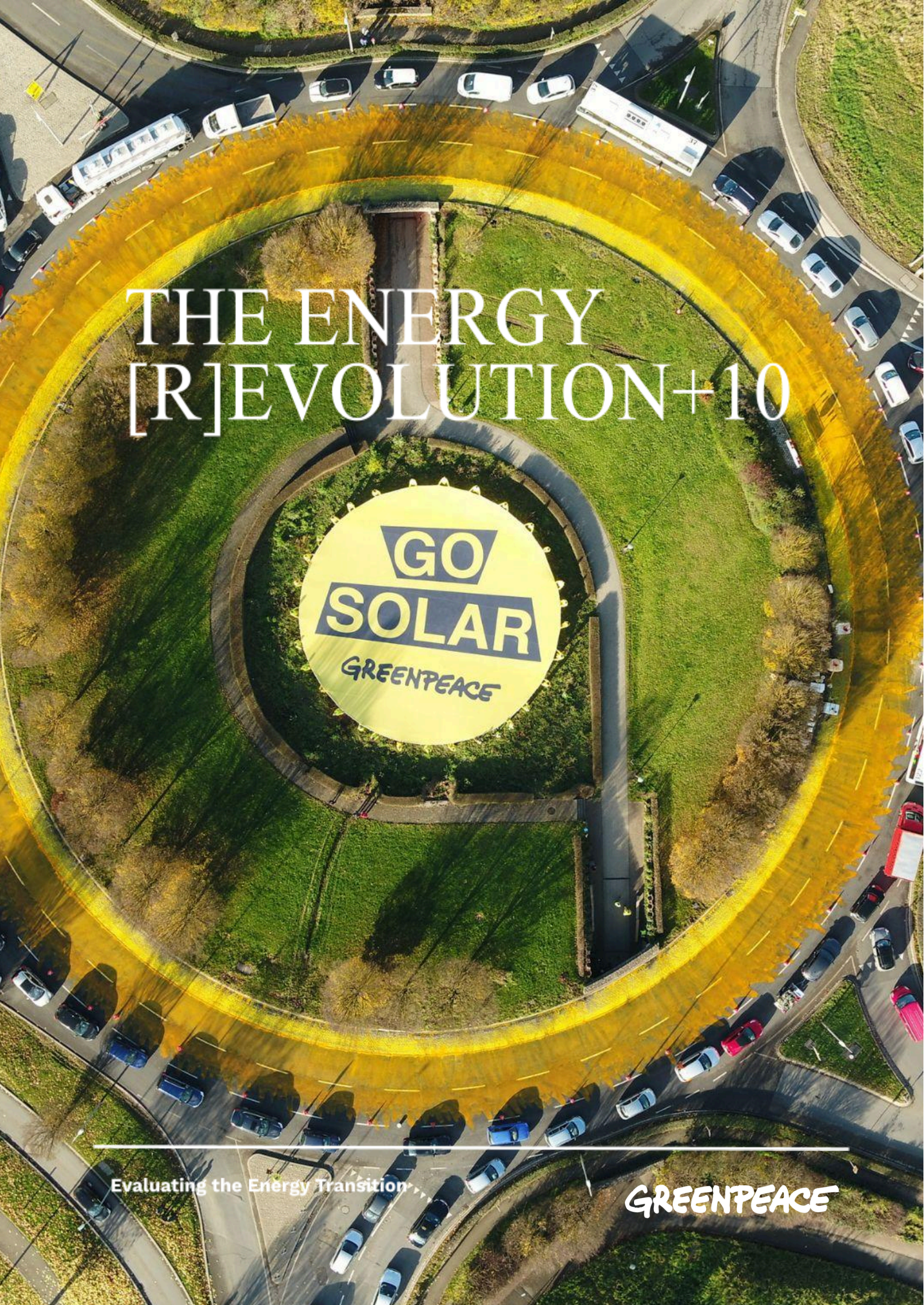
THE ENERGY [R]EVOLUTION+10



Evaluating the Energy Transition

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The Energy [R]evolution+10

Evaluating the Energy Transition 10 Years After the Paris Agreement

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Solar Action in Luxembourg.
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EVALUATING THE ENERGY TRANSITION

THE NEW REALITY 10 YEARS AFTER THE PARIS AGREEMENT

How bold visions, an oil and gas supply crisis and renewable energy policies can and are already transforming our world.

Introduction

Among the many impacts of the US-Israel war on Iran, the death toll and destruction of civilian infrastructure from the wider conflict has been devastating, both in Iran and Lebanon[1], alongside the casualties and damages from attacks by Iran across the region, including in Iraq and Israel.[2]

The conflict has also triggered political turmoil and a global energy supply crisis that has led to soaring cost-of-living pressures, looming economic headwinds[3] and - inadvertently - it is also "supercharging" the world's shift to renewable energy.[4] The crisis has led to surging rooftop solar and electric vehicle sales, alongside positive signals of government policy shifts.[5]

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[1] UN Office for the Coordination of Humanitarian Affairs (2025): Islamic Republic of Iran: Humanitarian Update No. 04 and the Office of the United Nations High Commissioner for Human Rights (2025): UN Deaths and Displacement in Lebanon - Update on the Human Rights Situation in Lebanon.

[2] Reuters (2025): How many people have been killed in the Iran war?

[3] IMF (2025): War Darkens Global Economic Outlook and Reshapes Policy Priorities

[4] Reuters (2025): Iran war is supercharging the clean energy transition, UN climate chief says

[5] Carbon Brief (2025): Iran war analysis: How 60 nations have responded to the global energy crisis

It's a global disruption that offers a seismic opportunity to free ourselves of fossil fuel dependency and propel ourselves into a new era of clean, secure and reliable renewable energy that not only will save households money, and strengthen energy security and sovereignty, but help deliver the safest climate possible.

And while we need disruptive action, it also needs to be planned with a long-term perspective and grounded by equity and fairness - the type of transition governments signed up to when they adopted the Paris Agreement in 2015.

Efforts to limit global warming to 1.5°C since then have lagged, however, and the climate kept heating: the years 2015-2025 have been the hottest 11 years on record and our climate is more out of balance than at any time in observed history.[6]

In the anniversary year of the Paris Agreement, at the UN climate talks COP30 in Brazil in 2025, a Greenpeace analysis showed the 2035 climate action plans (NDCs) from the world's biggest polluters - the G20 group of nations responsible for 80 % of global emissions - were failing to take the required leadership to bridge the 1.5°C ambition gap.[7]

This lack of government action - especially from developed countries with the responsibility to lead the transition - is, strangely, at odds with the observed pace of change in the renewables sector. In fact, the speed of the clean energy transition since the Paris Agreement was adopted has accelerated beyond even Greenpeace's lofty vision from 10 years ago, bringing hope that a world of clean and stable energy is much closer than we might otherwise think.

But managing the global phase out of fossil fuels - in a way that no country and community are left at a disadvantage, and the benefits of the new, stronger energy system are shared by all - will require international cooperation and action, accountability and a shared vision.

The clean energy vision of then and the exciting reality of now

Ahead of the 2015 Paris Agreement, Greenpeace pushed the boundaries with its Energy [R]evolution scenario[8], a transformative, nuclear-free blueprint for a 100 % renewable future leading to net zero greenhouse gas emissions by 2050. At the time, it was far more ambitious than the International Energy Agency's projections and was dismissed by many as unrealistic and fanciful. However,

[6] WMO (2025): State of the Global Climate report 2025

[7] Greenpeace International: The 2035 Climate Ambition Gap

[8] Greenpeace International: Energy [R]evolution - A Sustainable World Energy Outlook 2015

today, we can see that the E[R] scenarios were not far off the mark.

Ten years on the energy landscape has changed tremendously and the most visible success of the last decade lies in the sheer velocity of the renewable rollout:

- **Solar Power:**[9] Generation has increased 11-fold since 2015. It is now the fastest-growing electricity source in human history.
- **Wind Power:**[10] Global generation has tripled since 2015, and together with solar, now provides 15% of the world's electricity.
- **Battery Storage:**[11] Prices have plummeted by over 75 %, mimicking the exponential growth of photovoltaics and finally making wind and sun 'baseload capable'.

For the first time, wind and solar are growing faster than global electricity consumption, actively eating the market share of fossil fuels, mainly due to the significant cost reduction of renewables. Below we provide some examples of where progress is made aligned with our E[R] scenario (and as compared to the IEA's 2014 World Energy Outlook[12] pathway) and where progress is lacking and thus more government action is needed to limit global temperature rise to 1.5°C.

Energy Revolution Banner Action in Australia. © Greenpeace / Robert Shakespeare

[9] Gómez-Expósito (2025): The rooftop PV revolution in iEnergy doi: https://doi.org/10.23919/IEN.2025.0002

[10] Ember (2024): Wind targets are achievable but fall short of a tripling

[11] See BloombergNEF (2025): New Record Lows for Battery Prices and BloombergNEF (2024): Lithium-Ion Battery Pack Prices See Largest Drop Since 2017

[12] IEA (2014): World Energy Outlook 2014

Electrification, expanding solar and wind power and lower costs

Between 2015 and 2025, global solar power capacity increased from 226 GW in 2015[13] to 2,392 GW in 2025[14] and the global solar power boom is accelerating rapidly. Electricity generation through solar power actually exceeded the ambitious projections made in the E[R] scenario and by far exceeded the modest projections made by the IEA.

This shows that technology development is not to be underestimated and where political approval and supportive policy measures are actively enabled (such as national and international fiscal incentives and financial support), sustainable new technologies can flourish.

Table 1: comparison actual solar power generation (in TWh) in 2025 with E(R) and WEO2014 projections

	Actual (IRENA)	**WEO2014**	**E(R)2015**
2025	2,778	670	2,551
Difference to actual		+315%	+9%

Source: Ember/Greenpeace/IEA

In the same timeframe, wind power capacity increased from 416 GW in 2015[15] to 1,291 GW in 2025.[16] Actual wind power generation in 2025 proved to be slightly below the E[R] projections, but were substantially higher than the WEO scenario. Further developments with regard to offshore wind in particular offer hope that in the coming years reality will surpass the E[R] projection.

Table 2: comparison actual wind power generation (in TWh) in 2025 with E(R) and WEO2014 projections

	Actual (IRENA)	**WEO2014**	**E(R)2015**
2025	3,000	1,608	3,848
Difference to actual		+87%	-22%

Source: Ember/Greenpeace/IEA

[13] IRENA (2025): Renewable Energy Statistics 2025
[14] IRENA (2026): Renewable Energy Statistics 2026
[15] IRENA (2025): Renewable Energy Statistics 2025
[16] IRENA (2026): Renewable Energy Statistics 2026

The reason for such successful renewable electricity growth is the significant cost reduction. Cost reductions have happened well beyond projections - reductions that have been largely driven by China. While modern solar photovoltaic and wind power were started by forerunners in Europe, the US and Japan, China has taken over and dominates the global market, both in manufacturing of solar and wind, and domestically utilising those technologies.

Although China's policy choices are said to be helping to reshape global energy choices,[17] the country's energy mix remains fossil fuel-dependent.[18] The current geopolitical crisis further demonstrates the resilience of clean energy solutions, and is placing more pressure on Beijing to make a decision on when to systematically leave coal behind and make renewable energy the backbone of China's energy system.

While China's official 2035 NDC climate target offers little assurance to keep our planet safe, what's hopeful is that the actual decarbonisation of China's economy is likely to exceed its target on paper.[19]

Table 3: actual wind and solar power cost development (in USD/kW) from 2015 to 2024 and comparison to projected cost reduction in the Energy [R]evolution scenario

Total installed cost (2024 USD/kW)	2015	2025	Actual cost reduction	E[R] estimated cost reduction
PV power plant	2,140	615	-71%	-42%
Wind turbine onshore	1,965	913	-53%	-6%
Wind turbine offshore	6,265	2,836	-55%	-27%

Source: IRENA/Greenpeace

The reason for such successful renewable electricity growth is the significant cost reduction. Cost reductions have happened well beyond projections.

The E[R] underestimated the cost reduction potential between 2015 and 2025 for solar and wind. Solar photovoltaic reduced costs per kilowatt by around 70 % while the E[R] projected 42 %. Both onshore wind and offshore wind were able to halve costs while the E[R] projected 6 % and 27 % respectively.

[17] Ember (2025): China Energy Transition Review 2025

[18] Greenpeace East Asia (2025): China can peak coal power generation and power sector emissions in 2025

[19] Greenpeace East Asia (2025): Greenpeace East Asia reaction to China's new climate target

The energy transformation opportunity from the current energy supply shock

While fossil fuel consumption is growing less than anticipated by the IEA in 2014, consumption of gas and oil is still increasing, leading to continued greenhouse gas pollution well beyond the limits set by the Paris Agreement. The failure of governments to reduce global total energy demand means that for most of the past decade, the growth in solar and wind has been used to cover for increased energy demand[20] rather than to replace fossil fuel use.

Now, the war on Iran has sharpened both the urgency and inevitability of a transition to renewables, exposing how an engineered dependence on fossil fuels is a massive geopolitical liability that demands systemic and broad sectoral changes such as a shift to sustainable mobility.[21] This fossil-fuel-dependent system doesn't just enrich a wealthy elite, it leaves ordinary people defenceless against unaffordable costs and sudden price shocks.

But this energy supply crisis brings a once-in-lifetime moment to radically transform our energy, transport, industry and other systems in a way that is fair and just.

Global energy thinktank Ember likens the current crisis to the twin oil price shocks of the 1970s,[22] where an oil embargo and the Iranian Revolution also sent oil prices spiralling. While the 1970s shocks helped stimulate electrification and led to a global peak in final oil demand per capita in 1979, growing global energy demand and an absence of cheap renewable alternatives eventually saw a revival in oil and gas usage in the 1980s.

Fast forward to the 2022 invasion of Ukraine by Russia - the world's largest fossil fuel exporter - and the 2026 war on Iran, and the world is again facing a twin oil and gas shock. While energy-import dependent regions like the EU have finally started to move away from Russian gas imports, it has exposed itself to another form of dependency by committing to buy more LNG from the US.[23]

More recently, the closure of the Strait of Hormuz has forced the EU to hasten a recalibration of its energy policies, but the European Commission's plan is still too late and too light to deal with the scale of the problem[24] - doing too little to

[20] IRENA (2026): Transitioning away from fossil fuels

[21] Greenpeace International (2024): Vision for Sustainable Mobility

[22] Ember (2026): The New Twin Fossil Shock

[23] Greenpeace International (2026): Munich Security Conference: the EU's dependence on US gas is a security threat, Greenpeace warns

[24] Greenpeace European Unit (2026): EU Commission light touch too little to turn energy crisis around

solve Europe's structural dependence on fossil fuels. The simple fact is that more is needed, otherwise the EU will be again left exposed.

Intervention during Conference on Energy Transition in Santa Marta Beach, Colombia. © Sergio Calderón Cortés / Greenpeace

Political change is happening as a fair, fast and funded transition emerges

While the UN climate talks COP30 failed to agree[25] on the need to develop a roadmap to transition away from fossil fuels, more than 80 countries had supported the initiative, and as a way out the Brazilian COP30 Presidency made a commitment to develop a Presidency-led Roadmap instead.

Then, in the COP30 aftermath, 57 countries representing one-third of global GDP met in Santa Marta, Colombia, in April at the First Conference on Transitioning Away from Fossil Fuels.[26] This was a conference that was an important milestone on the road to long-term climate and energy stability as it explicitly focused on the transition needed. Now the work needs to be done.

The geopolitical faultlines are becoming very clear: on one side there are countries like the US that are rusted on to a 'drill, baby, drill' approach and on the other, there are countries ready to plan for and implement a post-fossil-fuel future.

[25] Greenpeace International (2025): Climate, forest protection roadmaps slashed from formal COP30 outcome as people demand change

[26] See the conference website Transitioning Away from Fossil Fuels (2026)

The coalition of countries emerging from the Santa Marta conference must now spearhead ambitious national action at home and help drive momentum and concrete progress in the UNFCCC and beyond. A second conference will be jointly held by Tuvalu and Ireland in April 2027.

> All of these political initiatives are reinforced by the fact renewables are demonstrating what true energy security looks like.

The next Climate Summit (COP31 in Turkiye) must accelerate implementation of the commitment to transition away from fossil fuels, in a just, orderly and equitable way, building on the momentum from COP30, the Santa Marta conference and the Brazil Presidency roadmap initiative.

All of these political initiatives are reinforced by the fact renewables are demonstrating what true energy security looks like. You cannot blockade the sun and you cannot sanction the wind. Countries that have aggressively scaled solar, wind and storage are now insulated from the volatility that plagues those still tethered to imported oil and gas.

The steps required now and tomorrow to achieve the Paris Agreement

If the ambitious vision of the Energy [R]evolution and the staggering acceleration of renewables in the past 10 years is any indication, then the future of our energy transition is bright. But what governments must do now is ensure the policy frameworks are in place to enable a fair, fast and funded transition.

Beyond economics, the shift is about resilience. Decentralised, democratically owned renewable energy systems controlled and owned by the people are harder to sabotage and immune to shipping disruptions, ensuring that even in times of crisis, our homes, schools, and hospitals remain powered and continue to deliver social, economic and environmental benefits for all.

This global realisation is now further driving permanent change. As IEA Chief Fatih Birol noted, the war on Iran has permanently altered the landscape;[27] it is no longer just a transition, but a forced acceleration toward a cleaner, electrified, and more secure future.

[27] The Guardian (2026): 'The damage is done': global oil crisis has changed fossil fuel industry for ever, IEA chief says

While we remain far from the 2050 Net Zero target, certain parts of the Greenpeace E(R) scenario, in particular related to renewable energy developments, have proven to be more than realistic. However, progress on sustainable mobility, reduced energy consumption and energy waste reduction remains dangerously slow. There also needs to be an increase in financial support from wealthy developed countries to developing nations that have done least to cause the climate crisis and continue to face inadequate support for a just transition.

In all cases it is clear that where governments take adequate action and develop the right policies and measures, real and substantial change has taken place, delivering health, economic and security benefits for the many, not the few.

Ultimately, the acceleration of the transition depends on shifting political priorities. That requires the development of national roadmaps for the just transition away from fossil fuels, including ambitious renewable energy targets, and the scaling up of predictable, accessible and affordable climate finance to support developing countries in delivering a just transition.[28]

The nations currently leading this transformation and securing the rewards of a clean energy future demonstrate that rapid change is a deliberate result of active political choices and strong policy frameworks.

- **The Greenpeace International** Just Transition Policy Briefing

Windfarm in Yeongyang-gun, South Korea. © Greenpeace

[28] Greenpeace International (2026): A Just Transition Away from Fossil Fuels - Policy Briefing