

## ENERGY UPDATES BY CHRIS SLADEN

An insightful commentary on the ever-evolving energy sector, written exclusively for the ANZMEX Business Council

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By Chris Sladen

### Energy Unwrapped

Need some talking points for that festive business lunch? Christmas drinks reception? Or when the boss sidles up to you at the annual year-end dinner dance? Here is my round up of key energy chat for 2024.

#### Elections

It was always going to be a massive year for elections, and it was! Many results had big implications for energy, particularly USA, UK, India, Mexico, Namibia & Venezuela. How the US results impact trade & energy with China, and within Latin America, for example Mexico, are obvious conversation openers. Renegotiation of trade agreements & tariffs is a hot topic.

Efforts by President-elect Trump to resolve the conflicts in Ukraine and the Middle East have started even before he takes office. Success would have big implications for stabilising the oil & gas sector, lowering political risk and holding down prices.

#### Oil

Prices drifted around in the \$70-90 per barrel range for Brent. The continuing conflicts in the Middle East and Ukraine surprisingly had little price impact. Threats to ships transiting the Red Sea & Suez Canal caused supply disruption pushing prices higher but the markets quickly found solutions in a world characterised by oversupply. Fossil fuels continued to make affordable, reliable, and scalable energy available to billions of people.

Whilst oil production in some countries continued to dwindle, such as Mexico & UK, there was no shortage of new supply, for example Guyana & Brazil, whilst Namibia & Suriname are building towards new profit centre potential. The Middle East continued to advance many mega-projects.

A return to deepwater exploration and exploring higher pressure & temperature rocks emerged, the attraction being giant and supergiant high-impact fields in established plays, and also in disruptive undrilled plays. Investment in deepwater drilling is the highest level in almost a decade.

Oil demand growth was from India, SE Asia, Africa & Middle East, with declines in Europe & North America. Russian oil and fuel at knock-down prices found its way to Chinese and Indian markets. Oil companies ramped up 2024 investments in biofuels, targeting sustainable aviation fuel.

#### Natural Gas/LNG

Natural gas continued to manifest a prominent role globally. Prices stayed robust with strong regional differences. Europe & Japan prices are typically 4x US prices which were mostly US\$ 2-3 MMBtu.

Gas remains central to the near-term energy transition, many countries seeing gas as a green fuel, clean fuel, transition fuel or simply the least damaging of the hydrocarbons. Liquefied natural gas (LNG) has become a globally traded commodity capable of smoothing out gas market disruptions and a vital part of energy security. A niche commodity 50 years ago, LNG today has become a global commodity.

US production breached the 100 bcf/d mark in part due to a surge in associated gas captured during oil production. Key drivers of US gas demand were strong industrial use, piped exports to Mexico (~6.6bcf/d) and growing LNG export capacity (~14bcf/d from US and Mexican terminals). The US Government temporarily halted further LNG export authorisations to evaluate the situation, and to review methane emissions related to LNG production & supply cycle.

From late 2024, new LNG liquefaction projects are boosting global production. Estimates indicate over 40% capacity growth in the next 5 years, the fastest expansion in LNG history. Most new exports are Qatar and US, with Qatar the largest global supplier.

In China and India, gas demand grew ~7% driven by urbanisation, a need for cleaner air, and industrial growth. Both countries are investing in LNG import projects, regasification, and infrastructure. Massive new gas pipelines linking China to Russia are near completion.

Meanwhile, Europe's LNG demand was quite stable. Much of Europe has leaned heavily into increased LNG supply from the US, Middle East & Australia to make up for the large reduction in Russian piped gas due to the conflict with Ukraine. The multi-billion \$ unanswered question remains: 'What happens to natural gas & LNG markets after the Ukraine conflict is over?'

#### Coal

In '23/24, the world has never burned more coal. Despite all the talk of coal phase-down and phase-out, and consigning coal to history books, 'Coal is King'. In Asia, coal-fired power plants remained the main source of electricity. China and India together consume over 60% of the world total. Real reductions remain elusive. India grew ~10%. Even-so, China issued no permits for new coal-fired plants in the first half of 2024, whilst adding new clean energy capacity (mostly solar & wind) equal to the UK's total current power generation from all sources.

The US, Japan, Russia, and Indonesia were also significant coal users. In 2024, prices remained robust. However, in the UK, coal finally disappeared from the power mix, replaced by cleaner alternatives and a desire 'to leave it in the ground'.

#### Wind & solar

The global market for green electrons is huge, and 2024 saw solar power grow beyond all predictions. Solar & wind took the lion's share of capex for new electricity supply, and when coupled with battery storage, they now offer formidable price competition and durability.

At the moment, solar leads from offshore wind and onshore wind. Rooftop solar is becoming a no-brainer for houses, factories, shopping malls, and pretty much anywhere that has a good combination of weather conditions, site suitability and nearby markets. Solar will soon become China's largest source of power gen offering increased energy security.

Costs continue to come down due to economies of manufacturing scale and technology improvements. Battery storage costs are also coming down as lithium prices have been falling. Some countries struggle to decouple wind & solar power prices from hydrocarbon power prices, for example the UK, leading to high electricity prices. Consumers want a discount, not pay a premium, to go green.

#### Nuclear

Many countries reinstated nuclear as a manifest part of their energy security, whilst giant nuclear projects under construction continue to plod ahead. But all the big news and chat is around Small Nuclear Reactors.

Many data centres are looking for carbon-free 100+ MW scale generation – hence the lure of SNR which can provide security of a large stable power supply, that can be added to with further modules. In late 2024, Google signed an agreement for a dedicated small nuclear power plant for one of its AI data centres, due online in 2035; Microsoft signed a deal to restart the Three Mile Island plant, scene of the worst US nuclear accident in 1979; and Amazon announced plans to buy a nuclear powered data centre.

Some data centres now have plans that need 1GW! VC and PE money is already moving away from green technology towards large AI data centres. These need both substantial power and land. AI's ability to transform efficiency in the energy sector is also moving rapidly because as an industry, energy thrives on data.

#### Geothermal

Use of shallow geothermal in the form of ground arrays, or loops in shallow boreholes, combined with ground source heat pumps continued to grow. Thermal Energy Networks advanced in many countries. Success of trials involving old oil & gas wells and closed loops shows great promise in developing heat projects (& potentially power) and underpins the concept that geothermal resources are available everywhere.

In the USA (the leader in geothermal power generation), developments were bolstered by significant new legislation & reforms this year, also the potential to extract lithium from geothermal brines, and the attractions of geothermal for powering data centres. Many projects highlight increasing use as a clean power baseload solution – not only the USA, but also Indonesia, Kenya, Canada, Turkey, El Salvador, UK – to name a few.

#### Energy Transition

After 30 years of COP meetings, CO2 emissions are increasing at a faster rate than in 1995. China, USA & India account for over half of global CO2 emissions. None will be turning their back on fossil fuels any time soon. 2024 is on track to be the world's warmest year on record and the 1.5C warming target is dead.

COP29, described by some as the worst COP meeting in a decade, became angrier, with walk outs & demonstrations; key sessions were at times hostile. Developed countries agreed to triple their climate financing to US\$300bn per year to help developing economies tackle global warming. Carbon market rules were finally agreed, Mexico set itself a Net Zero target of 2050, China voluntarily agreed to contribute to climate finance, and many influential players agreed to encourage Trump to not withdraw from the COP process.

Investments in renewables are now running significantly above oil & gas. The renewables market is driven by China, Europe, and USA where most (not all) of new electricity generation capacity is coming from solar and wind. Renewables needs \$3-4 trillion per year to start approaching Net Zero targets; investment is currently about half that, so way below what's needed. It is a reminder that to win, the energy transition needs to be a technological, physical, and chemical transformation financed over decades. Four things that could easily be done are 'Use less energy, use cleaner energy, scale up low carbon energy and recycle everything possible'.

2024 saw many oil & gas companies ease back on their energy transition targets and look to improve returns on their wind, solar & hydrogen projects. Sadly, methane gas emissions and venting by hydrocarbon companies shows no sign of going down, with an annual revenue loss of US\$ ~50-100bn. Methane is over 80 times more potent than CO2 over 20 years. Eliminating emissions are one of the cheapest and quickest opportunities for tackling global warming.

Hydrogen demand remains concentrated in refining and heavy industries. 2024 showed good progress with long distance & heavy transport projects. Its use as a type of energy storage is quickly gaining traction too. Blue ammonia, a fuel that enables hydrogen to be transported globally by tankers, struggled to find off-takers for large planned Middle East projects due to cost issues. On the supply side, the hydrogen industry remains dominated by highly polluting grey hydrogen made from steam reforming of fossil fuels. Much attention is focused on the scale-up of electrolyser manufacture needed for green hydrogen made from water using green power; production is set to grow by an order of magnitude by 2027, but this would still be <5% of total hydrogen production. Exploration for naturally occurring geologic hydrogen in subsurface rocks intensified with dozens of companies now pursuing projects. An important discovery was announced in Australia, but scale & commercial viability are yet to be proven.

#### Carbon Capture, Utilisation & Storage

After many false starts, 2024 was a coming-of-age year for CCUS, with many significant project announcements. It is no longer just talk & policies but now real projects, with around 400 under development worldwide. Cost & scale are where the pain is for what is ultimately a waste management industry.

Blue hydrogen produced from natural gas, then used for power generation with underground CO2 storage remains a key short-medium term fix to reducing emissions. Two UK projects received confirmation of funding (US\$ ~28 bn) enabling the construction phase to begin, and many CO2 storage licences were issued for injection into nearby offshore depleted reservoirs and saline aquifers. Elsewhere, key carbon capture projects were announced in the pulp and paper sector (Finland), direct air capture technology (USA), blue hydrogen and sustainable aviation fuel (Norway), the cement industry (Latvia) and new mineral sequestration projects (Iceland).

Norway's CO2 storage hub known as Northern Lights became the first cross-border project to allow industrial companies to transport and sequester CO2. Inaugurated in September, Phase 1 storing 1.5m tons of CO2 per year is fully booked and opens a new global value chain. Purpose built tanker ships are undergoing sea trials, and once operational will allow countries to dispatch liquid CO2 cargoes to the hub for waste storage.

Leakage at a CO2 storage site in Illinois in September was a timely reminder of the subsurface challenges for underground storage projects everywhere. Seepage and unexpected pressure changes from reservoirs will erode project value and public confidence, whilst creating new problems.

#### Electric vehicles (including hybrids)

The sector continued its pursuit of scale both in economics and efficiency, helped by lithium ion prices falling to less than half that of a year ago and are now their lowest in 3 years. The possibility of extracting lithium from oilfield brines accelerated rapidly in 2024 with the focus on acreage acquisition in the Smackover Fm in the USA, and Leduc Fm in Canada. Both have yielded legendary past oil & gas discoveries.

Many passenger EVs reached cost parity with internal combustion engine vehicles, and drivers acknowledge that the ride of an EV is superior. EV sales had another record year; in 2024, passenger vehicle sales were up ~ 20%. Over the last 5 years, EV car sales have increased 5-fold, but the concern now is that demand is noticeably slowing in certain markets, and competition is intense.

Slowing EV demand implies stronger oil demand. Other energy transition rare metals prices also fell due to oversupply and weaker growth than expected. The road to electrification is a rough ride with many car buyers opting for hybrid models over pure battery. This rise of hybrids is changing the demand dynamics for many battery inputs.

'Range anxiety' has dominated EV user's conversations for many years; this year the hot topic was 'Recharge anxiety' with thousands of social media posts about arriving at a scarce charging station only to find a charger doesn't work or is still occupied by a vehicle that has finished charging. The industry has a lot to improve on, as does EV driver etiquette; it is no surprise many motorists are opting for hybrids.

#### Energy word of the year

This goes to 'dunkelflaute'. This German term meaning dark doldrums is now used to describe a period of days or weeks when there is no wind or sun, consequently no power production from these sources. You are unlikely to survive a lengthy dunkelflaute just on battery power.

Season's greetings to all my readers. Hope to see you in 2025. Feliz navidad y próspero año nuevo, Chris

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Chris has an energy career of over 40 years, living in Mexico (2001-2018), Russia, Vietnam, Mongolia, China & UK. His contributions to the energy and education sectors have been recognised by the UK Government with both an MBE and CBE, and also the Aztec Eagle from the Mexican Government – the first foreigner in the energy sector to achieve this award. Chris' articles for ANZMEX reflect his experience and enthusiasm and are often also later published to a global audience in the USA, UK and Singapore. They are not paid for in any way.

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