



Creating a low-carbon stimulus program: EU Green Deal and lessons from other international experiences

As per the International Energy Agency (IEA), green stimulus programs implemented after the global financial crisis of 2008–09 provide useful lessons for the design of Post COVID stimulus efforts. Policy makers need to reflect on the urgency of the unemployment challenge of COVID-19, and leverage existing clean energy investment frameworks in an ambitious manner. Previous stimulus programs have demonstrated that more private investment can be leveraged with well-targeted and well-functioning policy frameworks, thus lowering the need for budgetary support.

Modular technologies that benefit from learning-by-doing proved to be more suitable targets for a short-term stimulus than large, complex engineering projects with lengthy project development times. However, infrastructure projects often face delays and can be held up by the deteriorating financial health of utilities. “Shovel-ready” projects, in this context, are proven to have powerful positive macroeconomic spill overs.

European Union Green Deal

The Union’s ambition to become the first climate-neutral bloc in the world by 2050 is at the heart of the European Green Deal. In July 2020, as part of the COVID recovery efforts, European governments approved more than €500 billion stimulus toward climate action.

Reflecting on the importance of tackling climate change in line with Union’s commitments to implementing the Paris Agreement and the United Nations Sustainable Development Goals, the bloc leaders reached a consensus that at least 30% of the recovery expenditure must support climate objectives. An effective methodology for monitoring climate-spending and its performance, including reporting and relevant measures in case of insufficient progress, will ensure that the package as a whole contributes to the implementation of the Paris Agreement. In order to address the social and economic consequences of reaching climate neutrality by 2050 and the Union’s new 2030 climate target, a Just Transition Mechanism, including a Just Transition Fund, will be created. The allocation for the Just Transition Fund for the period 2021–2027 is €7.5 billion.

The projects financed under the European Green Deal Investment Plan will contribute to the emergence of new, clean energy and circular economy industries and they will create high quality jobs for a competitive European economy fit for the 21st century.

The funds and programmes contributing to the European Green Deal Investment Plan (such as InvestEU or the Just Transition Fund) will provide tailored financing to a wide range of projects. Both small projects (e.g. individual household energy renovation) and larger ones (e.g. installation of a network of electric vehicle charging stations) will be able to benefit through dedicated programs and products. The investment support will be adjusted to the level of risk that specific projects carry. Some examples of such projects include modernizing district heating services in Budapest, supporting the installation of solar panels on private homes and making industrial companies more energy efficient in Lithuania, or modernizing the electricity and heat supply in Zagreb.

The Just Transition Mechanism will focus on the social and economic costs of the transition in the most impacted regions and finance projects ranging from creation of new workplaces through support to companies, job search and re-skilling assistance for jobseekers who lost employment due to the transition, but also renovation of buildings and investments in renewable energy, district heating networks and sustainable transport.

Source: European Commission





Lessons for India

Policy makers need to reflect on the urgency of the challenges posed by COVID-19 and leverage on the existing clean energy programs for quick economic recovery.

Labour intensive 'shovel ready' low carbon infrastructure projects having strong interactions with the hard-hit construction industry must be at the focus of the post COVID green stimulus efforts.





Pipeline of utility scale renewable power generation projects



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Utility scale renewable power generation projects ready for implementation

Introduction

India’s renewable energy (RE) based grid interactive power generation capacity has increased over 5 times since 2010 taking the cumulative installed capacity to ~92.97 GWp (as of February 2021). Wind and solar PV constitute 38.78 GWp and 39.06 GWp of the installed power generation capacity respectively in the current scenario. Together they dominate the overall RE based power generation capacity mix with over 80% contribution. The IEA in its latest renewables market update (2020) forecasts India to be the largest contributor to the renewables upswing in 2021, with the country’s annual additions almost doubling from 2020.

Shovel ready projects for implementation

There are over 300 utility scale RE based power generation projects in the pipeline led by both public and private sector. These projects include solar PV, wind, biomass and hybrid RE projects under different stages of development. Together these projects constitute ~84 GW of contracted capacity in pipeline.

India is witnessing a gradual transition from plain vanilla solar PV and wind power auctions toward hybrid RE auctions by blending solar PV, wind, biomass, storage and stranded thermal power generation assets. Round-the-clock (RTC) supply of hybrid renewable power is increasingly adopted in RE auctions to help Distribution Companies (DISCOMs) / bulk buyers manage the intermittency / variability otherwise associated with plain vanilla Solar PV or wind power projects. RE auctions designed for RTC renewable power supply mandate a minimum capacity utilization factor of 80% for the contracted capacity without any obligation to purchase surplus power.

| Contracted capacity of utility scale RE projects in pipeline (MW) | | | | | |
|---|---------------------------|--------|--------|-------|------------|
| RE Technology | Project announcement year | | | | Total (MW) |
| | 2018 | 2019 | 2020 | 2021 | |
| Biopower | - | 39 | 141 | - | 180 |
| Floating Solar PV | 150 | 262 | 119 | 600 | 1,131 |
| Hybrid (Solar-Biomass) | - | 54 | - | - | 54 |
| Hybrid (solar-storage) | - | - | 180 | - | 180 |
| Hybrid (Solar-Wind) | - | 1,880 | 2,755 | - | 4,635 |
| Hybrid (solar-wind-coal-storage) | - | - | 5,000 | - | 5,000 |
| Hybrid (solar-wind-storage) | - | - | 1,600 | - | 1,600 |
| Solar PV | 3,900 | 8,978 | 43,955 | 6,175 | 63,008 |
| Wind | 3,010 | 2,248 | 3,363 | - | 8,621 |
| Grand Total | 7,060 | 13,461 | 57,112 | 6,775 | 84,408 |

*Source: EY analysis from CEA 2020, GlobalData, CEEW-CEF 2020, SECI Auctions

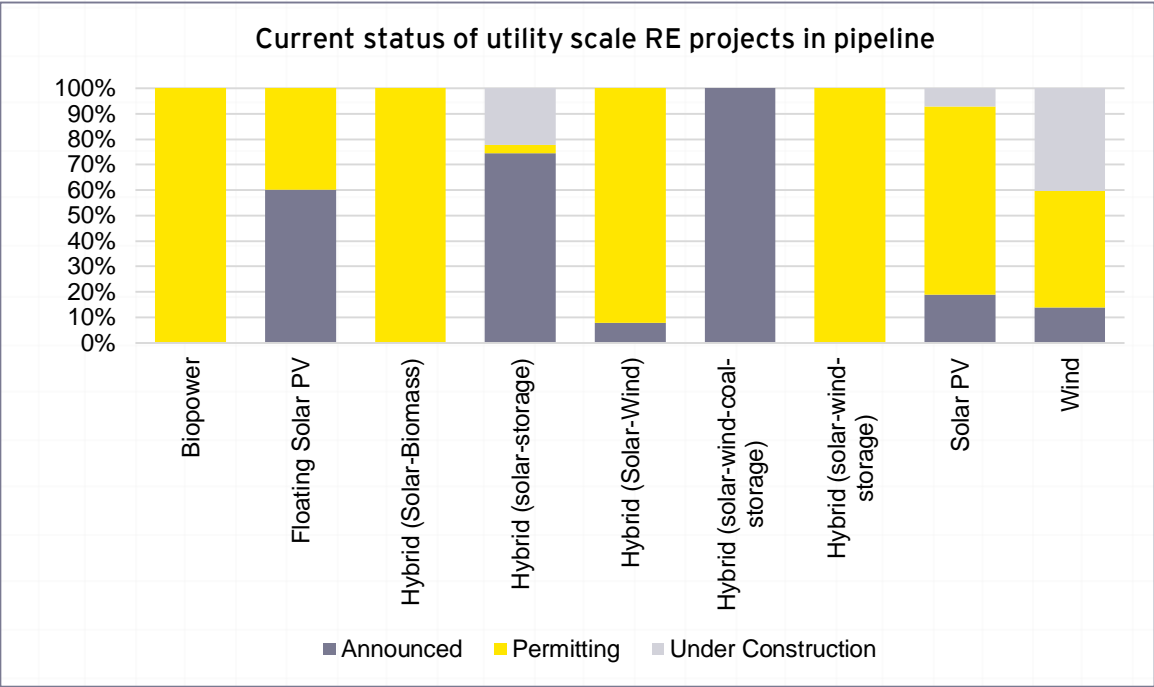




The total installed capacity comprising of individual plain vanilla RE sources (viz. solar, wind etc.) in a typical RTC hybrid renewable power project is multiple times (4–5) higher than the contracted capacity. Take for example, the auction results announced last year for RTC supply of 400 MW hybrid renewable power (RTC-I) by blending solar PV, wind and energy storage. We estimate the total installed capacity of solar PV modules and wind turbine generators together under this project could be ~4 times the contracted capacity (i.e. 400 MW AC). Another similar auction is under progress for supply of 5,000 MW of RTC power from grid-connected renewable energy sources blended with coal based thermal power projects (RTC-II). This auction may also witness installed capacity of individual RE sources in the range of 4–5 times the contracted capacity. Blending in hybrid renewable power projects is allowed either in front of the meter (delivery / interconnection point) or behind the meter. Behind the meter blending is akin to co-located systems where hybridization of power shall be done prior to or at the delivery point. Whereas, in front of the meter blending may involve multiple injection points in the grid for different sources / components of generation located anywhere in the country.

| Contracted capacity of utility scale RE projects in pipeline (MW) | | | | |
|---|--------------------------|------------|--------------------|------------|
| RE Technology | Project pipeline status* | | | Total (MW) |
| | Announced | Permitting | Under Construction | |
| Biopower | - | 180 | - | 180 |
| Floating Solar PV | 680 | 451 | - | 1,131 |
| Hybrid (Solar-Biomass) | - | 54 | - | 54 |
| Hybrid (solar-storage) | 134 | 6 | 40 | 180 |
| Hybrid (Solar-Wind) | 360 | 4,275 | - | 4,635 |
| Hybrid (solar-wind-coal-storage) | 5,000 | - | - | 5,000 |
| Hybrid (solar-wind-storage) | - | 1,600 | - | 1,600 |
| Solar PV | 11,850 | 46,648 | 4,510 | 63,008 |
| Wind | 1,200 | 3,932 | 3,489 | 8,621 |
| Grand Total | 19,224 | 57,145 | 8,039 | 84,408 |

Source: EY analysis from CEA 2020, GlobalData, CEEW-CEF 2020, SECI

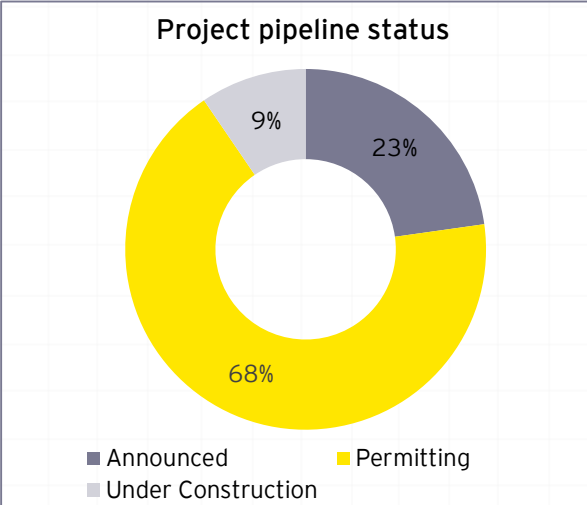


Source: EY analysis from CEA 2020, GlobalData, CEEW-CEF 2020, SECI

Overall, ~68% of the contracted capacity is under permitting stage, meaning that these projects have successfully completed auctions / competitive discovery of tariffs and under various stages of signing power purchase agreement (PPA), power sale agreement (PSA), tariff adoption and power procurement approvals from regulators, financial closure, land acquisition and permission for grid interconnection. About ~23% of the project capacity is under ‘announced’ stage, meaning that these projects still need to discover tariffs competitively and select project developer. Only ~9% of the project capacity is ‘under construction’ meaning that these projects have completed plant material order and started plant erection. These under construction projects account for ~40% of wind project capacity in pipeline and less than 5% of plain vanilla solar power project capacity in pipeline.



In 2021, India is likely to add ~4.8 GW of solar PV power capacity (installed) and ~3.2 GW of wind power capacity largely driven by auctions held in the years 2018–19. Whereas in 2022, India is likely to add ~7.5 GW of solar PV power capacity (installed) and ~1.6 GW of wind power capacity largely driven by auctions held in the years 2018–20. The project pipeline that is likely to get commissioned beyond 2022 has a disproportionately large capacity (installed) of solar PV in the range of ~77 GW and wind power capacity of ~6.8 GW in comparison.



Source: EY analysis from CEA 2020, GlobalData, CEEW-CEF 2020, SECI

| Solar PV power capacity (installed) in pipeline MW (AC) | | | | | | |
|---|-----------------------------------|---------|---------|---------|-------------|------------|
| RE Technology | Project commissioning (estimated) | | | | | Total (MW) |
| | H1 2021 | H2 2021 | H1 2022 | H2 2022 | Beyond 2022 | |
| Floating Solar PV | - | - | - | 427 | 704 | 1,131 |
| Hybrid (Solar-Biomass) | - | - | - | 48 | | 48 |
| Hybrid (solar-storage) | - | - | - | 40 | 140 | 180 |
| Hybrid (Solar-Wind) | - | - | 125 | - | 2,175 | 2,300 |
| Hybrid (solar-wind-coal-storage) | - | - | - | - | 20,000 | 20,000 |
| Hybrid (solar-wind-storage) | - | - | - | - | 2,200 | 2,200 |
| Ground mounted Solar PV | 3,300 | 1,540 | 4,186 | 2,716 | 51,266 | 63,008 |
| Total | 3,300 | 1,540 | 4,311 | 3,231 | 76,484 | 88,866 |

| Wind power capacity (installed) in pipeline MW (AC) | | | | | | |
|---|-----------------------------------|---------|---------|---------|-------------|------------|
| RE Technology | Project commissioning (estimated) | | | | | Total (MW) |
| | H1 2021 | H2 2021 | H1 2022 | H2 2022 | Beyond 2022 | |
| Hybrid (Solar-Wind) | - | - | 100 | - | 2,235 | 2,335 |
| Hybrid (solar-wind-storage) | - | - | - | - | 600 | 600 |
| Wind | 2,915 | 250 | 1,499 | - | 3,957 | 8,621 |
| Total | 2,915 | 250 | 1,599 | - | 6,792 | 11,556 |

Source: EY analysis from CEA 2020, GlobalData, CEEW-CEF 2020, SECI

For the first time, 2020 witnessed auctions led by SECI for competitive discovery of tariffs for 1,200 MW peak power supply and 400 MW of RTC supply of hybrid renewable electricity integrated with energy storage. Another 5,000 MW auction for RTC supply of hybrid renewable electricity is on the block. Apart from this, several other auctions are announced / conducted for solar-storage hybrids in remote locations, union territories and islands. Most of the energy storage capacity from these hybrid RE power projects are expected to commission beyond 2022.

| Energy storage capacity in pipeline MWh (AC) | | | | | | |
|--|-----------------------------------|---------|---------|---------|-------------|-------------|
| RE Technology | Project commissioning (estimated) | | | | | Total (MWh) |
| | H1 2021 | H2 2021 | H1 2022 | H2 2022 | Beyond 2022 | |
| Hybrid (solar-storage) | - | - | - | 120 | 225 | 345 |
| Hybrid (solar-wind-storage) | - | - | - | - | 6,700 | 6,700 |
| Hybrid (solar-wind-coal-storage) | - | - | - | - | 25,000 | 25,000 |
| Total | - | - | - | 120 | 31,925 | 32,045 |

Source: EY analysis from CEA 2020, GlobalData, CEEW-CEF 2020, SECI