GWEC
GLOBAL WIND ENERGY COUNCIL

ACCELERATING RENEWABLES TO ACHIEVE ENERGY SECURITY, AFFORDABILITY AND CLIMATE ACTION

Urgent recommendations for policymakers

July 2022

GWEC is a member-based organisation that represents the entire wind energy sector. The members of GWEC represent over 1,500 companies, organisations and institutions in more than 80 countries, including manufacturers, developers, component suppliers, research institutes, national wind and renewables associations, electricity providers, finance and insurance companies.

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Context

The world is facing unprecedented challenges to energy security, rising inflation and a narrowing time window to achieve climate goals and limit dangerous global heating. The global crisis has worsened in the last 12 months to constitute a true emergency, as consumers and industry face rocketing electricity and energy bills and policymakers initiate emergency response packages.

Since the Russian invasion of Ukraine in February 2022, oil and gas supply shocks have caused wholesale gas prices to soar to six times higher than a year ago and crude oil spot prices to spike by 66% ; fuel prices which are already at historic highs are forecast to continue climbing (see Annex: Crude oil prices versus natural gas spot prices from 2019 to 2022).[1] Due to gas price increases, households in Europe paid nearly two-thirds more for electricity in March 2022 compared to December 2021, and they will face still higher bills once annual retail contracts run up.[2]

The resulting inflation has reverberated throughout economies, and pushed inflation to its highest level in decades across the world (see Annex: Global commodity price changes from January 2020 to March 2022).[3]

The current global energy crisis has revealed the continued dangers of depending on fossil fuels. The crisis is a result of a delayed and disorderly energy transition. The only permanent fix for the three related problems of security, affordability and climate change is a determined and accelerated effort to move away from fossil fuels to renewables and related enabling technologies.

Wind energy is one of the most competitive and quickly deployable technologies we have today, and has a central role in improving global energy security. But for wind to thrive, it needs large volumes for deployment and a robust global supply chain – without these, any prospect of meeting net zero scenarios in this decade is beyond reach.

Some governments have already begun to enact change to increase volumes of renewable installations, as reflected in the REPowerEU framework to rapidly permit renewable projects, the pledges at the Leaders' Summit on offshore wind in the North Sea and Vietnam's preliminary target of 7-8 GW of offshore wind by 2030.

Despite these promising developments, the effects of the current energy crisis will be with us for several years at least, while the effects of the climate crisis will remain much longer.

However, we can take decisive actions within the next 12 months that will improve the situation in the short to mid-term, while avoiding decisions which lock in fossil fuel dependency and risk worse crises in the future. There are five key steps to this plan:

1 https://www.ft.com/content/a2eea1a1-f72a-43c4-aa93-4e5477b5ead4; https://www.reuters.com/business/energy/sinopec-q1-net-income-jumps-25-high-oil-prices-2022-04-27/; https://www.forbes.com/sites/jonathanponciano/2022/03/08/gas-prices-surge-to-record-high-ahead-of-russian-oil-ban-americans-will-feel-the-pain-for-a-while/
2 https://www.reuters.com/business/energy/german-gas-power-prices-households-new-highs-2022-03-16/
3 https://openknowledge.worldbank.org/bitstream/handle/10986/37223/CMO-April-2022.pdf

1 Urgently streamline permitting to produce a huge increase in wind capacity in the next 1-3 years and build a net zero-compatible project pipeline.

This can be achieved while supporting harmonious co-existence of the renewables industry with other land and ocean users and balancing the interests of many stakeholders. This is a clear "win-win" to lower energy prices, stimulate billions in investment, increase energy security and independence, foster job creation and make progress on climate goals.

2 Implement a grid access action plan to get large volumes of renewable energy connected.

Parallel to scaling up wind and solar deployment, governments must urgently outline grid buildout plans which address grid connection, priority dispatch, incentives for public/private investment and immediately scale up infrastructure which can store, manage and deliver renewable energy.

3 Introduce simplified mechanisms for clean power procurement and pricing to rapidly unlock investment.

Governments need to take concrete measures now to align market forces with the policy objectives of the energy transition and accelerate the build-out of renewables projects and power infrastructure.

4 Avoid locking in large-scale fossil fuel-based generation.

It is vitally important that measures designed to respond to the current crisis in the short term do not lock in long-term fossil fuel subsidies and generation. This would only create stranded investments and assets which are incompatible with long-term energy security, affordability and climate goals.

5 Commit to firm energy transition plans and milestones to allow the renewables industry to plan for healthy supply chain development.

Including proactive management of key commodities and materials and minimal trade barriers for green technologies.

Further measures such as energy efficiency are also critical to responding to the current energy security crisis, as acknowledged in this wind industry response to the IEA's 10-Point Plan to Reduce the European Union's Reliance on Russian Natural Gas.

A Global Energy Crisis

The Russian invasion of Ukraine has exposed the starkest challenges of energy security and fossil fuel dependence. But the energy crisis is global, and the past year has seen the biggest disruption in the global energy market in modern times. We are witnessing policy and market misalignments in terms of achieving the energy transition, resolving the energy trilemma and delivering a green recovery in the wake of the COVID-19 pandemic.

Fossil fuel price volatility already caused turmoil through last year. Coal shortages in China sparked widespread power outages and industrial shutdowns, while India experienced rolling outages due to low coal stockpiles and high coal prices.[4] These events were exacerbated by the intensifying impacts of climate change, including drought and recent heatwaves, as well as post-COVID industrial recovery that has sparked higher energy demand.

At the same time, 2021 saw the highest level of global carbon emissions in history, putting our Paris Agreement goals at risk.[5] The IPCC's latest report has made it clear that global greenhouse gas emissions must peak by 2025 and halve by 2030 to limit global warming to 1.5°C.[6]

But renewables buildout is nowhere near sufficient. Wind energy is growing in stop-start cycles in developing economies like South Africa and Mexico as well as mature markets in the West. New wind and solar projects are

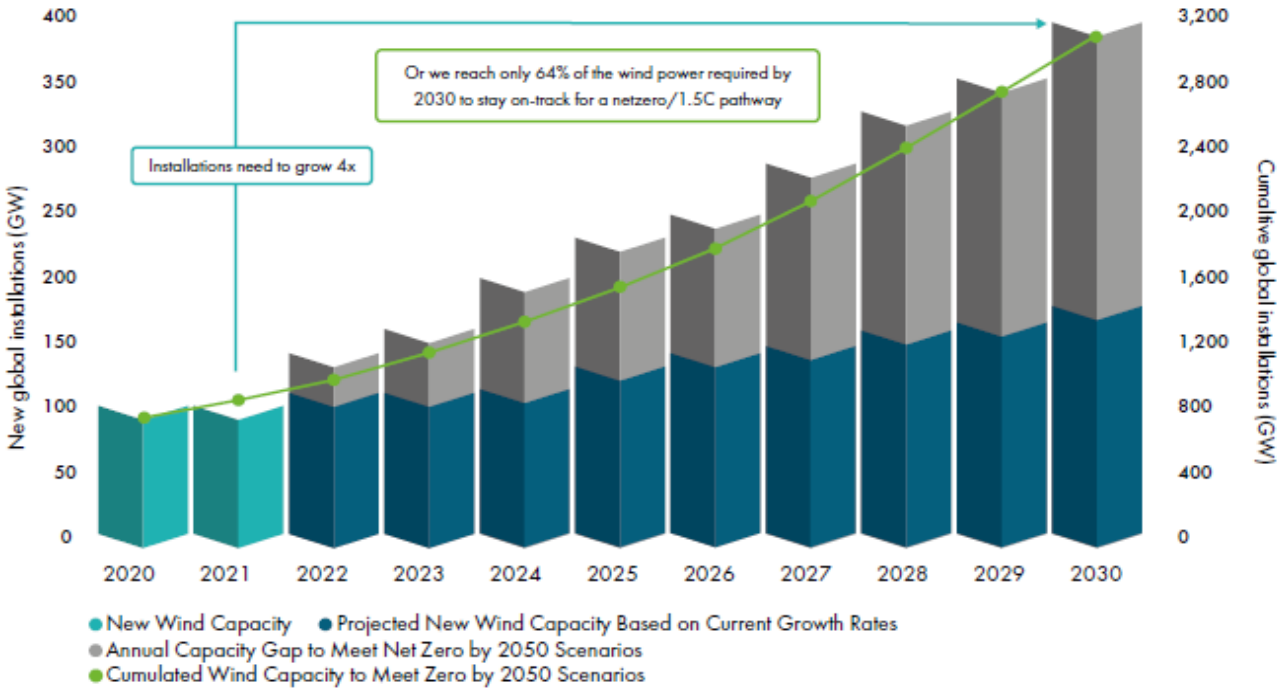
4 https://www.reuters.com/world/china/china-energy-crunch-triggers-alarm-pleas-more-coal-2021-09-28/; https://www.bloomberg.com/news/articles/2021-10-04/energy-crisis-deepens-in-india-as-power-plants-brace-for-outages
5 https://www.iea.org/news/global-co2-emissions-rebounded-to-their-highest-level-in-history-in-2021
6 https://www.ipcc.ch/report/ar6/wg3/resources/press/press-release/

denied access to grid, land or markets due to a lack of political will, overly lengthy permitting schemes or priority for incumbent fossil fuels.

In 2021, onshore wind projects bid into auctions at levels 19% below global average LCOE (Levelised Cost of Electricity), undercutting even the cheapest new fossil fuel generation.[7] Yet as price pressure with regards to raw materials and transport continues to increase, projects bids on scarce auction volumes keep declining, sometimes even entering negative price territory.

As a result of inadequate investment signals and restrictions on permitting, **global annual wind energy installations are only one-quarter of the level needed for a net zero trajectory**.[8]

Lagging growth in this decade leads to large wind energy shortfalls by 2030



Source: GWEC Market Intelligence; IEA Net Zero by 2050 Roadmap (2021). Projected new wind capacity from 2026-2030 assumes a ~6.6-7.0% CAGR, based on GWEC's projected CAGR from 2021-2026. It also accounts for ~34 GW in global decommissioned capacity from 2026-2030 based on 25-year turbine lifetime. Capacity gap figures are estimations based on the IEA Roadmap milestone for 2030. Cumulative global installations for wind energy are roughly in alignment with the IRENA World Energy Transitions Outlook: 1.5°C Pathway (2021). This data represents new capacity, cumulative capacity and decommissioned capacity, and does not include an estimate of repowering installations to replace the ~34 GW in decommissioned turbines globally.

7 https://www.irena.org/Statistics/View-Data-by-Topic/Costs/Global-LCOE-and-Auction-values

8 Wind energy installations are currently growing around 100 GW/year, but need to reach 390 GW of new wind capacity annually by 2030 in the IEA Net Zero by 2050 Roadmap. This roadmap sets out a global electricity generation mix of wind (35%), solar (33%), hydropower (12%), nuclear (8%), bioenergy (5%), hydrogen-based (2%) and fossil fuels with carbon capture utilisation and storage (2%). The IRENA World Energy Transitions Outlook: 1.5°C Pathway report sets out a similar global electricity mix of two-thirds wind and solar (comprising 8,174 GW of wind and 14,878 GW of solar by 2050, with wind generating a slightly higher overall share of global electricity).

No Regret Solutions For The Crisis

GWEC and its partners outline five key solutions below, which form both short-term responses (next 1-3 years) to contribute to easing the energy supply crisis, as well as long-term responses (to 2030) to scale up renewable energy worldwide. We have designed these solutions to be universal and flexible. This work has been informed by international experience, research and expert consultations with energy authorities, think tanks, consultancies and industry in 2022.

We note that further solutions, such as energy efficiency measures (e.g. building insulation, efficient heat pumps, behaviour change), widescale electrification and carbon pricing mechanisms, will also be critical to an accelerated transition and recovery from the current energy crisis.

1 Urgently streamline permitting to produce a huge increase in onshore and offshore wind capacity in the next 1-3 years and build a net zero-compatible project pipeline

Massively scaling up utility-scale wind and solar energy is a clear "win-win" in terms of lowering energy prices, stimulating investment, economic growth and job creation and achieving climate targets while supporting energy security. It draws on limitless and indigenous energy resources, enabling countries to reduce dependency on imported fossil fuels and restore a healthier balance of trade. And it can be achieved while supporting harmonious co-existence of land and ocean users.

While it is too late for wind and solar to address the coming winter spike in prices, large-scale renewables projects can be constructed very quickly once permitted – typically 1 year or less for onshore wind and solar and 2 years for offshore wind, depending on project size.

Studies estimate there is a global pipeline of nearly 600 GW of wind projects in development, of which many could be quickly constructed within the next 3 years under fast-track approval measures.[9] If barriers in permitting, grid access and supply chain scale-up are resolved, these projects could materialise from end of 2023-2025 (see Annex: Average number of years for offshore wind lease award to full commissioning of projects).

A majority of these identified "shovel-ready" wind projects are concentrated in the US, China, India, Australia, Brazil and the UK, where pipelines range from 25-100 GW of capacity. Further national pipelines of >10 GW of wind projects are identified within the EU27, while other countries with at least >5 GW in development include Mexico, Canada, South Korea, Japan, Turkey and South Africa.

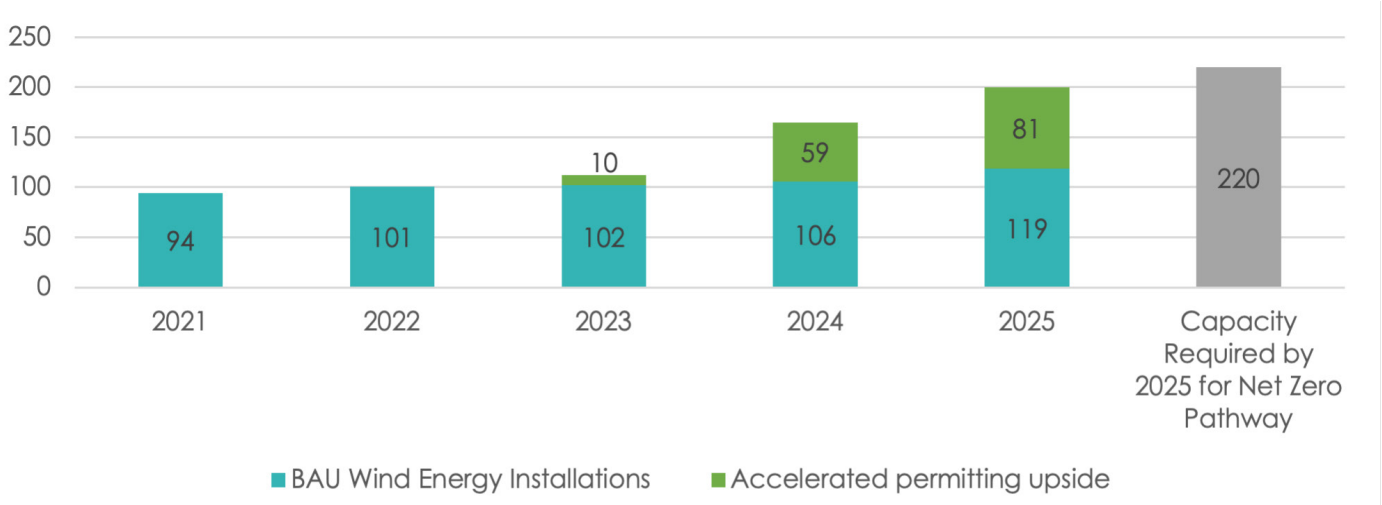
9 A clean COVID-19 recovery: The global opportunity 13,000 renewable energy projects for a green recovery. Prepared by EY-Parthenon, funded by the European Climate Foundation; GWEC Market Intelligence.

To put this into perspective, just 5 GW of onshore wind development generates roughly:[10]

- US$14 billion investment (US$35 billion for offshore wind projects)
- 130,000 jobs during the development, construction and installation phase of projects, and then a further 12,000 local jobs per year during the 25-year project lifetime
- Enough renewable electricity to power 4.9 million homes with clean energy per year
- Savings of 28.8 million litres of water annually, otherwise used for thermal

Capturing just one-quarter of these identified "shovel-ready" project opportunities across the EU27, G7 and G20 could realise annual wind energy installations of 200 GW by 2025 – double what we are installing today, and far closer to where we need to be for a net zero-compatible pathway.[11]

Global annual wind installations in Business-As-Usual vs Accelerated Scenarios, GW



The COVID-19 experience has shown that robust physical and digital infrastructure can be assembled in a crisis to reorganise supply chains in line with national interests. The same urgency needs to apply to the energy sector, with priority to building renewable projects and enabling infrastructure.

10 Capturing green recovery opportunities from wind power in developing economies, GWEC, February 2022.
11 The IEA's Net Zero by 2050 Roadmap (2021) targets 390 GW of wind installations by 2030 for a 1.5°C and net zero-compliant pathway. Given the 104 GW installed in 2020, an incremental ramp-up sees around ~220 GW of wind installed in 2025 to reach the net zero scenario. GWEC Market Intelligence forecasts 120 GW installed in 2025 in a BAU scenario.

GWEC recommends the following measures to streamline permitting for wind energy projects:

I. Assess "shovel-ready" onshore and offshore wind projects within national jurisdictions, identifying those which can be green-lit for construction within the next 1-3 years.

II. Mandate maximum lead times to permit wind plants. Standard recommended lead times are 2 years for greenfield onshore wind projects, 3 years for offshore wind projects and 1 year for repowering projects – these could be halved in light of the current energy supply crisis.

III. Dedicate centralised authorities and single focal points to work with renewable developers to streamline the siting and permitting process, such as through a "one-stop shop" model.

IV. Invest in more staff and digital resources for the various authorities which make decisions during the permitting process of a renewable energy and infrastructure project.

V. Build digitised, searchable and up-to-date databases for land registrations and siting of renewable energy projects, including an inventory of local ordinances and records of where energy projects have met community resistance, which can support zoning for projects.

VI. Align land and ocean use guidance at national and sub-national level, prioritising projects which support energy security, "Do No Significant Harm" principles, minimal impact to biodiversity and the green economy. This should also include designation of promotional "go-to" zones for new renewable energy projects to spur future development, and a review of minimum distance requirements which are up-to-date with latest technologies.

VII. Promote active dialogues between local authorities, communities and industry to ensure a shared understanding of priorities and concerns during the consenting and construction stages of wind projects. This is important to ensure a balance of interests across stakeholders and harmonious co-existence of the renewables industry with other land/ocean users.

VIII. Policymakers can consider attaching community benefit schemes to renewables projects to improve public support.

IX. Implement an emergency clearing house mechanism for legal disputes to prevent extended delays to critical infrastructure projects, and a structured and time-limited process for developers to provide evidence.

X. Enable repowering via regulatory fast-tracks covering EIA procedures, grid expansion and site license extensions, allowing new turbine technology to expand generation at existing sites.

2 Implement a grid access action plan to get large volumes of renewable energy connected

Less than 30% of public and private energy investment today targets storage and grid management solutions, and this needs to step up.[12] In many countries renewables projects face delays in connecting to the grid, and thermal plants retain priority grid dispatch. Without increasing grid, storage and flexibility services buildout, ramping up utility-scale renewables and electrification could drive up the costs of system balancing and redispatch. This could lead to curtailment issues and increased transmission and distribution levies for end-users.

Long-term anticipatory investments in grid, storage and flexibility services will result in huge competitive advantage and public savings. For example, the IEA shows that capital investment for clean energy technologies (wind, solar, batteries and electrolysers) in India to 2040, in line with a net zero pathway, would require US$1.4 trillion in additional funding compared to a business-as-usual scenario – but this amount would be more than recovered by the savings from oil import bills.[13]

We therefore call on governments to urgently:

In the short term

I. Conduct a review of lead times for grid connection decisions, and establish a mandated maximum lead time to ensure renewable projects can access timely connection to the grid. This can include a locational approach to siting and leasing allocation of new renewable energy projects, in zones which are under less pressure of grid congestion or constraint.
II. Establish a merit order for generation while assigning priority dispatch to renewables projects (if not already granted in liberalised markets with marginal cost-based dispatch). Increase the flexibility requirements for remaining fossil generation.

12 https://www.strategy-business.com/article/A-rising-tide-of-green-capital
13 https://www.iea.org/reports/india-energy-outlook-2021

III. Establish adequately resourced energy transition infrastructure commissions with strong mandates and powers. Such commissions can work closely with system operators and distribution authorities to harmonise grid planning needs and foster grid/cyber security.

In the mid term

IV. Ensure that investable frameworks for grid and flexibility services on supply and demand side are in place to allow adequate capital investment from the private sector, multilateral agencies and public bodies. Remove bottlenecks for public financing of grids in countries where this applies, e.g. allow for earlier orders of equipment by grid operators.
V. Align decision-making across sectors with indicative planning for grids, renewables and industry. Special public-private taskforces or working groups should combine representatives of different sectors and constituency groups, including industry, to ensure harmonisation of emissions thresholds and targets for energy demand and supply.
VI. Increase multilateral collaboration for equitable cross-border power trading, while ensuring diversity of supply and appropriate levels of spare capacity.

3 Introduce a simplified mechanism for clean power pricing to rapidly unlock investment

The energy sector is highly politicised with net zero ambitions and capacity targets, and there is a great deal of global capital waiting to flow into onshore and offshore wind projects. But energy policy and energy markets are not coherent – electricity markets struggle to send meaningful and timely investment signals to enact the transition.[14]

If fossil fuel prices fall back to pre-crisis levels in the next few years, renewable generators will again be subject to the cannibalisation effect, with near-zero marginal costs of an increasing number of wind and solar plants pushing clearing prices downward during periods of high generation.

Some markets are in a healthier state than others. But in many places, wholesale market design and the cannibalisation effect are leading to insufficient remuneration to generators to provide the massive working capital needed to invest upfront in new high-CAPEX utility-scale wind and solar projects – let alone in further technology innovation and R&D needs. This challenge is further underscored by the prospect of rising inflation and interest rates.

While auctions have grown in popularity, in many countries they work like a faucet running on a stop-start basis, often with restricted volume. Auctions that aim to leverage wholesale markets and achieve "negative bidding" (where the industry pays governments for the right to build a wind farm) have been particularly unhelpful, undermining the viability of renewables to replace fossil fuels.

The organisational structure of power markets must evolve to incentivise investment in

14 Wholesale markets based on marginal costs fulfil their design objective by allowing for cost-efficient power dispatch, when thermal plants are flexible enough to react to price signals. But this market design, introduced in many regions in the 1990s during market liberalisation, fails to sufficiently incentivise investment in low-marginal cost renewable generation.

low-marginal cost, high-CAPEX renewable generation and power infrastructure, as well as the optimal operation of these assets. But we recognise that such reforms are complex and time-consuming, and governments need to take concrete measures now to ensure green electrons are available.

In the short term

I. Launch an emergency national RFP/Open Call for renewable energy project development proposals, with long-term offtake contracts. A simple and transparent price mechanism should reasonably balance between cost-efficient power supply, revenue stabilisation, risk-sharing between offtakers and generators and healthy supply chain development. It should be based on required levels of CAPEX investment, social and environmental value and viable rates of return. It is important for CAPEX calculations to be indexed to prices for key commodities required for the wind and solar supply chain, revised on a regular basis.
II. Move away from restricted and stop-start procurement schemes, and implement mechanisms for continuous procurement based on rolling supply of contracts with government and stable annual capacity targets for the next decade, which can spur large-scale project development and a business case for supply chain investment.[15]

In the mid term

III. Governments should consider the shift in power procurement targets from a "lowest cost" basis to a "highest value for money" approach, given price uncertainty has a far-reaching impact on inflation and economic planning. There is a false narrative of continually falling costs in utility-scale wind and solar energy. While these technologies will continue to out-compete fossil fuels in wholesale markets, supply-side pressures and commodity/freight difficulties are fundamental business challenges and current design of liberalised power markets undermines the revenue case for renewables.
III. Adapt energy markets for high shares of renewable energy, new forms of flexibility and demand (such as green hydrogen and storage) and a broader reflection of socioeconomic and system value of power generation.[16] GWEC and its partners are supportive of a mid-term initiative to map out power market evolution for the energy transition with cross-sectoral industry input, including recommendations for different regions and countries, building on the existing body of work on this topic.

15 Such recommendations have been made by leading bodies like IRENA already, such as in a "dual market" approach that would see annual auctions for long-term contracts driving the energy market and addressing the requirements of CAPEX-intensive technologies, while a parallel delivery market procures and affordably dispatches the flexible resources for a power system. See: https://www.irena.org/publications/2020/Jan/IRENA-Power-system-structures; https://www.energy.nsw.gov.au/sites/default/files/2021-08/long-term-energy-services-agreement-design-consultation-paper-210316.pdf.

16 It is critical to ensure electricity market design supports large-scale renewables deployment, increased flexibility and storage. Otherwise, the IEA's Net Zero by 2050 Roadmap finds that by 2050, around 7% of wind and solar output would need to be curtailed, while major markets would see share of "zero-price" hours in the year rising from near-zero to 30%.

4 Avoid locking in large-scale fossil fuel-based generation for decades to come

Governments will need to take immediate measures to diversify fossil-based energy supply where they can. However, policymakers must be clear-eyed: Many solutions being proposed as urgent fixes will in fact take several years to implement (e.g. siting and construction of new LNG storage terminals, large-scale fracking, secondary oil and gas production in depleted provinces).[17] As much as possible, the speed and efficiency of constructing new grid-scale wind energy projects must be recognised, and prioritised for investment over further fossil fuel infrastructure.

Offering affordability, scalability, clean power and strong capacity factors, wind energy is already set to displace fossil fuel generation in economies worldwide, albeit not at a pace which is compatible with net zero (see Annex: Wind energy is set to displace gas in advanced and developing economies). This trend should be accelerated and not weakened in light of the current crisis.

We therefore call on governments to urgently implement the following measures:

I. Take emergency measures to increase energy efficiency and reduce demand for fossil fuels, particularly in hard to abate sectors such as gas-based heating.
II. Take measures to stabilise supply and diversify fossil fuel supply to increase energy security, especially in Europe where an exit from Russian fossil fuels must be achieved.
III. Recognise the full lifecycle of greenhouse gas emissions, including CO_2 and methane, of fossil fuel generation like coal, oil and gas, and the costs of these externalities to health and the environment. Ensure fossil fuels are taxed through carbon pricing mechanisms.

17 As the World Bank notes on the current energy crisis, "well-intentioned energy subsidies could delay the transition to a zero-carbon economy." See: https://openknowledge.worldbank.org/bitstream/handle/10986/37223/CMO-April-2022.pdf.

IV. Earmark the proceeds of carbon pricing mechanisms for investment in grid, storage and flexibility services to provide a strong foundation for a renewables-based system.
V. Ensure that new direct and indirect subsidies are not introduced for fossil fuel production and generation. Such a measure could be adopted among the G7/G20 or intergovernmental bodies like IRENA and the IEA, where member countries can agree to reduce demand and new investment in fossil fuels, as happened after the oil price shock of 1979.
VI. Ensure that investments are not directed to fossil fuel infrastructure which will make little difference to the current energy crisis. This includes refining green taxonomy frameworks for sustainable finance and ensuring that investment signals in the current crisis are not directed towards new fossil fuels and new nuclear projects which prolong the transition, further expose countries to fuel and price volatility and result in stranded assets.

5 Commit to firm energy transition plans and milestones to allow the renewables industry to plan for healthy supply chain development

The past year has shown the exposure and vulnerability of key renewables industries to geopolitical dependencies, commodity price cycles, logistics bottlenecks and trade barriers. The sudden post-lockdown recovery of industrial production last year led to fierce competition among different industries for raw materials, as well as ongoing bottlenecks in manufacturing capacity and transport logistics such as shipping (see Annex: Global metals price changes from 2019 to 2022).

This has had a significant impact on the wind industry as procurement and freight for raw materials and commodities of wind turbines, including steel, concrete, copper, nickel and a small but high-value volume of rare earth elements (REE) make up the lion's share of wind project CAPEX.

There has been a clear misalignment between energy, industrial, trade and financial policies. It must be understood that without well-functioning and competitive industrial supply chains and access to raw materials and components, there is no energy transition.

We therefore call on governments to urgently implement the following measures:

I. Cooperate via international forums, such as IRENA, IEA and WEF, as well as financial institutions to create a global index of key commodities for the renewable energy transition.
II. Create a new multi-stakeholder global body or special commission for coordinating stockpiles and sufficient production and supply of key energy transition commodities in the short, mid and long term, and for establishing green technology corridors. This body or commission could also work with institutions like the ILO to provide international guidelines for mining and manufacturing of key commodities and critical minerals, and support countries with mining and processing activities in sector decarbonisation.
III. On a regional or national level, conduct an industrial supply chain review with wind industry developers and manufacturers to identify critical supply chain gaps that will require strategic investment to ensure stable GW-scale growth in the future.
IV. Diversify sources of mining and processing of critical minerals and commodities, and promote recycling of raw materials through a circular economy approach.
V. Provide room for interventions or exceptions when necessary to prevent supply shortages and subsequent price spikes of key transition commodities. This could include deepening international negotiations on transition-centric trade agreements like the Environmental Goods Agreement under the World Trade Organization.[18]
VI. Create priority systems to ensure vital commodities are available for the energy transition, utilising import/consumption taxes and other appropriate financial and trade instruments.
VII. Invest in advanced monitoring and management systems for international logistics, so blockages can be identified and key supply chains can reorient before shortages occur.

18 https://www.wto.org/english/tratop_e/envir_e/ega_e.htm

The Way Forward

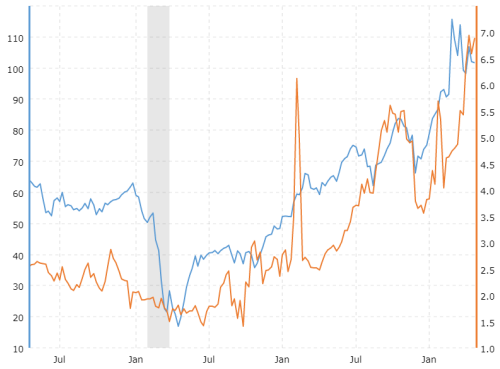
Policymakers must show leadership by recognising the energy transition as a national priority for security, economic growth, economic productivity and social harmony. This requires alignment across the public sector, including heads of state, treasuries and ministries of finance, trade, energy, environment and planning. With improved coordination, policymakers can generate coherent transition action plans and foster wide non-partisan support and participation among citizens.

A renewables-led response to the current crisis can contribute to restoring order in the short term, injecting huge volumes of new wind and solar capacity and investment to economies by 2025. These five solutions to streamline permitting, enable grid access, stabilise pricing, avoid fossil fuel lock-in and manage supply chains can usher in a system transformation which benefits the whole of society.

Annex

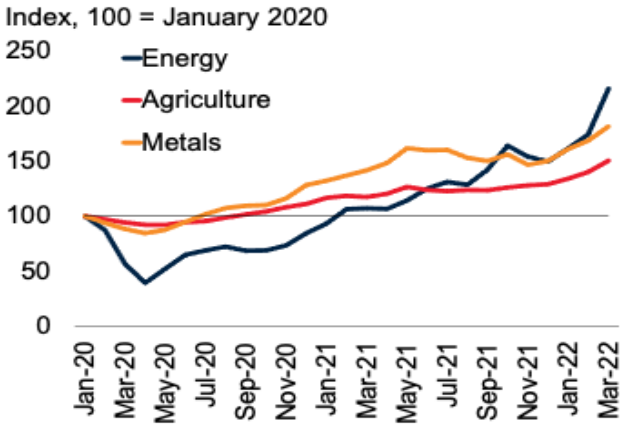
Crude oil prices versus natural gas spot prices from 2019 to 2022

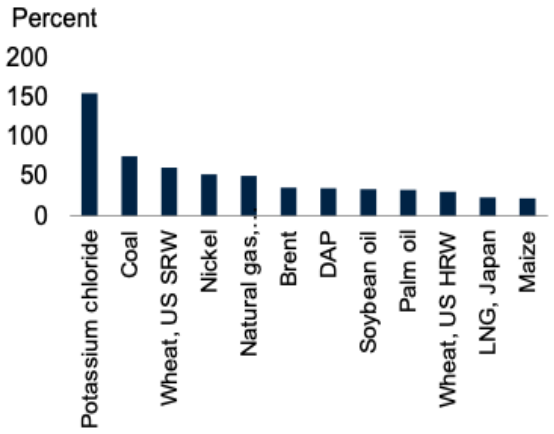
Oil = blue; Natural gas = Orange



Source: Macrotrends.net.
Note: This chart compares the price performance of West Texas Intermediate (WTI) or Nymex Crude Oil vs the Henry Hub Natural Gas spot price.

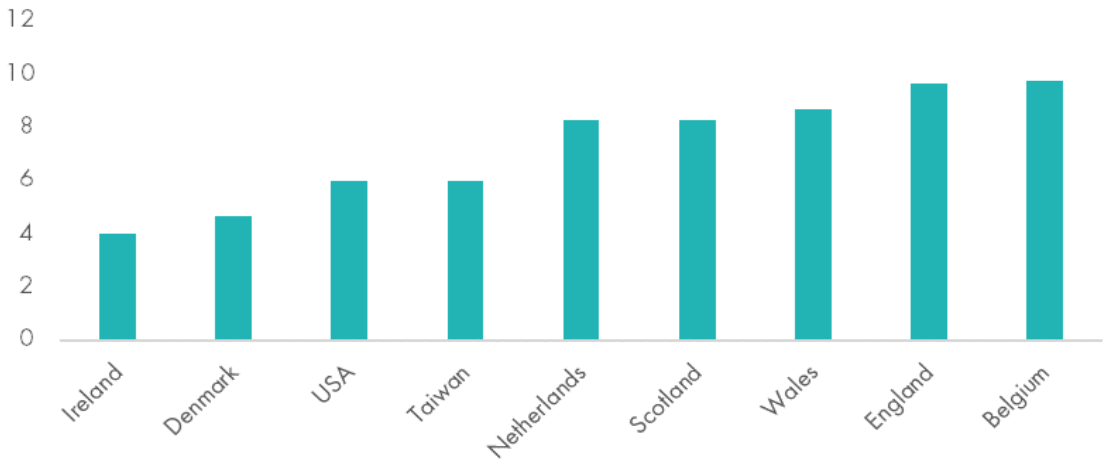
Global commodity price changes from January 2020 to March 2022





Source: Commodity Markets Outlook, World Bank, 2022.

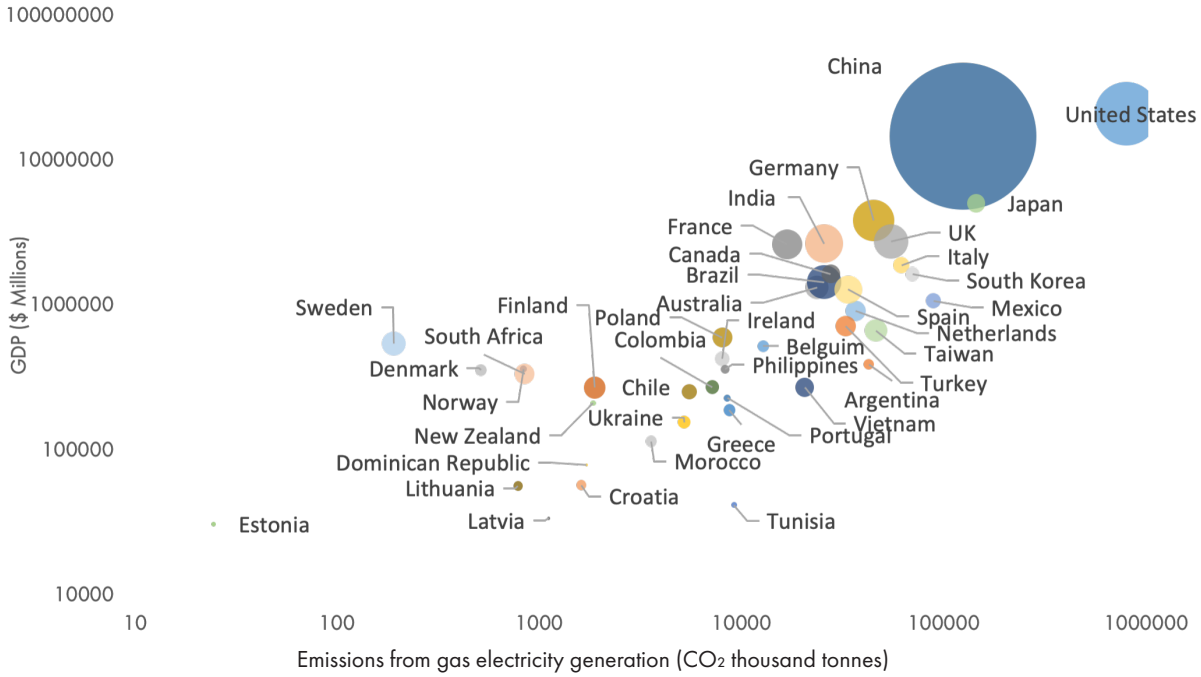
Average number of years for offshore wind lease award to full commissioning of projects



Source: GWEC Market Intelligence; RenewableUK EnergyPulse

Wind energy is set to displace gas in advanced and developing economies

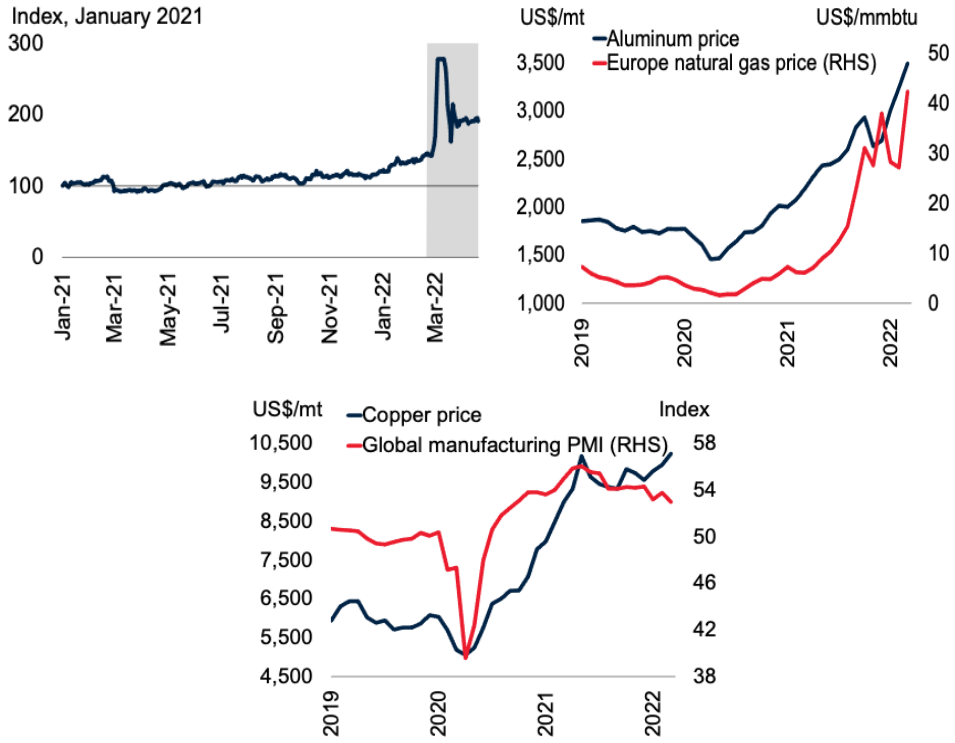
Bubble size represents the volume of new wind capacity forecast in a BAU scenario from 2022-2026



Source: GWEC Market Intelligence; RenewableUK EnergyPulse

Global metals price changes from 2019 to 2022

First graph represents nickel prices.



Source: Commodity Markets Outlook, World Bank, 2022.

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