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

LEVELIZED COSTS OF RENEWABLE ENERGY VS FOSSIL-FUEL ENERGY
LOW FINANCING COST VS. HIGH FINANCING COST ENVIRONMENT

Low Financing Cost Environment (Wind vs. Gas)
High Financing Cost Environment (Wind vs Gas)

PRE-TAX LCOE (USD CENTS/kWh)

Wind (onshore)
Gas (CCGT)

Low Financing Cost Environment
Capital Structure: 30% Equity; 70% Debt
Cost of Equity = 7%
Cost of Debt = 3%

High Financing Cost Environment
Capital Structure: 30% Equity; 70% Debt
Cost of Equity = 16%
Cost of Debt = 8%

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

Select Cornerstone Instrument
Examples:
- Feed-in tariff
- PPA-based bidding process

Select Policy Derisking Instruments
Examples:
- Long-term RE targets
- Streamlined permits process
- Improved O&M skills

Select Financial Derisking Instruments
Examples:
- Public loans
- Partial loan guarantees
- Political risk insurance

Direct Financial Incentives (If positive incremental cost)
Examples:
- FiT/PPA price premium
- Tax credits
- Carbon offsets

Derisking Renewable Energy Investment
Kazakhstan (1): Financing cost waterfall, wind

PRE DERISKING FINANCING COST WATERFALL FOR WIND ENERGY INVESTMENTS

Cost of Equity (USD)

## Derisking Renewable Energy Investment

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

<table>
<thead>
<tr>
<th>Risk Category</th>
<th>Policy Derisking Instruments</th>
<th>Financial Derisking Instruments</th>
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</thead>
<tbody>
<tr>
<td>Power Market Risk</td>
<td>• Update transparent, long-term national renewable energy strategy</td>
<td>NA</td>
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<td>• Establish and run IPP bidding process, with bankable PPA</td>
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<td>• Establish a renewable energy office in the regulator</td>
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<td>Permits Risk</td>
<td>• Streamlined process for RE permits (dedicated one-stop shop)</td>
<td>NA</td>
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<td>• Contract enforcement and recourse mechanisms</td>
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<td>Social Acceptance Risk</td>
<td>• Awareness-raising campaigns</td>
<td>NA</td>
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<tr>
<td>Developer Risk</td>
<td>• Technology R&amp;D</td>
<td>NA</td>
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<td></td>
<td>• Support for industry associations</td>
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<tr>
<td>Grid/Transmission Risk</td>
<td>• Strengthen KEGOC’s grid management capacity</td>
<td>• Take-or-pay clause in PPA</td>
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<td>• Transparent, up-to-date grid code</td>
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<td>• Policy support for long-term national transmission/grid road-map</td>
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<td>Counterparty Risk</td>
<td>• Reform and maintain creditworthy Financial Settlement Centre structure</td>
<td>• Government guarantee for PPA payments</td>
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<td>• Public loans to IPPs</td>
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<tr>
<td>Financial Sector Risk</td>
<td>• Fostering financial sector reform towards green infrastructure investment</td>
<td>• Public loans to IPPs</td>
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<td></td>
<td>• Strengthening financial sector’s familiarity with renewable energy and project finance</td>
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<tr>
<td>Political Risk</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Currency/Macroeconomic Risk</td>
<td>NA</td>
<td>• Partial indexing of PPA tariff to hard currencies</td>
</tr>
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</table>
Derisking Renewable Energy Investment
Kazakhstan (3): Impact of public instruments, wind

POST DERISKING FINANCING COST WATERFALL FOR WIND ENERGY AND SOLAR PV INVESTMENTS

Cost of Equity (USD)

Cost of Equity BAU
Power Market Risk
Permits Risk
Social Acceptance Risk
Developer Risk
Grid/Transmission Risk
Counterparty Risk
Financial Sector Risk
Political Risk
Currency/Macro. Risk
Kazakhstan Pre-Derisking
Kazakhstan Post-Derisking

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

Levelised Cost of Electricity (LCOE)

- Baseline (unsubsidised): 5.7 USD cents/kWh
- Wind Investment BAU: 9.2 USD cents/kWh
- Wind Investment Post-Derisking: 7.1 USD cents/kWh

**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$_2$e over 20 years

II. Small-scale Renewable Energy
Theory of change: High financing costs penalize small-scale RE

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

**REDUCE RISK**
Policy Derisking
Examples:
- Clear regulations
- Streamlined customs

**TRANSFER RISK**
Financial Derisking
Examples:
- Loan guarantees
- Public loans

**COMPENSATE FOR RISK**
Financial Incentives
Examples:
- Tax incentives
- Grants

**DIVERSIFY RISK**
Aggregation (By Private Sector)

Source: UNPD/ETH Zurich (2016)
Derisking Renewable Energy Investment
Mini-grid Kenya – financing cost waterfall

PRELIMINARY FINDINGS

Cost of Equity (USD)

9.0%  2.0%  0.8%  1.2%  0.8%  2.2%  1.2%  1.9%  2.4%  1.4%

Cost of Equity Pre-Derisking

Source: UNDP/ETH Zurich (2015), based on preliminary data collected through interviews with investors and developers of mini-grids. Please do not use without authors' permission.
III. Climate Aggregation Platform
Climate Aggregation Platform Overview

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

**Deal Steps**
- Aggregating Entity
- Special Purpose Vehicle (SPV)

**Stakeholders**
- End Users
- Solar Co.
- Installers
- Legal Counsel
- Investment Bank
- Credit Rating Agencies
- Cons. Credit Info Companies
- Manufacturers
- (Tax Investors)
- Development Bank (credit enhancement)
- Securities Regulator
- Financial Regulator
- Institutional Investors

**Barriers & Public Measures**
- Limited data on credit worthiness of end-users
  - Support to develop national credit information markets
- Fragmented approach to contracts, installation and O&M
  - Standardized contracts, installation and O&M, performance metrics
- Lack of experience; high costs for deal structuring
  - Piloting first-of-a-kind deals; online platforms for project ID; national industry associations
- Lack of experience; inefficient due diligence; unconducive regulations
  - Mock filings; common due diligence metrics; securities law reforms
- Low demand due to lack of familiarity; lack of liquidity; inefficient due diligence; unconducive regulations
  - Engage and raise awareness of investors; common due diligence
Thank you