

*Our genuine view  
of your future energy*

# CEPSA ENERGY OUTLOOK 2030

Executive summary



# Cepsa's view of the global energy mix for the future

Cepsa Energy Outlook 2030 is the energy group in-depth look at society trends and energy markets for the future. The world shall face the challenge of providing more energy than ever before to a growing population, with greater material aspirations, while doing so sustainably and curbing emissions. Cepsa takes an innovative approach based on a detailed analysis and outcomes of forthcoming trends explained in terms of their fundamental drivers. From an original standpoint and from an energy perspective, the analysis divides the world up into three different regions:

Regulators, Energizers and Consumers. Regulators comprise all OECD countries – except for Mexico which is an Energizer–, that are exposed to energy market regulation and whose forecast energy demand is lower than in other regions; Energizers are the world's leading exporters of energy resources, chiefly oil and gas, and include Latin America, Africa, the Middle East and former Soviet Republics; All Asian countries are dubbed Consumers due to their impact on future energy consumption.

## REGULATORS

Mature developed countries with a leading regulatory role and technological pioneers.



- USA & Canada
- Europe
- OECD Asia



**Pilar, 48**  
Spain, Wine producer



**George, 76**  
USA, Retired engineer



**Laura, 7**  
France, Student



**Peter, 54**  
Ireland, Truck driver

**70%**  
of global wind and solar generation in 2015

## ENERGIZERS

Resource rich countries, mainly net energy exporters.



- Middle East
- Latam
- Africa
- CIS

**70%**  
of total new oil supply between 2015-2030



**Javier, 8**  
Colombia, Student



**Nudia, 26**  
Nigeria, Receptionist



**Hannan, 31**  
UAE, School teacher



**Olga, 24**  
Russia, Air hostess

## CONSUMERS

Largest energy demanding countries, mainly net energy importers.



- China
- India
- South East Asia
- Rest of Asia

**70%**  
of total new primary energy demand between 2015-2030



**Xiangzi, 53**  
China, Shop assistant



**Kaushik, 20**  
India, Actor



**Dakila, 36**  
Philippines, IT programmer



**May, 14**  
Thailand, Student

The changing environment begs some questions and opens-up new opportunities. Through its 11 chapters, the Cepsa Energy Outlook 2030 answers a number of questions

including: Will the countries fulfill the COP21 agreements?, Will renewables continue to be the fastest growing energy?, How will the balance between gasoline and diesel be?

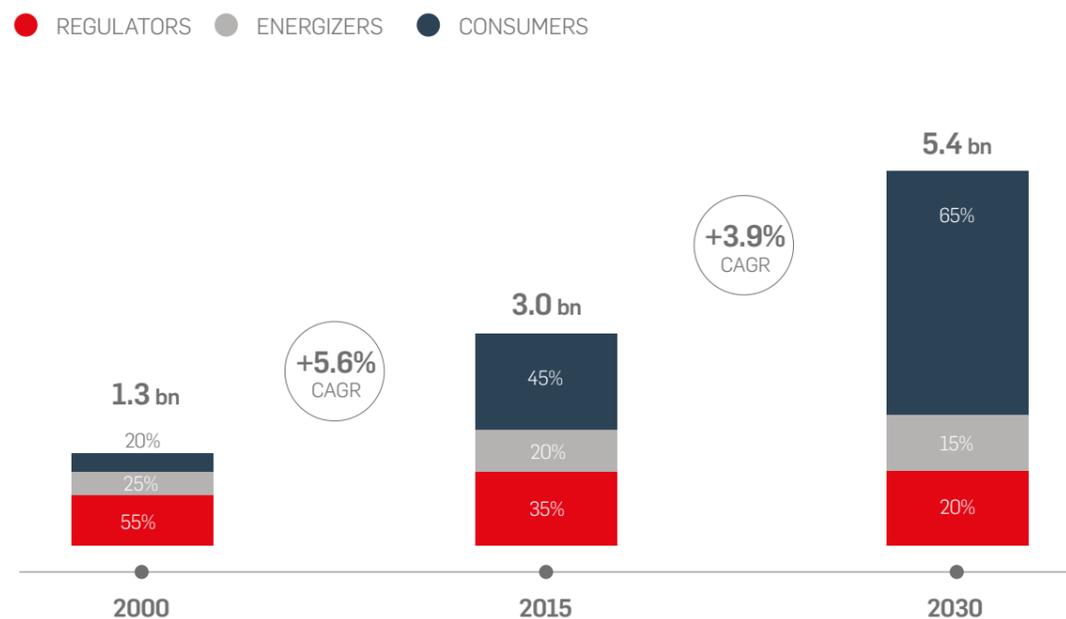
# 1 POPULATION & ECONOMY

## More for all

The world's GDP will increase by 50% between now and 2030, although the growth rate will slow down when compared with previous years, in step with the population. The economic shift toward the East will be consolidated in the years ahead as population

giants China and India lead global GDP growth. The middle classes will grow strongly, particularly in Asia, supporting similar levels of economic growth as seen in the last 15 years. The rise of this strong middle class will be the most relevant socio-economic factor affecting energy consumption in the years ahead.

### Middle-class population changes 2000-30



Source: Brookings Institution, Cepsa Analysis

“As middle class incomes increase and trigger economic development, they will have a knock-on effect on demand”

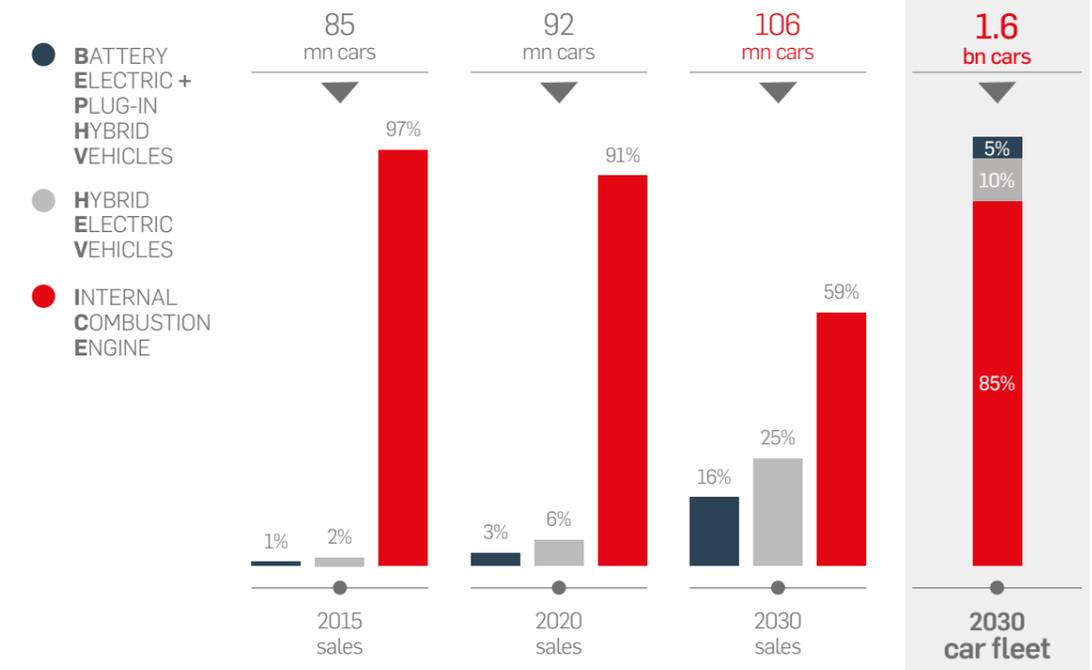
# 2 TECHNOLOGY

## The game changer

New technologies such as big data and the Internet of Things will speed up change by finding new ways to save energy and boost productivity, as well as revolutionize the way business is done. Technological advances will enhance efficiency, anticipate customer needs and enable them to interact with suppliers. All these innovations will allow users to consume energy smartly. Technological advances in renewable energy in the form of cost reductions along with favorable policy support will have great impact

on the energy sector's supply side. Technology will also allow renewables to be competitive with coal, the cheapest fossil fuel for power generation, by 2030. Due to technology, Internal Combustion Engines (ICE) efficiency will have six times the impact on reducing oil consumption than the penetration of Alternative Fuel Vehicles (AFVs). In 2030 the passenger cars fleet will be 25-30% more efficient than it is today and although electric vehicles will gain ground, this fleet will still be overwhelmingly fossil fueled.

### Global car sales by type and the 2030 fleet 2015-20-30



Source: Cepsa Analysis

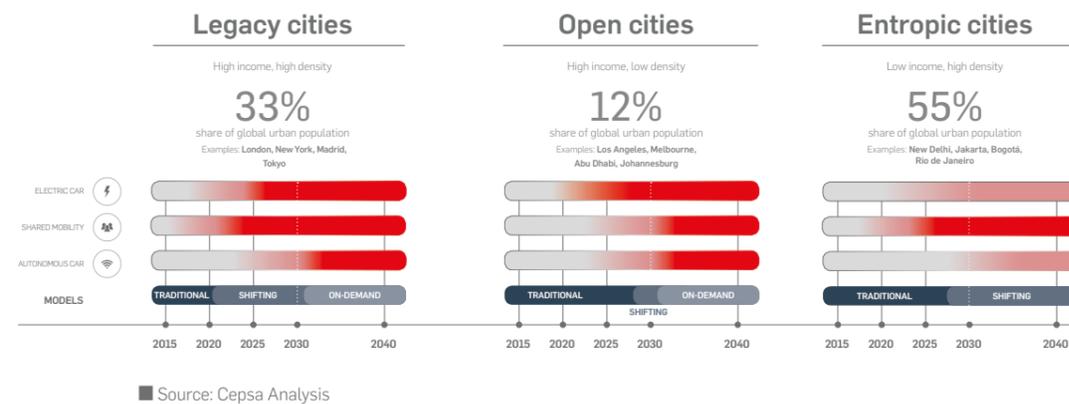
“Although EVs will gain ground, the 2030 passenger car fleet will still be overwhelmingly fossil fueled”

# 3 MOBILITY A smart move

Accelerating future trends will be the vast numbers of people crowding into cities, particularly megacities. This in turn will pose new challenges for getting around, but for which original solutions are on the horizon as we move away from private cars to shared mobility. In fact, new urban mobility models will be shaped by three main factors: electrification, driverless cars and shared mobility services. These new mobility

models will affect energy supply. The development path of mobility systems will depend on the circumstances of each urban area: Legacy cities, where shared mobility services will see a strong uptake; Open cities, where larger distances and lower population density make private car use more appealing; and Entropic cities, where shared mobility services will be widely accepted.

## The development path of mobility systems



“ Electrification, shared mobility and autonomous driving will shape mobility systems

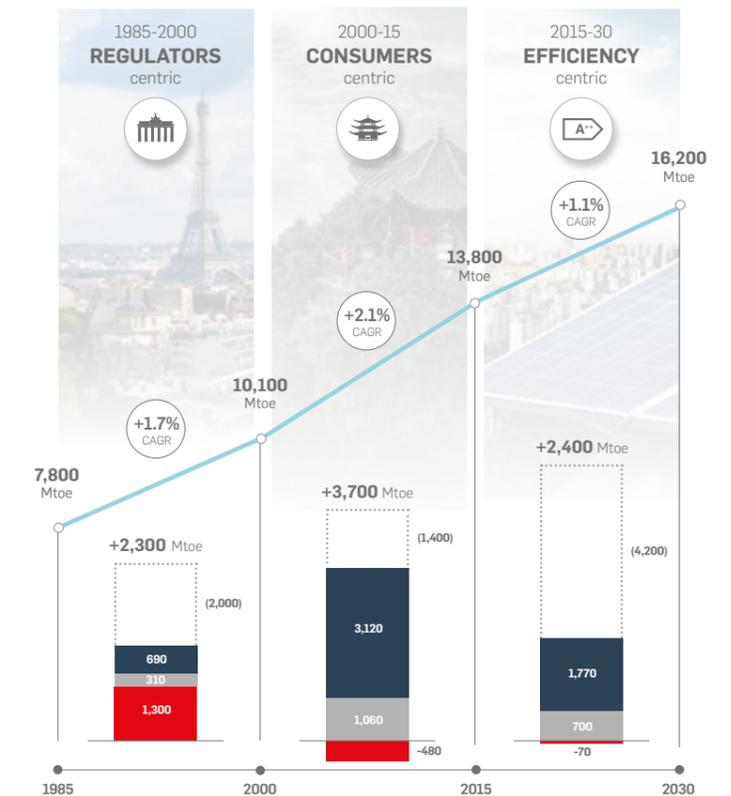
# 4 GLOBAL ENERGY Doing more with less

Global energy demand will grow in 2015-30 at half the rate of the previous 15-year period as efficiency improves. But as it will start at the highest level ever, growth in energy demand will be substantial (20%). Developing regions such as Costumers an Energizers will be the sole contributors to this rise in energy demand. Countries such as China and India will lead the energy demand surpassing 1,770 Mtoe. Similarly, buildings and transport will outpace the industry in global energy demand with 58% (9,300 Mtoe) compared to 37% (6,100 Mtoe),

respectively. In total, the world demand for energy in 2030 will be 16,200 Mtoe. Renewables will provide more than half of the increase in power generated over the next 15 years, an unprecedented event driven by increasing wind and solar penetration. Natural gas will come second but gain a share of only 1% in the global power mix, as it takes a back seat to renewables. The 2030 energy mix will still be dominated by oil, gas and coal, but renewables are quickly gaining ground.

## World total primary energy demand (Mtoe)

- WORLD
- REGULATORS
- ENERGIZERS
- CONSUMERS
- ENERGY SAVINGS



“ Efficiency saves more than 20% of energy demand and is mostly achieved on the consumer end

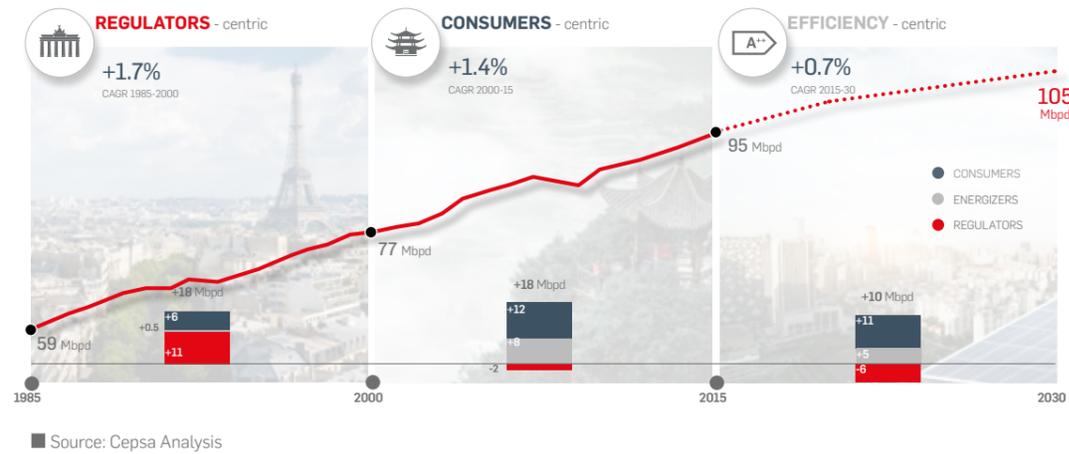
# 5 LIQUIDS DEMAND Still in the lead

Oil demand will be 10% more in 2030 than it is today –although it will be growing at a slower rate as fuel efficiency improves and a switch is seen to other energy sources–. In fact, consumption will be 10 million barrels per day (Mbpd) greater in 2030 than today due to increased demand for passenger transportation and petrochemicals.

Diesel and gasoline will continue to dominate demand for petroleum products across all regions. European and USA mature markets will shrink, in contrast to the rest of the world. India and China will be the fastest growing markets. Also, demand for naphtha will raise significantly driven by Asian population growth. Ethane and LPGs will grow in feedstock volumes for petrochemicals production.

## World liquids\* demand (Mbpd)

\*Includes oil, NGLs and biofuels



“Transportation continues to ramp up demand for liquids and will account for 60% of global consumption in 2030”

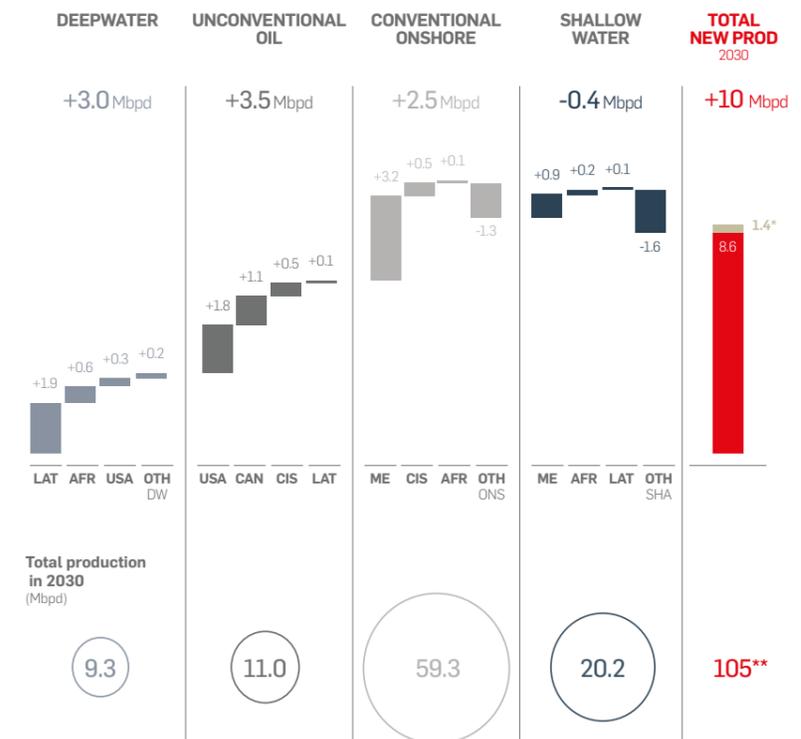
# 6 LIQUIDS SUPPLY By sea, by land... and shale

Oil will still dominate the world's energy supply as “the more we look for it, the more we find”. However, oil supply dynamics in the near future will be fraught with fundamental geopolitical and economic uncertainties. The Middle East, Latam and the USA will account for 90% of oil supply growth by 2030. These producing hubs will dominate in onshore,

deepwater and unconventional technologies, respectively. Regarding refining, it has enjoyed a recent boom. Access to low feedstock prices and growing demand have boosted refining margins. The refining sector will need to boost petroleum products production by 7 Mbpd by 2030 in order to process the estimated increase in liquids demand.

## Increase in regional liquids production by technology 2015-30 (Mbpd)

2015-30 (Mbpd)



Source: IEA, Cepsa Analysis

“The Middle East, Latam and the USA will account for 90% of oil supply growth by 2030”

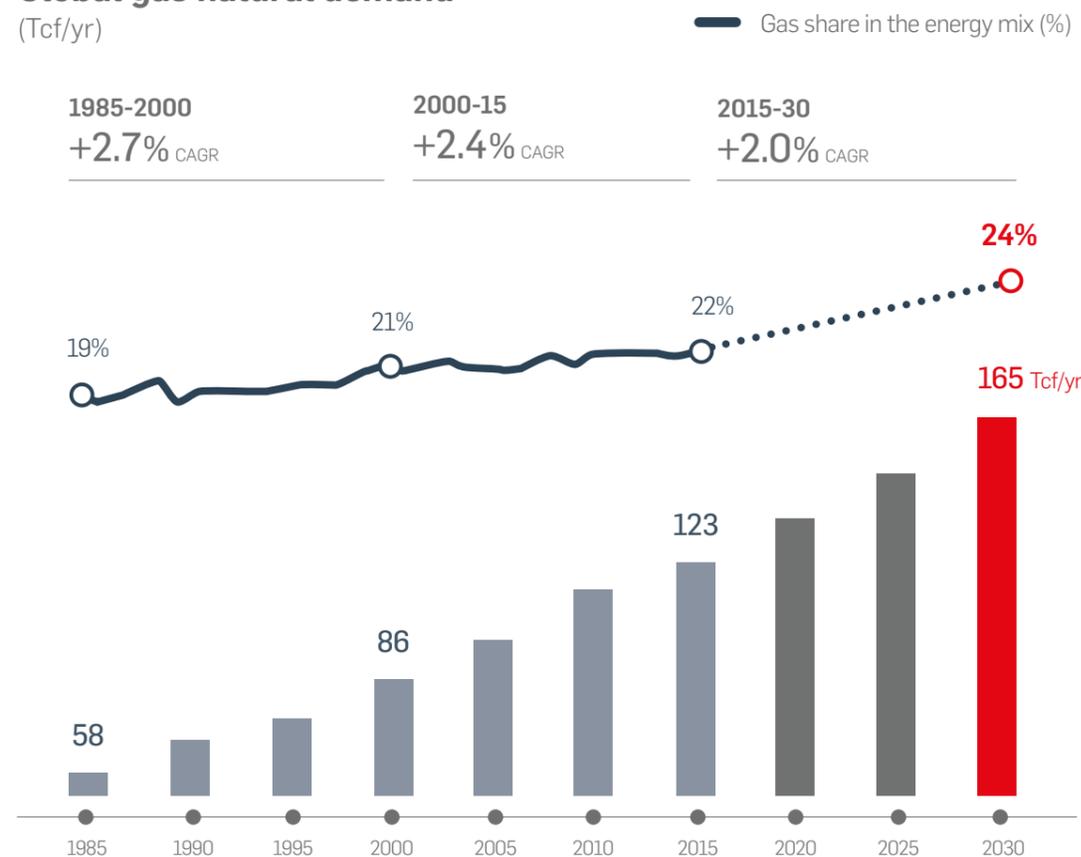
# 7 GAS

## A volatile transition

There is a broad consensus that natural gas will probably be the fastest growing fossil fuel source in the next few years, and it could well unseat coal to become second only to oil as the world's leading energy source. But its role in power generation might be thwarted by renewables. It risks becoming a transition fuel on the road to a decarbonized world.

The expected rise in electricity consumption will trigger an increase in natural gas demand. Industry will come second as a driver while slowing down due to a more modest outlook for production, as developing shift toward services. On the other hand, LNG's share in global gas demand will grow from a current 10% to 15% in 2030.

### Global gas natural demand (Tcf/yr)



“ Natural gas use will grow by a solid 35% but a slower pace than in the past

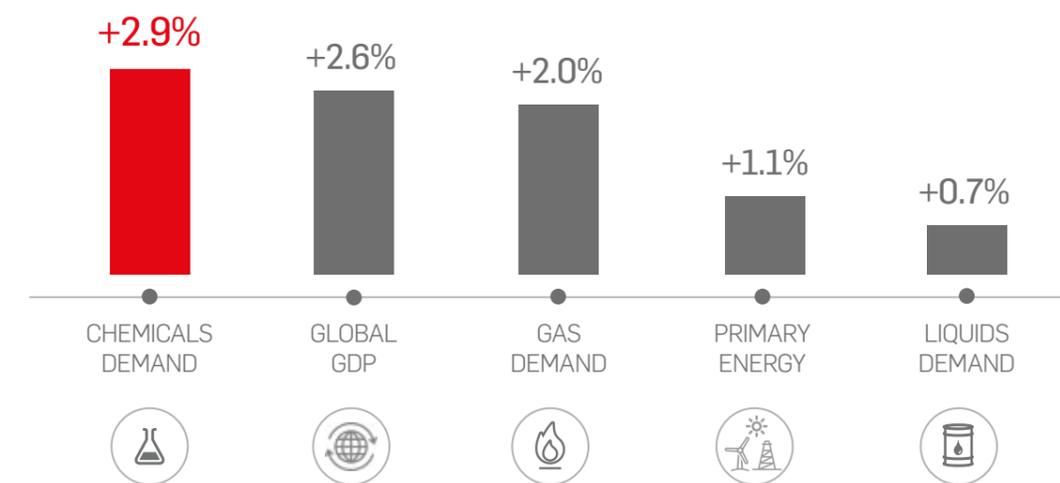
# 8 CHEMICALS

## Look around

Chemical demand growth will be driven, firstly, due to the increased use of existing products as the middle class expands and more people have higher living standards. Secondly, innovation will allow some existing chemical products to begin to have new applications. Finally, there will be a regulatory push encouraging the use of new, more advanced and environmentally friendly products. Consumer countries will lead the way in capacity expansions in line with demographic trends. Asia will account for more than 70% of the total

increase in chemical production over the next 15 years. National oil companies in Consumer and Eastern Energizer countries are also putting emphasis on their chemical production. Their privileged position for supplying Asian markets will put these players in an advantaged position. On the other hand and as oil prices recover, USA gas-based chemical production will become more competitive in naphtha markets. The USA chemical industry's feedstock of choice is ethane, while Asia and Middle East use petroleum products such as naphtha and LPGs.

### Chemicals growth vs. other sectors to 2030 (%)



■ Source: McKinsey, Cepsa Analysis

“ 95% of all manufactured goods, like electronics, furniture, appliances or textiles are based on chemicals

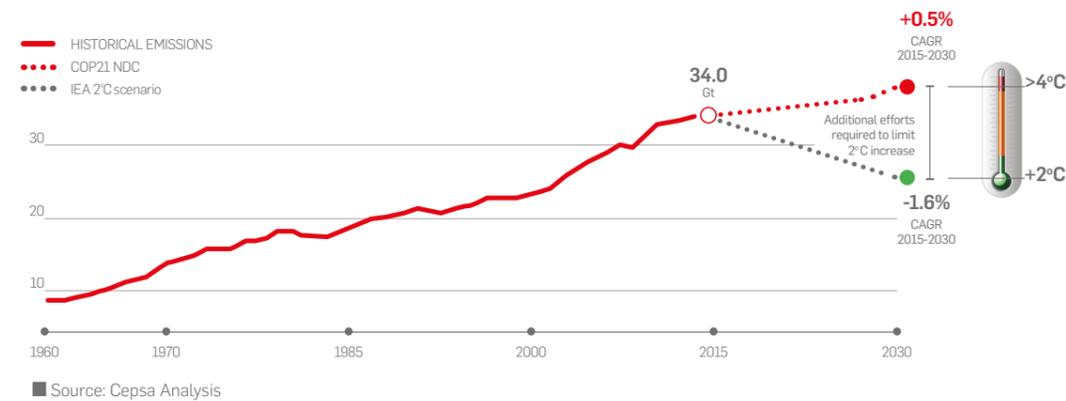
# 9 EMISSIONS

## A crucial balancing act

The key to having a sustainable future is getting the right balance between curbing CO<sub>2</sub> emissions and encouraging economic growth. The Outlook examines the impact this will have on

energy, especially in the light of the recent COP21 Paris Accord —though its pledges will not be enough to keep global warming to “well below” a target of 2°C above pre-industrial levels—.

### Energy related CO<sub>2</sub> historical emissions and COP21 forecast (Gt)



Although progress has been made in slowing down the rise in CO<sub>2</sub> emissions, they are not expected to start on a downward path until after 2030. The main challenge for regulators will be to maintain living standards while curbing emissions. Consumer countries will need

to sustain economic development without increasing per capita emissions to the same level as in Regulators. Energizers will need access to cutting-edge energy to decouple economic development from increasing emissions for the first time ever.

“ The pledges committed at Paris will not be enough to keep global warming to “well below” a target of 2°C above pre-industrial levels

# 10 SPAIN

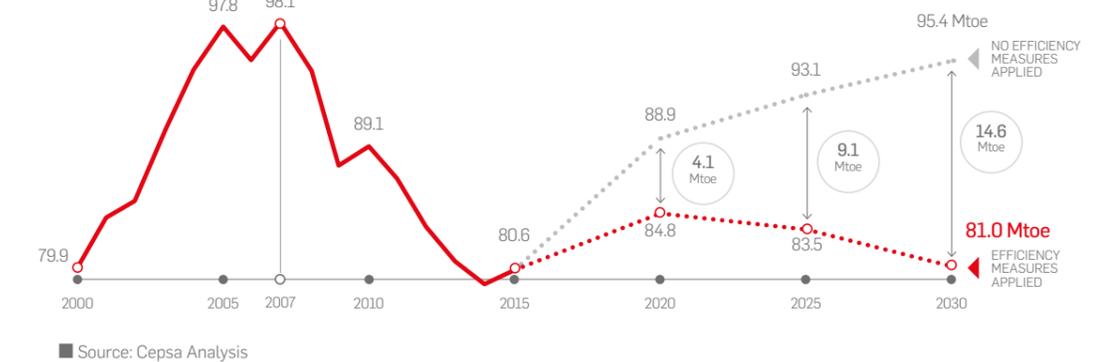
## A unique 21<sup>st</sup> century player

Spain may appear to be a typical Regulator country recovering from a recent crisis and adapting to compete in mature. However, its energy outlook different is unique due to its extensive and growing renewables penetration, as well as demand driven by massive international tourism and its access to strategic shipping routes. In addition, it is

a strategic European gateway for LNG and gas pipelines, an exporter to North America, Africa and Latin America, in which it is a major investor. Spain is on track to comply with its 2020 energy commitments. Efficiency and renewable energies will be the major drivers for the energy system in the years ahead.

### Spain final energy demand 2000-30 (Mtoe)

(International shipping not included)



Oil products will continue to dominate Spanish energy consumption. Certain fuel uses will peak and begin to see a fall in demand heading to 2030. Electric vehicles are not forecast to take off until

the end of the 2020s. Spanish cars will still largely use combustion engines, opting for gasoline over diesel by 2030. In fact, a 25% gain in fuel efficiency will hit demand for oil products from car drivers.

“ Petroleum products will still dominate Spain’s energy mix in 2030 despite their steady decline

# 11

## SCENARIOS

# Alternate realities

The CEO 2030 looks at how altering some base line estimates would affect the related projections in order to provide a glimpse of black swan moments we might need to prepare for. For example: in the hypothetical case that all electricity is generated from renewable sources by

2030, emissions will plummet to 40% below Cepsa's base case.

If efficiency should improve twice as quickly as assumed in Cepsa's base case, then emission would be 20% lower. If the global economy should grind to halt over the next 15 years, then oil demand will be curtailed by 20%.

The CEO 2030 includes a benchmark which compares other outlooks. What makes Cepsa stand out is its high forecast for renewables penetration which, coupled with a greater expected slowdown in energy demand, leads to a lower projection for emissions.

## CEO 2030 Methodology

Cepsa's 2030 projection is based on a three dimensional analysis: end use sector (transport, industry, buildings and petrochemicals), energy source (liquid, gas, power, coal, biomass) and regional breakdown (Regulators, Energizers and Consumers). Together they comprise a compounded growth rate (2015-2030).

To better understand how energy demand is evolving, the CAGR is comprised of three factors: activity factor, efficiency factor and substitution factor.





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