



## **An innovative CDM-type Paris Mechanism for effective mitigation**

*COP23 side event “Market mechanisms 2.0: Whereto from here? Moving from the Kyoto regime to the Paris scheme”, Nov 9<sup>th</sup>, 2017*

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# Agenda

- 1 **Motivate** Art. 6 mechanism focusing on de-risking
- 2 Describe **functioning** of proposed mechanism
- 3 Present **simulation results** for exemplary project
- 4 Discuss **pros & cons** and aspects to be detailed

# Context changed since CDM, esp. concerning renewables

## Kyoto/CDM world (2005+)



- Kyoto protocol: Only Annex-1 countries with commitments



## Paris/Art 6 world (2016+)



- Paris Agreement: All countries with commitments as per their NDCs

- Many renewables w/ very high abatement cost, massive subsidy needed for profitability



- Strong decline of renewables CAPEX, broad track record for PV & wind
- But: investment risk and financing cost still high in many developing countries

- Mixed experience with CDM
  - Build-up of ecosystem
  - Bypassing of national-level policies
  - Additionality being debated
  - Collapse with EU ETS price decline



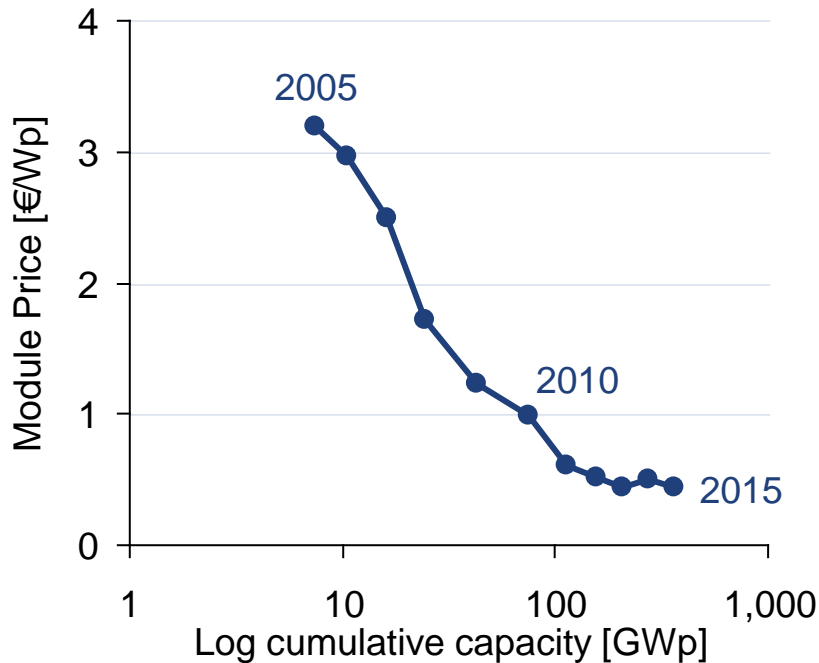
- Learnings for Art. 6 mechanism?

Note: CAPEX = Capital Expenditure; CDM = Clean Development Mechanism; ETS = European Union Emission Trading System; NDC = Nationally determined contributions

# While cost declined radically, renewables stay capex-intense

## Solar PV learning curve

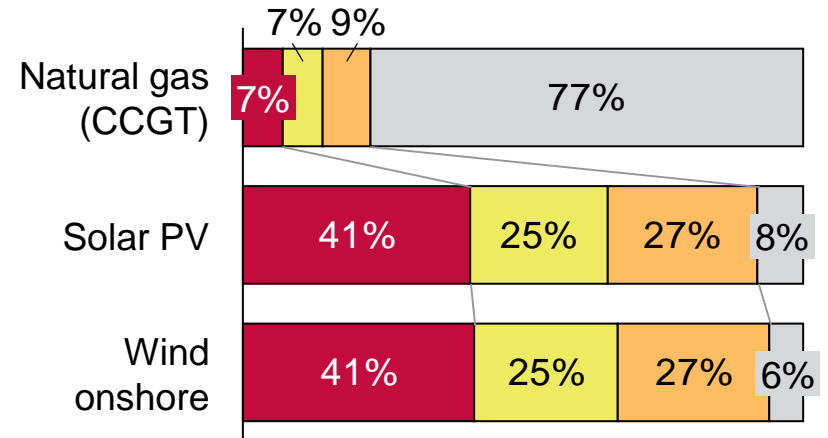
Annual PV module price (2005-2015)



## Split of cost for different technologies

Typical cost split of power generation projects in developing countries (2014)

- Capex
- Cost of equity
- Cost of debt
- Opex (O&M, fuel)



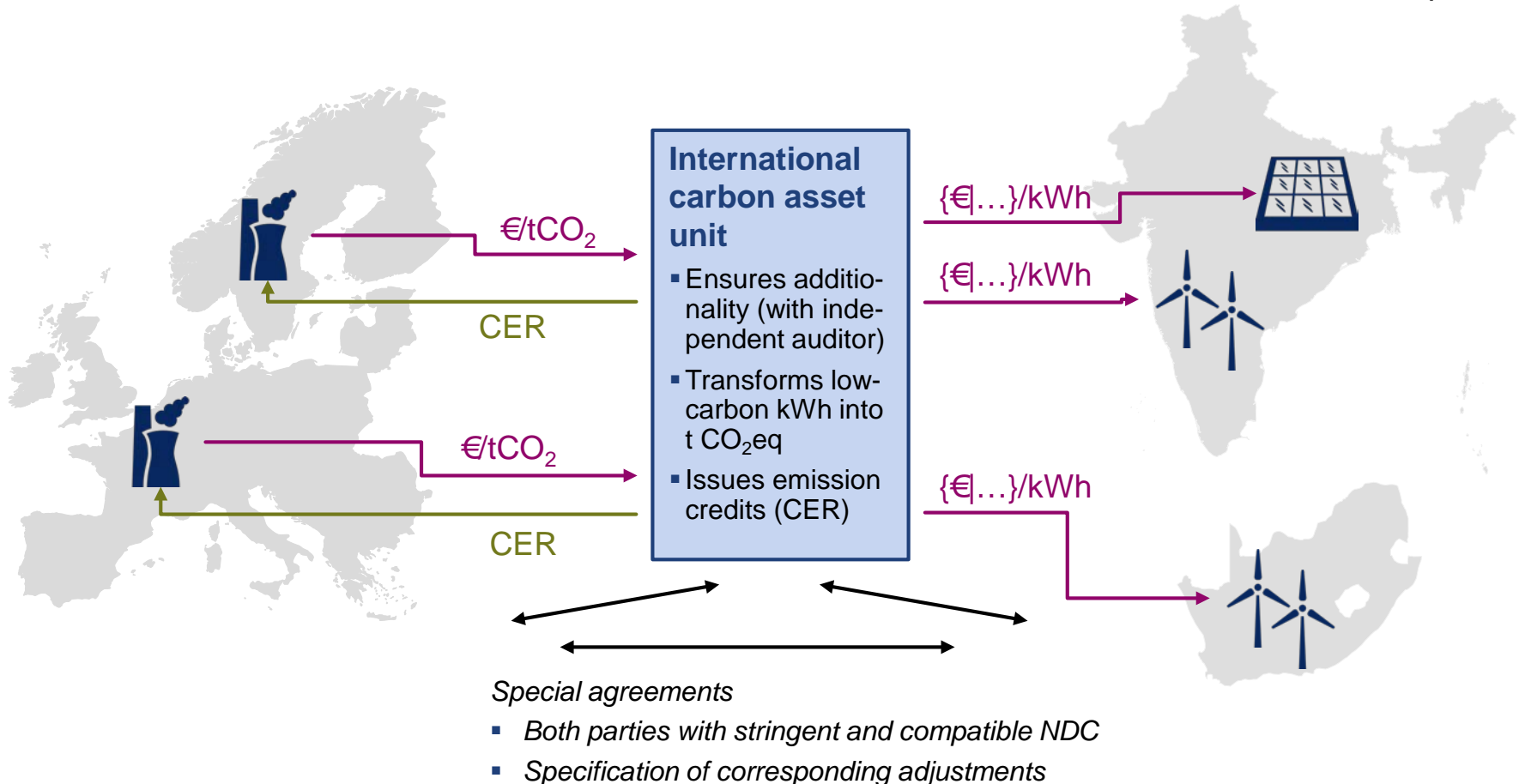
Left side: Source Fraunhofer Institute for Solar Energy Systems, Photovoltaics report 2017. Right side: Assumes 10% cost of debt, 18% cost of equity, European fuel cost. Data from Schmidt, T. S. (2014). Low-carbon investment risks and de-risking. *Nature Climate Change*, 4(4), 237-239.

# We propose an Art. 6 mechanism focusing on de-risking

- **De-risking low-carbon projects can allow for low mitigation cost**
  - Renewables investment (soon) profitable without subsidy in many countries
  - But highly dependent on investment risk and financing cost
  - De-risking by international instruments low-cost approach to make projects viable
  
- **Merchant renewables can be additional to NDC commitments**
  - Renewables auctions/PPA might define pathway in line with NDC
  - Proceedings from Art. 6 could be used for add'l merchant projects
  
- **Sector-specific approach can be extended step by step**
  - Specific agreements allowing for «quick wins» and successive roll-out

# Certificates are issued for outcomes achieved by de-risking

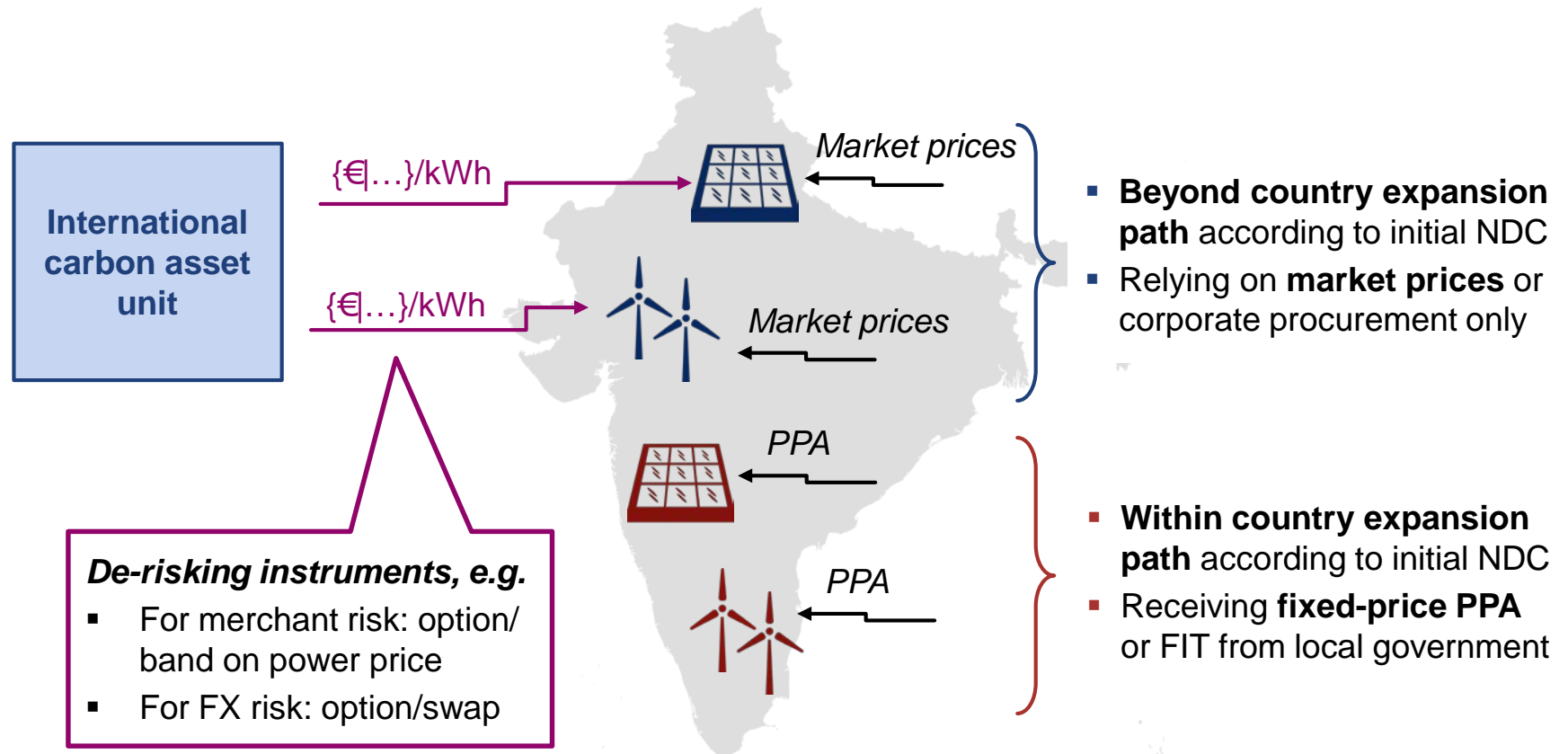
*Simplified*



Note: CER = Certified Emission Reduction

# Additionality requires NDC translated into sector-specific path

*Simplified*



Note: FIT = Feed-in Tariff; FX = Foreign Exchange; NDC = Nationally Determined Contributions; PPA = Power Purchase Agreement

# From project point-of-view, mechanism is result-based finance

Transaction Parties	<i>Who is the source of the payment?</i>	National gov. (e.g. donor countr.)	International unit <sup>New</sup>	Involuntary carbon markets	Voluntary carbon markets	Other donor (e.g. philanthropic)
	<i>Who receives the payment?</i>	Individual projects	Project portfolios	Other contractual parties (e.g. off taker)	National gov. (e.g. recipient countries)	Other authorities (e.g. city govts.)
	<i>How is the recipient chosen?</i>	Reverse auction <sup>New</sup>	Criteria-based selection <sup>New</sup>	„First come first serve“	Carbon markets	Others
	<i>What is the payment linked to?</i>	Avoided Emissions (tCO <sub>2</sub> )	Green electricity generated (MWh) <sup>New</sup>	Project completion gates	Other (e.g. no. of households electrified)	
Transaction Characteristics	<i>How is the payment determined?</i>	Ex-ante fixed payment	Local market dependent <sup>New</sup>	Global emissions market dependent	Other	
	<i>Who is responsible for the verification?</i>	Electricity market operator	Independent auditors	Others (e.g. gov.. agencies)		



Note: CDM = Clean Development Mechanism

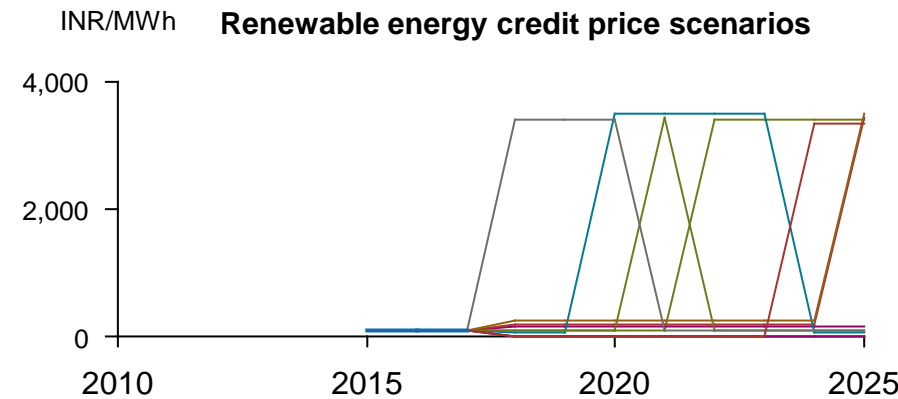
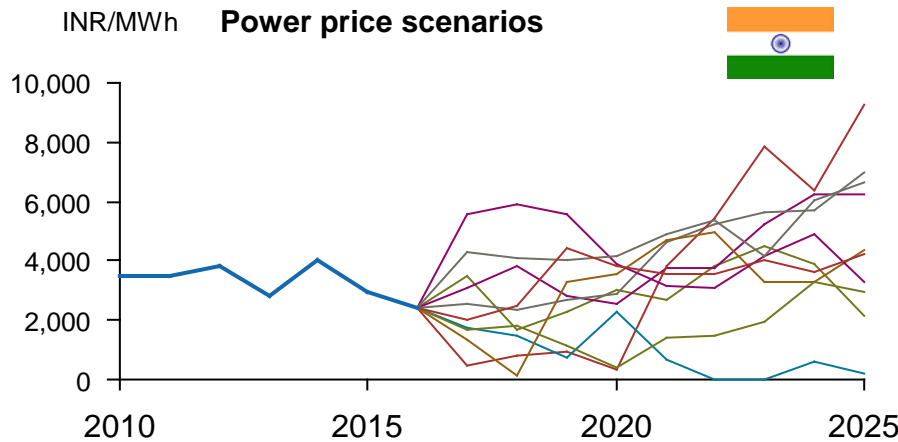


# Example 1: Addressing electricity market price uncertainty

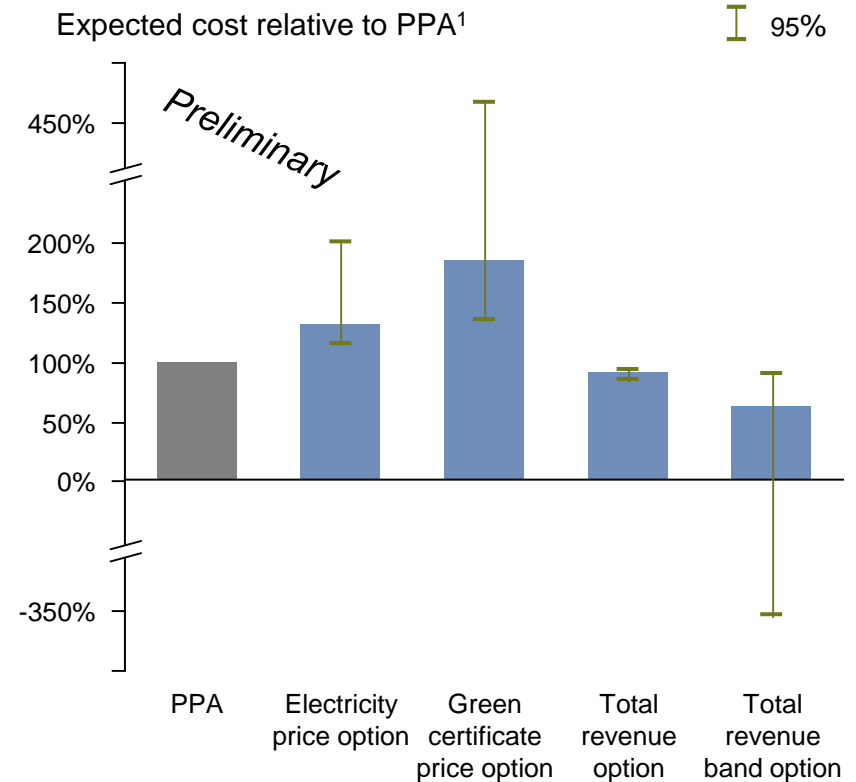
Illustrative

Merchant PV project in India...

...could be enhanced by revenue options



Simulation of option with strike price always guaranteeing a positive NPV

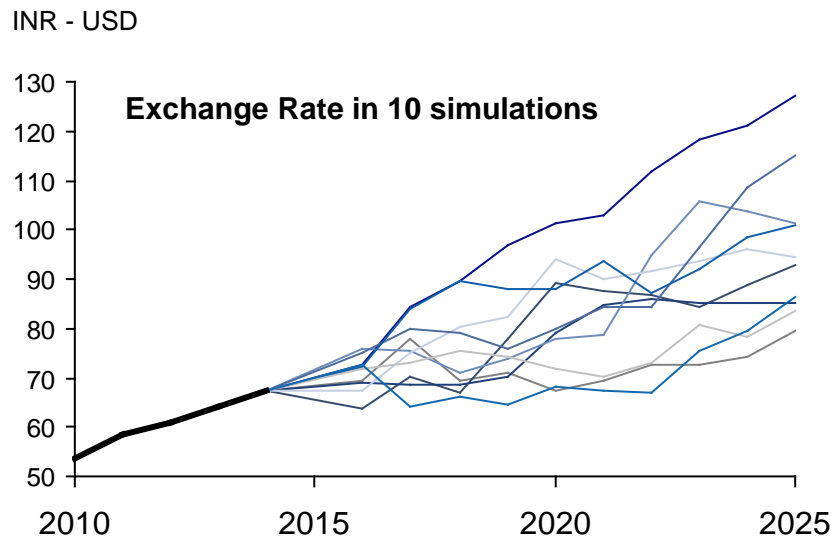


Note: NPV = Net Present Value; PPA = Power Purchase Agreement

# Example 2: Addressing foreign exchange rate uncertainty

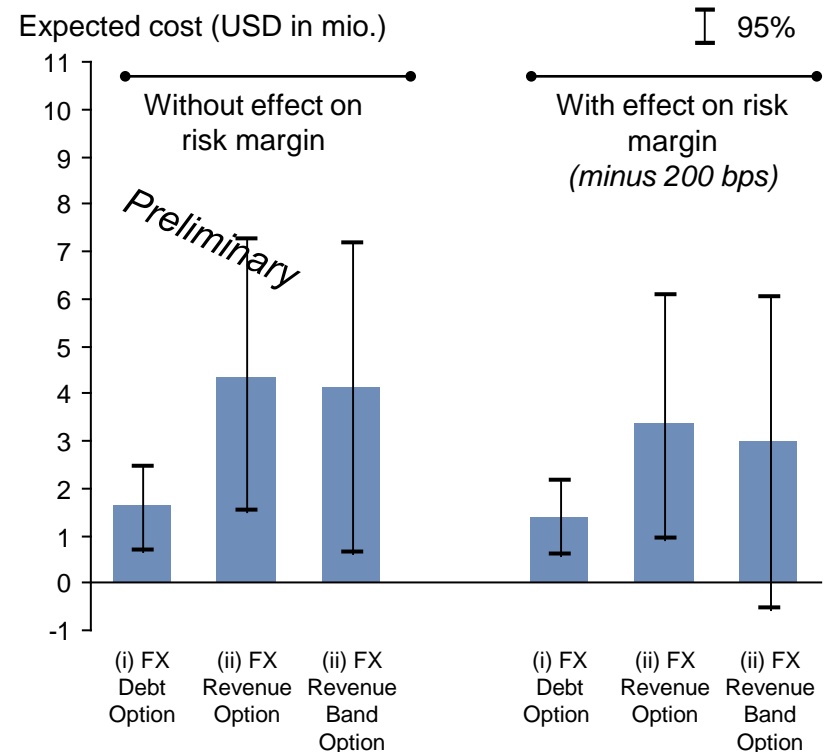
Illustrative

Merchant PV project in India by foreign investor



FX option might reduce cost of capital

Simulation of option with strike price guaranteeing (i) debt payback (ii) a positive NPV



Note: FX = Foreign Exchange; NPV = Net Present Value

# Proposal thought as input into broader discussion

## Key characteristics

- Focus on risk-side of capital-intensive projects to achieve low abatement cost
- Incentive for stringent, comprehensive NDC as precondition to participate
- Stepwise implementation for renewable energy projects in selected countries, addressing market price and FX risks
- Possibility for later extension to further investment risks and sectors

## Need for further clarification & challenges

- Minimum requirements for NDC of both parties
- Timing and process for corresponding adjustments
- Roles and responsibilities, especially ownership for central international unit
- Interaction with potential other «channels» for Art. 6 transactions and with further approaches and instruments (including climate finance)

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