



Global Upstream Trends and the Impact of Sustainable Energy

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“It is difficult to get a man to understand something when his salary depends upon his not understanding it.”

Upton Sinclair,
American novelist & social reformer.

IMAP Systems Pty of Australia was founded in 1998 as a portfolio and strategy management consultancy. IMAP subsequently entered into software development. Extensive collaboration with university research groups resulted in the creation of a highly visual and flexible platform able to easily adapt to all complex and dynamic business environments. The latest cloud-based portfolio, programme and project management platform, *Zume*, was launched in 2017.

Zume is designed to render critical insight out of the complexity of a dynamically changing environment. It provides oversight and governance and facilitates resource management and the formulation of strategy by capturing critical data from across the entire organisation and dynamically displaying trends and future impact. It has the versatility to adjust to the complexities of changing decision making processes, reporting requirements and management structures and the ability to review information used at the time of making past decisions, track progress against objectives, and to model future scenarios.

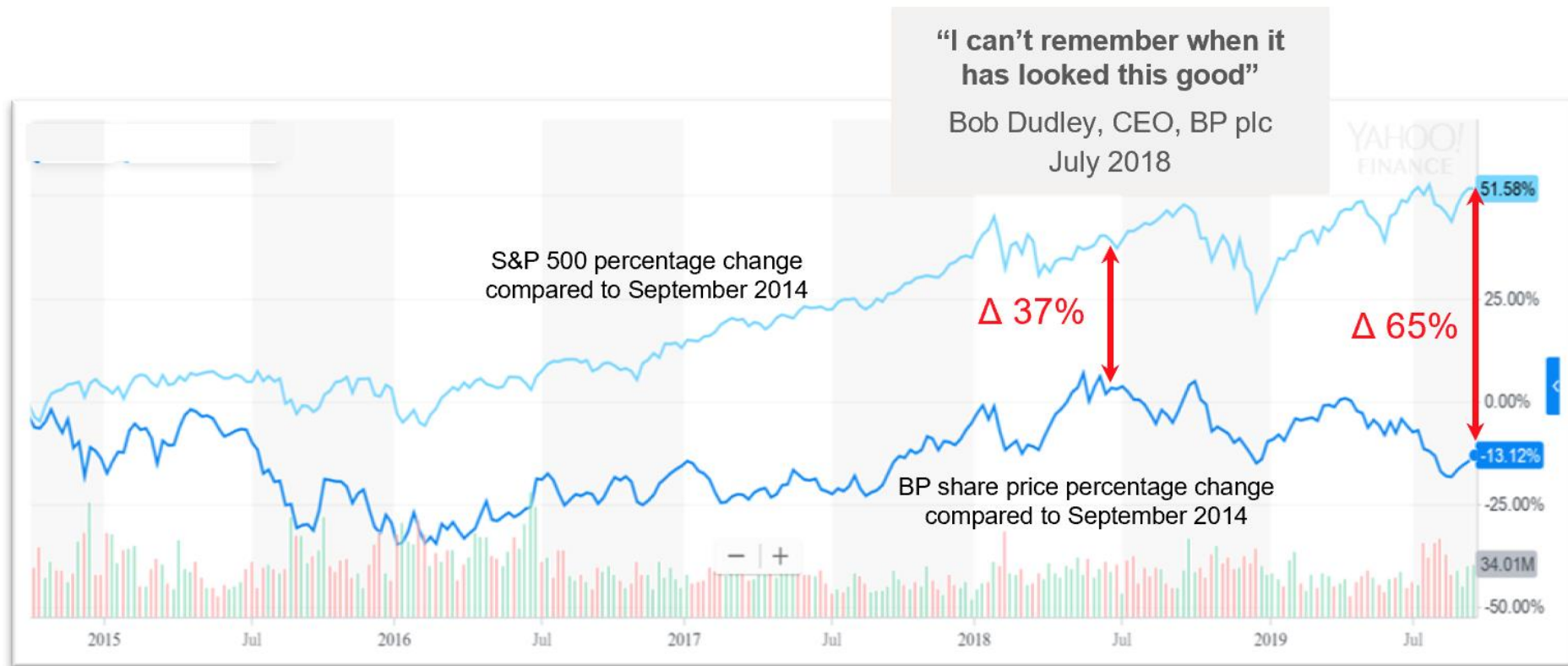
Our clients report a variety of benefits ranging from significant improvements in operational performance, more effective strategy formulation and improved resource and capital allocations and management. Administration and reporting burdens are significantly eased as are the governance and approval processes. Effective stakeholder management, governance and oversight at all levels of the organisation are also ensured.

Global Upstream Trends and the Impact of Sustainable Energy - Key questions

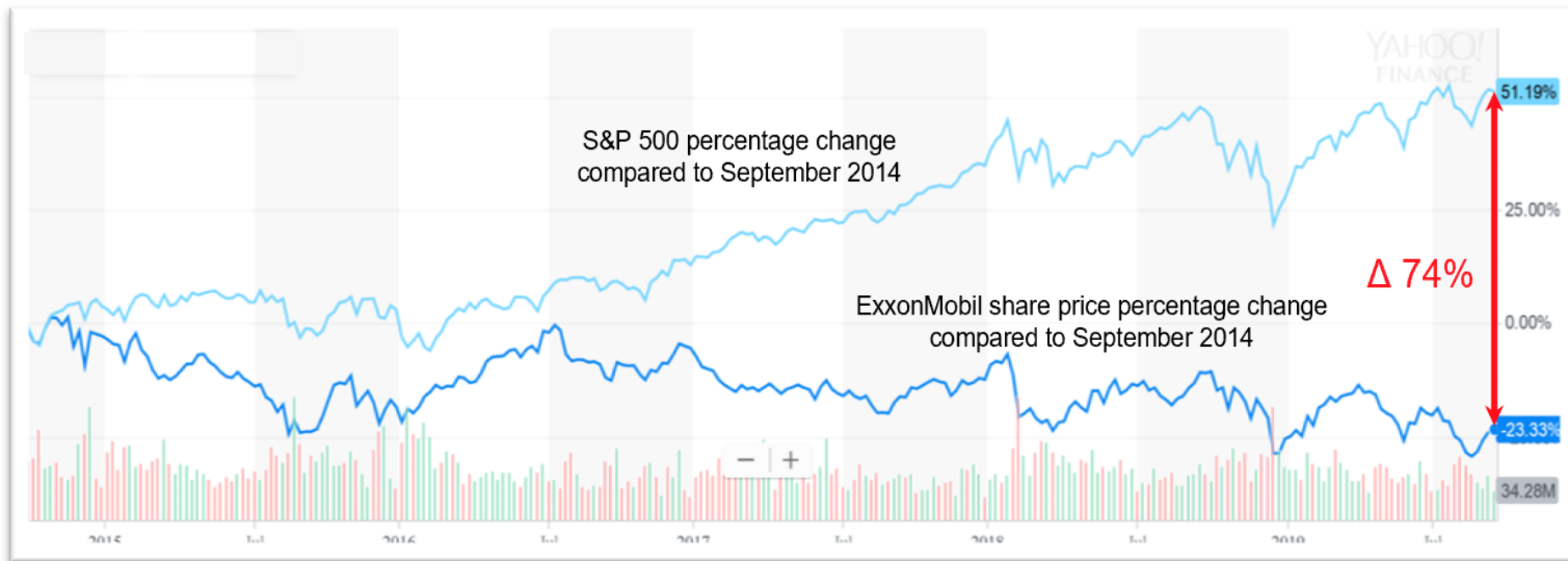
- **What on earth is wrong with oil and gas?**
- **What will be the potential impact of renewable energy on the upstream industry?**
- **What is the future of offshore oil?**
- **What is the long-term future of the upstream oil and gas industry?**

What is wrong with oil & gas?

BP's 5-year stock performance vs S&P 500



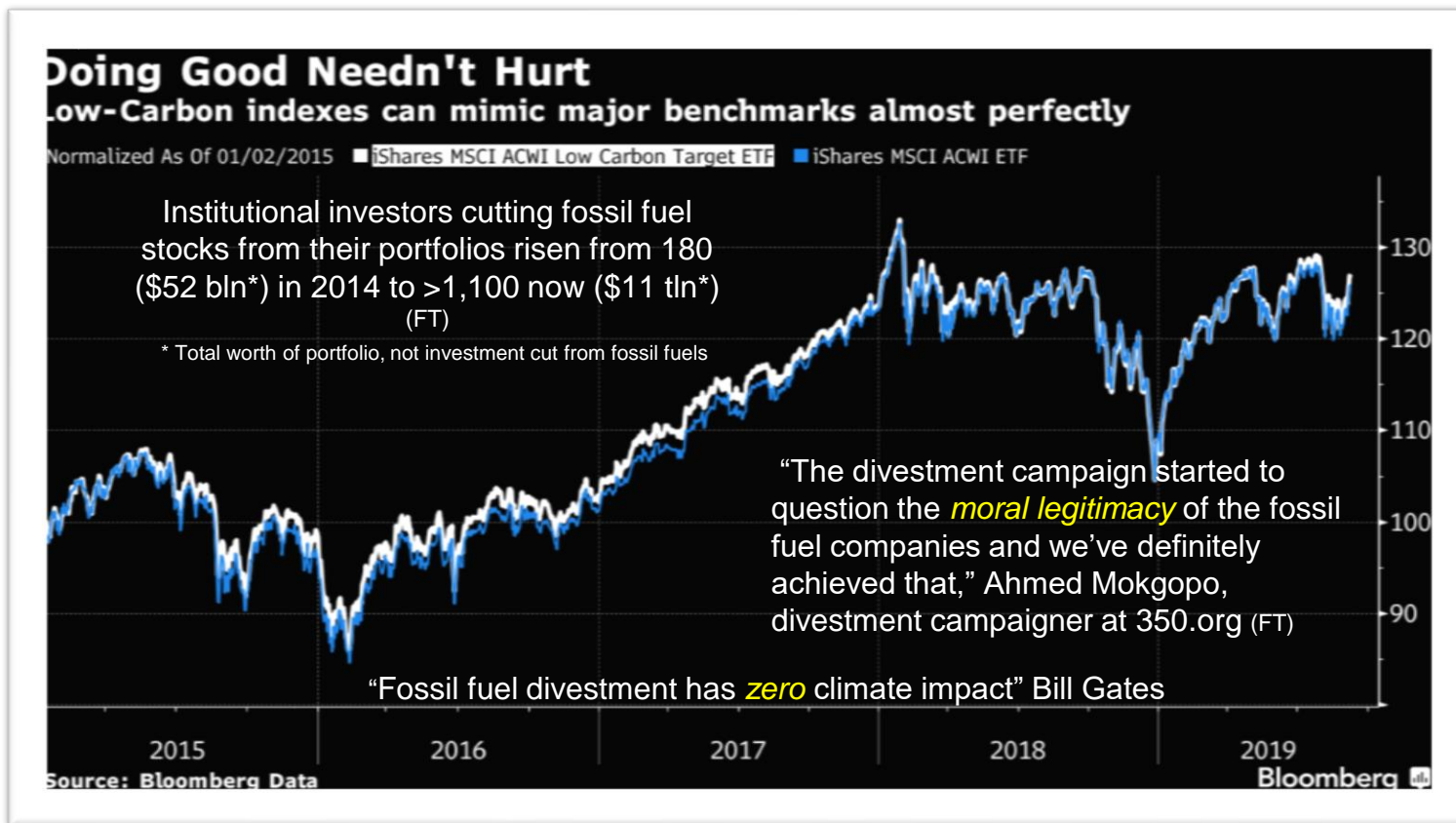
Exxon Mobil's 5-year stock performance vs S&P 500



Complacency and contempt

- Oil & gas stocks have been hit by:
 - Fears of a global economic downturn
 - Reassurance of surplus oil storage – operational vs strategic storage?
 - Glut of natural gas in the US
 - Probability of an extended trade war between US and China
 - US sanctions not cutting Iranian exports as deeply as planned
 - US shale sector failing to show necessary cost discipline / response to technology
 - **Anti-petroleum climate lobby, extinction rebellion, etc..**
 - **Failure to fully embrace stricter environmental, social and governance (ESG) standards → litigation**
 - **Changing energy dynamics - concern of “inevitable” longer term decline**

Draining the source of capital



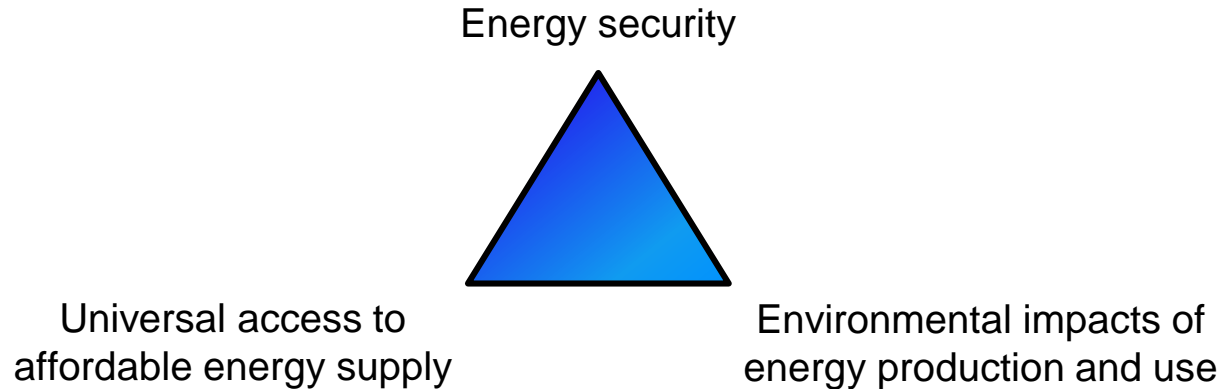
Renewable versus non-renewable energy

This is the age of disruption

Ged Davis

Executive Chair Scenarios, World Energy Council

The IEA's Energy Trilemma



Poland defies Brussels by vowing to stick to coal

Energy security is higher priority than EU emissions goals, says government official



Poland generates 80% of its electricity from coal and Warsaw researchers say it would cost it €60bn to meet the EU's 2030 target of a 45 per cent emissions cut © Reuters

Source: FT

Cold, hard fact

In 2008, hydrocarbons represented 81% of total global energy supply

In 2018, the figure is still 81%

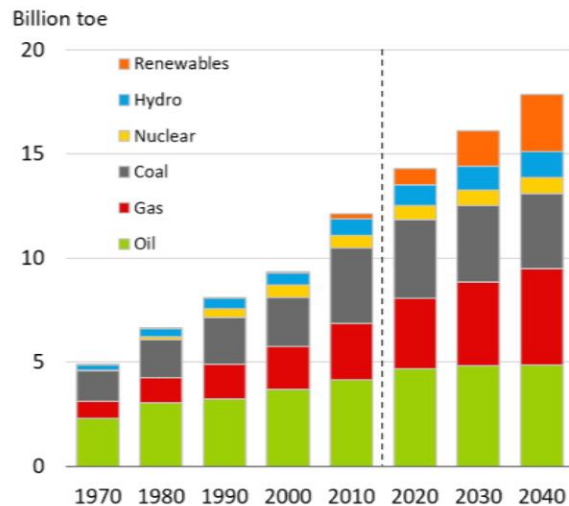
**In 2040, hydrocarbons should still represent 74% of
total global energy supply**

Source: IEA World Energy Outlook 2018

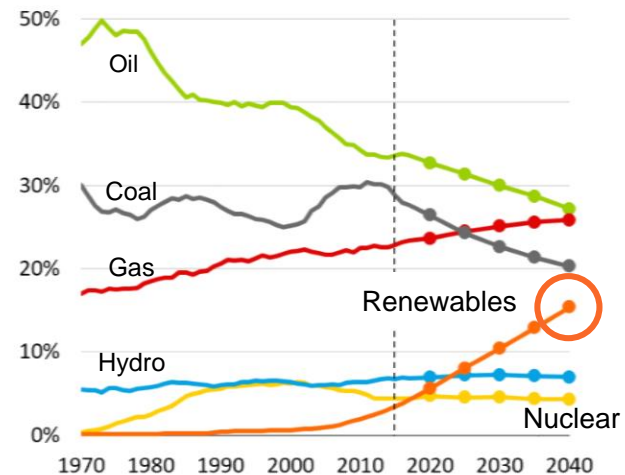
Global energy by fuel type “Evolving transition”



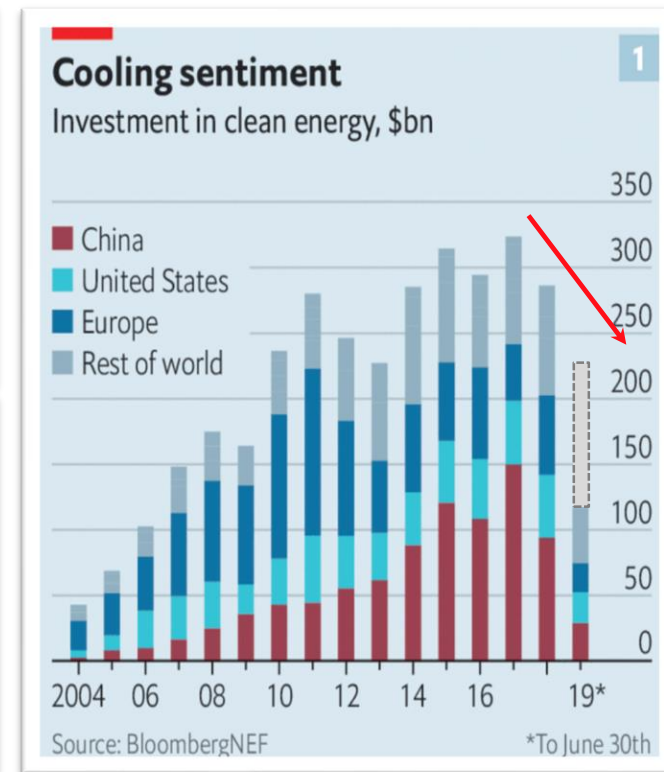
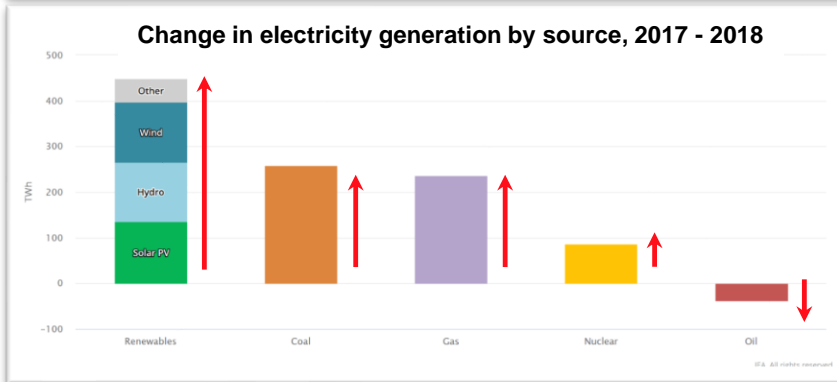
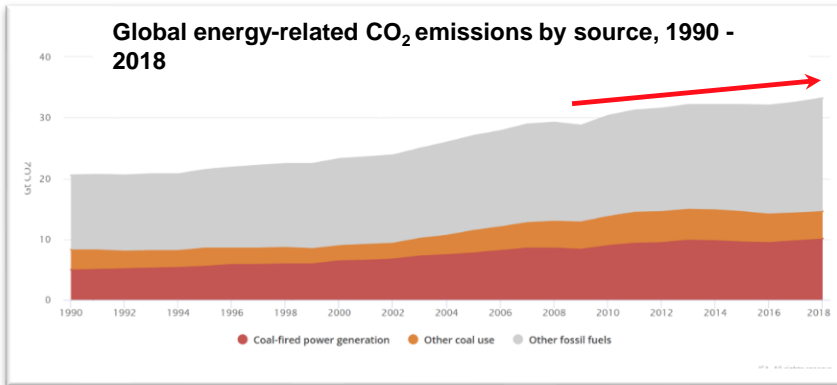
Primary energy consumption by fuel

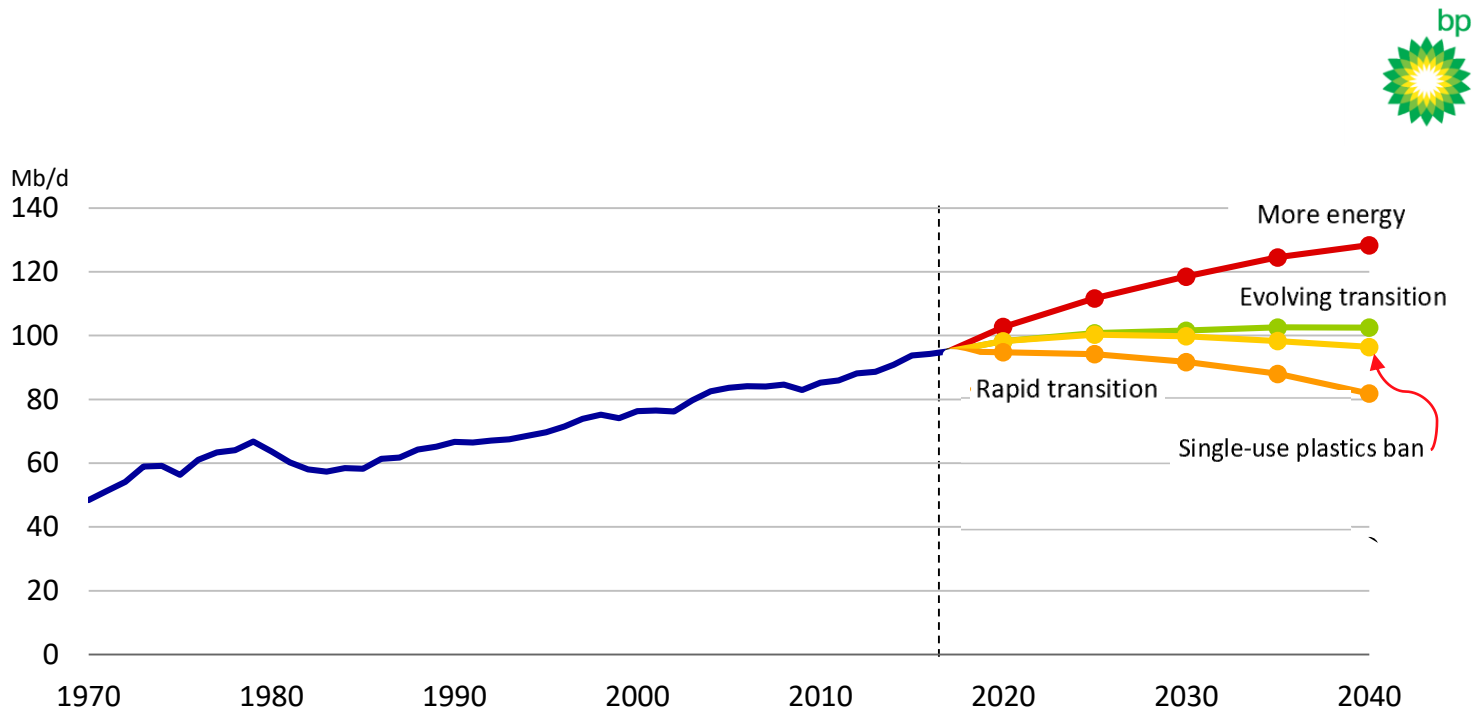


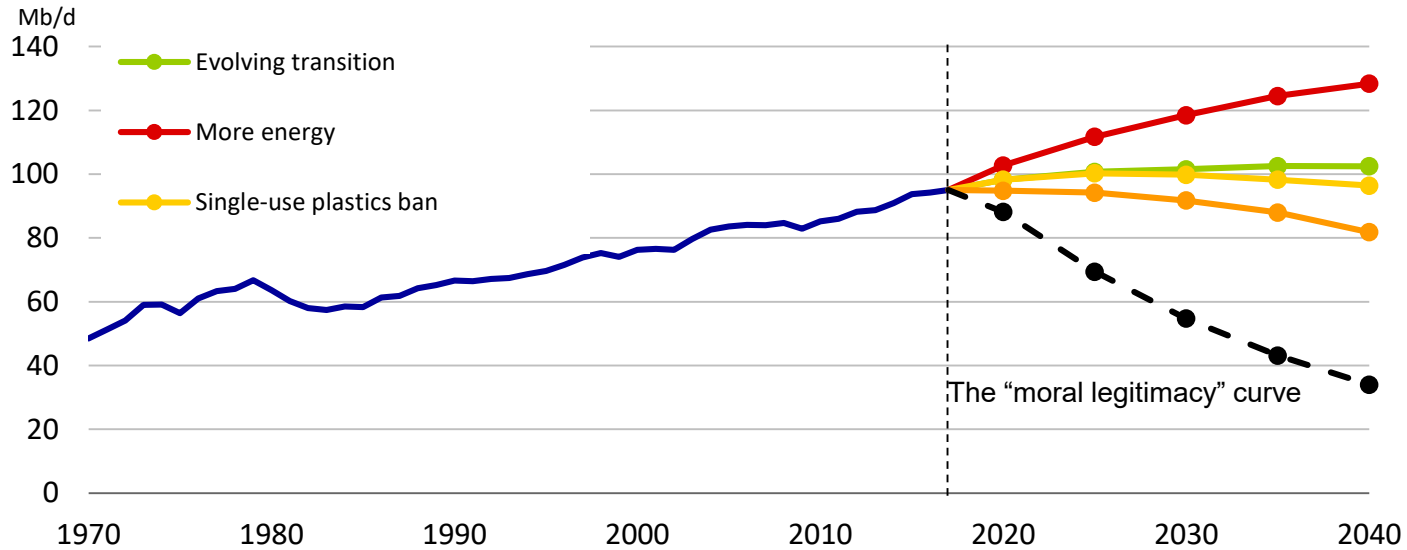
Shares of primary energy



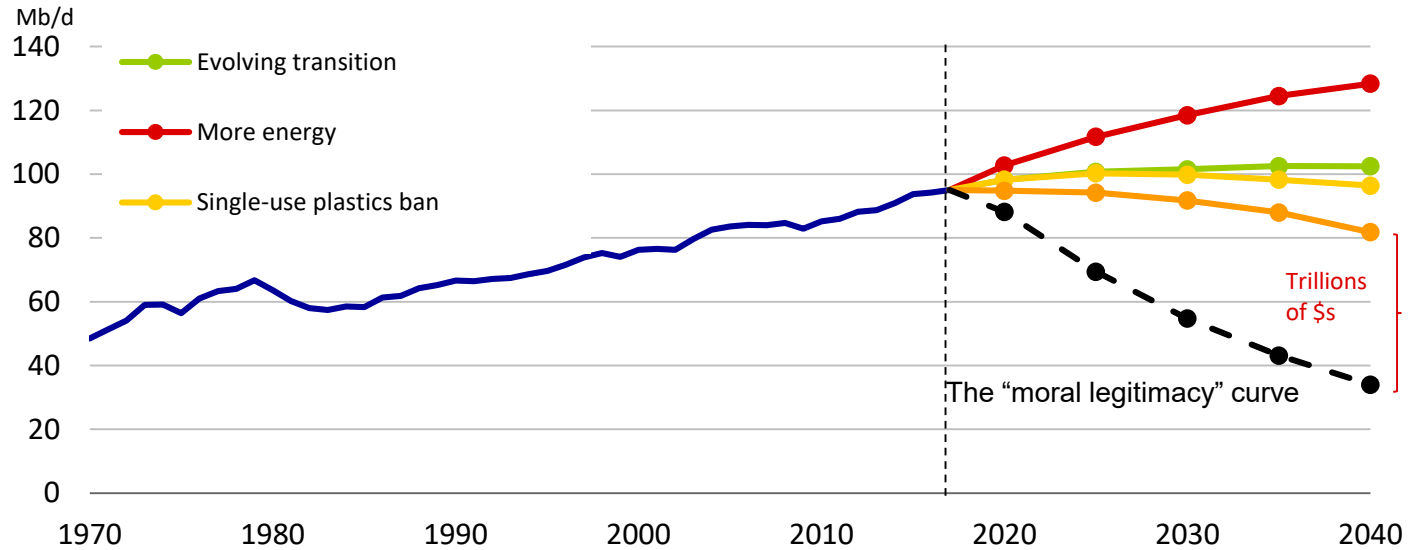
2019 BP Energy Outlook



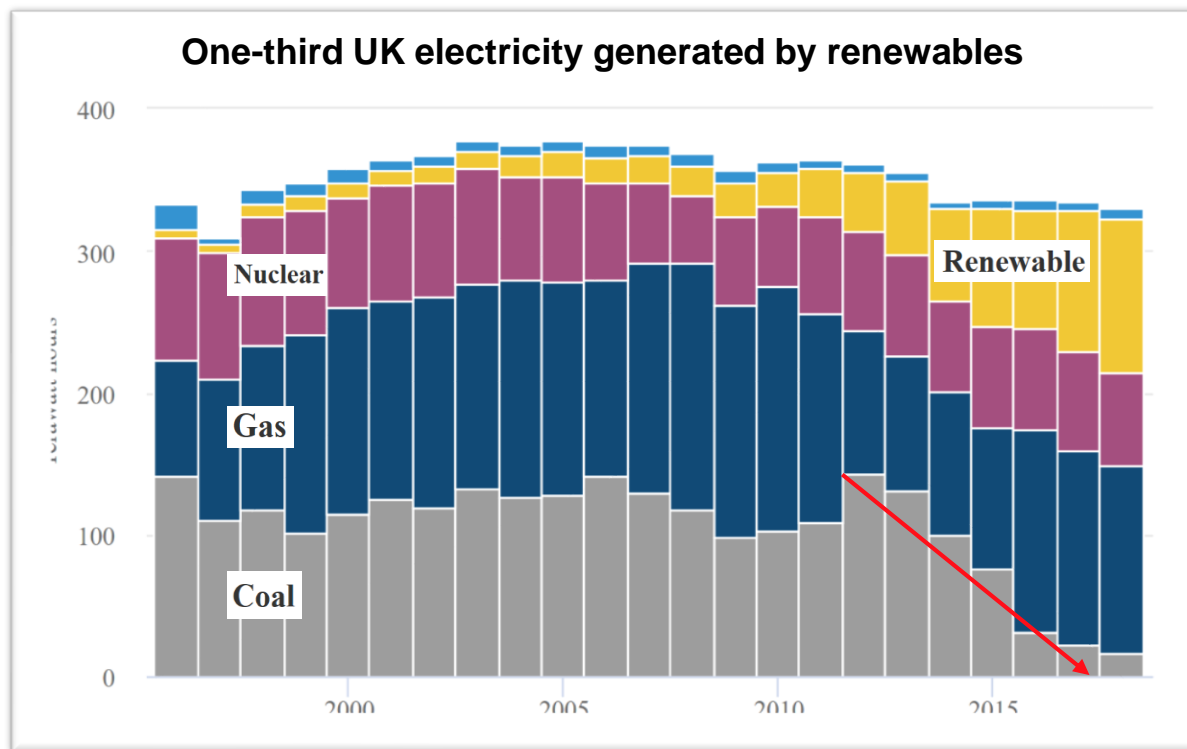




Demand and supply of oil

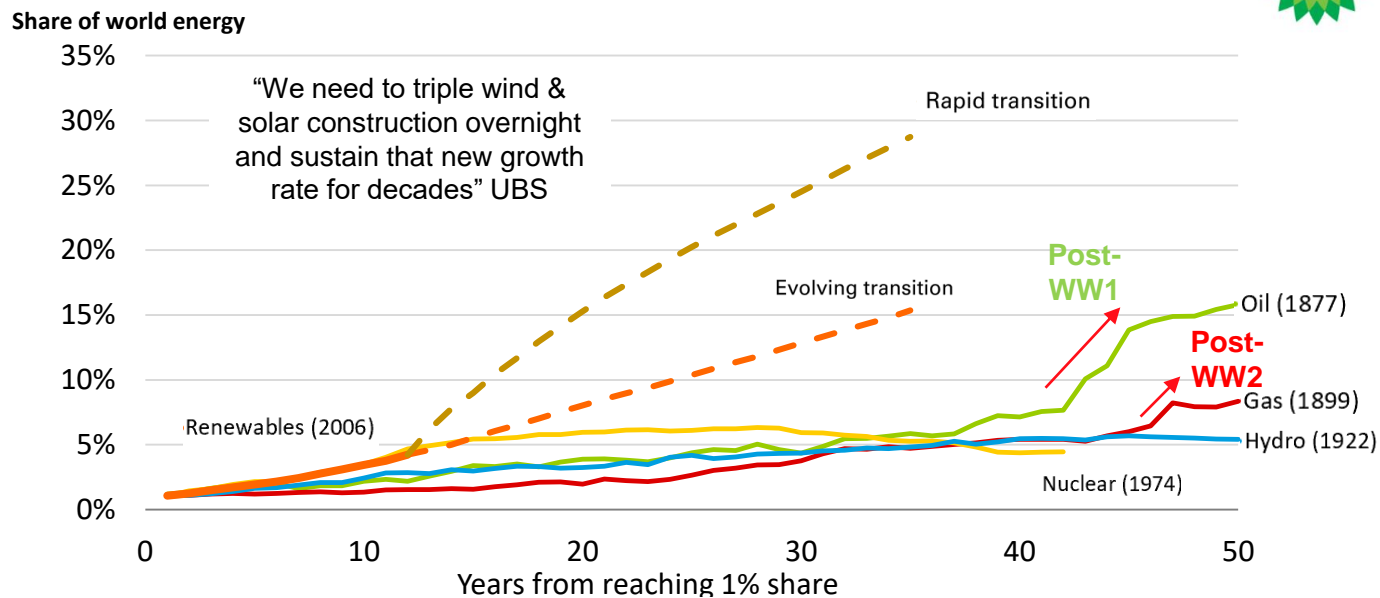


UK electrical generation





Speed of penetration of new fuels in global energy system





The U.N. “race of our lives”

Repeated affirmation without knowledge of credible solutions does not mean that which must happen will happen.



“Preventing irreversible climate disruption is the race of our lives.....we need to cut greenhouse gas emissions by 45% by 2030.”

UN Secretary General
António Guterres

**Cut GHG
by 45% in
10 years!!**

The children - a cry to panic

"It's so simple a child can understand it".
Greta Thurnberg, 16 years old



The rich and famous - first degree suicide

Arnie drives an electric Hummer

California's electricity is generated by natural gas (30%) & nuclear (9%)

Theoretically, 85% of energy consumed in manufacturing the Hummer and its batteries came from hydrocarbons

OFF MESSAGE

Schwarzenegger to Sue Big Oil for 'First Degree Murder'

the former California governor lets loose on climate change

350
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STOP FOSSIL FUELS. BUILD 100% RENEWABLES.

We are standing up to the fossil fuel industry to stop all new coal, oil and gas projects and build clean energy for all.

1. A Fast & Just Transition to 100% Renewable Energy for All

Accelerate the transition to a new, just clean energy economy by supporting community-led energy solutions.

2. No New Fossil Fuel Projects Anywhere.

Stop and ban all oil, coal and gas projects from being built through local resolutions and community resistance.

3. Not a Penny more for Dirty Energy

Cut off the social license and financing for fossil fuel companies — divest, desponsor and defund.

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The politicians - not in my back yard

French parliamentarians have passed a law banning fossil fuel extraction. President Macron says he wants France to lead the world with switch to renewables



The politicians - maybe think that one through a bit first

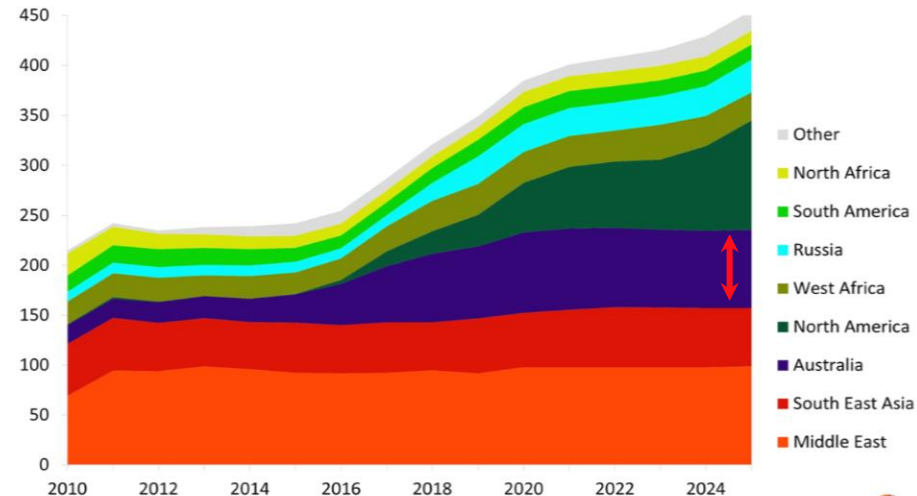


"On my first day as president, I will sign an executive order that puts a total moratorium on all new fossil fuel leases for drilling offshore and on public lands. And I will ban fracking — everywhere."

Elizabeth Warren, Democate presidential candidate

Result: halting production of shale oil which is currently running at 8.5 mln bo/d & >20 trillion cu feet of natural gas

Global LNG supply by region
Million tonnes LNG



Source: Rystad Energy UCube, September 2019

The oil companies - the cunning plan

BP planning sale of some oil projects to hit climate target

In other words:

“Let’s accelerate the monetisation of some of our assets with the worst CO₂ record and let someone else do the polluting!”





*“..’Oh, it’s easy to do’
(is a statement that) hurts
our ability to fix the
problems. Distinguishing a
real solution from a false
solution is actually very
complicated.”*

We need innovation that
is:

- cheaper
- zero CO₂ emissions
- reliable

*“In science, miracles are
happening all the time”*

But you can’t expect a
miracle in engineering

We need an energy miracle



“Whichever way you look, we are storing up risks for the future” Dr Fatih Birol, Executive Director, IEA

“Energy investments now face unprecedented uncertainties, with shifts in markets, policies and technologies,”

“.. the bottom line is that the world is not investing enough in traditional elements of supply to maintain today’s consumption patterns...

..nor is it investing enough in cleaner energy technologies to change course.”

“Government leadership is critical to reduce risks for investors in the emerging sectors that urgently need more capital to get the world on the right track.”

Dr. Birol, Executive Director, IEA

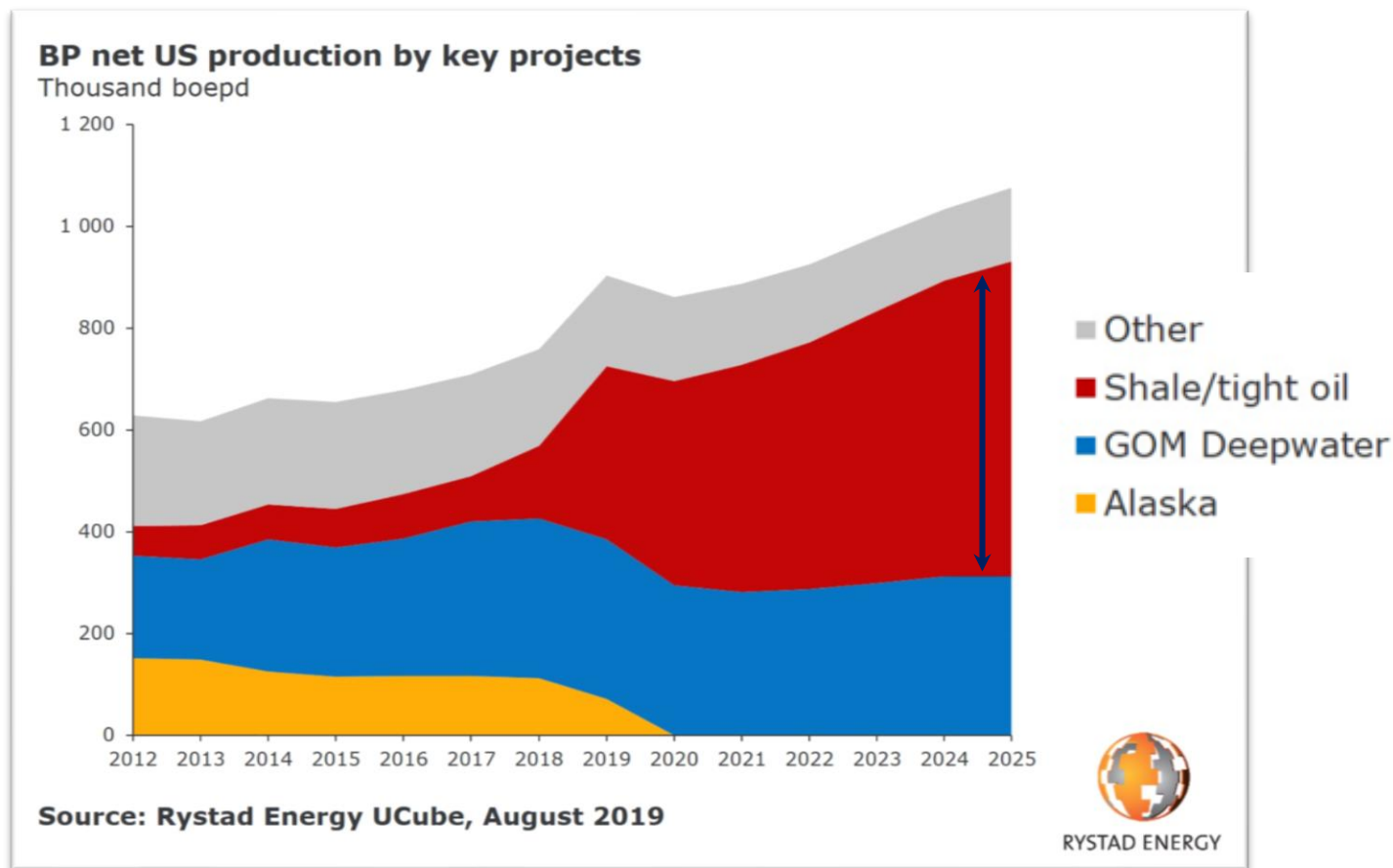
Environmental politics is the dog that has yet to bark in electoral terms.

Robert Shrimmsley, FT journalist

- Global energy investment totalled more than USD 1.8 trillion in 2018, a level similar to 2017.
- Power sector has attracted more investment than the oil and gas industry for past three years.
- Approvals for new conventional oil and gas projects far short of future global demand.
- Substantial reallocation of capital towards energy efficiency and cleaner supply sources to meet Paris Agreement is just not happening.
- Public spending on energy R&D is far short of what is needed.
- Coal-fired power plant FIDs declined to lowest level this century and retirements rose.
- BUT... global coal power fleet continues to expand.
- Coal investment filling growing gap between soaring demand for power and levelling off of ... generation from low-carbon investments.

US shale

BP's future in the US is shale



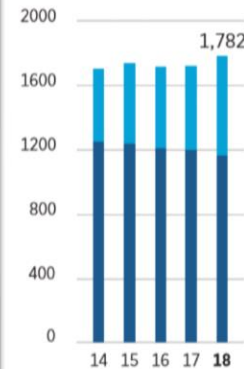
Shale dragging Chevron's upstream earnings

Earnings by major upstream operating area

	Year ended December 31		
	2018	2017	2016
Upstream			
United States	\$ 3,278	\$ 3,640	\$ (2,054)
International	10,038	4,510	(483)
Total Upstream	13,316	8,150	(2,537)

- US losses in 2016 4x greater than international
- Oil prices improved in 2018 compared with 2017
- Chevron's international upstream earnings doubled
- US earnings declined slightly in 2018!
- US production is rising whilst international production is shrinking!

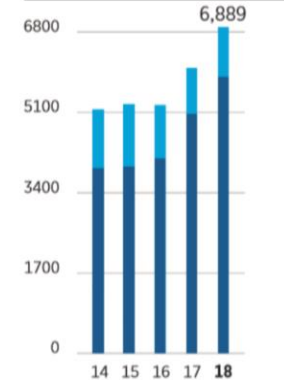
Net liquids production*
Thousands of barrels per day



■ United States
■ International

* Includes equity in affiliates.

Net natural gas production*
Millions of cubic feet per day



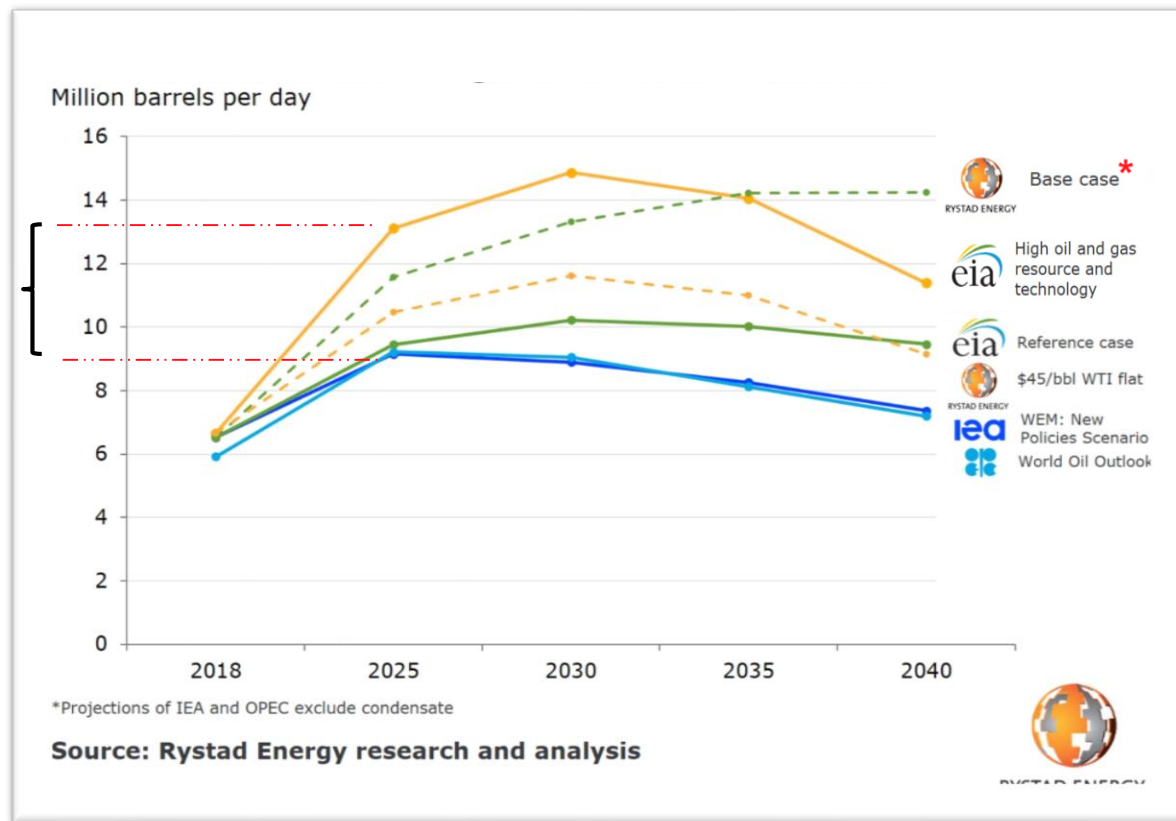
■ United States
■ International

* Includes equity in affiliates.

Sources: Chevron Corp.

Production scenarios for US tight crude oil and condensate

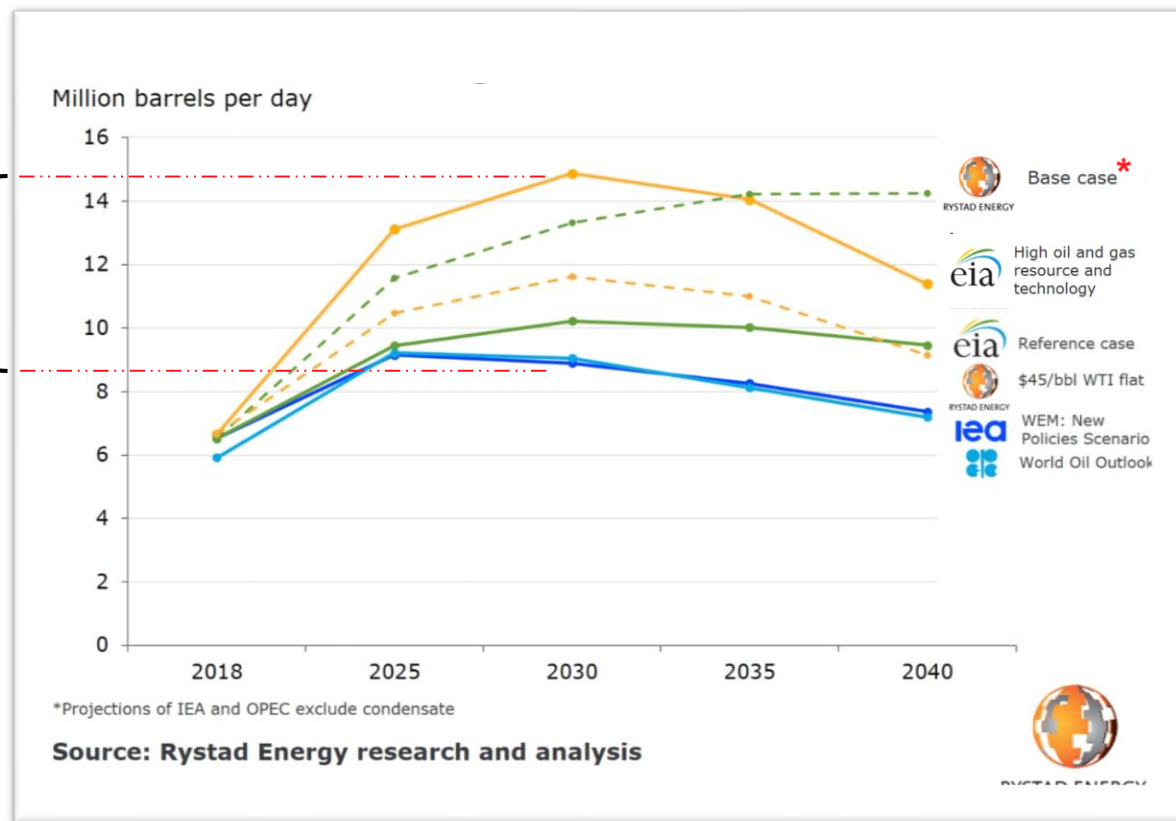
Δ 4 mln bo/d



*The Rystad Energy base-case price scenario assumes a WTI price at \$55/bbl in 2019; \$54/bbl in 2020; \$54/bbl in 2021 and \$57/bbl in 2022.

Production scenarios for US tight crude oil and condensate

Δ 6 mln bo/d



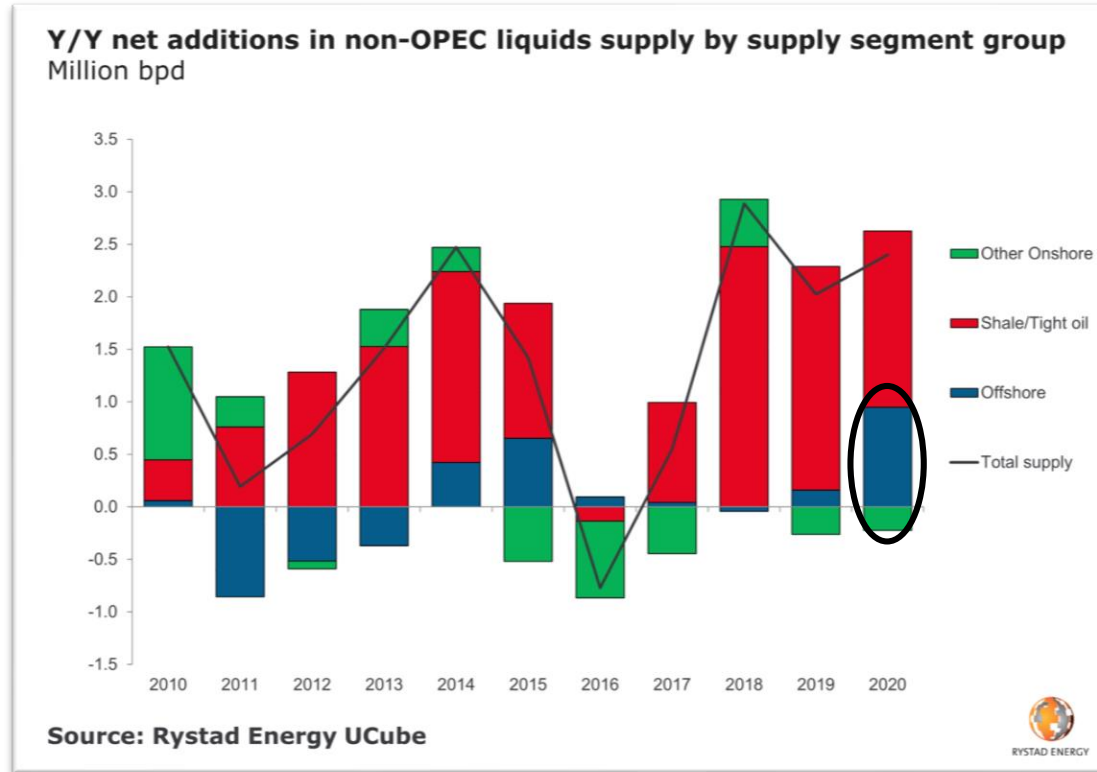
*The Rystad Energy base-case price scenario assumes a WTI price at \$55/bbl in 2019; \$54/bbl in 2020; \$54/bbl in 2021 and \$57/bbl in 2022.

The future of offshore oil

“We expect offshore ..(project approvals).. to nearly double from 2018 to 2020, and sustain high levels of spending over the next five years”

“Offshore project ..(approval).. in 2019 looks ready to reach heights not seen since the \$100 barrel of oil”

Matthew Fitzsimmons, VP of Oilfield Service
Research at Rystad Energy.



- What on earth is wrong with oil & gas?
It's under-funded, under-estimated and under-loved!
- What is the long-term future of the upstream oil and gas industry?
Very bright but very challenging
- What is the future of US LTOs (oil shale)?
Challenging for the majors in the Permian, very bad for the investors
Majors well positioned for next oil price spike
- What is the future of offshore oil?
Very bright for those that move before costs escalate

- What will be the potential impact on the upstream industry of a transition to renewable energy?

Significant, if fossil fuel companies loose their “moral legitimacy”

Otherwise none - energy efficiency will have a far greater impact

- and possibly non-GHG environmental issues

“More plastics regulation could reduce the demand for petrochemicals by one-sixth by 2040”
BP’s chief economist

**Disruption to society due to changing climate
and environmental collapse would have a far
more devastating impact on energy
consumption**

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Jonathan Green is an energy analyst with over 35 years of experience. He has led regional competitive intelligence teams and a leading industry consulting practice specialised in business strategy and government advisory. He is Associate Executive Director of IMAP Systems pty and Managing Director of Bonmont Energy Sàrl, a Swiss-based consulting firm.

The public, the politicians and business are only now beginning to realise just how complex and dynamic the climate change problem really is