Overcoming Challenges in Renewables Development

PNG NATIONAL POWER SECTOR FORUM

Lessons from Southeast Asia and Beyond

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Developing RE projects is expensive, difficult, and risky

- Your speaker (Shumway) led development of solar PV projects in El Salvador
- Several years to develop, approx, $350k + much time
- Bid 10 MW solar PV project into 100 MW RE procurement, lost on price
- Lessons were learned!

Excerpt from Post Bid Marketing of Development Assets

- **10 MW Doña Mariana project bid into 100 MW solar/wind RFP**
  - 33 projects, 31 solar PV projects
  - our project was qualified technically but lost on economic offer
- **10 MW El Rebalse + 10 MW Aqua Park under development**
- **Site control for 1.5 to 2 years for all 3 projects**
- **Interconnection feasibility at all sites**
- **Superior buildability and insolation at all sites**

Doña Mariana Model Extract

Claremont Energy Development El Salvador - Solar PV
Summary

Model Balance?		YES
Debt Service Coverage Ratio	Average	Minimum
	1.54	1.30

Uses of Funds	USD	$/W-DC	%
Plant, Property, and Equipment	20,918,701	$ 1.71	73.6%
Land	655,940	$ 0.05	2.3%
Development	944,250	$ 0.08	3.3%
Developer's Fee	1,172,400	$ 0.10	4.1%
Contingency	334,699	$ 0.03	1.2%
Erection All Risks Insurance	44,231	$ 0.00	0.2%
Working Capital	200,000	$ 0.02	0.7%
Debt Service Reserve Account	492,176	$ 0.04	1.7%
Interest During Construction	725,439	$ 0.06	2.6%
Capitalized Financing/Transaction Fees	2,952,327	$ 0.24	10.4%
Total Project Uses of Funds	28,440,162	$ 2.33	100%

Sources of Funds	USD	%
Equity	9,983,628	35%
Senior Debt	18,456,534	65%
Total Project Sources of Funds	28,440,162	100%

Key Profitability Indicators	
Unlevered Project IRR	NOT SHOWN
Equity IRR	
Equity Net Present Value, $000s	
Starting Tariff, $/MWh	
Average Debt Service Coverage Ratio	1.54
Minimum Debt Service Coverage Ratio	1.30

Several Local Team Members, with Doña Mariana Bid Package

- **Other key development milestones include**
  - bankable resource assessment (Black & Veatch)
  - project engineering/production report (Power Engineers/First Solar)
  - tax report
  - insurance quote
  - detailed indicative OEM/EPC bid from First Solar
  - Delaware project SPV + El Salvador SPV (in progress)
  - fully-functional financial model
  - fatal flaw environmental report
  - complete documentation package

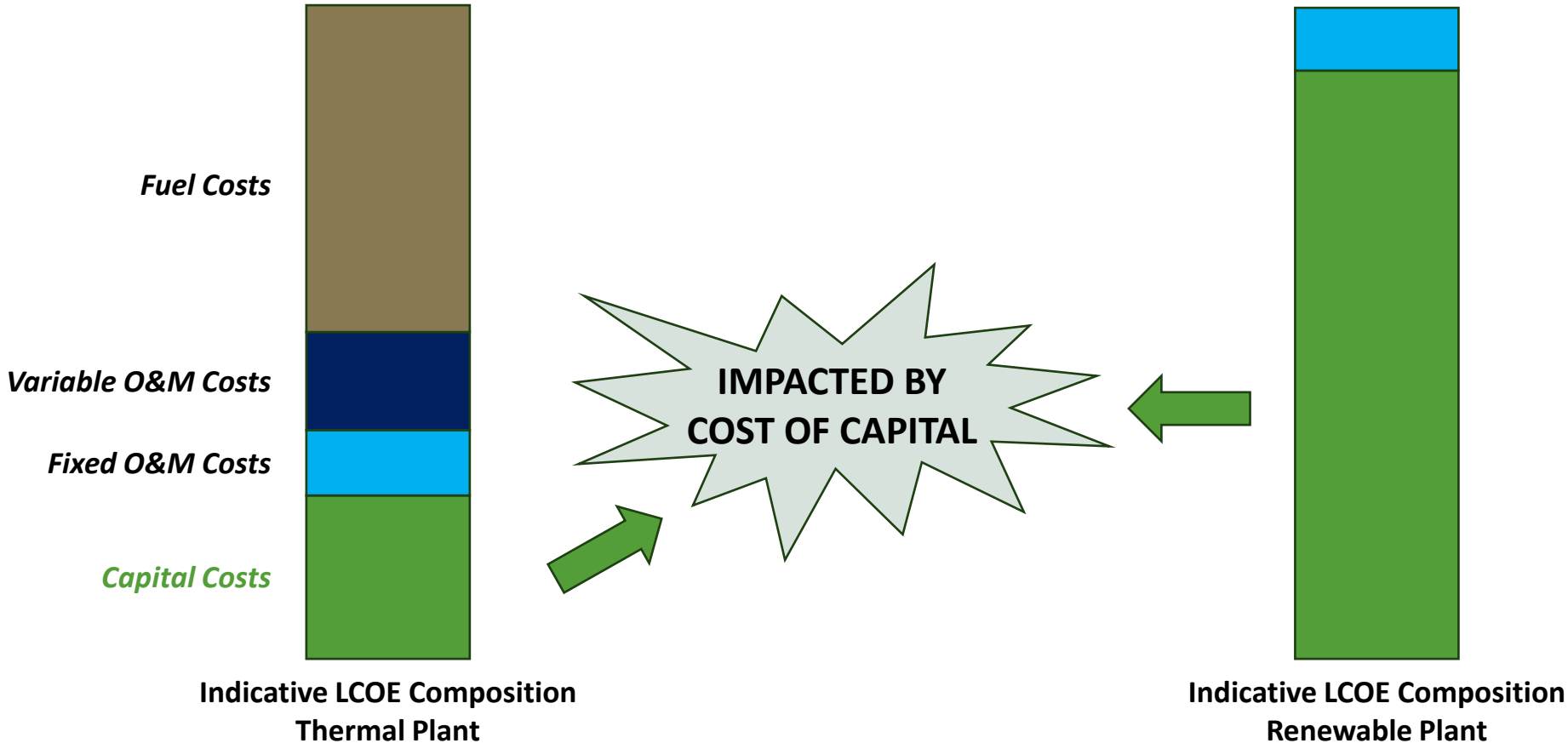
The project site that was bid into the procurement

- On highway, directly across from access road to Aqua Park
- Dirt road (owned by the site) runs north-south up the middle of the site
- Completely flat, no rocks
- 1.5 year site control under a "Arrendamiento con Promesa de Venta" (same site control arrangement for all three sites)

Another site that was developed

- Site was permitted for ash dump for AES Fonseca 350 MW coal-fired power project
- On highway
- Interconnection feasibility on adjacent 46 kV distribution line
- Site control through Q1 2017
- "Arrendamiento con Promesa de Venta"

RE competitiveness depends on cost of capital



RE developer considerations

MARKET STRUCTURE

- Relationships between ministry, utility, regulator?
- Are political connections required?
- What is involved in PPA approval process?

OFFTAKER & PPA

- Is utility interested in my (or any) project?
- Financial health of off-taker?
- Is PPA "bankable"?
- Capacity of utility to evaluate bids and facilitate procurement process?

LOCATION

- Was grid study conducted?
- Who is competing for substation hosting capacity?
- Who owns land? How to achieve bankable site control?
- Resource quality at location?

TECHNOLOGY

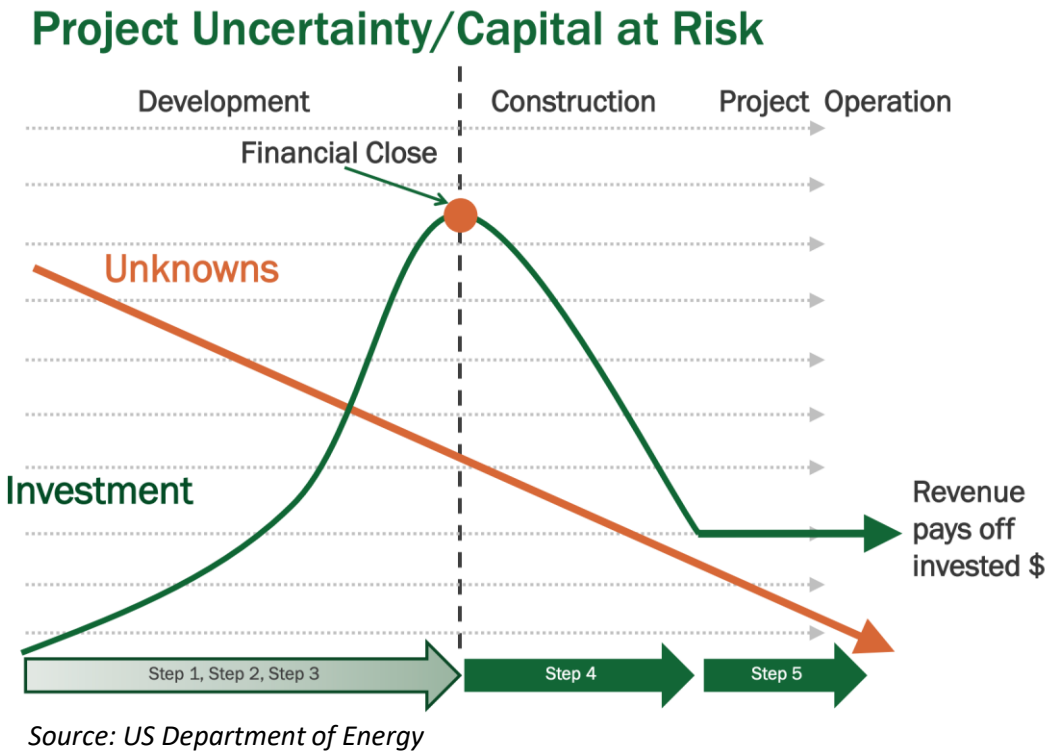
- Are technology (e.g., panels, inverters) requirements specified, and if so, why?
- Does the project concept being proposed/procured make sense?
- Utility familiar with this technology?

TIMELINES

- How much background work has been completed?
- Prior procurement track record?
- What is driving timelines?
- What happens if there are delays?

FEWER RISKS ("UNKNOWNS") → LOWER PPA TARIFF

Project stages and development capital



Source: US Department of Energy

	Activity	Funding	Risk/Return
Step 1	Identify/evaluate site, evaluate market, confirm resource potential	Development capital	**Very high risks** **3X – 5X returns**
Step 2	Regulatory & permitting considerations, tariff negotiations or participate in tender	Development capital; majority/ minority equity investor; TA grants	Entry of equity investors with lower hurdles (15%-35%) as project advances
Step 3	Finalize project, financing, contracting	Sponsor equity; subsidy grants	Sponsor equity risk/return profiles
Step 4	Construction & commissioning	Sponsor equity; debt; subsidy, grants	Entry of cheaper debt (7% - 12%)
Step 5	Project operations	Cash flows; exit of equity sponsor(s)	Dependent on technology and operations

Longer development timelines greatly increases overall cost of capital, given high cost of capital for development phase

Thank You!