**ESR NEWSLETTER**
**October 2025**

# Introduction

This newsletter starts with extracts from the International Energy Review 2025 which gives a useful update on global energy production and trends. It is followed by an article on producing biochar from human waste to help reduce greenhouse gas emissions from agriculture. Unfortunately, much of the remainder paints a rather depressing picture. It can only be hoped that humanity is able to rise above wilful ignorance, selfishness and greed. It must.

As always, the newsletter consists primarily of information extracted from the internet from various websites. Wherever possible, the source of that information is given at the start of each item.

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# 1.Extracts from IEA Global Energy Review 2025

## 1.1 Key Findings

- **Global energy demand grew by 2.2% in 2024 – faster than the average rate over the past decade. Demand for all fuels and technologies expanded in 2024.** The increase was led by the power sector as electricity demand surged by 4.3%, well above the 3.2% growth in global GDP, driven by record temperatures, electrification and digitalisation. Renewables accounted for the largest share of

the growth in global energy supply (38%), followed by natural gas (28%), coal (15%), oil (11%) and nuclear (8%).

- **Emerging and developing economies accounted for over 80% of global energy demand growth.** In China, growth in energy demand slowed to under 3% in 2024, half the rate in 2023 and well below China's average annual growth of 4.3% in recent years. Nevertheless, China still saw the largest demand growth in absolute terms of any country in 2024. India saw the second-largest rise in energy demand in absolute terms – more than the increase in all advanced economies combined.
- **Advanced economies also saw a notable return to growth in energy demand after several years of declines, with demand rising by almost 1%.** The United States saw the third-largest absolute demand growth in 2024 after China and India. The European Union returned to growth for the first time since 2017 (aside from the post-Covid rebound in 2021).
- **Global oil demand growth slowed markedly in 2024, in line with the IEA's forecast. Oil's share of total energy demand fell below 30% for the first time ever**, 50 years after peaking at 46%. Demand for oil rose by 0.8% in 2024, compared with a 1.9% increase in 2023. However, trends varied between sectors and regions. Oil demand from global road transport fell slightly, driven by declines in China (-1.8%) and advanced economies (-0.3%). Oil demand from aviation and petrochemicals grew.
- **Natural gas saw the strongest demand growth among fossil fuels.** Demand increased by 2.7% in 2024, rising by 115 billion cubic metres (bcm), compared with an average of around 75 bcm annually over the past decade. China had the largest absolute growth in gas demand in 2024 of over 7% (30 bcm), with growth also strong in other emerging and developing economies in Asia. Gas demand expanded by around 2% (20 bcm) in the United States. Consumption grew modestly in the European Union, notably for industrial use.
- **Global coal demand rose by 1%.** Power generation was the main driver of growth as high temperatures pushed up electricity consumption for cooling. Intense heatwaves drove coal use higher in both China and India, which together represented the large majority of the global demand increase of around 65 million tonnes of coal equivalent (Mtce). China remained the largest coal consumer globally, accounting for a record 58% of global coal use.
- **Global electricity consumption rose by nearly 1 100 terawatt-hours (TWh) in 2024, more than twice the annual average increase over the past decade.** The increase – more than Japan's annual electricity consumption – was the largest ever, outside of years when the global economy rebounded from recession. China made up more than half of the global increase in electricity demand, but the rise was broad-based, with growth of 4% in other emerging and developing economies. Electricity demand reached a new high in advanced economies.

- **Rising global electricity use was driven by factors such as increasing cooling demand resulting from extreme temperatures, growing consumption by industry, the electrification of transport, and the expansion of the data centre sector.** Electricity use in buildings accounted for nearly 60% of overall growth in 2024. The installed capacity of data centres globally increased by an estimated 20%, or around 15 gigawatts (GW), mostly in the United States and China. Meanwhile, the continued growth in the uptake of electric vehicles resulted in a rise in electricity use in transport. Global sales of electric cars rose by over 25%, surpassing 17 million units and accounting for one-fifth of all car sales, in line with the IEA's projections for 2024.
- **In 2024, 80% of the growth in global electricity generation was provided by renewable sources and nuclear power.** Together, they contributed 40% of total generation for the first time, with renewables alone supplying 32%. New renewables installations hit record levels for the 22nd consecutive year, with around 700 GW of total renewable capacity added in 2024, nearly 80% of which was solar PV. Generation from solar PV and wind increased by a record 670 TWh, while generation from natural gas rose by 170 TWh and coal by 90 TWh. In the European Union, the share of generation provided by solar PV and wind surpassed the combined share of coal and gas for the first time. In the United States, solar PV and wind's share rose to 16%, overtaking that of coal. In China, solar PV and wind reached nearly 20% of total generation.
- **In 2024, over 7 GW of nuclear power capacity was brought online, 33% more than in 2023**. The new capacity added was the fifth-highest level in the past three decades. Electricity generation from nuclear in 2024 rose by 100 TWh, equalling the largest increase this century outside of the post-Covid rebound. Construction starts for nuclear power plants grew by 50% in 2024, exclusively using Chinese and Russian designs.
- **Energy intensity improvements continued to slow in 2024.** After improving at an average rate of around 2% annually between 2010 and 2019, energy intensity improvements slowed to 1.2% per year between 2019 and 2023 and only 1% in 2024. Key reasons for this recent slowdown include investment- and manufacturing-intensive post-Covid growth in major emerging and developing economies such as China and India; higher energy demand due to extreme temperatures; and a trend of poor growth in hydropower output that was only partially reversed in 2024, leading to more consumption of less-efficient fuels in some regions.

## 1.2 Global CO2 emissions

***Total energy-related $CO_2$ emissions increased by 0.8% in 2024, hitting an all-time high of 37.8 Gt $CO_2$. This rise contributed to record atmospheric $CO_2$ concentrations of 422.5 ppm in 2024, around 3 ppm higher than 2023 and 50% higher than pre-industrial levels***. In 2024, $CO_2$ emissions from fuel combustion grew by around 1% or

357 Mt $CO_2$, while emissions from industrial processes declined by 2.3% or 62 Mt $CO_2$. Emissions growth was lower than global GDP growth (+3.2%), restoring the decades-long trend of decoupling emissions growth from economic growth, which had been disrupted in 2021.

2024 $CO_2$ per capita examples: China 8.9 tonnes, EU 5.4 tonnes, India 2.1 tonnes, Japan 7.7 tonnes, US 13.4 tonnes per capita.

Natural gas emissions rose by around 2.5% (180 Mt $CO_2$) in 2024, making it the largest contributor to global carbon emissions growth. This increase was driven by higher consumption in China, the United States, the Middle East, and India.

Global coal emissions rose by 0.9% (135 Mt $CO_2$) in 2024. The increase was primarily fuelled by growing coal consumption in China, India and Southeast Asia, while demand declined in advanced economies, particularly in the United States and the European Union.

While global oil consumption rose by 0.8% in 2024, oil-related emissions increased by only 0.3%. This was despite aviation emissions surging by approximately 5.5% amid record global air passenger demand. The modest overall rise in emissions from oil use is largely due to the fact that petrochemical feedstocks accounted for 70% of the total volumetric increase in oil use.

In emerging market and developing economies, energy-related $CO_2$ emissions increased by 1.5% (375 Mt $CO_2$) in 2024, driven by rising energy demand associated with rapid economic and population growth. Emissions from coal rose by 2%, while natural gas emissions increased by 3.7% and oil emissions rose by 0.3%, reflecting the continued reliance on fossil fuels to meet expanding industrial activity and improve energy access.

In advanced economies, energy-related $CO_2$ emissions decreased by 1.1% (120 Mt $CO_2$) in 2024, driven by a 5.7% decline in coal emissions and a 0.5% drop in oil emissions. Natural gas emissions increased by 0.9%. The reduction reflects advanced economies' continued deployment of low-emissions energy sources, with renewables and nuclear power accounting for over 50% of electricity generation, led by strong growth in wind and solar.

The United States' energy-related $CO_2$ emissions decreased by 0.5% (20 Mt $CO_2$) in 2024, reflecting mixed trends across fuel sources. Emissions from coal dropped by 4.5% as the country registered the lowest coal power generation levels in nearly 60 years, while oil emissions fell by 0.3%. However, natural gas emissions increased by 1.3%, driven by its role as the largest US electricity source, accounting for almost 43% of the generation mix. For the first time, solar and wind surpassed coal in electricity generation.

## 2. Biochar from human waste could solve global fertiliser shortages, study finds

*Extracts from a report by Andy Deng, Guardian web site, 11 Aug 2025*

Charcoal made from human waste could help solve fertiliser shortages as well as reduce pollution and energy use, a study has found.

Biochar is a form of charcoal made from organic matter treated at high heat, which is often used on farming soil as a fertiliser. The process also removes carbon from the atmosphere, making it a useful carbon sink.

The study estimated that biochar made from solid human excrement could provide up to 7% of the phosphorus used around the world each year. Although the biochar process converts only solids, nutrients taken from urine could be added to it, and the researchers found this could provide for 15% of annual phosphorus application, 17% of nitrogen, and up to 25% of potassium.

Treated sewage sludge is already spread on farmland, but its use is controversial as it often contains microplastics, heavy metals, Pfas forever chemicals, pathogens, and pharmaceuticals. The researchers say biochar can avoid this problem by separating the waste at source.

The study estimated that the biochar process could decrease both the weight and volume of solid excrement by up to 90%, which represents a significant gain in efficiency when compared with transporting sewage sludge, due to the latter's high water content.

The biochar production process also allows nutrient proportions to be adjusted according to the needs of individual crops. This can address problems associated with fertiliser use such as weed growth and eutrophication – when excess nutrients leach into groundwater, causing rapid growth of algae which depletes oxygen availability and reduces the sunlight available for underwater ecosystems.

Dr Johannes Lehmann, a professor of soil biogeochemistry at Cornell University and lead author of the study published in the journal PNAS, said: "Talking about sewage is not as glamorous as renewable energy, but preventing resource wastage by creating a circular economy is also key to the green transition."

Agriculture accounts for 25% of global greenhouse gas emissions, according to the Intergovernmental Panel on Climate Change. As demand has increased on global agricultural systems to provide enough food for all, so too has its appetite for fertiliser to replenish soil nutrients.

Synthetic fertilisers deliver three main nutrients to soils – nitrogen, potassium, and phosphorus – and all three involve energy-intensive and often environmentally destructive production processes. Atmospheric nitrogen is used to make ammonia via the Haber process, and turning this into nitrogen fertilisers and using these in agriculture emits an estimated 2.6bn tonnes of CO2 a year – more than global aviation and shipping combined.

Strip mining phosphate rock for phosphorus permanently scars natural landscapes and processing it into fertiliser also leads to radioactive phosphogypsum as a byproduct. Potash

mining for potassium contributes to soil salinisation and freshwater contamination due to its large amounts of waste salt byproduct.

According to Lehmann, “the implications [of biochar resource recovery] go beyond just agriculture, and involve economics and geopolitics. As finite mineral resources become more scarce, countries without significant reserves could become dependent on those with for their agricultural needs and food security. For example, Morocco holds 70% of the entire world’s reserves of phosphates.

“Instead, an alternative future where nutrients are recycled through a circular economy could empower countries to produce food without relying on imported fertilisers, redressing issues of environmental justice across the global south by potentially mitigating climate migration, one of the main drivers of which is agricultural failure.”

## 3. Sustainable Jet Fuel Update

*From Reuters Power Up, 12 August 2025*

While major airlines have touted sustainable aviation fuel (SAF) as a pathway to cut emissions and build cleaner operations, the projects needed to build the industry are faltering.

While airlines have announced some 165 SAF projects in the past 12 years, only 36 have materialized, a Reuters analysis found. Of those that remain, 23 have been abandoned, 27 are delayed or on indefinite hold, and 31 have yet to produce fuel. Four are credit deals, where no physical fuel is delivered.

SAF costs three to five times more to make than traditional jet fuel. Aviation accounts for 2.5% of global planet-warming emissions, and that figure is expected to rise as air traffic doubles from 2019 levels by 2050.

The industry's struggles could spell trouble not just for the environment, but airlines as well. Under new EU rules, for example, sustainable fuel must account for 2% of flights this year, rising to 6% by 2030 and 70% by 2050.

The International Air Transport Association estimates it will account for 0.7% of fuel use this year, up from 0.3% last year.

## 4. Trump team’s contentious climate report ‘makes a mockery of science’, experts say

*Extracts from an article by Oliver Milman and Dharna Noor, Guardian website, 2 September 2025*

A group of the US’s leading climate scientists have compiled a withering review of a controversial Trump administration report that downplays the risks of the climate crisis, finding that the document is biased, riddled with errors and fails basic scientific credibility.

More than 85 climate experts have contributed to a comprehensive 434-page report that excoriates a US Department of Energy (DOE) document written by five hand-picked fringe researchers that argues that global heating and its resulting consequences have been overstated.

The Trump administration report, released in July, contains "pervasive problems with misrepresentation and selective citation of the scientific literature, cherry-picking of data, and faulty or absent statistics", states the new analysis, which is written in the style of the authoritative Intergovernmental Panel on Climate Change (IPCC) reports.

"This report makes a mockery of science," said Andrew Dessler, a climate scientist at Texas A&M University. "It relies on ideas that were rejected long ago, supported by misrepresentations of the body of scientific knowledge, omissions of important facts, arm waving, anecdotes and confirmation bias. This report makes it clear DOE has no interest in engaging with the scientific community."

Chris Wright, the US energy secretary, has said the report pushes back against the "cancel culture Orwellian squelching of science" and that the five authors were not ordered what to write. Reached for comment, DOE spokesperson Ben Dietderich said: "Unlike previous administrations, the Trump administration is committed to engaging in a more thoughtful and science-based conversation about climate change and energy." In the DOE report, Wright says the authors were chosen "for their rigor, honesty, and willingness to elevate the debate".

The problems with the new DOE assessment began when the agency hand-picked five climate contrarians to author it, the analysis says. They include John Christy, an atmospheric scientist who has said the climate crisis could be positive; Judith Curry, a climatologist who rails against climate "alarmism"; Steven E Koonin, a physicist who has called climate science "unsettled"; Ross McKitrick, an economist who has said the climate crisis is not a "big issue"; and Roy Spencer, a meteorologist and climate scientist who has said top scientists overblow the impact society has on the climate.

By selecting these authors, the Trump administration appears to be violating a 1972 law requiring balanced perspectives within executive advisory committees, the new review says. "[T]his group appears to have been personally recruited by the Secretary of Energy to advance a particular viewpoint favored by DOE leadership," the analysis says.

Federal advisory committee members are subject to transparency laws aimed at promoting citizen input and accountability, the analysis notes, but the group's convenings happened in secret, and their work was withheld from the public. Under Office of Management and Budget rules, such assessments are also meant to be subject to peer review. But no such review has yet occurred, the authors note. The working group's process also violated the stated aims of the Trump administration, they say. In a May executive order, the president said only peer-reviewed science that is conducted in a conflict-free and transparent manner should underpin policies.

Asked about these concerns, Dietderich said the DOE report was "reviewed internally by a group of DOE scientific researchers and policy experts from the Office of Science and National Labs" and is now "opened to wider peer review from the scientific community and general public via the public comment period".

The Trump administration report selectively reviews scientific literature and plucks small sections to support its arguments, rather than present a full picture of the evidence, the scientists' review states. For example, the Trump-appointed researchers point to the extreme heat of the 1930s Dust Bowl, while ignoring what was going on in the rest of the world and how this compares to global trends today. Other "cherry-picked" evidence is used to support claims about the role of the strength of the sun in raising Earth temperatures and the sensitivity of the climate to carbon emissions, the review finds.

Another section, in which the report looks at climate-driven extreme events, is badly mischaracterized, according to Dessler. “I mean, they just don’t understand what they’re talking about,” he said.

While the DOE report was written in four months, traditional federal and international climate reports – such as the US national climate assessments and IPCC reports – are each authored by hundreds of experts, the new analysis says, “with multiple rounds of internal and external review”.

The Department of Energy report was released as part of a Trump administration push to repeal the “endangerment finding” – a landmark 2009 determination that greenhouse gases harm human health. The elimination of this finding by the Environmental Protection Agency would effectively kneecap all US policies designed to cut planet-heating pollution from cars, trucks and power plants. The DOE report is intended to provide cover for this political goal rather than act as a credible work of science, the review found.

Dietderich said the president “values the role of science” and that the administration “have not pre-judged how this report will impact EPA’s proposed Endangerment Finding rulemaking or any policy or program at the Department of Energy”. Yet by sidelining credible climate scientists and actively promoting the report’s conclusions in draft form, the Trump administration has shown that this work is merely a tool in service of a political goal, the reviewing scientists added.

## 5. US intends to cancel $13 billion in funds for green energy

*Extracts from a news item by Reuters dated September 24, 2025:*

The U.S. Department of Energy intends to cancel more than $13 billion in funds that the Biden administration had pledged to subsidize wind, solar, batteries and electric vehicles, it said on Wednesday.

It was not immediately clear which funds were being targeted. The department did not immediately respond to a request for more details. "By returning these funds to the American taxpayer, the Trump administration is affirming its commitment to advancing more affordable, reliable and secure American energy and being more responsible stewards of taxpayer dollars," the department said.

The announcement generated sharp criticism from California Governor Gavin Newsom, who said the U.S. was ceding leadership on clean energy to China.  California, the most populous U.S. state, has among the most ambitious clean energy and greenhouse gas emissions reduction goals in the world.

The news came a day after Trump dismissed climate change as "the greatest con job" in the world during his address to the United Nations General Assembly, doubling down on his skepticism of global environmental initiatives and multilateral institutions. Trump has pushed to maximize the output of oil and gas, which were already at record production when he returned to office in January, while cutting subsidies for renewable energy and EVs.

## 6. BP Oil Demand Forecast – Peak Oil pushed back to 2030

*Extract from Reuters Power Up Newsletter article by Ron Bousso, ROI Energy Columnist*

Forecasting trends is often a fool's errand. This is especially true when discussing energy markets that are undergoing a profound transformation, with countries expanding the use of renewables while trying to reduce their reliance on fossil fuels. It is, however, notable that British energy giant BP's new energy outlook, published on Thursday, expects oil consumption between now and 2050 to be higher than previously assumed.

Under its "Current Trajectory" scenario, which is based on existing and planned government policies, BP has pushed back the date at which "peak oil" demand will be reached from 2025 to 2030. Moreover, while its previous report anticipated that demand would reach 77 million barrels per day bpd in 2050, down from 100 million bpd in 2023, it now sees oil demand declining less sharply over the next quarter century to 83 million bpd. It also forecasts a slower pace of demand destruction in scenarios that assume a faster energy transition.

Oil consumption is expected to grow over the rest of this decade, albeit at a declining rate, to 103.4 million barrels per day (bpd), before edging back near its current level by 2035. The report assumes declining demand in developed economies will be offset by lower energy efficiency and increased consumption in India and other Asian countries. Moreover, BP assumes rapid growth in electric vehicle sales will put downward pressure on demand, but strong growth in the petrochemicals sector will put a floor under consumption.

Perhaps most importantly, BP sees the share of oil in the total energy mix falling only nine percentage points by 2050 to 23%, highlighting the fact that they believe crude will remain central to the global economy even as the energy transition progresses.

## 7. China sets renewables goal

*From an article by Colleen Howe, Reuters website, September 26, 2025*

Summary

- China has history of setting targets it can achieve
- China's renewable capacity is already the world's largest
- Goal marks first time China has promised to cut emissions

China's climate goals made public on Wednesday (September 24th) promise the continued expansion of renewable energy, which it has already added at a rapid pace, but make no specific commitment to increase its share in power generation or scale back coal. In announcing the country's first carbon reduction goals, President Xi Jinping said China would increase its wind and solar power capacity, already the world's largest, by six times from 2020 levels to 3,600 gigawatts by 2035.

Last year, China reached a target to bring total wind and solar generating capacity to 1,200 GW six years ahead of schedule, reflecting what analysts said is its penchant for setting goals it knows it can meet.

Anders Hove, senior research fellow at the Oxford Institute for Energy Studies, said China's renewables challenge is not capacity but surging curtailment rates. Curtailment occurs when grid managers limit the power coming onto the grid to maintain a balance with demand or due to infrastructure constraints. Hove said China should focus more on ensuring that renewable power goes into the grid, displacing electricity from coal and gas.

Xi said China would aim to cut greenhouse gas emissions by 7%-10% from the peak, a level it has not yet defined but that analysts expected to happen earlier than the official 2030 goal.

Although the new goals, including the renewable target, were expected to provide a clearer roadmap to achieving progress, the headline number fell short of the 30% emissions cut observers said is needed to keep China on track for carbon neutrality by 2060.

"There's a lot of uncertainty around demand growth in China and the need to allow for continued growth from traditional users as well as new users, like data centres and others," said Michael Davidson, a University of California, San Diego, professor who researches renewable energy systems and carbon neutrality in China.

Xi stopped short of setting new targets for coal or reiterating a target from 2020, when China said it would "phase down" coal use between 2026 and 2030. It has continued to build and permit new coal mines.

## 8.Extracts from Energy Source & Distribution Magazine, Sep/Oct 2025

# AUSTRALIAN ROOFTOPS DRIVING THE NATION'S 2030 SOLAR TARGETS

Aussie rooftops continue to be a clean-energy powerhouse, with Australia on track to meet—and likely exceed—its 2030 rooftop solar targets.

The Clean Energy Council's bi-annual Rooftop Solar and Storage Report reveals that by June this year, Australians had installed a total of 26.8GW of rooftop solar capacity across 4.2 million homes and small businesses.

The Australian Energy Market Operator's (AEMO) *Integrated System Plan*, which underpins the national 82% renewable energy target, expects that by 2030 Australia will have approximately 36GW of rooftop solar installed throughout the National Electricity Market.

The amount of rooftop electricity currently installed represents nearly three-quarters of the capacity needed to meet the 2030 target of 36GW. Based on current trends, the Clean Energy Council expects Australia to have installed 37.2GW of rooftop solar by June 2030, beating projections by 3.3%.

In the first half of 2025 alone, the report found 115,584 rooftop systems were installed nationwide, adding 1.1GW of capacity, with rooftop solar contributing 15,463GWh to the national energy mix.

Queensland added the most rooftop solar in the first half of 2025, with 326MW of installed capacity, followed by New South Wales (321MW) and Victoria (230MW). Overall New South Wales retains the highest overall rooftop solar capacity in the nation at 7.5GW, with Queensland close behind at 7.2GW—leading the nation with more than 1.1 million total installations—while Victoria ranks third with 5.4GW.

Australians are also installing home batteries at record pace, with 85,000 battery units sold in the first half of 2025—a 191% increase on the previous year. Cumulatively, 271,000 home batteries have now been installed nationwide, nearly double the total from 12 months ago.

Government rebates such as the Federal Cheaper Home Batteries Program and the WA Residential Home Battery Scheme, have helped spur demand.

# WOODSIDE'S NORTH WEST SHELF PROJECT EXTENSION APPROVED

The Australian Government has made a final decision to grant environmental approval for Woodside's contested North West Shelf Project Extension.

The approval followed an extensive assessment and appeal process and included rigorous conditions to manage the protection of cultural heritage, including additional monitoring and management of air emissions to protect the Dampier Archipelago National Heritage Place.

Woodside executive vice president and chief operating officer Australia Liz Westcott said, "This final approval provides certainty for the ongoing operation of the North West Shelf Project, so it can continue to provide reliable energy supplies as it has for more than 40 years.

"Over this time, the North West Shelf Project has paid more than A$40 billion in royalties and excise, supported thousands of Australian jobs and contributed well over A$300 million to communities in the Pilbara through social investment initiatives and infrastructure support."

North West Shelf gas plant *(Image: Woodside)*

But environmental conservation groups are say the conditions cannot curb the climate damage that will flow from the massive fossil fuel project's extension.

"The conditions can't alter the fact the Albanese government is responsible for granting one of the world's largest gas approvals while the planet is engulfed in a climate crisis," Australian Conservation Foundation climate program manager Gavan McFadzean said.

"The Albanese government's progress on renewables at home is wiped out by its continued support to expand Australia's gas exports. No matter where Australian gas is burned, it puts people and nature in harm's way by fuelling more extreme weather.

"The safeguard mechanism already requires major emitters to be net zero by 2050. This is not a new condition."

Research released by ACF in 2024 shows lifetime emissions from the North West Shelf project would be more than 13 times Australia's annual emissions from all sources.

"It beggars belief that the Albanese government would choose to detonate this carbon bomb," McFadzean said.

"With this decision, Prime Minister Albanese has betrayed Australians who voted for him, believing he was serious about acting on climate change."

Ross Rutherford

ESR Newsletter Editor

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