

# Investor Day – Focus Presentations

London, February 2019





# Total Energy Outlook 2040

# Energy Outlook 2040

## Demand fundamentals

### Key drivers

**GDP:** + 3.3 % p.a.  
**Population:** ~9 Bn in 2040  
**Access to energy:** ~1 Bn people without access to electricity in 2018

**Regulation and policies**

**Technology**

### Key outcomes for net energy demand

**Energy demand growth**

**Energy savings**

Development of **low carbon energies**

**Multiple pathways** addressed by modeling **scenarios**



# Energy Outlook 2040

Total presents two scenarios: Momentum and Rupture

## ➤ Momentum

Energy demand based on

- **Announced policies** and regulations
- EV: **50%** of sales, **32%** of total fleet by 2040
- Adopting **state of the art technologies**
- Energy intensity falls by **2.2 %** pa

## 🌟 Rupture

Anticipating **technological breakthroughs** and strong shift in **public policies**

- Mass **electricity storage**
- Massive switch to **renewable** power generation
- Faster **electrification** in all sectors
- **Steeper decrease** of energy intensity, ending with same energy demand level in 2040 as in 2015

**Momentum scenario explores oil, natural gas and power demand in detail...**



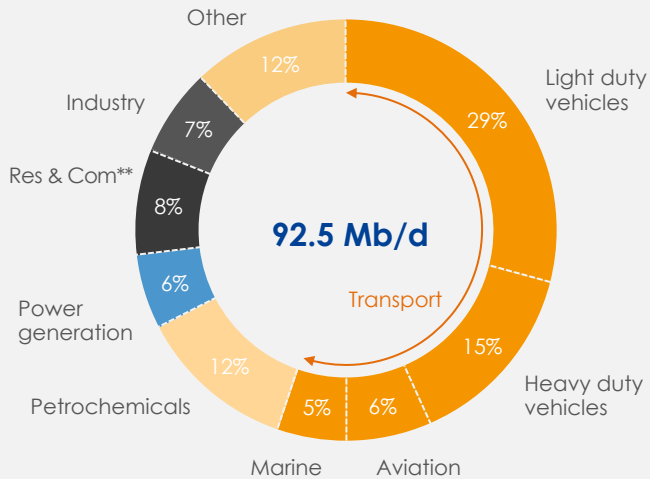
Momentum scenario: oil demand



# Oil demand dominated by transport and petrochemicals

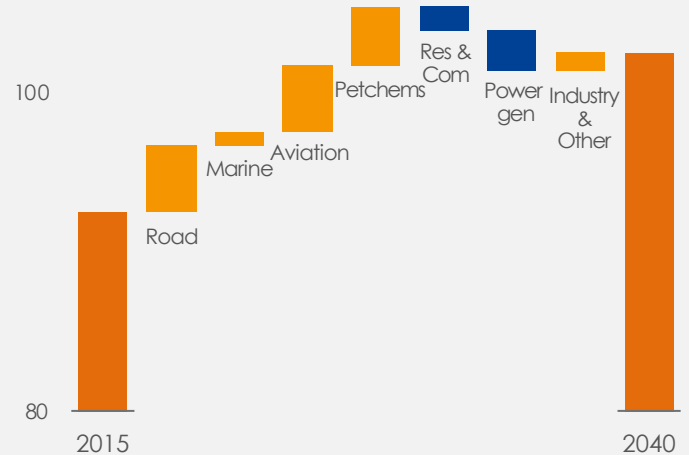
## Emerging markets underpinning rising demand

2015 global oil\* demand  
%, Mb/d



\* Hydrocarbon liquids, including NGLs, excluding biofuels  
\*\* Residential & Commercial Sector

Global oil demand  
Mb/d

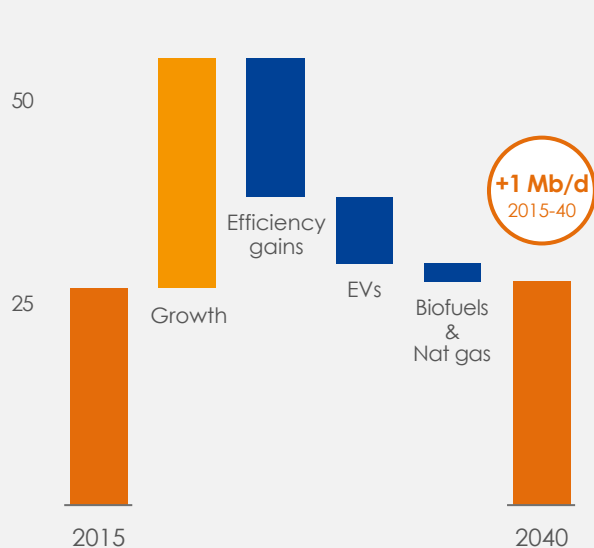


**Growth** concentrated in **transportation** and **petrochemicals**

# Oil demand stagnating for light duty vehicles

## Growth offset by efficiency gains and EV penetration

Oil demand: light duty vehicles\*  
Mb/d



\* 2 & 3 Wheelers + Cars + Light commercial vehicles

### Worldwide fleet of cars doubles

from 1.1 billion to > 2 billion by 2040

- In developing regions, fleet nearly triples

### Fuel efficiency gains impact demand

by ~ 30% mainly due to environmental regulations

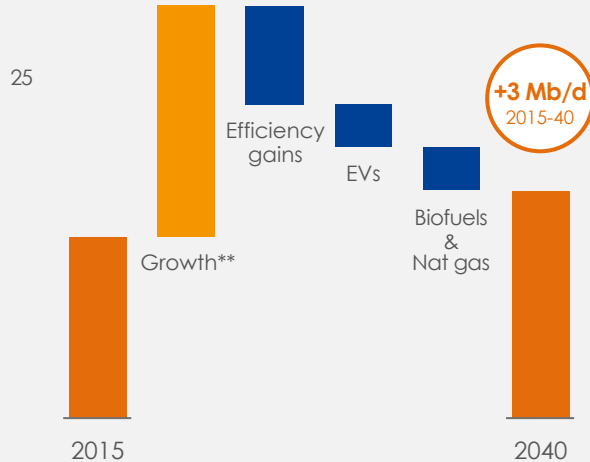
### Electric Vehicle penetration by 2040

- Aggressive penetration: 50% of sales, 32% of fleet
- EVs drive fewer km/y, mainly urban users

# Oil demand growing for heavy duty vehicles

Main source of growth for road transportation despite electrification of urban buses & trucks

Oil demand: heavy duty vehicles\*  
Mb/d



\* Buses + Trucks

\*\* net of improved load factors

Heavy duty vehicle **activity more than doubles**

**Efficiency gains** enhanced by **energy switch** in an already optimized sector

**Buses and urban delivery trucks switch to electricity**

- Stricter air quality standards in cities
- 35% electric by 2040

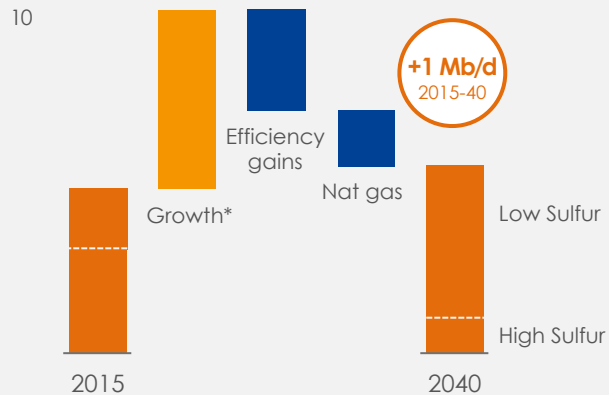
**Rising natural gas penetration**



# Oil demand growing for aviation and marine fuels

## Shipping sector facing product quality change

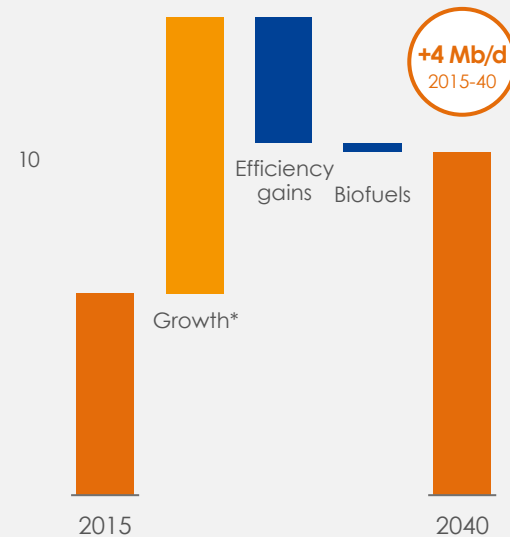
Oil demand: marine fuels  
Mb/d



Global cap stimulating **LNG substitution**

\* net of improved load factors

Oil demand: aviation fuels  
Mb/d



**Limited alternatives to jet fuel**

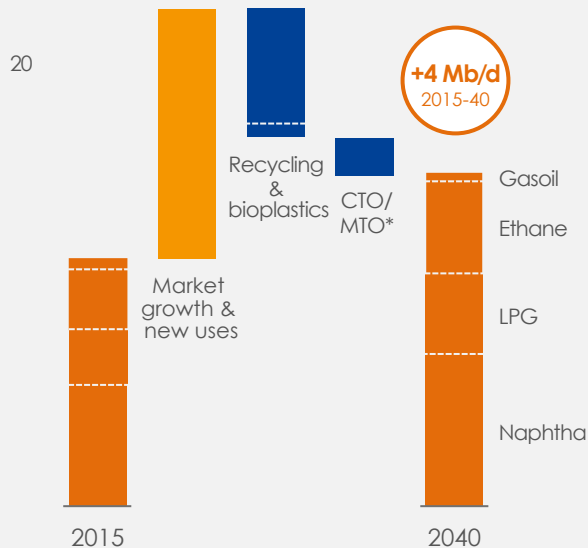
Strong traffic growth for **cargo and people**

# Oil demand growing for petrochemicals

## Recycling technologies developing rapidly

Oil demand: petrochemicals

Mb/d



**+1.2 Mb/d** oil products and  
**+2.7 Mb/d** ethane and LPG **in 2040**

\* Coal To Olefins / Methanol To Olefins

**Demand for plastics** grows

- Rising global prosperity
- Increasing urban population with higher plastic consumption

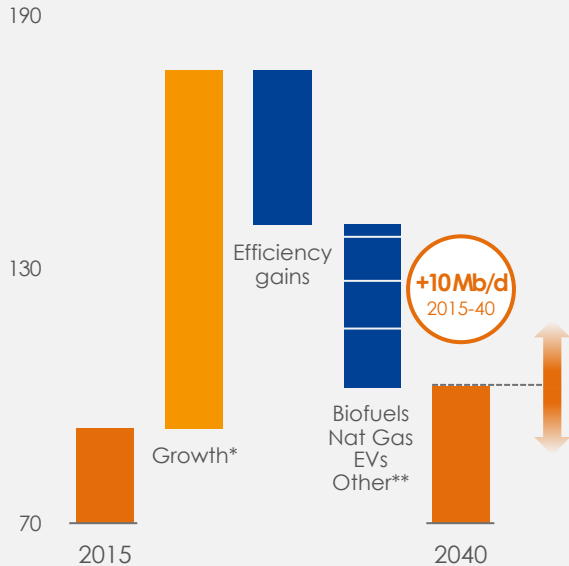
**~25%** of feedstock displaced by rapidly expanding **plastic recycling**

Oil-based feedstock increase mostly coming from **LPG** and **ethane**

# Sustained oil demand

Despite EVs, efficiency gains, and substitution

Global oil demand  
Mb/d



\* net of improved load factors in transports

\*\* Including plastic recycling

Demand for **mobility remains strong in emerging countries**

**Natural gas is the main alternative** to oil

- > 10 Mb/d of oil displaced by natural gas

**Aggressive case for EV penetration**

**Stronger disruptions needed**

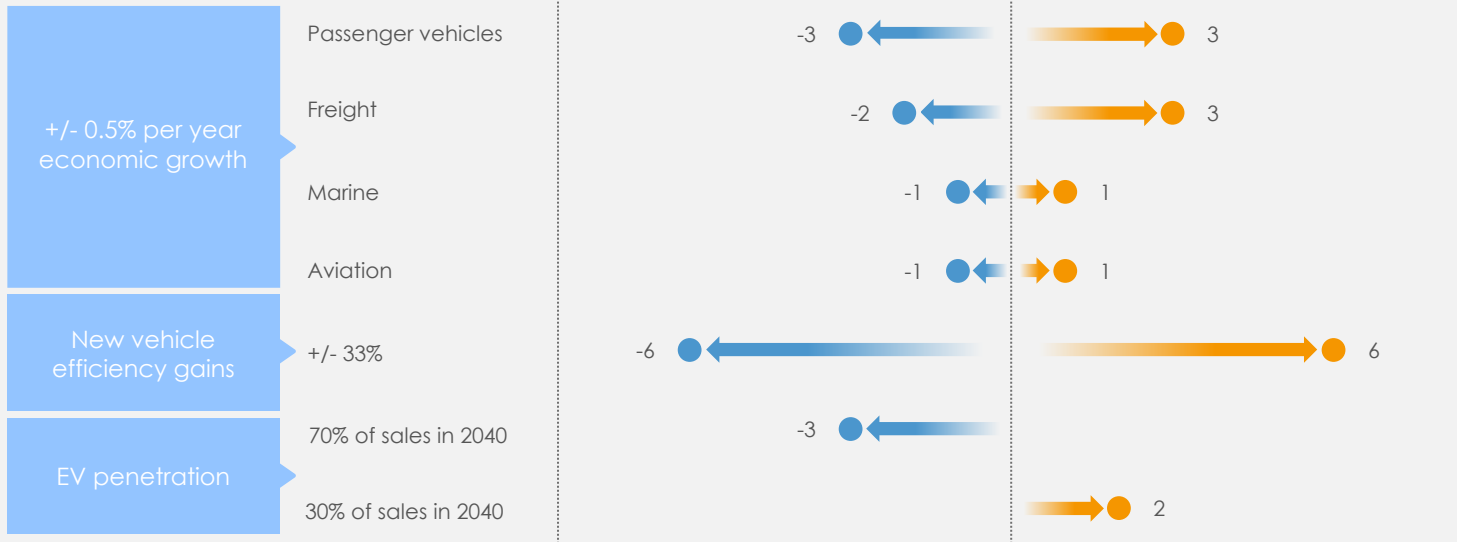
to meet the IEA 450 ppm scenario

# Oil demand sensitivities

2040 oil demand  
Mb/d

-9

9

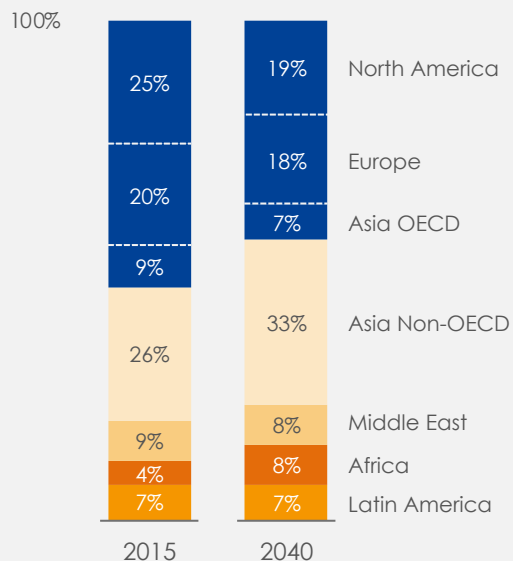




# Regional oil demand is shifting rapidly

## North America, Europe, & Asia OECD shares decreasing

Oil demand: evolution by region\*  
%, Mb/d



\* Excluding International Marine Bunkers





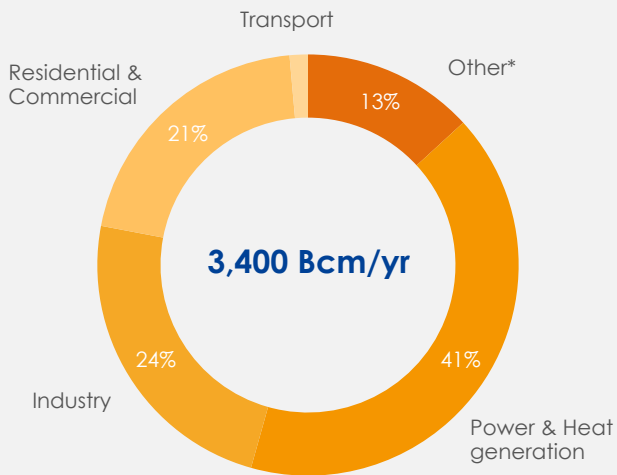
**Momentum scenario: natural gas demand**



# Natural gas demand growing in all sectors

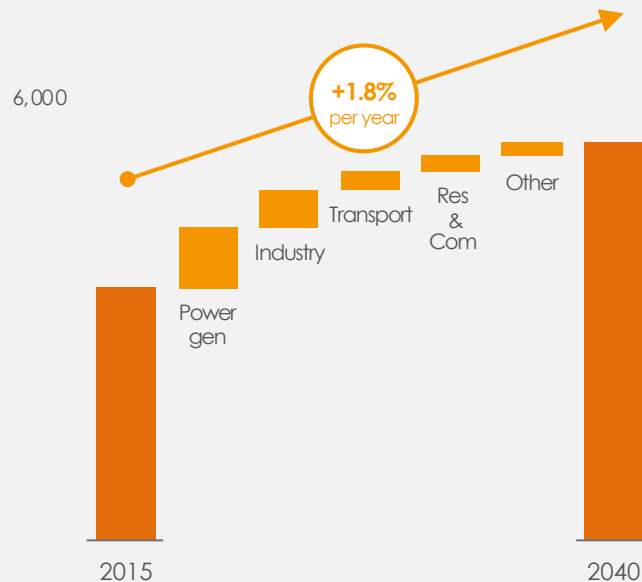
## Power generation and industry pulling-up global natural gas demand

2015 global natural gas demand  
%, Bcm/yr



\* including autoconsumption

Global natural gas demand  
Bcm/yr

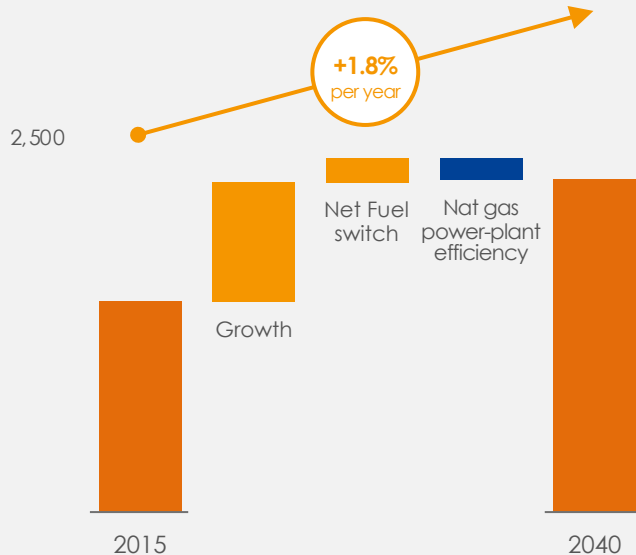


**All sectors growing**, dominated by **power generation** and **industry**

# Power generation

Remains #1 driver for natural gas demand through 2040

Natural gas demand: power generation  
Bcm/yr



**Growth** spurred by the **increase of power demand**

**Fuel switching mainly from coal**

- More from coal and oil products to natural gas than from natural gas to renewables

**Efficiency gains** driven by the **improvement of gas-fired power plants**

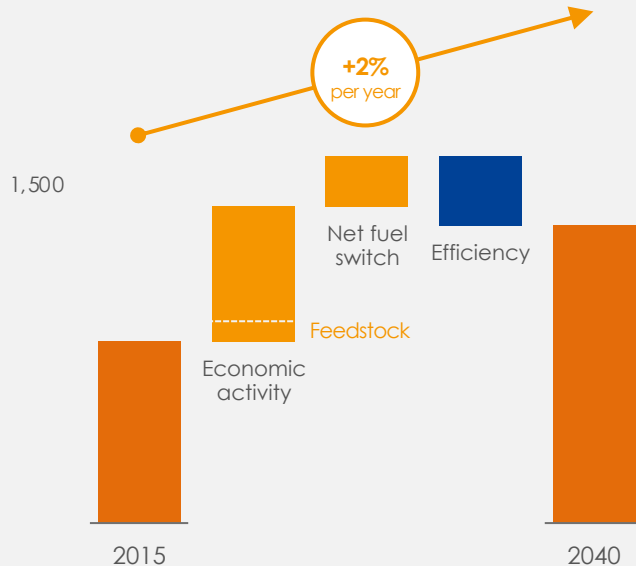


# Strong industrial natural gas demand

## Natural gas use as an energy source and feedstock

Natural gas demand: industry

Bcm/yr



**Growth** driven by **economic activity**

**Switch from coal & oil** driven by

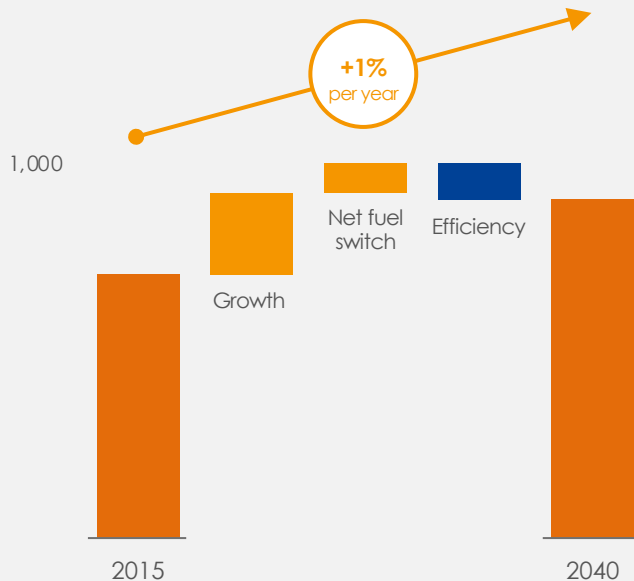
- Regulation (Blue Sky in China)
- Natural gas availability and affordability

**Two key factors for significant natural gas savings**

- Improvements of existing processes
- Structural switch towards less-energy intensive industries

# Slower demand growth in Residential & Commercial

Natural gas demand: Res & Com\*  
Bcm/yr



\* Residential & Commercial Sector

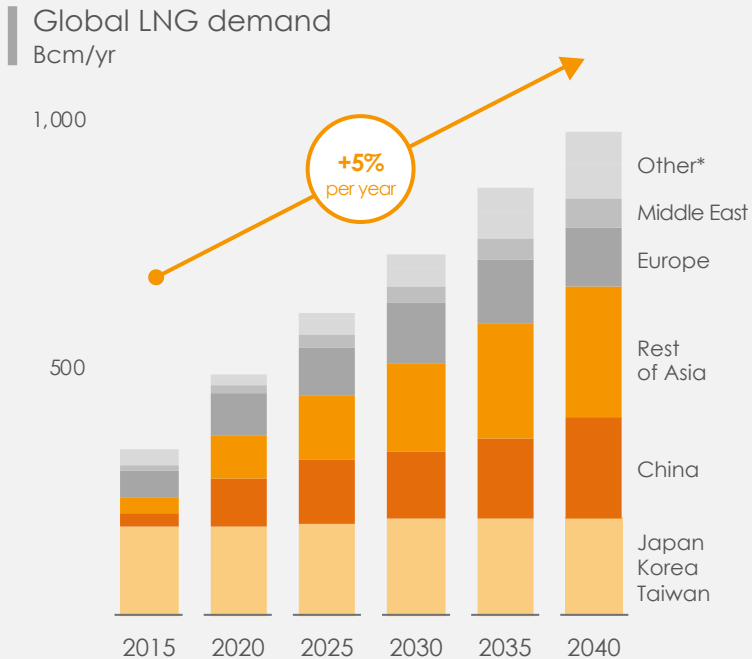
**Growth** mainly driven by **economic activity** and **increased comfort** in households, partially offset by efficiency gains

**Switching away from oil & coal**  
Two-thirds of the switch in China

Efficiency gains **mainly in commercial sector**

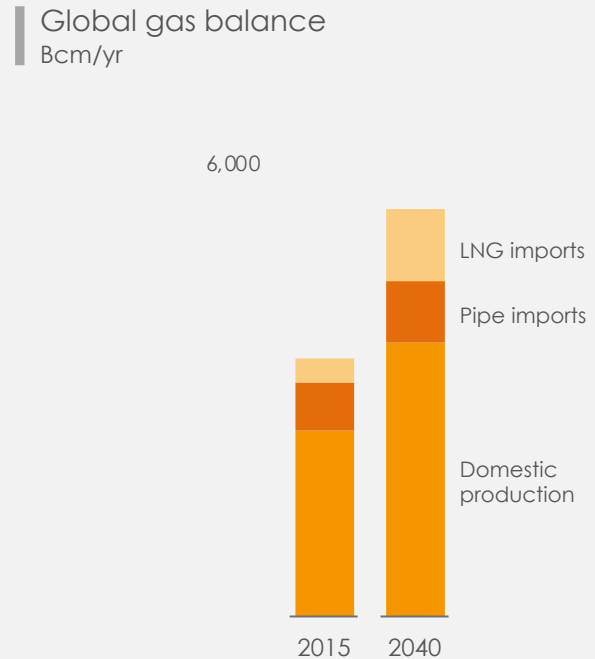
# Strong LNG demand growth driven by Asia

## Supportive government policies for natural gas



Emerging markets **driving growth**

\* Including Bunkers



**LNG** expected to **surpass pipelines** in international gas trade

# Natural gas demand sensitivities

## 2040 natural gas demand

Bcm/yr

### Macro drivers

Change in economic growth

+/- 0.5% per year GDP growth

### Efficiency drivers

Change in energy efficiency

+/- 0.1% per year Energy efficiency

### Sectoral drivers

Boost gas in transport (trucks and marine bunkers)

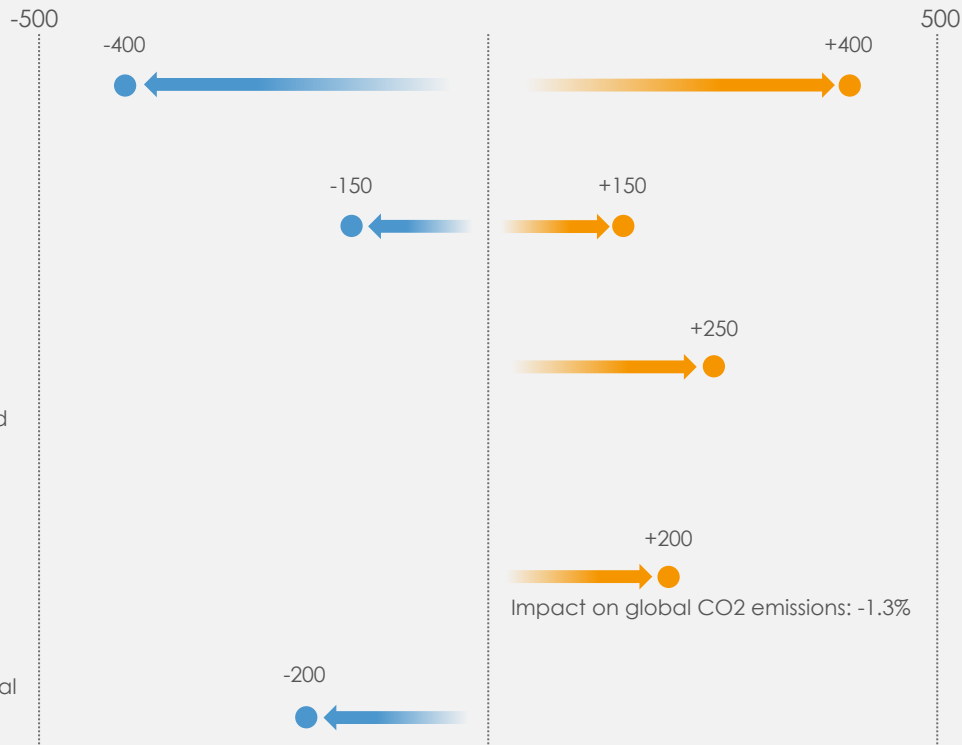
Extra 10% market share for natural gas in long haul truck and marine bunker fleet

Coal-to-gas switch in power generation

10% of remaining coal switched

Competition with renewables in power generation

Gas represents 5% less of the incremental generation







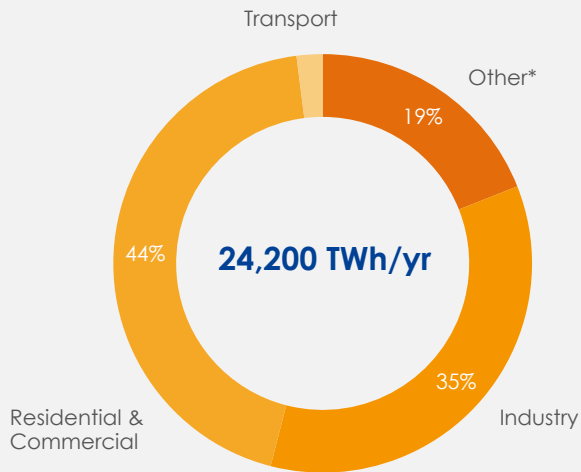
Momentum scenario: power demand



# Power demand growing in all sectors

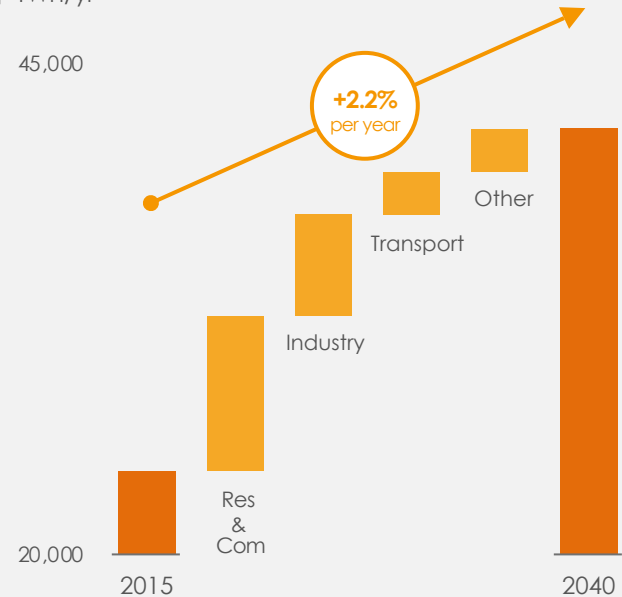
## Growing twice as fast as global energy demand

2015 global power demand  
%, TWh/yr



\* Including losses

Global power demand  
TWh/yr

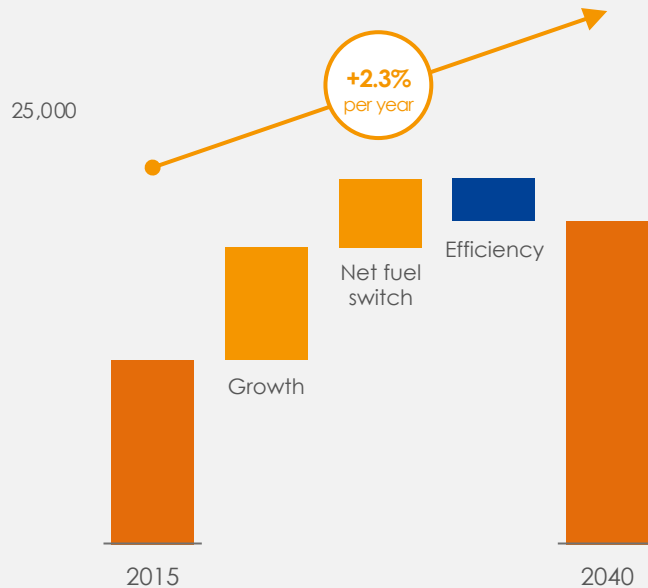


**All sectors growing**, dominated by **residential & commercial** and **industry**

# Residential & Commercial

## Accounts for nearly half the growth

Power demand: Res & Com  
TWh/yr



**More people**, increased **wealth per capita** and **service growth**

### Electrification of energy use

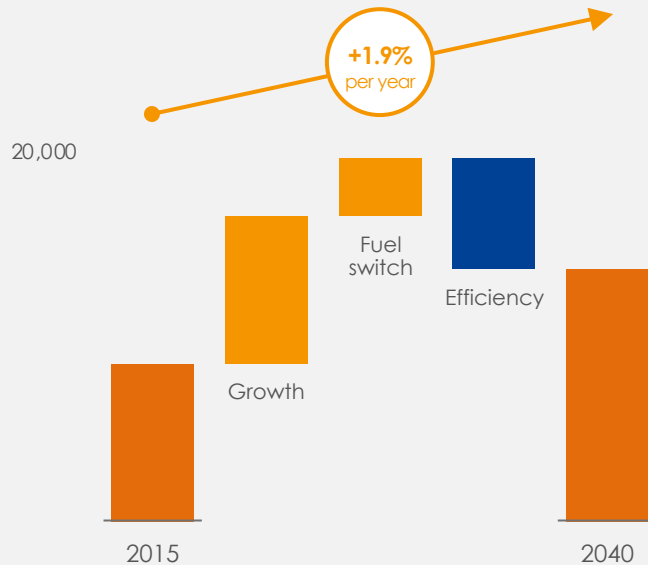
- Switching from biomass (access to electricity) and hydrocarbon fuels

### Efficiency gains

- Technical improvements: appliance efficiency, building insulation and LEDs
- Partially offset by increasing power demand per capita in developing countries

# Electrification will transform industry

Power demand: industry  
TWh/yr



## Growth driven by economic activity

**Fuel switching** driven by electrification of processes and automation

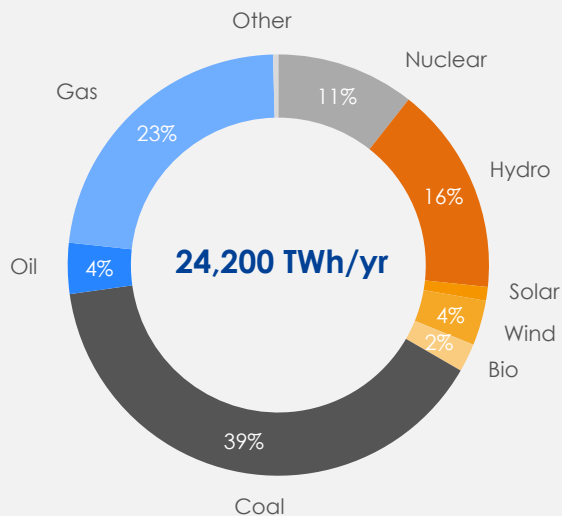
**Energy efficiency** expected from

- Technology adoption
- Structural switch toward less electricity-intensive industries

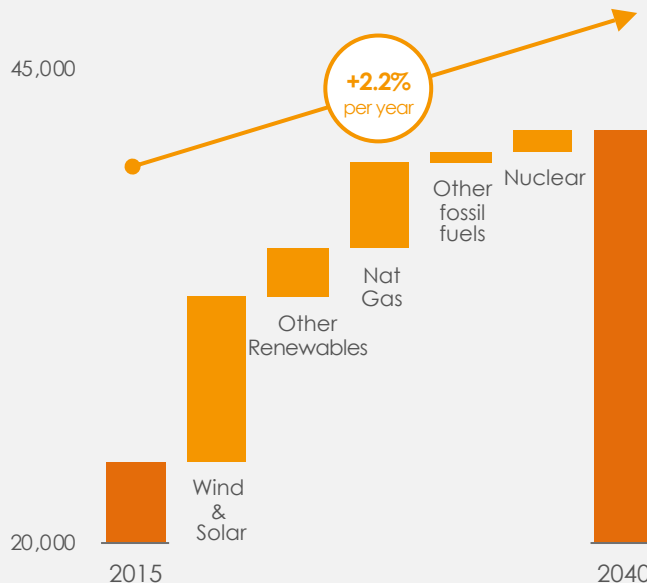
# Power generation: more low carbon electricity

## Hydrocarbon share of generation falls to half in 2040

2015 global power generation  
%, TWh/yr



Global power generation  
TWh/yr



**Renewables** and **natural gas** dominating growth  
Decrease of **carbon intensity** by one third

# Power demand sensitivities

2040 power demand  
TWh/yr

## Macro drivers

Change in  
economic growth

+/- 0.5% per year  
GDP growth

## Efficiency drivers

Change in  
energy efficiency

+/- 0.1% per year  
Energy efficiency

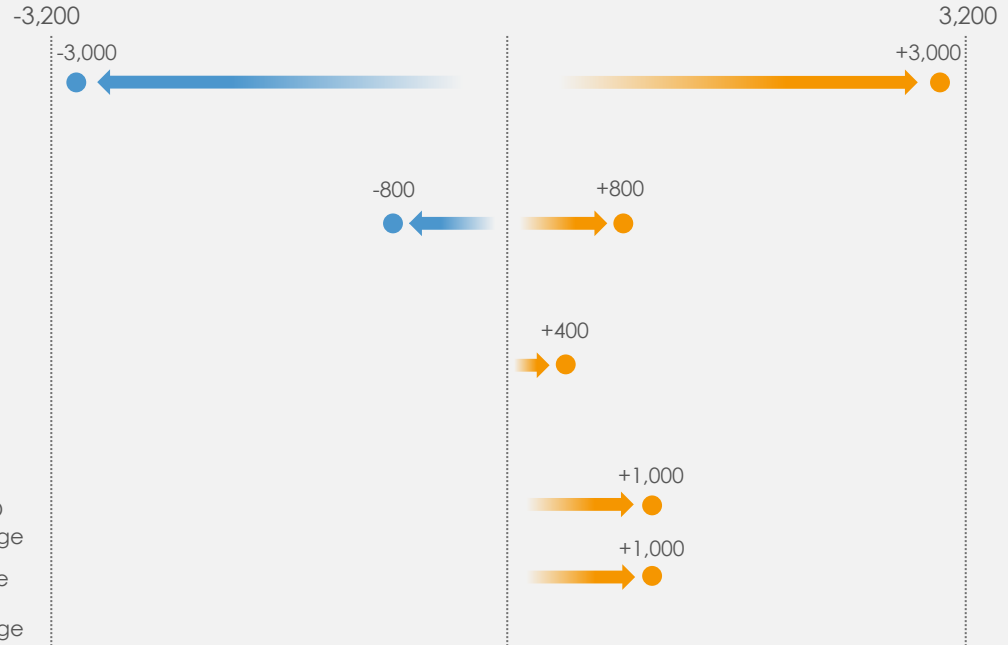
## Sectoral drivers

Boost electric cars

Extra 10% market  
share for EVs in  
LDV fleet

Convergence of  
per capita  
electricity demand  
in Res. & Com.

China fills 1/3 of  
the gap vs. OECD  
per capita average  
India fills 1/3 of the  
gap vs. China's  
per capita average

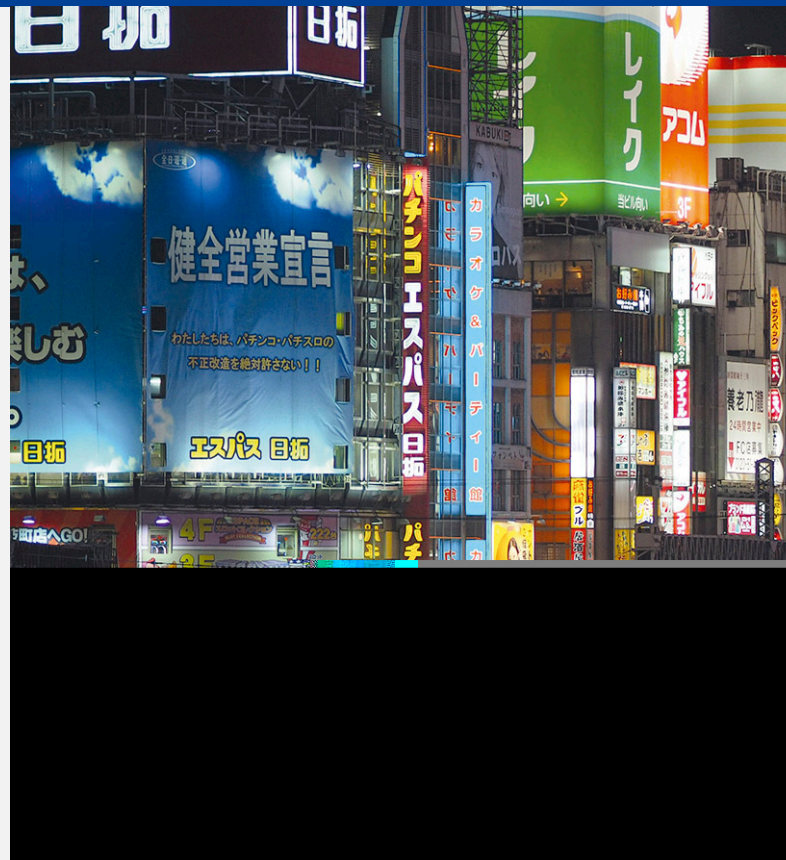
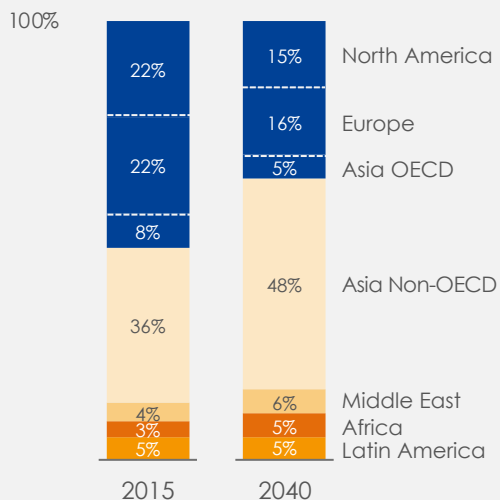




# Regional weights in power demand shift massively

## Non-OECD Asia will use more than North America, Europe, & OECD Asia

Power demand: evolution by region  
%, TWh/y



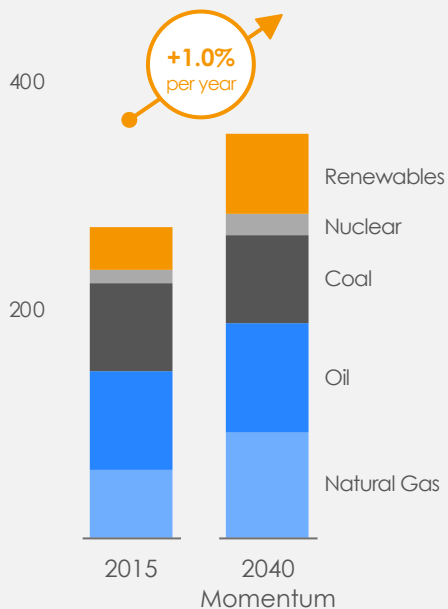


# Primary energy demand and CO2 emissions

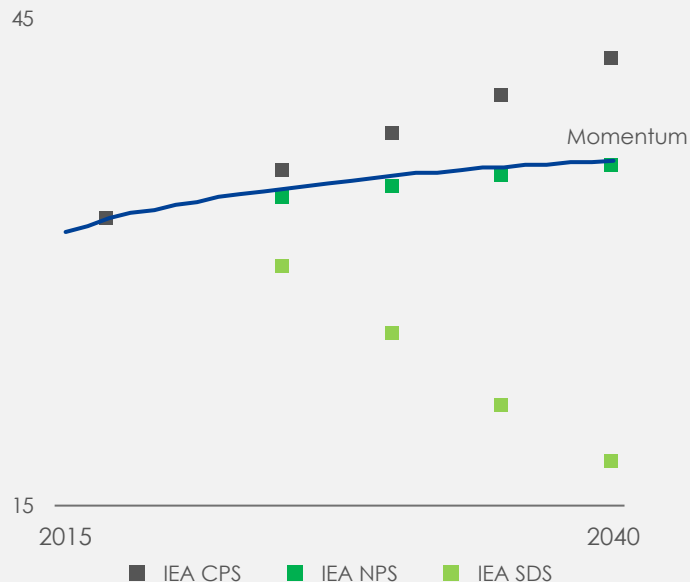
# Momentum scenario: global primary energy demand

## Gas and renewables outperform global energy demand growth

Global primary energy demand  
Mboe/d



CO2 emissions  
GtCO2/yr

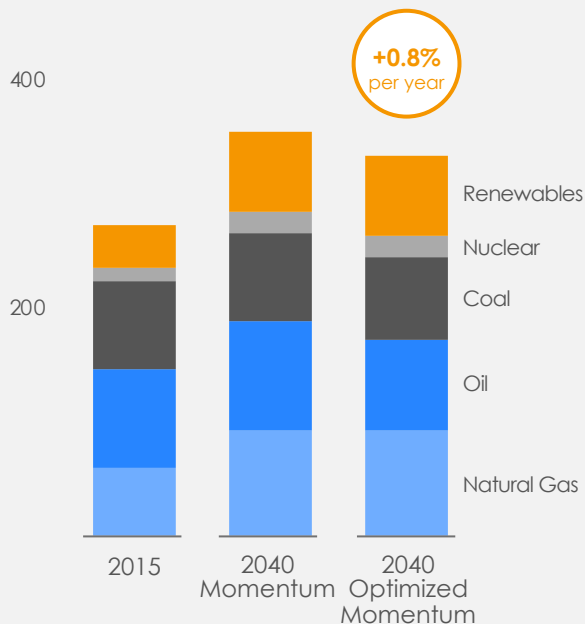


**CO<sub>2</sub> emissions** in line with **IEA New Policy Scenario (NPS)**

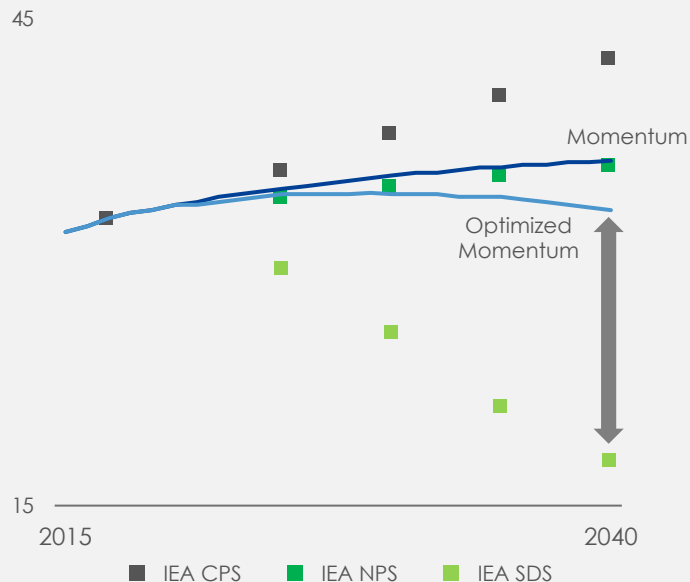
# Optimized Momentum scenario

Adding efficiency and sectorial sensitivities insufficient for a 2°C pathway

Global primary energy demand  
Mboe/d



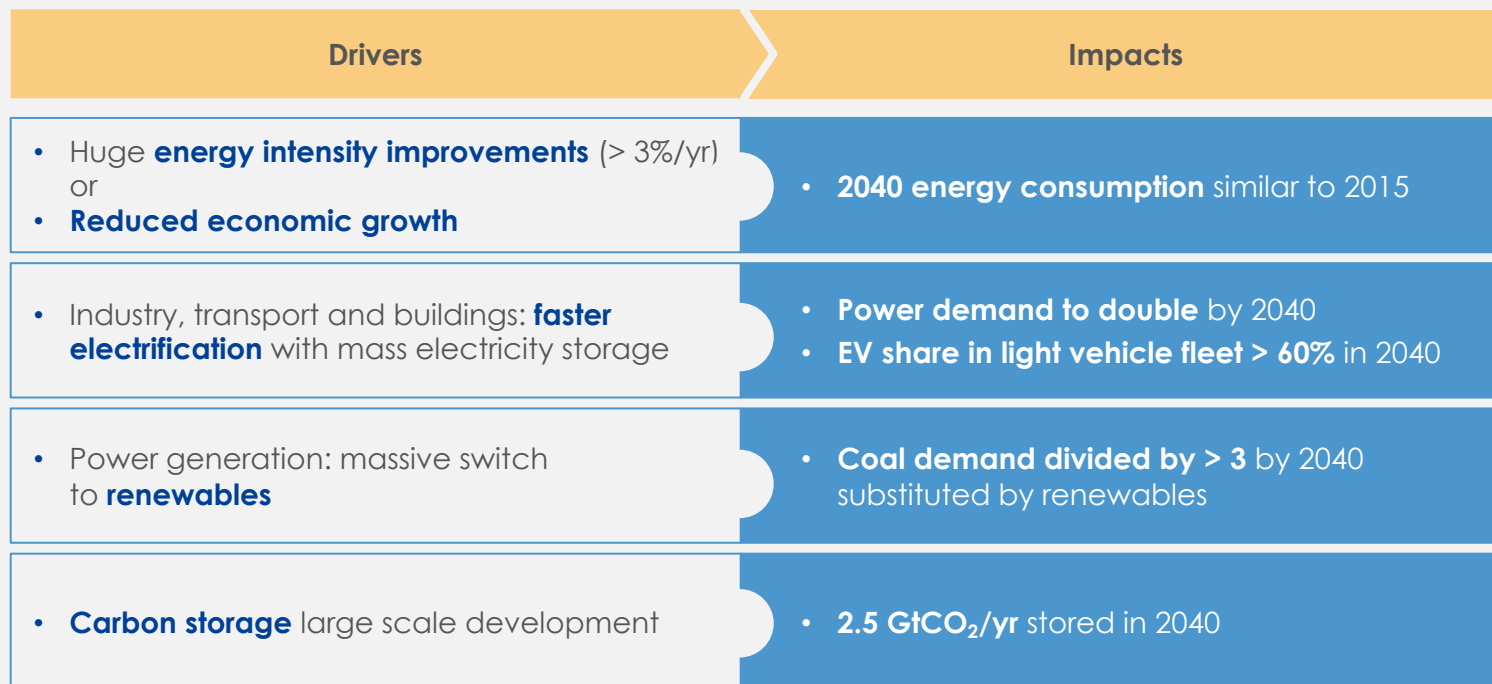
CO2 emissions  
GtCO2/yr



Need for a **Rupture scenario**

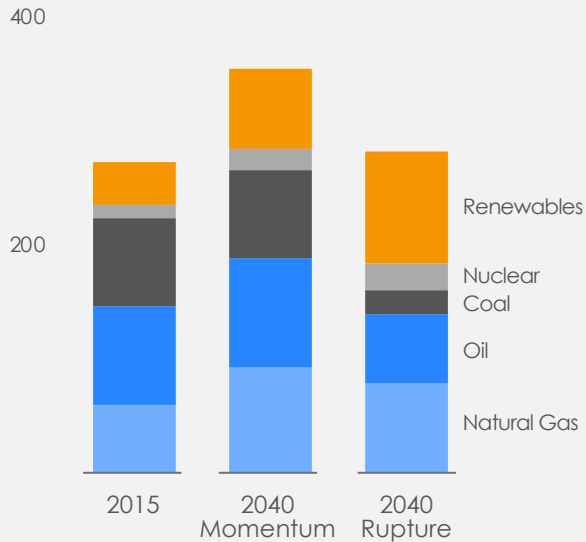
# Rupture scenario

Technological breakthroughs and strong shift in public policies

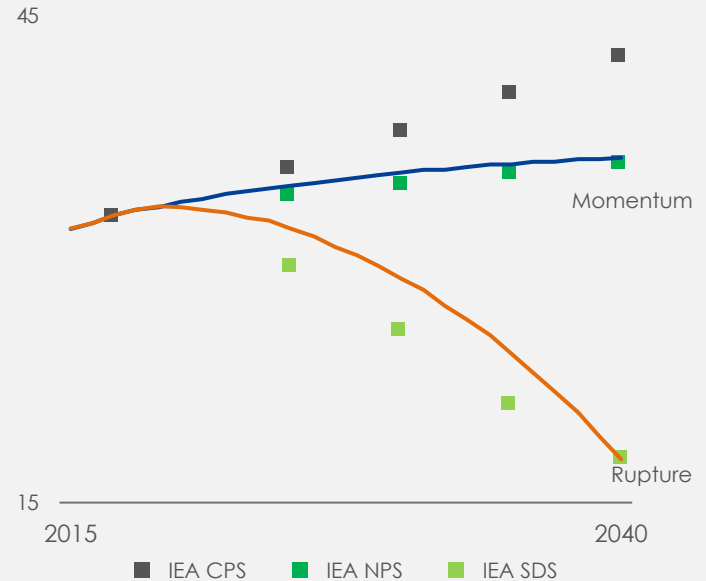


# A rupture required for a 2°C pathway

Global primary energy demand  
Mboe/d



CO2 emissions  
GtCO2/yr





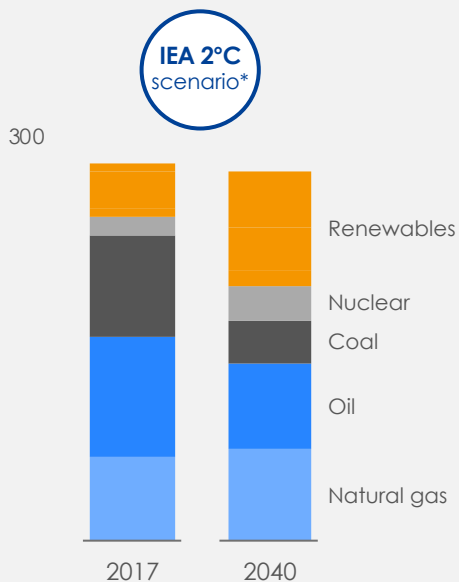


**Integrating climate  
into strategy**

# Integrating climate into strategy

Taking into account anticipated market trends

Global energy demand  
Mboe/d



\* IEA Sustainable Development Scenario

Focusing on **oil** projects with **low breakeven**



Expanding along the **gas value chain**



Developing profitable & sizeable **low carbon electricity** business





# Further improving efficiency of our operations

Over 10% improvement of energy efficiency since 2010



## Objectives

- **Energy efficiency: -1% /year**  
> 10% reduction achieved\*
- **Zero routine flaring by 2030,**  
> 80% reduction achieved\*

## Actions

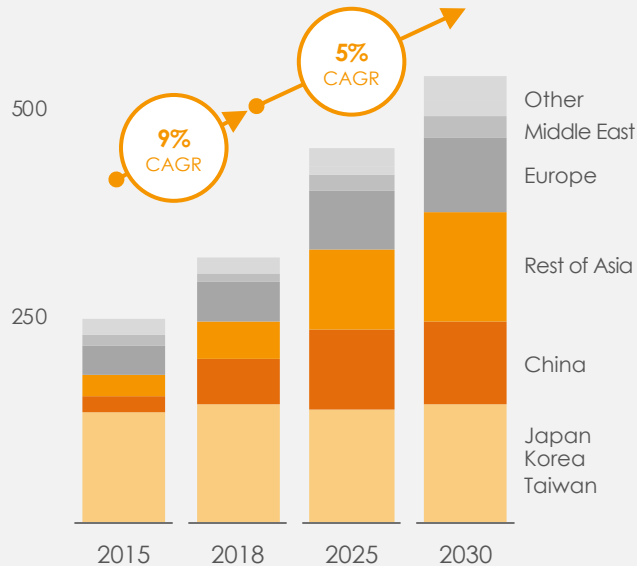
- **300 M\$ capital investment plan in energy efficiency** over 5 years in downstream facilities
- **GHG intensity reduction for new facilities:** process electrification, no routine flaring, fuel switch to low-carbon energies
- **30 \$/t CO<sub>2</sub> price** embedded in investment decisions

\* Over 2010-2018

# Growing in natural gas

## Key to fast climate action

2015-30 LNG demand  
Mt/y



**+10% in 2018 (China +41%)**

### Integrating along the gas value chain

- 2<sup>nd</sup> LNG player, 10% market share
- Developing B2B and B2C gas marketing

### Creating new LNG markets

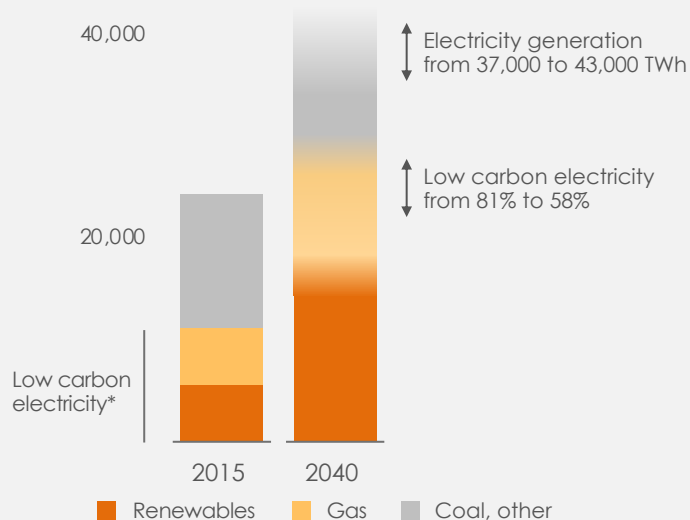
- Developing LNG-to-Power through FSRU in emerging countries
- Pioneer in LNG for transportation

### Reducing upstream methane emissions

- 2018 upstream level below 0.3%
- Emissions sustainably below 0.2% by 2025 or earlier

# Developing a profitable low carbon electricity business

## 2015-40 electricity generation TWh



## Solar, wind and gas: x2.5 over 2015-40

\* Gas and renewables  
Source: IEA scenarios - SDS, NPS, CPS

## Low carbon power generation

- ~3 GW current capacity (gas, solar & onshore wind)
- Offshore wind and hydro ambitions
- 10 GW within 5 years

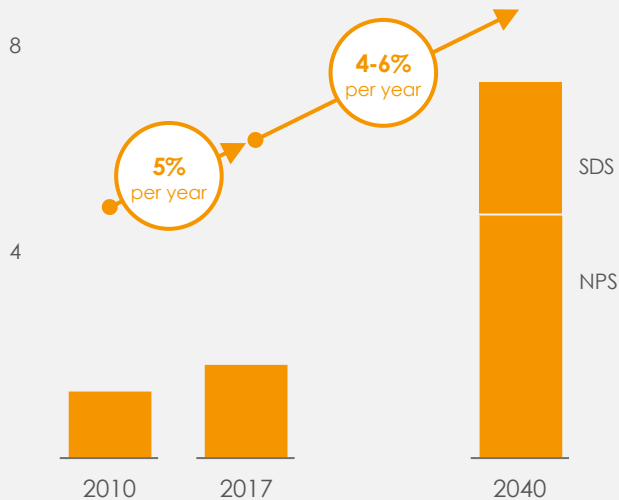
**Batteries** to leverage renewables, developing Saft in energy storage systems

## Marketing electricity

- Targeting 15% market share B2C in France and Belgium by 2022 (vs. 6% and 9% in 2017)

# Promoting sustainable biofuels

Biofuels world consumption  
Mboe/d



## Supportive government policies

Source: IEA scenarios - SDS, NPS (in millions of barrels equivalent)

**Leading European biofuel distributor** in 2018 with 2.4 Mt/y

Entering **M&S business in Brazil, a major biofuel market**

**Starting-up HVO production** in La Mède based on sustainable vegetable oil

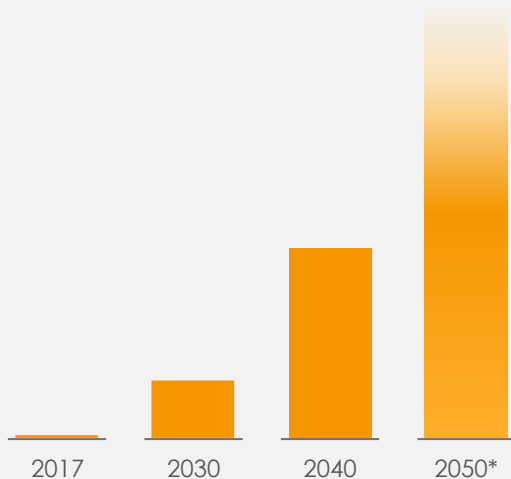
Early **biogas** positions (France, Netherlands, US)



# Investing in carbon sink businesses

CO<sub>2</sub> volume capture as per IEA SDS scenario  
Gt/y

6



\* Scenario 2DS - IEA Energy Technology Perspective 2017

**Carbon sinks mandatory** to reach zero net emissions by second half of the century

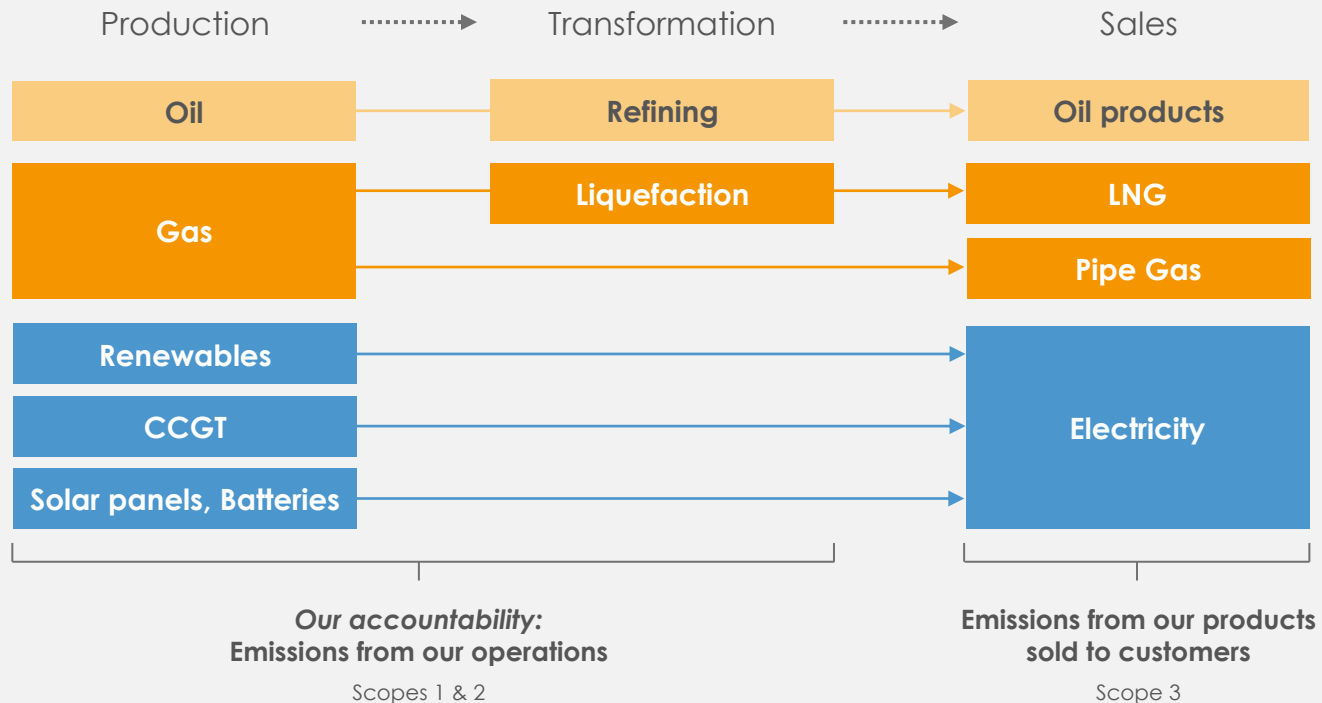
## Natural sinks

- Investing in preservation of forests, mangrove and degraded lands
- Creating a dedicated business unit with agro-environmental experts and 100 M\$/y investments budget from 2020

**CCUS:** looking for profitable business models

- 10% of R&D program
- Successful pilot in Lacq
- Projects in Norway (Northern Lights) and UK (Clean Gas Project)

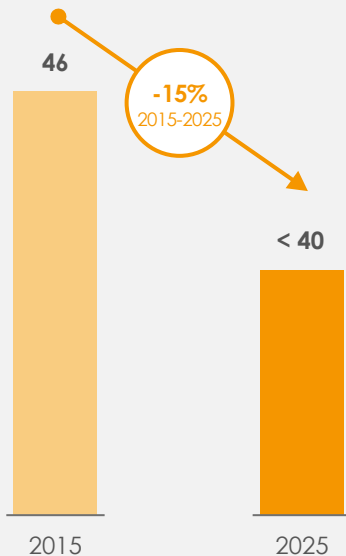
# GHG emissions: from our operations to our sales



# Our accountability: reducing emissions from our operations

15% reduction of our GHG emissions (scope 1+2) between 2015 and 2025

2015-25 Scope 1 & 2 emissions from operated facilities by E&P + RC + M&S Mt/y



Flaring reduction



Methane Control



Energy Efficiency



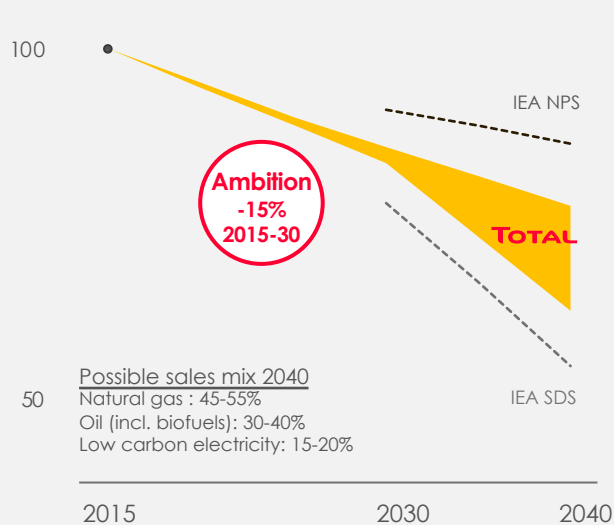
Process electrification

Scope 1 & 2 emission reduction targets to be included in **Total executives** compensation

# Our ambition: strategy contributing to tackle climate change

## Reducing the carbon intensity of our energy sales

Carbon intensity: weighted average of lifecycle\* emissions of energy products sold  
Base 100 in 2015 (75 gCO<sub>2</sub>/kbtu)



NPS: New Policy Scenario ~2.7°C by 2100  
SDS: Sustainable Development Scenario ~2°C by 2100  
\* Scopes 1, 2 & 3

Further improving **efficiency** of our **operations**

Growing in **natural gas**

Developing a profitable **low carbon electricity** business

Promoting sustainable **biofuels**

Investing in **carbon sink businesses**  
(natural sinks & CCUS)

# Total, the Responsible Energy Major

## International Leadership on ESG & climate actions



Annually reporting since 2016  
**Integrating climate into our strategy**



Supports **TCFD** and **recommendations** implemented in our reporting



Founding Member.  
Advocating a **Carbon Dividends** plan



**Oil & Gas Climate Initiative**  
and Climate Investments fund



Total recognized as **Global compact Lead Company** on Sept 2018



Founding member of  
**Alliance to end plastic waste**  
in the environment, especially in the ocean

# Disclaimer

This document may contain forward-looking information on the Group (including objectives and trends), as well as forward-looking statements within the meaning of the Private Securities Litigation Reform Act of 1995, notably with respect to the financial condition, results of operations, business, strategy and plans of TOTAL. These data do not represent forecasts within the meaning of European Regulation No. 809/2004.

Such forward-looking information and statements included in this document are based on a number of economic data and assumptions made in a given economic, competitive and regulatory environment. They may prove to be inaccurate in the future, and are subject to a number of risk factors that could lead to a significant difference between actual results and those anticipated, including the price of petroleum products, the ability to realize cost reductions and operating efficiencies without unduly disrupting business operations, changes in regulations including environmental and climate, currency fluctuations, as well as economic and political developments and changes in business conditions. Certain financial information is based on estimates particularly in the assessment of the recoverable value of assets and potential impairments of assets relating thereto.

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Financial information by business segment is reported in accordance with the internal reporting system and shows internal segment information that is used to manage and measure the performance of TOTAL. In addition to IFRS measures, certain alternative performance indicators are presented, such as performance indicators excluding the adjustment items described below (adjusted operating income, adjusted net operating income, adjusted net income), return on equity (ROE), return on average capital employed (ROACE) and gearing ratio. These indicators are meant to facilitate the analysis of the financial performance of TOTAL and the comparison of income between periods. They allow investors to track the measures used internally to manage and measure the performance of the Group. These adjustment items include:

## (i) Special items

Due to their unusual nature or particular significance, certain transactions qualified as "special items" are excluded from the business segment figures. In general, special items relate to transactions that are significant, infrequent or unusual. However, in certain instances, transactions such as restructuring costs or asset disposals, which are not considered to be representative of the normal course of business, may be qualified as special items although they may have occurred within prior years or are likely to occur again within the coming years.

## (ii) Inventory valuation effect

The adjusted results of the Refining & Chemicals and Marketing & Services segments are presented according to the replacement cost method. This method is used to assess the segments' performance and facilitate the comparability of the segments' performance with those of its competitors.

In the replacement cost method, which approximates the LIFO (Last-In, First-Out) method, the variation of inventory values in the statement of income is, depending on the nature of the inventory, determined using either the month-end price differentials between one period and another or the average prices of the period rather than the historical value.

The inventory valuation effect is the difference between the results according to the FIFO (First-In, First-Out) and the replacement cost.

## (iii) Effect of changes in fair value

The effect of changes in fair value presented as an adjustment item reflects for some transactions differences between internal measures of performance used by TOTAL's management and the accounting for these transactions under IFRS.

IFRS requires that trading inventories be recorded at their fair value using period-end spot prices. In order to best reflect the management of economic exposure through derivative transactions, internal indicators used to measure performance include valuations of trading inventories based on forward prices.

Furthermore, TOTAL, in its trading activities, enters into storage contracts, which future effects are recorded at fair value in Group's internal economic performance. IFRS precludes recognition of this fair value effect.

The adjusted results (adjusted operating income, adjusted net operating income, adjusted net income) are defined as replacement cost results, adjusted for special items, excluding the effect of changes in fair value.

Euro amounts presented herein represent dollar amounts converted at the average euro-dollar (€-\$) exchange rate for the applicable period and are not the result of financial statements prepared in euros.

This document also contains extra-financial performance indicators, including a carbon intensity indicator for TOTAL energy sales that measures the weighted average greenhouse gas emissions of energy products sold by TOTAL, from their production in TOTAL facilities to their end use by TOTAL customers. This carbon intensity indicator covers, besides direct GHG emissions of TOTAL (scope 1), indirect GHG emissions (scopes 2 and 3) that TOTAL does not control (for the definitions of scopes 1, 2 and 3, refer to Total's Registration Document).

Cautionary Note to U.S. Investors – The SEC permits oil and gas companies, in their filings with the SEC, to separately disclose proved, probable and possible reserves that a company has determined in accordance with SEC rules. We may use certain terms in this presentation, such as resources, that the SEC's guidelines strictly prohibit us from including in filings with the SEC. U.S. investors are urged to consider closely the disclosure in our Form 20-F, File N° 1-10888, available from us at 2, Place Jean Millier – Arche Nord Coupole/Regnault - 92078 Paris-La Défense Cedex, France, or at our website: total.com. You can also obtain this form from the SEC by calling 1-800-SEC-0330 or on the SEC's website: sec.gov.