SUMMARY OF

Statkraft's Low Emissions Scenario 2023

Statkraft's Low Emissions Scenario is an optimistic but realistic assessment of global energy trends up to 2050. The scenario analysis is developed by analysts leveraging the knowledge of more than 50 internal experts and their work to model power markets in detail across 21 countries.

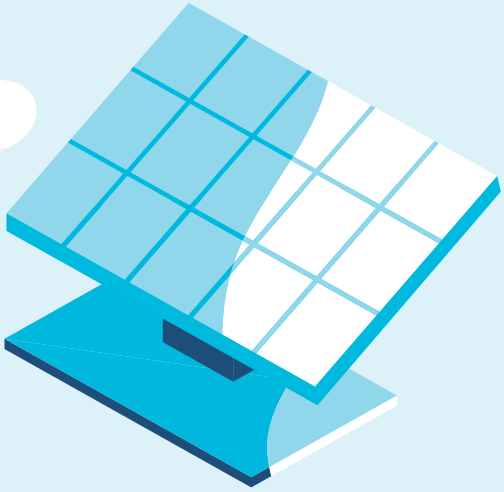
In response to growing global uncertainty, this year's Low Emissions Scenario also features two additional scenarios: Clean Tech Rivalry and the Delayed Transition.

Competitive clean tech and energy security drive decarbonisation

Clean energy technologies like wind and solar power, and batteries have seen a 70 to 90 per cent cost reduction over the past decade, making them competitive with fossil fuels. Battery electric vehicles and heat pumps are also nearing cost parity. In addition, recent market turmoil and geopolitical tensions have increased global focus on energy security, spurring stronger policies for renewable energy deployment and energy efficiency.

In this context, the Low Emissions Scenario projects strong growth in solar and wind power, even beyond the 2022 report. By 2050, solar and wind power are expected to increase 22 and 12 times respectively, driven by competitiveness and supported by energy security and climate policies. Deep electrification and green hydrogen in transport, industries, and buildings more than double global electricity consumption by 2050 in the Low Emissions Scenario. Primary energy consumption, on the other hand, decreases slightly due to increased energy efficiency and electrification.

The Low Emissions Scenario projects an emissions pathway that limits global warming to below 2 °C, at a pace somewhat faster than last year's projections.



Additional scenarios explore alternative transition pathways

Increasing global fragmentation could challenge the pace and scope of the energy transition. Climate change mitigation has so far relied on extensive global trade and adequate supply chains for clean energy technologies and raw materials. Global collaboration also bolsters technology development, economic efficiency, and necessary financing for the energy transition. Emergence of new societal challenges and increased geopolitical tension could, however, lead to more protectionism that may affect the global energy transition more than previously anticipated. With the current economic and geopolitical challenges, the uncertainty surrounding the pace of the global energy transition seems greater than before. Against this background, Statkraft analyses two additional scenarios called the Delayed Transition and the Clean Tech Rivalry scenarios in this year's report.

In the Clean Tech Rivalry scenario, subsidies spur a clean energy transition, but at higher costs and with delays

In the Clean Tech Rivalry scenario, we assume that global powerhouses like the US, EU, and China engage in a subsidy-fueled competition for dominance in clean energy supply chains. In this scenario, building and safeguarding regional supply chains is emphasised, resulting in less global trade for materials and technologies crucial to the energy transition. A subsidies-led transition can lead to a less efficient transition with higher shares of technologies like nuclear and Carbon Capture, Utilisation and Storage (CCUS). Despite delays and higher costs, the energy transition gradually gains momentum in the Clean Tech Rivalry scenario as regional supply chains develop, and towards 2050, solar and wind volumes grow 20 and 10 times, respectively. However, this scenario results in 20 per cent higher energy-related CO_2 emissions in 2050 compared to the Low Emissions Scenario, and 15 per cent higher cumulative emissions from 2021 to 2050.

In the Delayed Transition scenario, conflicts and unrest slow, but don't halt, the clean energy transition

The Delayed Transition scenario assumes that the energy transition is lower on the political agenda as conflict, social unrest, and higher costs of living take precedence. As global geopolitical tensions escalate, national and energy security concerns come to the fore, and fossil-fuel technologies with lower upfront costs remain a larger part of the energy mix for longer. This may slow the energy transition, but will not halt it entirely, since cost-efficient wind and solar power remain competitive. Even in this scenario, solar and wind power generation grow 6.5 times to 2050. Electrification develops at a reduced pace compared to the Low Emissions Scenario, especially in sectors where strong proactive policies are still needed. Less mature technologies like hydrogen and CCUS barely reach deployment by 2050. This results in 130 per cent higher energy-related CO_2 emissions in 2050 compared to the Low Emissions Scenario, and 30 per cent higher cumulative emissions from 2021 to 2050.

To reach net zero by 2050, we need more of everything and faster

In the Low Emissions Scenario, emissions drop by nearly 70 per cent by 2050, falling short of the Paris Agreement's targets. To meet these climate targets, wind and solar energy deployment must accelerate even faster. The gap in wind and solar generation between Statkraft's Low Emissions Scenario and the IEA's Net Zero Roadmap is about 20 per cent in 2030 and 2050. Electrification must also speed up and scale wider, with more efficient energy use. The key difference between the Low Emissions scenarios and IEA's Net Zero Roadmap lies, however, in the deployment of immature technologies like hydrogen and CCUS in hard-to-abate sectors. These technologies grow two to three times faster in the IEA's Net Zero Roadmap.

The European energy transition is inevitable

The report delves specifically into the clean energy transition of the European energy system. In all scenarios, the energy transition is inevitable. In the Low Emissions Scenario, Europe meets its 2030 RePower EU targets of reducing emissions by 55 per cent without Russian gas. This is primarily achieved through the deployment of renewable energy, energy efficiency and electrification in transport and heating. Solar power deployment may reach or even exceed the targets set in REPowerEU while the wind power target appears more challenging. Wind and solar power replacing fossil fuels is the dominating emission reduction solution towards 2030, while electrification and hydrogen growth is strongest in the latter half of the period to 2050.

A clean energy transition serves multiple objectives

A conflicted world may add substantial hurdles on the path to a clean energy system. At the same time, the energy crisis illustrated the risks and vulnerability in the dependence on fossil fuels supplied from unstable regimes. This report shows that a fast, clean energy transition, as in the Low Emissions Scenario, may both mitigate climate change and contribute to the development of resilient energy systems. Renewable energy is a key to the energy trilemma of sustainability, affordability, and supply security. The report also concludes that even in a more conflicted world, renewable energy growth remains strong and does not reverse under any scenario; it may just progress at a slower pace.