Renewable Energy

ESMAP Business Plan FY21-24

ESMAP
Energy Sector Management Assistance Program

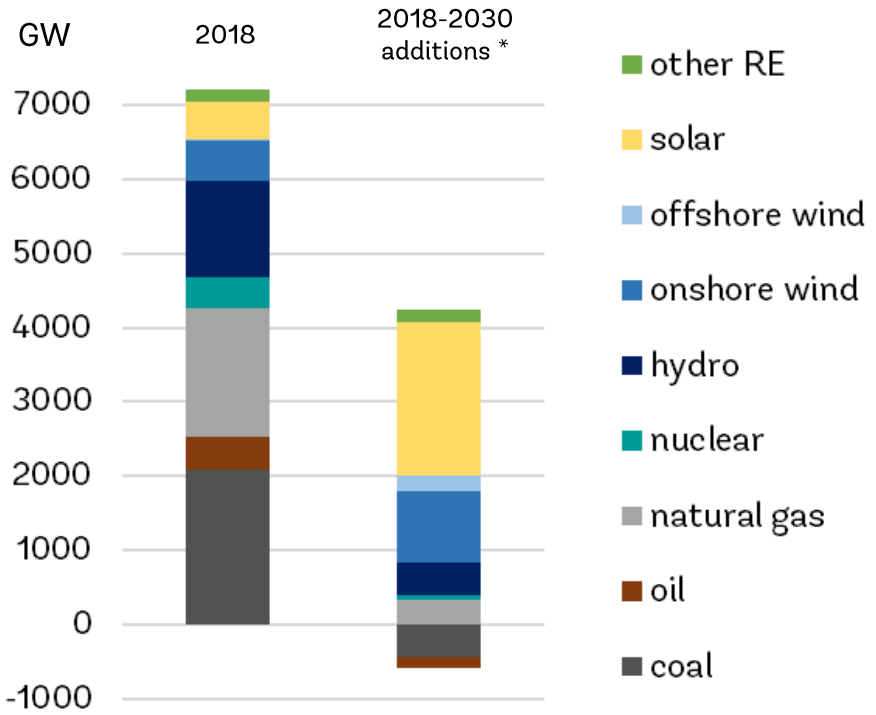
THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

PROBLEM STATEMENT

Achieving "affordable, reliable, sustainable and modern energy for all" requires a lot of renewable energy: Need to install over 440 GW of hydropower and even larger amounts of variable power: more than 2000 GW of solar, 950 GW of onshore wind, and 200 GW of offshore wind by 2030*

- **For developing countries this represents $350 billion of capital investment in renewables per year** for the next five years – which is far more than can be achieved using scarce public funding
- **But the scale-up of RE is not happening fast enough**, meaning that consumers are being locked into other potentially more expensive investments and that climate change targets will be missed
- **There is an urgent need to support countries in improving the enabling environment** to unlock investment and least-cost capacity additions from RE
- **Furthermore we must ensure that no country is left behind in the transition to RE:** no large scale (>20MW) solar or wind capacity is currently installed in over 80, and 100 countries, respectively. For such countries work often has to start with the basic building blocks, such as identifying zones for RE development.
- **Finally, we must broaden the range of RE and storage technologies that can be deployed:** geothermal, hydropower, onshore wind, conventional solar PV and current battery storage will not be sufficient and new technologies are needed to ensure that climate change targets are met as quickly and cost-effectively as possible. Additionally, attention needs to be given to grid integration issues and power system flexibility, where storage has an important role to play.

Global installed power capacity (GW)



* Additions in Sustainable Development Scenario of the IEA's World Energy Outlook 2019. The scenario satisfies SDG7 and Paris Agreement goals

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CONTEXT

External factors:

- RE technologies are now THE cheapest source of power, and resources are available in every country
- RE power, in particular wind and solar, is growing rapidly but the rate of growth is insufficient
- There is increasing emphasis on "electrification of end uses" to meet decarbonization targets that will require even greater RE growth

Client needs:

- Clients want to take advantage of their indigenous resources to power economic development and increase access, but are often not familiar with grid integration issues, dealing with private sector and fostering of local industrial value chain
- RE development often requires a rethinking of power sector norms, and may involve reconfiguring policies introduced when RE was more expensive (e.g. feed-in tariffs)

World Bank Group:

- Climate Change Action Plan committing to 36GW of RE and 17.5GWh of batteries by 2025; IDA19 targets committing to 10GW of RE and 5GWh of batteries by 2023
- The World Bank has a strong portfolio on geothermal and solar PV, but much of this is low-hanging fruit; IFC is strong on solar and wind

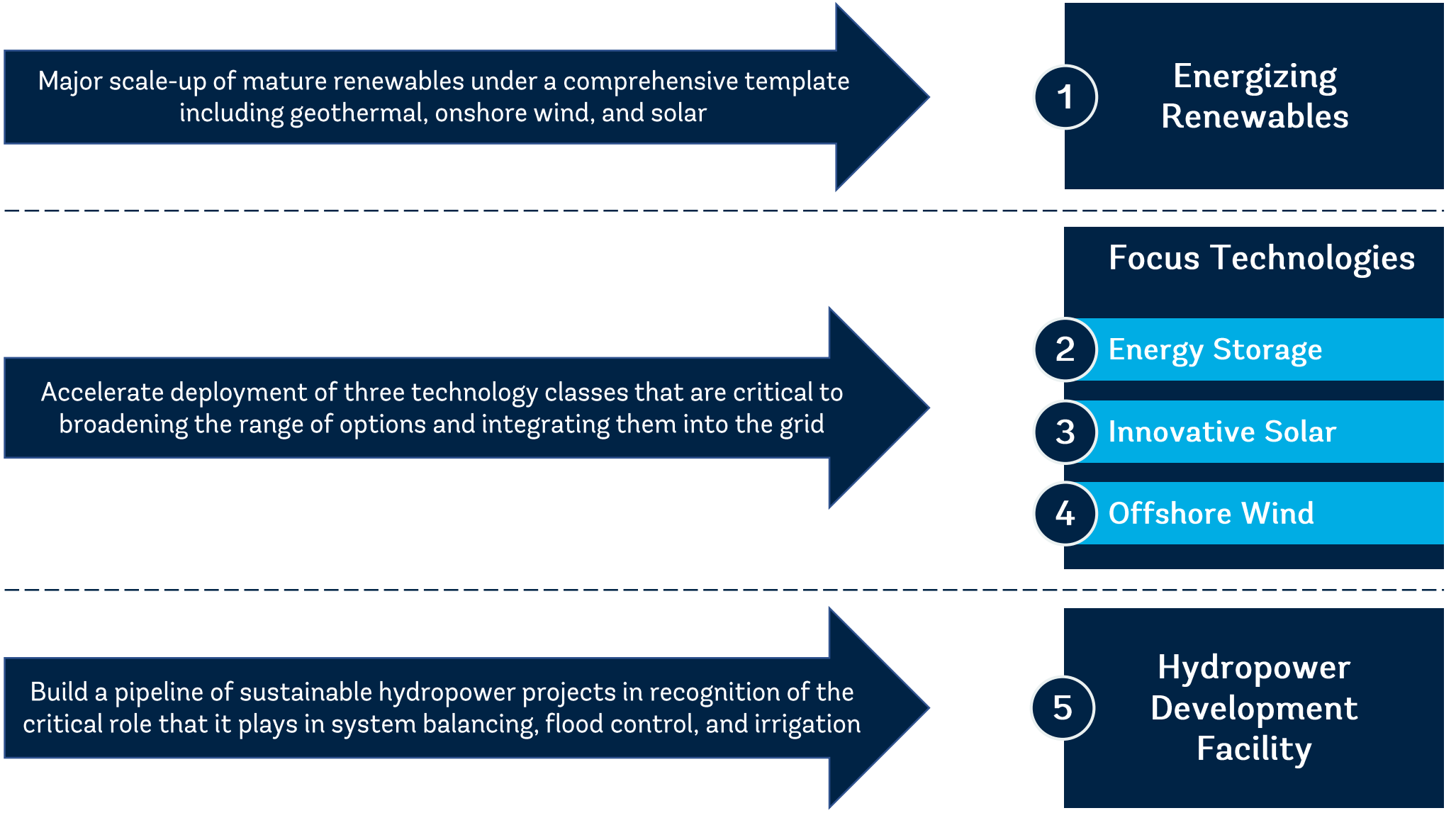
ESMAP:

- Under the last Business Plan ESMAP focused on two specific technology categories (geothermal and solar power) and invested heavily in generating high-quality global datasets (including the Global Solar Atlas and Global Wind Atlas), standardized models for project development, and knowledge around VRE integration
- We supported the launch of the Solar Risk Mitigation Facility (SRMI under our program Energizing Renewables) in partnership with AFD and the International Solar Alliance, under which we developed a set of "Solar Deployment Guidelines" and a pipeline of country projects
- This work has provided a strong bedrock for deeper, more ambitious action that can be tailored to countries with very different needs

Lessons learnt to date:

- From external evaluation: i) Support an integrated approach and link RE support with viable national utilities and competitive procurement. ii) Continue to identify emerging technologies and generate demand within the WBG and with country clients for these innovations
- Clients and teams both inside and outside the WBG benefit from having access to standardized datasets, tools, templates and services and this leads to faster adoption and improved cross-learning
- Improving the policy and enabling environment for RE is a highly political process, often requiring time and effort to overcome misconceptions and to deal with the inevitable issue of vested interests: individual technical studies are important, but are not on their own sufficient, and are ideally accompanied by broader policy engagement under a programmatic, multi-year activity with the flexibility to adapt to client needs

Proposed ESMAP Response

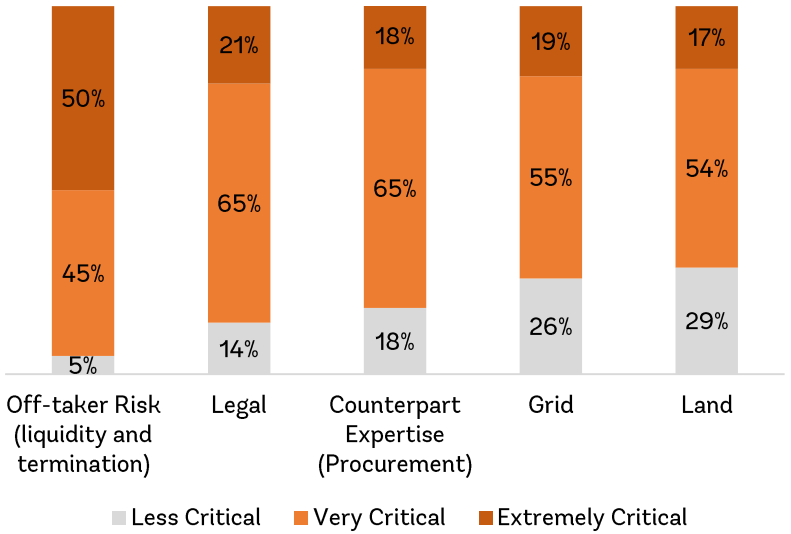


1 ENERGIZING RENEWABLES (ENREN)

WHY:

- Private sector is reluctant to invest in developing countries due to:
  - Weak enabling environment
  - Grid integration issues
  - Absence of open and transparent procurement
  - Lack of access to risk mitigation coverage
- Result:
  - Piecemeal approach, project-by-project
  - Lack of bankable and sustainable pipeline of projects for private sector to invest into

Key Risks Identified by Private Investors [1]



WHAT:

- ESMAP will work with governments on developing sustainable RE programs to (i) attract the private sector in optimized conditions, (ii) reduce reliance on public finances (limited to critical public investments) and (iii) maximize socio-economic benefits with a focus on women's employment and skills development
- This work will incorporate our 'focus technologies', but the majority of work is likely to involve grid-connected **solar** and **onshore wind** with an expected installed capacity exceeding 25 GW and leveraging more than USD 20 billion of private financing
- Continue to support risk mitigation in upstream geothermal development

The EnRen pipeline covers currently more than 20 countries:

- North Africa: Algeria, Djibouti and Tunisia
- Sub-Saharan Africa: Botswana, Burkina Faso, Burundi, DRC, Ethiopia, Kenya, Liberia, Mali, Namibia, Nigeria, Zambia, Zanzibar and Zimbabwe
- East Asia: Indonesia and Vietnam
- South Asia: Maldives, Afghanistan and Pakistan
- Europe and Central Asia: Kazakhstan and Turkey
- Latin America and the Caribbean: Dominica, El Salvador and St. Lucia

HOW:

Leveraging SRMI, an integrated package of ESMAP support combined with MDB and climate finance for:

- Technical assistance (through ESMAP) to support countries (I) to develop evidence-based RE targets based on sound planning, (ii) to design and implement a sustainable RE program, and (iii) to have a robust procurement process. Complement ESMAP program to fostering next generation utilities.
- Public Sector Investments for critical investments needed for RE integration (such as grid upgrade and battery storage), mitigation of development risks (e.g. parks infrastructures) and electrification (e.g. mini-grids). ESMAP support for IBRD/IDA/climate finance project development and preparation.
- Risk Mitigation Instruments to propose tailored risk mitigation instruments to private investors to cover the residual risks (such as guarantees covering the off-taker risk) and mitigation instruments for upstream geothermal risks.

*Based on a market sounding conducted by ESMAP in September 2018 with 45 responses from private sector IPPs/lenders covering more than 20 countries

2 ENERGY STORAGE

WHY:

- Storage is key to accomplishing 1.5 C and SDG7 access goals by addressing the variability of solar and wind.
- Renewable energy with storage can offer local, easy-to-deploy, scalable alternatives to fossil-based generation.
- By the end of 2018 there were 17 GWh installed in stationary applications, of which 7 GWh are installed in developing countries.
- Accelerating deployment requires lowering cost (currently at 300 USD/kWh for Li-ion) and shifting focus to developing countries to catalyze a 200-400 GWh market.
- Since the $1 billion energy storage program was announced in September 2018, the World Bank has approved projects with 3.9 GWh of battery storage deployments mostly in Africa and Asia.
- Significant knowledge gaps and capacity needs still exist (e.g., duration, performance, safety, recycling, capacity, regulation) to accelerate deployment of sustainable storage technologies in developing countries.

WHAT:

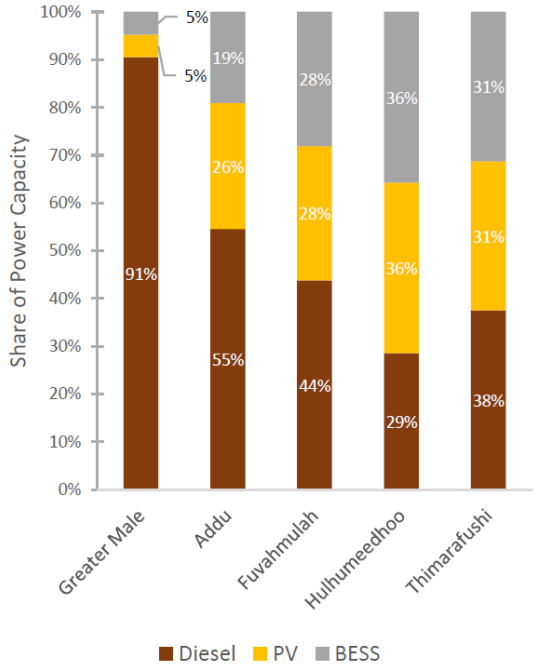
Energy Storage Partnership (ESP)

- The ESP convened by the WBG aims to foster international cooperation to adapt and develop energy storage solutions for developing countries, expanding the global market for energy storage.
- The ESP is a vehicle to inform the WBG and other MDBs' investments in energy storage, bringing best practices (policy, procurement, enabling infrastructure)
- ESP's 35 partner organizations are working together to address key barriers that are currently limiting scale up of energy storage in developing countries: safety, recycling, local capacity, testing, sizing, modeling, policy, regulation, and procurement.

Deliver a pipeline of 15 GWh of battery storage capacity under IBRD/IDA financed projects

- Accelerate deployment of sustainable energy storage technologies, including those alternative to Li-ion.

Installed capacity ratio in the Maldives in 2040, where solar PV + BESS will contribute with more than 50% in some of its islands



HOW:

- Secretariat of the Energy Storage Partnership (ESP).
- Collaboration with Climate Investment Funds and other climate finance by developing a pipeline of investable energy storage projects.
- Supporting clients with technical studies, and enhancing battery regulation and procurement.
- Building local capacity for designing, maintaining, operating, and recycling battery projects.
- Organizing country workshops, fostering interactions with the private sector, disseminating new technologies and solutions, and raising awareness.
- Raising funding for grants and concessional lending (World Bank for public infrastructure, IFC for project financing).

Recipient and Bank-Executed Grants

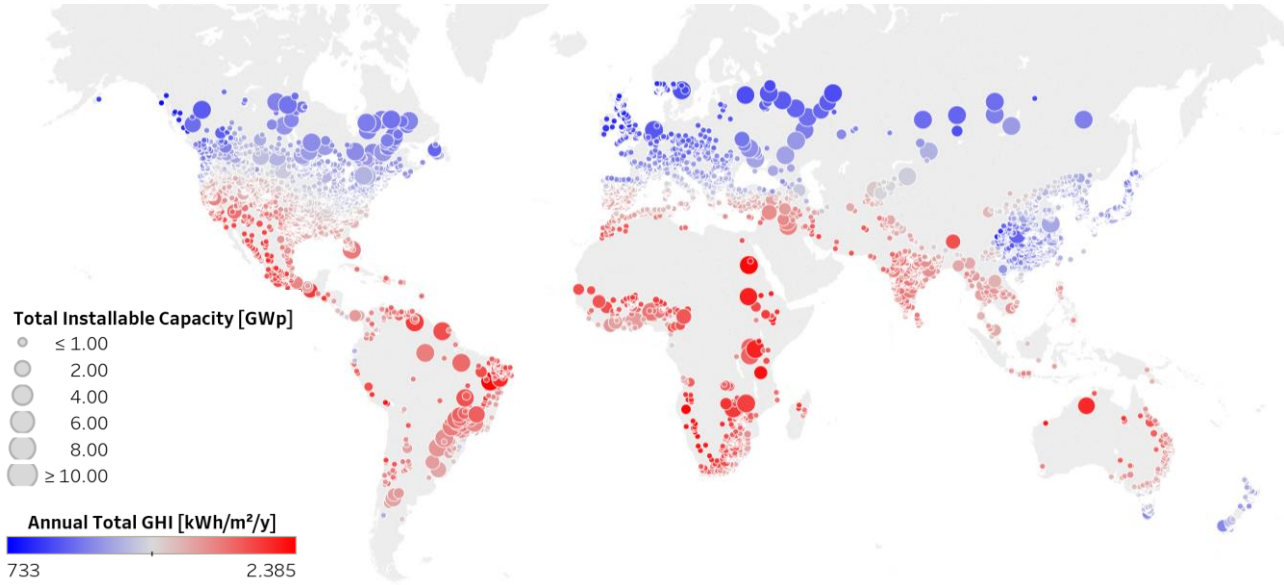
- Recipient-executed grants will be required to deploy testing facilities (testbeds) and pilots to assess the performance of different storage technologies in developing countries' conditions and to increase local capacity; to support recycling infrastructure, and to introduce sustainable manufacturing practices.
- World Bank-executed grants will be required to support project preparation and development, along with necessary technical studies (e.g. prefeasibility studies) and support to policy/regulatory reforms.

3 INNOVATIVE SOLAR

WHY:

- Solar is easy to deploy but can face challenges with land acquisition, low use of evacuation lines, variability
- For 2000GW of solar needed by 2030, a surface area of the size of Belgium is necessary but floating solar and rooftop solar can help:
  - ESMAP's work on floating solar shows that using just 1% of water surface of existing manmade reservoirs would double the global installed capacity of PV in 2018 and there is potential for up to 4000 GW of solar installations on manmade water bodies globally
  - ESMAP's work on mapping potential for rooftop solar in large cities in developing countries shows that some cities can have over 5GW potential (Ho Chi Minh City in Vietnam has a 6.3GW potential)
- Hybridizing solar with other sources can decrease or eliminate variability, increase resilience, and brings more efficient use of land, evacuation lines, substations, etc. Regulatory support and new structuring schemes are needed for this type of deployment
- Business models needed for successful rooftop solar deployment in developing countries are different from developed countries

Floating solar capacity potential worldwide based on total surface area available on man-made reservoirs and dams (more than 4,000GW globally)



WHAT:

- Improve knowledge awareness of countries on benefits of innovative solar for their grids and land use, and achieve active engagement on these topics in at least 12 countries
- Demonstrate value of hybridization (costs, land use, infrastructure use, resilience, grid integration advantages)
- Develop a pipeline of 3GW of investable projects for rooftop solar, floating solar, CSP, and solar hybrids with hydropower, wind and energy storage

HOW:

- Global knowledge generation:
  - Methodologies for hybridization of solar with other technologies with aim to achieve dispatchability (in "Where Sun Meets Water Series")
  - Business models for rooftop/distributed PV deployment
- Support to structuring of projects (e.g. complex structuring for solar + hydropower hybrids when hydro is already existing)
- Country workshops and awareness raising
- Support with access to concessional financing, where appropriate

4 OFFSHORE WIND

WHY:

- Costs are falling fast: already below 5c/kWh
- Excellent resource: 3,000 GW of technical potential identified by ESMAP "Going Global" report…in only eight countries!
- Resource close to demand centers such as coastal cities and industrial centers
- Deployable (virtually) anywhere with the introduction of 'floating wind' technologies
- Major driver of jobs and economic development; attractive in areas with declining offshore oil and gas industries
- But offshore wind industry is not yet focused on emerging markets, where there is huge potential to displace coal

WHAT:

- Improve knowledge and awareness of offshore wind potential in emerging markets
- Engage with at least 10 countries with strong technical potential to integrate 20 GW of offshore wind into their policies and plans
- Develop a pipeline of investable projects, targeting 5 GW through World Bank and IFC financed projects
- Accelerate the deployment of floating wind

Recipient-Executed Grants

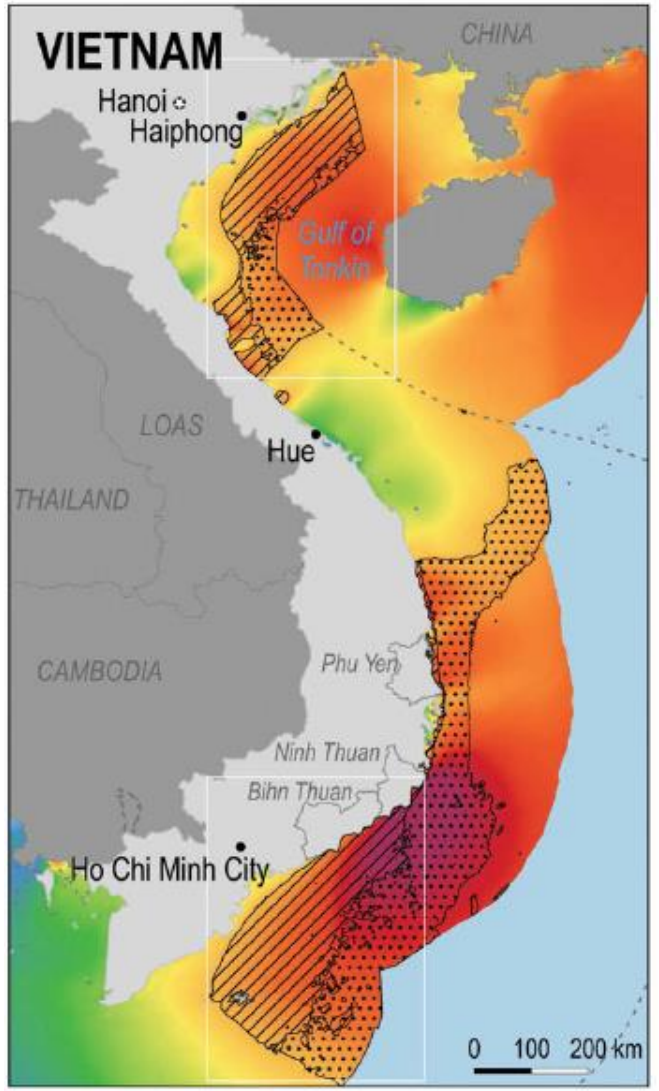
- Clients will require access to recipient-executed grants to carry out downstream studies, as these must be client-executed and cannot be implemented by WBG
- These may be attached to lending operations (strongly preferred due to lower transaction costs) or as stand-alone grants
- ESMAP will first engage with existing climate fund (GCF and CIF) to explore a programmatic approach; if there is lack of appetite then additional funding of $150m ($15m x 10 countries) may be required

HOW:

- Global knowledge generation:
  - Technical potential report – published!
  - Key factors for successful development of offshore wind in emerging markets
  - Environmental and Social Framework studies
- Knowledge exchange events: global and within target countries to raise awareness
- Roadmap studies: geospatial, economic, supply chain, E&S
- Raise funding for grants and concessional lending
- Support clients with downstream technical studies and transaction advisory (recipient-executed – see box)
- Work with GWEC's Women in Wind to integrate gender into skills and employment analysis in at least two countries
- Financial structuring: World Bank for public infrastructure, IFC for project financing, other MDBs and private finance
- Explore and scope out possible need for targeted innovation program (see box below)

Offshore Wind Innovation Program

- Floating wind technology is critical for offshore wind to take off in developing countries: 2 TW out of 3 TW of potential in the eight countries assessed is floating
- Innovation needs to be accelerated and made relevant to developing country conditions, for example typhoon resistant turbines
- ESMAP will engage widely on innovation needs and current/planned initiatives to determine if additional action is required
- A large-scale innovation program is not currently budgeted for and could be led by others; ESMAP will revert to donors if additional funding in this area is required



Detailed analysis of Vietnam shows up to 475 GW of technical potential, of which around half is from floating foundation sites

5 HYDROPOWER DEVELOPMENT FACILITY

WHY:

Hydropower is currently the world's largest source of renewable electricity, producing around 17% of global electricity generation from 1250 GW of installed capacity. Hydropower is expected to maintain an important place in the sustainable energy systems of the future, given its ability to provide a range of services:

- Low-cost Source of Reliable Electricity Supply and Essential Grid Services
- Enabler of Increased Renewable Energy Integration
- Water Management Services
- Operational Flexibility and Efficiency, Storage and Back-up

There are challenges to developing hydropower projects in a manner that mitigates their risks efficiently, attracts private sector participation, and implements them according to the highest international environmental, social, and fiduciary standards.

WHAT:

- The Hydropower Development Facility (HDF) will address one of the major constraints to the rapid development of sustainable hydropower in the world, i.e. the lack of adequately prepared hydropower projects that are ready to be undertaken for implementation. Managing risks through careful preparation is the key to sustainable hydropower projects for both public and private sectors.
- The plan is to support ten countries where there is active World Bank engagement under the HDF

Donors as of December 13, 2019:

HOW:

- Core areas for HDF support: Environmental and Social Impact Assessment, Feasibility Study and Site Investigation, Project implementation, and Capacity building and project management
- Analytical studies in climate resilience, green bonds market, private sector financing, GIS based early screening, global sediment management studies, fisheries and hydropower, Operation and Maintenance, Hydropower Sustainability Protocol, etc.
- Project development, preparation and implementation support: In 2019/2020 support provided to Agus Pulangi (Philippines), Drina River Basin (Balkans), Mpatamanga (Malawi), Rusumo Falls (Burundi-Rwanda-Tanzania), Upper Arun (Nepal), Upper Cisokan (Indonesia), and Volobe (Madagascar).
- International networking – World Hydropower Congress (Paris 2019), Observer to the Board of IHA, participation in ICOLD, etc.

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RESULTS FRAMEWORK: OUTCOMES

Program Development Objective: **Major scale-up of renewable energy in all WBG client countries**			
			Target (by end of FY24)
OUTCOME 1: Governments have adopted policies and plans to support a major scale-up of RE			
Outcome indicator 1.1	RE capacity additions under government policies and plans up to 2030		**60 GW**
	Of which:	1.1.1: Offshore wind in government policies and plans to 2030	20 GW
OUTCOME 2: Public and private investment in RE and ancillary infrastructure stimulated			
Outcome indicator 2.1	RE capacity commitments (direct and enabled through ancillary infrastructure and grid improvements) under WBG financed projects		**32.5 GW**
	Of which:	2.1.1: Capacity commitments under EnRen-supported financed projects	20 GW
		2.1.2: Innovative solar capacity commitments under financed projects	3 GW
		2.1.3: Hydropower capacity commitments under financed projects	4.5 GW
		2.1.4: Offshore wind capacity commitments under financed projects	5 GW
Outcome indicator 2.2	Volume of financing leveraged for projects that increase RE capacity		$25 billion
	Of which:	2.2.1: WB financing leveraged	$3 billion
		2.2.2: Private financing leveraged	$22 billion
Outcome indicator 2.3	Battery storage capacity commitments under financed projects		15 GWh
INTERMEDIATE OUTCOME 1: Countries have included EnRen approach to energy generation in their policies and/or plans			
Intermediate outcome indicator 1.1	Number of countries with WB engagement in increasing the penetration of RE in generation mix		30
Intermediate outcome indicator 1.2	Number of countries with WB engagement on geothermal power is newly established		3
INTERMEDIATE OUTCOME 2: Countries have included innovative technologies in their policies and plans			
Intermediate outcome indicator 2.1	Number of countries with WBG engagement on battery storage		40
Intermediate outcome indicator 2.2	Number of countries with WBG engagement on innovative solar technologies		12
Intermediate outcome indicator 2.3	Number of countries with WBG engagement on offshore wind		10
INTERMEDIATE OUTCOME 3: Countries are developing the next generation of hydropower projects			
Intermediate outcome indicator 3.1	Number of countries with WB engagement under the Hydropower Development Facility		10
INTERMEDIATE OUTCOME 4: Countries have supported employment opportunities for women in renewable energy			
Intermediate outcome indicator 4.1	Number of countries with WBG engagement in supporting development of roadmaps including maximizing socio-economic benefits derived from RE development with a focus on women's employment and skills development		20

Results Framework: Outputs

Energizing Renewables	
Output 1	Flagship report: Sustainable deployment of solar (grid and off-grid) and wind projects (EnRen guidelines)
Output 2	Events: Workshops to disseminate the EnRen integrated approach and promote the related support
Output 3	Report: Lessons learnt from the Noor Ouarzazate complex in Morocco (lessons for EnRen approach)
Output 4	Tool: Diagnostic tool to identify standardized solutions consistent with the EnRen methodology
Output 5	Tool: E-tendering platform* for standardized competitive procurement of RE projects
Output 6	Report: Assessment of geothermal drilling costs
Output 7	Event: Gender in geothermal workshops
Output 8	Report: Lesson learnt from cumulative environmental and social impacts from geothermal development in Turkey
Energy Storage	
Output 9	Flagship report: lessons learned from WB projects and pilot projects
Output 10	Reports: Coordination of outputs developed under the Energy Storage Partnership
Output 11	Report: Social development framework and sustainable manufacturing practices for batteries
Output 12	Events: Convene exchanges under the Clean Energy Ministerial campaign on energy storage
Output 13	Events: Technology-focused workshops and regional exchange events
Innovative solar	
Output 14	Flagship report: Distributed solar PV in developing countries
Output 15	Report: Benefits of hybridization of hydropower with solar PV
Output 16	Report: Environmental and social considerations for offshore floating PV development (social considerations to include gender aspects)
Output 17	Events: Global knowledge sharing on innovative solar (as a part of EnRen workshops/consultations)
Output 18	Databases: Floating solar potential on existing hydropower reservoirs (geospatial database) and nearshore floating solar potential (geospatial database)
Offshore Wind	
Output 19	Flagship report: Key factors for successful development of offshore wind in emerging markets
Output 20	Report: Environmental framework for development of offshore wind
Output 21	Report: Social framework for development of offshore wind
Output 22	Event: Global seminar and knowledge sharing on offshore wind development (location TBD)
Hydropower	
Output 23	Report: Private Sector Financing
Output 24	Report: Gender & Hydropower
Output 25	Database: Global compendium of hydropower dams
Output 26	Report: Sustainability initiatives
Output 27	Report: Sediment Management in Reservoirs

Note: Outputs listed are for global work programs only

(*) Subject to adequate arrangements being identified and implemented

Proposed Budget

Business Line	Component	SUB-TOTAL	TOTAL
Energizing Renewables	**Global**: Knowledge generation, exchange and program management	5.0	
	WBG-executed country grants: Upstream technical assistance (sustainable RE targets planning and other upstream studies, workshops)	17.5	
	Recipient-executed country grants: Downstream technical assistance (feasibility studies, transaction advisory, capacity building)	63.5	**$86 million**
Energy Storage	**Global:** Energy Storage Partnership (ESP)—secretariat function and knowledge generation	6.0	
	WBG-executed country grants: pre-feasibility analysis of energy storage projects; and policy and regulatory technical assistance	12.0	
	Recipient-executed country grants: development of test beds, support recycling infrastructure, and the introduction of sustainable manufacturing practices.	12.0	**$30 million**
Innovative Solar	**Global:** knowledge generation, exchange and program management	1.5	
	WBG-executed country grants: Upstream technical assistance (technical and structuring pre-feasibilities, regulatory work, business models, capacity building)	6.0	**$7.5 million**
Offshore Wind	**Global**: knowledge generation, exchange and program management	3.5	
	WBG-executed country grants: Upstream technical assistance activities (workshops, roadmaps and strategies)	6.5	**$10 million**
Hydropower	**Global**: knowledge generation	10.0	
	WBG-executed country grants: upstream preparation of hydropower projects	10.0	
	Recipient-executed country grants: downstream preparation of hydropower projects	30.0	**$50 million**

Global own-managed:	$26 million
Country grants WBG-executed:	$52 million
Country grants recipient-executed:	$105.5 million
TOTAL:	$183.5million

INDICATIVE RETF GRANT PIPELINE

Country	Description of activities	Estimated RETF grant	Estimated WB financing	Estimated Delivery
Multiple	**EnRen**: For details see annex slides			
Morocco	**Energy storage test bed** • Assess the performance of different technologies in local weather and O&M conditions • Increase confidence of the stakeholders in the long-term performance of storage technologies in local conditions • Increase local capacity for operation and maintenance	$ 4 million	$0	FY21/22
Vietnam	**Offshore Wind** pre-development and capacity building: • Technical studies (geotech, metocean, LIDAR measurement campaign, navigation, bird and marine mammal studies) • Procurement strategy and transaction advisory • Stakeholder consultation, including on fisheries and other existing uses, supply chain, environmental groups • Government capacity-building to build up central government and provincial expertise for permitting • Training and skills development to avoid labor shortages	$15 million (to be obtained from climate funds in the first instance)	$500 million	FY21/22
Indonesia	**Geothermal** • Advisory services to MEMR for its geothermal tender process and oversight role in GREM including hiring of financial and safeguards consultants for project screening and prioritization	$1 million	$10 million	FY22/23

Note: Table gives an example of what RETF grants may look like based on the more advanced countries in the existing pipeline

Partnerships & Initiatives

Partner	Organization/Initiative Description	Role/Purpose	Relationship
Energy Storage Partnership (ESP)	Energy Storage Partnership (ESP) that will foster international cooperation among 35 partners (IDB, EBRD, IEA, IRENA, UK, India, NRC, ZAE, DTU, among others) to address critical energy storage challenges to enable the rapid uptake of variable renewable energy in developing countries.	Accelerate deployment of sustainable **energy storage** solutions including batteries, thermal storage and other types of energy storage. Inform WBG's and other MDBs investments in energy storage with best practices (policy, procurement, enabling infra.) and sustainable storage solutions adapted to the needs of developing countries.	ESMAP holds the secretariat function of the ESP, and coordinates among partner organizations.
Global Wind Energy Council (GWEC)	The international trade association for the wind power industry. GWEC has convened an Offshore Wind Taskforce that has representation from all the major developers and consultant firms.	The WBG is collaborating with GWEC to ensure strong private sector consultation and engagement on our activities on **offshore wind**, on event organization and delivery, and for targeted knowledge generation including through their Women in Wind initiative.	The WBG has been invited as an observer on the Offshore Wind Taskforce. GWEC will be contracted on a case-by-case basis for events and knowledge generation activities under a Master Agreement.
International Finance Corporation (IFC)	Private sector arm of the World Bank Group	There are multiple partnerships with IFC across the program. ESMAP's work on **energy storage, floating solar, offshore wind and SRMI** has been positioned as WBG initiatives, with IFC a key part of both teams. IFC brings means of consultation with and dissemination to the private-sector.	Where IFC staff are part of joint WBG teams working on ESMAP projects or deliverables, ESMAP funding is used to cover some of their costs. ESMAP is also able to provide country grants to IFC-led teams or co-fund global knowledge generation.
PROBLUE	Umbrella multi-donor trust fund, housed at the World Bank, that supports the sustainable and integrated development of marine and coastal resources in healthy oceans.	PROBLUE is helping co-fund the global and in-country WBG-executed work on environmental and social issues around **offshore wind** development and marine-based **floating solar**.	PROBLUE is sister MDTF managed by the Environment & Natural Resources Global Practice. The intention is for ESMAP to access PROBLUE funding and expertise to help support specific activities.
SRMI Partners	SRMI is an initiative of WB-ESMAP, in partnership with Agence Française de Development (AFD), International Solar Alliance (ISA) and International Renewable Energy Agency (IRENA). It is supported by a Stakeholders Group that includes the African Development Bank (AfDB), the European Investment Bank (EIB), and the Kreditanstalt für Wiederaufbau (KfW).	Join forces to **unlock a pipeline of sustainable and bankable privately-financed projects**. Targeting initially solar, the initiative has been scaling-up to renewables with a focus on solar and wind under WB SRMI program. Leveraging the SRMI approach, EnRen provides an integrated framework leveraging the unique position of the WBG to support governments develop sustainable RE programs to (i) attract the private sector in optimized conditions, (ii) reduce reliance on public finances (limited to critical public investments) and (iii) maximize socio-economic benefits triggered by the projects launched in the country with a specific focus on gender.	ESMAP is leading the overall initiative with a focus of its partners as follows: - AFD on guarantees provided to small scale RE projects through their support to the Africa Trade Insurance Agency (ATI) on their liquidity product (RLSF) in partnership with KfW - ISA on the capacity building to empower the key public stakeholders on the solar value chain - IRENA on the risk mitigation platform to inform on the risk mitigation instruments available

Risks

Risk description	Proposed Mitigation
COVID-19 related risks: implementation delays, changed priorities, reduced energy demand, and other as yet unknown issues	ESMAP will be proactive in understanding the challenges and opportunities that arise and how RE development can be part of the response to COVID (e.g. to install rooftop solar with battery storage to provide backup electricity for healthcare facilities). Initially this may result in a near-term focus on knowledge work while there are restrictions on travel and client engagement is more difficult. There may also be shifts within the sub-sector that the team will need to respond to (decreased investment, enhanced interest in resilience), but we believe our broad program of work is well positioned to adapt.
Insufficient funding for proposed interventions, meaning that the outcome indicators would be impacted accordingly. Reduced funding will likely impact the ability to award country grants, resulting in a higher percentage of funding for global/own-managed work.	ESMAP would seek to scale back ambition according to the resources already committed, with the preference to delay implementation of one or more components.
Lack of donor appetite for proposed Recipient-executed work or a desire for ESMAP to utilize funding provided through other mechanisms.	ESMAP can support clients and WBG teams to apply for climate finance for some of the recipient-executed activities proposed. However, additional global resources are likely to be required to cover the higher transaction costs of such a strategy, and this is also likely to delay implementation of certain activities such as downstream work on offshore wind.
Lack of appetite or willingness to fund proposed Recipient-executed work by key sources of climate finance (e.g. GCF or CIF)	ESMAP would first seek support from CG members represented on these funds; then investigate other potential sources of funding, including attracting additional donor funding for RETF activities through ESMAP.
FCV operating risks, including risk of delayed/canceled implementation, lack of data, sudden change of direction. This could lead to activities being delayed and/or dropped, non-performing activities or an absence of expected results, and/or additional ESMAP resources required to mitigate potential negative impacts.	Specific approaches suitable to different FCV contexts will be adopted, including collaboration with local private sector, non-profit partners and appropriate UN agencies.
Lack of government capacity to overcome the policy/institutional roadblocks preventing the achievement of results. This could require WBG teams to divert additional ESMAP resources towards capacity building rather than implementation; activities could also be delayed.	ESMAP will ensure activities and interventions are planned to an appropriate level according to government capacity. ESMAP knowledge products provide an appropriate baseline analysis to evaluate government capacity for proposed activities.

Energy Sector Management Assistance Program
The World Bank
1818 H Street, NW || Washington DC || USA
www.esmap.org || esmap@worldbank.org

ESMAP
Energy Sector Management Assistance Program

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ENREN CURRENT PIPELINE* IN WIND AND SOLAR (1/2)

		PREPARATION FUNDS (ESMAP)				Public Investment	Risk Mitigation Instruments	Expected Outcomes					
Country	Scope of Project	BETF TA grant	Scope of BETF grant	RETF TA Grant (mUSD)	scope of RETF TA	Total Loan	Total Guarantees	Utility Scale Installed capacity (MW)	VRE integration (enabled MW)	Battery Storage (MWh)	mini-grids/SHS	Private sector leveraged (mUSD)	Newly connected people
Algeria	500 MW solar + VRE integration	1.5	VRE integration and least-cost generation plan	3.5	solar park FS, geotechnical, ESIA	120	75	500	1000	0	0	375	-
Afghanistan	50 MW (solar project (PPP)	1	VRE integration and least-cost generation plan	2	solar park FS, geotechnical, ESIA	65	12	50	0	50	0	75	0
Botswana	200 MW grid-connected solar and 100 MW wind + electrification	2.5	- Least cost generation and transmission planning support with VRE integration study - Locational study (for substation based and solar parks) - Solar deployment strategy - Wind resource assessment (with met mast)	5	- 1 Solar Park: FS, ESIA, Geotechnical studies - 1 wind park: FS, ESIA, Geotechnical studies - Transaction Advisory (Phase 1)	150	10	300	0	50	0	200	250,000
Burkina Faso (mini-grid)	mini-grids as part of a RE project for 300 MWp of solar parks with battery storage			1	transaction advisory (mini-grids)	loan access/solar (170m)	10	10	0	30	mini-grids	25	200,000
Burundi	mini-grids			1	transaction advisory (mini-grids)	40	5	10	0	30	mini-grids	15	200,000
DRC	mini-grids	2	pre-FS and technical studies	4	transaction advisory (mini-grids), feasibility studies of mini-grids	500	25	100	0	300	mini-grids	250	2,000,000
Ethiopia	mini-grids			1	transaction advisory (mini-grids)	500	12	10	0	30	mini-grids	15	1,500,000
Indonesia	VRE integration + hybridization	0.5	solar strategy			300	0	200	0	200	0	100	500000
Kenya	300 MW grid-connected solar	1	- Least cost generation and transmission planning support with VRE integration study - Locational study (for substation based and solar parks)	6	- 3 Solar Park: FS, ESIA, Geotechnical studies - Transaction Advisory (Phase 1)	75	0	300	150	50	0	225	0
Liberia	150 MW Solar (hydro collocated) + 100 MW hydro			1	transaction advisory	200	15	250	0	0	0	112.5	0

(*) Indicative pipeline as of January 2020

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ENREN CURRENT PIPELINE* IN WIND AND SOLAR (2/2)

		PREPARATION FUNDS (ESMAP)				Public Investment	Risk Mitigation Instruments	Expected Outcomes					
Country	Scope of Project	BETF TA grant	Scope of BETF grant	RETF TA Grant (mUSD)	scope of RETF TA	Total Loan	Total Guarantees	Utility Scale Installed capacity (MW)	VRE integration (enabled MW)	Battery Storage (MWh)	mini-grids/SHS	Private sector leveraged (mUSD)	Newly connected people
Maldives	solar rooftop integration and guarantees	0.5	VRE integration + planning			38	36	40	0	100	0	50	0
Mali (grid-connected)	300 MW grid-connected solar and VRE integration	0	Already financed by SOP #1 project	1	transaction advisory	40	0	300	0	300	0	360	0
Mali (mini-grids)	mini-grids			1	transaction advisory (mini-grids)	already approved (100m)	5	10	0	30	mini-grids	15	200,000
Namibia	200 MW CSP, 100 MW PV, 100 MW wind	2.5	- Least cost generation and transmission planning support with VRE integration study - Locational study (for substation based and solar parks) - Solar deployment strategy - Wind resource assessment (with met mast)	6.5	- 2 Solar Park+CSP: FS, ESIA, Geotechnical studies - 1 wind park: FS, ESIA, Geotechnical study - Transaction Advisory	100	0	400	0	50	0	895	0
Nigeria	mini-grids	0.5	PPP model strategy	2	transaction advisory	already approved (350m)	40	100	0	200	mini-grids	200	1,500,000
Pakistan	1 GW of CSP, 1 GW grid-connected solar & 1 GW of wind and VRE integration	0	wind resource assessment (with met mast) solar (financed under BEIS funds - already allocated)	9	5 solar parks-CSP: FS, ESIA, geotechnical studies transaction advisory (phase 1)	350	0	3000	6000	300	0	5450	0
Tunisia	100 MW CSP + 400 MW PV	1	pre-FS and technical studies	3	solar park FS, geotechnical, ESIA Transaction advisory	70	0	500	500	50	0	1500	
Vietnam	2 GW of solar parks, 1 GW of wind onshore and 3 GW of wind offshore	1	wind resource assessment (with met mast) solar (financed under BEIS funds - already allocated)	8.5	3 solar parks: FS, ESIA. Geotechnica studies 2 wind parks: FS, ESIA, geotechnical studies	300	0	6000	5500	300	0	10200	0
Zambia	VRE integration	1	technical studies			75	0		300	50	0		
Zanzibar	Enabling support for 30- 50 MW PV and Sector strengthening	0.5	VRE integration + planning			115	4	50	50	45	0	38.5	1,000,000
Zimbabwe	100 MW solar	1	VRE integration and least-cost generation plan	5	solar park FS, geotechnical, ESIA Transaction advisory	no loans possible	0	100	0	0	0	75	0
Total		**16.5**		**60.5**		**3038**	**249**	**12230**	**13500**	**2165**	**0**	**20176**	**7,350,000**

(*) Indicative pipeline as of January 2020

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