Opportunities For De-risking Of RE Investments And Results-based Climate Finance
A Private-sector View

Dr. Harald Diaz-Bone, First Climate
International Research Network for Low Carbon Societies (LCS-RNet),
11th Annual Meeting, Rome, 17-18 October 2019
• IRENA: The world needs USD 110 trillion worth of investments by 2050 for a climate-safe energy system

• Currently planned fossil-fuel investments must be largely redirected into renewables, efficiency and other clean technologies

• LCOE for RE technologies are falling, but certain investment risks remain high in many developing countries

• If we manage to de-risk RE investments (DREI), private sector should invest

• De-risked results-based finance might be a viable instrument for engagement at scale

• Investors have the power to play a critical role in diverting dangerous climate change
The objective: to make RE investment cost competitive with the business-as-usual investment, typically fossil-fuel based energy.

The opportunity: policymakers to address the high financing costs for RE in developing countries.

Theory of change: policymakers to derisk as much as possible, before paying for the remaining incremental costs by incentive mechanisms.

The question: What is the most effective public instrument package?
DREI: The methodology in a nutshell

DREI measures the perceived probability and impact of risks

Risks such as:
1. Power market risks
2. Permits risks
3. Social acceptance risks… etc.

DREI is quantitative: LCOE modeling

DREI measures the perceived effectiveness of public instruments

Instruments such as:
1. Well-defined regulation
2. Streamlined permitting
3. Public loans… etc.

DREI evaluates the public instruments w.r.t. performance metrics

How does the private sector view the ability of public instruments to mitigate risks?

Stakeholder interviews:

How does the private sector view the investment risks underlying RE?

1. Pre derisking
2. Post derisking

Best in Class developed country

Cost of equity/debt %

Derisking instruments %

Wind (onshore)

€/kWh

Developed country

Developing country

Developing c. post derisking

%
DREI: Public instrument package

**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

**Levelized Cost of Electricity**

- **Gas**
  - Pre-derisking €/kWh
  - Post-derisking €/kWh

- **RE**
  - Pre-derisking €/kWh
  - Post-derisking €/kWh

**Pre-Derisking**

- #1
- #2
- #3
- etc.

**Derisking instruments**

**Post derisking**

- %
DREI: Public instrument package

Select Cornerstone Instrument
Examples:
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Examples:
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Select Financial Derisking Instruments
Examples:
- Public loans
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- Political risk insurance

Direct Financial Incentives (If positive incremental cost)
Examples:
- FIT/PPA price premium
- Tax credits
- Carbon offsets
Lebanon performed a DREI analysis for both wind energy and solar PV investment opportunities.

- In 2015, 3% of electricity produced from RE (hydro)\(^1\)
- In 2013, fossil fuel subsidies constitute 7% of GDP (mainly direct payments to EDL for fuel purchase)\(^2\)
- Domestic generation does not meet demand, private generators filling this gap constitute a shadow market\(^3\)
- Clear regulation of the electricity sector elaborated but not yet into force (Law 462)
- Limited private sector RE investment to date

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\(^1\) IEA 2015, www.iea.org
\(^2\) CCCU at MoE, 2015; Fossil Fuel Subsidies in Lebanon
\(^3\) MoE 2015; National GHG Inventory Report and Mitigation Analysis for the Energy Sector in Lebanon

**Electricity generation by fuel**

- **Oil**
- **Hydro**
- **Nat. Gas**

**Current status**

- In 2015, 3% of electricity produced from RE (hydro)\(^1\)
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Lebanon performed a DREI analysis for both **wind energy** and **solar PV** investment opportunities

- 12% RE by 2020 (2010 policy paper)\(^1\)
- 12.6% RE by 2030 (NREAP envisioned target)\(^2\)
- 15-20% RE by 2030 (conditional INDC target)\(^3\)

Envisioned targets for wind energy and solar PV are outlined in the National Renewable Energy Action Plan 2016-2020:

- **450 MW wind farms**
- **300 MW large-scale solar PV**

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1) MoEW 2010; *Policy paper for the electricity sector*
3) GoL 2015; *Lebanon’s Intended Nationally Determined Contribution*
Financing cost waterfalls

17 structured interviews
equity and debt investors, national and international

Data from DREI Lebanon (unpublished)

Best-in-Class developed country

Pre-Derisking

Post-Derisking

Instruments addressing risks related to:

Power Market
Permits
Social Acceptance
Developer
Grid/transmission
Counterparty
Financial Sector
Political
Currency/Macroeco.

Cost of Equity

Pre-Derisking

Post-Derisking

Cost of Equity
## Public Instruments

### Instruments addressing risks related to:

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<tr>
<th>Risk Category</th>
<th>Policy Derisking Instruments</th>
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| **Power Market Risk**         | • Long-term, legally-binding RE targets  
• Enabling regulatory framework  
• FIT/PPA tender (standardized PPA)  
• Independent regulator for power sector | NA                                              |
| **Permits Risk**              | • Streamlined process for RE permits  
• Contract enforcement, recourse mechanisms | NA                                              |
| **Social Acceptance Risk**    | • Awareness-raising campaigns  
• Stakeholder outreach | NA                                              |
| **Developer Risk**            | • Capacity building for resource assessment Technology and O&M assistance | NA                                              |
| **Grid/Transmission Risk**    | • Strength EDL’s grid management capacity  
• Transparent, up-to-date grid code  
• Policy support for grid infrastructure development | • Take-or-pay clause in PPA                     |
| **Counterparty Risk**         | • Strength EDL’s management and operational performance | • Government guarantee for PPA payments  
• Concessional public loans to IPPs |
| **Financial Sector Risk**     | • Fostering financial sector reform towards green infrastructure investment  
• Strengthening financial sector’s familiarity with renewable energy and project finance | • Concessional public loans to IPPs              |
| **Political Risk**            | NA | • Political risk insurance for equity investments                                           |
| **Currency/Macroeconomic Risk** | NA | NA                                              |

### Cost of Equity

Pre-Derisking: 16.0%  
Post-Derisking: 12.8%

-3.2% variation

#1  
#2  
#3  
etc.  

Derisking instruments

Pre derisking  
Post derisking

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## Public Instruments and LCOE Modeling

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### Levelized cost of electricity

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<th>LCOE [USD cents/kWh]</th>
<th>Baseline Investment</th>
<th>Solar Investment BAU</th>
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**Source:** DREI Lebanon

**Theory of change:** Policymakers to derisk as much as possible, before paying for the remaining incremental costs.

**The question:** What is the most efficient public instrument package?
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Key performance metrics

INVESTMENT LEVERAGE RATIO

Present value of costs over 20 years

- Policy derisking instruments
- Financial derisking instruments
- Price premium (FIT, PPA)

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<tr>
<th>Millions USD</th>
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Key performance metrics

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**SAVINGS RATIO**

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<th>Million USD</th>
<th>Cost of Post-Derisking Instruments</th>
<th>Incremental Cost BAU</th>
<th>Savings</th>
<th>Incremental Cost Post-Derisking</th>
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<td></td>
<td>46 5 41</td>
<td>140</td>
<td>97</td>
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**CARBON ABATEMENT**

- **5.2 Mt CO₂ (20 years)**
  - Solar PV Abatement Cost BAU: 27.0 USD/tCO₂e
  - Solar PV Abatement Cost Post-Derisking: 17.1 USD/tCO₂e

Data from DREI Lebanon (unpublished)

- derisking is more effective in catalyzing private sector funding
- explore how different instrument packages affect economy wide saving and other metrics
- compare carbon prices and use e.g. for NDC design
DREI Lebanon’s Findings For Wind Energy

- 2030 envisioned investment target: **450 MW of utility-scale wind energy**
- Public derisking measures estimated at **USD 98m** can have the following impacts:
  - Catalysing **USD 635m** in private sector investment
  - Lowering wind energy generation costs from USD 11.4 cents to USD 9.4 cents per kWh
  - Creating economic **savings of USD 221m** over 20 years
  - Reducing carbon emissions by **-10.0 million tonnes of CO₂** over 20 years
DREI Lebanon’s Findings For Solar PV

- 2030 envisioned investment target: **300 MW of utility-scale solar PV plants**
- Public derisking measures estimated at **USD 46m** can have the following impacts:
  - Catalysing **USD 279m** in private sector investment
  - Lowering solar PV generation costs from **USD 10.0 cents to USD 8.2 cents per kWh**
  - Creating economic **savings of USD 97m** over 20 years
  - Reducing carbon emissions by **-5.2 million tonnes of CO₂** over 20 years
Link to DREI Lebanon report and further resources: www.undp.org/DREI