Vietnam Electricity

Version 2



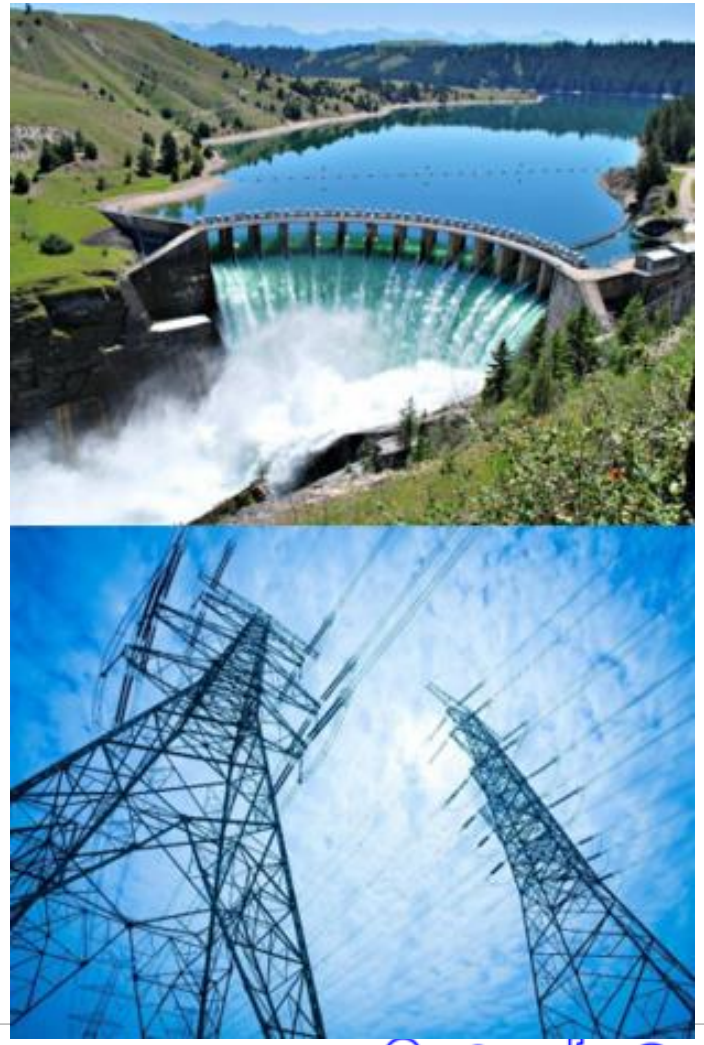
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I. The electricity revenue come from…?

Value chain of Vietnam electricity industry



	Power generation	Transmission	Distribution	End-user
Key players				
EVN	EVN account 64% national generator Gennco 1 Gennco 2 Gennco 3 Others	Owned by EVN 100% NLDC (Load dispatch Center) NPT (Owning Transmission Network) EPTC (Electricity Trading)	Owned by EVN 100% Northern Power Corp Central Power Corp Southern Power Corp HCM Power Corp Hanoi Power Corp	Household Industrial parks Mega factories
Other Developers	PetroVietnam 11% BOT & others 25%			

- Electricity Viet Nam Corp (EVN) play monopoly position in mid-stream
- EVN is sole buyer electric from power plants and sole seller to end-users
- So, how is the market structure for power plant seller?

Revenue of a power plant

Revenue of a power plant



= **P*Q** = Price (PPA price and CGM price)* Volume (Qc and non-Qc)

= **PPA * Qc + CGM price * non-Qc**

= Contracted price/Fixed price *Contracted volume + CGM price/Market price* CGM volume

Contracted volume (Qc) ← **100%** → Non- Contracted volume (non-Qc)

X Contracted Price

X Competitive market price

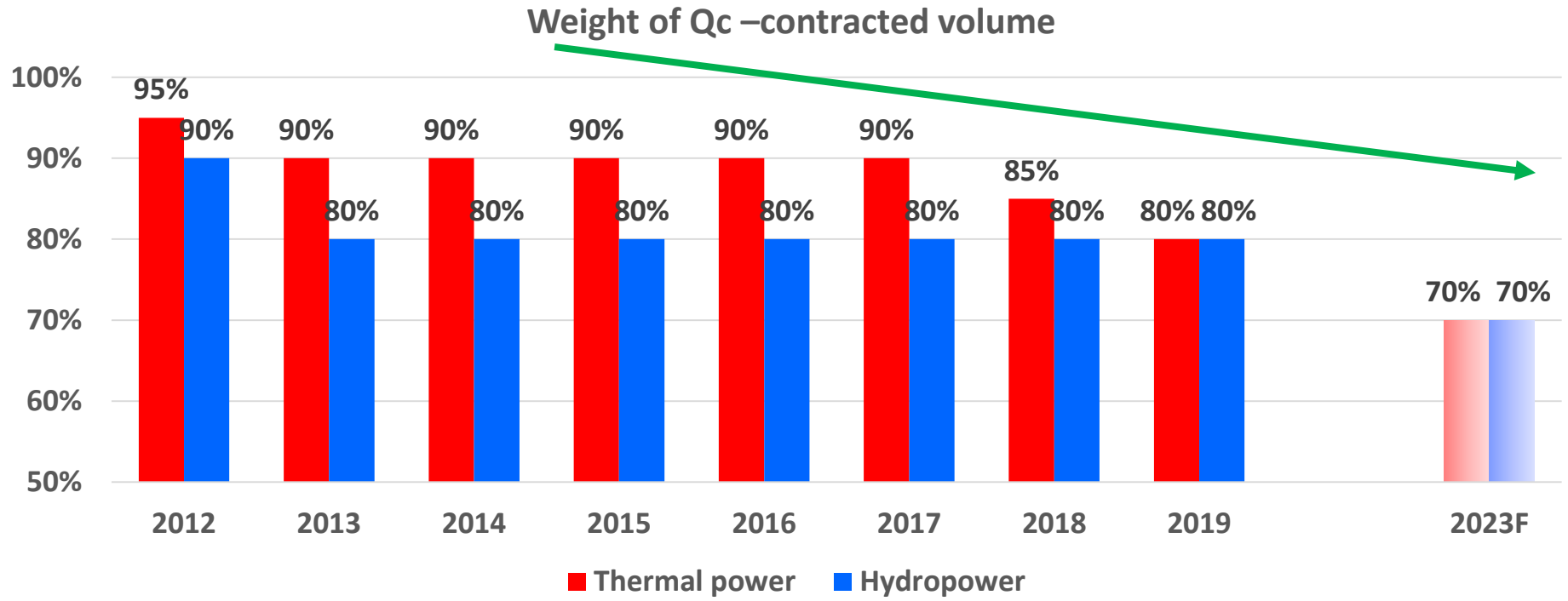
Which effect to power volume?

Revenue from Power Purchase Agreement (PPA)

Revenue from Selling power on competitive market

Qc/contracted volume: a protection for the seller but also the buyer

- Vietnam's MOIT government decides weight of contracted volume every year.
- Qc ensure power generators' output to earn enough cash for debt payment: protects the seller (the power plants)
- But it also protects the buyer (EVN) when securing a certain volume at a fixed price if the market price increases significantly
- The government projects to decline annually Qc percentage to 60%. However, we believe Qc will account 70% in next 5 year due to electricity shortage.



Revenue of a power plant

Revenue of a power plant



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= Contracted price/Fixed price *Contracted volume + CGM price/Market price* CGM volume

Contracted volume (Qc) ← **100%** → Non- Contracted volume (non-Qc)

X

Contracted Price

X

Competitive market price

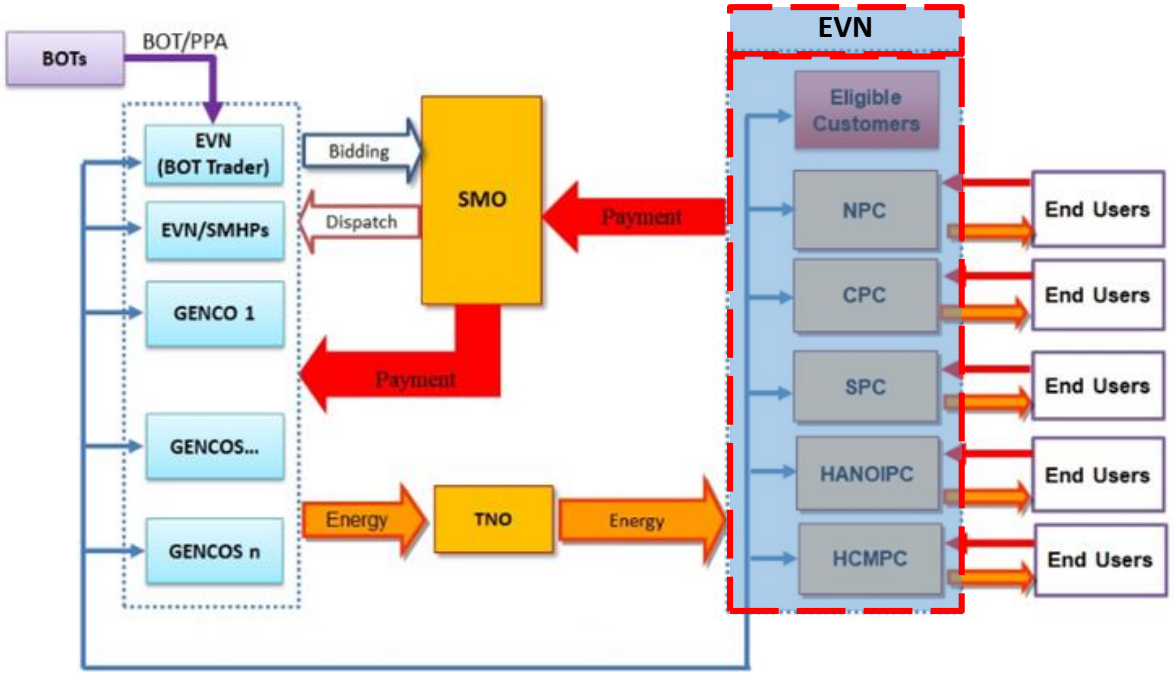
Which effect to revenue from competitive market?

Revenue from Power Purchase Agreement (PPA)

Revenue from Selling power on competitive market

Electricity market

Competitive generator market

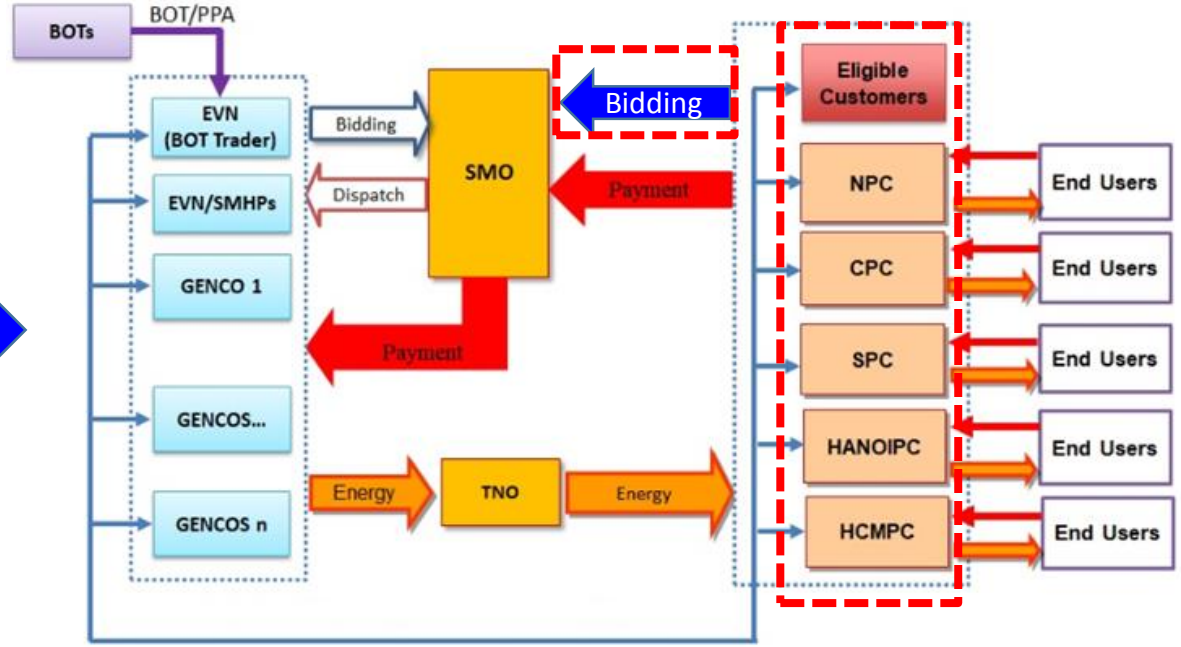


- Electricity Viet Nam Corp (EVN) is **single buyer**
- 5 Distributor network **owned 100%** by EVN
- 84 plants (a half of the system) bid with each other selling to EVN at CGM price/market price

Bidding

How does bidding price work?

Wholesale competitive market



- Electricity Viet Nam Corp (EVN) is **service supplier**
- 5 Distributor network **will be equitizated and play buyer role**
- Large customers (industrial parks, steel – cement plant…) could attend competitive market

We believe Wholesale market has a very long way to be operated

Bidding price in competitive market

- 1 day separate out 24 slots, each slot 60 minute
- System & Market Operator (SMO) announce power demand volume every day
- Power plants **offer their volume and price for each slot** to auction center/National Load & Dispatch Center (NLDC)
- On the trading day, NLDC will **mobilize from the lowest offering to the higher** until it has enough electricity to balance with demand.



Qmax 1 = 1,000Mw
Price: 950 VND/kwh



Qmax 2 = 300Mw
Price: 850 VND/kwh



Qmax 3 = 600Mw
Price: 900 VND/kwh

SMO (EVN)



Matching: 1,500 MW
- Power 2 sell: 300 MW
- Power 3 sell: 600 MW
- Power 1 sell: 600 MW

Matching market price:
950 VND/kwh

Customers' power demand:
1,500 MW

Revenue of a power plant

Revenue of a power plant



= **P*Q** = Price (PPA price and CGM price)* Volume (Qc and non-Qc)

= **PPA * Qc + CGM price * non-Qc**

= Contracted price/Fixed price *Contracted volume + CGM price/Market price* CGM volume

Contracted volume (Qc)

X

Contracted Price

Revenue from Power Purchase Agreement (PPA)

100%

Non- Contracted volume (non-Qc)

X

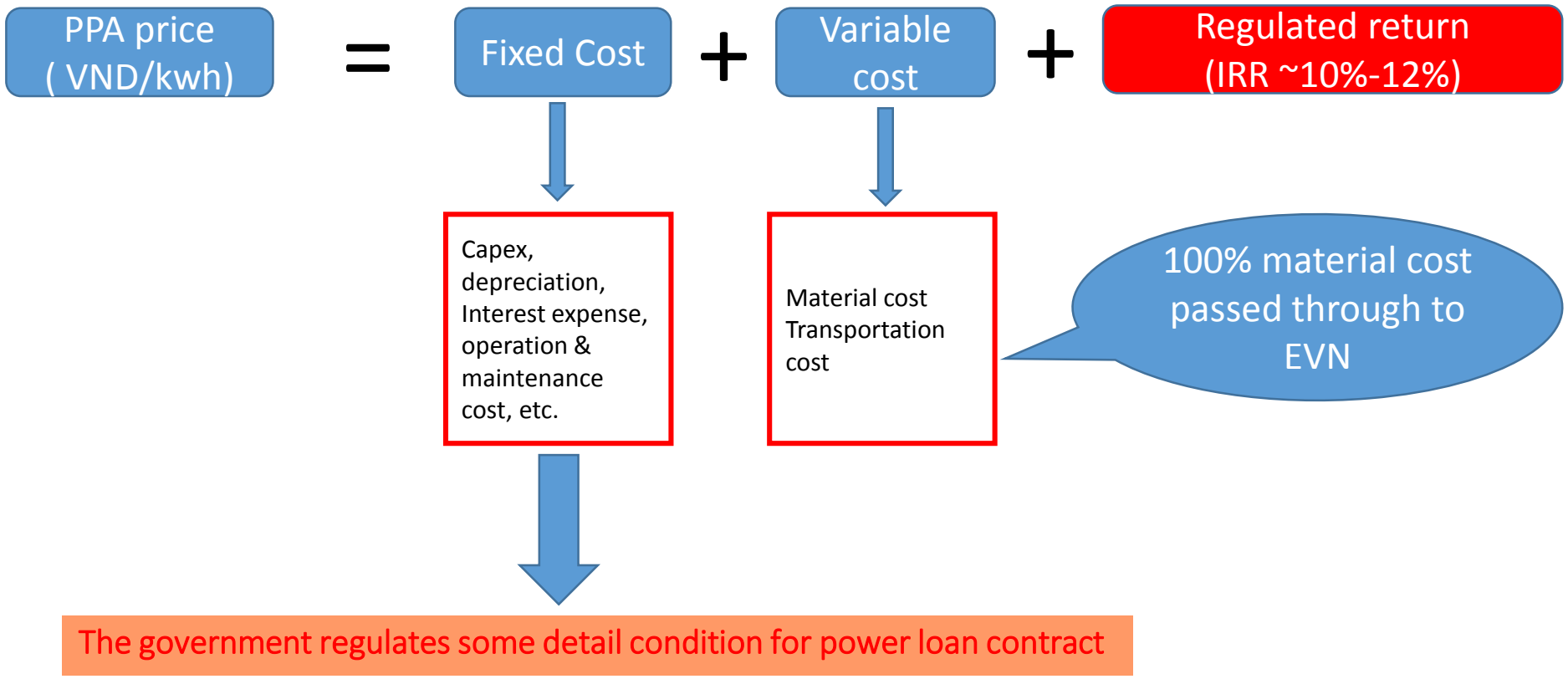
Competitive market price

Revenue from Selling power on competitive market

Which effect to revenue from Power Purchase Agreement (PPA)?

Power Purchase Agreement (PPA)

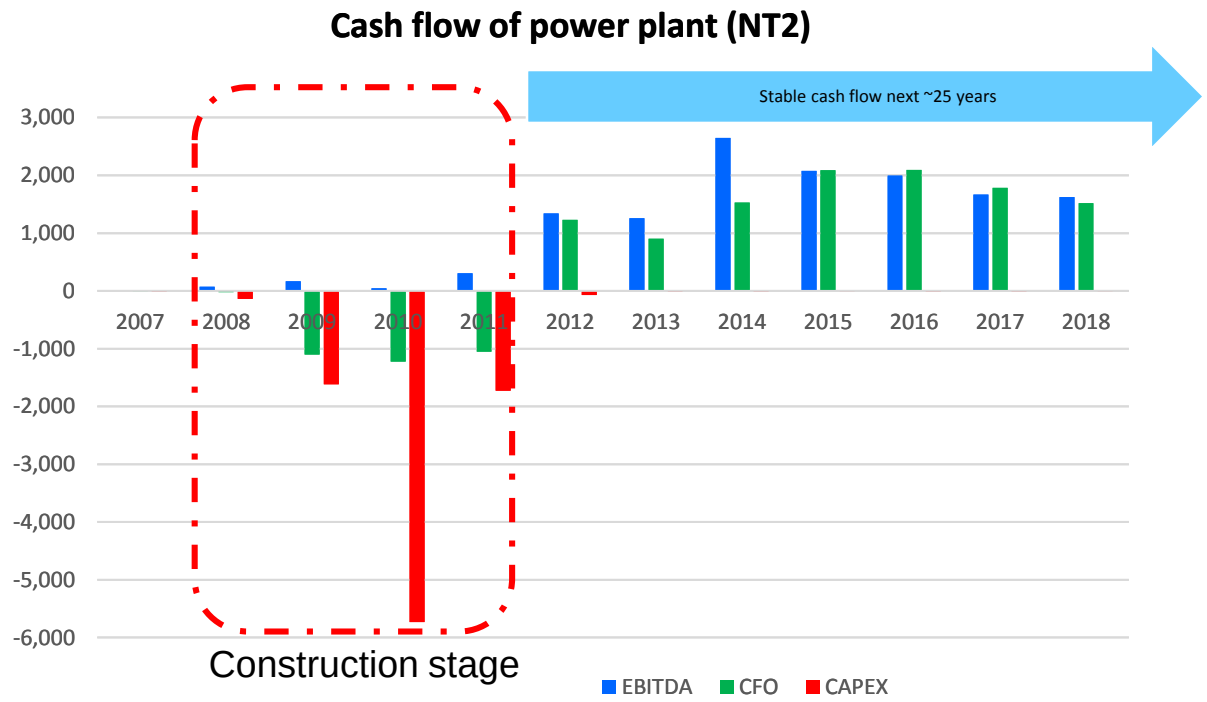
- Vietnam government regulate the PPA price formula between EVN and power investors
- EVN and power plants negotiate many assumptions: capex, capital structure, average utilization rate for the whole cycle of the project, etc, of a discounted cash flow model and plug in PPA to derive a project IRR of 10-12%.



II. Regulation and risk of loan contract in electricity industry

Electric infrastructure is capital-intensive

Cash-cow business model



	Item	Regulation	Risk for lender
Fixed Cost	Capex & depreciation	• Based on total CAPEX approved in the first time • Based on time depreciation of MOF & project life cycle	• Power plants delay construction period • Actual CAPEX cost higher than approval
	Interest rate	• Foreign currency: 10-yrs Libor + 3% • Domestic currency: ADR + 3.5% *ADR (Average determined reference) interest rate 12 month from 4 big SOEs bank*	• Borrower could face bankrupt if the interest rate surge sharply
	Loan tenor	• Minimum loan tenor is 10 years	• Construction period usually takes at least 2-3 years • Currency and interest rate risk for long time contract
Signed loan contract	Having signed loan contract before having output contract	• Power plants have to submit loan contracts to EVN before negotiation on electricity selling price	• Risk for bank if negotiation period take long time


Thank
you