Opportunities For De-risking Of RE Investments And Results-based Climate Finance

A Private-sector View

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International Research Network for Low Carbon Societies (LCS-RNet),
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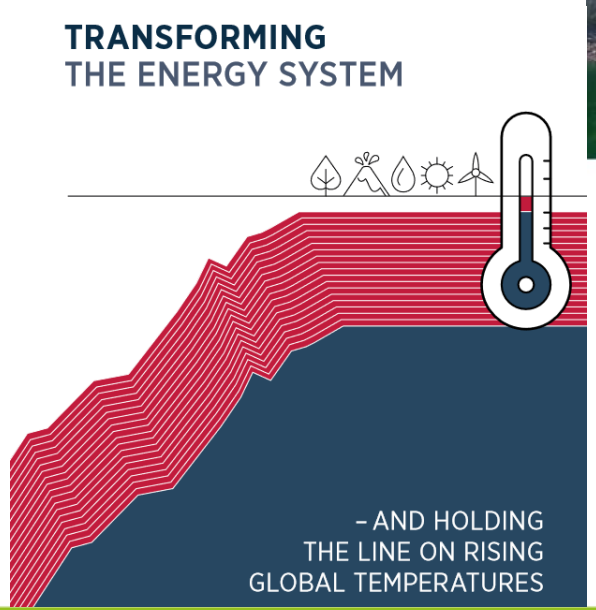
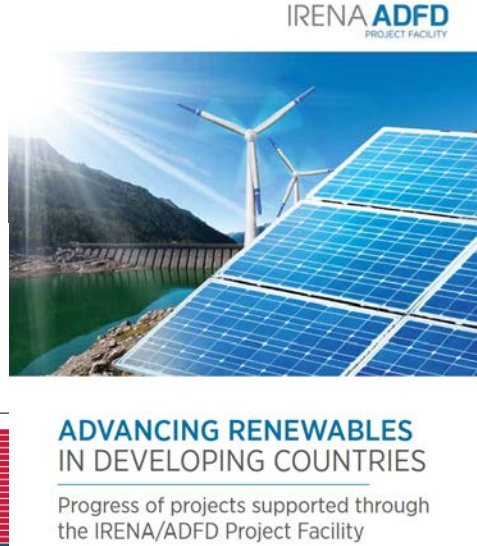
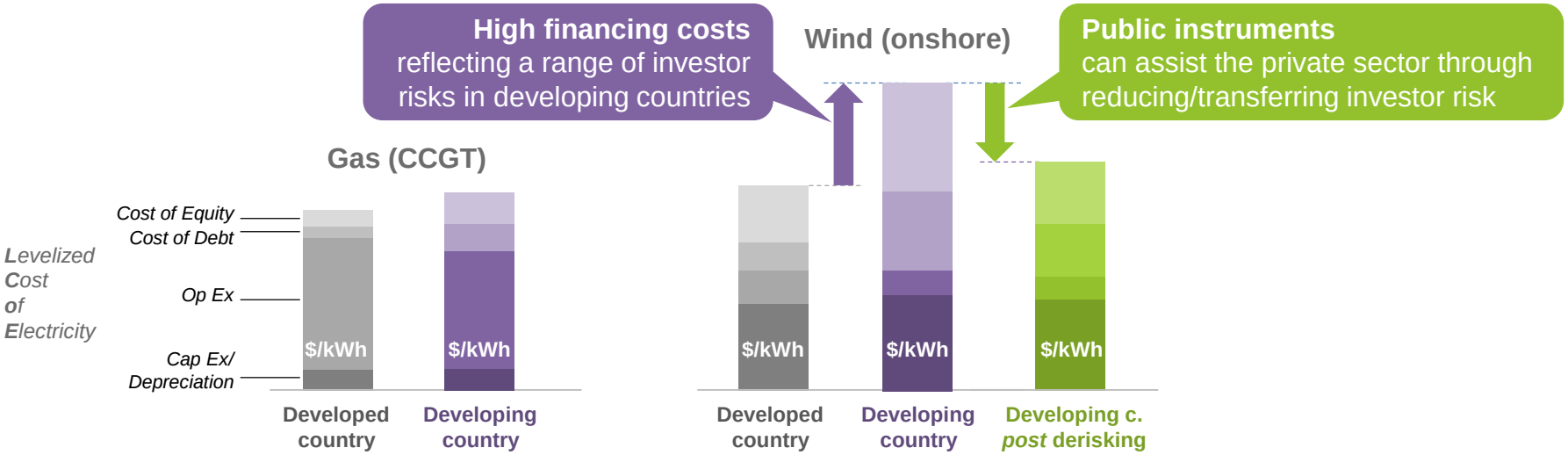
Key Messages

- 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





High financing costs penalize renewable energy



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

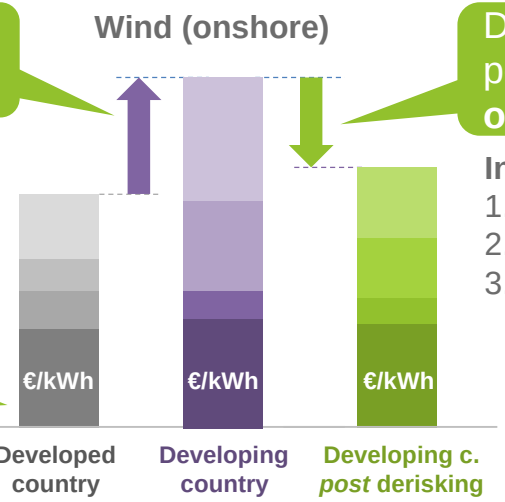
The question: What is the most effective public instrument package?

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**

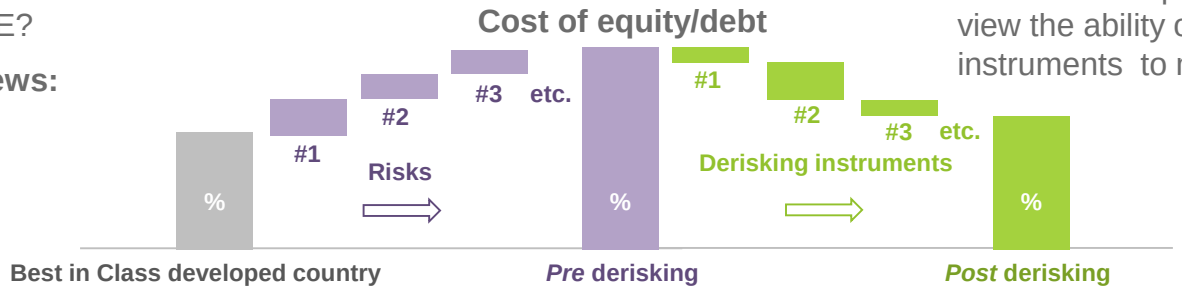
Instruments such as:
1. Well-defined regulation
2. Streamlined permitting
3. Public loans… etc.

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

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

→ **Stakeholder interviews:**

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



DREI: Public instrument package

Select Cornerstone Instrument

Examples:

- Feed-in tariff
- PPA-based bidding process

Select Policy Derisking Instruments

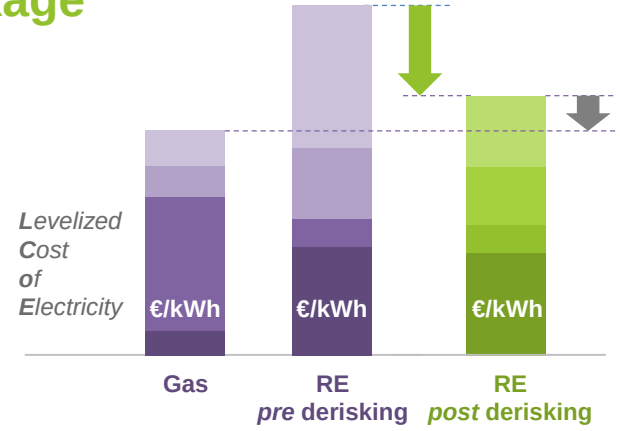
Examples:

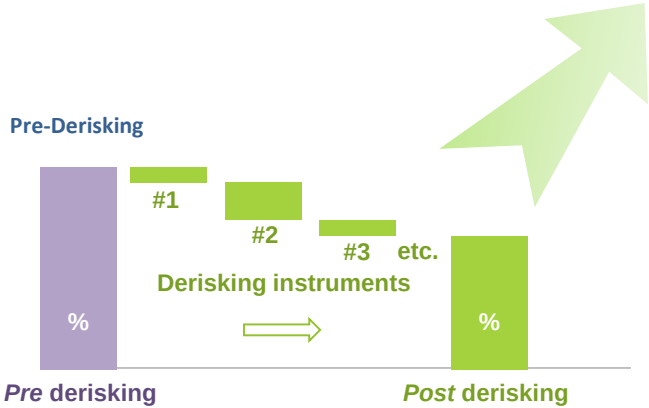
- Long-term RE targets
- Streamlined permits process
- Improved O&M skills

Select Financial Derisking Instruments

Examples:

- Public loans
- Partial loan guarantees
- Political risk insurance





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Select Financial Derisking Instruments

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- Public loans
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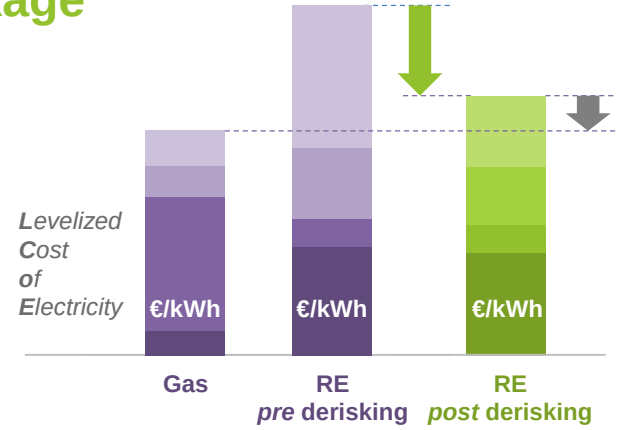
- Political risk insurance

Direct Financial Incentives
(If positive incremental cost)

Examples:

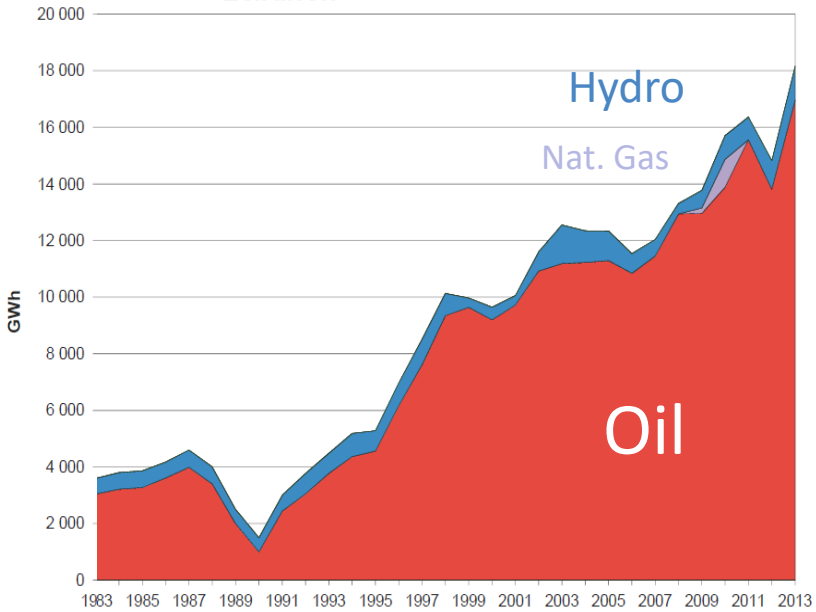
- FiT/PPA price premium
- Tax credits
- Carbon offsets



DREI Case Study Lebanon

- Lebanon performed a DREI analysis for both **wind energy** and **solar PV investment opportunities**

Electricity generation by fuel



Source: IEA 2015, www.iea.org

Current status

- 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

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*

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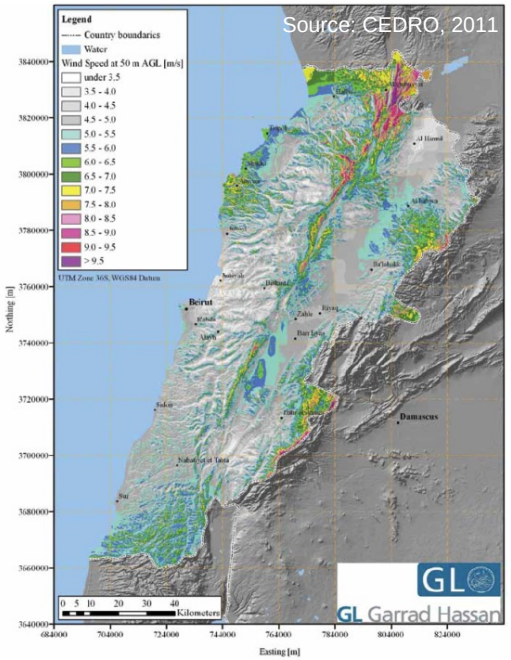
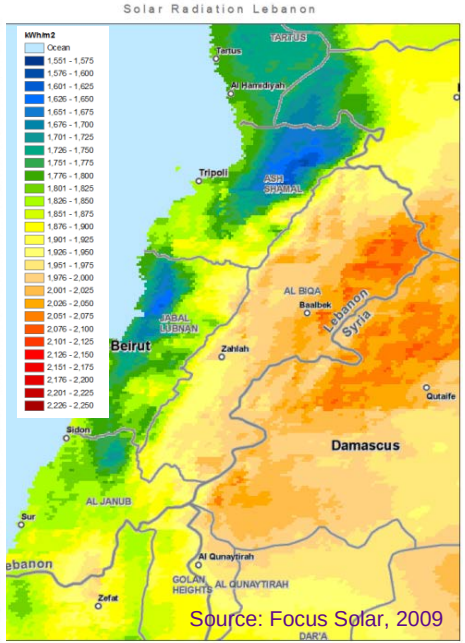
Wind and solar resources





Lebanon's RE targets

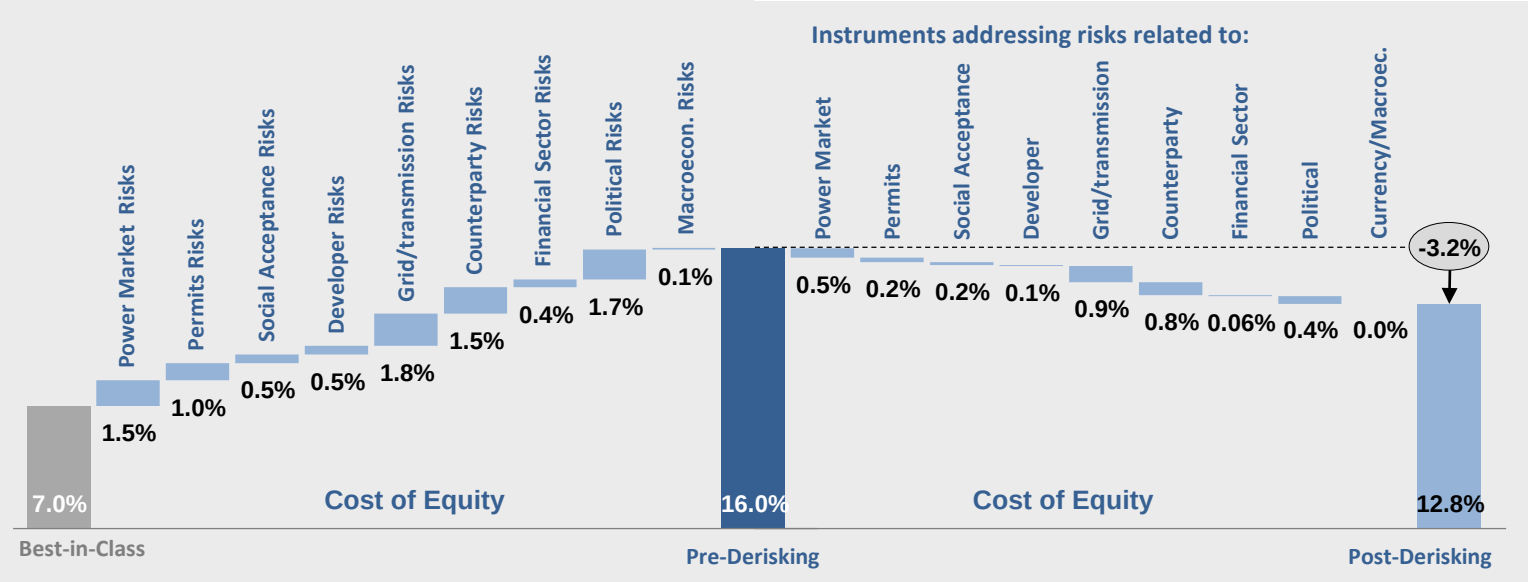
- 12% RE by 2020 (2010 policy paper)[1)]
- 12.6% RE by 2030 (NREAP envisioned target)[2)]
- 15-20% RE by 2030 (conditional INDC target)[3)]

- 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**

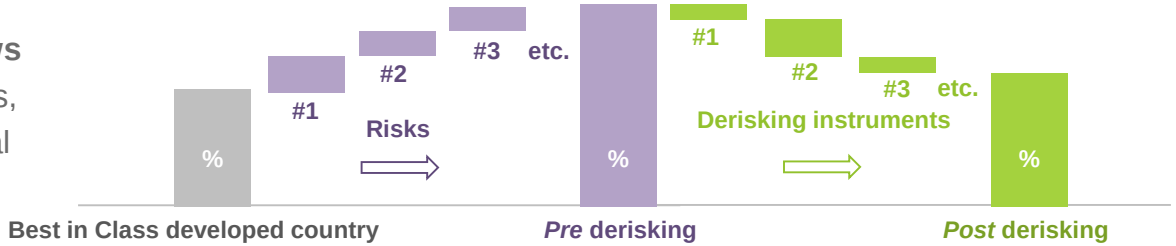
1) MoEW 2010; *Policy paper for the electricity sector*
2) MoEW/LCEC 2016; *National Renewable Energy Action Plan 2016-2020*
3) GoL 2015; *Lebanon's Intended Nationally Determined Contribution*

Financing cost waterfalls

Data from DREI Lebanon (unpublished)

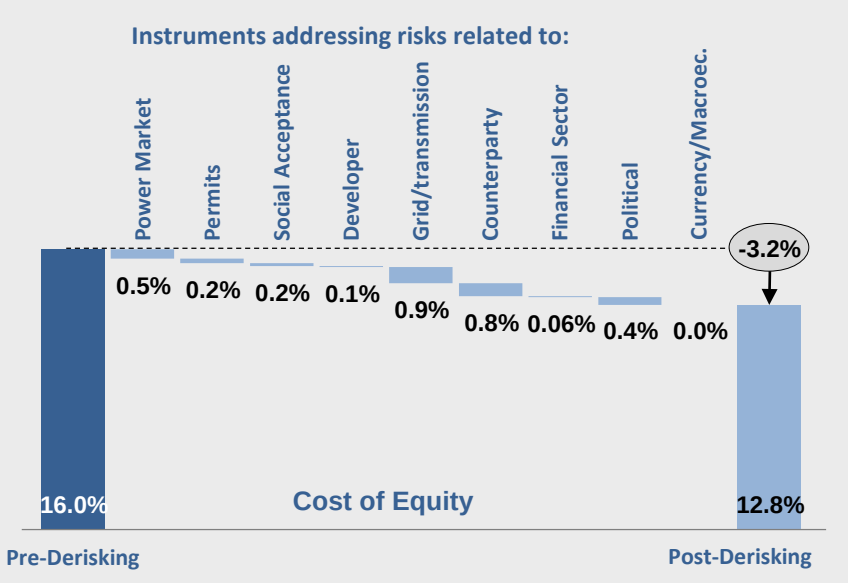


17 structured interviews
equity and debt investors, national and international



Public Instruments

Risk Category	Policy Derisking Instruments	Financial Derisking Instruments
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	• Strengthen 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	• Strengthen 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



Public Instruments and LCOE Modeling

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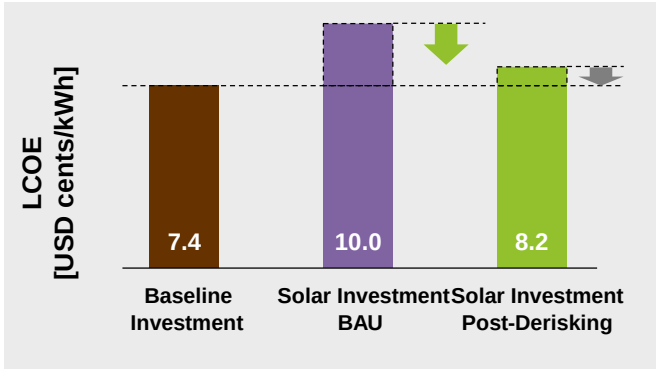
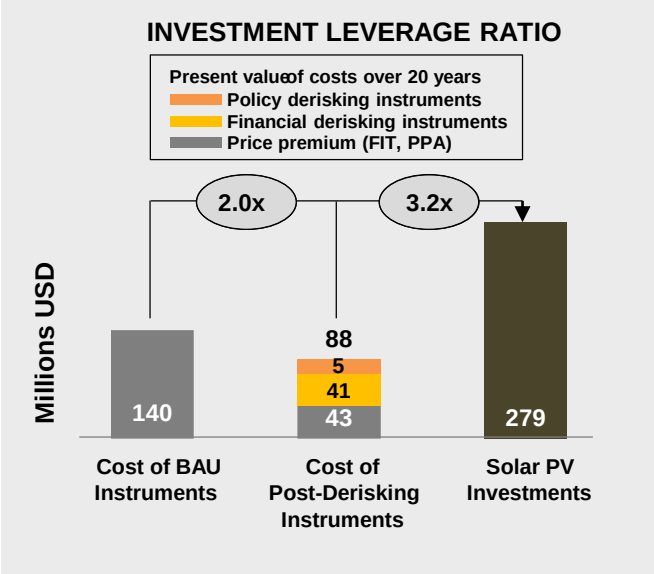


Theory of change: Policymakers to **derisk** as much as possible, before paying for the **remaining incremental costs.**

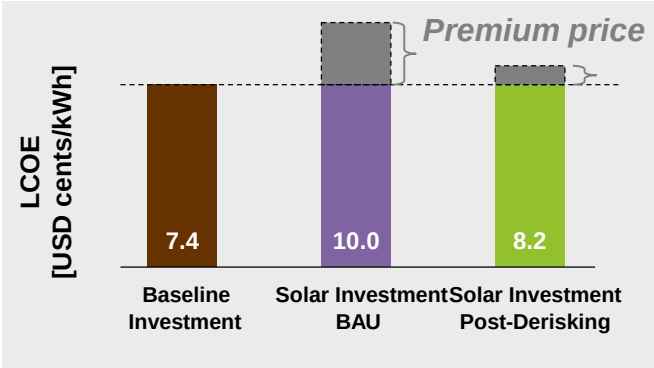
The question: What is the most efficient public instrument package?

Key performance metrics



Source: DREI Lebanon

Levelized cost of electricity



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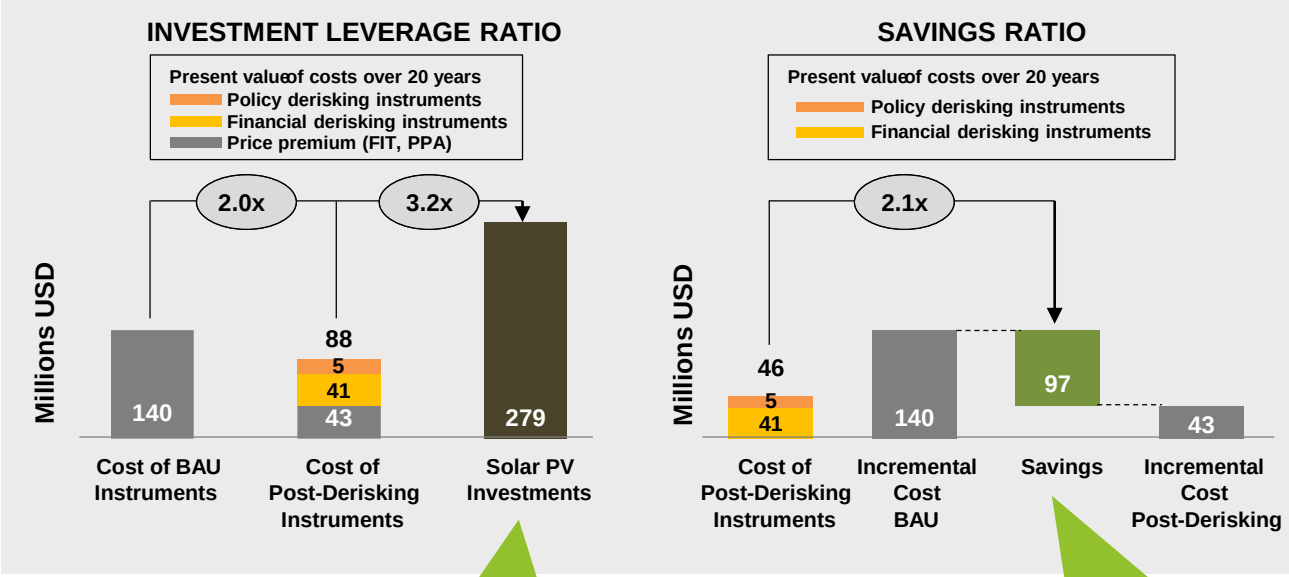

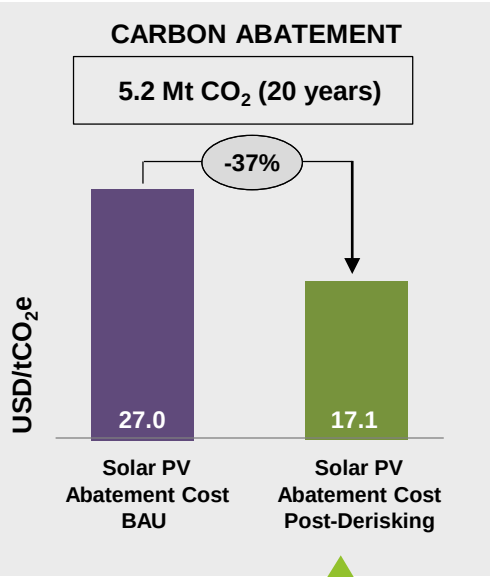

Data from DREI Lebanon
(unpublished)

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 CO_2** 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 CO_2** over 20 years

Link to DREI Lebanon report and further resources: www.undp.org/DREI