

Derisking Renewable Energy Investment

A framework to support policymakers in selecting public instruments to promote renewable energy investment in developing countries

CESEC Webinar – Policy Derisking for Renewable Energy

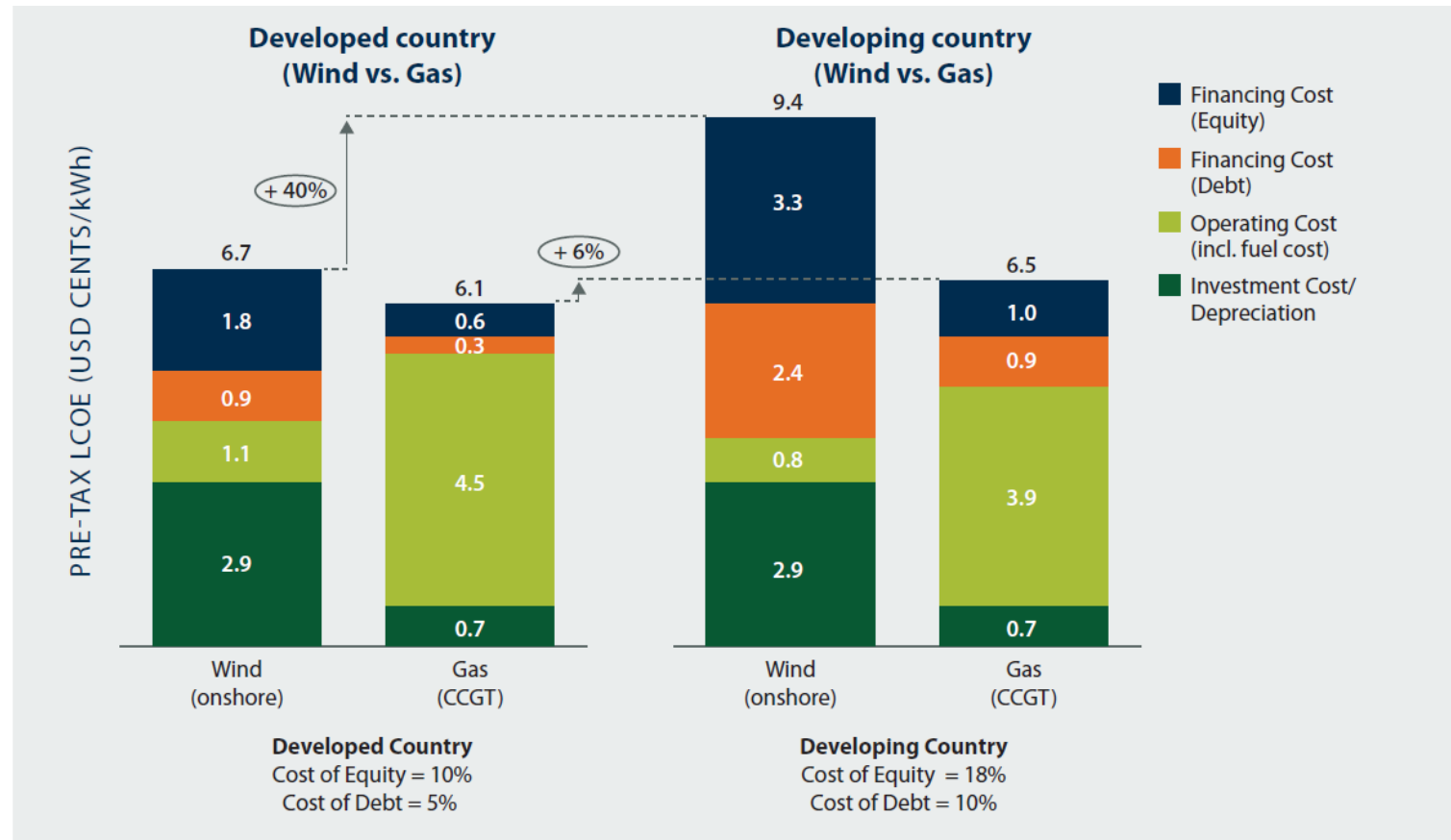
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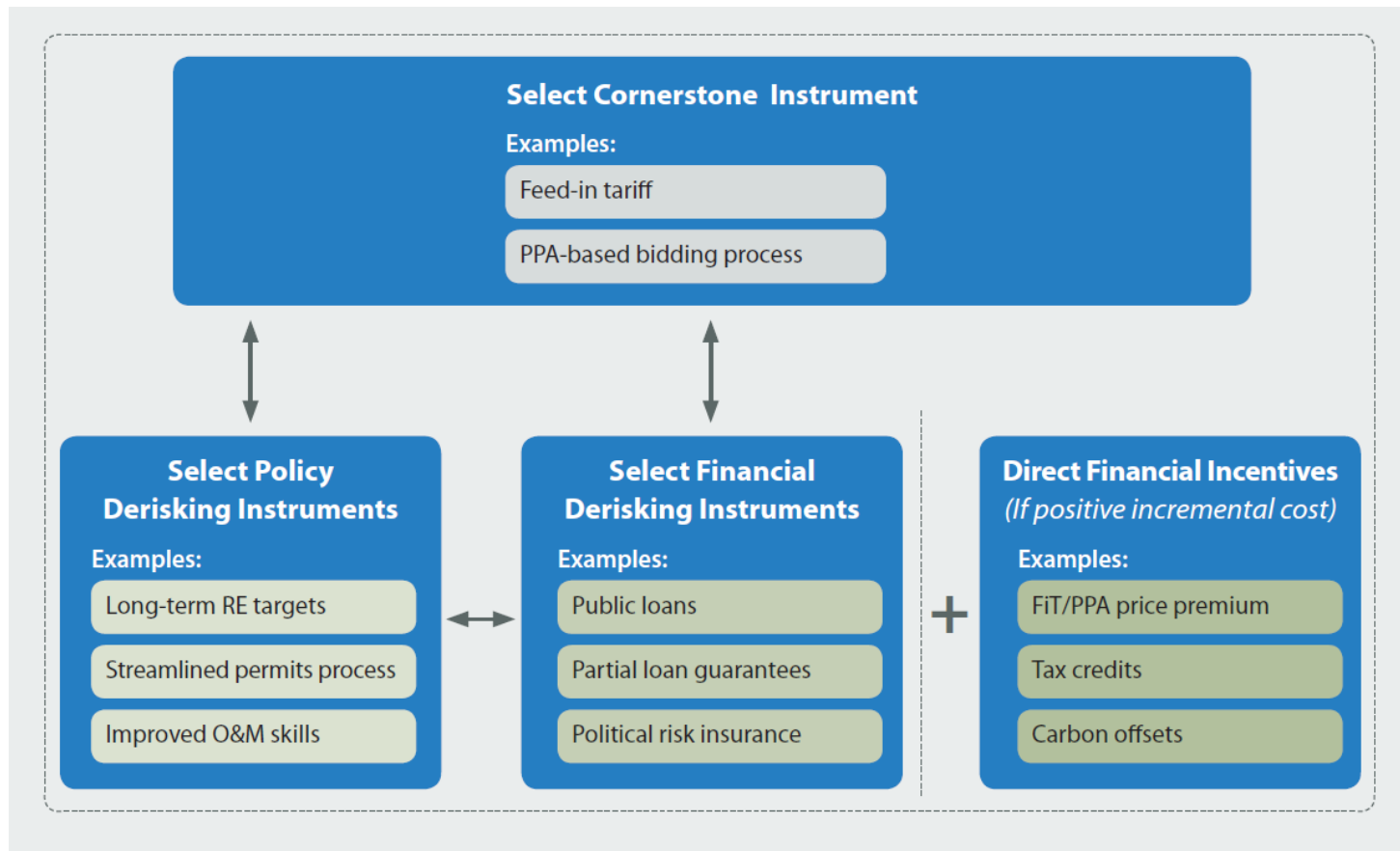
Renewable energy vs fossil-fuel energy

Developed vs. developing countries



Source: UNDP, *Derisking Renewable Energy Investment (2013)*. 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.

Key concepts: Selecting a package of public instruments



Key concepts: Public instrument table for renewable energy (Pt 1)

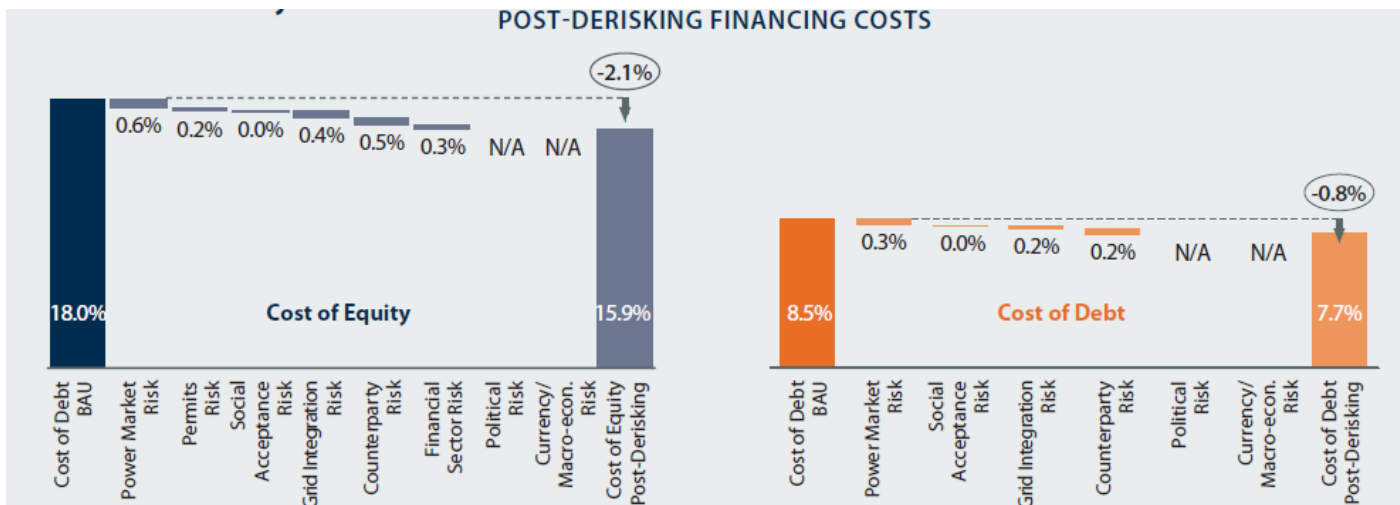
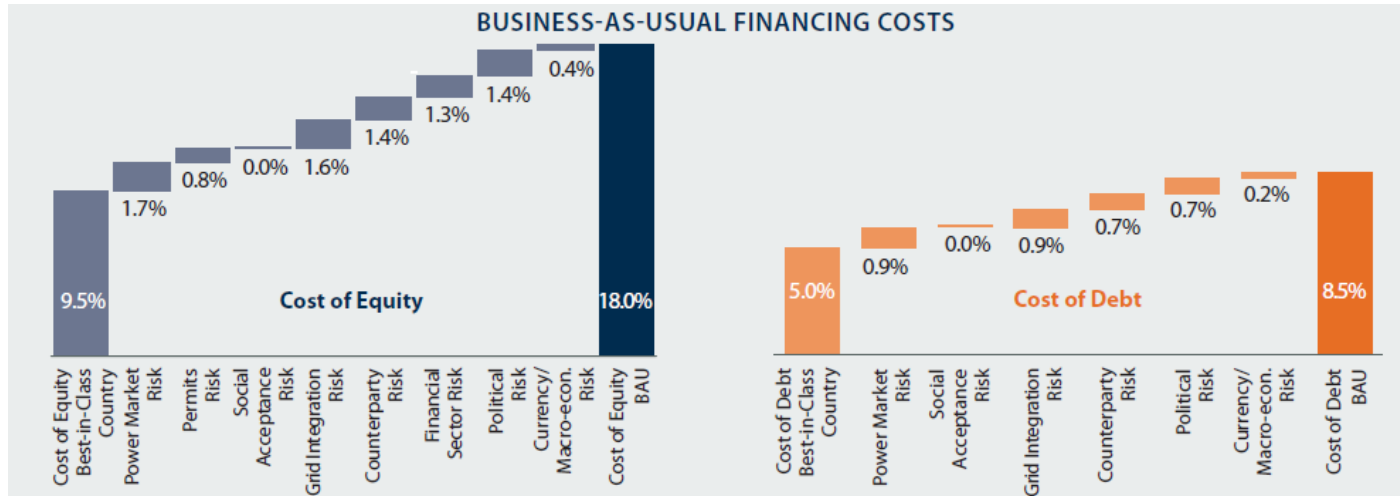
BARRIERS				MENU OF SELECTED PUBLIC INSTRUMENTS			
RISK CATEGORY	DESCRIPTION	UNDERLYING BARRIERS	KEY STAKEHOLDER GROUP	POLICY DERISKING INSTRUMENTS		FINANCIAL DERISKING INSTRUMENTS	
				ACTIVITY	DESCRIPTION	ACTIVITY	DESCRIPTION
1. Power Market Risk	Risk arising from limitations and uncertainties in the energy market, and/or sub-optimal regulations to address these limitations and promote renewable energy markets	<ul style="list-style-type: none"> Market outlook: lack of or uncertainties regarding governmental renewable energy strategy and targets 	Public sector (policymakers, legislators, regulators)	Establish transparent, long-term national renewable energy strategy and targets	National-level resource inventory/ mapping; establish national energy office; review technology options; renewable energy target formulation (as part of national energy planning)		
		<ul style="list-style-type: none"> Market access and prices: limitations related to energy market liberalization; uncertainty related to access, the competitive landscape and price outlook for renewable energy; limitations in design of standard PPAs and/or PPA tendering procedures 		Establish a harmonized, well-regulated and unbundled energy market, with cornerstone instruments to address price and market-access risk for renewable energy projects	Unbundling of the energy market (generation, transmission, distribution); establish well-designed and transparent procedures for FIT, PPA tendering (or similar); well-designed, transparent policy on key clauses* for standard PPA		
		<ul style="list-style-type: none"> Market distortions: such as high fossil fuel subsidies 		Reform of fossil fuel subsidies	Assessment of fuel subsidies; phase-out/down of subsidies; awareness campaigns; design of transfer programs to vulnerable social groups		
2. Permits Risk	Risk arising from the public sector's inability to efficiently and transparently administer renewable energy-related licensing and permits	<ul style="list-style-type: none"> Labour-intensive, complex processes and long time-frames for obtaining licences and permits (generation, EIAs, land title) for renewable energy projects 	Public sector (administrators)	Establish a one-stop-shop for renewable energy permits; streamline processes for permits	Establish institutional champion with clear accountability and appropriate expertise for renewable energy; harmonisation of requirements; reduction of process steps; training of staff in renewable energy		
		<ul style="list-style-type: none"> High levels of corruption. No clear recourse mechanisms 		Contract enforcement and recourse mechanisms	Enforce transparent practices, renewable energy related corruption control and fraud avoidance mechanisms; establish effective recourse mechanisms		
3. Social Acceptance Risk	Risks arising from lack of awareness and resistance to renewable energy in communities and end-users	<ul style="list-style-type: none"> Lack of awareness of wind energy amongst consumers, end-users, and local residents 	End-users, general public	Awareness-raising campaigns targeting communities and end-users	Awareness campaigns, stakeholder dialogue and workshops with end-users, policymakers, and local residents.		
		<ul style="list-style-type: none"> Social and political resistance related to NIMBY concerns, special interest groups 		Pilot models for community involvement at project sites	Community consultations including piloting models, such as in-kind services (energy access, local employment, etc.) or equity stakes in renewable energy projects		
4. Resource & Technology Risk	Risks arising from use of the renewable energy resource and technology (resource assessment; construction and operational use; hardware purchase and manufacturing)	<ul style="list-style-type: none"> For resource assessment and supply: inaccuracies in early-stage assessment of renewable energy resource; where applicable (e.g. bioenergy), uncertainties related to future supply and cost of resource 	Project developers, supply chain	Project development facility: capacity building for resource assessment	Dissemination of top-level, national resource assessment findings; grant funding for on-site resource assessment (depending on technology); capacity building for resource assessment.		
		<ul style="list-style-type: none"> For planning, construction, operations and maintenance: uncertainties related to securing land; sub-optimal plant design; lack of local firms offering construction, maintenance services; lack of skilled and experienced local staff; limitations in civil infrastructure (roads etc.) 		Project development facility: feasibility studies; networking; training and qualifications	Industry conferences; grant funding for pre-feasibility studies (depending on technology); training, apprenticeships and university programmes to build skills (planning, construction, O&M).		
		<ul style="list-style-type: none"> For the purchase and, if applicable, local manufacture of hardware: purchaser's lack of information on quality, reliability and cost of hardware; lack of local industrial presence and experience with hardware, including skilled and experienced local workforce 		Research and development; technology standards; exchange of market information (e.g. via trade fairs)	Test centre for research and development into long-term quality of equipment; standards, testing and certification; awareness campaigns and trade fairs	Financial products by development banks to assist manufacturers in gaining access to capital/funding	Depends on specific financial circumstances. Can include as necessary: public loans; public loan guarantees; public equity

Key concepts: Public instrument table for renewable energy (Pt 2)

BARRIERS				MENU OF SELECTED PUBLIC INSTRUMENTS			
RISK CATEGORY	DESCRIPTION	UNDERLYING BARRIERS	KEY STAKEHOLDER GROUP	POLICY DERISKING INSTRUMENTS		FINANCIAL DERISKING INSTRUMENTS	
				ACTIVITY	DESCRIPTION	ACTIVITY	DESCRIPTION
5. Grid/Transmission Risk	Risks arising from limitations in grid management and transmission infrastructure in the particular country	<ul style="list-style-type: none"> <i>Grid code and management:</i> limited experience or suboptimal operational track-record of grid operator with intermittent sources (e.g. grid management and stability). Lack of standards for the integration of intermittent, renewable energy sources into the grid 	Utility (transmission company, grid operator)	Strengthen transmission company's operational performance, grid management and formulation of grid code	Develop a grid code for new renewable energy technologies; sharing of international best practice in grid management		
		<ul style="list-style-type: none"> <i>Transmission infrastructure:</i> inadequate or antiquated grid infrastructure, including lack of transmission lines from the renewable energy source to load centres; uncertainties for construction of new transmission infrastructure 		Policy support for national grid infrastructure development	Develop a long-term national transmission/grid road-map to include intermittent renewable energy	Financial products by development banks to assist transmission companies in gaining access to capital/funding	Depends on specific financial circumstances. Can include as necessary: public loans; public loan guarantees; public equity
6. Counterparty Risk	Risks arising from the utility's poor credit quality and an IPP's reliance on payments	<ul style="list-style-type: none"> Limitations in the utility's (electricity purchaser) credit quality, corporate governance, management and operational track-record or outlook; unfavourable policies regarding utility's cost-recovery arrangements 	Utility (electricity purchaser)	Strengthen utility/distribution company's performance	Establish international best practice in utility/distribution company's management, operations and corporate governance; implement sustainable cost recovery policies	Government guarantees or backing for PPA payments; counterparty guarantees offered by development banks	Depends on specific circumstances and division of risks in PPA. Can include, as necessary: partial risk guarantees on PPA; counterparty guarantees as part of political risk insurance (PRI)
7. Financial Sector Risk	Risks arising from general scarcity of investor capital (debt and equity) in the particular country, and investors' lack of information and track record on renewable energy	<ul style="list-style-type: none"> <i>Capital scarcity:</i> Limited availability of local or international capital (equity/and or debt) for green infrastructure due to, for example: under-developed local financial sector; policy bias against investors in green energy 	Investors (equity and debt)	Financial sector policy reforms	Assess trade-offs between financial stability regulation and renewable energy objectives (e.g. liquidity treatment); promote financial sector policy favorable to long-term infrastructure, including project finance	Financial products by development banks to assist project developers to gain access to capital/funding	Depends on specific financial circumstances. Can include as necessary: public loans; public loan guarantees; public equity
		<ul style="list-style-type: none"> <i>Limited experience with renewable energy:</i> Lack of information, assessment skills and track-record for renewable energy projects amongst investor community; lack of network effects (investors, investment opportunities) found in established markets; lack of familiarity and skills with project finance structures 		Strengthen investors' (debt and equity) familiarity with and capacity regarding renewable energy projects	Industry-finance dialogues and conferences; workshops/training on project assessment and financial structuring (project finance); public-private partnership building		
8. Political Risk	Risks arising from country-specific governance and legal characteristics	<ul style="list-style-type: none"> Uncertainty or impediments due to war, terrorism, and/or civil disturbance 	National level			Risk sharing products by development banks to address political risk	Provision of political risk insurance (PRI) covering (i) expropriation, (ii) political violence, (iii) currency restrictions
		<ul style="list-style-type: none"> Uncertainty due to high political instability; poor governance; poor rule of law and institutions 					
		<ul style="list-style-type: none"> Uncertainty or impediments due to government policy (currency restrictions, corporate taxes) 					
9. Currency/Macro-economic Risk	Risks arising from the broader macro-economic environment and market dynamics	<ul style="list-style-type: none"> Uncertainty due to volatile local currency; unfavourable currency exchange rate movements 	National level	<p><i>Private sector instruments, such as hedging for currency risk or interest rate swaps, are commonly used to address this risk category but are not shown in this public instrument table.</i></p>			
		<ul style="list-style-type: none"> Uncertainty around inflation, interest rate outlook due to an unstable macro-economic environment 					

Illustrative case-study - Kenya (1 GW, wind)

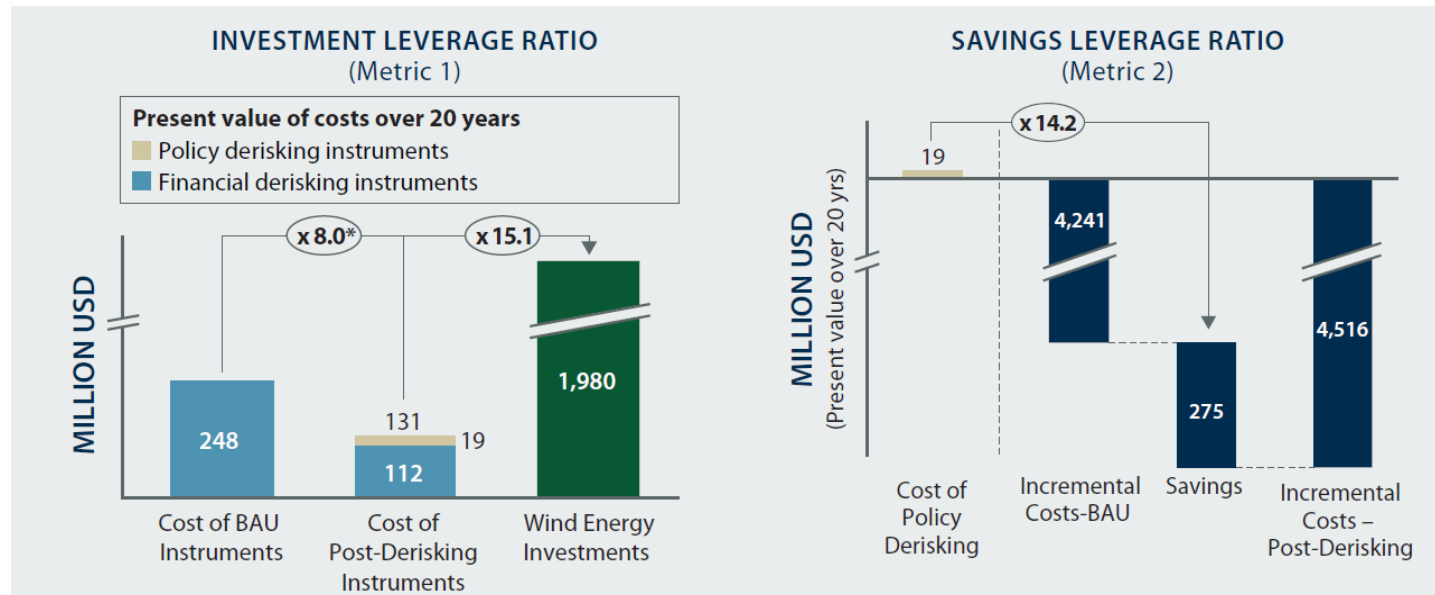
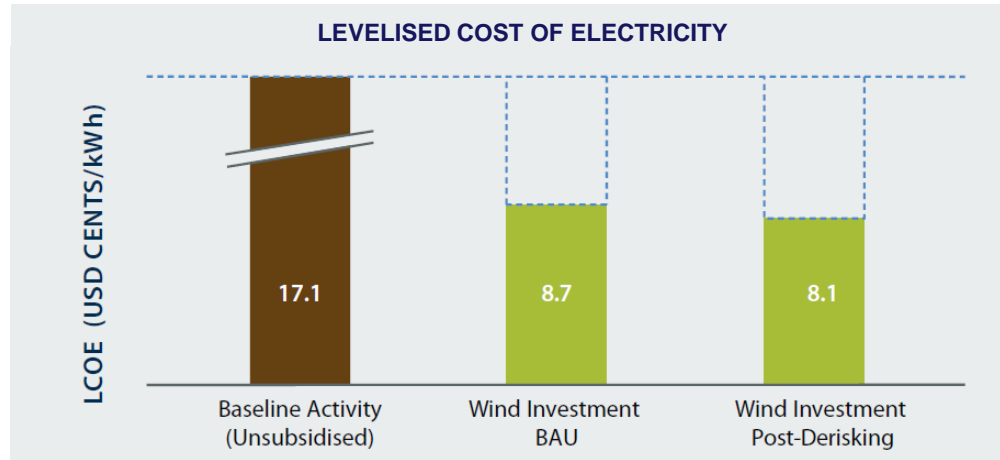
Risk waterfalls



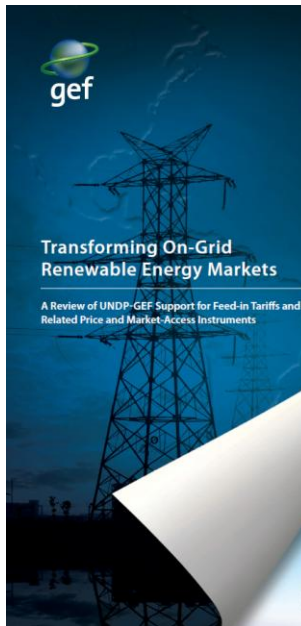
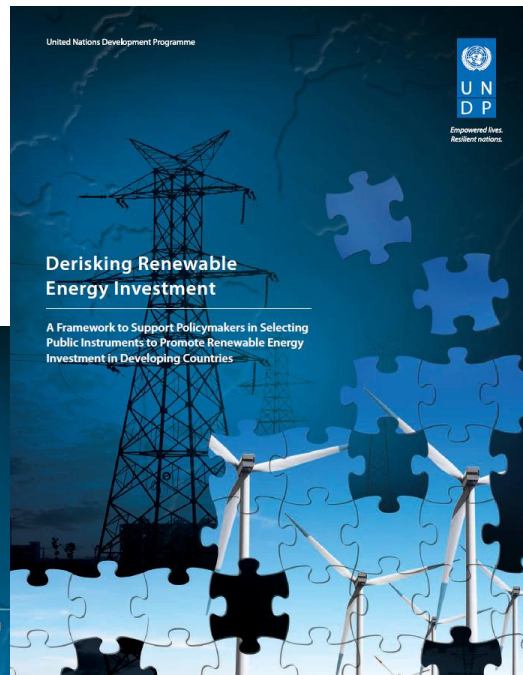
Source: UNDP, *Derisking Renewable Energy Investment (2013)*. Data obtained from interviews with wind investors and developers. See Annex A of the report for full assumptions. The post-derisking cost of debt and equity show the average impacts over a 20 year modelling period, assuming linear timing effects.

Illustrative case-study - Kenya (1 GW, wind)

Modeling results



Derisking Renewable Energy Investment Reports & Financial Tool



	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	DERISKING RENEWABLE ENERGY INVESTMENT																
4	FINANCIAL TOOL																
5																	
6																	
7																	
8																	
9																	
10	A. OVERVIEW																
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 levelled 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																	
15																	
16	Please go to UNDP's website to download the report, latest versions of this financial tool and other materials:																
17	http://www.undp.org/development/undp/development/energy/low_emission_climate/development/derisking-renewable-energy-investment/																
18																	
19	B. TABLE OF CONTENTS																
20																	
21	This financial tool is organised into the following eight sheets:																
22																	
23	I. Summary Outputs																
24	II. Inputs, Baseline Energy Mix																
25	III. Inputs, Wind Energy																
26	IV. LCOE, Baseline Energy Mix																
27	V. LCOE, Wind Energy																
28	VI. Additional Data																
29	VII. Supplementary Information																
30	VIII. User Notes																
31																	
32	C. IMPORTANT GUIDANCE																
33																	
34	The following modelling conventions are used throughout this tool:																
35																	
36	Input cells																
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 blue font . 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	Output cells																
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 black font .																
44																	
45	Guidance comments																
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	Checks																
50	- Check cells will appear when there is an invalid entry of some sort. Check cells are formatted in red font . If it appears, the check cell provides guidance on how to rectify the invalid entry.																
51																	
52	Protected sheets and cells																
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																	
55	Introduction / I. Summary Outputs / II. Inputs, Baseline Energy Mix / III. Inputs, Wind Energy / IV. LCOE, Baseline Energy Mix / V. LCOE, Wind																
Ready																	

Derisking Renewable Energy Investment

Key take-aways

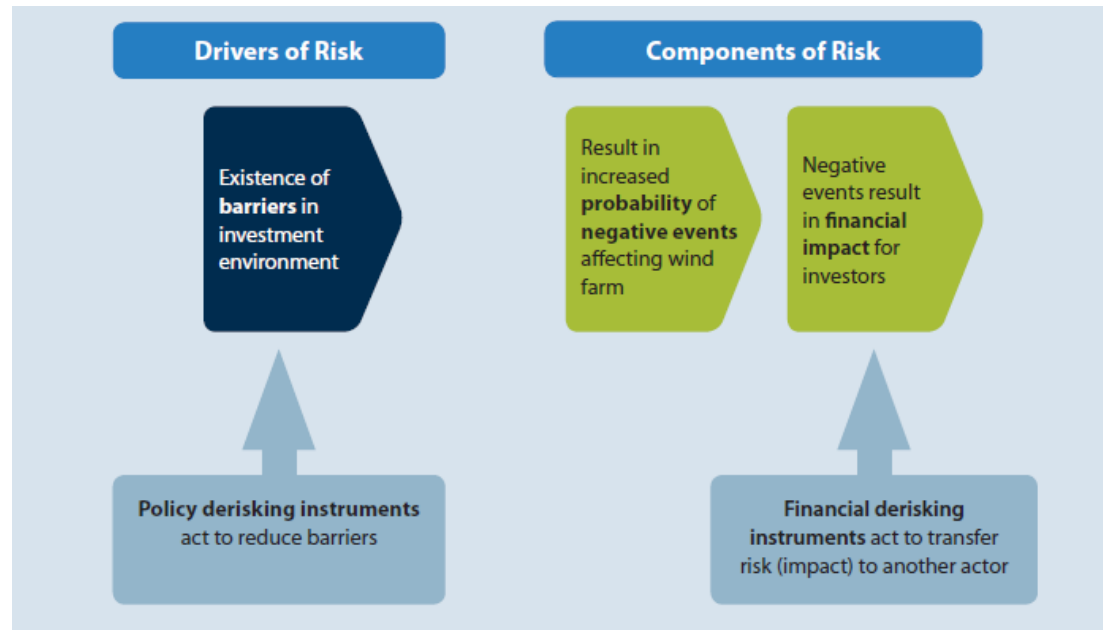


- Theory of change: With technology costs for renewable energy having fallen in recent years, a key opportunity is to address the high financing costs for renewable energy in developing countries.
- Some key findings from the report:
 - The best outcomes occur when policymakers address the risks to renewable energy investment in a systematic and integrated way
 - Investing in derisking measures appears to be cost effective when measured against paying direct financial incentives, such as a feed-in tariff premium

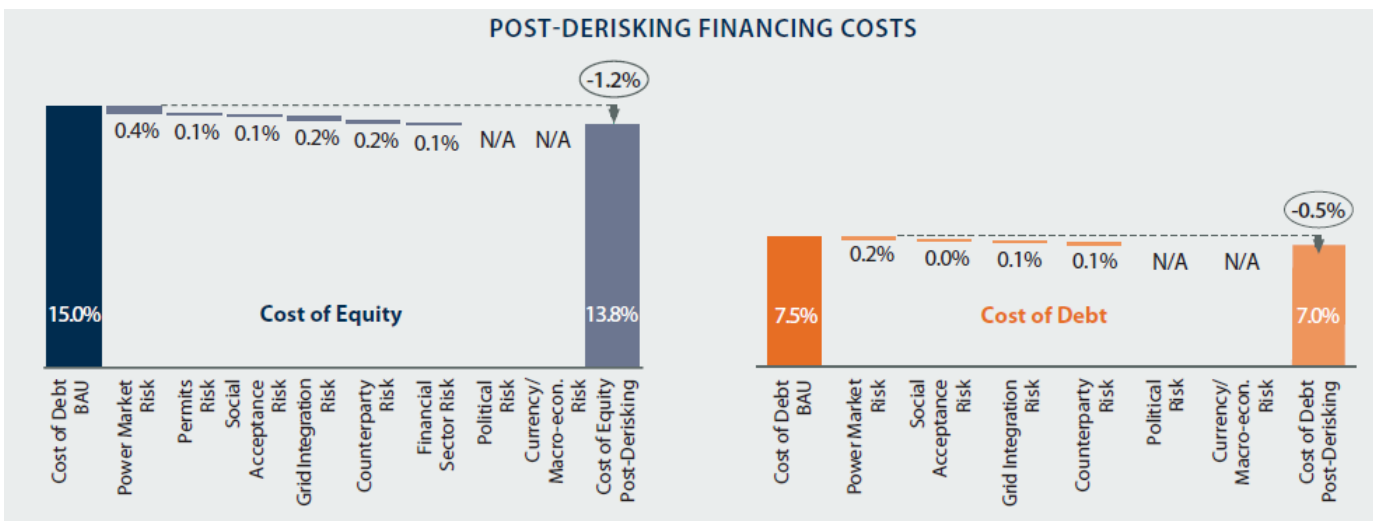
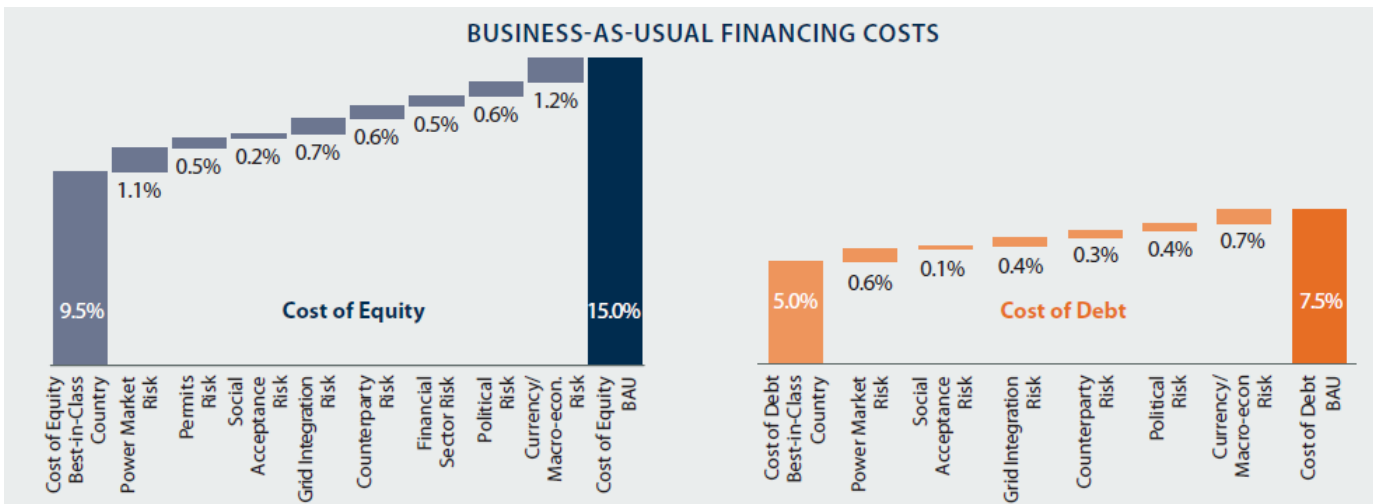
Supplementary Slides

Key concepts

Policy vs. financial derisking



Illustrative casestudy – South Africa (8.4 GW, wind) Risk waterfalls



Source: UNDP, *Derisking Renewable Energy Investment (2013)*. Data obtained from interviews with wind investors and developers. See Annex A of the report for full assumptions. The post-derisking cost of debt and equity show the average impacts over a 20 year modelling period, assuming linear timing effects.

Illustrative casestudy – South Africa (8.4 GW, wind) Modeling results

