



The Commonwealth

Toolkit for developing business cases for clean energy investments in Small Island Developing States (SIDS)

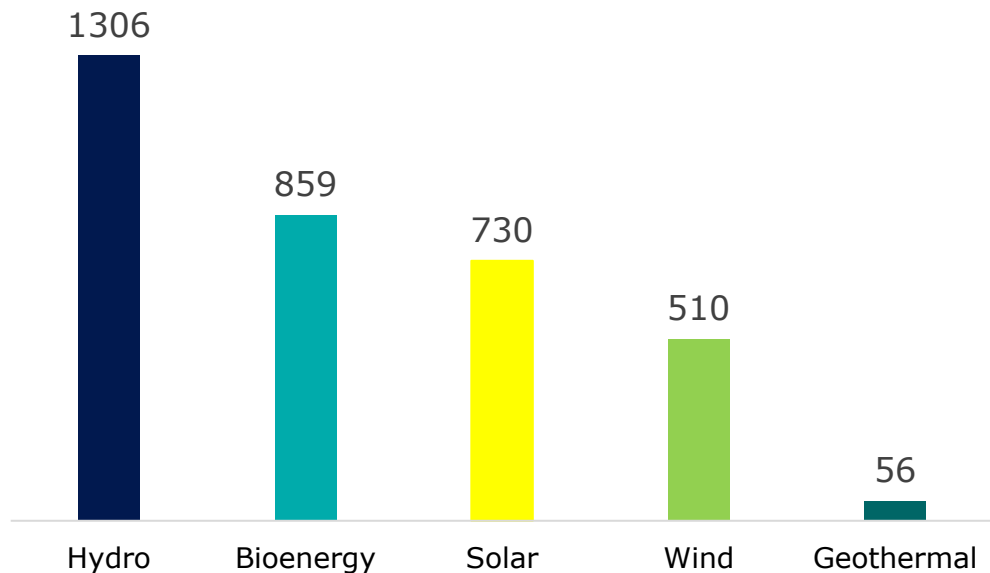
December 2021

Renewable energy in Small Island Developing States (SIDS)

Despite significant RE resource potential, SIDS are highly dependent on imported fossil fuels to meet their energy needs, including electricity generation

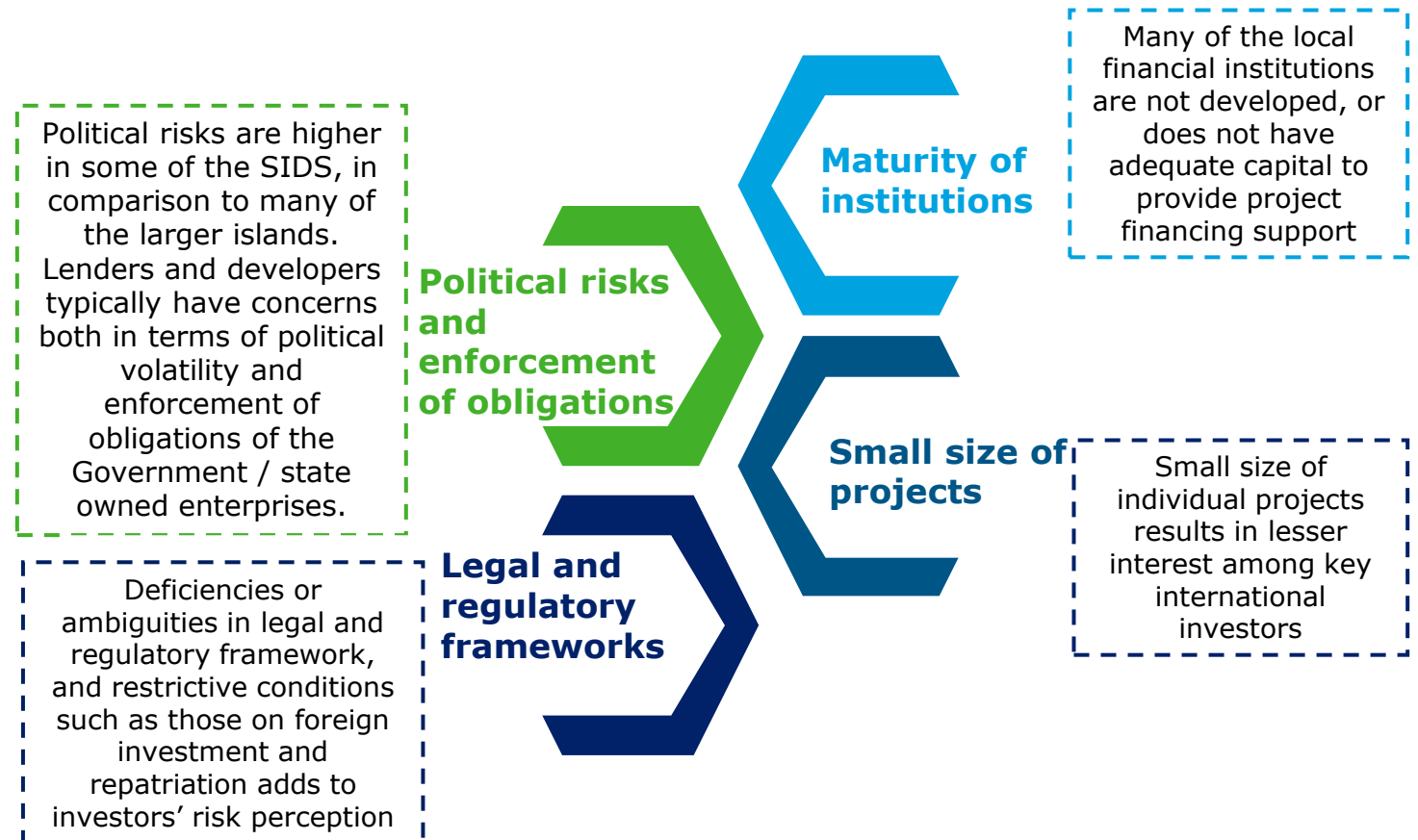
Considering 36 SIDS, the total RE capacity was ~3.46 GW by 2019 from ~2.29 GW in 2013

SIDS RE source wise capacity (MW) in 2019



Source: IRENA

Key challenges impeding RE deployment in SIDS



Context for developing the toolkit

The SIDS Clean Energy Toolkit is envisaged to assist in developing investment grade business case and strategies for clean energy transition of SIDS.



Small Island Developing States (SIDS)



Concern areas for SIDS

Climate change impact mitigation and adaption, improvement of energy security



SIDS commitments during UN Climate Action Summit

100% RE target by 2030
Net zero emission target by 2050



Primary challenges

Lack of sufficient funding (private and public) to achieve the sustainable energy transition.

SIDS Clean Energy Toolkit

Jointly conceptualized by
Commonwealth Secretariat
and Sustainable Energy for
All (SEforALL)

Toolkit for for developing
investment grade business
cases for SIDS.

Ultimate use of Clean Energy toolkit by Commonwealth Secretariat and SE4ALL

Develop country specific clean energy business cases that detail cost-benefit analysis and investment grade strategies needed to unlock investment

Guide the formulation of recommendations to maximize the energy and climate benefits of a clean energy pathway.

Build resilience and support leveraging of socio-economic opportunities of clean energy transition.

Objectives of the toolkit

SIDS are committed to build a sustainable energy sector and have made a collective commitment to achieve 100% renewable energy targets by 2030 and net zero emissions by 2050

Toolkit to address key questions



1



What is **current trajectory** towards achieving 100% RE by 2030 and net zero emissions by 2050?



2



What is current trajectory in achieving SDG 7 on ***universal access to clean, affordable, reliable and modern energy*** for all by 2030?



3



What are the gaps to achieve the targets on current trajectories?



4



What are the ***expected costs, savings, and the finance*** required for achieving the targets?



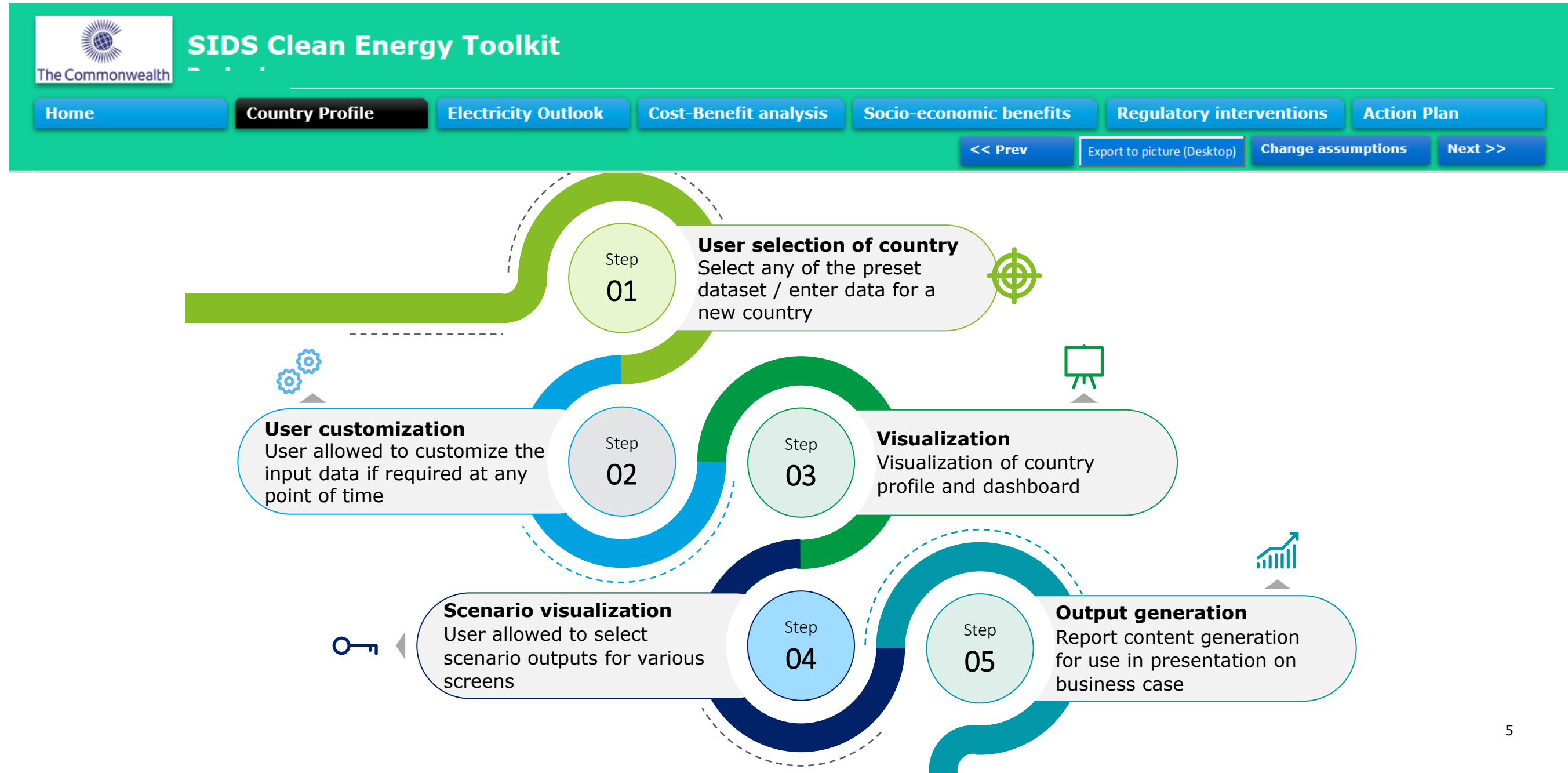
5



What are ***socio-economic benefits***? How do they differ under different strategies and scenarios?

Conceptual visualization

Toolkit will showcase trajectories, policy target shortfalls, investment requirements, benefits, policy recommendations etc.



Key features of the toolkit

Filled-in information pack for countries

- For selected countries, the toolkit already has captured a substantial data set related to economics and energy sectors.
- This allows the toolkit to be utilized without any manual addition of data points for the selected countries.

Key country data	Key data based on global benchmarks
Source wise electricity generation	RE source wise capital cost*
Electricity energy requirement	RE source wise levelized cost of energy (LCOE)*
GDP, employment and other macroeconomic data	RE source wise capacity utilization factor (CUF)*
Nationally Determined Contribution (NDC) targets of countries	Fuel source wise emission factors for electricity generation
RE roadmaps of countries	
Utility electricity cost information	
Carbon emissions	
Status of regulatory and policy measures	

* With ability to use country specific data, if the information is made available.

User customization on key data points and scenarios

- In spite of readily available input information, the toolkit allows users to deviate from the default values, and to select custom inputs through a graphical interface.

User customization allowed for:

RE source wise capital cost, CUF and LCOE

Project financing mix

Grid enhancement costs for RE

Energy storage support and corresponding costs for RE

Exchange Rate

Escalation Rate Of Utility Average Power Purchase Cost

Carbon Price (USD per tonne of CO2)

Demand reduction due to energy efficiency

Illustration (screen shot from the toolkit)

Financing Inputs	Unit	Selected Value	Use Sliders to change values
Equity Contribution	%	20.00%	<input type="text"/>
Debt Contribution	%	80%	<input type="text"/>
Rate of Interest	%	7.23%	<input type="text"/>
Return on Equity	%	7.82%	<input type="text"/>
Tax Rate	%	15.00%	<input type="text"/>
Discount Rate	%	6.48%	<input type="text"/>

Levelized cost of electricity, for RE	Unit	Selected Value	Use Sliders to change values
Solar PV	USD/kWh	0.055	<input type="text"/>
Wind	USD/kWh	0.053	<input type="text"/>
OffShore Wind	USD/kWh	0.115	<input type="text"/>
Small Hydro	USD/kWh	0.047	<input type="text"/>
Other RE	USD/kWh	0.066	<input type="text"/>

Three scenarios



Business as usual (BAU)
Scenario where existing trend of RE capacity expansion is continued.



Planned Pathway (Govt. Trajectory)
Scenario as per RE targets in Government plans or roadmaps



Preferred Pathway
100% RE by 2030, net zero emissions by 2050

Ability to highlight areas for improvement

- Ability to highlight required policy measures, and other interventions

Basic institutional, policy and regulatory strategies		
Strategies that could be adopted	Strategies that could be improved / enhanced	Strategies that have already been adopted
RE evacuation plan - Plan or policy or framework for grid enhancements to support RE evacuation	Policy targets for RE/RE roadmap Net metering for distributed solar PV	NDC targets and commitments Net zero or carbon-neutral target pledges Appointment of nodal agency for RE Allow IPPs to set up RE projects Grid code and guidelines for RE connectivity
Advanced institutional, policy and regulatory strategies		
Strategies that could be adopted	Strategies that could be improved / enhanced	Strategies that have already been adopted
RE quota or portfolio standards - Targets for mandatory procurement of RE Carbon tax or carbon pricing Emission trading program RE forecasting regulations - Framework for forecasting, scheduling and deviation settlement for renewables		RE integration studies/policy -
Market demand stimulation and market transformation		
Strategies that could be adopted	Strategies that could be improved / enhanced	Strategies that have already been adopted
Feed-in-tariff for RE - Generic predefined tariff approved by regulator for each		

Other features

- Automatic calculation of latest exchange rate
- Ability to export output screens to images
- Scalable – to allow addition of more countries
- Considers a customizable level of energy storage investments also
- Displays potential benefits of energy efficiency investments

Limitations

- The toolkit focuses on only electricity sector. This also results in some parameters such as 'net zero emission' displaying different results as compared to energy sector wide numbers.
- Toolkit is dependent on country specific data, user inputs and industry benchmarks. However, most industry benchmarks are typically available at a global level, and not separately for SIDS. In such cases, global benchmarks are adopted.
- Considering data limitations, many of the trend-based estimations are done with limited years of past data (three to five years)

Key analysis and results

Toolkit Analysis

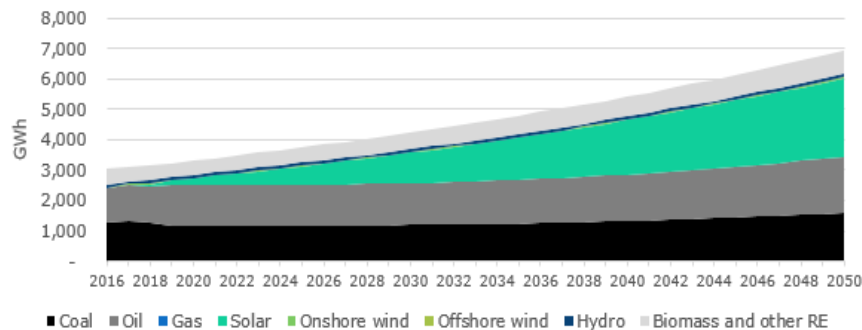
1: What is the current trajectory towards achieving 100% renewable energy by 2030 and net zero emissions by 2050?

- Estimate under three different scenarios

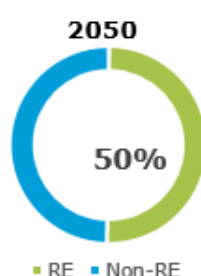
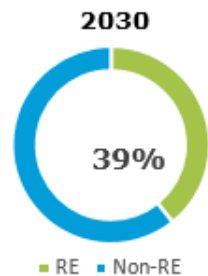


Business as usual (BAU)

Generation mix - Business as usual

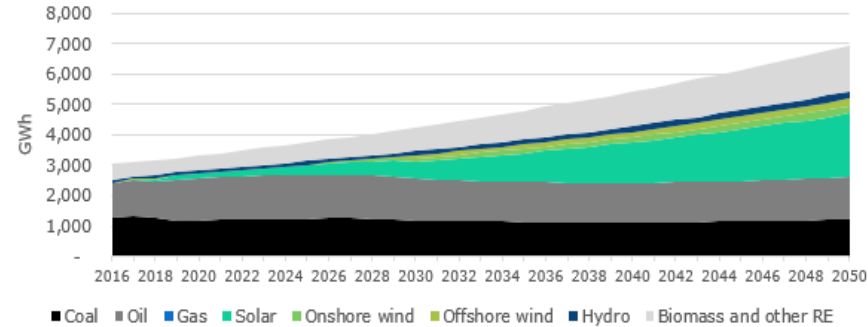


RE Share - Business as usual

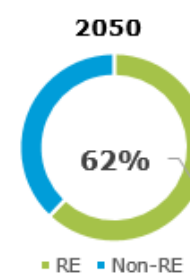
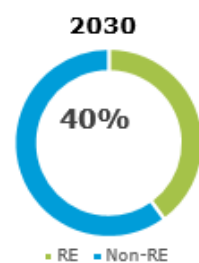


Planned Pathway (Govt. Trajectory)

Generation mix - Planned trajectory (Govt. policy)

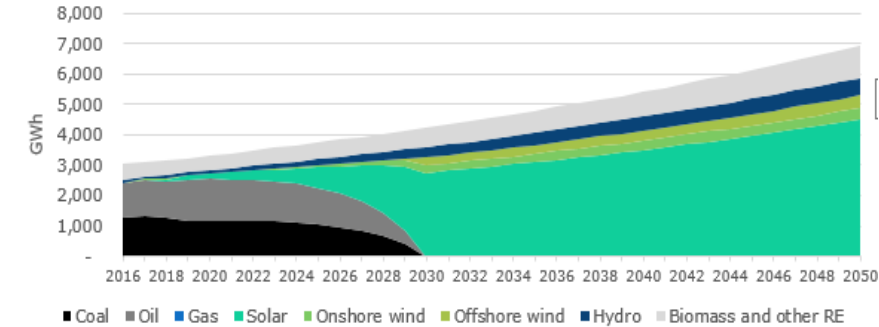


RE Share - Planned trajectory

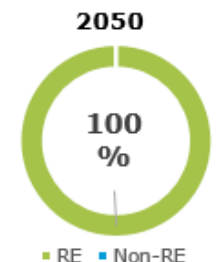
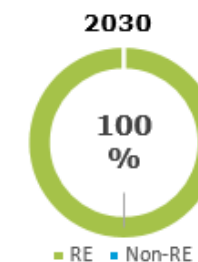


Preferred Pathway 100% RE by 2030, net zero emissions by 2050

Generation mix - Preferred trajectory

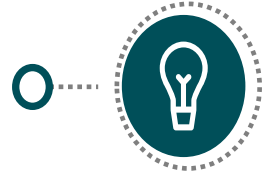


RE Share - Preferred trajectory

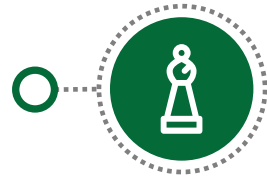


Toolkit Analysis – costs and returns, savings

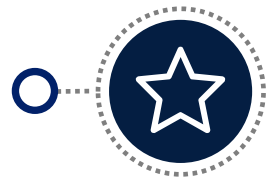
2: What are the expected costs, returns, and the finance required of a clean energy transition and climate resilient energy system?



Investment in Generation, grid enhancement and energy storage

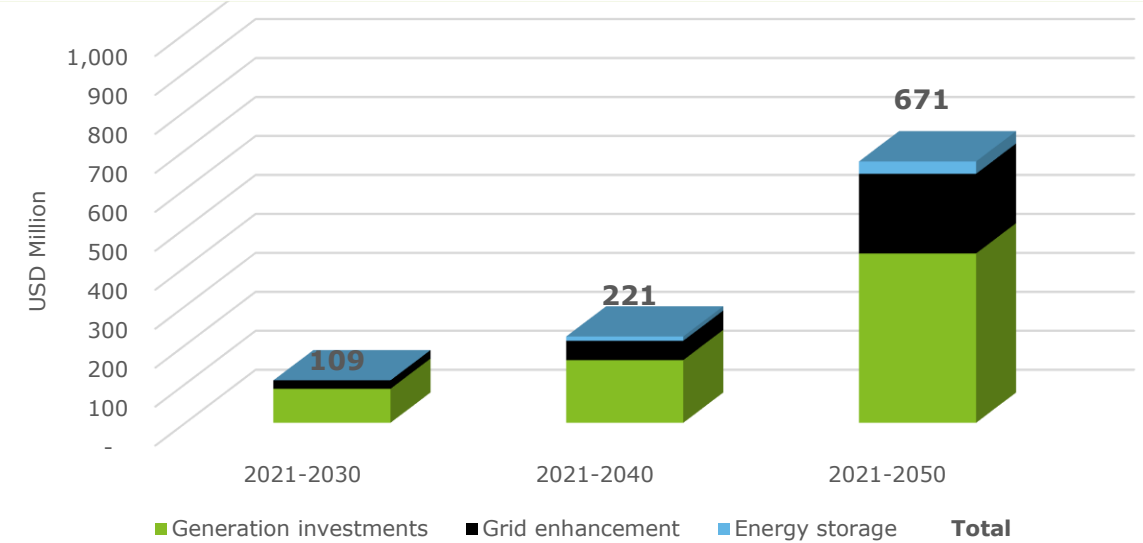


Savings on account of replacement of fossil fuel-based power generation. Expected RE technology cost reduction to support transition

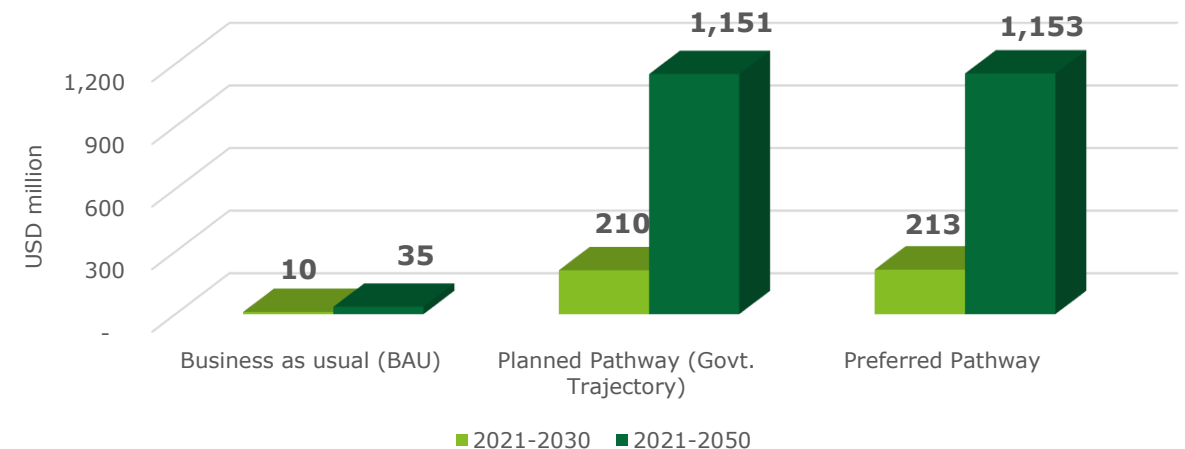


Potential savings from Energy Efficiency measures also analyzed

Investment required

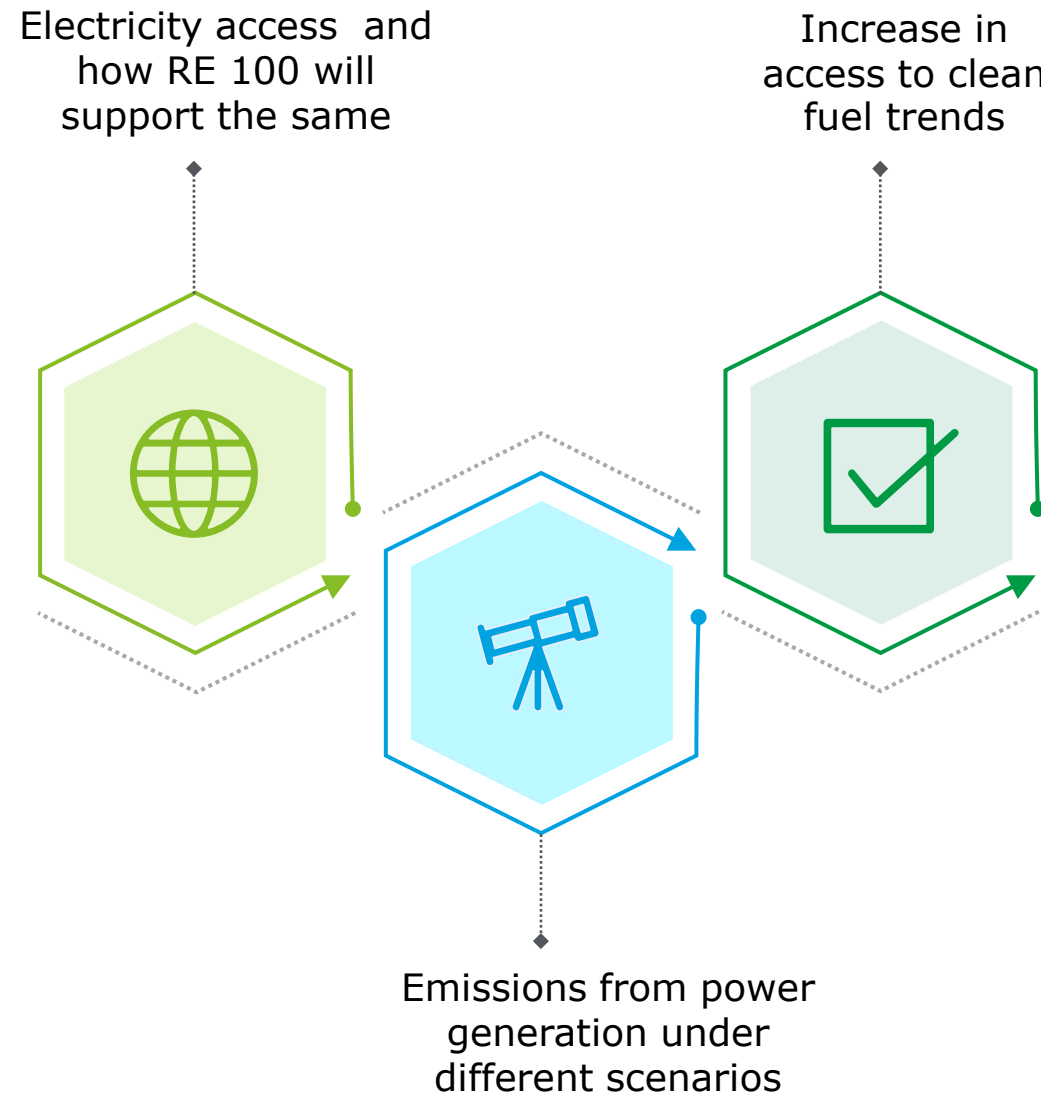


Net Present Value (NPV) of savings

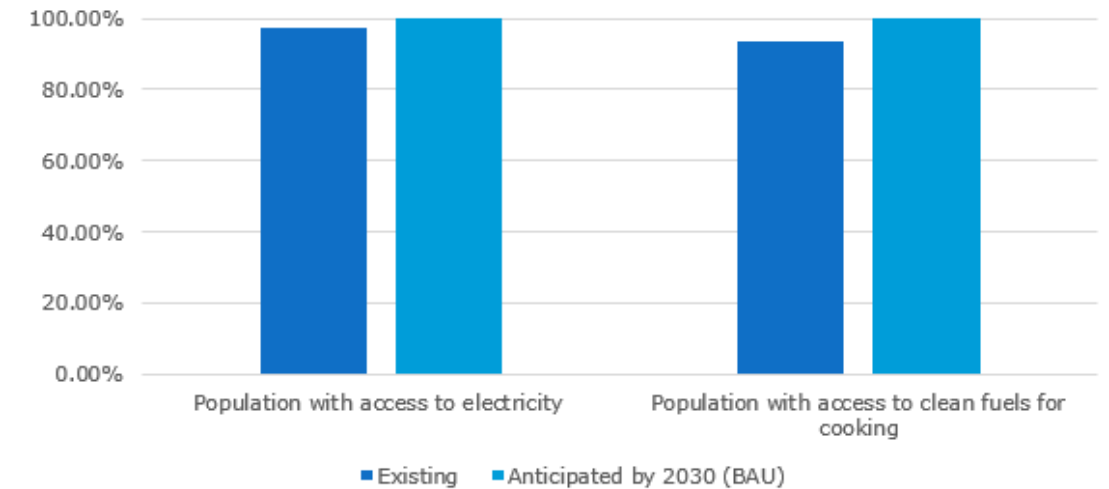


Toolkit Analysis

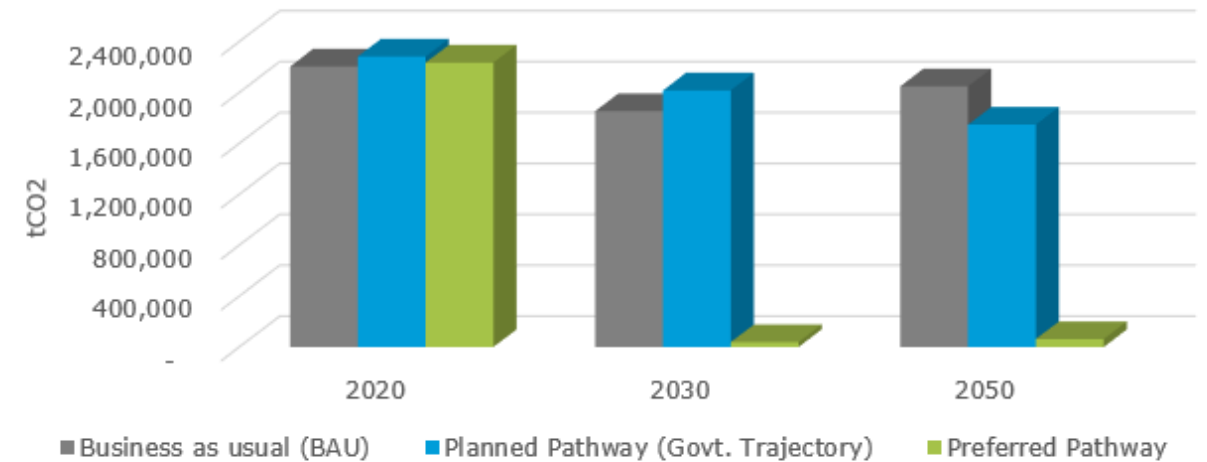
3: What is the current trajectory in achieving SDG 7?



Improvement in access to clean energy and clean cooking



Net emissions from generation of electricity



Toolkit Analysis – socio-economic benefits

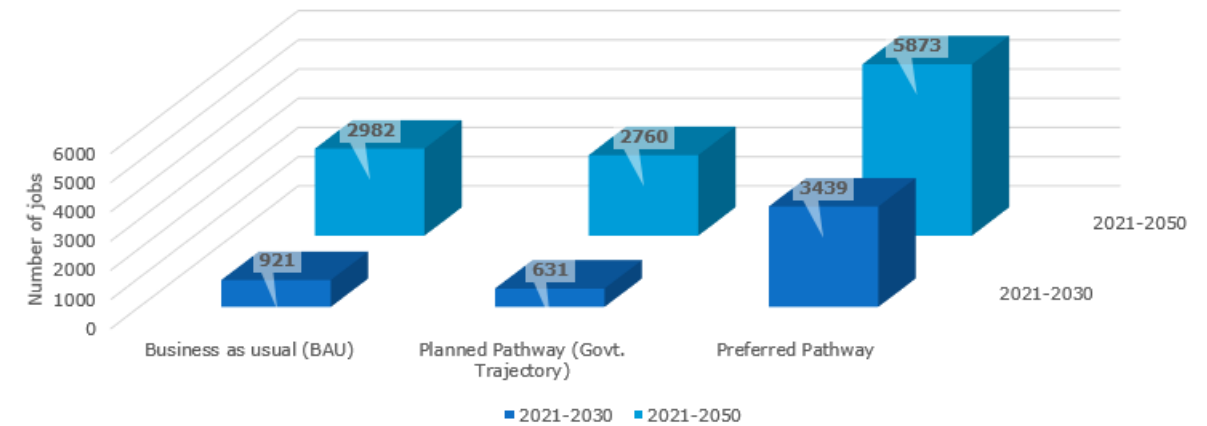
4: What are socio-economic benefits? How do they differ under different strategies and scenarios?

Expected direct job creation quantified

SIDS to avoid forex outflow on account of reduced fossil fuel imports

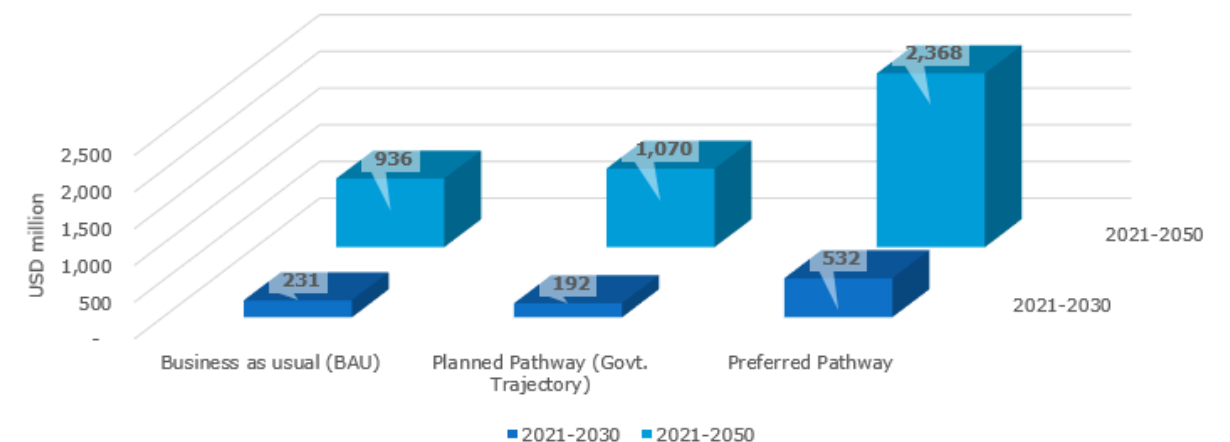
Water usage in power generation to reduce with increase in RE capacity

Direct job creation, within the country, for construction and O&M of RE projects



Avoided outflow of foreign exchange

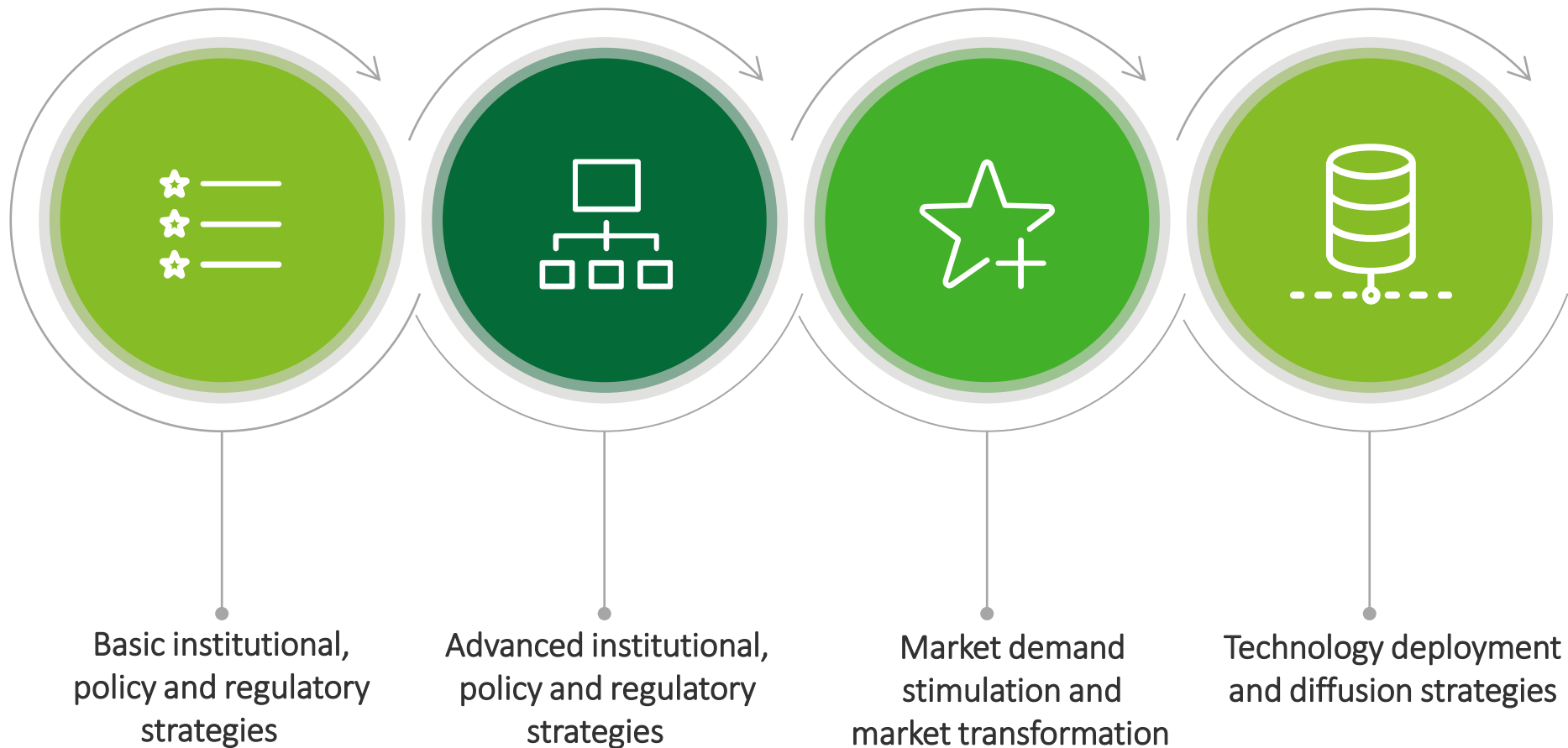
NPV of avoided foreign exchange outflow



Toolkit Analysis - gaps

5: What are and how big are the gaps to achieve targets based on current trajectories?

Depending upon current status of RE in the country, gaps identified based on international best practices with select areas of action for the country



*******END*******



The Commonwealth Secretariat and Sustainable Energy for ALL acknowledge the contribution of Deloitte Touché Tohmatsu India LLP in developing this Toolkit.