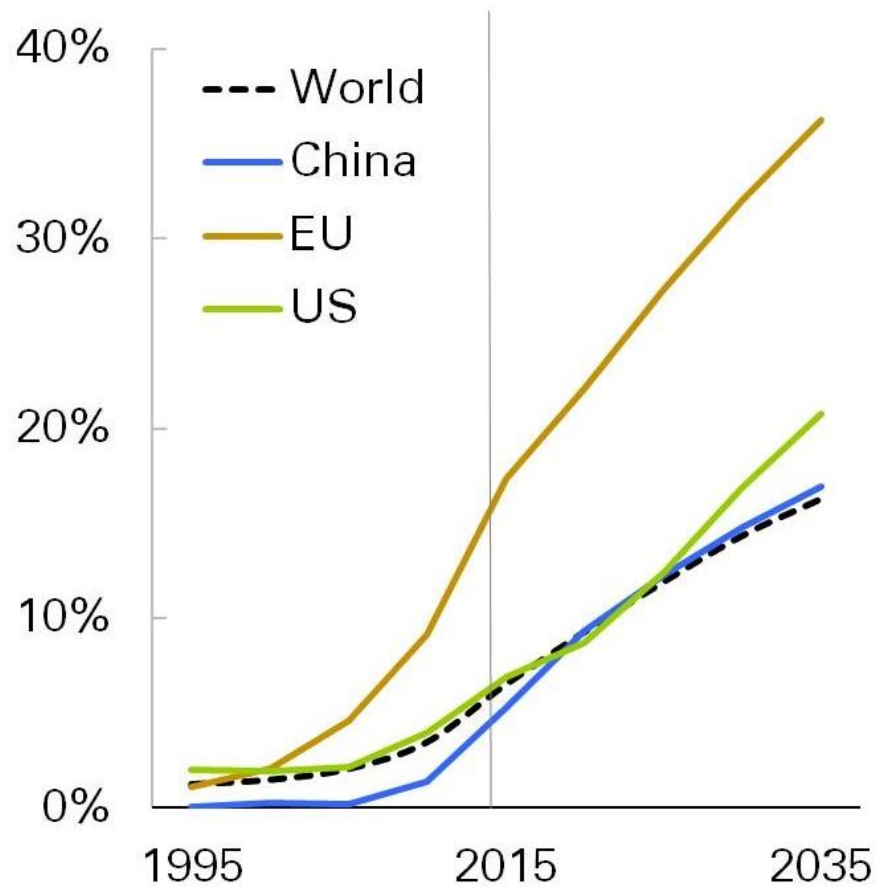


Ten year increments by region



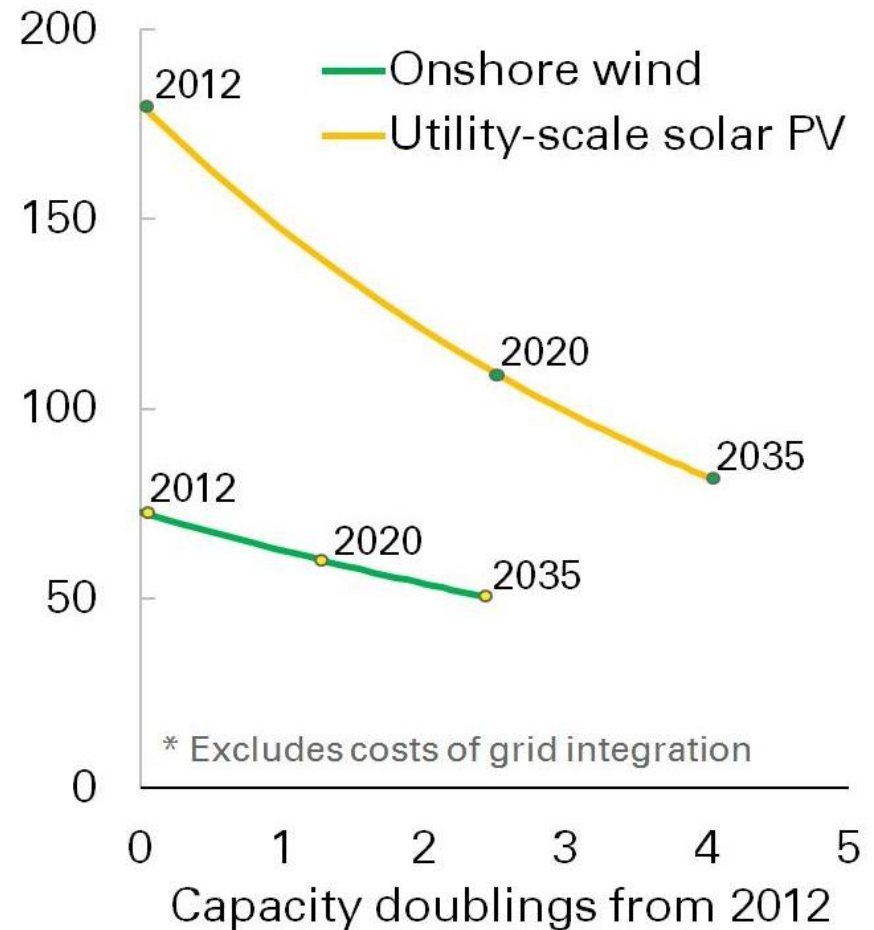
Renewables continue to grow rapidly

Renewables share of power generation



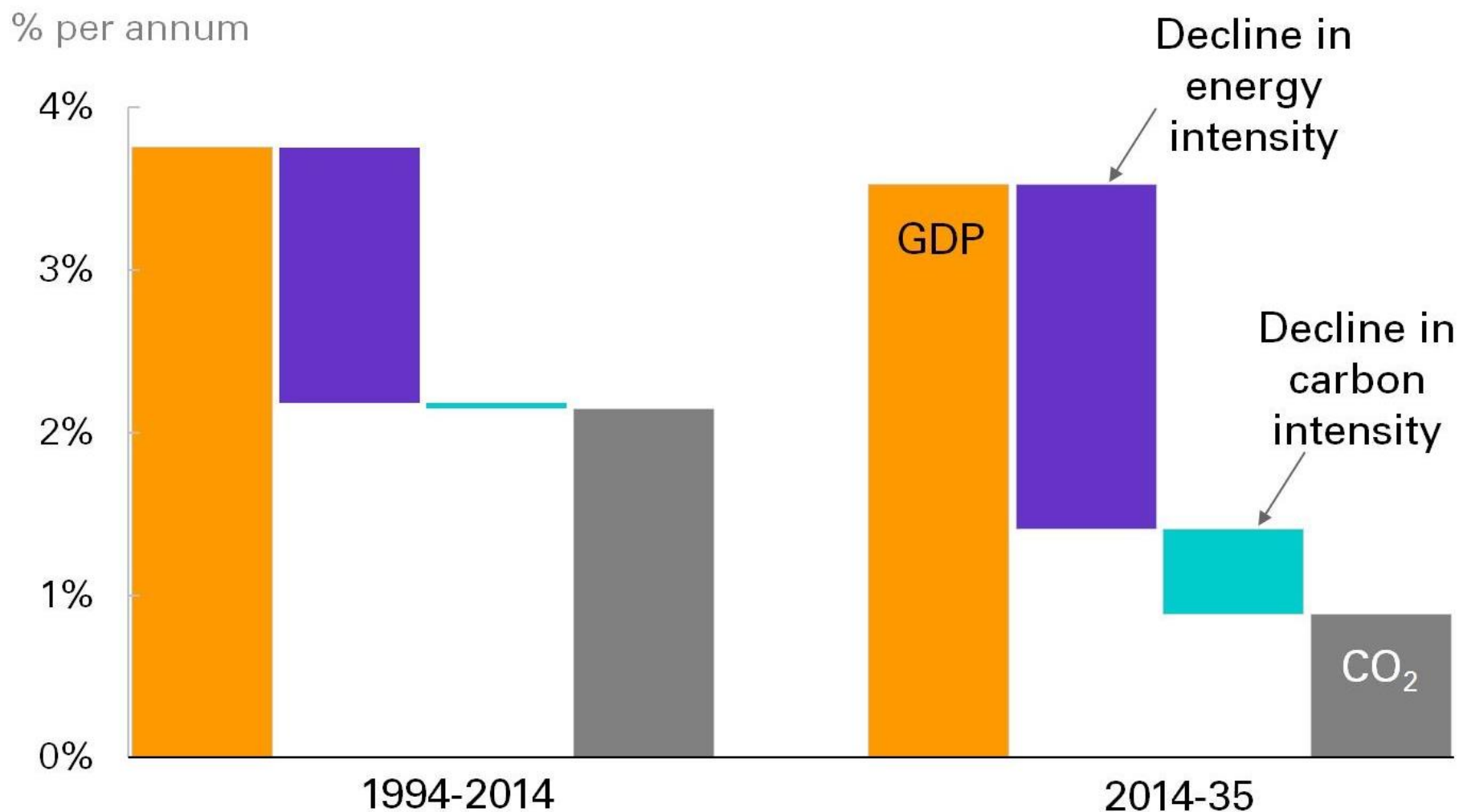
Levelized cost* of electricity in North America

\$2012/MWh



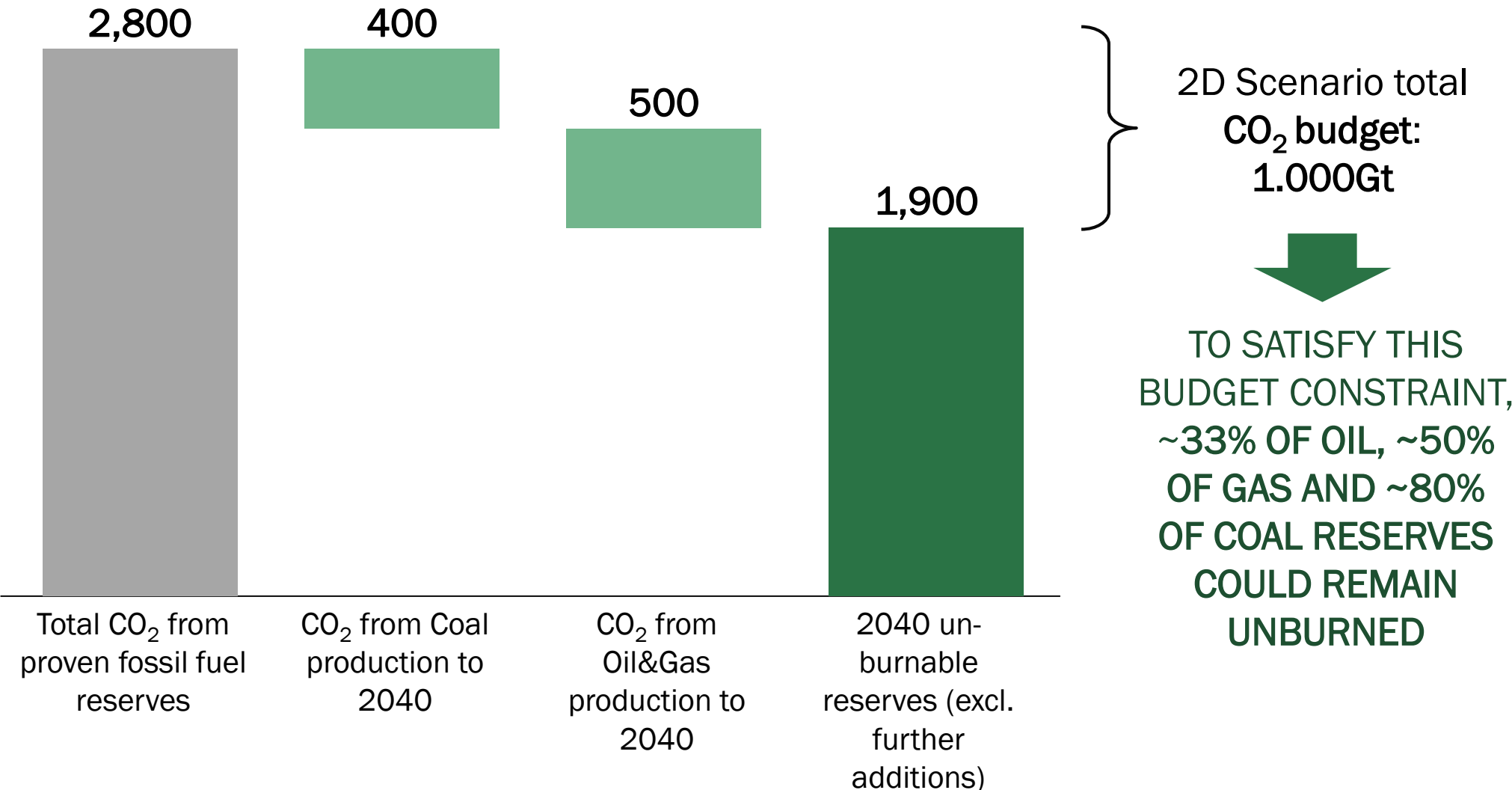
The growth rate of Carbon Emissions more than halves

Decoupling emissions growth from GDP growth



Assuming a stricter enforcement of COP 21 commitments, CO₂ emissions will become the key governing factor in Fossil Fuels exploitation

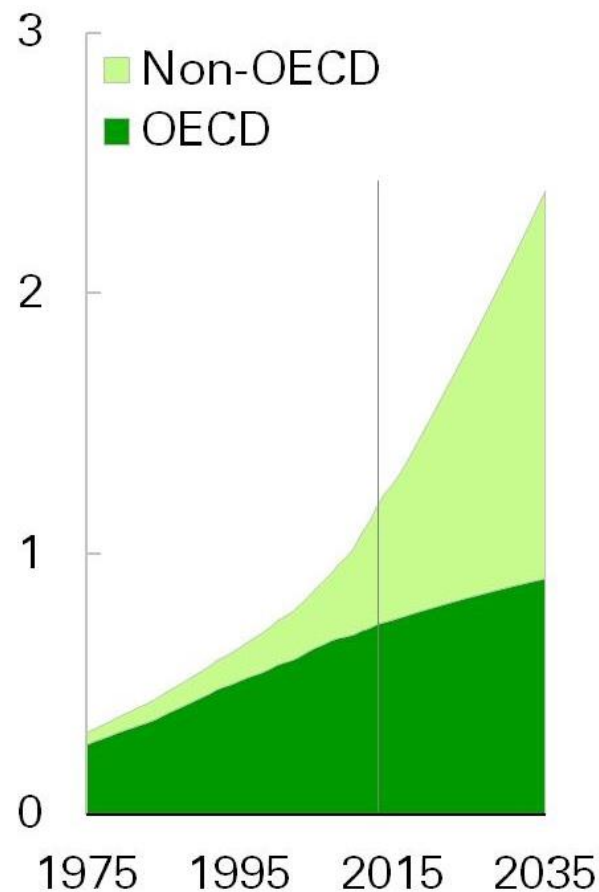
Fossil fuel reserves and planned production to 2040 in CO₂ equivalent, Gt



The global vehicle fleet more than doubles, but the fuel economy improves greatly

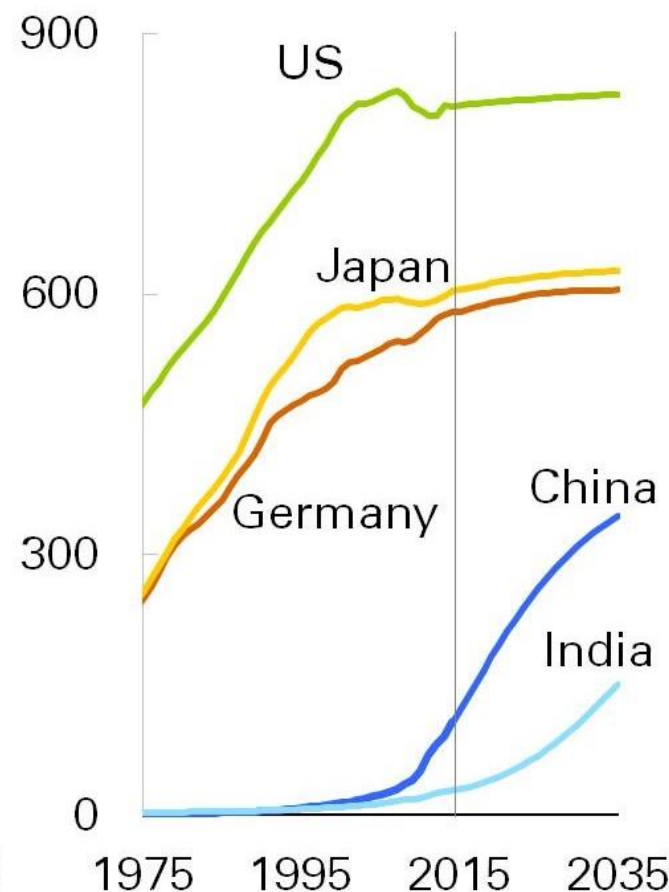
Vehicle fleet

Billion vehicles



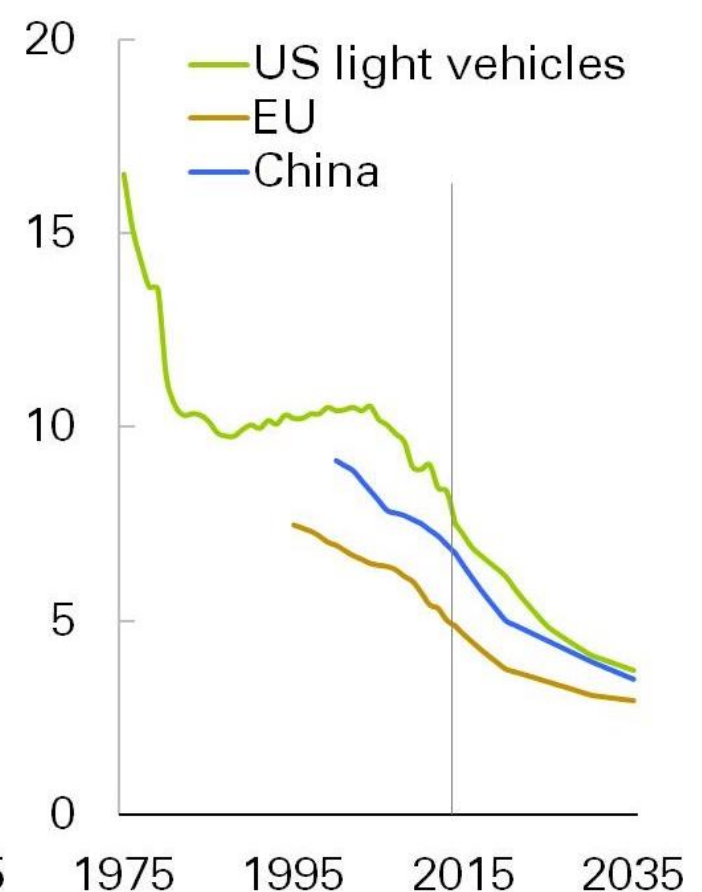
Vehicle ownership

Vehicles per 1000 people



Fuel economy of new cars

Litres per 100 km



Conclusions ... so far



- We are at the end of a 15y high oil price cycle - "new normal" at 50 ÷ 70 \$/bbl for the medium term
- CAPEX to resume gradual growth from lowest 2016 levels
- Only projects at significantly lower costs will materialize
- However, the industry is poised for significant changes

Agenda

MARKET CONTEXT

OUTLOOK ON INVESTMENTS

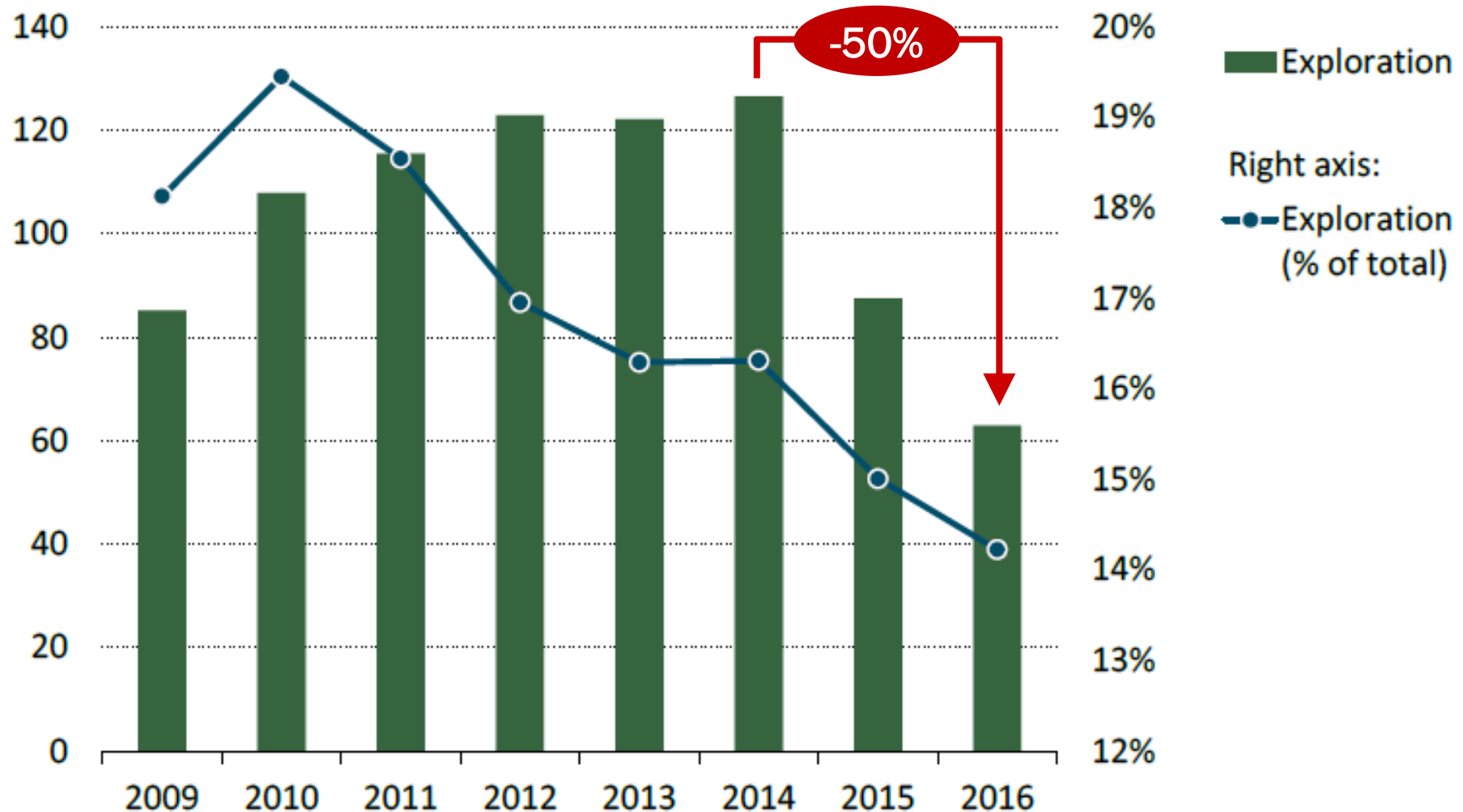
FOCUS ON OPEX

IMPACT ON THE VALUE CHAIN

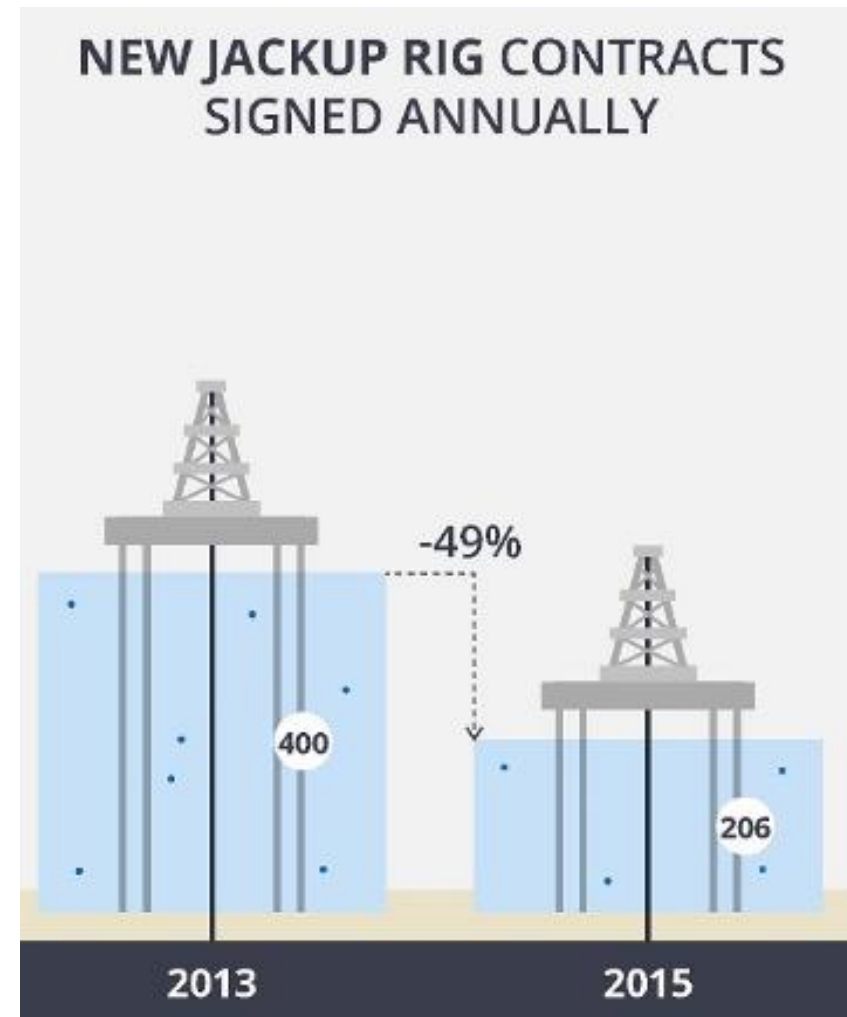
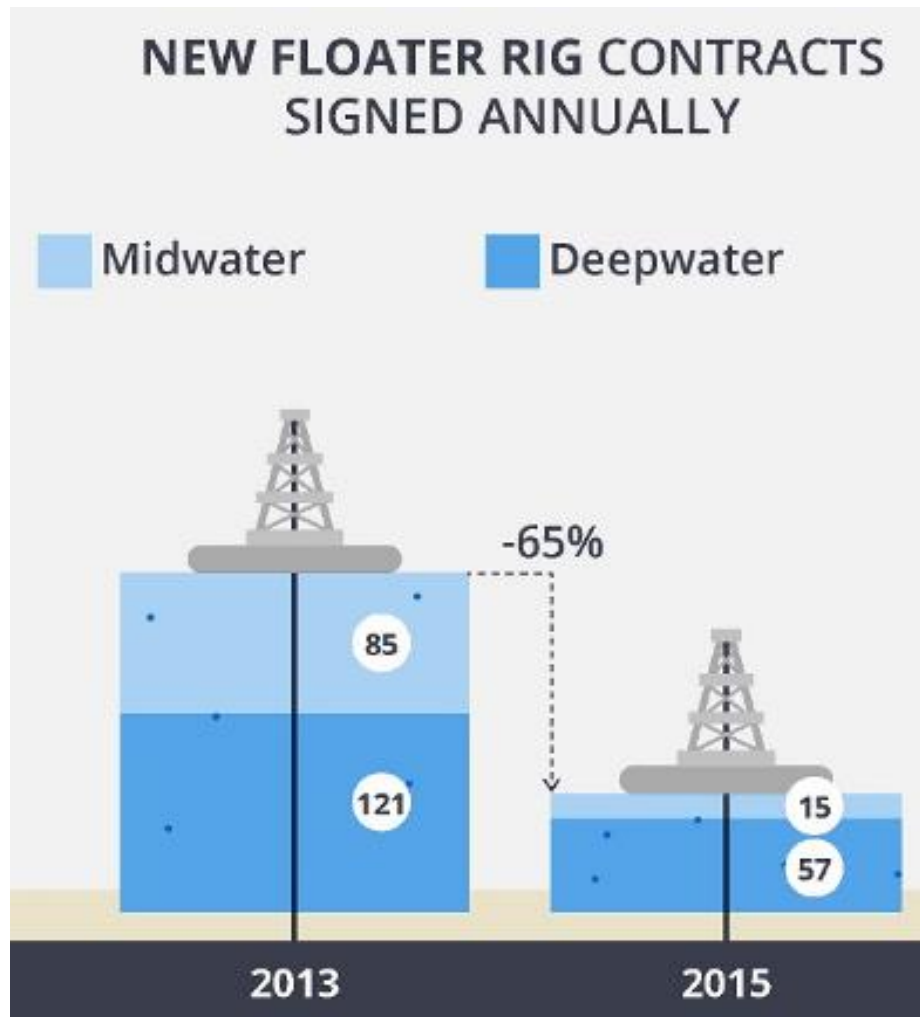
UPSTREAM OIL&GAS

CAPEX for Exploration strongly impacted

World investment in Oil&Gas Exploration, USD Billion

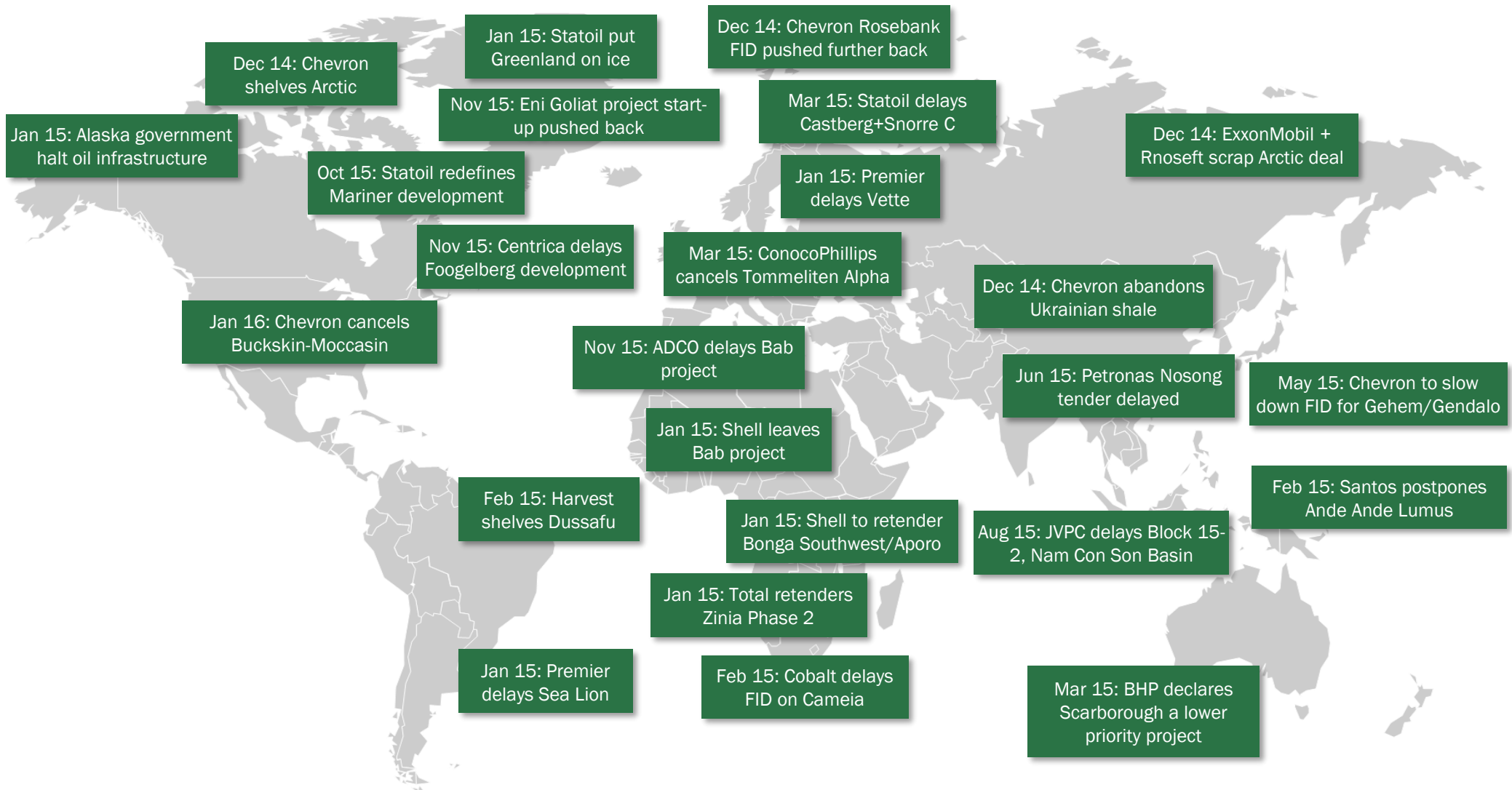


New contracted volume in Offshore Drilling declined by 50%+ between 2013 and 2015



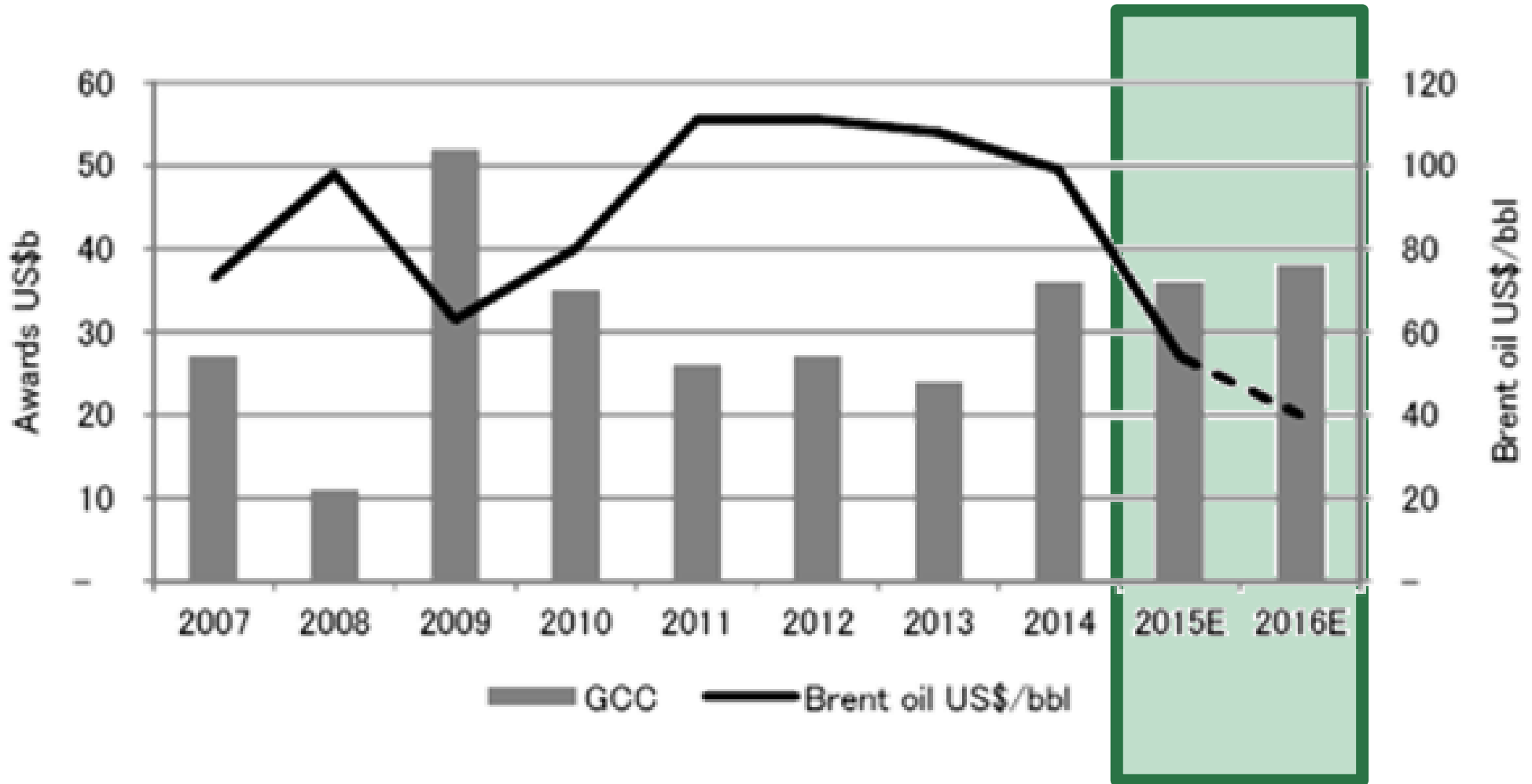
Many Upstream initiatives are being “postponed”

Main postponed Upstream projects



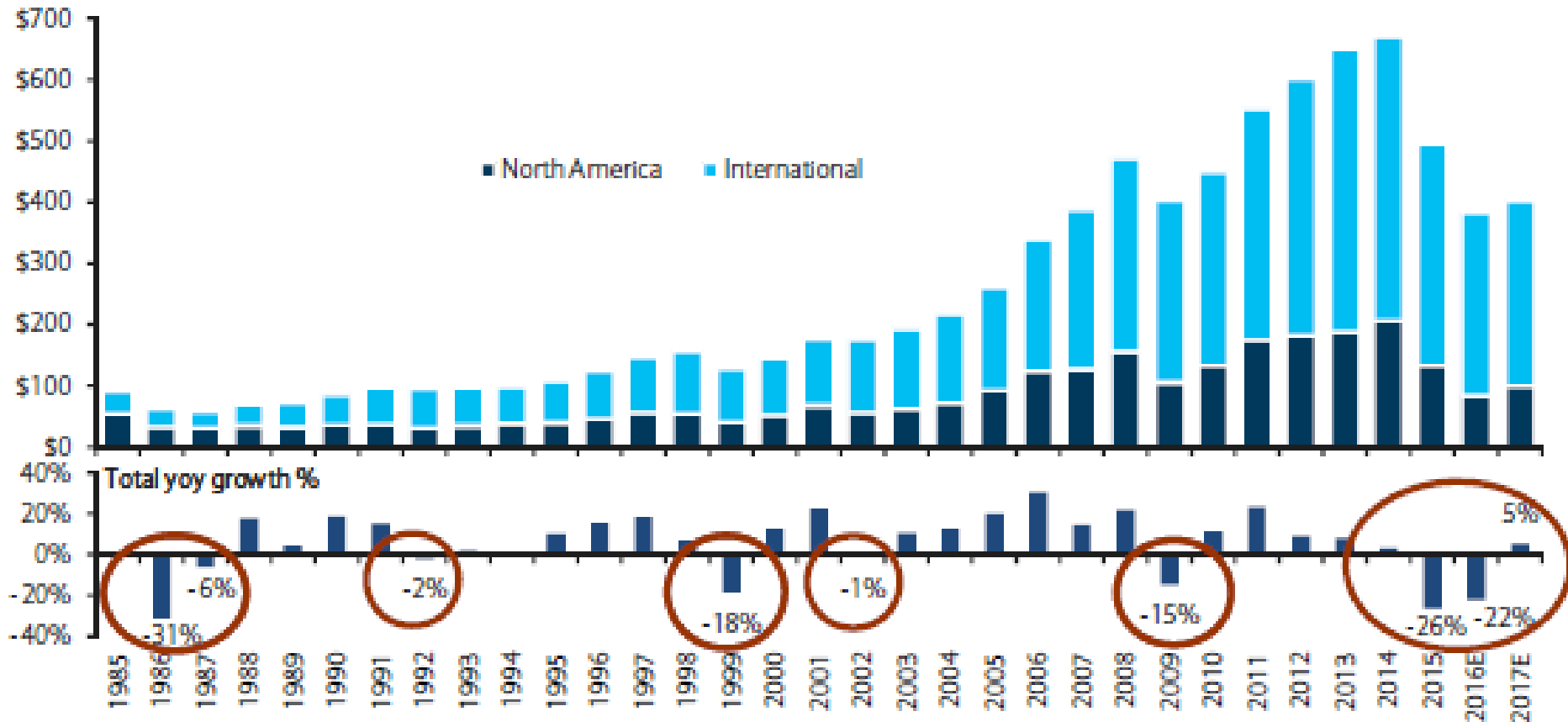
Middle East has been resilient

EPC awards in GCC (USD) and Oil Price (RHA)



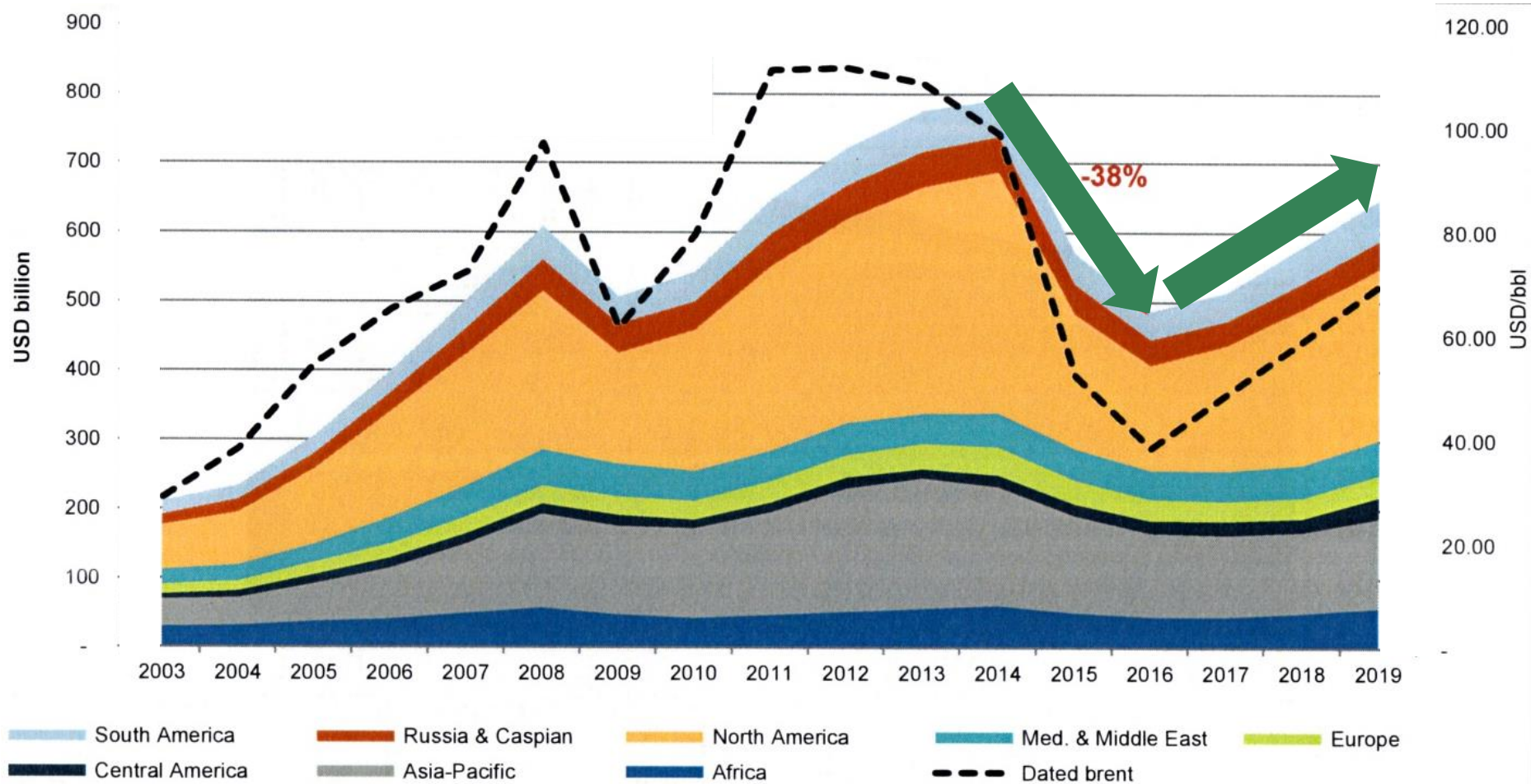
CAPEX could - slowly and gradually - start growing again

Upstream CAPEX, USD B



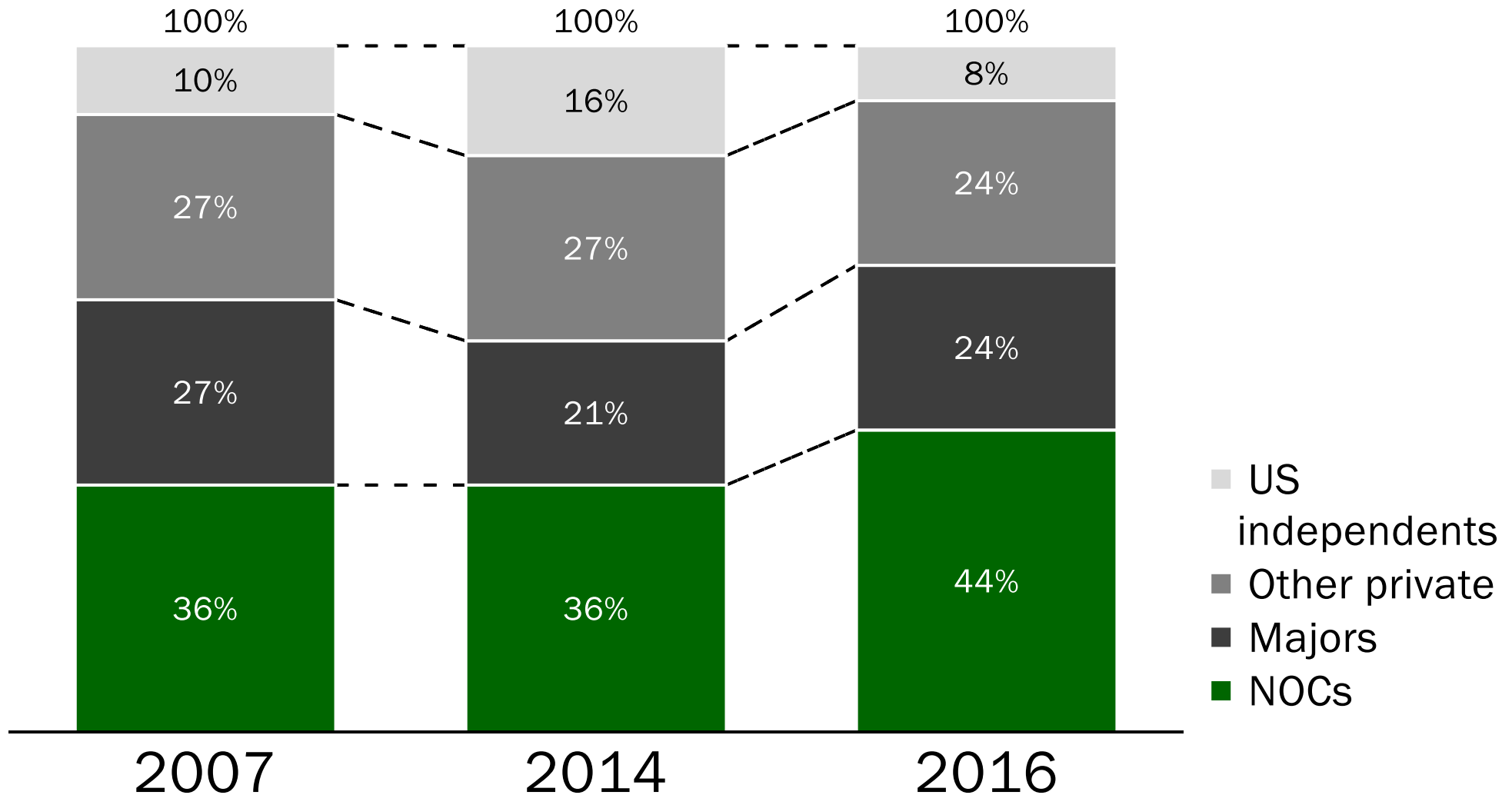
Sharp decline in spending in 2015 and 2016, expected recovery starting in 2017

Upstream spending by region (USD B) and Brent (USD/bbl)



The share of NOCs reached an all time high, with Majors still key

Share of Upstream Oil&Gas investment by company type



Funding is key, with increasing role of ECA's guarantees, impacting the Procurement Strategy

Typical source of financing for investments

	CONVENTIONAL UPSTREAM OIL&GAS	SHALE	MIDSTREAM & DOWNSTREAM OIL&GAS	TRADITIONAL POWER GENERATION	RENEWABLE POWER GENERATION
OWN CASH FLOW	✓			✓	
DEBT AND BOND MARKETS	✓		✓		
DEVELOPMENT BANKS AND ECAs	✓		✓		✓
GOVERNMENT INVESTMENTS / SUBSIDIES	✓		✓	✓	✓
EQUITY MARKETS AND VC		✓			✓

Future opportunities: proven resilience of traditional areas (Middle East + Egypt + APAC)



Further postponements in deepwater projects and Arctic

Greenfield developments with low breakeven are expected to proceed; many projects are linked to tiebacks and reeling;
new trend of Platform-as-a-Service
Expected growth of Decommissioning and Life-of-field; market suitable for unmanned platform technologies, as an alternative to subsea

Onshore upstream less affected by Western sanctions, new initiative to support gas export to China, with uncertain timing
Large initiatives planned in Turkmenistan

Beside Italy (Tempa Rossa), small upstream potentials from Germany and Albania
Adriatic sea could show opportunities for Decommissioning

Sour developments expected to increase in the Caspian area;
New developments being assessed in the Black Sea; Kazakhstan expected to slow down

Market characterized by SURF development (reeling)
Opportunities expected in subsea processing technologies, Decommissioning and Life-of-field

Expected a trend of subsea developments from Egypt and Mozambique
Angola seems to remain low
Upstream projects in Egypt and Algeria
Libya still far
Uganda slowly progressing

Some gas initiatives proceeding in Indonesia
Significant prospect under development in Papua New Guinea
Australia, China and India should drive new opportunities in deep water (SURF & partially floaters)
Expected new opportunities in Brownfield, Decommissioning and Life-Of-Field

>20 Upstream projects announced in Iran, Qatar and Kuwait
Saudi Arabia backed by shale developments
Conventional EPCI projects and Brownfield expected for Platform replacements

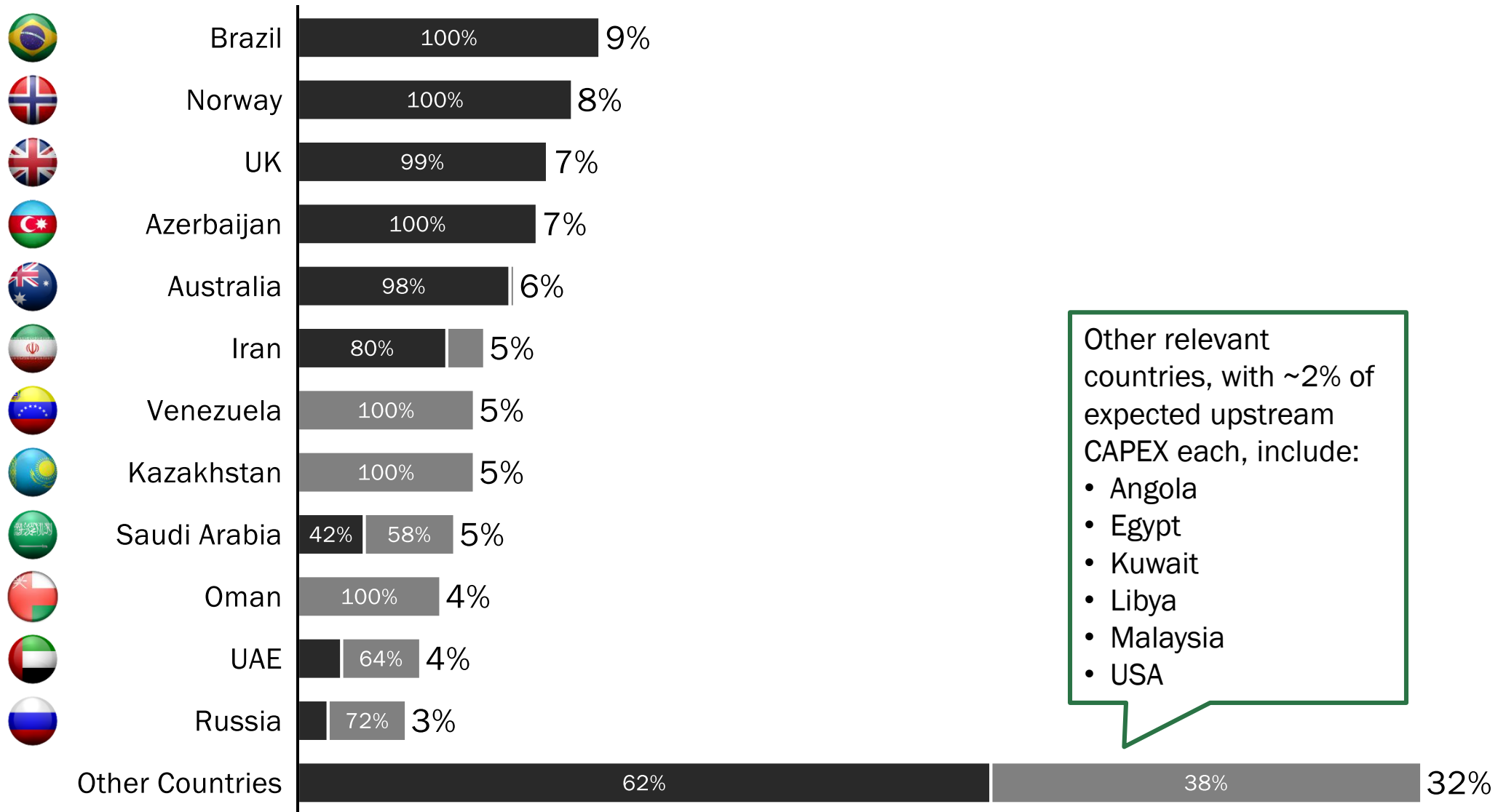
Bolivia and Ecuador are between the most promising countries in South America

Possible recovery linked to Libra development
Opportunities in Life-of-field and integrity management services

Upstream opportunities are distributed among countries, with no clear “winner”

■ Offshore
■ Onshore

Global Upstream Oil&Gas CAPEX by Country, 2016-2018 (%)





MIDSTREAM OIL & GAS

ONSHORE
LIQUEFACTION

FLOATING
LNG

REGASIFICATION
(ONSHORE,
FSRU)

ONSHORE
PIPELINES

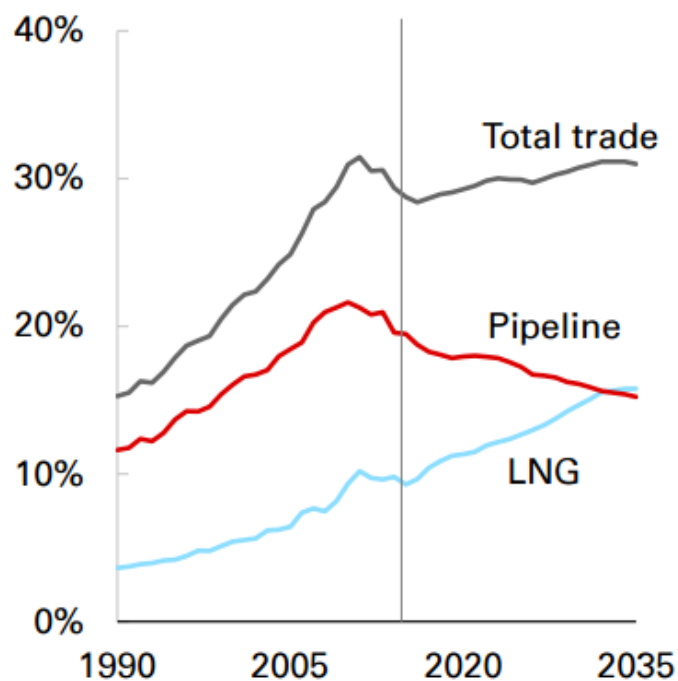
OFFSHORE
PIPELINES

Potentially good news for cheap Gas

DRIVERS FOR GAS GROWTH

- There is **market demand for gas but only at a low price**
 - Coal and renewables are low cost competitors
- **COP21 is theoretically good for gas**
- Needs of the **new non-OECD buyers**
 - LNG regasification terminals are now planned worldwide

Trade as share of global consumption



FURTHER OPPORTUNITIES

- Will LNG be **used extensively for transportation?**
- **Mid-scale LNG** has proved its usefulness in **China** for gas distribution overland
- Shale, CBM and the resolution of border disputes can mean a **renewal of domestic gas production**
 - **Gas pipeline** projects can be more common

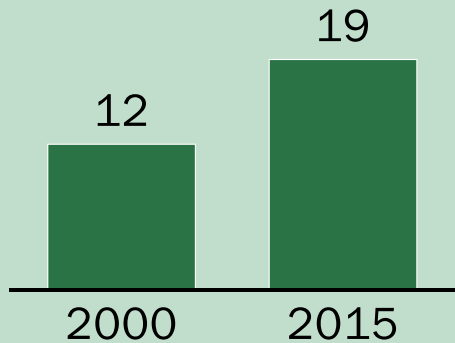
The global LNG trade is expected to keep growing

LIQUEFACTION



Global Liquefaction Capacity

Exporting countries



TRANSPORT



total LNG trade in 2015,
corresponding to 10% of global gas supply.
72% of LNG demand is in Asia

+2.5% from 2014

+6.5% CAGR '15-'21

Expected Growth in LNG demand

410 vessels

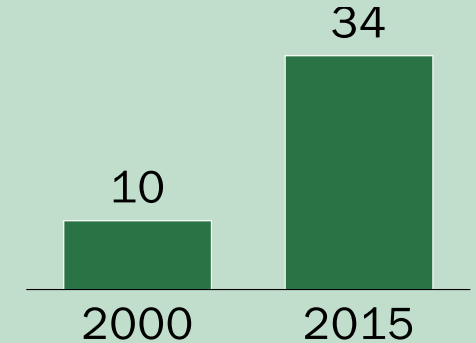
in the global LNG fleet

REGASIFICATION



Global Regasification Capacity

Importing countries

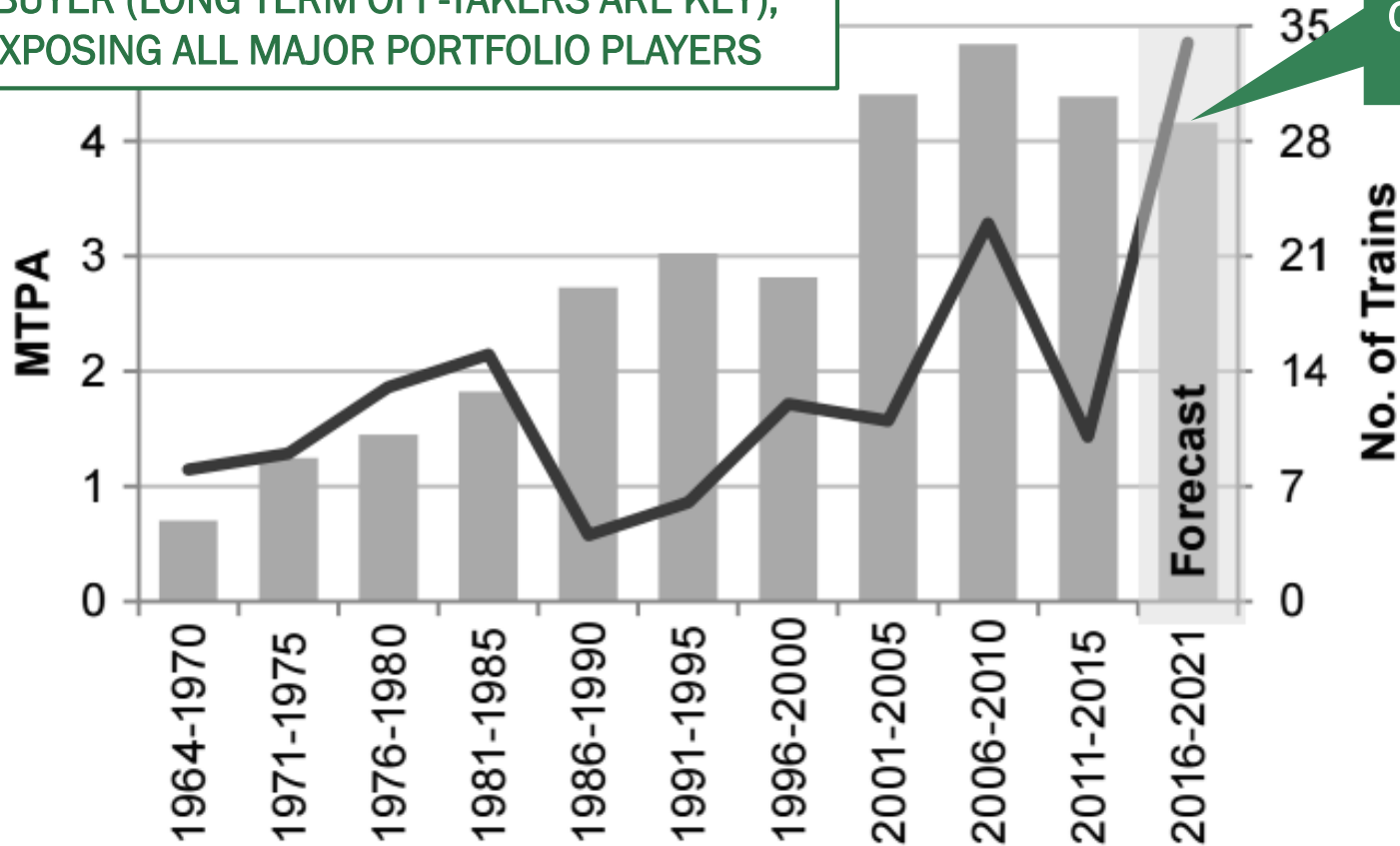


A new LNG train coming on stream every 8 weeks for the next 5 years

Number of trains commissioned and average train capacity

MUCH OF THE NEW US VOLUMES WILL NOT FIND A BUYER (LONG TERM OFF-TAKERS ARE KEY), EXPOSING ALL MAJOR PORTFOLIO PLAYERS

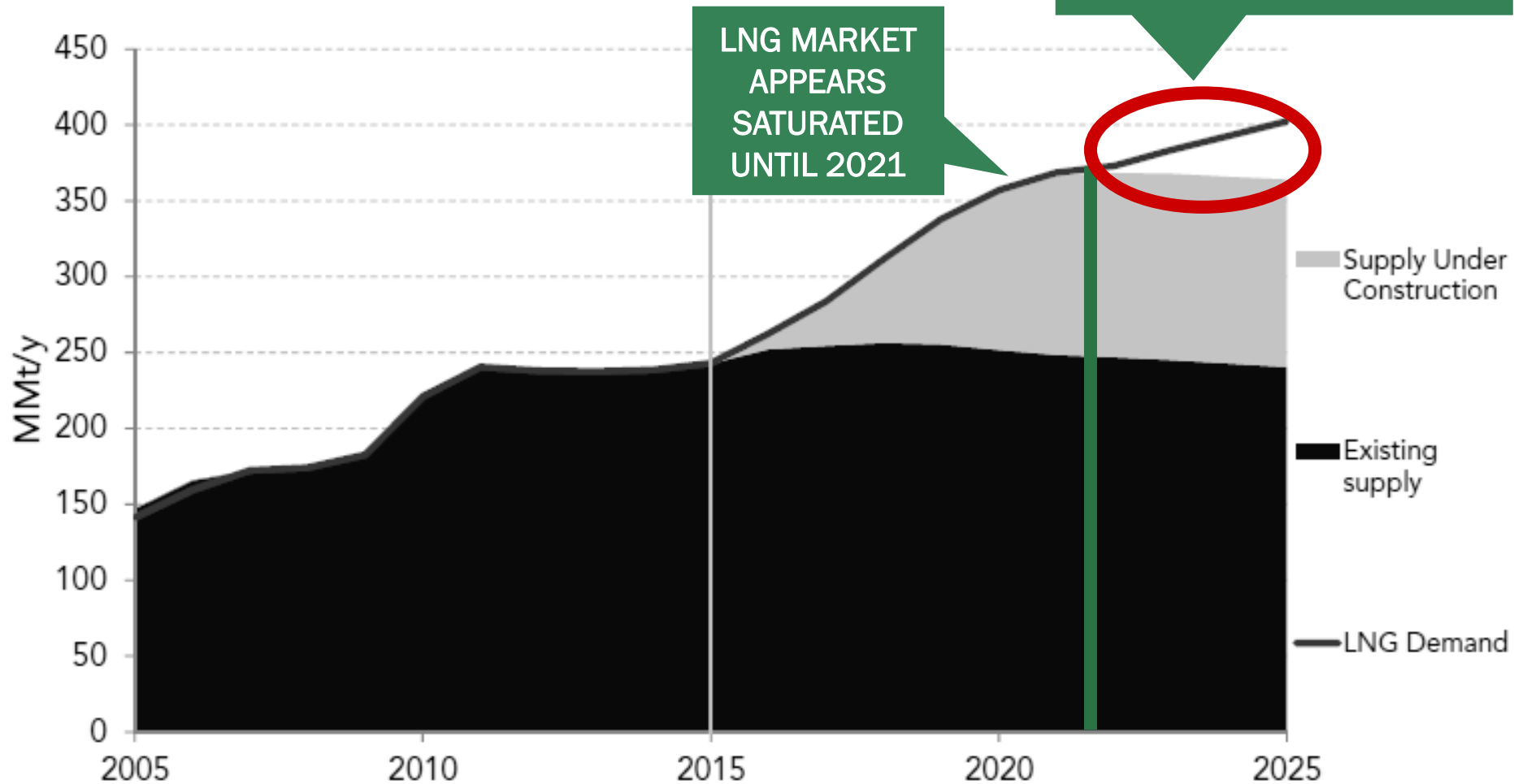
RECORD NUMBER OF 34 LNG TRAINS TO COME ON STREAM IN 2016-2021



Average Gross Capacity of Trains Commissioned, MTPA
 No. of New Trains Commissioned (right axis)

Liquefaction growth beyond 2021 requiring more projects

Global LNG Demand vs committed projects

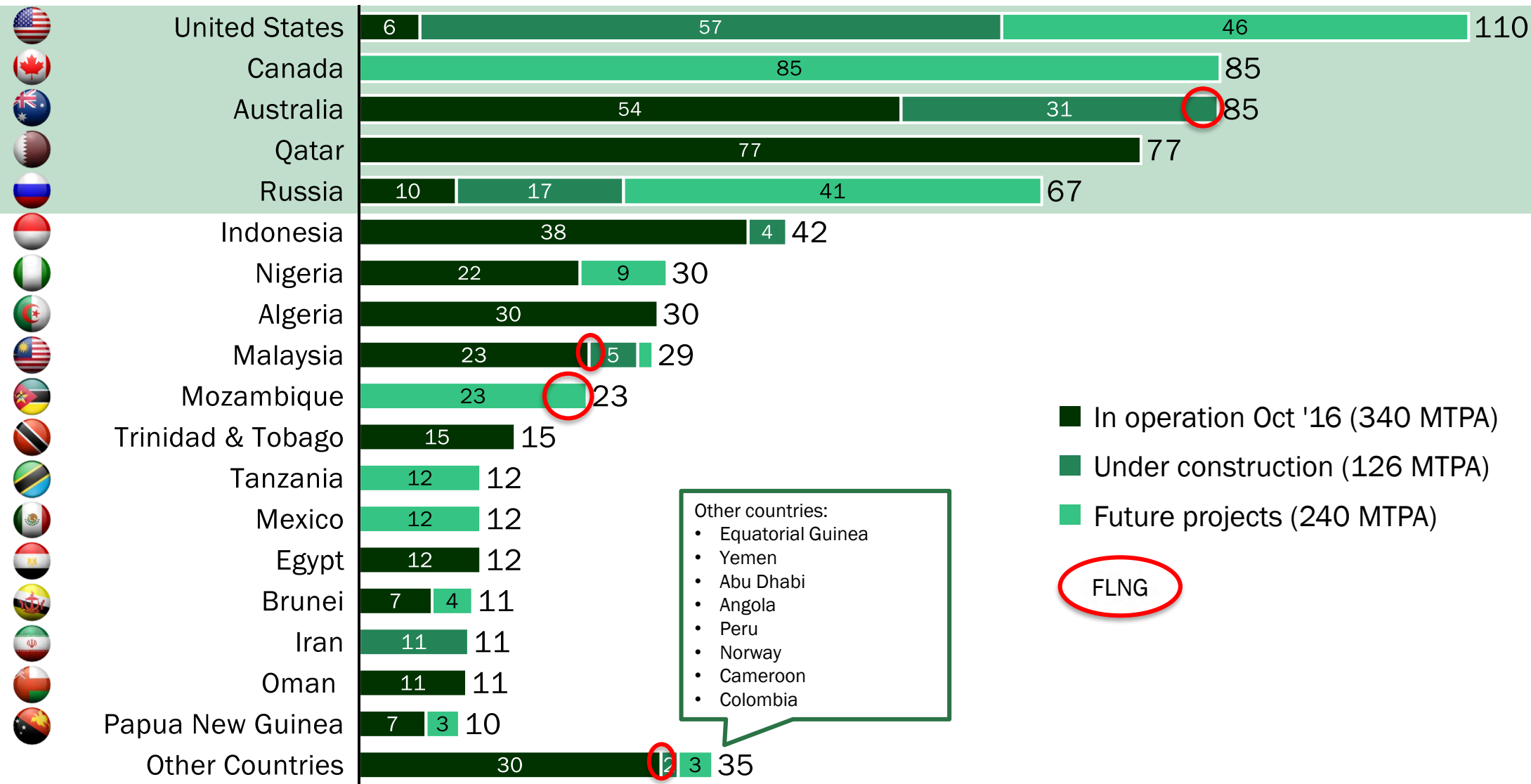


LNG MARKET APPEARS SATURATED UNTIL 2021

FROM 2021 TO 2025 THERE COULD BE FEW LNG LIQUEFACTION PROJECTS COMING ONLINE

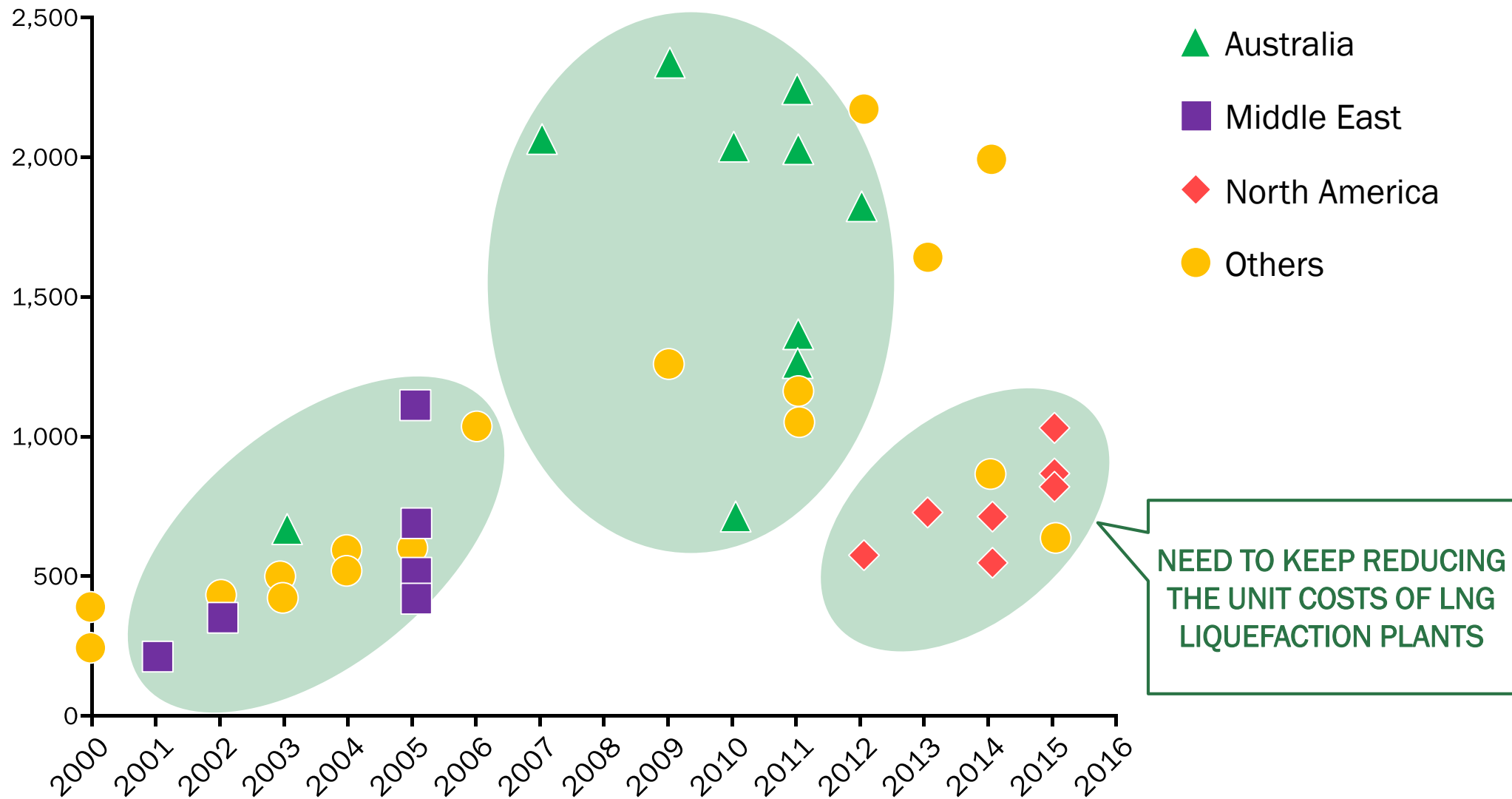
Liquefaction capacity to increase significantly in North America, Canada, Australia and Russia

Estimated World LNG Liquefaction capacity (MTPA)



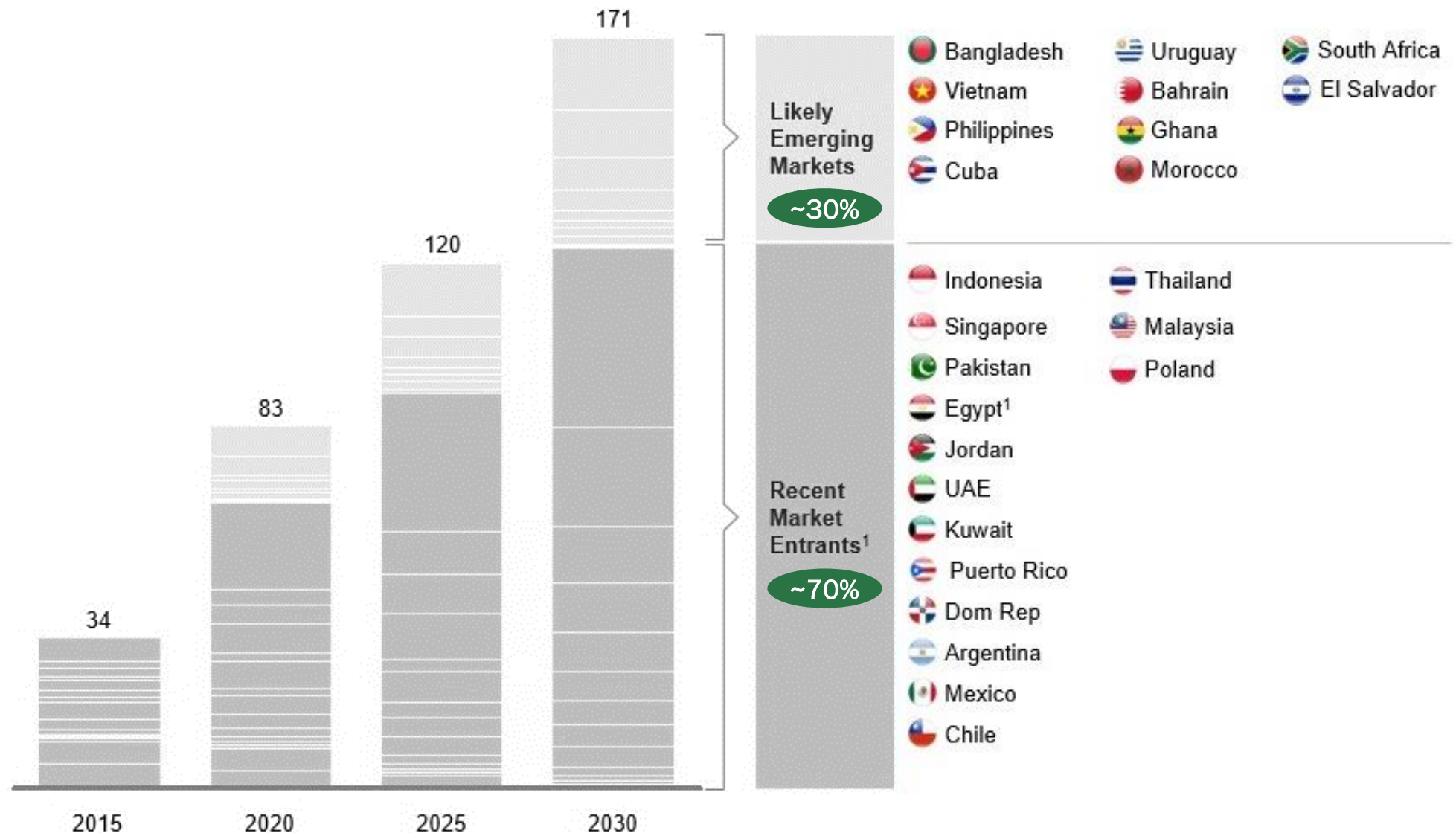
World LNG Liquefaction investment costs at FID strongly decreasing

LNG liquefaction plant investment costs by FID date (not startup date), USD/Tonne



Regasification: new LNG markets are the ones to carry the future growth in demand

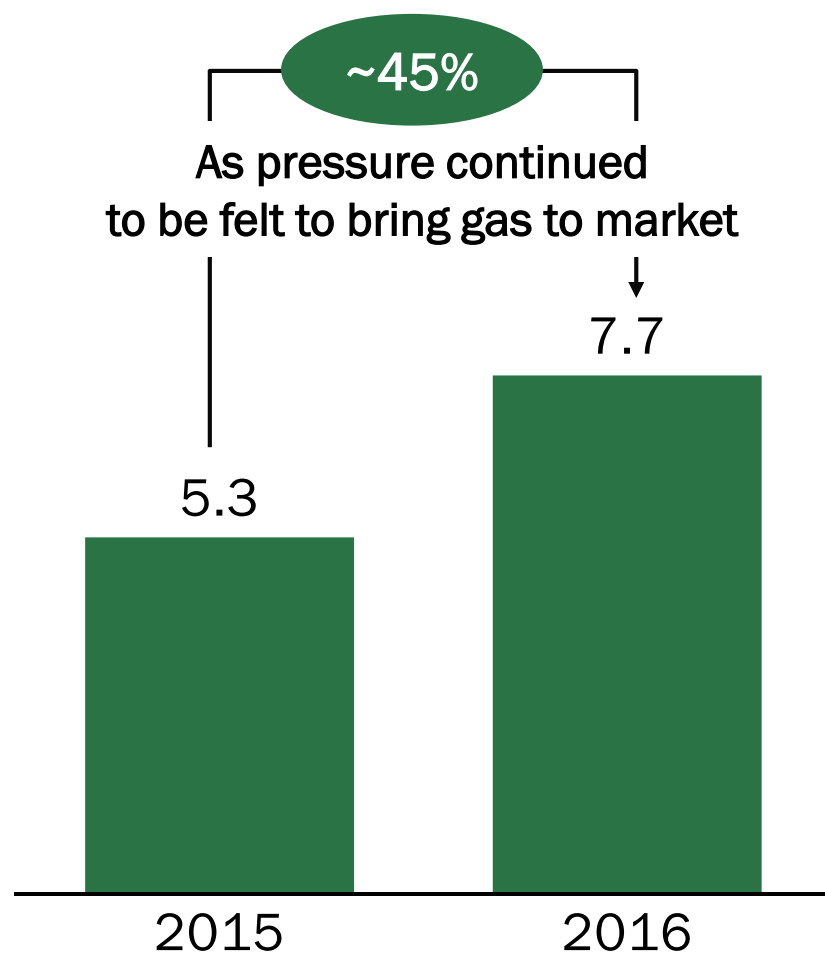
LNG demand by country for recent and likely market entrants (MTPA)



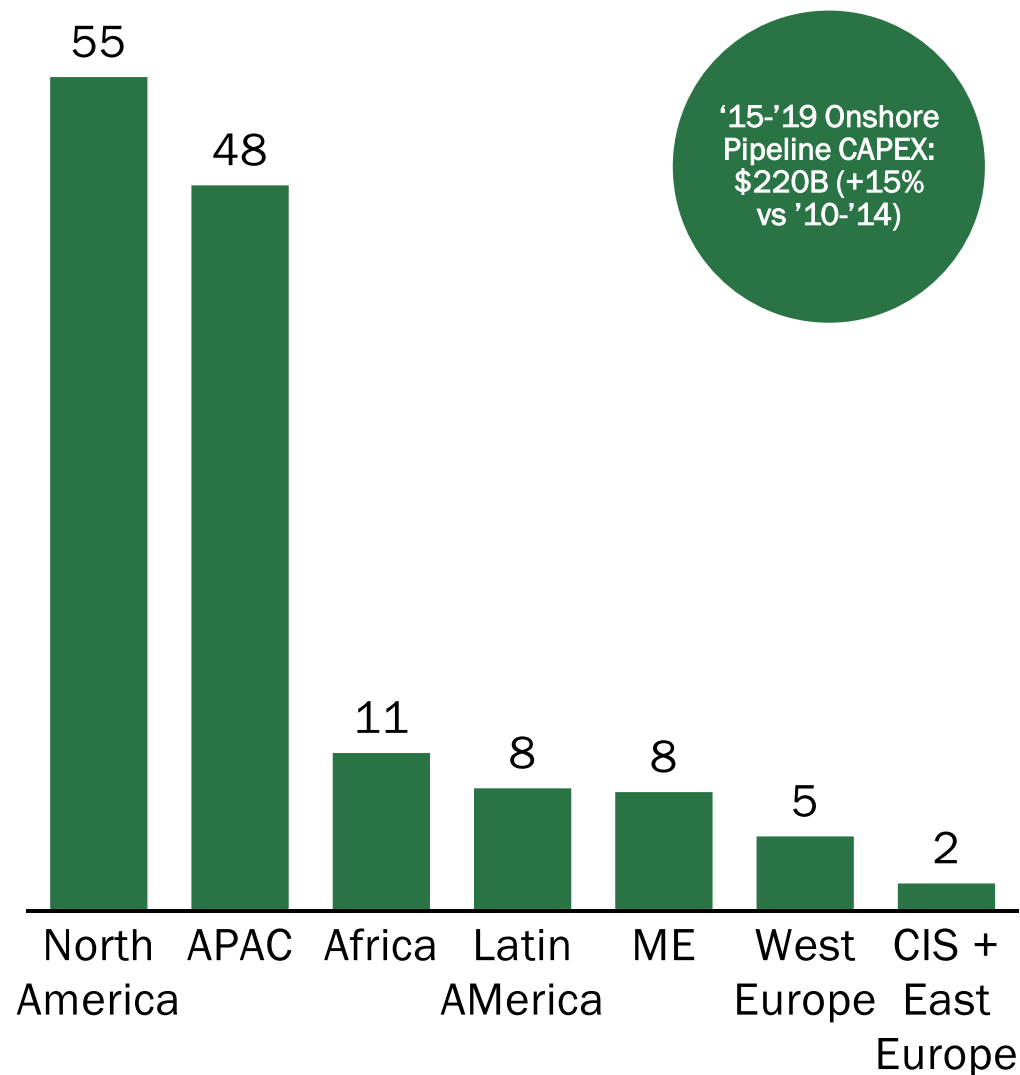
Note: Egypt and Argentina currently import LNG but are not expected to do so in 2030 due to recovering domestic production
 Source: McKinsey

The outlook for Onshore Oil&Gas Pipeline is positive

USD Million/mile in Pipeline construction costs



Planned and Under Construction Onshore Pipelines, global, Thousands km, as of 2016



Expect few new LNG Liquefaction projects to take FID in the next 12-18 months

Mainly LNG Liquefaction projects in British Columbia that - unlike those in the US - require large upstream and pipeline investments, adding to project costs and therefore uncertainty; Few initiatives could emerge from Canada LNG prospects

Despite a decrease in the profitability of pipeline operators, the US are expected to remain the largest market for pipeline investments in the short term ('16-'18)

LNG Liquefaction US projects going ahead on a tariffed commercial model (predictable CIF pricing of HH+3-4\$/MMBtu) that is uncompetitive in Europe; spot market will be well supplied (by "homeless" LNG)

In Mexico, surging gas demand has prompted an increased reliance on US pipeline (and, to a lesser extent, LNG) imports as domestic production declines. As a result, the country's 2 proposed liquefaction projects (7 MTPA) are longer-term opportunities

Multiple liquefaction proposals in Mozambique (44 MTPA) and Tanzania (20 MTPA): however, project risks in both countries include evolving domestic demand requirements, a lack of infrastructure, and regulatory uncertainty; East Africa (Kenya, Mozambique, Tanzania and Uganda) expected to drive demand for pipelines in the medium term

Yamal progressing according to plan. Future developments announced; indefinite postponement of CACGP Russia-China interconnection; potential in LNG

Turkish Stream and TAP most significant announced in recent times; New trunk-lines are possible in the Mediterranean to link new gas sources

Qatar holds 25% of global liquefaction capacity, but no new plants are expected in the short term; Export facilities from Iran to Oman under appraisal

LNG investments in Australia are expected to slow down

China, despite not adding any new terminals in 2015, has been the fastest growing market for LNG regasification in the last 5 years. However, regasification development activity may slow down due to the falling competitiveness of gas over other fuels such as coal (LNG demand growth remained below expectations in 2015)

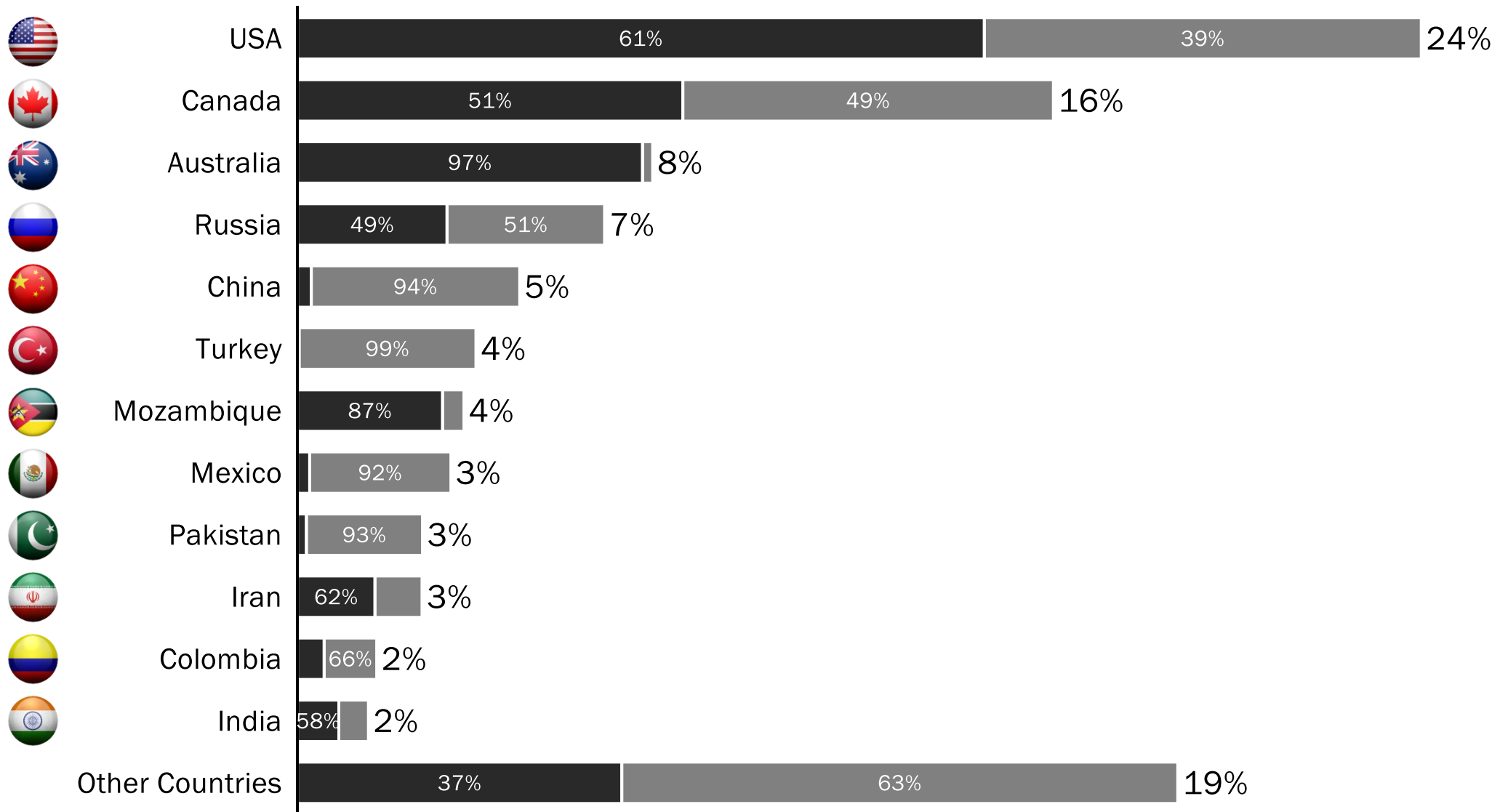
Lack of infrastructures could lead to new pipeline installations, starting from China, Pakistan and India

The only non-US FID (Tangguh expansion in Indonesia) in the past year

Future opportunities: USA and Canada to drive Midstream CAPEX

■ LNG CAPEX
■ Pipelines CAPEX

Global Midstream Oil&Gas CAPEX by Country, 2016-2018 (%)



Note: CAPEX is expressed as a % of the total weighted CAPEX of all projects currently Planned or Ongoing, LNG includes liquefaction and regasification
Source: SupplHi Projects Database, October 2016



DOWNSTREAM OIL & GAS

REFINING

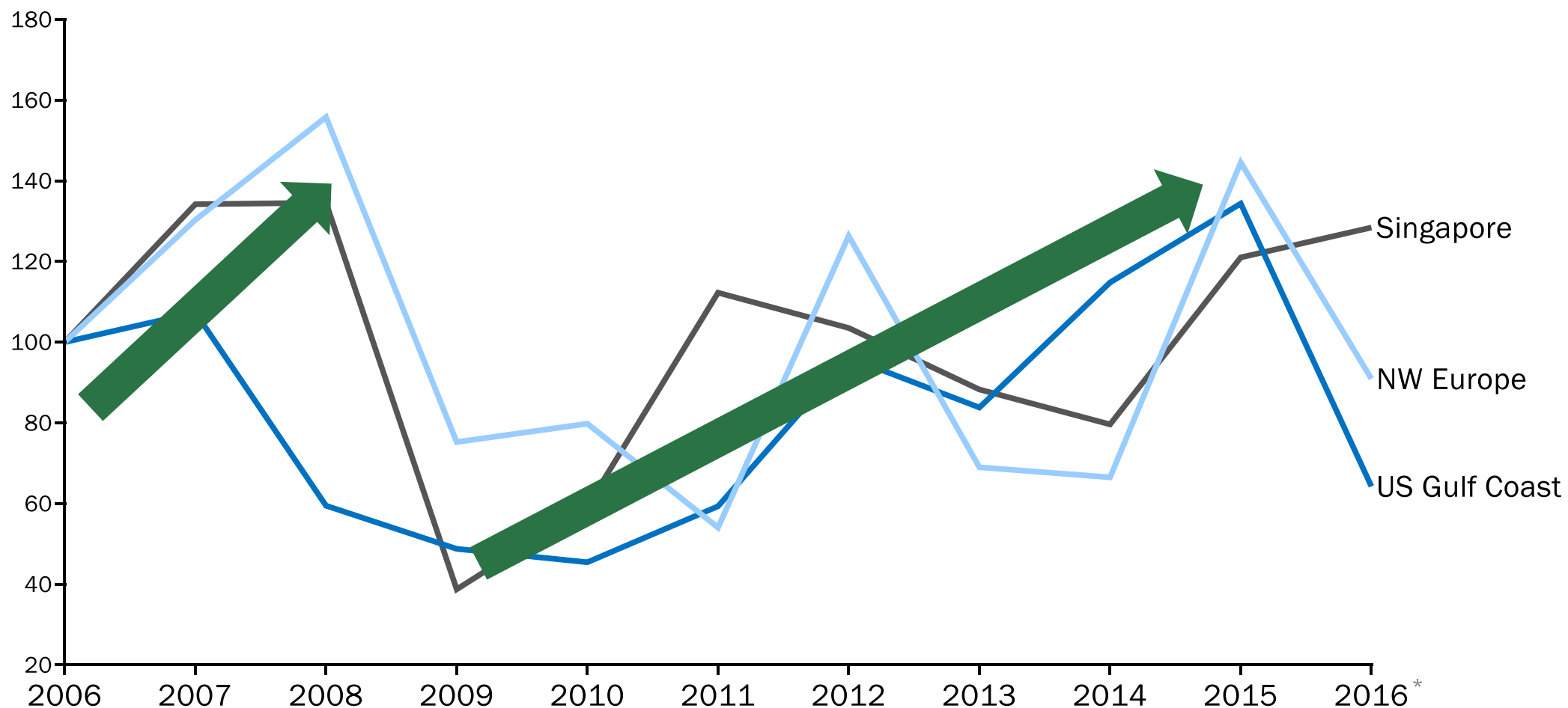
BASE
CHEMICALS

PETROCHEMICAL

FERTILIZERS

Low Oil prices meant increased Refining Margins

Refining margins, indexed to 2006



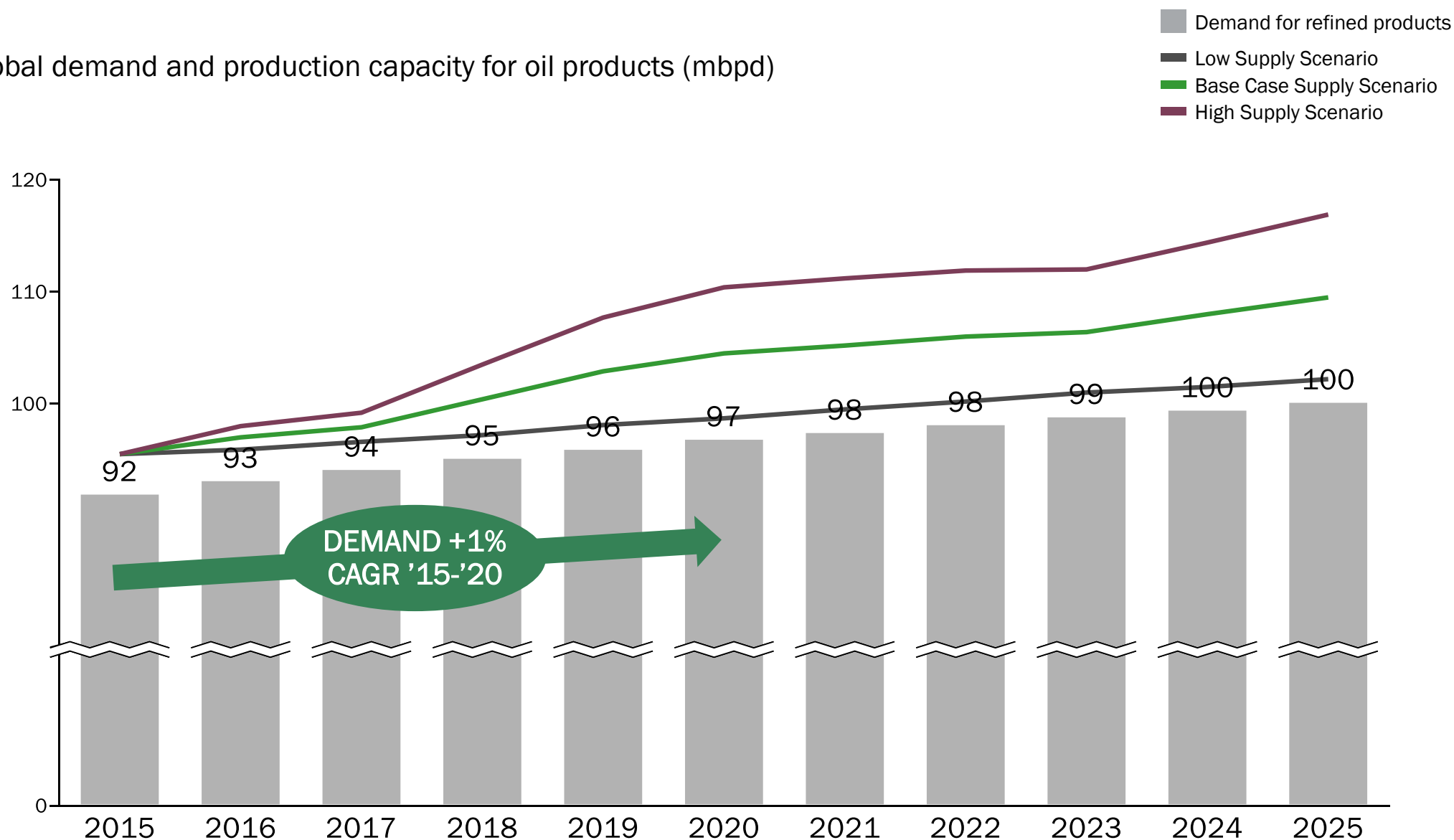
Note: US Gulf Coast refers to 50/50 Heavy Louisiana Sweet / Light Louisiana Sweet Cracking; NW Europe refers to Brent Cracking; Singapore refers to Dubai Cracking

*January and February 2016

Source: IEA

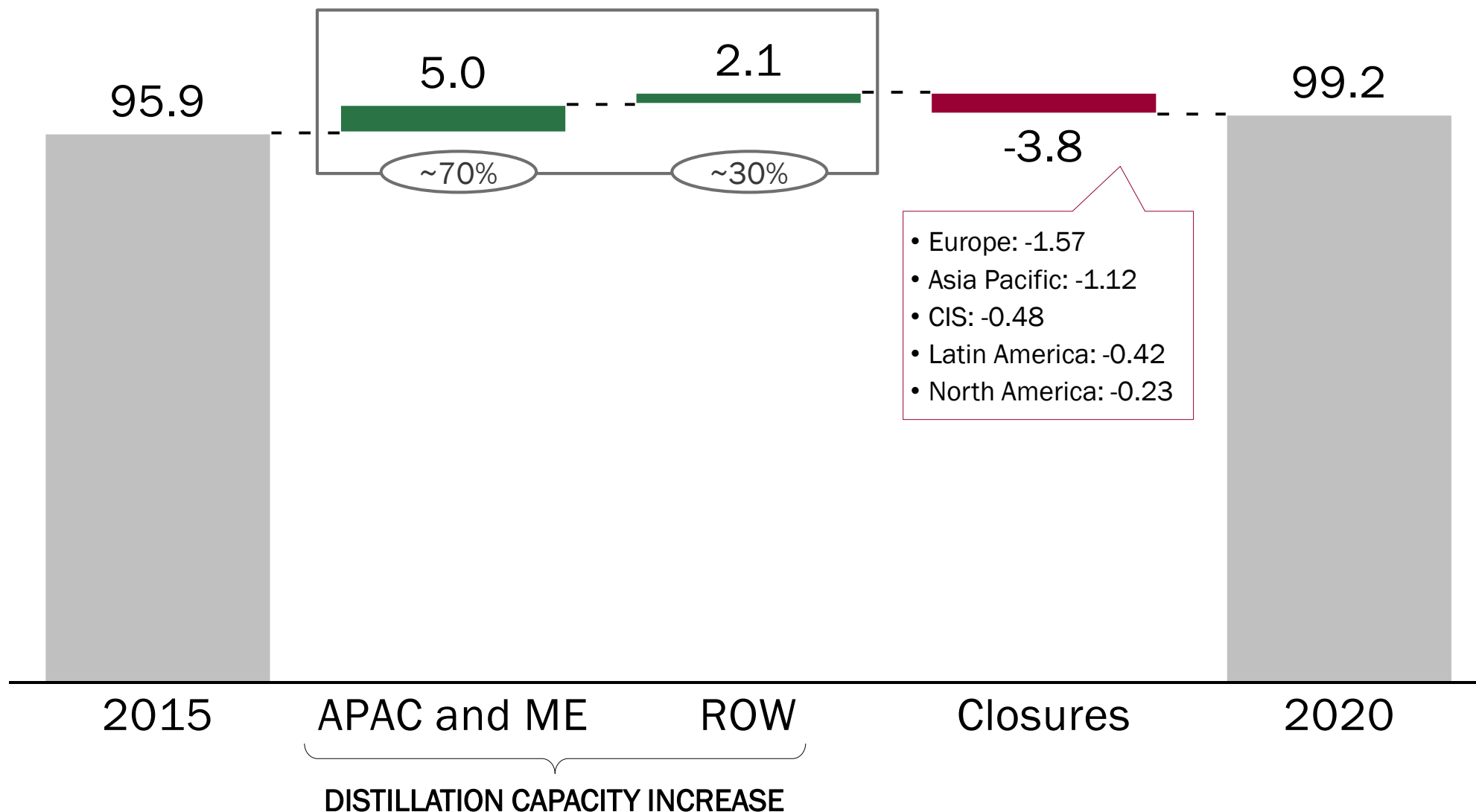
Even considering shutdowns, expected refining overcapacity at global level

Global demand and production capacity for oil products (mbpd)



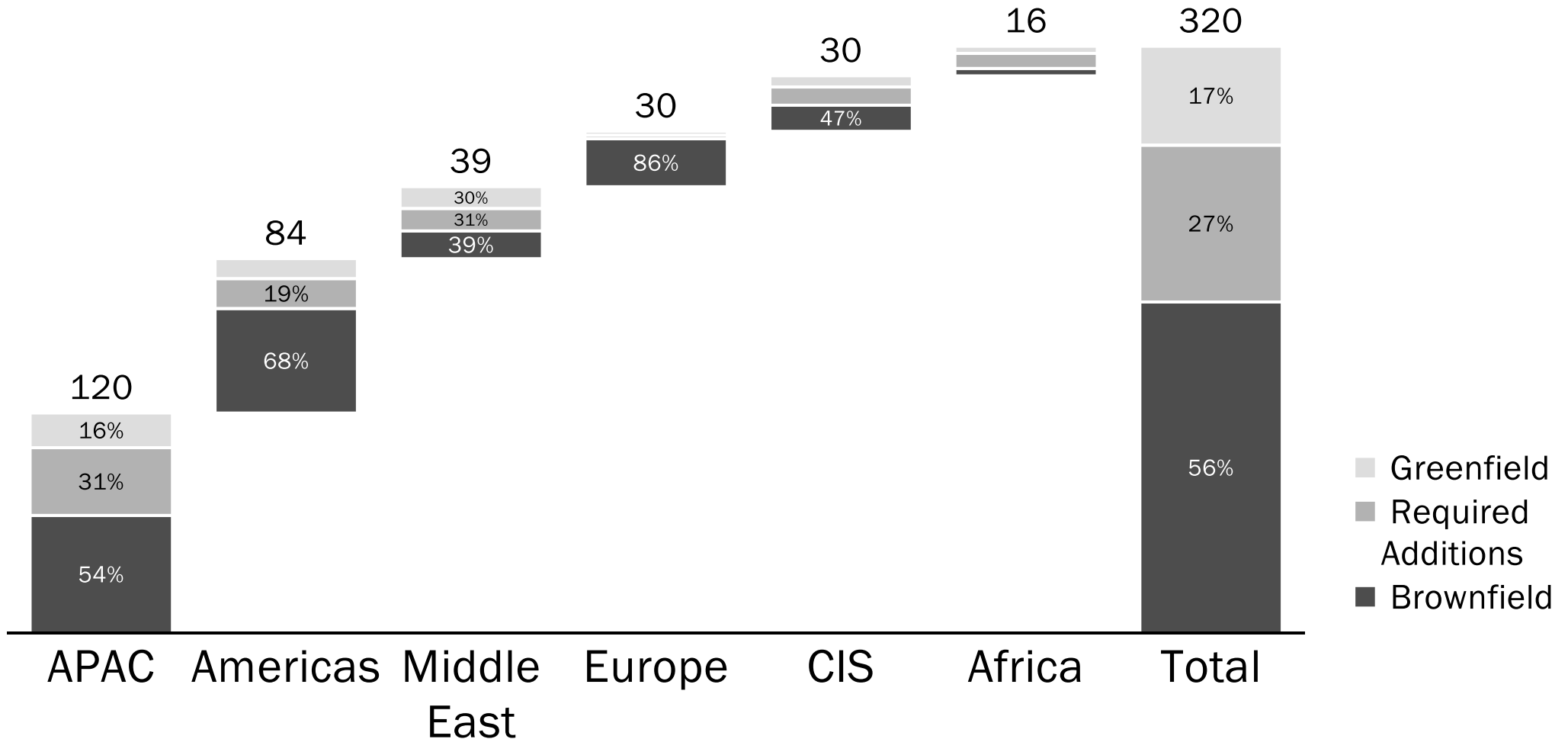
Global distillation capacity to increase by +0.7% CAGR to 2020, driven by APAC and ME

Global distillation capacity (CDU), MBPD



\$320 B in global refining investments through 2020

Expected CAPEX in Refining, 2015-2020, Billion USD



Notes: "Greenfield" projects are new units for increase of distillation capacity; "Required Additions" are new conversion, desulphurization and octane units in existing plants; "Brownfield" are refurbishments / revamping / replacements / projects of existing units.

Source: analysis on OPEC World Oil Outlook, 2015

Three drivers steer the Refining segment towards Refurbishing & Revamping projects

CLEAN FUELS LEGISLATIONS

- **Clean Fuels legislation** is a major driver everywhere:
 - Less emissions, more stringent product quality
 - More stringent **Marine Fuel Oil specifications (MARPOL)** will require more investments in bottom-of-the-barrel processing
 - Emphasis on **conversion and residue upgrading, desulphurization and octane units**

LOW QUALITY OF CRUDE OIL

- Heavier and more sour oils also require less complex refineries to invest in **conversion units** to stay in the game
- On the contrary, the **light crude oils that come from the US Shale** can cause:
 - **West African** producers to displace heavier crudes in the Asian markets
 - To keep **low complexity capacity in the market increasing supply** from refineries that should have been closed

NEW CONFIGURATIONS

- New refinery configurations to **improve product quality and margins**
 - Availability of **cheap gas** to influence future refinery configurations
- **Flexibility for broader crude choice**, declining residual fuel oil markets
- **Ongoing switch from Diesel to Gasoline** (the export refineries are building units to export Euro 5 and Euro 6 to Europe)

EU Regulations are setting the pace and getting tougher

FUEL SPECS TO LOWER EMISSIONS



- **Euro 6 emission standards** in place since late 2014 for diesel and gasoline (Sulphur < 10ppm)
- **Sulphur Emission Control Areas (SECA)** expanding in EU sea: sulphur content limited to 1000 ppm (vs 3500 ppm in other areas)

REFINERY HSE REQUIREMENT



- The **Refining BREF** issued by the **Industrial Emission Directive (IED)** sets maximum emission levels for solid and gases in refineries that will be costly to implement, especially for new and modernized capacity

USE OF BIOFUELS

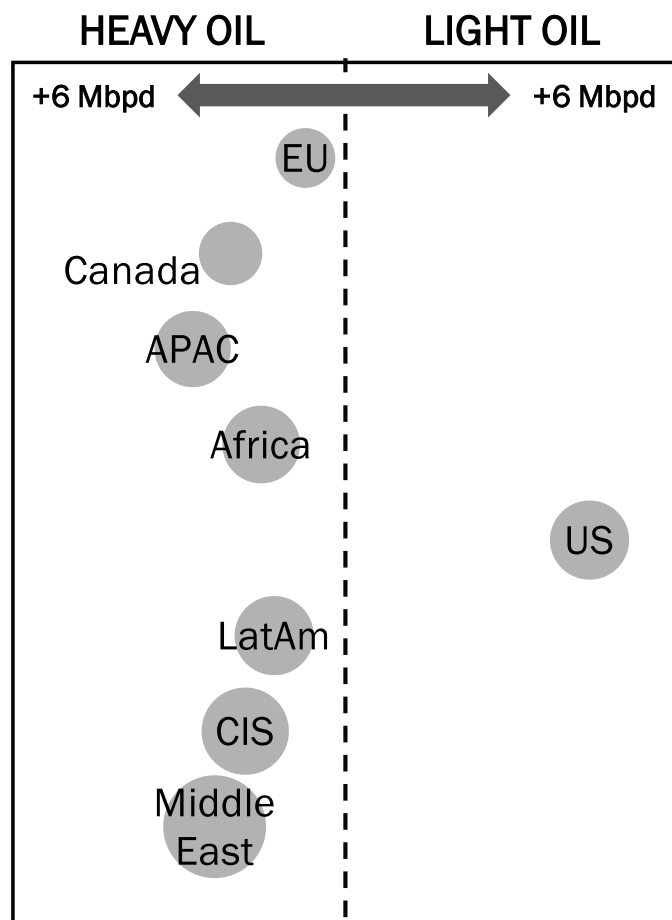


- The **Renewable Energy Directive (RED)** mandated that at least 10% of all energy in road transport fuels be produced from renewable resources by 2020

Quality of crude has been declining, but the scenario may change

IN RECENT PAST OIL HAS BECOME HEAVIER...

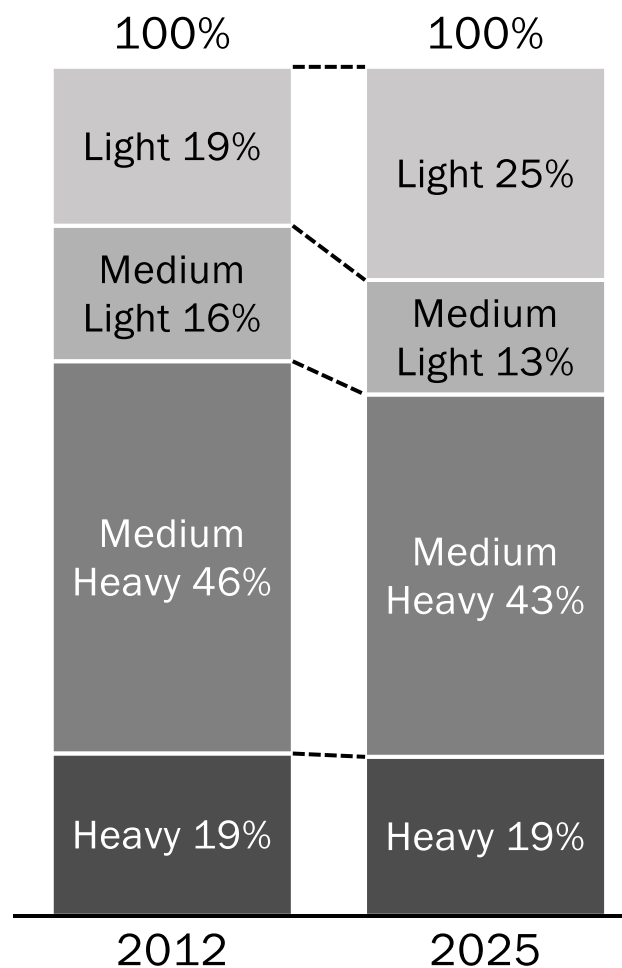
Net growth in crude oil production, Mbpd '00-'14



● 6 Mbpt, 2014 production

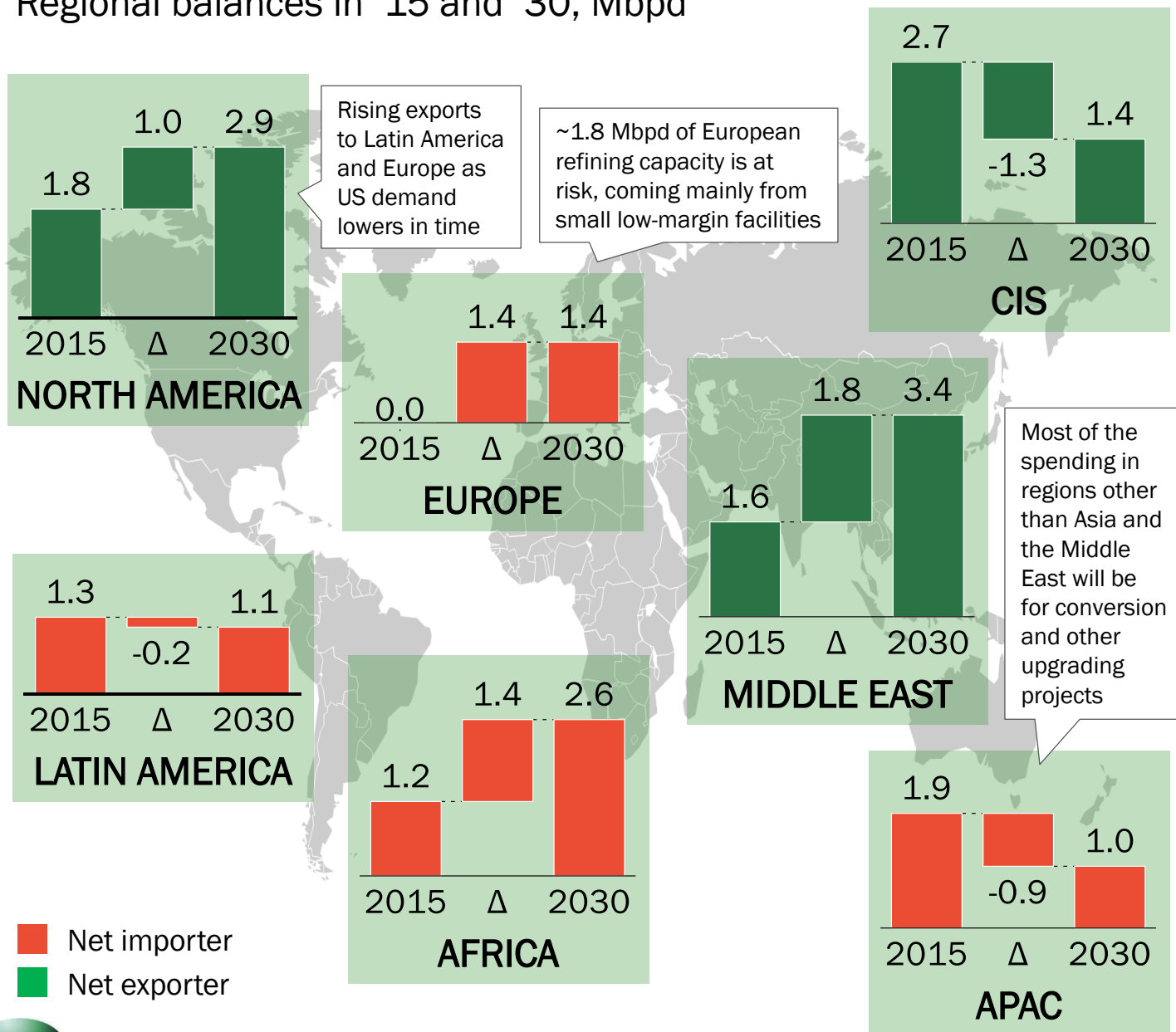
... BUT THE TREND MAY BE REVERSING

Global crude supply, Mbpd



The “globalization of refining” is firmly underway

Regional balances in '15 and '30, Mbpd



- More uniform product specifications → products more interchangeable globally
- Less competitive low-margin refineries vs stronger export hubs (e.g. Middle East)
- More NOCs, less IOCs → a more competitive and fragmented landscape

Envisioning the “Refinery of the Future”

FOCUS ON THREE PRIMARY OPERATIONAL GOALS

AGILITY

Quickly **switch** between fuels and petrochemicals to take advantage of market demand and opportunities

RELIABILITY

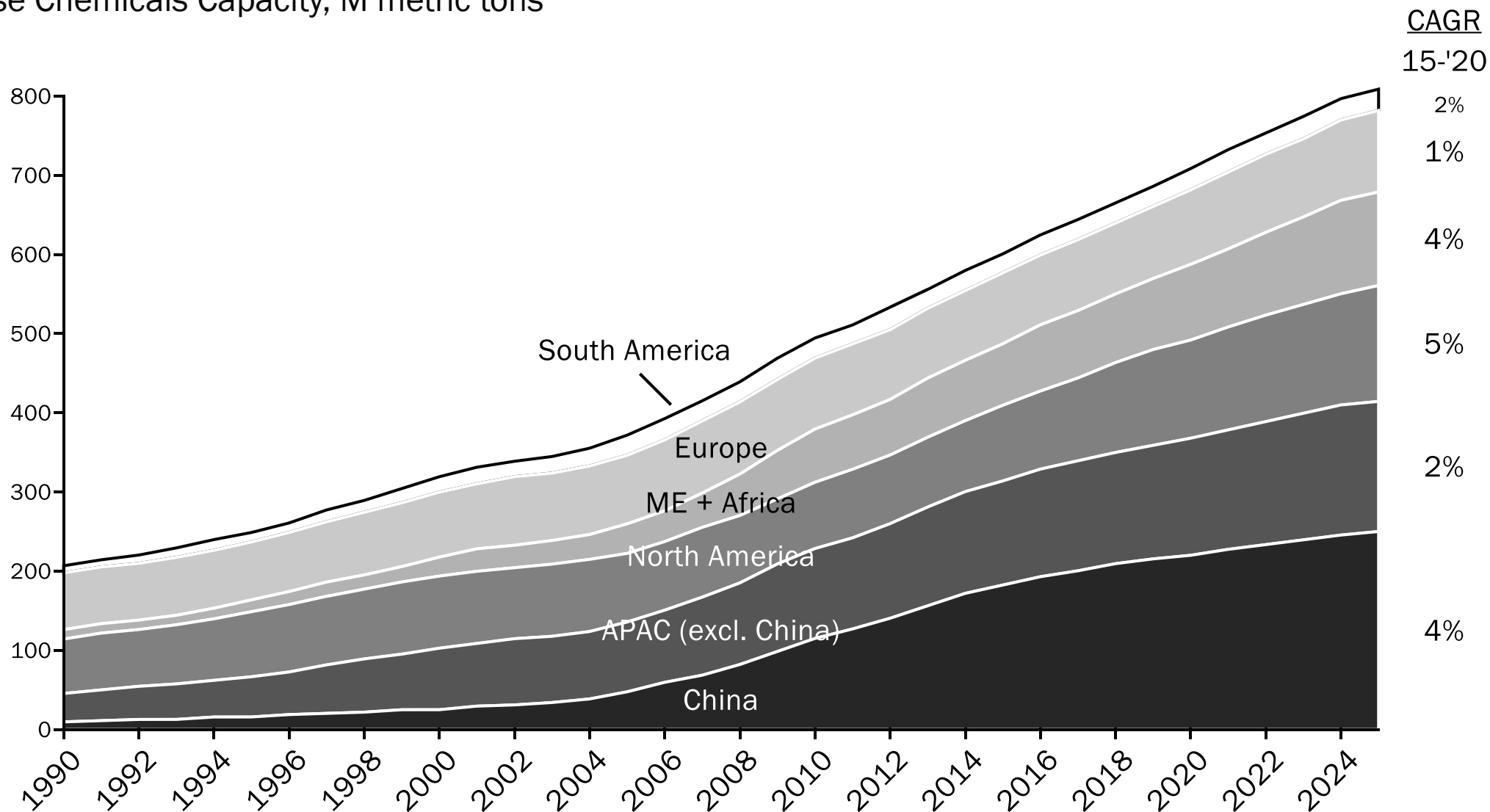
Top-performing refineries will operate with virtually **no downtime**

SHARED INTELLIGENCE

Automated and simplified processes, enabling expertise and **decision-making to be shared across multiple facilities**

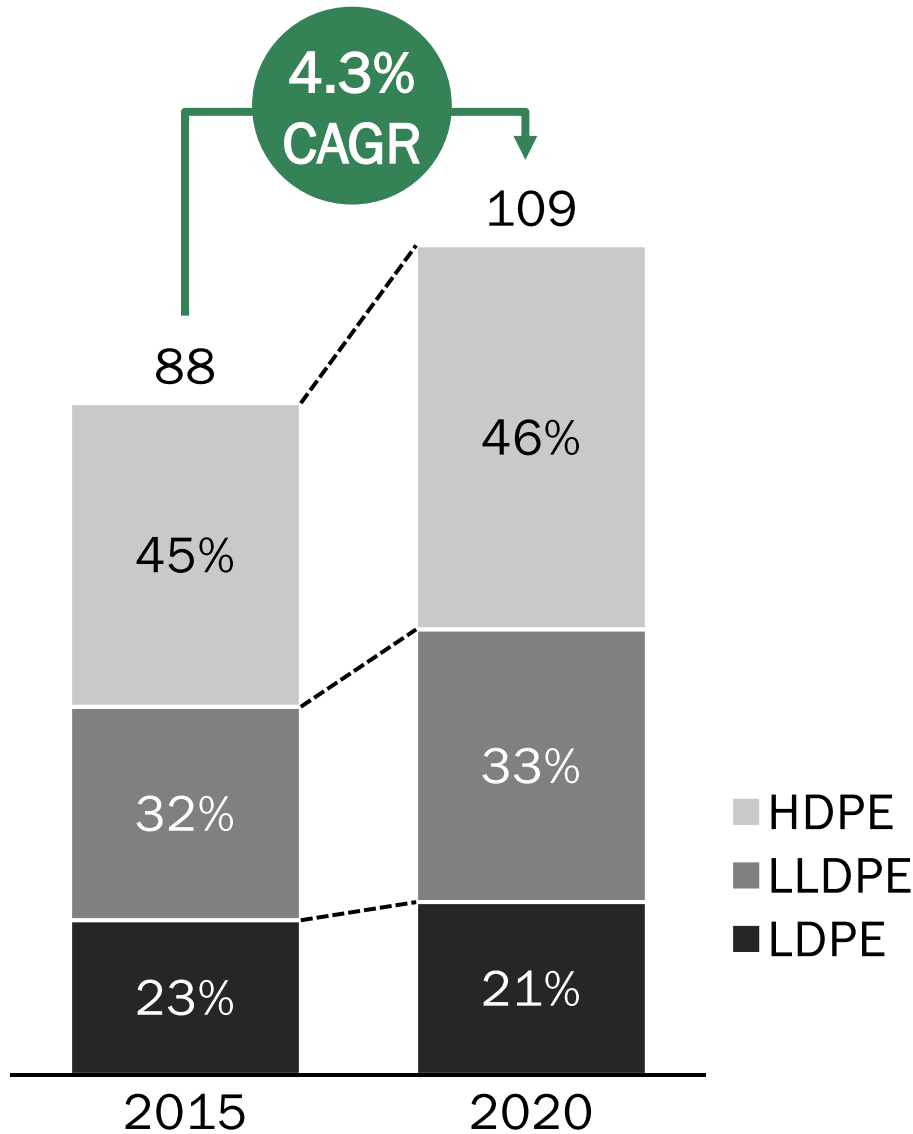
Base Chemicals capacity to grow at ~3.4% CAGR between '15-'20

Base Chemicals Capacity, M metric tons

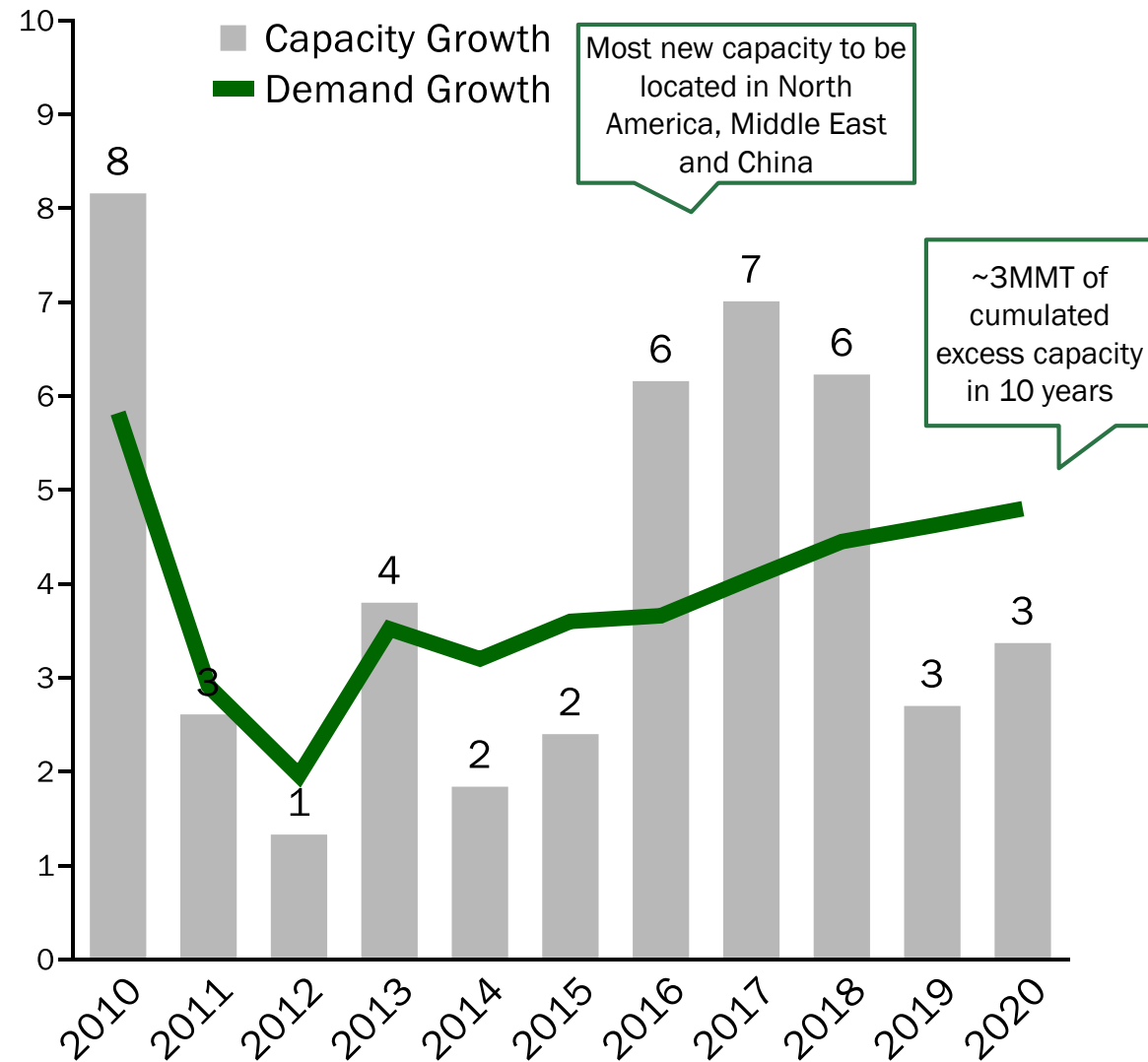


Polyethylene demand expected to grow fast, compensated by the capacity increase

Global polyethylene demand (MMT)

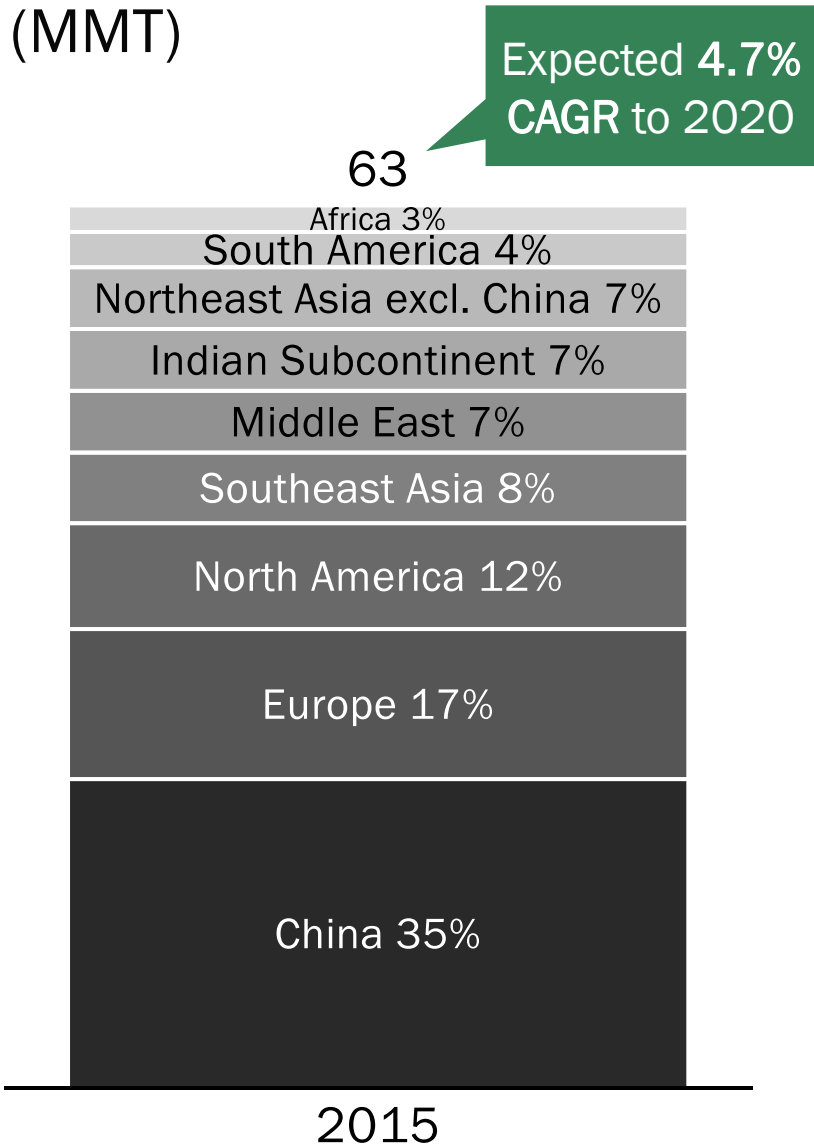


Polyethylene additional supply, demand, and cumulated excess capacity (MMT)

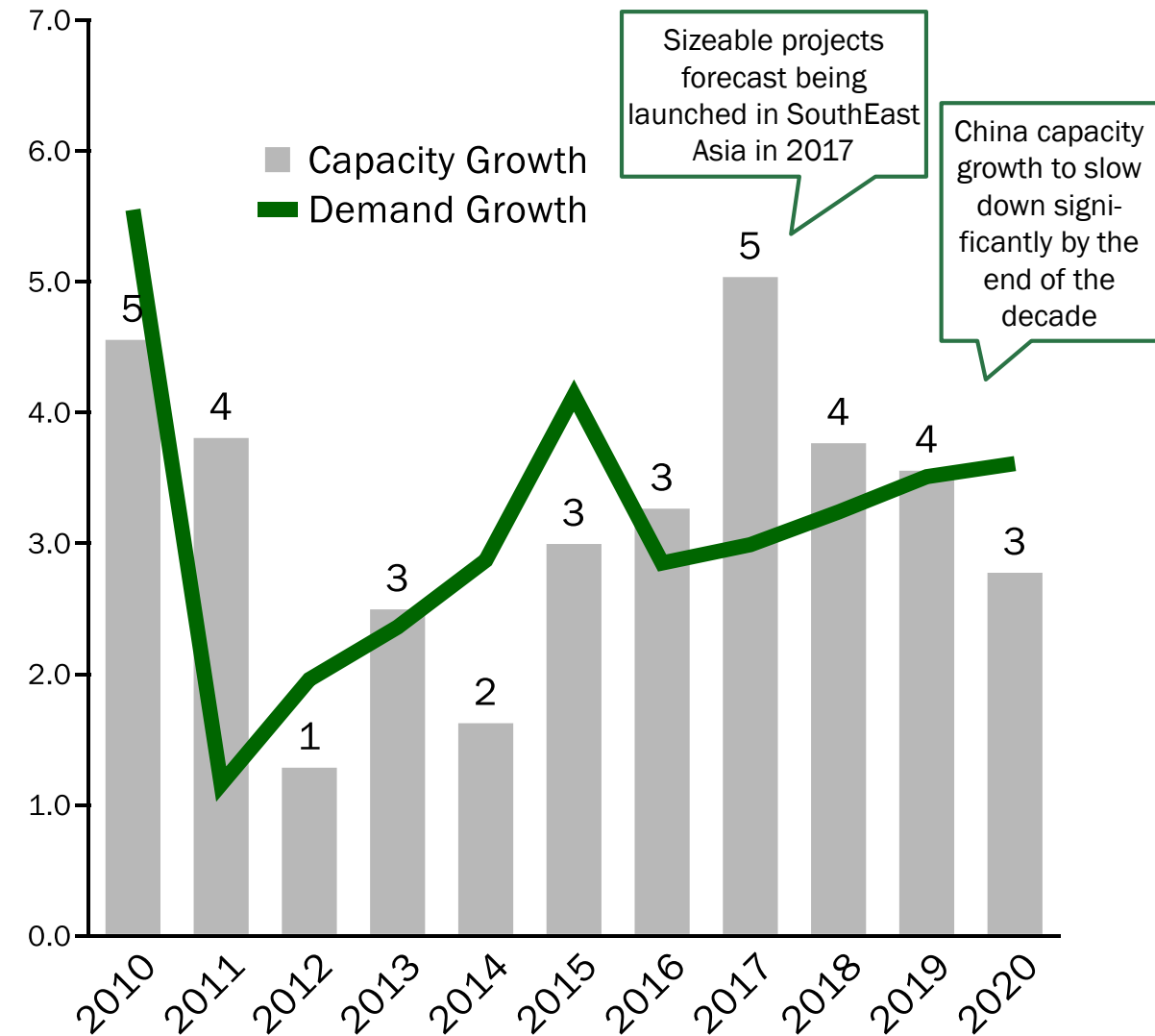


Large majority of Polypropylene demand is located in China

Global polypropylene demand (MMT)

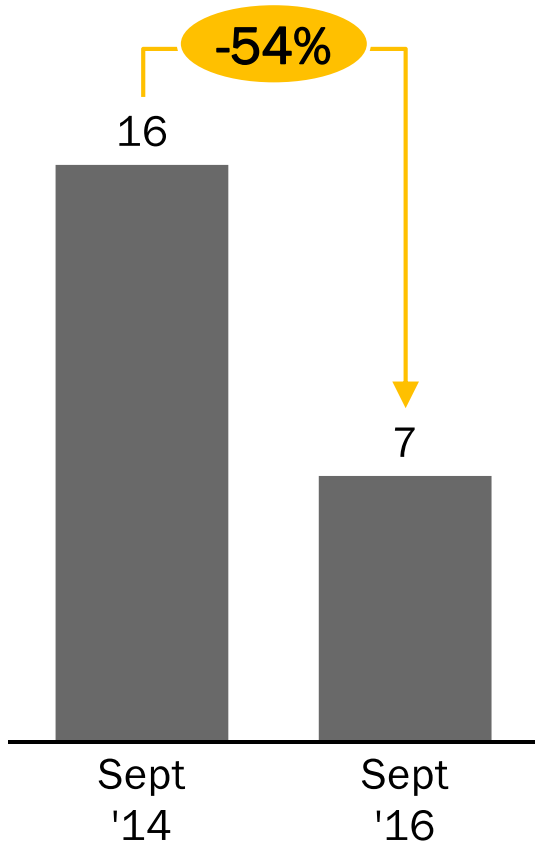


Polypropylene additional supply, demand, and cumulated excess capacity (MMT)

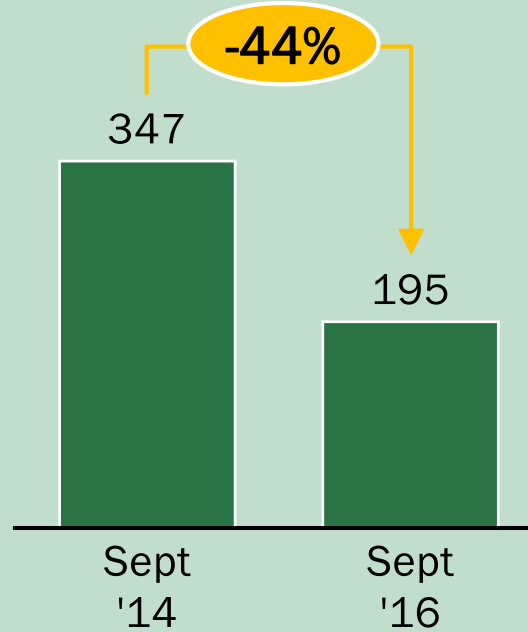


Fertilizer prices have declined sharply in the last two years

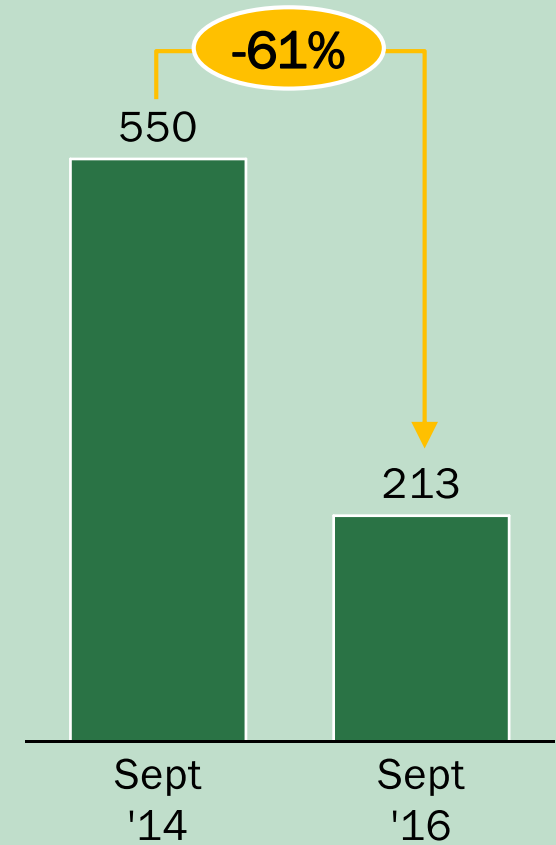
Gas Spot Price
(USD per MBTU)



Urea Spot Price
(USD per tonne)

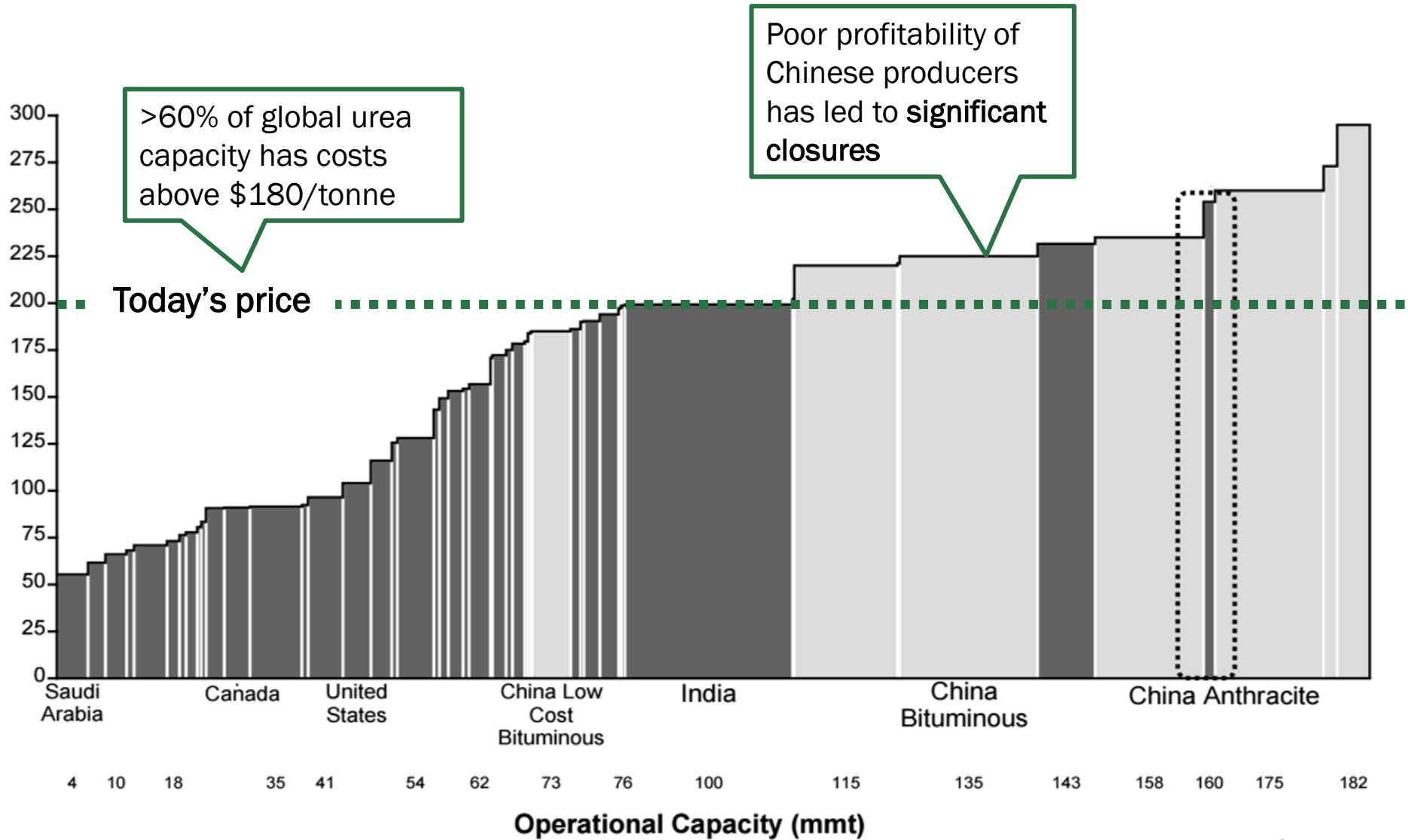


Ammonia Spot Price
(USD per tonne)



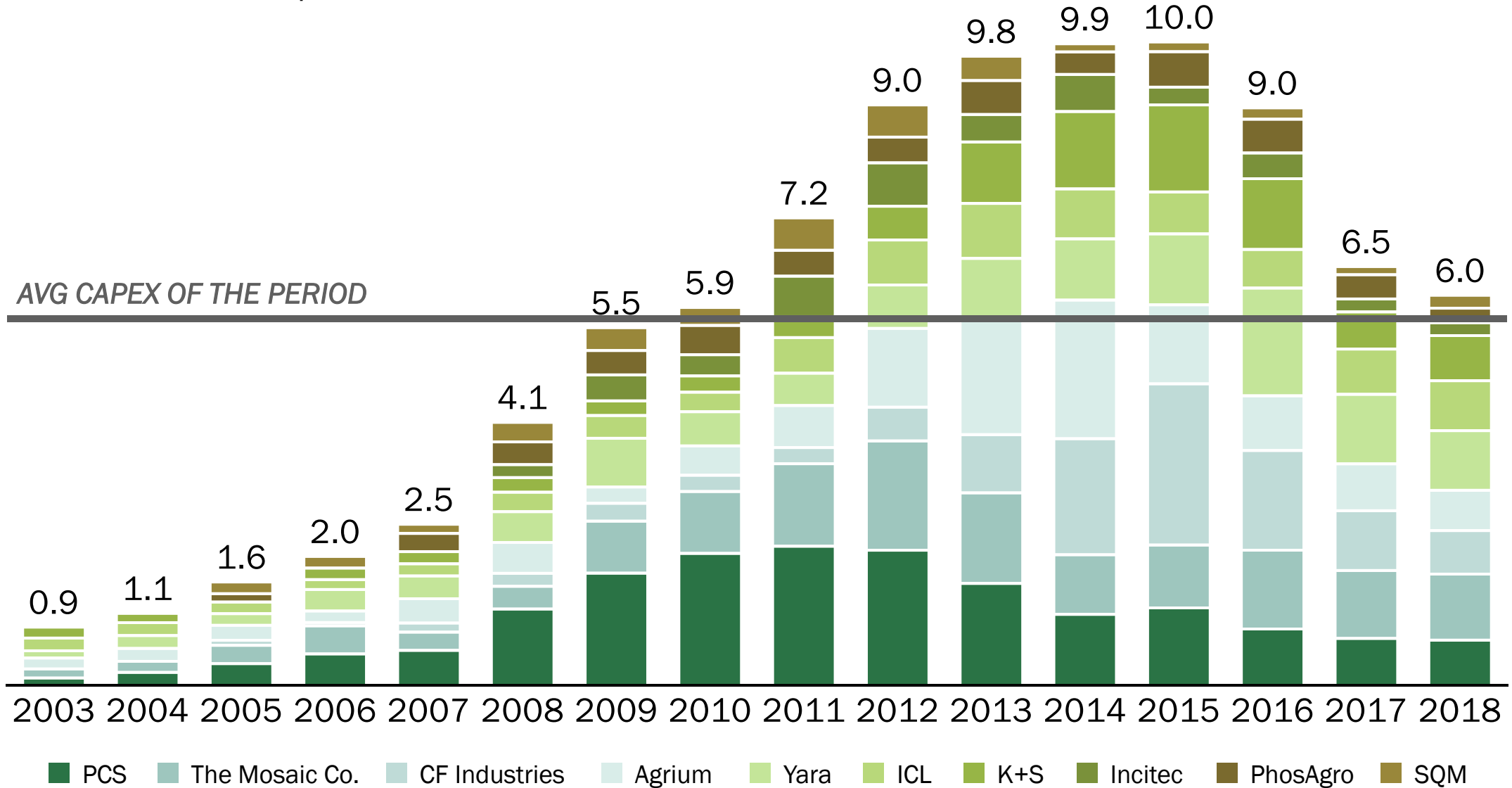
China and India have the majority of global nitrogen capacity but are high cost producers

Global nitrogen fertilizers cost curve (USD per tonne FOB)



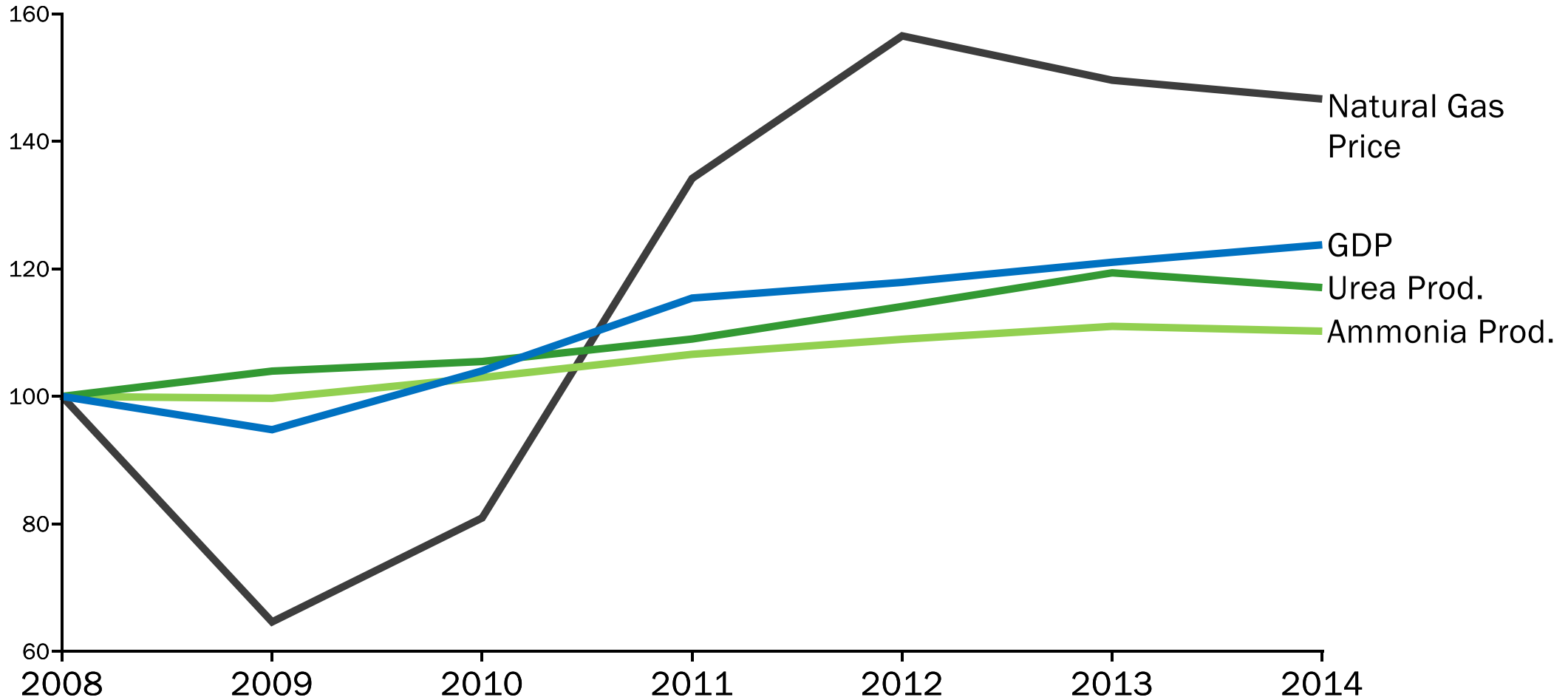
The investment cycle has still steam in Fertilisers

Fertilizer CAPEX of top End Users, USD B



Ammonia and Urea productions are correlated to GDP

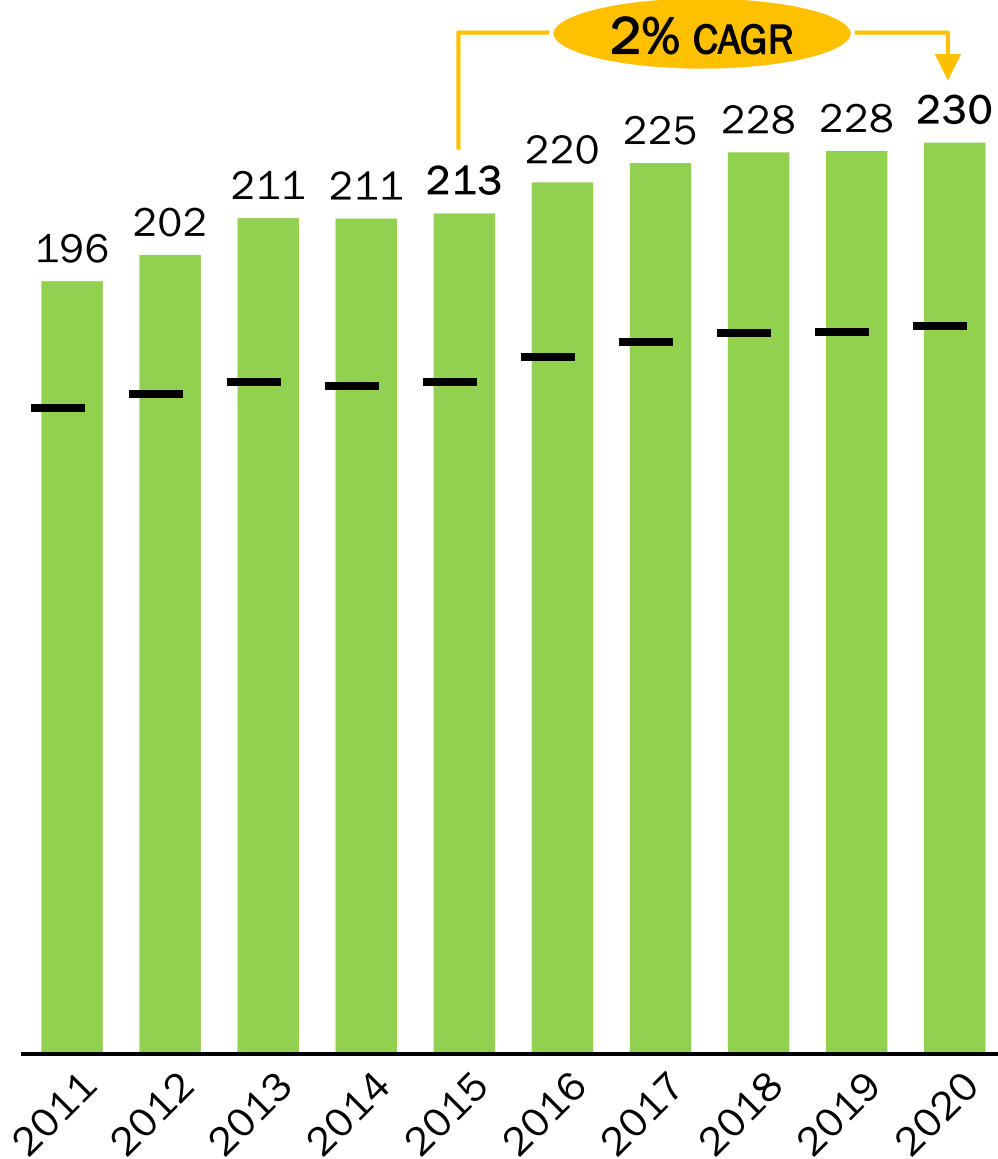
Base 100 in 2008



Ammonia capacity expected to increase +2% CAGR in the coming 5 years ...

■ Capacity
— Demand

Global Ammonia Capacity, MTPA

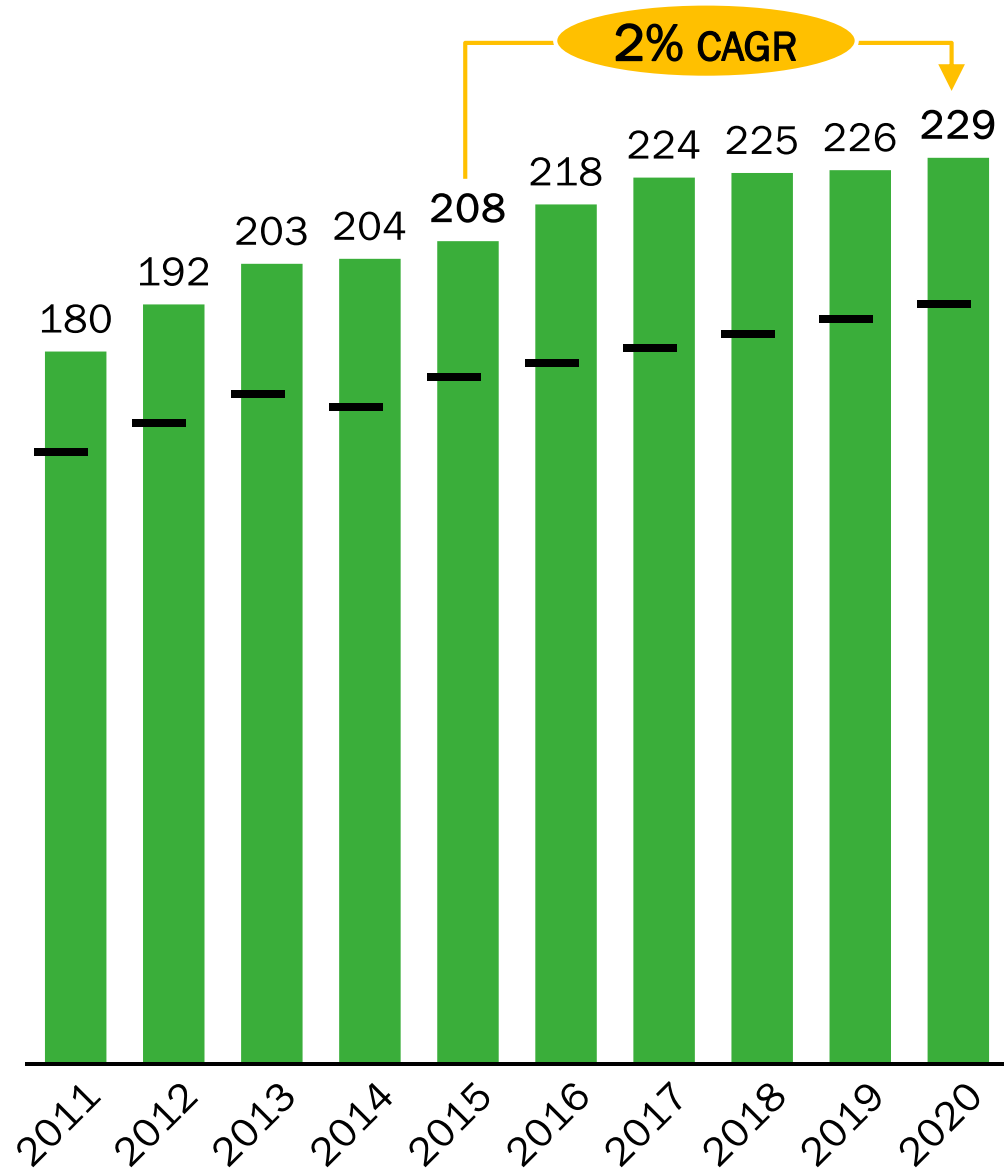


- Global ammonia capacity will reach **230 Mt NH3 in 2020**, expanding by 10% compared with 2015
 - Large increases in capacity are expected in **Africa, North America and EECA***
 - **Large capacity reductions in China:** for the first time in a decade, due to the removal of close to 15 Mt of ammonia capacity in China in 2015-2016, capacity in East Asia will show virtually no net growth
- **At regional level:**
 - **Deficits** are expected to further expand in **South Asia, Latin America and Oceania**
 - **Surpluses** are seen as expanding in **Africa, EECA** and, to a lesser extent, **West Asia**

...as will Urea capacity, remembering that it is a regional market

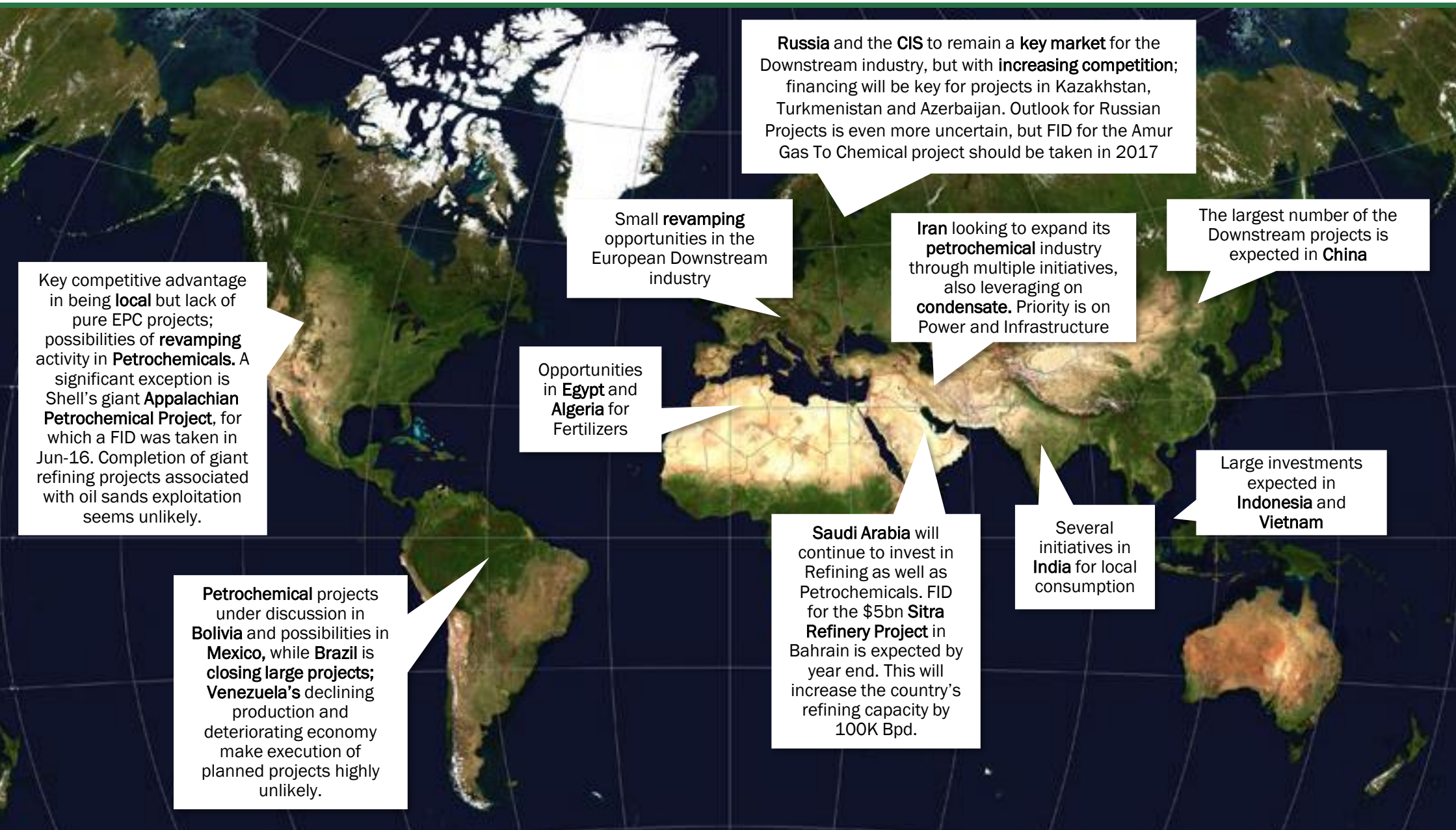
■ Capacity
— Demand

Global Urea Capacity, MTPA



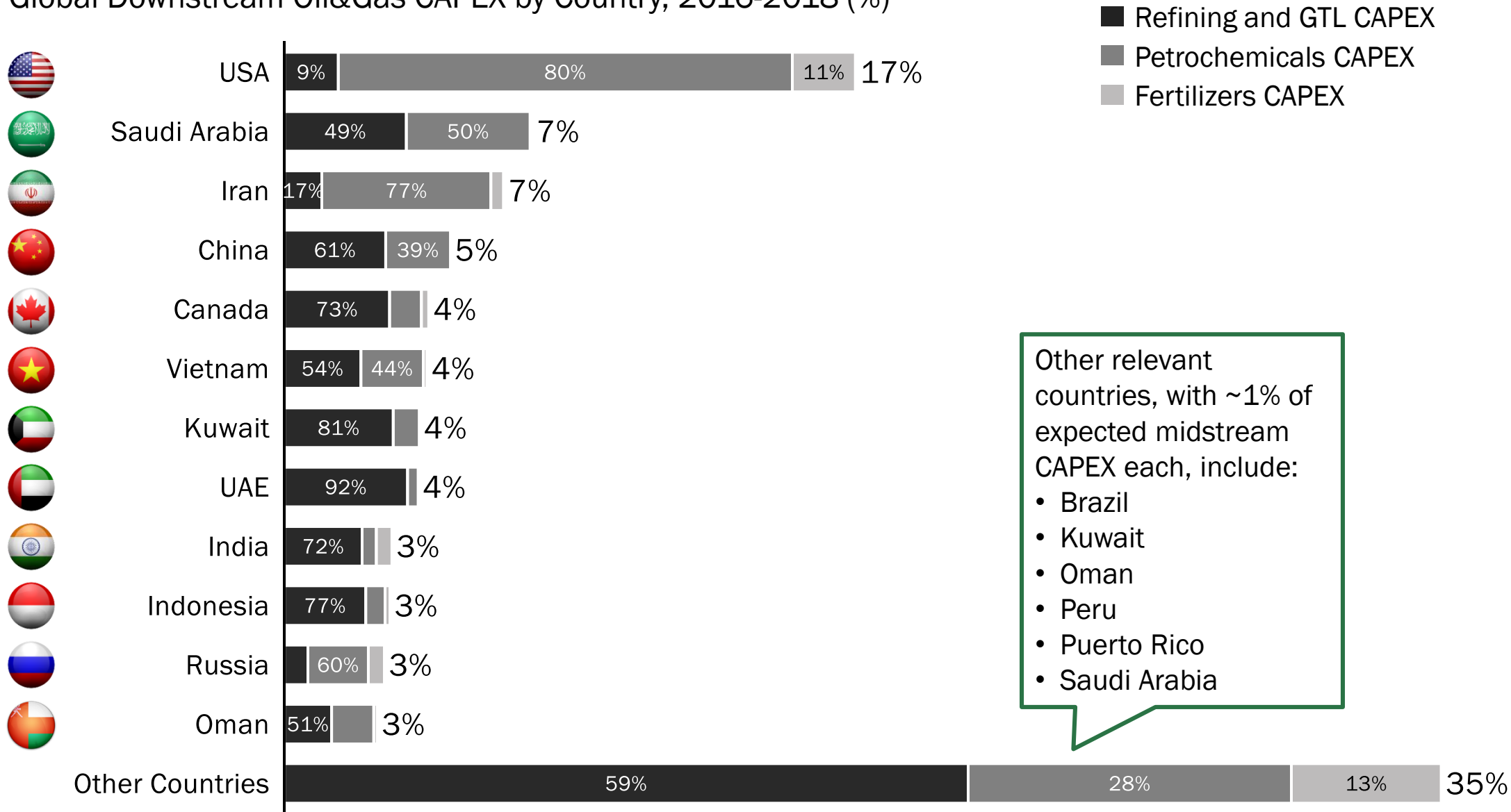
- Global urea capacity is projected to increase by +10%, to 229 Mt in 2020
- New urea plants beyond 2020 are mainly expected where population and GDP will grow
- On a regional basis, Africa, North America and EECA will account for 70% of overall capacity growth.
- Global demand for urea for all uses is forecast to increase by 2% p.a. compared with 2015, to 192 Mt in 2020
 - Latin America and South Asia will each contribute close to half the global incremental demand
- Large potential surpluses are therefore expected to persist during the coming 5 ys

Future opportunities: interesting but challenging markets where to operate



Future opportunities: USA, Middle East and China to drive Downstream investments

Global Downstream Oil&Gas CAPEX by Country, 2016-2018 (%)



Other relevant countries, with ~1% of expected midstream CAPEX each, include:

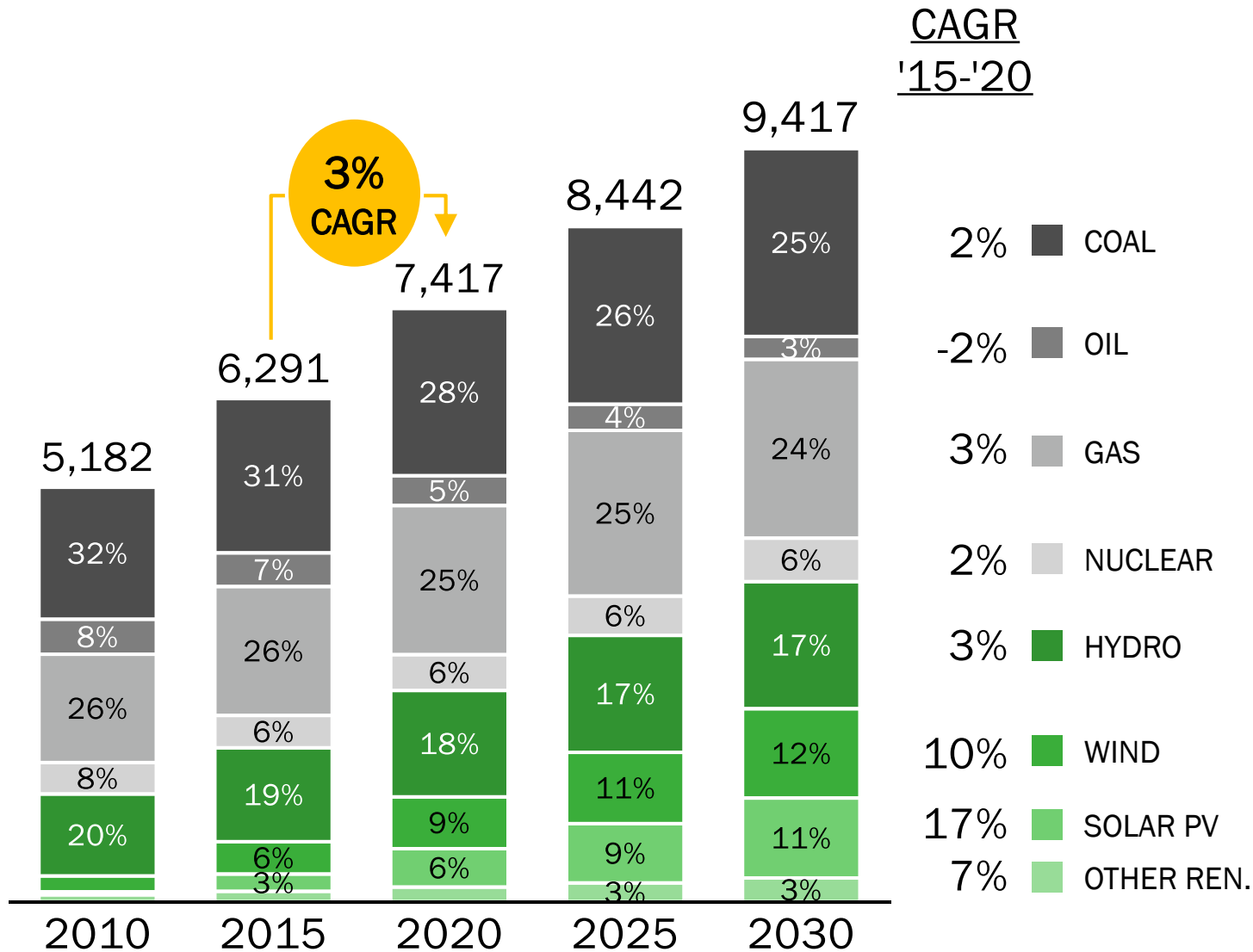
- Brazil
- Kuwait
- Oman
- Peru
- Puerto Rico
- Saudi Arabia



POWER

Installed Capacity to grow at 3% CAGR between 2015 and 2020

Installed Capacity by Fuel (GWe)



Electricity demand drivers

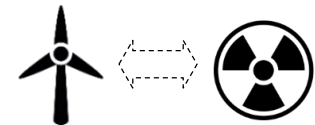
POPULATION INCREASE



GDP TREND



ENVIRONMENTAL & ENERGY POLICIES

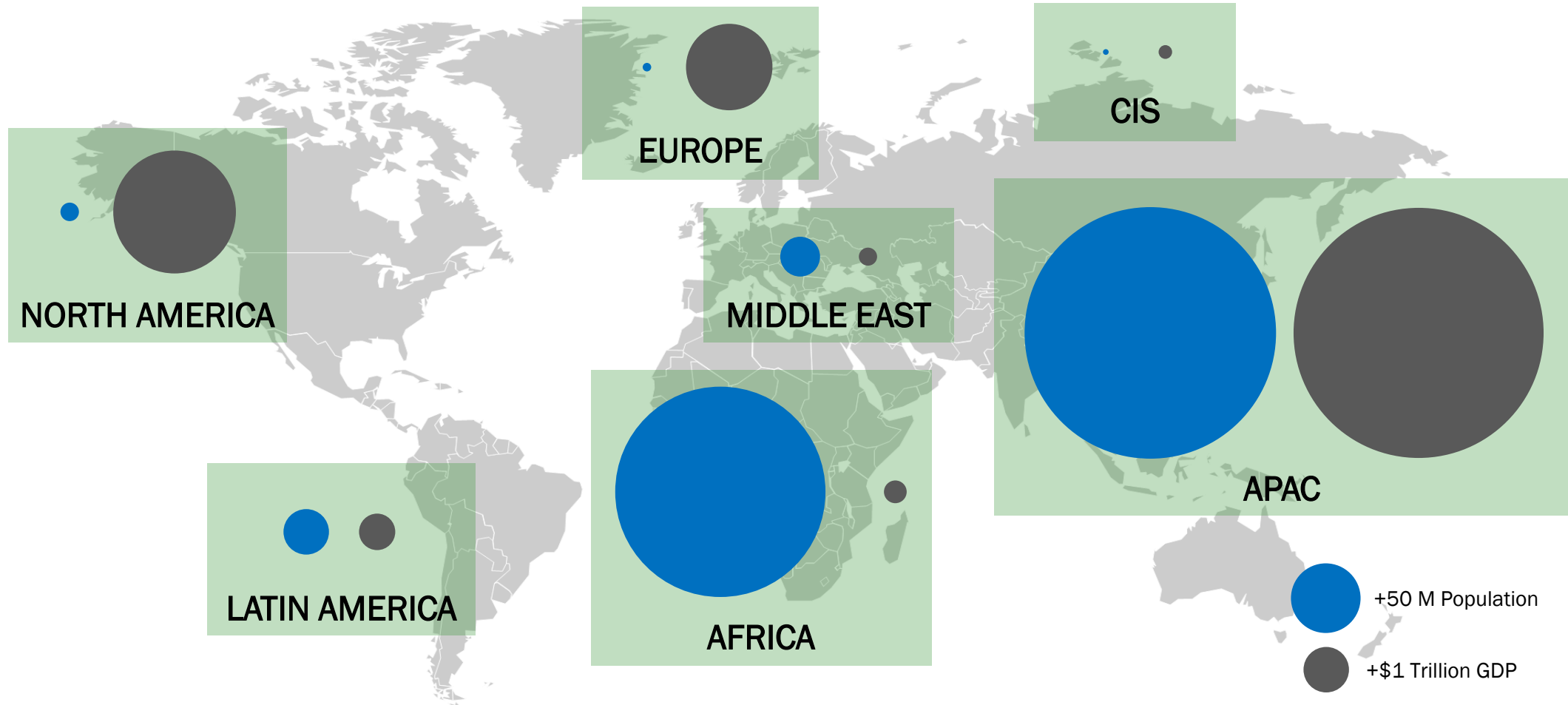


FUEL ENERGY PRICE



Large majority of population increase will occur in developing countries

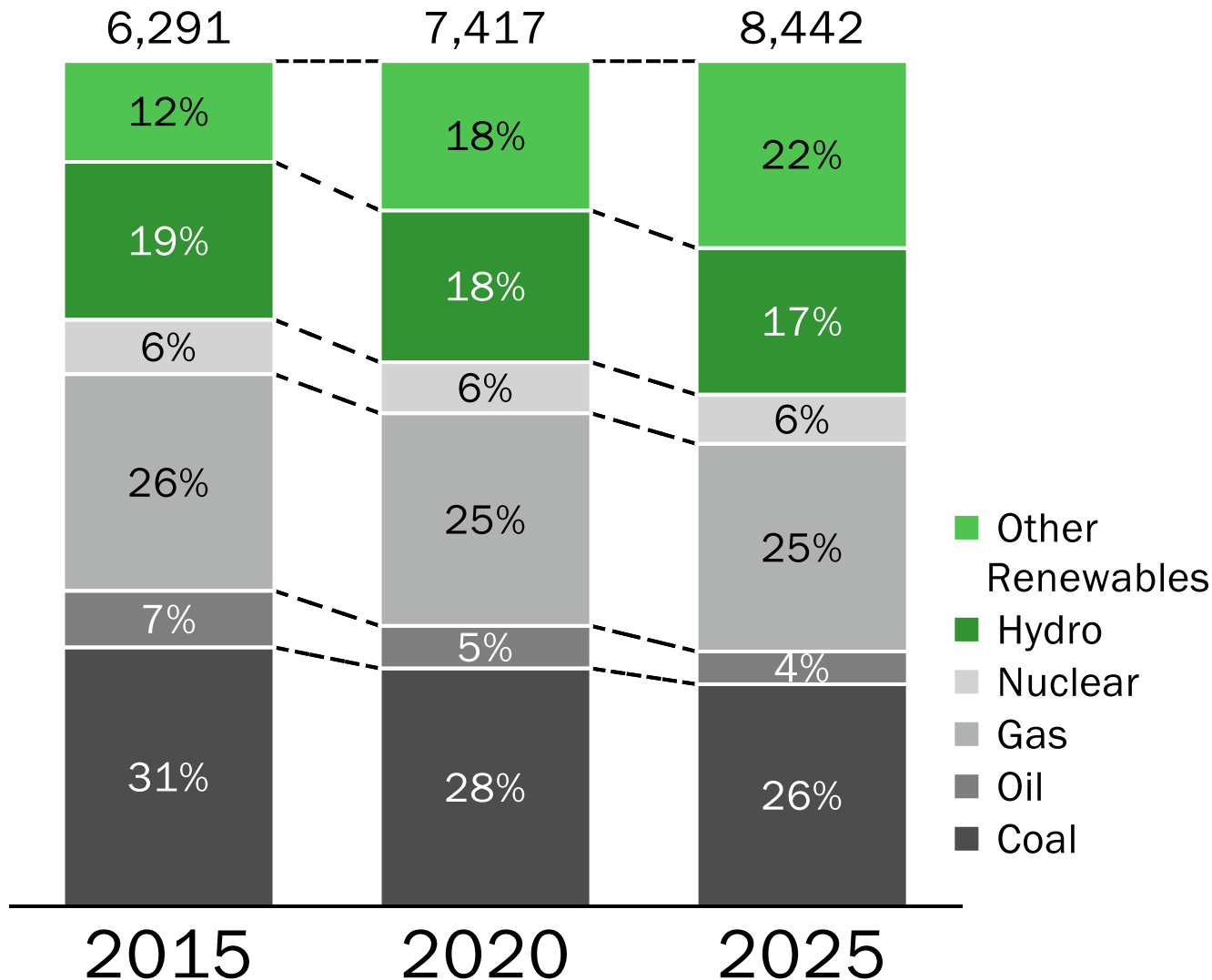
Population and GDP growth 2015-2020



KEY GROWTH COUNTRIES WHOSE RISING POPULATIONS AND LIVING STANDARDS WILL DRIVE STRONG INCREASES IN ENERGY DEMAND ARE *CHINA, MEXICO, NIGERIA, IRAN, THAILAND AND INDONESIA*

Renewables to significantly gain market share

Power Generation mix evolution (GWe)



- **Coal to lose** market share due to environmental concerns
- **Gas will keep a stable** market share
- **Oil will vanish**
- **Renewables** will see a massive expansion, driven by:
 - **Incentives**
 - **Emissions regulations and CO₂ emissions trade market**
 - **Capacity payments**

Not only a change in mix... but also in the “delivery model”

TRADITIONAL MODEL



- Large plant at regional level, with electricity sent through the national grid
- Higher transmission losses and higher carbon emissions

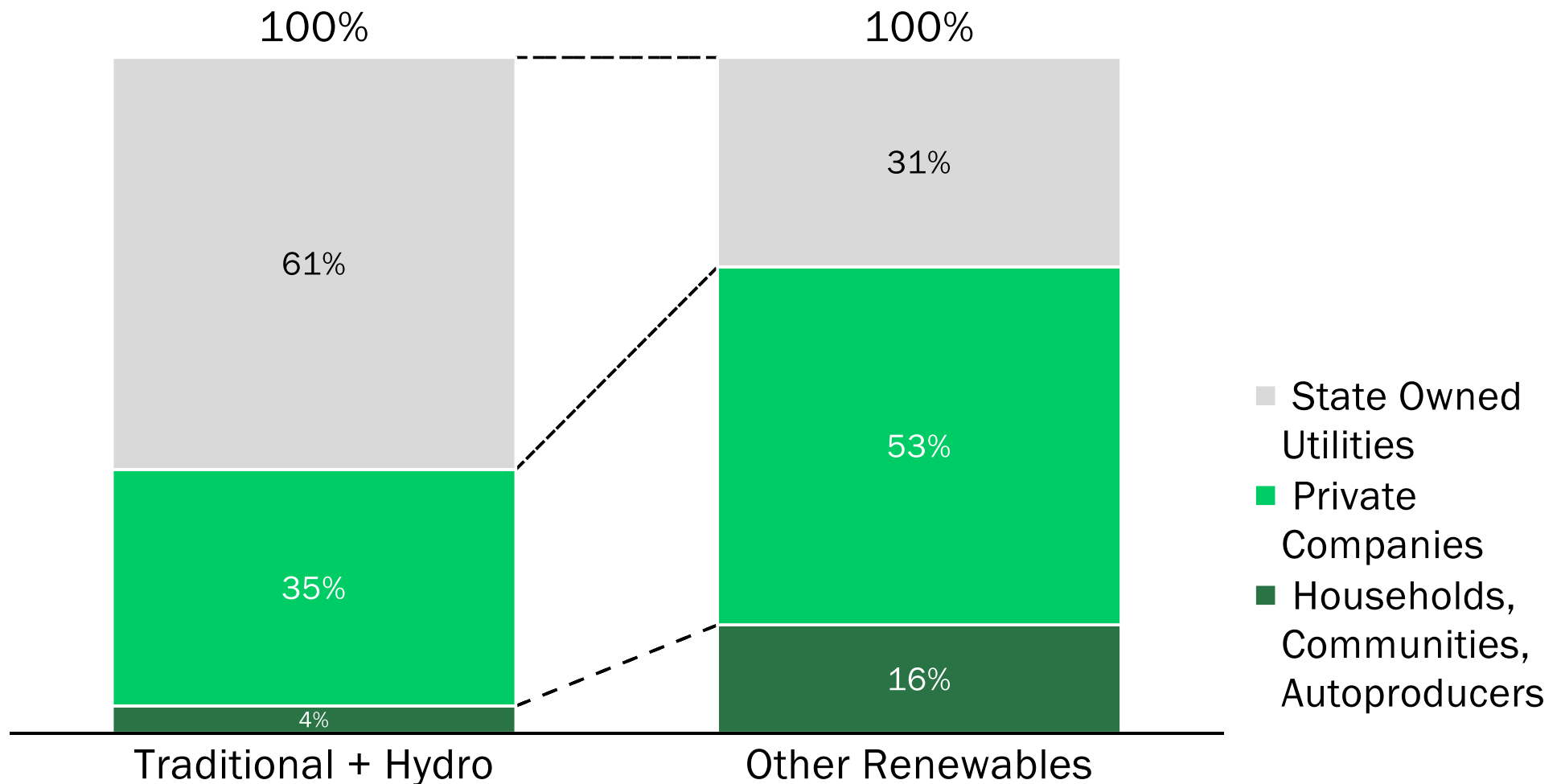
NEW MODEL



- Customers evolve from consumers to energy partners
- Focus on micro-grids
- Initial installation costs vs a special decentralised energy tariff

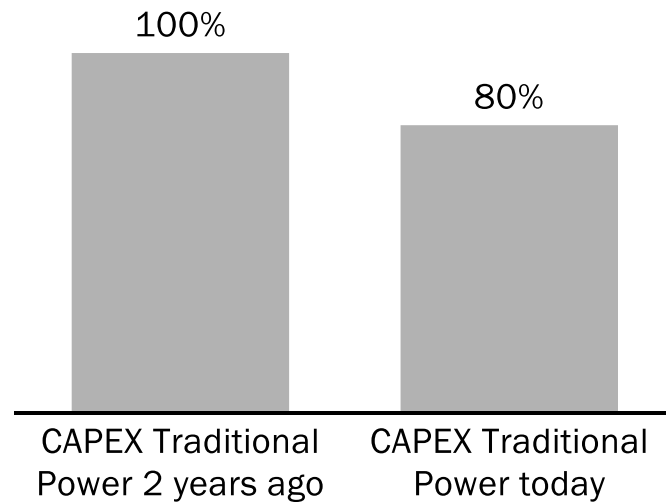
Not only a change in mix... but also in the type of End-Users

Ownership of global power generation capacity commissioned in 2015



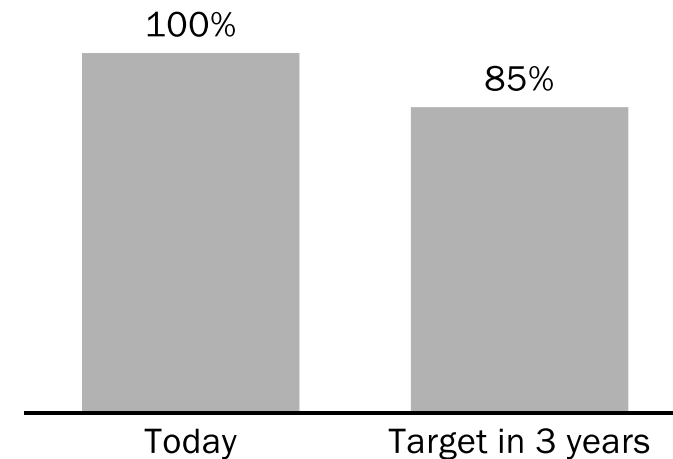
Also in Power... focus on strong CAPEX efficiency and OPEX reduction

CAPEX efficiency



- **Revision of Traditional Power pipeline, targeting shorter time-to-EBITDA**
- **Abandoned large environmentally unfriendly projects, e.g. coal projects**
- **Origination focused on gas and hydro technologies**

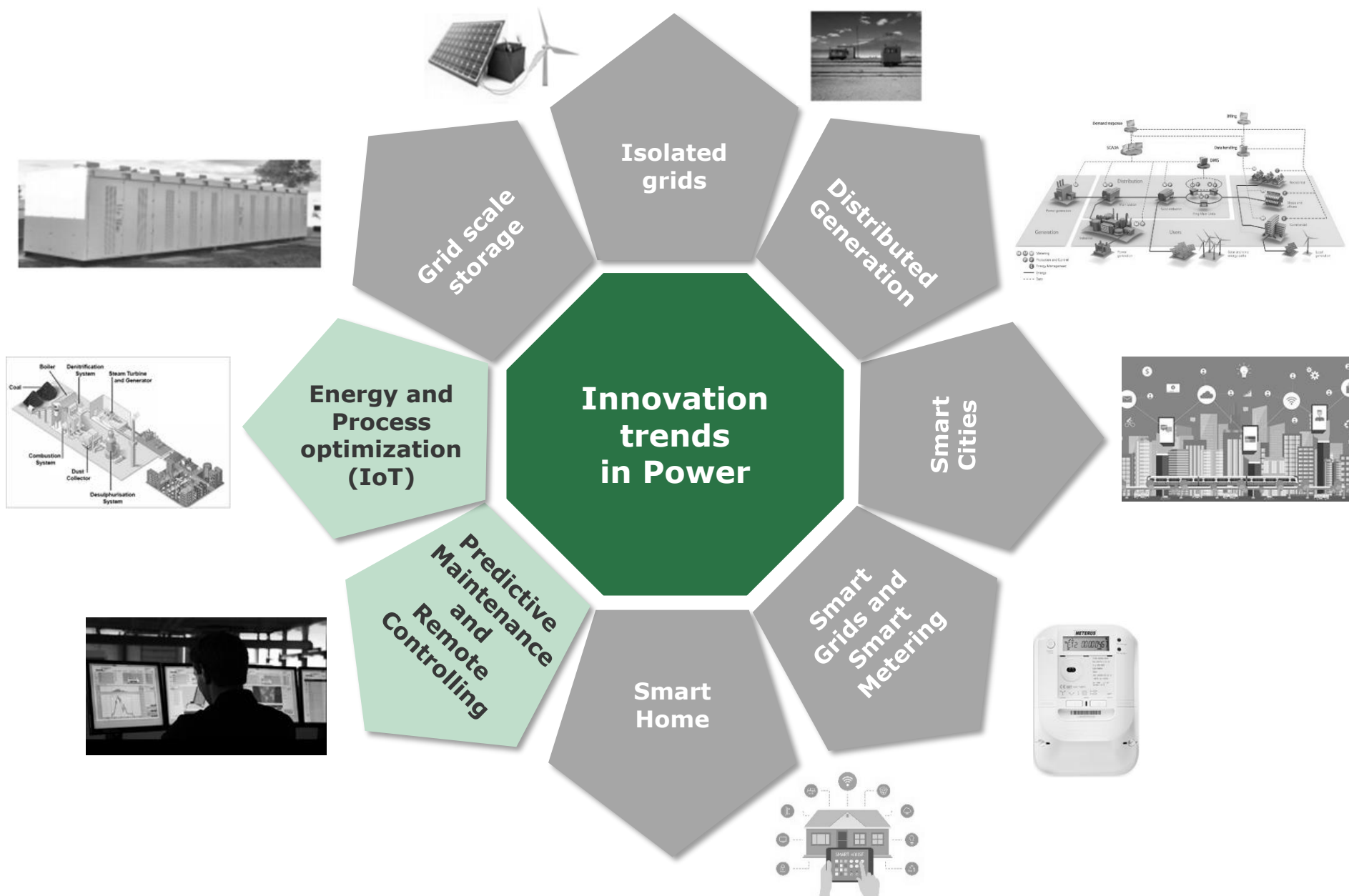
OPEX reductions



- **Lean organisation and processes**
- **Focus on scheduled and predictive maintenance**
- **Maintenance contracts optimization also through economies of scale**

Active management of the innovation portfolio

EXAMPLES



Agenda

MARKET CONTEXT

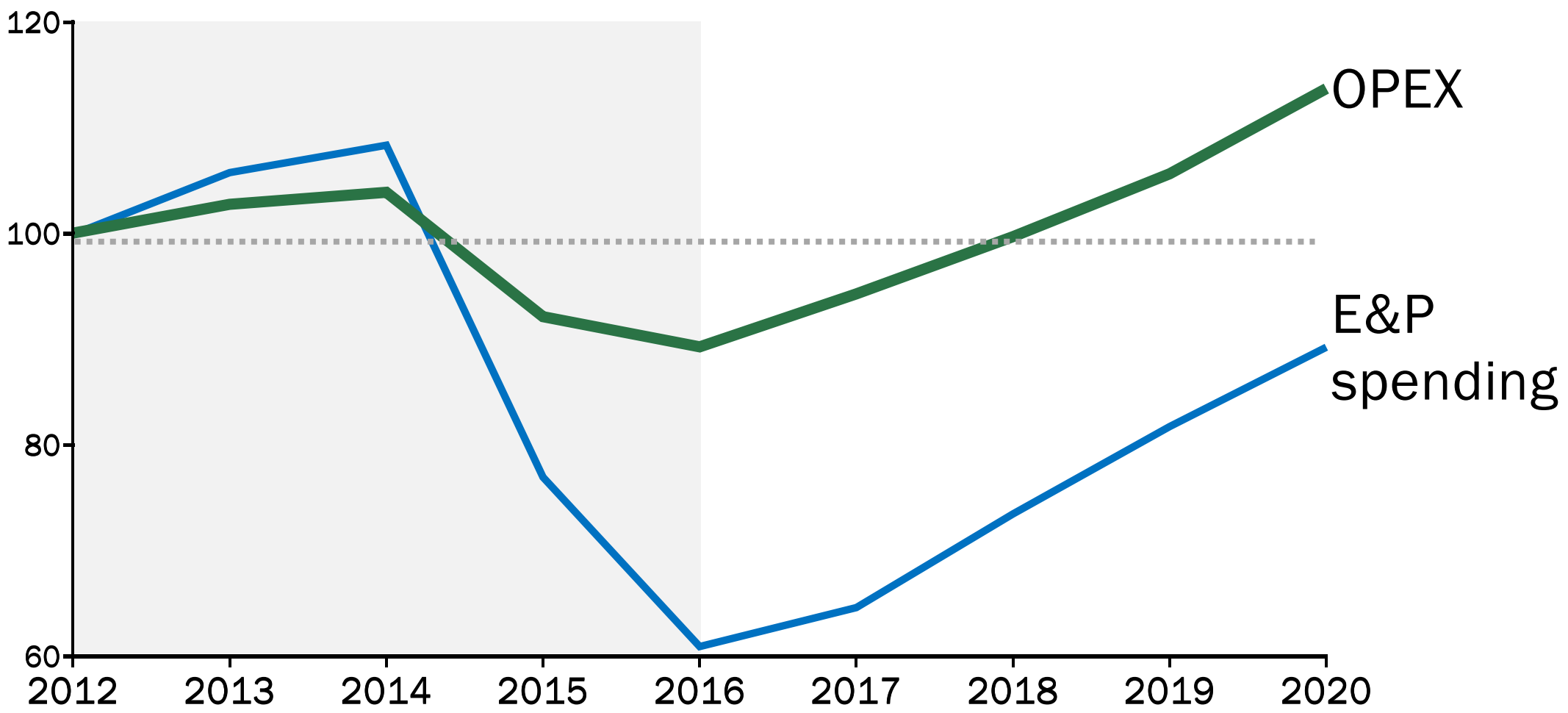
OUTLOOK ON INVESTMENTS

FOCUS ON OPEX

IMPACT ON THE VALUE CHAIN

While CAPEX has been sinking OPEX tends to be more resilient

E&P and OPEX spending evolution (indexed 2012)



The OPEX we see in the market is just the tip of the iceberg

Annual spending in OPEX in the global Downstream industry

An iceberg floating in the ocean. The tip of the iceberg is above the water line, and the much larger base is submerged. The text '~\$50B' is written in large black font on the tip. The text '~\$177B' is written in large white font on the submerged part. The text 'Internal Operations (65%) & Maintenance (35%)' is written in white font on the submerged part.

~\$50B

Internal Operations (65%)
& Maintenance (35%)

~\$177B

- Competences that are **complex to export and replicate**
- Local presence / **Local Content required**
- **International OEM** involved for critical equipment (the installed base matters)
- **Training** as a key component
- **Outsourcing of O&M in Downstream can be considered as an exception:**
 - internal teams of the End-Users manage the value driving operations and maintenance activities and outsource just part of the activities to specialists
- **EPC Contractors are increasingly looking at opportunities in this field, being more proactive, mainly with independent clients**

Agenda

MARKET CONTEXT

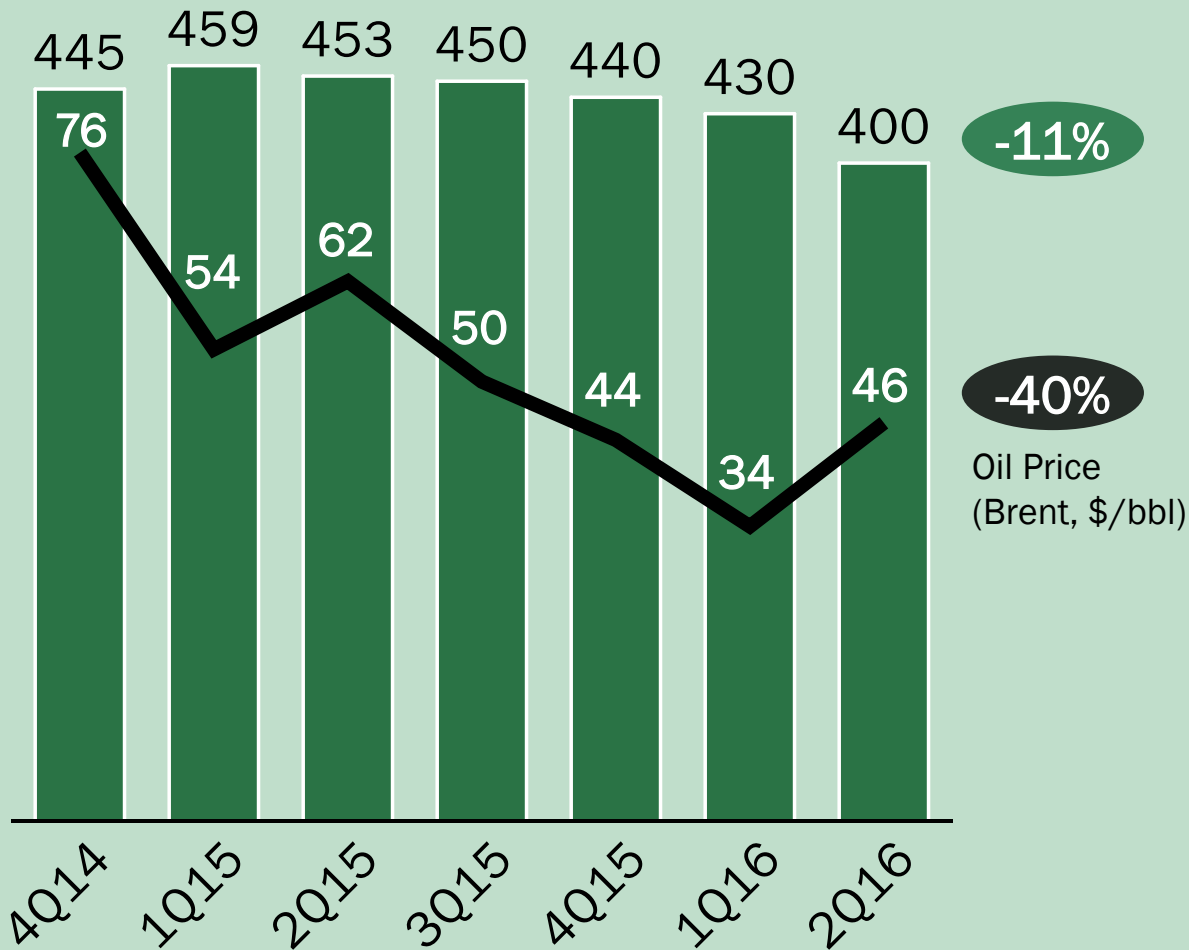
OUTLOOK ON INVESTMENTS

FOCUS ON OPEX

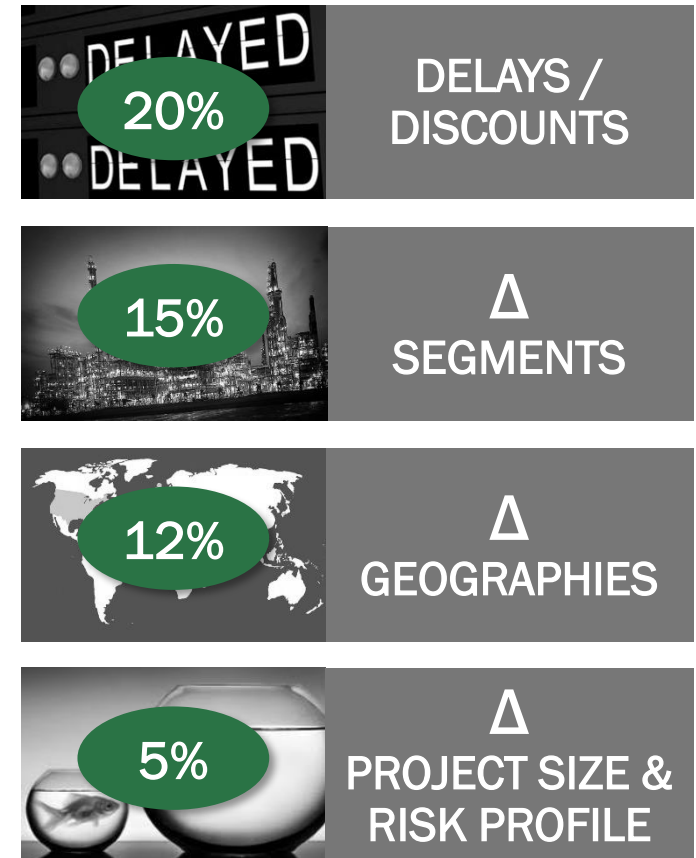
IMPACT ON THE VALUE CHAIN

Int'l EPC Contractors: More-of-the-same... but very different!

Project value of TOP50 Int'l EPC Contractors
(Onshore and Offshore), Billion USD



Composition of 2Q16 backlog

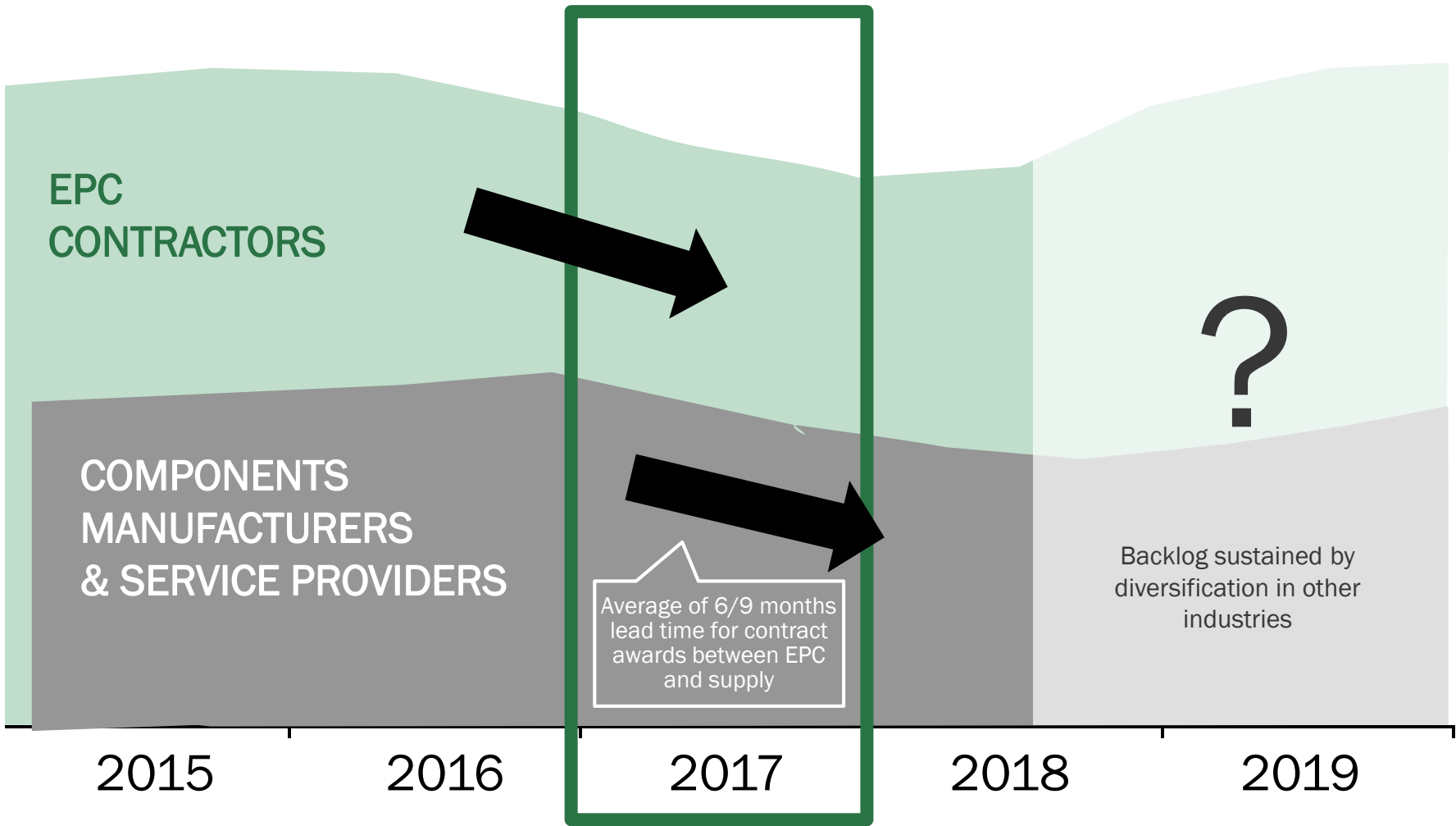


**IN REALITY, ONLY ~50% THE
BACKLOG IS "SIMILAR" TO
PREVIOUS YEARS**

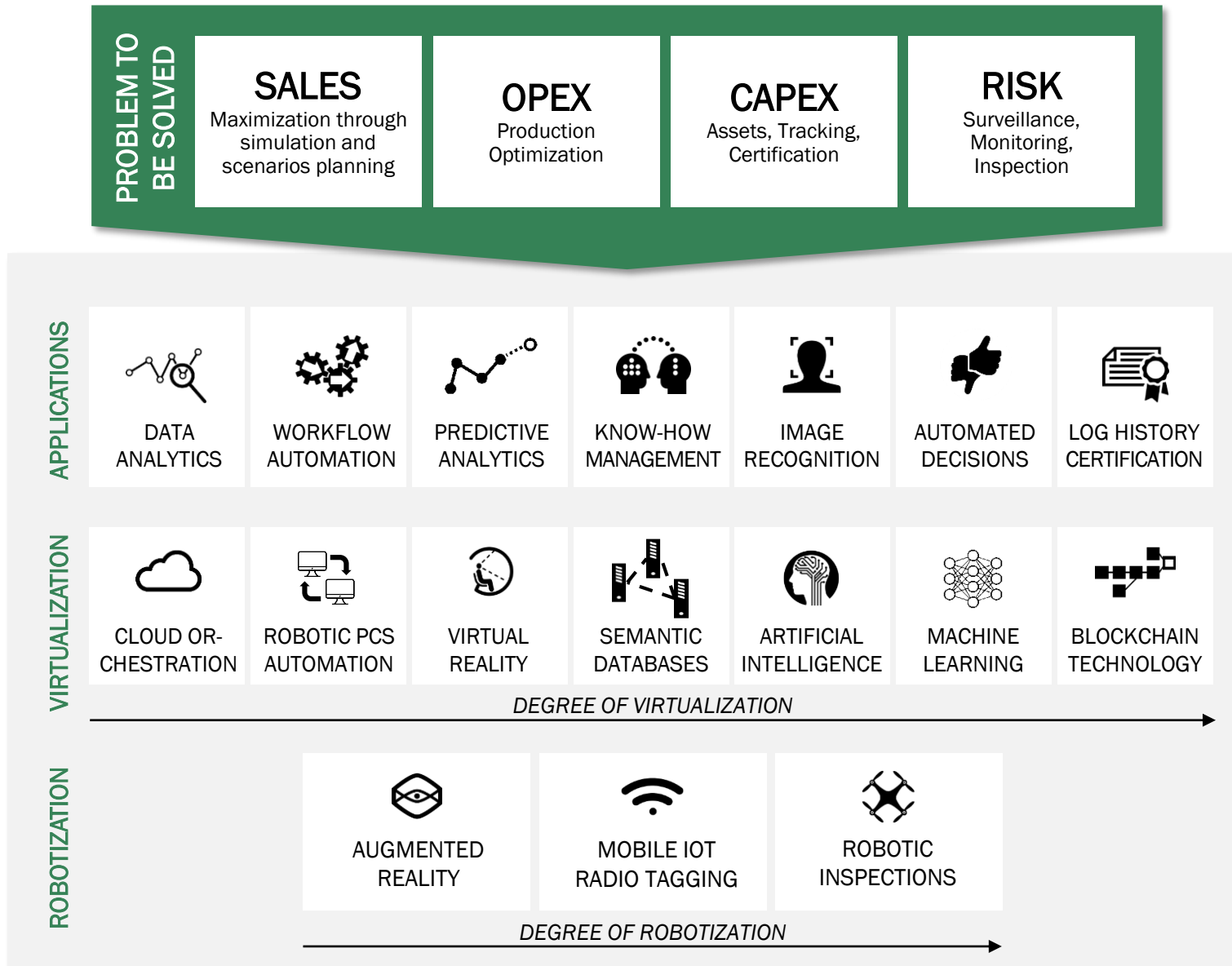
2017 as a “transitional” year for the industry

ILLUSTRATIVE

Expected backlog evolution

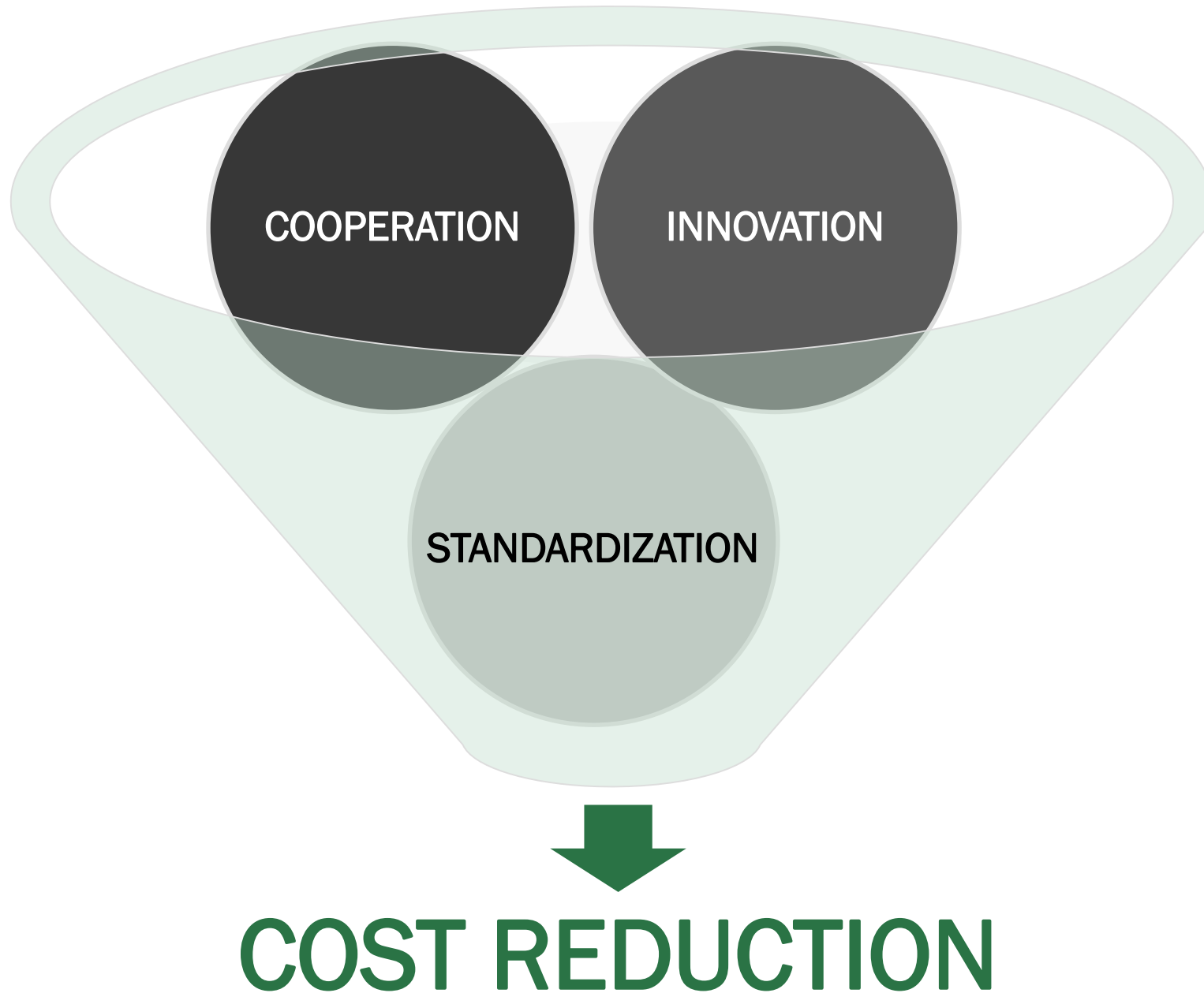


How to ride the Digital Innovation wave (Virtualization & Robotization) in the Energy industry?



- Mapped ~100 start-ups in the global Energy industry able to deliver Digital Innovation
- Large companies are the real engine, also through internal start-up Labs
- Low level of patenting → knowledge of the application is key

Way Forward: find new ways to reduce cost in order to allow the projects to go ahead



Grazie per la cortese attenzione

Disclaimer

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