De-risking solar power investments in Rapidly Developing Countries

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Global challenge: booming carbon emissions

» Rapidly Developing Countries will account for...
  ...all of the increase in global carbon emissions by 2035

» Mainly coming from power generation

» Power investments from high-carbon to low-carbon tech

» Solar could be the world’s largest source of electricity by 2050
Investment decisions....financial return and investment risk

Higher investment risks in developing countries

Due to a number of barriers and their associated financial impact

....Financing costs are significantly higher
Context: higher financing costs in Dev Countries

Source: Schimdt (2014)
Research: de-risking solar power investments

Carafa, Frisari and Vidican (under review)

» Can governments and development finance institutions decrease investment risks?

» What is their relative impact on financing costs?

» 3 messages today:

  » The case of Morocco

  » A de-risking governance approach

  » Results: Moroccan government did partially reduce investment risks and financing costs
The case of Morocco

» Framework conditions for Morocco’s policy decisions representative of many Rapidly Developing Countries (RDCs)

» RDCs:
  China, South Korea, Malaysia, Chile, Thailand, Panama, Peru, Colombia, Turkey, Russia, Brazil, Philippines, Mexico, Indonesia, South Africa, Morocco, India, and Egypt

Source: Bloomberg (2014)
The case of Morocco

Electricity production by source, 1973-2012 (IEA 2014)
The case of Morocco

CO2 emissions by sector, 1973-2012 (IEA 2014)

* Other energy industries include refining and energy own-use.

** Commercial includes commercial and public services, agriculture/fishing and forestry.
The case of Morocco

» Rising electricity consumption (7% per year)
» Fossil fuel import dependency (95% year)

» 2009 Moroccan Solar Plan: solar to cover 14% of total power generation by 2020

» Ouarzazate Noor CSP complex (500 MW)

» Noor 1 (160 MW and 3h of thermal energy storage using parabolic trough technology)
» Awarded in September 2012
A de-risking governance approach

Governance
  » Governance structures as a way to reduce transaction costs of cooperation
    » May have an effect on the downside risk of solar power investments

De-risking
  » risk reduction (i.e. investment barriers)
    » risk transfer (i.e. transferring portions of risk to other parties)
The impact of de-risking at project level

(1) Investors’ profitability: equity rate of return given the awarded tariff

(2) Levelized cost of electricity

(3) Public subsidy to cover the viability gap
Results

Effective partial de-risking at policy and financial levels
  » domestic policy
  » domestic institutional capacity to transform commitment into concrete projects
  » development finance institutions

Lower financing cost
  » concessional finance
  » proactive policy de-risking at domestic level
  » the competitive auction
Partial policy de-risking by Morocco

Reduced power market risk for large-scale RES-E only
  » 2009 Renewable energy law regulates permits process
  » Creation of MASEN as key national actor

But...
  » Electricity market structure unchanged
  » Vertically integrated market, single-buyer model
  » Grid connection to be negotiated on a project basis

Electricity prices are subsidized directly and indirectly
  » Transfers to cover operating costs
  » Low prices for fuel oil
DFIs performed effective financial de-risking

2009 MENA CSP Investment Plan approved by the CTF
  » USD 750 million + USD 4.8 billion
  » 960 MW + transmission infrastructure in 6 MENA countries

2012 Ouarzazate Noor 1 bid stood at USD 795 million
  » USD 120 million of equity capital from the developers
  » USD 40 million of equity capital from MASEN
  » USD 635 million debt from multiple lenders
  » with a USD 197 million CTF concessional loan

Further CTF concessional loans
  » USD 238 million for Ouarzazate 2 and 3
  » USD 50 million for Midelt or Tata
The impact of de-risking on the financing costs

» Post-derisking waterfall of Ouazazate Noor 1

- CSP Reference Tariff (Morocco): 390 USD/MWh
- Concessional Finance: 125 USD/MWh
- Policy De-risk: 20 USD/MWh
- Auction effect: 60 USD/MWh
- Acwapower Bid: 185 USD/MWh
- Market Tariff (Morocco): 147.8 USD/MWh
Implications

» The creation of MASEN was of key importance
» Domestic institutional capacity to transform commitments into power plants

» Centralised public procurement of electricity not all bad for power investors
» Aim to get a PPA

» Auction of crucial importance
» Too lengthy process...more than 2 years
» Ouarzazate Noor 2 and 3 going faster

» Need to increase private investments, requiring further cost reductions
Thanks for your attention

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