

INCLUDES PRELIMINARY FINDINGS,  
SUBJECT TO CHANGE



# Derisking Renewable Energy Investment

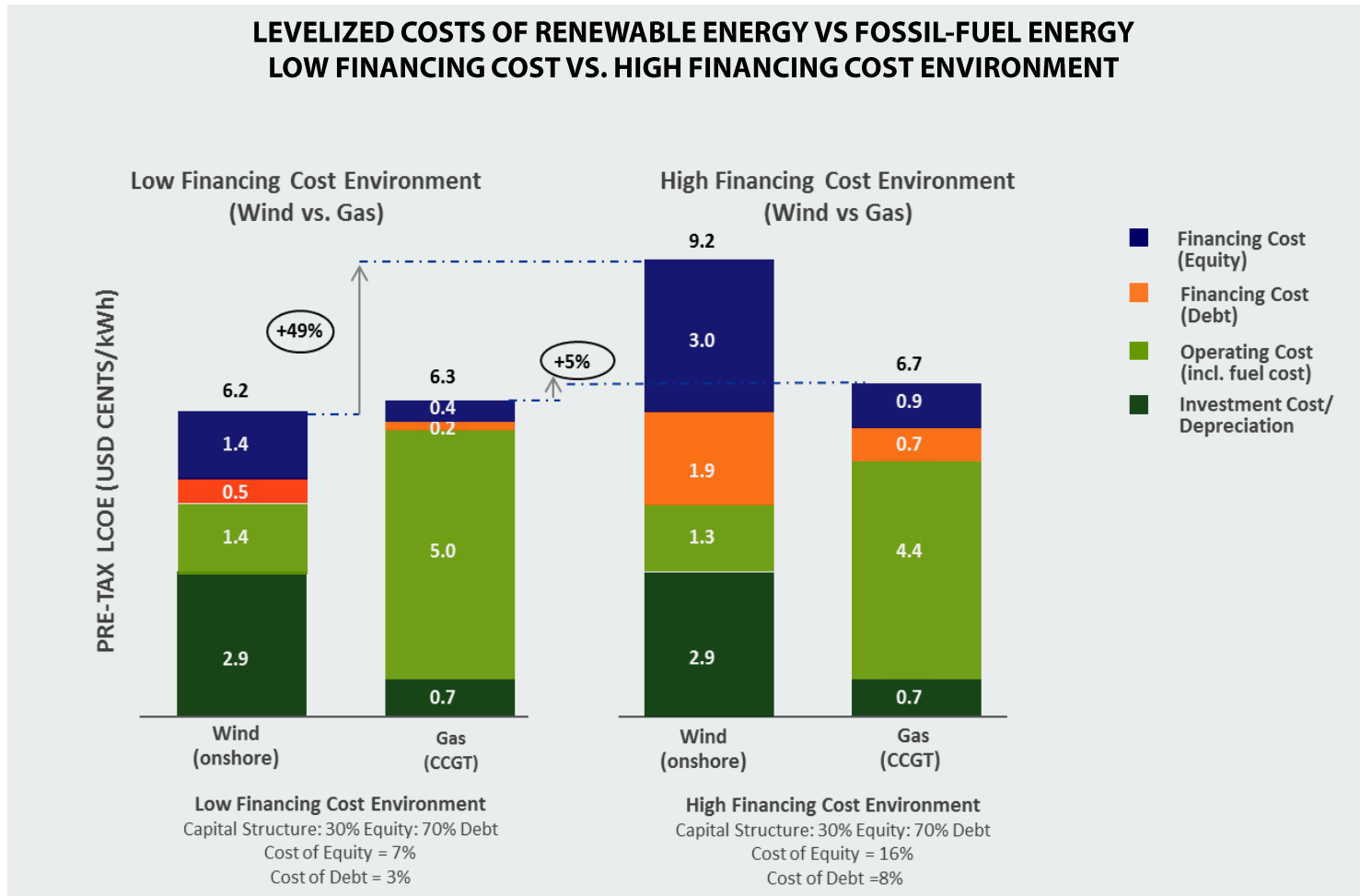
## Cost-Efficient Interventions to Promote Affordable Renewable Energy



# **I. Utility-Scale Renewable Energy**

# Derisking Renewable Energy Investment

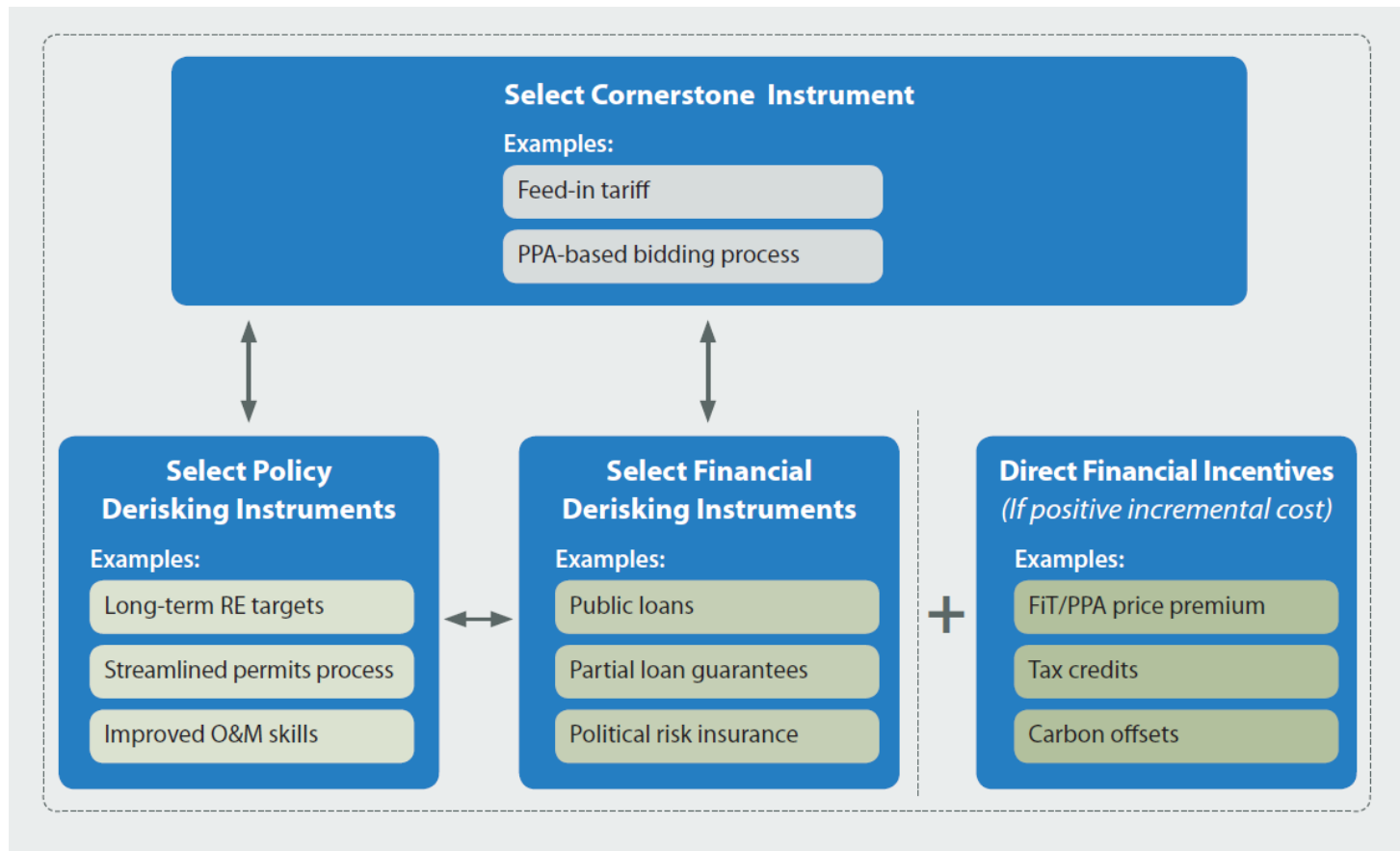
## High financing costs penalise renewable energy



Source: UNDP, Kazakhstan: *Derisking Renewable Energy Investment (2017)*. See Annex A of the report for full assumptions. All assumptions (technology costs, capital structure etc.) except for financing costs are kept constant between the developed and developing country. Operating costs appear as a lower contribution to LCOE in developing countries due to discounting effects from higher financing costs.

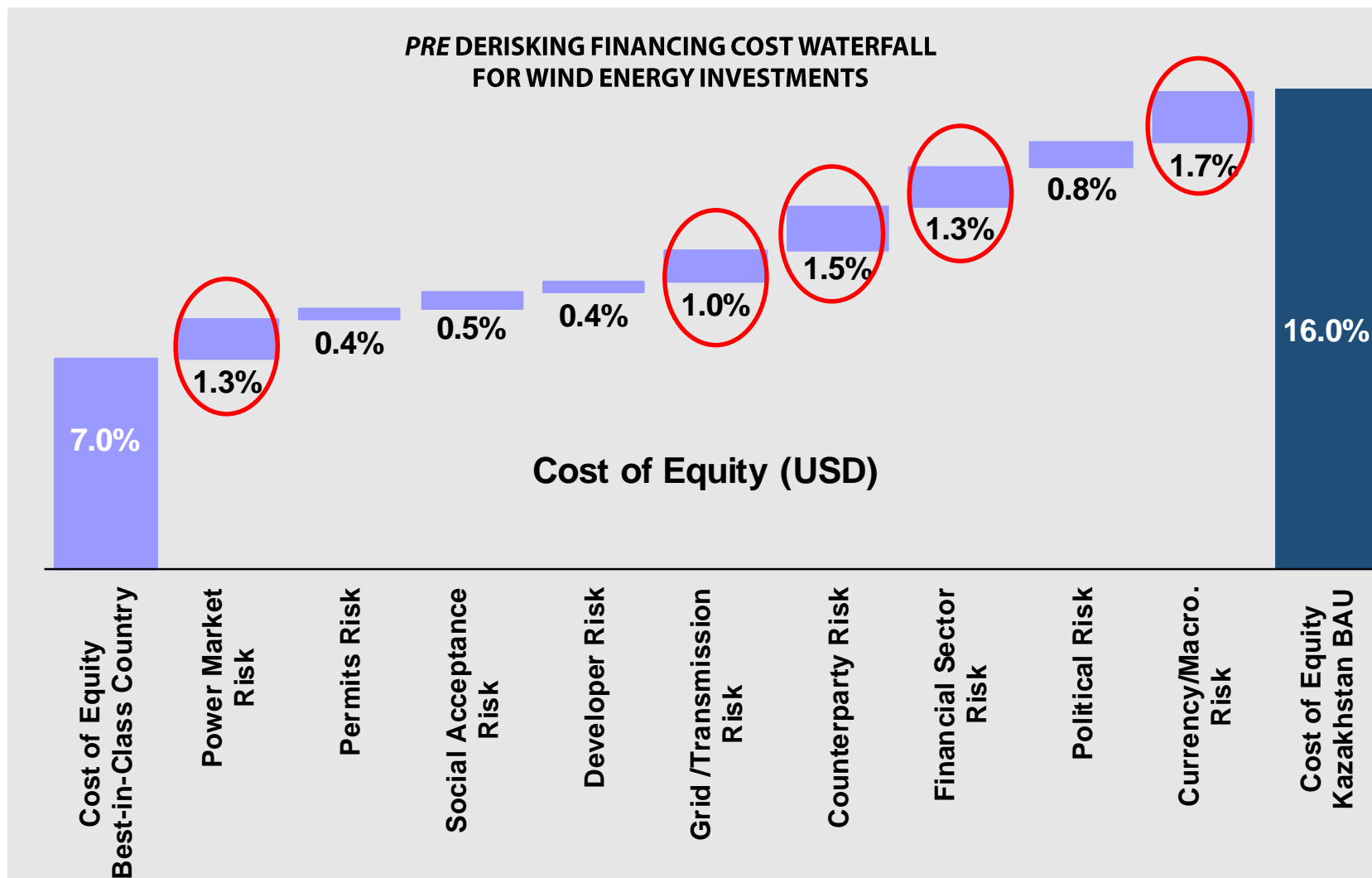
# Derisking Renewable Energy Investment

## Public instrument packages



# Derisking Renewable Energy Investment

## Kazakhstan (1): Financing cost waterfall, wind

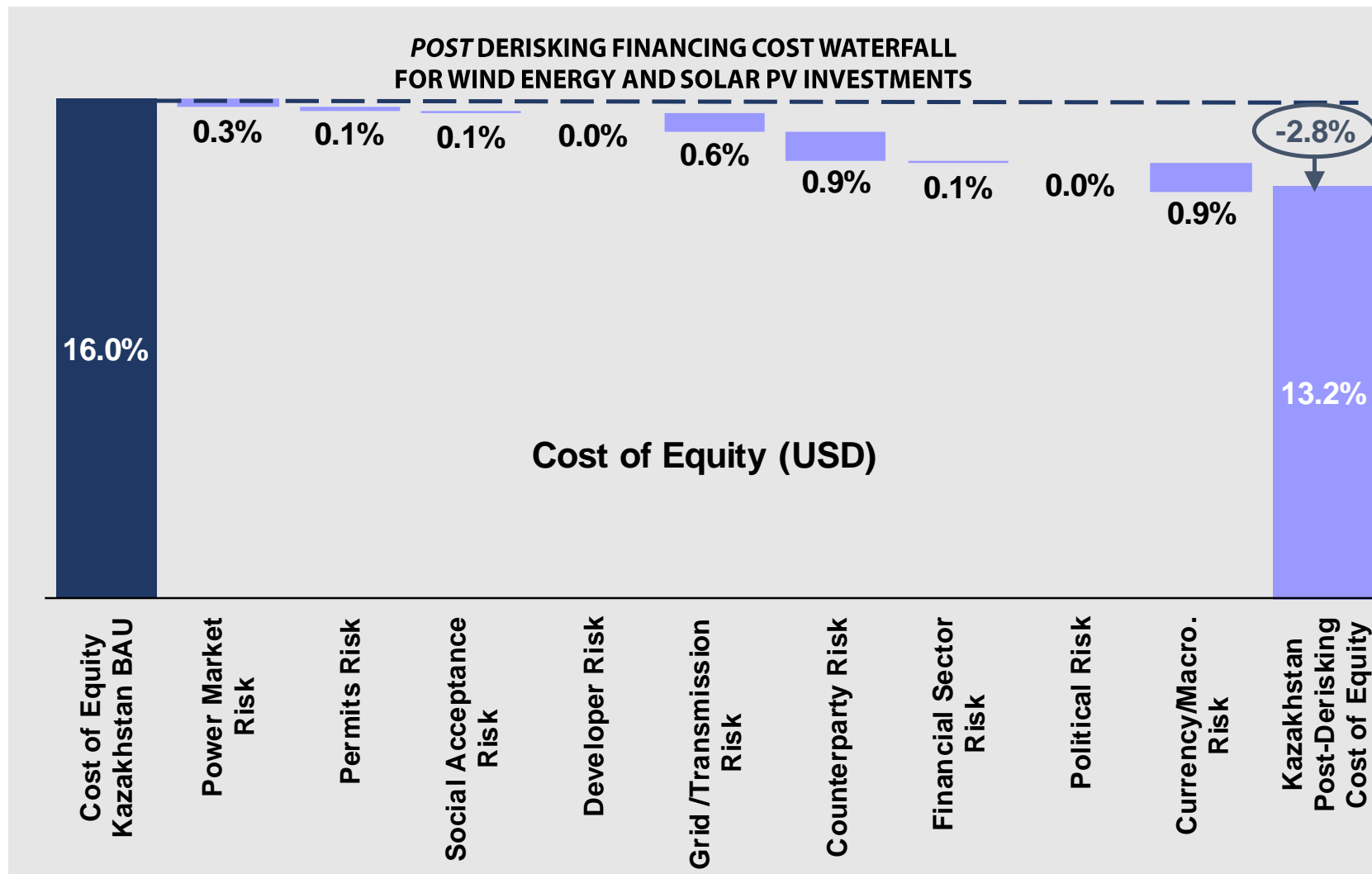


# Derisking Renewable Energy Investment

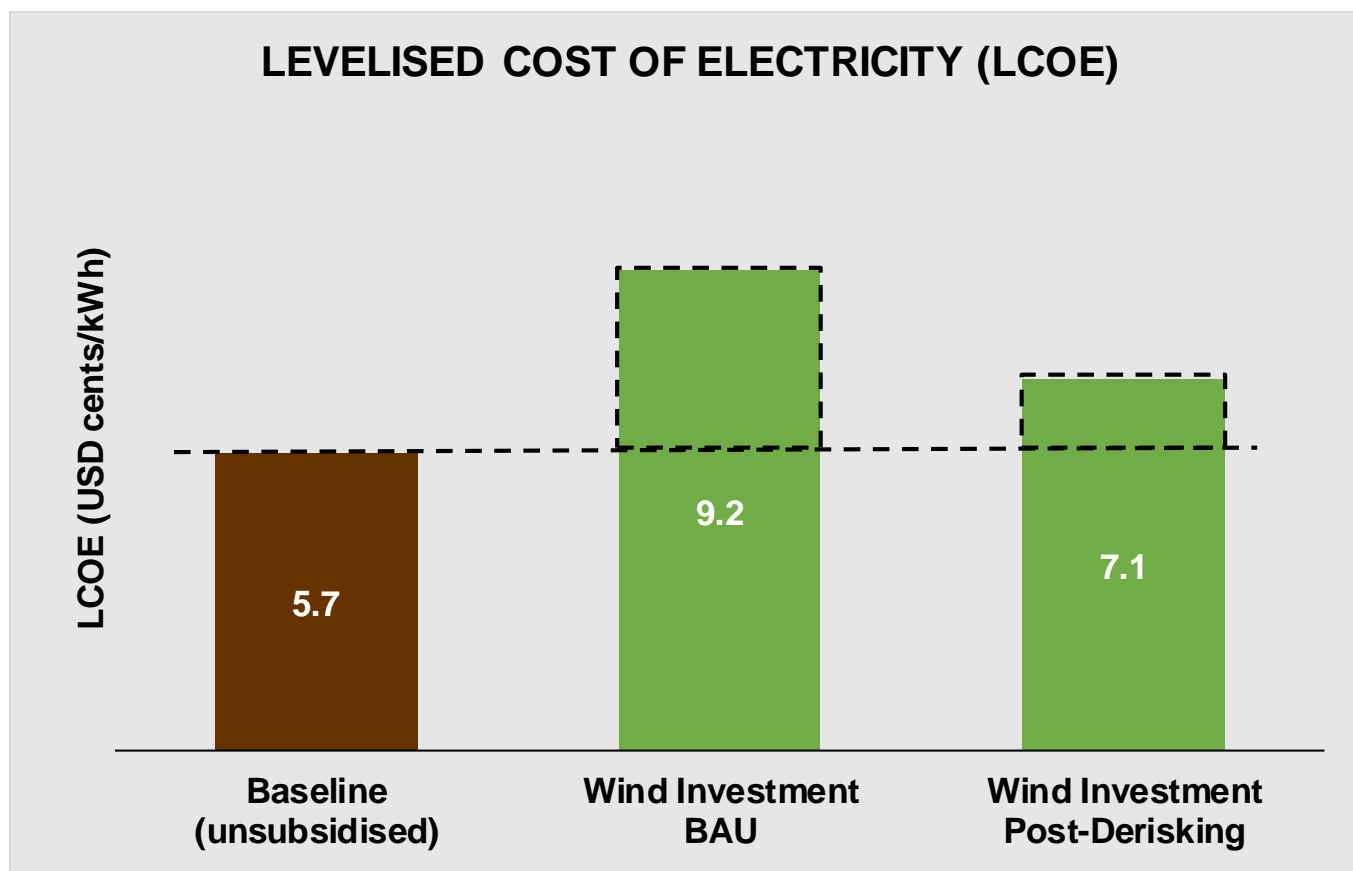
## Kazakhstan (2): Selecting public instruments, wind

Risk Category	Policy Derisking Instruments	Financial Derisking Instruments
<b>Power Market Risk</b>	<ul style="list-style-type: none"> <li>Update transparent, long-term national renewable energy strategy</li> <li>Establish and run IPP bidding process, with bankable PPA</li> <li>Establish a renewable energy office in the regulator</li> </ul>	NA
<b>Permits Risk</b>	<ul style="list-style-type: none"> <li>Streamlined process for RE permits (dedicated one-stop shop)</li> <li>Contract enforcement and recourse mechanisms</li> </ul>	NA
<b>Social Acceptance Risk</b>	<ul style="list-style-type: none"> <li>Awareness-raising campaigns</li> </ul>	NA
<b>Developer Risk</b>	<ul style="list-style-type: none"> <li>Technology R&amp;D</li> <li>Support for industry associations</li> </ul>	NA
<b>Grid/Transmission Risk</b>	<ul style="list-style-type: none"> <li>Strengthen KEGOC's grid management capacity</li> <li>Transparent, up-to-date grid code</li> <li>Policy support for long-term national transmission/grid road-map</li> </ul>	<ul style="list-style-type: none"> <li>Take-or-pay clause in PPA</li> </ul>
<b>Counterparty Risk</b>	<ul style="list-style-type: none"> <li>Reform and maintain creditworthy Financial Settlement Centre structure</li> </ul>	<ul style="list-style-type: none"> <li>Government guarantee for PPA payments</li> <li>Public loans to IPPs</li> </ul>
<b>Financial Sector Risk</b>	<ul style="list-style-type: none"> <li>Fostering financial sector reform towards green infrastructure investment</li> <li>Strengthening financial sector's familiarity with renewable energy and project finance</li> </ul>	<ul style="list-style-type: none"> <li>Public loans to IPPs</li> </ul>
<b>Political Risk</b>	NA	NA
<b>Currency/ Macroeconomic Risk</b>	NA	<ul style="list-style-type: none"> <li>Partial indexing of PPA tariff to hard currencies</li> </ul>

# Derisking Renewable Energy Investment Kazakhstan (3): Impact of public instruments, wind



# Derisking Renewable Energy Investment Kazakhstan (4): Levelised costs, wind





# Derisking Renewable Energy Investment Kazakhstan (5): Measuring impact, wind

## Report's 2021 (5 year) wind investment targets: 1 GW

If **USD 275.6 million** is invested in public derisking measures to promote wind energy in Kazakhstan, this can have the following impacts:



### **Catalysing private sector funding**

- USD 1.6 billion in private sector investment in wind



### **Generating economy-wide savings** (over 20 years)

- USD 804.7 million savings due to derisking (lower wind costs)
- USD 310.6 million savings due to avoided fossil fuel subsidies



### **Better affordability for end-users**

- Wind energy generation costs decrease from USD 9.2 cents/kWh to USD 7.1 cents/kWh



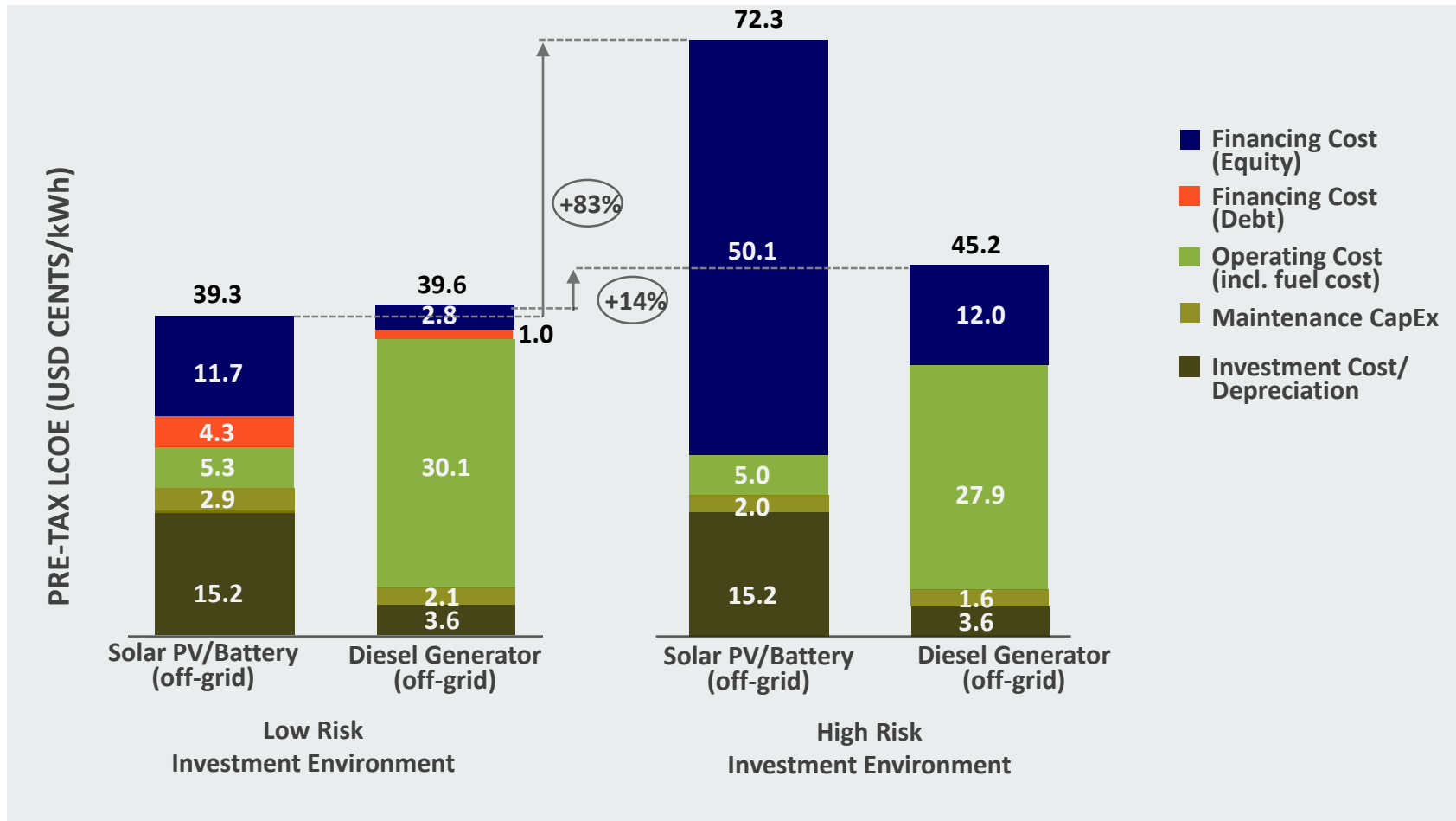
### **Benefit the environment**

- Emission reductions of 56.3 million tCO<sub>2</sub>e over 20 years

## **II. Small-scale Renewable Energy**

# Theory of change: High financing costs penalize small-scale RE

LEVELIZED COSTS OF OFF-GRID SOLAR PV/BATTERY VS DIESEL GENERATOR MINI-GRIDS



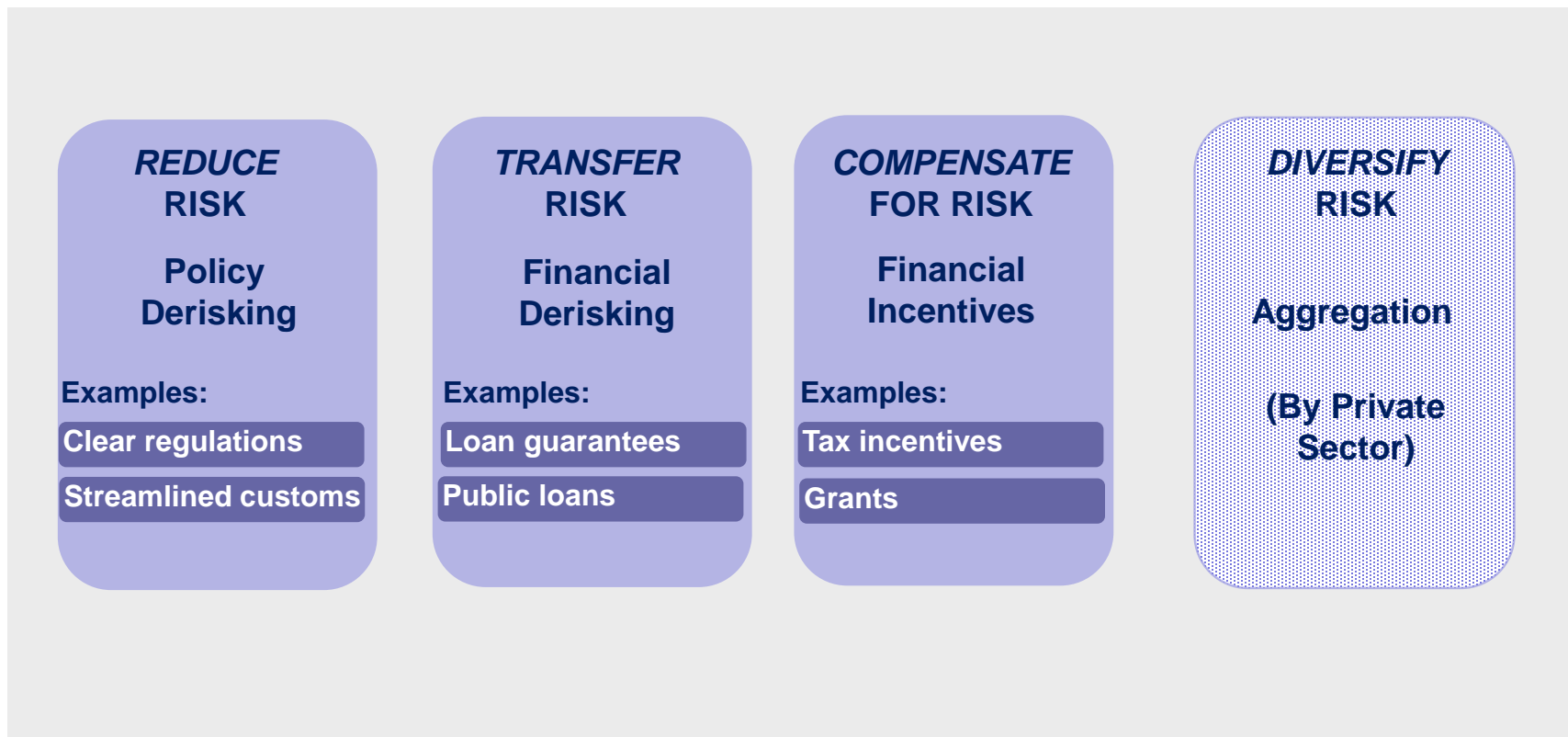
Source: UNDP/ETH Zurich, Preliminary calculations

Generation costs only; Assumes equal annual electricity output; Solar PV/Battery System Size @25 kW, Diesel System Size @ 14 kW, Investment Life= 20 years, Replacement: Battery (5 years), Inverters (10 years), Generator (10 years), Diesel Fuel Price:\$0.81/L, Inflation:2%; Loan tenor = 10 years, where applicable

# Packages of public instruments

## Addressing risk-return profile of investments

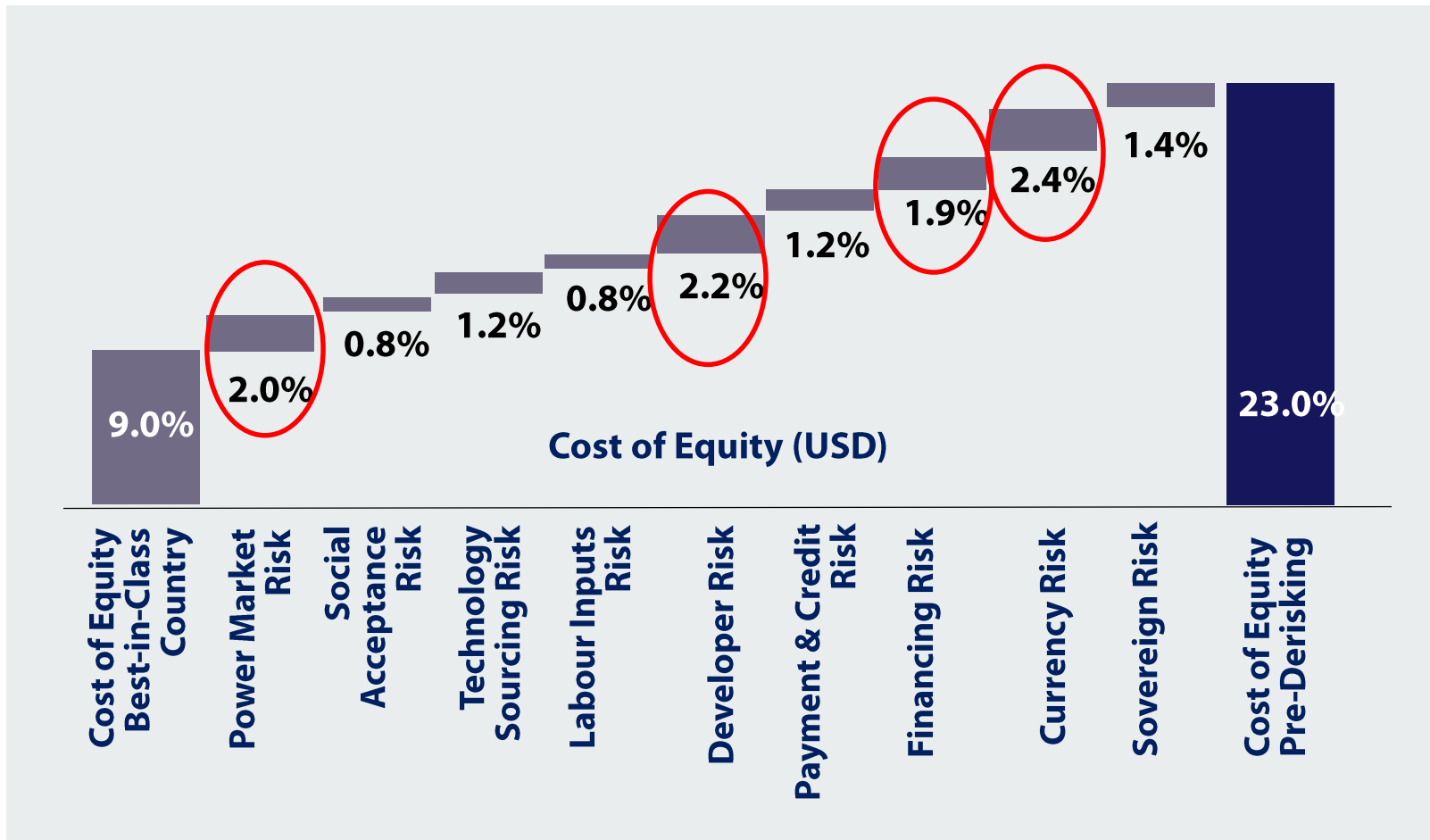
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Source: UNPD/ETH Zurich (2016)

# Derisking Renewable Energy Investment Mini-grid Kenya – financing cost waterfall

PRELIMINARY FINDINGS



## **III. Climate Aggregation Platform**

# Climate Aggregation Platform Overview



## CLIMATE AGGREGATION PLATFORM



### GLOBAL INDUSTRY WORKING GROUP

*(Composed of key industry actors)*

#### OUTPUTS:

- Strategic work programme
- Regional, national, technical sub-committees



### STANDARDISED TOOL KITS

#### OUTPUTS:

- Develop and disseminate best practice, standardised:
  - Template contracts
  - Installation and O&M
  - Due diligence metrics
  - Transaction structures



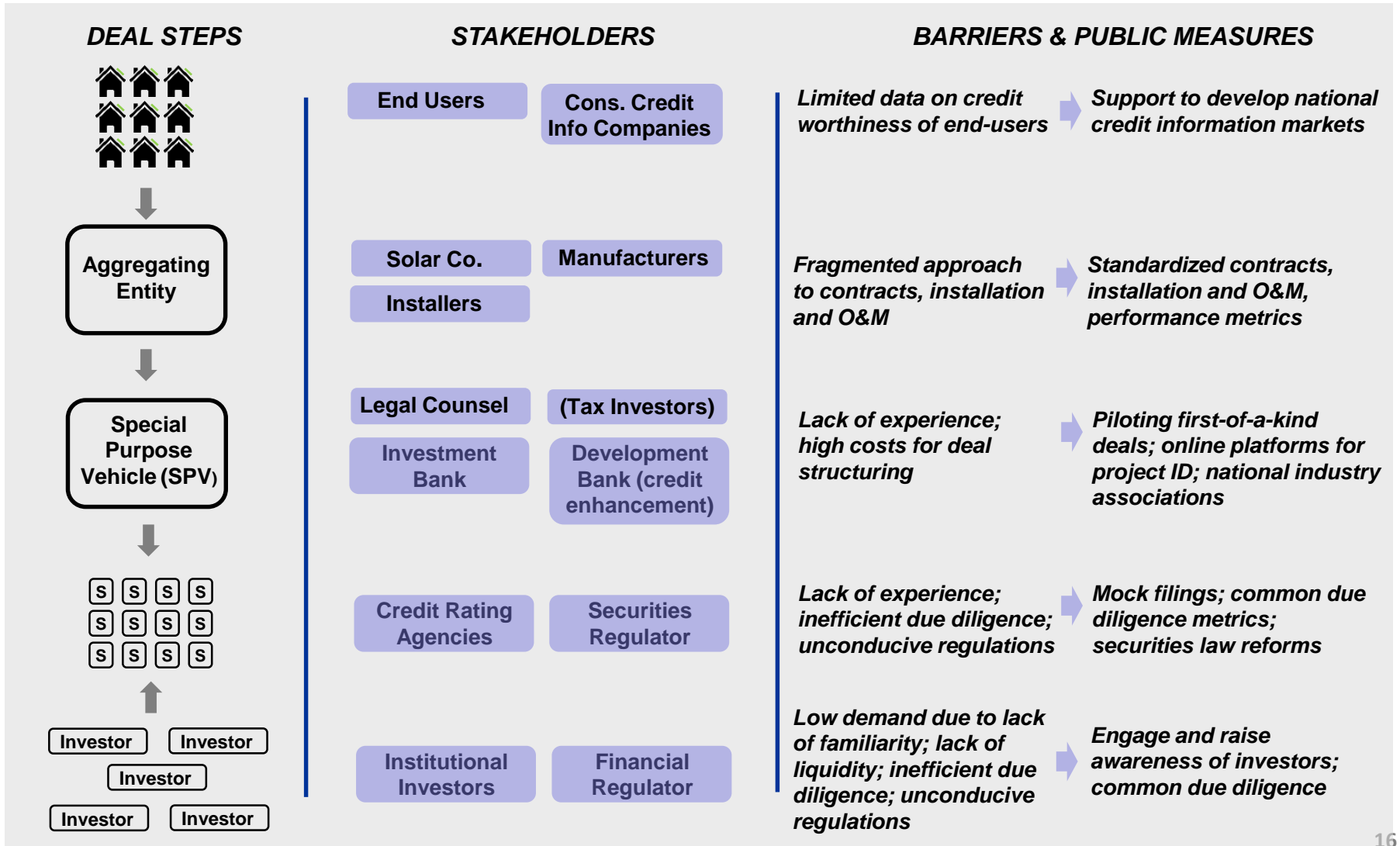
### IN-COUNTRY DEMONSTRATION AND SCALE-UP

*(In partnership with other development actors)*

#### OUTPUTS (project funds for 4 countries):

- Technical support for pilot first-of-a-kind transactions
- Technical support for policy/market architecture

# Climate Aggregation Platform Overview

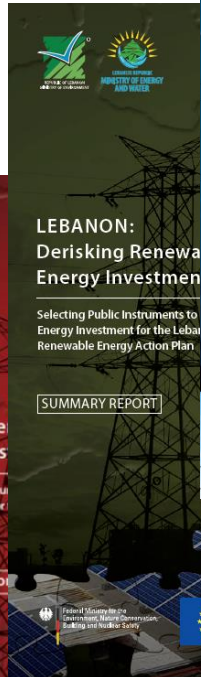
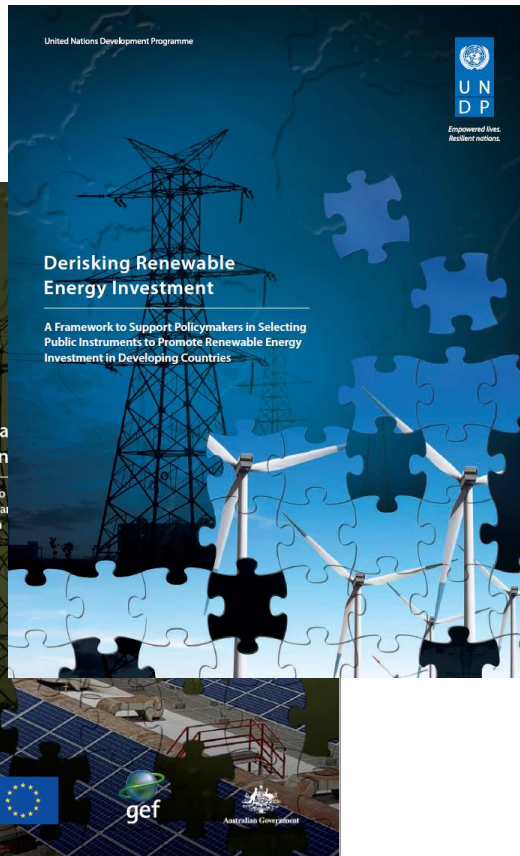






**Thank you**

# Reports, Financial Tools and Case Studies



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q						
1	UNDP, VERSION 1.0 (APRIL 2013)																						
2																							
3	<b>DERISKING RENEWABLE ENERGY INVESTMENT FINANCIAL TOOL</b>																						
4																							
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10	<b>A. OVERVIEW</b>																						
11																							
12	This financial tool supports the framework presented in UNDP's <i>Derisking Renewable Energy Investment</i> report to assist policymakers in selecting public instruments to promote renewable energy investment. The financial tool calculates the levelised cost of electricity (LCOE) for a given country's baseline energy mix and the LCOE of onshore wind energy, before and after the introduction of public instruments.																						
13																							
14	Please go to UNDP's website to download the report, latest versions of this financial tool and other materials:																						
15	<a href="http://www.undp.org/content/undp/en/home/library/page/environment-energy/low_emission_climate/energy/equipment/derisking-renewable-energy-investment/">http://www.undp.org/content/undp/en/home/library/page/environment-energy/low_emission_climate/energy/equipment/derisking-renewable-energy-investment/</a>																						
16																							
17																							
18																							
19	<b>B. TABLE OF CONTENTS</b>																						
20																							
21	This financial tool is organised into the following eight sheets:																						
22																							
23	<b>I. Summary Outputs</b>																						
24	<b>II. Inputs, Baseline Energy Mix</b>																						
25	<b>III. Inputs, Wind Energy</b>																						
26	<b>IV. LCOE, Baseline Energy Mix</b>																						
27	<b>V. LCOE, Wind Energy</b>																						
28	<b>VI. Additional Data</b>																						
29	<b>VII. Supplementary Information</b>																						
30	<b>VIII. User Notes</b>																						
31																							
32	<b>C. IMPORTANT GUIDANCE</b>																						
33																							
34	The following modeling conventions are used throughout this tool:																						
35																							
36	<b>Input cells</b>																						
37	- Input cells require the user to enter numeric data or to select an option from a drop-down menu.																						
38	- Input cells are formatted in <b>blue font</b> . An example of the format is as follows: <input type="text" value="50"/>																						
39	- Sometimes input cells may be formatted in purple font. This signifies that default input data is inserted to act as an initial guide. Users are invited to input their own data.																						
40																							
41	<b>Output cells</b>																						
42	- An output cell consists of a pre-existing formula. Do NOT enter data into an output cell. If the formula is overwritten, this could compromise the financial tool.																						
43	- Output cells are formatted in <b>black font</b> .																						
44																							
45	<b>Guidance comments</b>																						
46	- The input sheets have a column with guidance comments. These comments provide explanatory notes, definitions and address common issues.																						
47	- The column with guidance comments is initially hidden from view. To view the comments click on the ungroup symbol (which appears as a "-" sign) in the top right-hand corner of the sheet.																						
48																							
49	<b>Checks</b>																						
50	- Check cells will appear when there is an invalid entry of some sort. Check cells are formatted in <b>red font</b> . If it appears, the check cell provides guidance on how to rectify the invalid entry.																						
51																							
52	<b>Protected sheets and cells</b>																						
53	- In order to ensure that the tool maintains its functionality and formulae are not accidentally deleted and/or compromised, this tool is distributed with sheets and cells in 'protected' mode.																						
54	<table border="1"> <tr> <td>Introduction</td> <td>I. Summary Outputs</td> <td>II. Inputs, Baseline Energy Mix</td> <td>III. Inputs, Wind Energy</td> <td>IV. LCOE, Baseline Energy Mix</td> <td>V. LCOE, Wind</td> </tr> </table>																	Introduction	I. Summary Outputs	II. Inputs, Baseline Energy Mix	III. Inputs, Wind Energy	IV. LCOE, Baseline Energy Mix	V. LCOE, Wind
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55	Ready																						

Available at [www.undp.org/DREI](http://www.undp.org/DREI)