



RENEWABLE ENERGIES: THE PLACE TO GO

Research Support Service
July 2020

PRESCOUTER

Intelligence Brief Question

How are companies transitioning to renewable energy production and what are the main drivers and challenges of this change?

Executive Summary

COVID-19 has impacted all industries and renewable energy is no exception. The present document aims to picture the scenario for this particular industry.

The renewable energy market is expected to **grow** in the near and mid-term future.

Some of the key drivers include:



Major drop in global oil demand



Need to cut/reduce global greenhouse gases (GHG) emissions: 22% of global industrial greenhouse gas emissions are produced by the mining industry.

With these two drivers in place, this Intelligence Brief shows real examples of major oil and gas (O&G) and mining companies transitioning to renewable energy generation, and in particular in the last months where COVID-19 has already impacted the global economy.

Executive Summary

There are a number of challenges for this industry to overcome in this scenario, the toughest being:

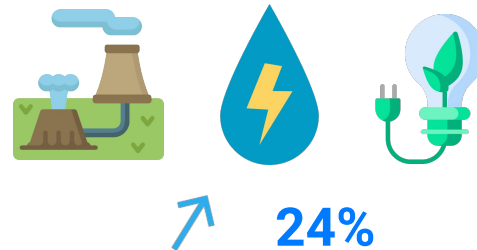
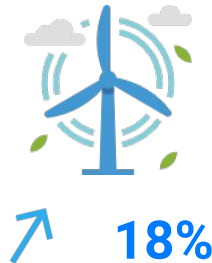


Disruptions in the supply chain



Currency depreciation in many countries

Finally, a **forecast** for the growth of the major renewable energies from 2020 to 2021 is presented: Solar is expected to grow 29% while wind 18% and the rest (hydropower, geothermal and bioenergy) 24%.





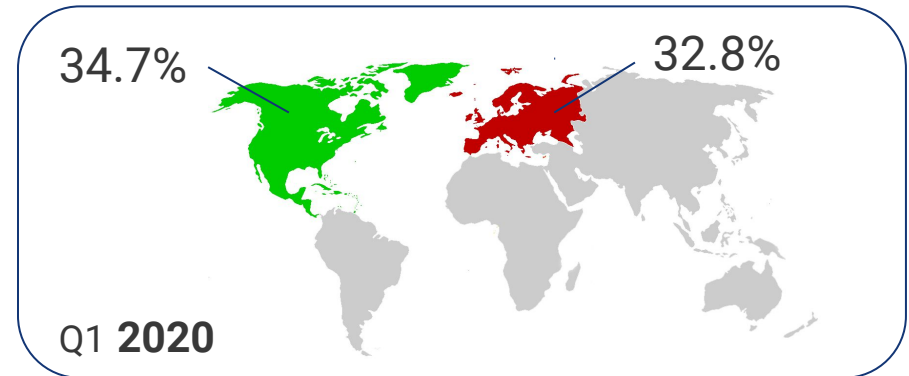
Drivers



COVID-19 and O&G

The coronavirus pandemic has caused oil and gas operators to pull investments and cancel projects. Between January and March 2020, the number of recorded contracts issued fell to 1,000 compared with 1,365 in the three months before, and 1200+ in Q1 in 2019. Of these, 347 were in North America, with Europe following with 328.

1200+	1000
Contracts in Q1 2019	Contracts in Q1 2020



Global oil demand is expected to decline in 2020 as the impact of COVID-19 spreads around the world, constricting travel and broader economic activity, according to the International Energy Agency (IEA) oil market report.

As renewable energy is the optimal environmentally-friendly alternative to oil, **the demand for renewable energy and related projects is likely to increase in the near future, and will be less impacted during the COVID-19 period.**

The following slides show some of the examples of major O&G companies shifting / investing in big renewable energy projects.

O&G Renewable Projects

Shell's 'net-zero by 2050' vision



Shell officially announced its ambition to become a **net-zero emissions energy business by 2050 or sooner** in April of this year. Reports show that Shell is investing \$2 billion a year in its renewable energy business. Some of the recent announcements are the result of those ongoing project reviews and it's net-zero by 2050 vision.



Feb. 7, 2020



First large-scale solar farm



Early 2021



Queensland, Australia

Shell Australia will build and operate its first industrial-scale solar electricity farm near Wandoan in central Queensland, Australia.

- The solar farm will generate 120 megawatts of solar electricity from about 400,000 photovoltaic panels
- It is expected to be completed in early 2021. The announcement was made on February 7, 2020.

"Solar is one of the building blocks of Shell's power strategy. We are increasingly incorporating renewable energy ... by combining renewable energy with a firm energy solution offering reliable supply, a fixed price and a cleaner lower emission package.

— Greg Joiner, Vice-President for Shell Energy in Australia.

O&G Renewable Projects

Shell's 'net-zero by 2050' vision



Feb. 13, 2020



Investment in biofuel production plant



Early 2021



Ontario, Canada

FORGE Hydrocarbons Corp, a Canadian biofuel start-up, announced an equity investment from Shell Ventures and a follow-on contribution from Valent Low-Carbon Technologies on the 13th of February. FORGE's patented Lipid-to-Hydrocarbon (LTH) technology creates renewable jet fuel, diesel and naphtha from waste fats and oils.

- The investment will help build a first-of-its-kind CAD \$30 million commercial-scale, biofuel production plant in Sombra, Ontario.
- The capacity of the Sombra production plant is 7.5 million gallons of renewable fuels annually.

"Biofuels are critical in the move to lower-carbon marine, aviation and heavy-duty transport. Collaboration will be key to a successful energy transition and Shell's investment in FORGE to progress this commercial-scale project can help accelerate this technology."

— Andrew Murfin, General Manager Advanced Biofuels at Shell

O&G Renewable Projects

Shell's 'net-zero by 2050' vision



May 7, 2020



Creation of a green hydrogen hub using wind power



2023



Rotterdam, Netherlands

Shell Nederland is working together with partners to create a green hydrogen hub in the port of Rotterdam.

- Shell aims to produce green hydrogen on the Tweede Maasvlakte using green electricity from wind power. This wind power will preferably come from the Hollandse Kust (noord) offshore wind farm.
- Through their joint venture CrossWind, Shell and Eneco are participating in the tender for this wind farm, with plans for it to be operational in 2023.
- Both companies have issued guarantees to CrossWind for investments in the construction and operation of Hollandse Kust (noord). The announcement was made on May 7.



O&G Renewable Projects

BP's 'net-zero by 2050' vision



BP is investing around \$500 million in low carbon activities and businesses in 2020 as planned, despite spending cuts elsewhere. The company has announced its aim to reach “net-zero across its operations by 2050” on the 12th of February, including from its upstream O&G production and overhaul its reporting and transparency processes by 2023. The oil major has also announced plans that go beyond its own operations. Recent announcements and investments clearly show that BP is shifting towards renewables even as oil prices bottom out at record low prices.



March 19, 2020



Funding Texas solar project



End of 2020



Texas, USA

Lightsource BP, a global solar leader, announced on March 19th that it has successfully closed on a \$250 million financing package for its Impact Solar project located in Lamar County, Texas, 120 miles northeast of Dallas.

- The energy generated by the 260 MW project will be traded through a long-term agreement with BP.
- Construction has begun and commercial operation is expected to be by the end of 2020.

“We are continuing to support the transition towards a lower carbon energy system by successfully advancing our solar energy projects across the globe.”

— Nick Boyle, Lightsource BP's Group CEO

O&G Renewable Projects

BP's 'net-zero by 2050' vision



May 8, 2020



Mass hydrogen production feasibility study



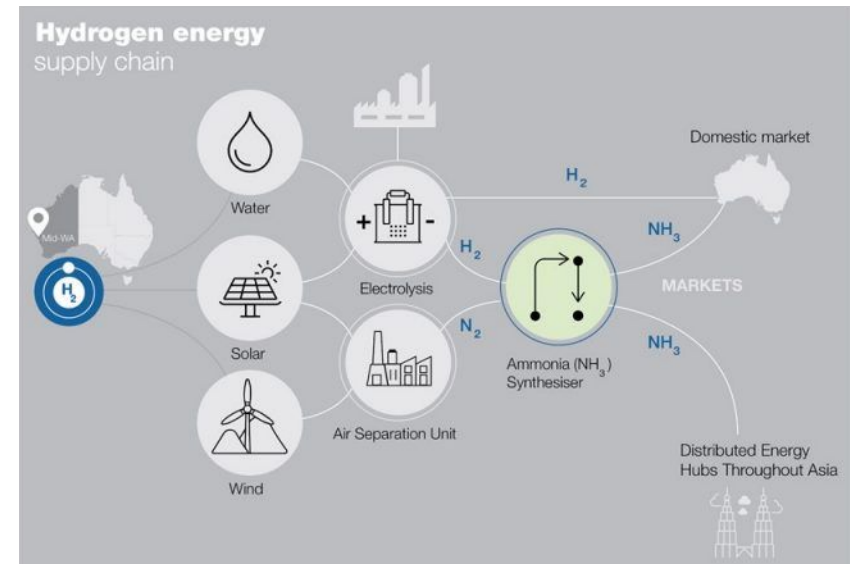
Early 2021



Geraldton, Australia

BP announced on May 8, it will invest USD \$1.76M into an Australian scheme to study the practicalities of mass hydrogen production. This will include an evaluation of different technologies and process configurations required to manufacture green hydrogen and green ammonia. The feasibility study will use water to produce hydrogen, which would be converted into ammonia instead of using natural gas as a source.

- Production in Geraldton, Western Australia will start at 20,000 tonnes of ammonia per year, scaling up to one million tonnes per year.
- The commercial-scale plant would require around 1.5GW of power, expected to be sourced from greenfield renewable power generation, enabling the project to benefit from the advantaged solar and wind resource in the region.



Source: BP

O&G Renewable Projects

Total SA's 'net-zero by 2050' vision



Total SA set out bolder commitments to eliminate most of its carbon emissions by 2050, while curbing spending on oil and gas projects due to the crude-price slump. Total has become the third of the “Big Six” producers to make “a net-zero emissions by 2050” pledge by announcing it’s ambition on May 5th. The company’s commitment to invest more in clean energy, despite a sharp drop in profit as the coronavirus hammers fuel demand, illustrates the enduring pressure on oil giants from investors and society to tackle long-term environmental challenges.



March 12,
2020



Largest battery-based energy
storage project in France



N/A



Mardyck, France





Total announced on March 12, the launch of a battery-based energy storage project in Mardyck, at the Flandres Center, in Dunkirk’s port district.

- With a storage capacity of 25 megawatt-hours (MWh) and output of 25 MW of power, the new lithium-ion energy storage system will be the largest in France.
- It will be used to provide fast reserve services to support the stability of the French power grid. It is part of government policy to support the development of electrical capacity through capacity mechanisms.

*Scheduled for commissioning in late 2020, the new storage system, which represents an investment of around €15 million, will be based on Saft’s Intensium Max 20 High Energy solution and will comprise 11 integrated 2.3 MWh containers, designed and manufactured at Saft’s production site in Bordeaux
— As stated in Total’s press release*

O&G Renewable Projects

Total SA's 'net-zero by 2050' vision

 March 6, 2020  PPA Contract for solar rooftops for major food company  Q4 of 2020  Thailand

Total, through its affiliate Total Solar Distributed Generation, announced on March 6, that it has signed a binding contract to provide 25 megawatt-peak (MWp) of solar rooftops for 24 facilities of one of the largest food companies in Thailand, Betagro. Each one of these projects benefits from a 20-year Power Purchase Agreement (PPA). Jointly they constitute one of the largest portfolios of corporate PPAs in Thailand.





- Equipped with over 62.000 solar panels, the projects are designed to generate nearly 38 GWh of renewable electricity per year, helping Betagro shrink its carbon footprint by 26.000 tons of CO2 over the life of the solar rooftops while providing about 15% of the company's total power consumption.



Source: Total Solar Distributed Generation

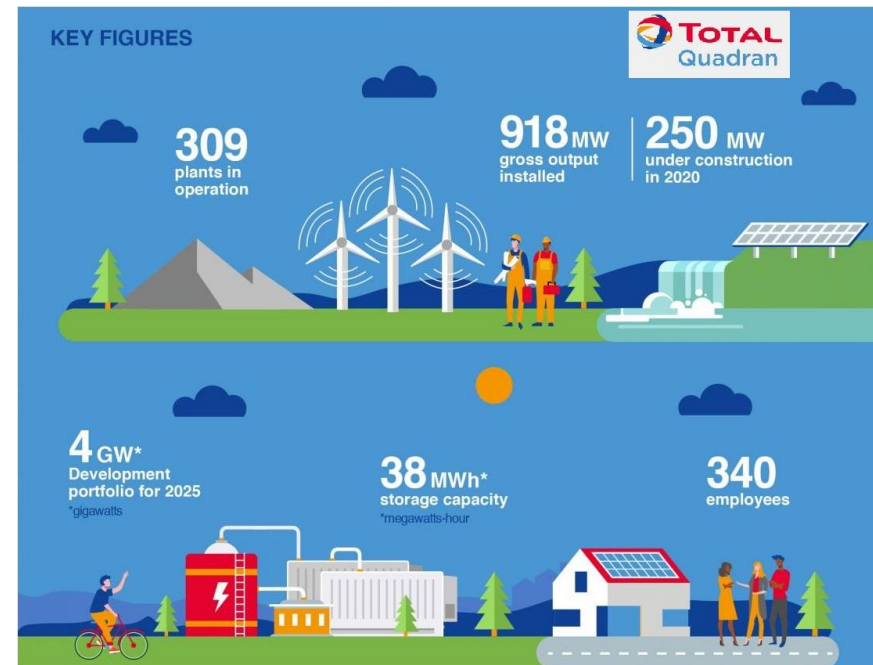
O&G Renewable Projects

Total SA's 'net-zero by 2050' vision

 March 20, 2020  Acquisition of Global Wind Power (GWP) France  2025  France

Total continues its growth in renewable energy in France with a substantial investment in wind power. Total, through Total Quadran - its 100% renewable developer and producer in France, acquired 100% of Global Wind Power (GWP) France.

- GWP is a company with a 1000-megawatt (MW) portfolio of onshore wind projects, including 250 MW scheduled to come on stream by 2025.
- The announcement was made on March 20.



Source: Total SA

O&G Renewable Projects

Total SA's 'net-zero by 2050' vision



March 19,
2020



Floating offshore wind project in
UK



2025



Wales, UK

Total positions itself on the floating offshore wind segment in line with its strategy to develop renewable energy. The Group announced March 19 that the company signed an agreement with the developer, Simply Blue Energy, to acquire 80% stake in the pioneering floating wind project Erebus located in the Celtic Sea, in Wales.

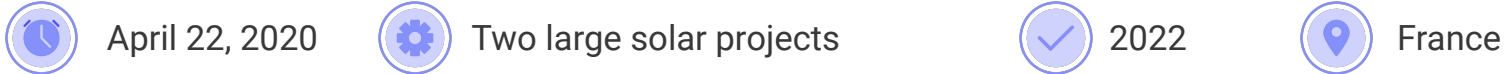
- The project will have a 96 megawatts capacity and will be installed in an area with a water depth of 70 meters.
- This makes Total one of the first movers in this technology in the UK, the world's largest offshore wind market.



Read more about floating wind farms [here](#).

O&G Renewable Projects

Total SA's 'net-zero by 2050' vision



Total was awarded 131 megawatt-peak (MWp) of solar projects in France which includes tenders for ground-mounted solar parks, as well as 5.6 MWp of solar in the French Overseas departments and collectivities (ZNI). More than half the capacities awarded fall under Total's program to solarize its industrial facilities and reuse of industrial brownfield sites, including:

Largest ground-mounted solar plant in France:

- The 50 MWp solar plant in Valenciennes is the largest project awarded in the call for tenders and Total Quadran's biggest solar plant to date. It will be installed on Total's former refinery site that has been redeveloped by RETIA, an affiliate specialized in cleanup and reclamation operations. The solar plant will supply green electricity to nearly 32,000 people when it comes on stream in 2022.

Largest photovoltaic power plant of the Greater Paris Region:

- Located near the Grandpuits refinery, the 25 MWp solar plant will be the largest in the Greater Paris Region. It will generate enough renewable electricity to cover the needs of nearly 17,000 people. The plant is scheduled to come on stream by 2022.

Mining

While responses to the worsening impact of the coronavirus outbreak are currently dominating corporate agendas, the urgency of the renewable energy transition remains a key issue for the mining industry and the investors that uphold it. Miners are collectively responsible for **22% of global industrial GHG emissions** and pressure from customers, shareholders and regulators to lower this has been growing.

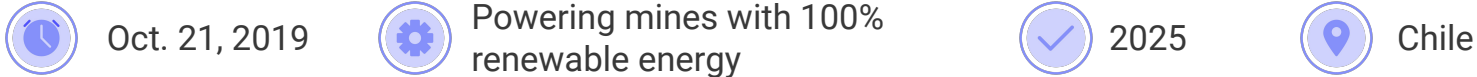
Around the world, mining companies are starting to set concrete renewable energy goals amid pressure to cut emissions, with some firms announcing 100 per cent targets for major mines. **More than 20 miners**, including international giants Glencore, Rio Tinto, BHP, Vale and Anglo American have signed up to the Task Force on Climate-related Financial Disclosures (TCFD).

The **financial incentives** for the mining industry are also accelerating the switch to renewable energy. It gives the opportunity to reduce overall electricity costs by up to a quarter through leveraging solar, wind or batteries on-site. The tactic could appeal especially to mining companies in countries like South Africa, Zimbabwe and Australia, where grid or fuel access is often difficult, expensive or unreliable.

Mining companies could alternatively seek off-site clean energy procurement, with **long-term power purchase agreements (PPAs)** proving an increasingly popular route. This model has proven effective in Chile, the leading country for renewable energy in mines. It allows companies like BHP or Anglo American to meet 100% renewable energy targets without losing reliability.

Mining Renewable Projects

BHP's shift to renewables



Australian mining giant, BHP, announced plans to power 100% of its Escondida and Spence mines in Chile fully with renewable energy by 2025.

- Escondida is the world's largest copper mine and converting it to renewables would require the equivalent of 2 gigawatts of solar energy.
- BHP has already signed four renewable power agreements that it said would cut energy prices by 20% compared to existing coal contracts.

When fully operational, these renewable supply arrangements will eliminate virtually all of Escondida and Spence Scope 2 emissions (i.e. those our operations emit via purchased energy).

— Danny Malchuk, President Operations, Minerals Americas

Mining Renewable Projects

Rio Tinto's shift to renewables



Feb. 16, 2020



Solar power plant and battery system for Koodaideri mine



End of 2021



Pilbara, Western Australia

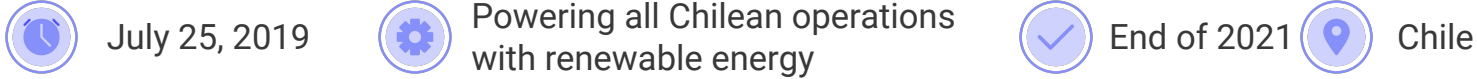
Anglo-Australian mining giant, Rio Tinto, with a similar ambition to BHP, announced a plan in February to invest \$1.5B to reach net-zero Scope 1 and 2 emissions by 2050. Rio Tinto will invest \$98 million in a 34-megawatt PV array and 12-megawatt-hour lithium-ion battery system to help power its Koodaideri mine in Pilbara, Western Australia.

- The solar plant is expected to cover all of the mine's electric power needs during peak solar generation hours and 65% of its overall electricity consumption.
- Rio Tinto will start building the plant soon and is looking to complete it next year.

The plant will be Rio Tinto's first company-owned solar facility and will consist of an estimated 100,000 panels, covering an area of 105 hectares. The project is expected to lower annual CO2 emissions by about 90,000 tonnes.

Mining Renewable Projects

Anglo American's shift to renewables



Another mining giant Anglo American will power its Chilean operations entirely from renewables after 2021. Enel Chile will supply renewable power for Anglo American's Los Bronces and El Soldado copper mines and Chagres smelter.

- Anglo American has partnered with Engie to develop the world's largest hydrogen-powered mine haul truck, which is expected to begin testing this year at a metals mine in South Africa.
- Anglo American has also installed an 84-kilowatt floating solar array, a first for the industry, at its tailings pond at Los Bronces.

Read more about floating solar arrays [here](#).

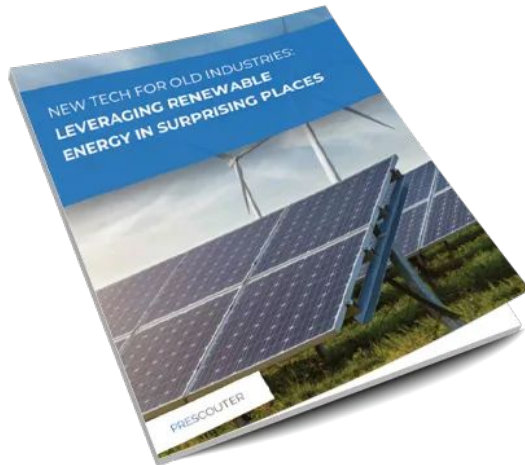


Mining Renewable Projects

Other examples

Antofagasta Minerals has pledged to go fully renewable at its Zaldívar and Antucoya projects. Collahuasi, a joint venture between Anglo American and Glencore, is expected to be powered completely by renewables by this year or next.

Brazilian mining giant, **Vale**, has gone a step further with a pledge to achieve self-sufficiency with renewable energy by 2030.



We previously profiled how various sectors of the natural resources industry can benefit and leverage renewable energy, in sometimes surprising places. Learn more about in our paper titled:

[New tech for old industries: Leveraging renewable energy in surprising places](#)

Challenges, Forecast & Recommendations

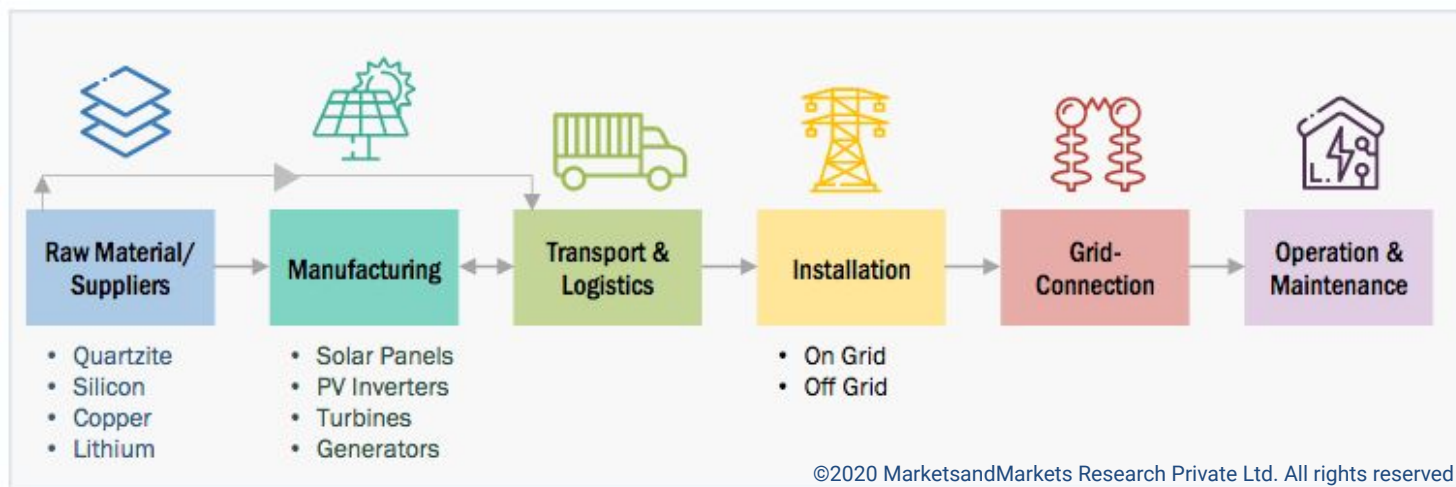


Challenges

The most significant near-term impacts on renewable plants that are already contracted or under construction may be felt through supply chains. Renewable industry executives are anticipating delivery and construction slowdowns, either because nations shutter industries to slow the spread of coronavirus or because the workers get sick.

Many parts for large-scale renewable projects come entirely or partially from China, other parts of Asia, or the US. These are specialized supply chains with few ready substitutes. The COVID-19 outbreak has, for example, slowed the production of solar panels and materials in China, delaying projects in countries such as India and Australia.

When investing in renewables a thorough **risk management program** would be needed to overcome the risk of delays on projects and depending on a relatively few number of suppliers.



Challenges

Moreover, due to the COVID-19 outbreak, the local currencies of many countries depreciated. Renewable projects in Australia, Brazil, Mexico and South Africa will be especially impacted, as projects in the procurement phase could face capital cost increases of up to 36% due to the rapid depreciation of local currencies.

32%

Devaluation of Rand (South Africa) from January to April 2020

4.7%

Expected GBP drop in Brazil in 2020

36%

increase in capital costs due to rapid depreciation of local currencies

Forecast

From the renewable energy market segmented on the basis of technology type as solar, wind, and other (hydropower, geothermal and bioenergy), solar is estimated to be the largest renewable energy market. It is expected to grow from USD 84,585 million in 2020 and projected to reach USD 109,329 million by 2021. The wind segment is the second largest market, by technology type.

Technology Type	2019	2020-e	2021-p
Solar	100,630	84,585	109,329
Wind	93,253	77,733	91,634
Others	25,064	21,993	25,128
Total	218,947	184,311	226,091

e- Estimated; p- Projected

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Recommendations

As stated in previous slides, shifting to renewable energies will be the preferred strategy not only in the mid and long-term future but also in the short term (due to depreciation of oil price and pressure on GHG reductions).

To overcome some of the challenges faced by the renewable energy industry, PreScouter recommends the following actions:

- 1) To alleviate the problem of **shortage of manpower**, emerging technologies in the offshore wind farms, such as inspection using drones, blade maintenance robots, and automation & AI, are solutions PreScouter recommends investigating and/or employing.



A current wind turbine inspection costs approximately USD 1,500 per tower, performing the same task with the help of drones cuts this by 50%.

Some companies in this space include:



Recommendations

- 2) To **avoid high prices** of their products, solar/wind component manufacturers are shifting to South East Asia to identify **cost-effective subcomponents suppliers** in countries such as Vietnam, Malaysia and Thailand.



Countries like Vietnam and Taiwan, where the impact of Covid-19 is not that severe, are considered to be emerging markets for solar power producers.

- 3) **Thin film** technologies for PV are a less material and labor intensive technology compared to crystalline technology (the price is paid with lower efficiency rates).



In a context where COVID-19 has severely impacted the mining industry (silicon) and higher automation is prometered, thin films position themselves as a technology gaining more traction.

PreScouter recommends and continuously does investigations into new and developing **materials**, process improvements through continued advancements in **digital and automation technologies** and also **alternative technology suppliers** to keep pace with competitors and growing demand within renewable energy industries.

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Next Steps

SOME POSSIBILITIES THAT PRESCOUTER CAN OFFER FOR CONTINUATION OF OUR RELATIONSHIP

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✓ TRENDS MAPPING

✓ ACQUIRE NON-PUBLIC INFORMATION

✓ PATENT COMMERCIALIZATION STRATEGY

✓ DATA ANALYSIS & RECOMMENDATIONS

✓ REVIEW BEST PRACTICES

✓ SUPPLIER OUTREACH & ANALYSIS

✓ CONSULT WITH INDUSTRY SUBJECT MATTER EXPERTS

✓ INTERVIEWING COMPANIES & EXPERTS

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- ✓ **CONFERENCE SUPPORT:** Attend conferences of interest on your behalf.
- ✓ **WRITING ARTICLES:** Write technical or more public facing articles on your behalf.
- ✓ **WORKING WITH A CONTRACT RESEARCH ORGANIZATION:** Engage with a CRO to build a prototype, test equipment or any other related research service.

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