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CLIMATE FINANCE CAN DRIVE THE SHIFT TO RENEWABLE ENERGY

The latest report from the world's leading expert climate panel says finance for renewable energy projects will be crucial to stave off global warming.

According to a recent special report from the Inter-governmental Panel on Climate Change (IPCC), global warming could still, possibly, be kept within 1.5 degrees Celsius (°C) during this century – low enough to avert catastrophic climate change.

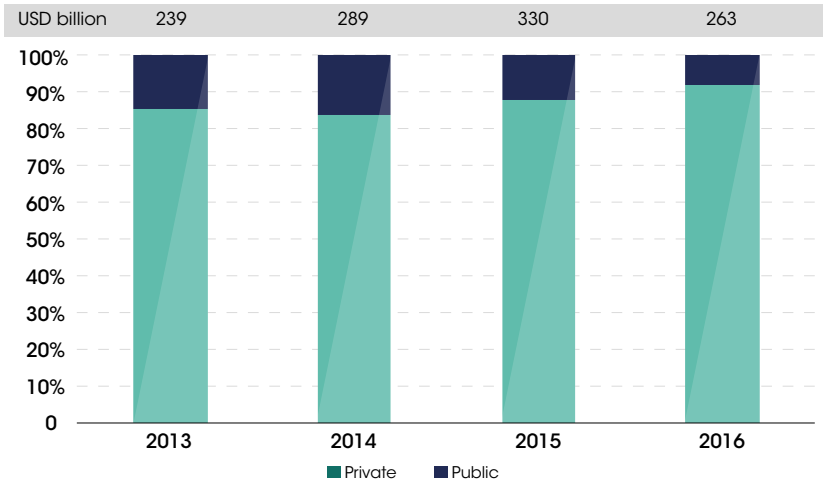
Yet the report issued on 8 October stresses the need for rapid and decisive actions to mitigate, as well as adapt to, climate impacts.

The Paris Agreement in 2015, which set the framework for a global response to the climate threat, highlighted the need to limit the global average temperature rise to well below 2°C, and ideally 1.5°C, in order to avoid catastrophic impacts.

Scaling up of investment in climate-safe energy solutions, driven in part by climate finance mechanisms, is critical.

Climate finance is a diverse concept, referring broadly to financing actions and mechanisms that seek to address climate change. It is frequently overlaps with so-called green finance, sustainable finance and low-carbon finance.

Public and private investment in renewable energy finance, 2013-2016



Global investment in renewable energy increased steadily between 2004 and 2011 and has fluctuated since then at around USD 300 billion per year. However, decisive decarbonisation of the energy sector would require over USD 22 trillion to be invested in renewables by 2050, as opposed to USD 10 trillion investment already expected under existing plans and policies, according to analysis by the International Renewable Energy Agency (IRENA).

Public and private investment in renewable energy finance, 2013-2016

This entails average global renewable energy investments of more than USD 600 billion per year. This is more than double their current level.

As public resources are generally limited, the bulk of investment needed for energy decarbonisation will have to come from the private sector. Private sources accounted for almost 90% of total renewable energy finance between 2013 and 2016 (see figure). Likewise, most of the investment needed to implement the renewable energy components of Nationally Determined Contributions (NDCs) the pledges made by countries under the Paris accords, will have to come from private sources. Fortunately, renewable energy is becoming increasingly cost-competitive. Yet public finance has to serve as a catalyst to attract more private capital to scale up investment in renewables.

This can be achieved by focusing on risk mitigation instruments and structured finance mechanisms. Risk mitigation is particularly important in renewable energy projects because of their high upfront capital requirement. Financial de-risking instruments, accompanied by sound policy, can reduce the financing costs of and help attract capital at scale.

Despite a rise in installed generation capacity worldwide, renewable power deployment still often fails to attract financial support. Perceptions of high risk with unfamiliar new technologies, cumbersome administrative procedures, insufficient transparency in the project cycle, and limited access to suitable instruments can all add to the financial challenge.

Project facilitation initiatives, such as those offered by IRENA seek to tip the financing balance in favour of renewables. For more, see project facilitation at: **www.irena.org**

Solar and wind cost deflate steadily

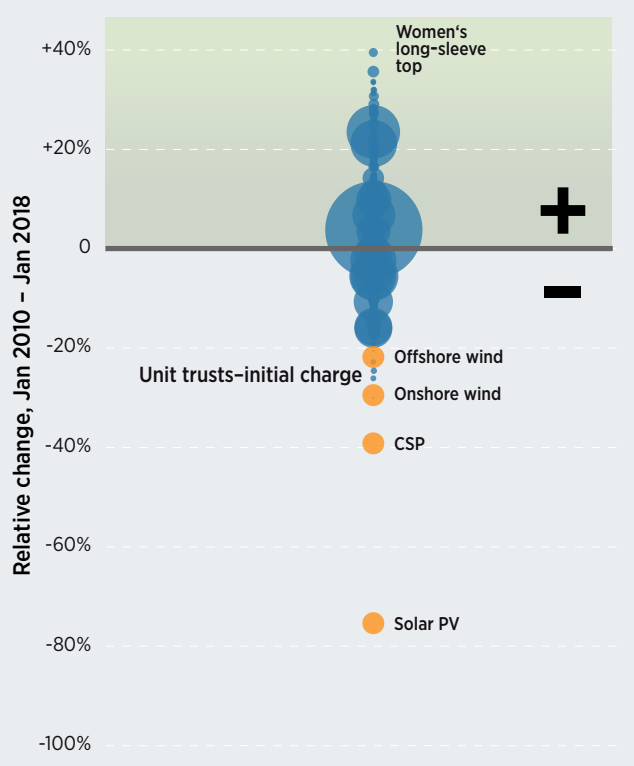
When central bankers discuss deflation, they usually do so in hushed terms, amid trepidation of the devastating impact it can have on an economy. However, when the costs of the key inputs to productive activity go down, the situation is very different.

There is such a thing as "good" deflation. Lower input costs can increase company profits and dividends. Costs to consumers also go down, either directly, via electricity bills, or indirectly. This improves the lives of the poorest households, while stimulating increased expenditure on other goods and services overall.

The rate of cost reduction for electricity from solar and wind technologies has been extraordinary. Inflation statistics help to put these cost declines into perspective.

Between 2010 and 2017, the global weighted average cost of electricity from solar photovoltaic (PV) fell by 73% in real terms (taking into account changes in price level over time) or 75% in nominal terms (the unadjusted amount). Electricity costs fell by 33% in real terms (or 39% nominally) for concentrated solar power (CSP), 13% (or 22%) for offshore wind, and 22% (29%) for onshore wind.

Electricity cost decline for solar and wind power compared to UK consumer price index (CPI) data



Diameters of blue circles represent relative shares in CPI weighting system. Orange circles are not to scale.

> No major category of UK household spending has seen a price reduction larger than electricity from solar and wind power

National statistical offices generally collect detailed price data for the economy to calculate inflation rates. This provides a rich dataset to see just what goods and services can rival solar and wind for cost declines since 2010 compared to say, the bottle of orange juice you buy each week or the cost health or education services.

For illustrative purposes, the global cost declines for solar and wind can be compared to UK consumer price inflation data. This can be done with the consumer price index (CPI), which is calculated by weighting the various expenditure items by the share of a hypothetical basket of goods and services that are designed to be representative of spending patterns. Thus, food items have a higher weight than televisions, as there is ongoing weekly expenditure on the latter, while televisions may only be purchased once every 5, 10 or even 15 years.

No category of UK household spending with a large weighting in the baskets of goods and services in the CPI index has seen a price reduction larger than the cost declines seen for electricity from solar and wind power between January 2010 and January 2018 (see figure).

The CPI category with the largest reduction the UK was the initial charge for financial investments in unit trusts (an investment vehicle), which declined 31% over the period January 2010 to January 2018.

The nominal price reduction for electricity from solar photovoltaic (PV) electricity globally for 2010-2017 is around 2.4 times higher, but this had a tiny weight in overall expenditure.

The cost decline for electricity from CSP also comfortably exceeded this price decline. Onshore wind, with a similar decline to the UK's initial charge for unit trusts, still beat every other CPI category. Offshore wind cost reductions meanwhile, were only beaten by internet DVDs, surveyors' fees for mortgage valuations and Underground/Metro fares outside London.

For more information on the latest trends, including costs and auction price data from around the world, for each of the main renewable power technologies, see **Renewable Power Generation Costs in 2017**

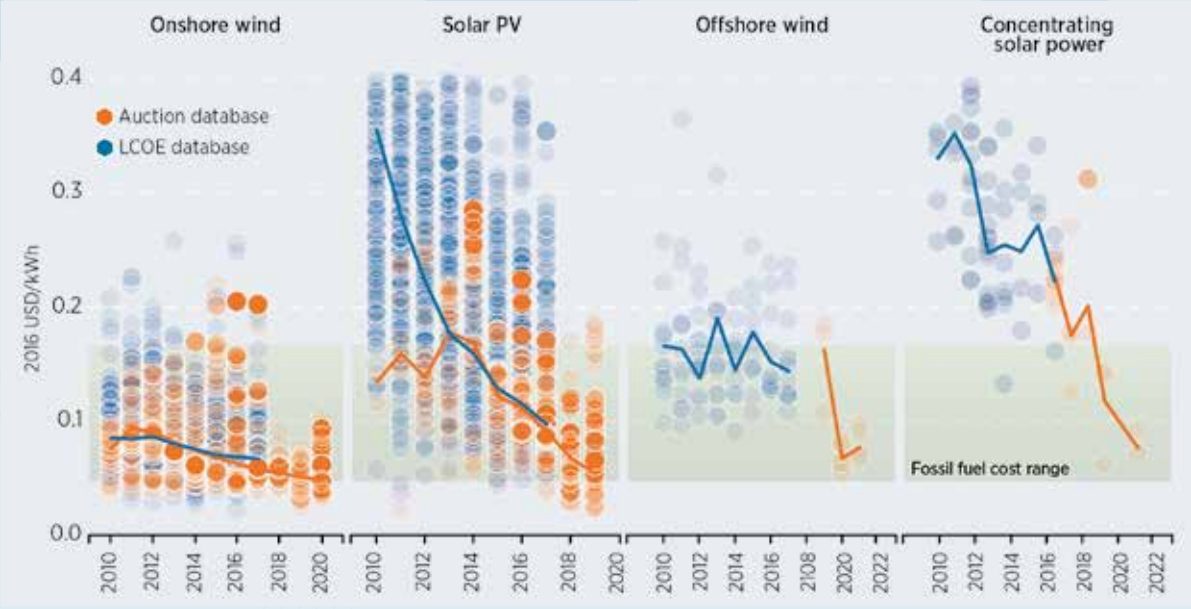
Falling power generation costs

Technology innovation, enabling policies and cost reductions have all helped to place renewables at the centre of a global energy transformation, meeting countries' energy, economic, environmental and social policy goals. At this stage, however, the chief driver of renewable power is its increasingly compelling business rationale. In the case of renewable energy, cost deflation is proving to be a tremendous advantage.

With rapidly falling costs for renewable power generation, policy makers and investors face a new set of economic opportunities, as well as challenges, arising from a scale-up of renewable energy. Over the last two years, renewable power generation technologies have become steadily more competitive.

Cost reductions should continue unabated until 2020 and beyond. Recent auctions for renewable electricity around the world have given clear price signal for the future delivery of renewable power generation projects.

Levelised cost of electricity and global weighted average values for solar and wind power technologies, 2010-2022



Source: *IRENA Renewable Cost Database and Auctions Database.*

Note: *Each circle represents an individual project or an auction result where there was a single clearing price at auction. The centre of the circle is the value for the cost of each project on the Y axis. The thick lines are the global weighted average LCOE, or auction values, by year. For the LCOE data, the real WACC is 7.5% for OECD countries and China, and 10% for the rest of the world. The band represents the fossil fuel-fired power generation cost range.*

Small islands grapple with climate change

While the world leaders debate the next steps on the global climate agenda, tropical storms, such as cyclones continue becoming more prevalent. Small Island Developing States (SIDS) are particularly vulnerable to the adverse effects of climate change.

The rise in global temperature, attributed to the increase in greenhouse gases found in the atmosphere, is causing oceans to heat up. This additional heat is stored in the oceans, which in turn produce more intense and longer-lasting typhoons, cyclones and hurricanes.

The increased intensity of storms also causes disruptions in energy supply. This is particularly evident during the annual hurricane/cyclone seasons, when fuel vessels may be re-routed. In addition, extreme weather events can damage power generation facilities and transmission and distribution systems.

Access to energy, already a major constraint to sustainable island economic growth and development then becomes even more limited.

Warmer waters are also contributing to ice-melt at both poles, which adds to the rise of sea levels, currently at the rate of 3 millimetres each year. Higher seas mean storms reach farther inland, threatening food security and livelihoods, says Kumar Tiku, who works on tropical cyclone recovery for the United Nations Development Programme (UNDP).

Islanders, already rebuilding after each catastrophic event, move further inland to higher ground to avoid future storm surges, while shrinking island coastlines continue to be battered by the changing weather patterns.

Island economic activities, such as marine tourism, fishery and horticulture, tend to be largely coastal. These are at risk with rising sea levels. Sea water penetration also increases the salinity of island ground water, reducing potable water supplies and harming crops.

Even so, upgrading and modernising energy-related infrastructure can greatly improve small-island resilience to the impact of climate change.

Greater use of renewable energy can dramatically boost socio-economic development, expand energy access, reduce costs and improve food security. Renewables, moreover, are seen as a crucial part of the Nationally Determined Contributions for SIDS under the Paris climate deal.

Tropical storms damage fragile power generation infrastructure

In Tuvalu, solar photovoltaic panels generating 150 kilowatts of electricity are installed on the roofs of buildings at the local port and hospital. Stand-alone solar PV systems allow the hospital to have a stable energy supply through. Mini-grids help to reach out-of-the-way areas, while small-scale renewable power units help islanders build modernised infrastructure with stable energy access.

In the Solomon Islands, isolation and high energy costs have created hardships for the local copra (coconut husk) industry, which struggles to transport feedstock, as well as the resulting coconut oil. However, trials sponsored by the Asian Development Bank have shown that locally produced coconut oil could replace diesel, providing a sustainable biofuel option to reduce production costs and boost economic activity.

For many island inhabitants, desalination units have ensured access to clean drinking water. Production plants that use reverse osmosis water-making facilities can be powered by either sun and wind, filtering sea water into pure, drinkable water.

As on-the-ground advantages of renewables become apparent, island communities recognise the chance to preserve their way of life while transforming their energy systems.

To learn more, see: **www.irena.org/islands**

Photograph: Shutterstock

Egypt undertakes power sector transformation

Electricity consumption in Egypt is growing fast, especially in the residential sector. The country has one of the world's fastest-growing populations, and larger numbers are entering the middle class, with the means and the expectation to maintain cool indoor temperatures.

Initiatives to attract investment boost growth, while creating more jobs and further raising living standards, could also put unprecedented stress on the power grid.

Yet Egypt could draw more than half of its electricity from renewables by just over a decade from now, while maintaining adequate supply to avoid power outages.

To meet the country's burgeoning demand, the government is pursuing energy diversification through the Integrated Sustainable Energy Strategy to 2035. This plan calls for the national electricity mix to be 20% renewable by 2022 and 42% renewable by 2035.

Egypt has ample potential to achieve these ambitious targets. It enjoys an abundance of renewable energy resources with high deployment potential, including hydropower, wind, solar and biomass. The strategy involves stepping up the development of renewables, as well as boosting grid efficiency through vigorous rehabilitation and maintenance programmes.

To date, the country's total installed capacity from renewables amounts to 3.7 gigawatts (GW), including 2.8 GW of hydropower and 900 megawatts of solar and wind power. The government has made renewables a part of wider economic growth plans.

The Egyptian electricity sector, for example, has adopted a localisation programme. This has succeeded in meeting a 30% domestic content target for wind farm inputs, with the aim of reaching 70% by 2020. Concentrated solar power (CSP) plants should have 50% local content by the same year.

> The country is turning to renewables to meet demand

Because of existing industries, Egypt enjoys a significant comparative advantage in different segments of the renewable energy value chain.

Higher uptake of renewable power, meanwhile, along with growing use of renewables for heat and transport, would reduce overall energy costs, says a recent study done by the International Renewable Energy Agency (IRENA) in co-operation with Egypt's New and Renewable Energy Authority (NREA) and the Ministry of Electricity and Renewable Energy.

With the right enabling frameworks for renewable energy investments in place, together with the necessary energy efficiency measures, the country has the potential to supply 53% of its electricity mix with renewables by 2030, the study finds. This would save USD 900 million on average annual energy costs, not including environmental and health-related costs, which would be in the billions.

For more, see: **Renewable energy outlook: Egypt**

Health care gets a renewable boost

While there is tremendous momentum in the deployment of off-grid renewables, an estimated one billion people around the world rely on health facilities that lack electricity. Most of these are rural health centres, mainly in Asia and Africa.

Renewable power sources can help remote clinics ensure 24-hour refrigeration and power for vital medical equipment. International development and humanitarian interventions can also make use of off-grid renewables to reach isolated or uprooted communities. They can also help deliver healthier future, both by powering health facilities and reducing air pollution. More broadly, energy access offered by renewable sources could help to lift millions out of poverty and pave the way for a more equitable, prosperous future.

"If we want to achieve clean air and avoid seven million premature deaths every year, renewable energy is critical," said Dr. Maria Neira, Director of Public Health at the World Health Organisation "We need to join forces to solve this issue."

Cost reductions and technology upgrades now make renewables the most economic and reliable option for off-grid electrification, which can address the energy constraints of remote healthcare facilities.

"Off-grid renewable energy solutions are key to improving the quality of health services in energy poor areas," said Adnan Z. Amin, Director-General of the International Renewable Energy Agency (IRENA). "Already today, a large proportion of rural healthcare facilities in countries lacking energy access use solar off-grid as a primary or backup source."

More broadly, off-grid renewable energy will be essential to achieve universal energy access. It is also needed to meet other Sustainable Development Goals, as defined by the United Nations. One of those is SDG 3 – *ensuring healthy lives and promoting well-being for all at all ages*.

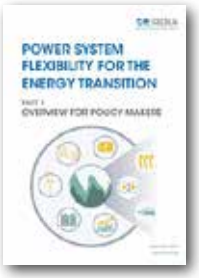
Yet in the absence of reliable power, basic life-saving interventions often cannot be undertaken safely, if at all. Concerted action is needed from companies and institutions across the energy and health sectors to overcome this gap.

Dr. Neira and Mr. Amin made their comments during IRENA's International Conference on Renewable Energy Solutions for Healthcare Facilities, which sought to build cross-sector alliances. For more on how renewables can boost energy access, see **Policies and regulations for renewable energy mini-grids**

Recent publications

Planning and prospects for renewable power: West Africa

Low-cost renewable energy, especially from solar photovoltaic installations, has become an increasingly important part of West Africa's electricity supply. This report outlines three broad scenarios for the growth of renewables in the region's power systems. The report is also available in French.

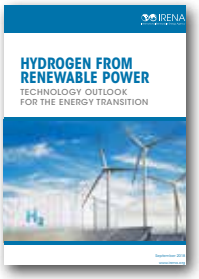


Power system flexibility for the energy transition: Overview for policy makers

Growing shares of solar and wind power call for increasingly flexible grid operation. This report outlines a planning approach to boost flexibility, and make more use of variable renewable (solar and wind) energy sources. It is also accompanied by a guide to the IRENA FlexTool methodology.

Offshore innovation widens renewable energy options

This brief highlights opportunities, challenges and the vital need for international co-operation to spur the global energy transformation. It provides the background and recommendations to G7 policy makers on how to speed up progress.



Hydrogen from renewable power: Technology outlook for the energy transition

Electric power from renewables has emerged as a vital energy source and yet transport and industry will still require combustible fuels for many purposes. Such needs could be met with hydrogen, which itself can be produced using renewable power. This report explores these options.

www.irena.org/publications

About IRENA

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation that supports countries in their transition to a sustainable energy future and serves as the principal platform for international co-operation, a centre of excellence, and a repository of policy, technology, resource and financial knowledge on renewable energy. IRENA promotes the widespread adoption and sustainable use of all forms of renewable energy, including bioenergy, geothermal, hydropower, ocean, solar and wind energy, in the pursuit of sustainable development, energy access, energy security and low-carbon economic growth and prosperity.

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