

Introduction to Presentation & Brief Discussion of Haiti Paper

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Presented at the NARUC Committee on International Relations

Winter Meeting

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Outline of Session

1. Very brief presentation of Haiti paper
2. Central America paper

We are grateful to NARUC, an institution we admire for the invitation. During my career at USAID I found ways to collaborate with NARUC in support power sector reform in numerous countries

Copenhagen Consensus Center “Eminent Panel” examined 85 interventions

- “Based on the research, the Eminent Panel ranked this intervention the [highest priority for Haiti](#). Juan A. B. Belt (Lead Author), Bahman Kashi, Nicolas Allien, and Jay Mackinnon of Limestone Analytics.” Eminent Panel included Vernon Smith, Nobel Prize laureate
- Main reasons for ranking: power a main constraint to growth, & proposed program credible & based on best practices

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International Confederation of Energy Regulators (ICER)

Distinguished Scholar Award 2018

**Thanks to Erin Hammel who encouraged
me to submit the paper to ICER**

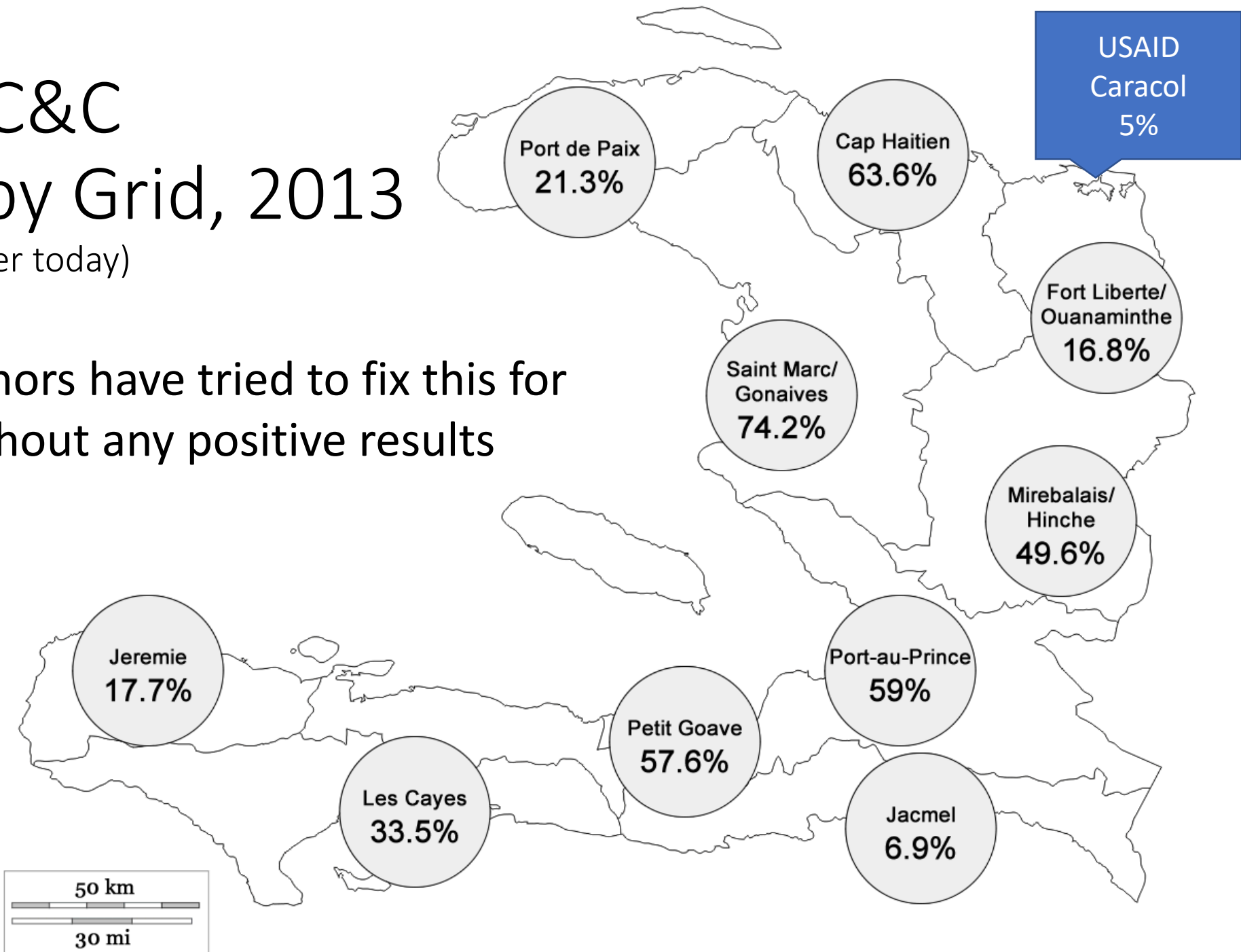


EDH ATC&C

Losses by Grid, 2013

(losses are higher today)

Multiple donors have tried to fix this for decades without any positive results



Proposal & Conclusions

PROPOSAL

• Phase 1

- Support Ministry & Regulator
- Corporatize EDH
- Establish the basis for management contracts, leases, concessions and privatization of the different units of EDH

• Phase 2 only if conditions met

- Support units of EDH with TA & equipment, mostly meters
- Different units managed through management contracts with incentives for performance, leases, concessions
- Jacmel privatized

CONCLUSION even under pessimistic assumptions IRR >17%

Central America Power Sector: Policy Recommendations with Particular Emphasis on the Role of Auctions

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Scope of Presentation and Outline

Scope:

- In the interest of time, we will not present the entire paper
- We will not discuss the gas sector nor the regional market

Outline:

1. Power sector reform in Latin America: from competition in the market to competition for the market
2. Conceptual model & performance of the different Central American countries
3. Guatemala reform: first stage
4. Guatemala reform: second stage auctions for generation & transmission
5. Next steps

Background of Reform Process in Latin America

- Stage 1: Competition in the market
- Stage 2: Competition for the market, auctions for IPPs

Latin America: Leader in Power Sector Reform

- Usual/recommended steps
 - Corporatization
 - Independent regulator
 - Tariff adjustments
 - Unbundling
 - Privatization
 - Strengthening off takers
 - Establishing wholesale markets

BUT: not incentives to ensure long-term supply

Second Wave of Reform

- Electricity auctions large countries in Latin America: Brazil, Chile, Peru, Argentina, Colombia, and lately Mexico
- Auctions resulting in lower & declining prices
- Auctions in Central America: Guatemala, Panama, El Salvador
- Usual steps in auctions:
 - Least cost generation & transmission planning
 - Approval by regulator of planning & bidding documents
 - Prequalification of bidders & bonds
 - Competitive bidding (auctions & tenders)
 - Approval by regulator of PPA

Central America Performance of Power Sector



Multiple Factors Influence Attractiveness for Private Investment in Energy Generation

- Macroeconomic environment
- Country risk

- General laws, regulations, institutions
- Business climate

- Finance
- Banking
 - Equity market

- Sector specific laws & regulations
- Independent regulator
- Cost-reflective tariffs
- Planning (IRP)
- Human capital

- Creditworthy off-takers
- Transmission network

Generator



Main Conclusions: Generalization would Require Much More Research

- **Guatemala & Panama** best performing power systems in region
 - Panama has very good high level conditions
 - Guatemala has poor high level conditions but good regulation & strong DISCOS
 - A possible conclusion: even under poor high level conditions you can have a well-functioning power sector
- **Costa Rica** has very good macro conditions but not opened the sector to significant private participation and vibrant competition
 - **Negative:** Private participation in generation low (18%) & **high prices** to commercial & industrial users; utility highly inefficient in terms of clients per employee
 - **Positive:** High coverage (close to 100%) at low prices for residential consumers & low emissions
 - **Stumbling block:** State-owned utility (ICE) that included power & telecommunications has very powerful political backing and strong labor unions

Guatemala: Successful Power Sector Reform in a country affected by poverty & 36 years of armed conflict.



Population: 16.6 million

GDP/capita: US\$4147

Installed capacity: 4.201MW Peak demand: 1,701.6MW

Guatemala: Situation Before Reforms

Blackouts in the front page of the newspapers



- Electricity sector assets were government owned
- Financial crisis of the power sector
- Insufficient capital investment to satisfy demand resulted in extensive load shedding (blackouts) in early 1990s
- Low electricity service coverage, particularly in rural areas
- Electricity tariffs not covering costs
- Political interference in management & operation of utilities resulted in low internal efficiency
- Civil war

Guatemala: Key Aspects of Reform & NARUC Role

1. Promotion of competition & private participation through legal/regulatory reforms (shown in graph)

- USAID funded mostly Chilean & Argentine consultants as those were two countries that had implemented power sector reform based on competition
- Eventually US-based consultants

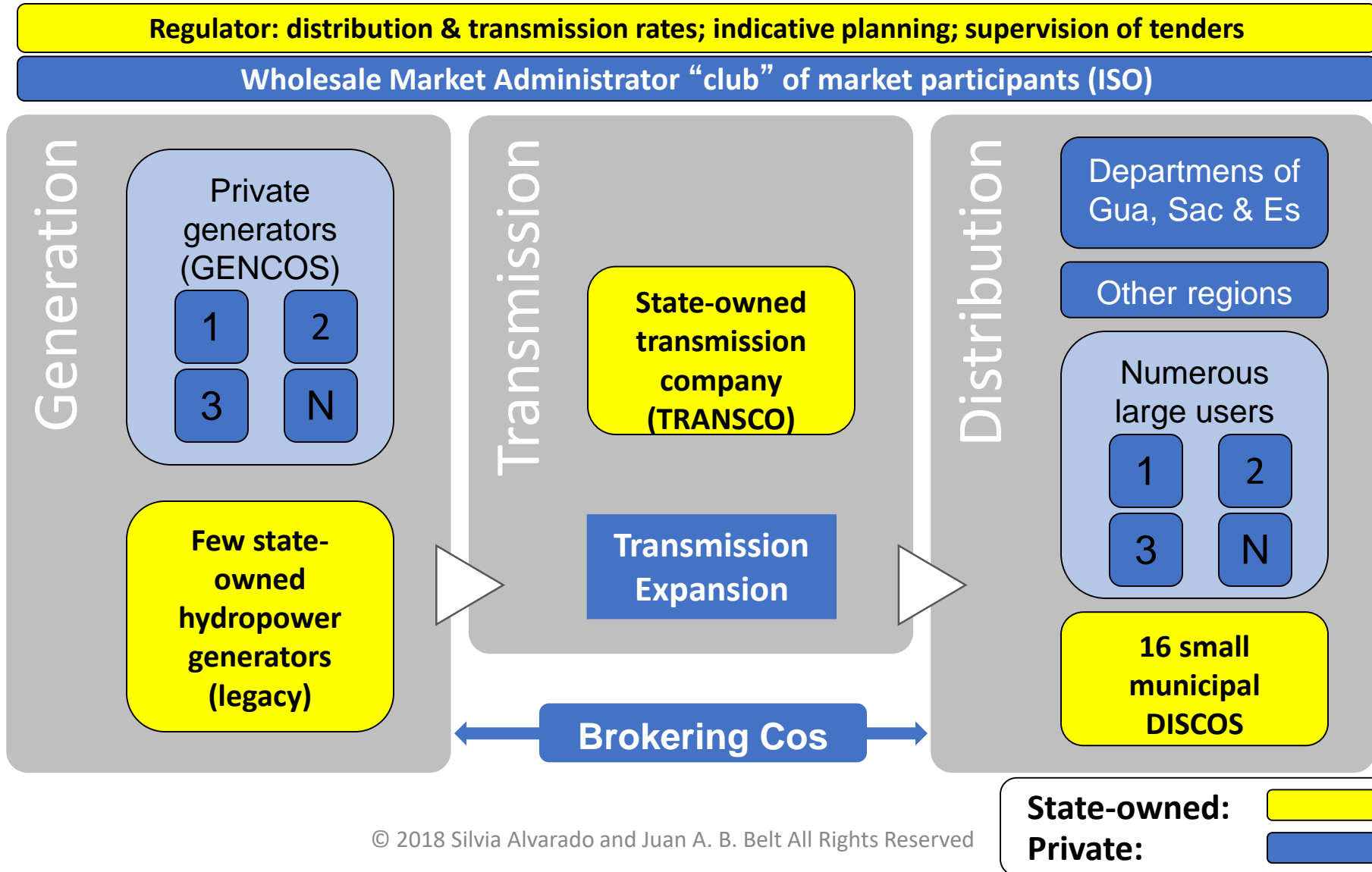
2. Connecting the unconnected mostly in low-income rural areas (graph)

- Use of privatization proceeds (\$101m placed at trust fund to extend the grid to be managed by the awarded distribution private operator)

3. Promotion of clean & sustainable energy (Ms Alvarado will show)

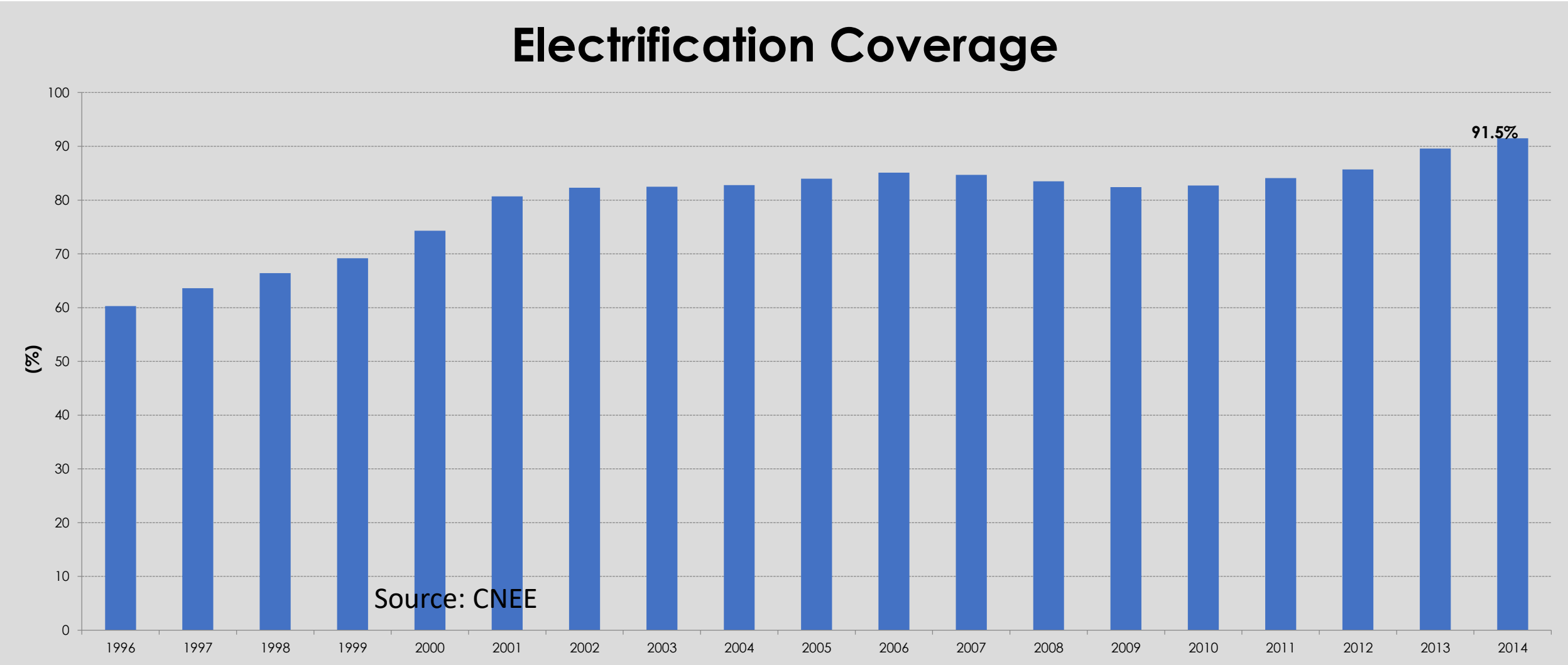
- NARUC provided support for geothermal development & renewable energy training to regulator (CNEE)

Guatemala Adopted the Prevailing Model of LAC:



Guatemala: A Success Story

Electrification Coverage



Privatization Revenues went to trust fund to finance grid extension

Guatemala: Key Elements for Success



President Arzu & privatization committee:
President of Congress Lopez, head of
committee Victor Suarez & other private sector
leaders

- Strong political commitment and sector leadership: Minister of Energy personally involved with full endorsement from President Arzu
- Excellent external consultants
- USAID requested local committee of main stakeholders as counterpart to consultants
- **Government followed recommendations in key areas such as tariff adjustment & privatization of DISCOS as initial steps**
- Local think-tank CIEN organized consultations with the legislature, press, civil society, etc.



Guatemala's Second Stage of Reform: Generation and Transmission Expansions through Successful Tenders and Auctions

Guatemala does not have very good macro conditions but has been highly successful in the power sector reform effort.

From First Price Sealed Bids to Reverse Electronic Auctions

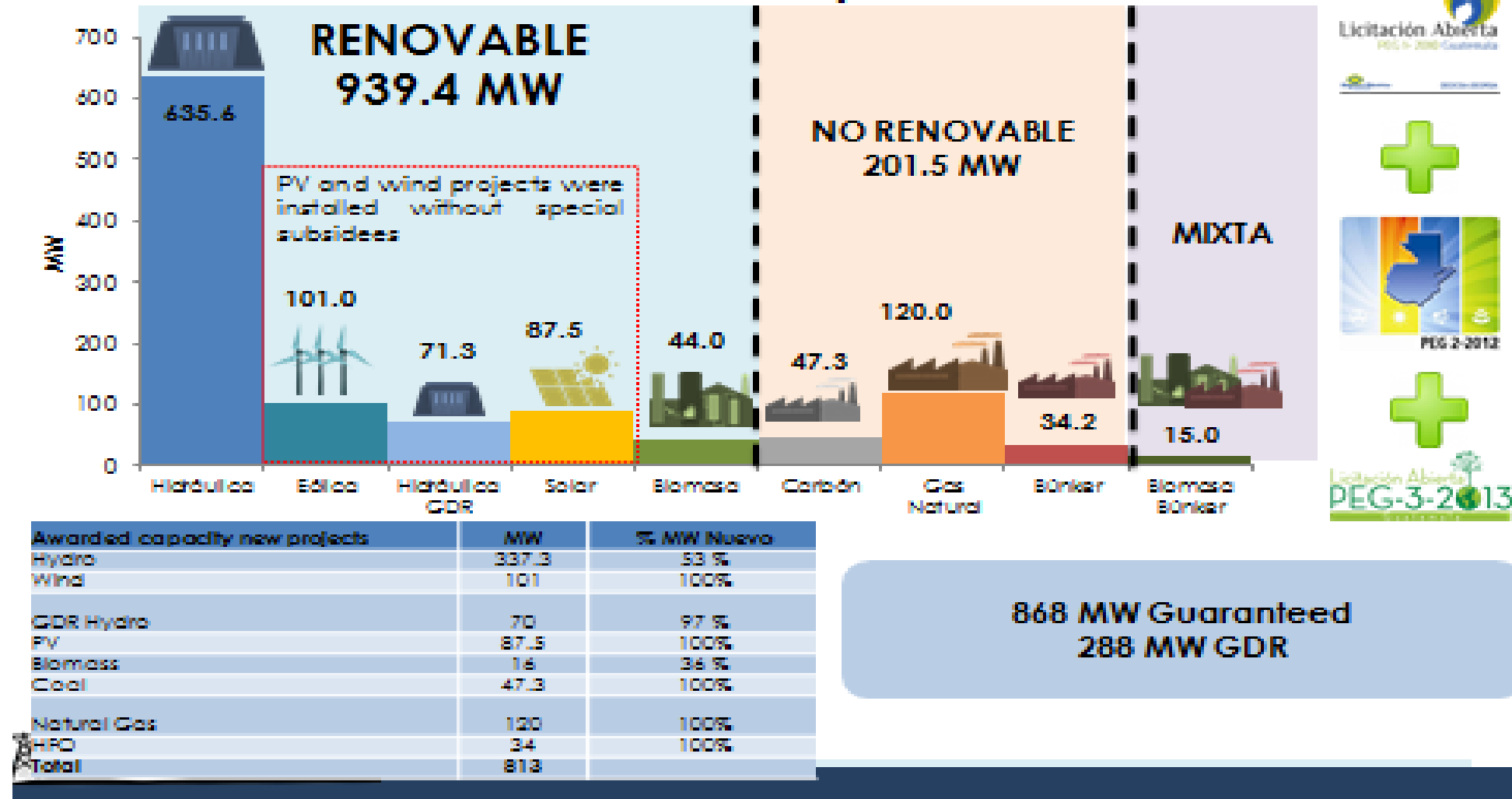
- Law only required discos two year contracts in advance of peak demand.
- No incentives to long term new investments
- 2007 amendment to bylaws: generation and transmission indicative expansion plans & DISCOs allowed entering into long term contracts (up to 15 years)
- New tenders resulted in the following awards:
 - 2009: 200MW PPA for a base load generation facility (coal fired)
 - 2010 a US\$350MM expansion transmission plan
- Subsequent tenders: three new long term bids for new and existing generation units technology neutral (PEG refers to Generation Expansion Plan)
 - PEG 1 was a first under a price sealed envelope bid (FPSB)
 - PEG 2 introduced the use of a “virtual offer” concept or cap price by technology in order to give a fair opportunity to each technology.
 - PEG 3 was designed to be a reverse electronic auction with more than 100 generation units competing for price (discussed in detail in the next slide)
 - Total of 813MW of capacity awarded in three PEG bids
 - In addition 288MW of new distributed generation(5MW or less connected directly to DISCOS)

Guatemala Long Term Tenders for Generation



Awarded Capacity Tenders

PEG1, PEG-2 y PEG-3



Source: CNEE

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Auction Procedures

- Long Term Energy Policy & Indicative Planning set reference
- DISCOs estimate demand needs & regulator validates
- TORs are requested by DISCOs
- Regulator issues TORs
- Based on TORs DISCOs prepare bidding documents for Regulator's approval
- From that point, the process is carried out by the DISCOs with oversight from the regulator.
- Draft PPAs part of bidding documents & can't be modified or amended without Regulator's approval
- Bids received, evaluated and awarded in public thus promoting transparency

PEG 3: 65 bidders & 101 generating units participated

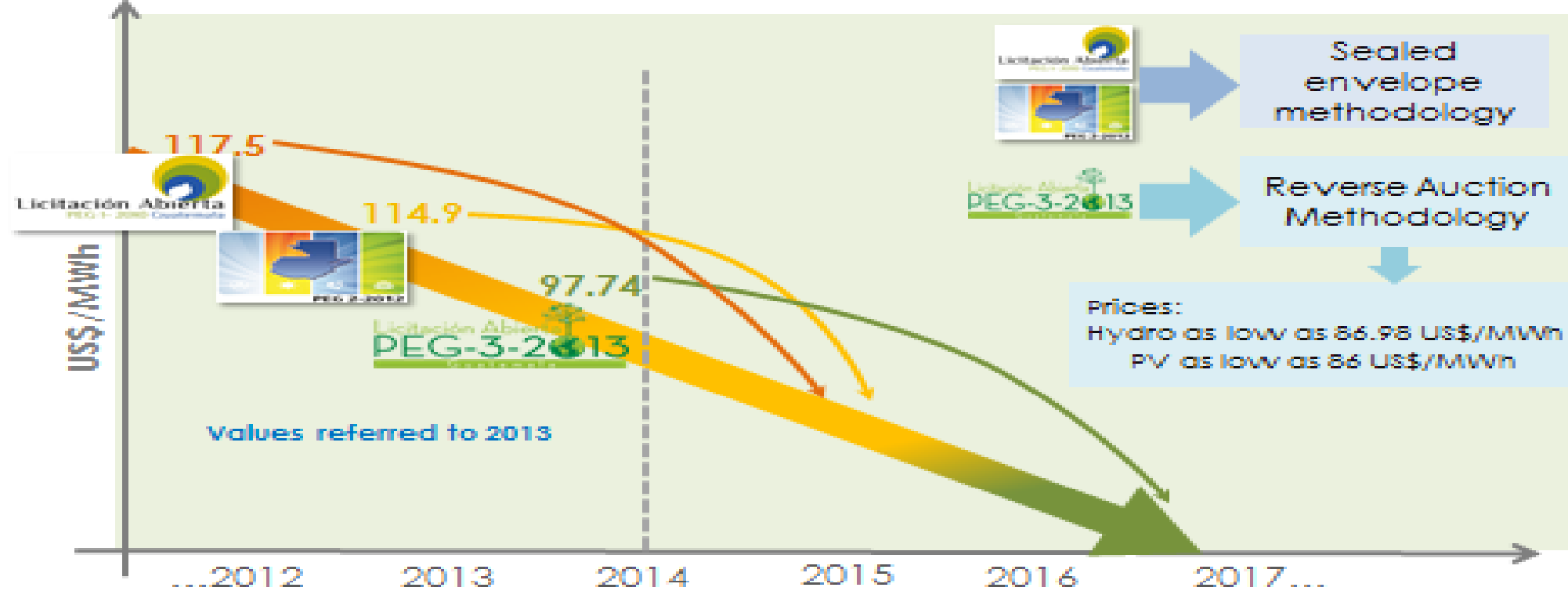


PEG 3/Electronic Reverse Auction: Costs and Length

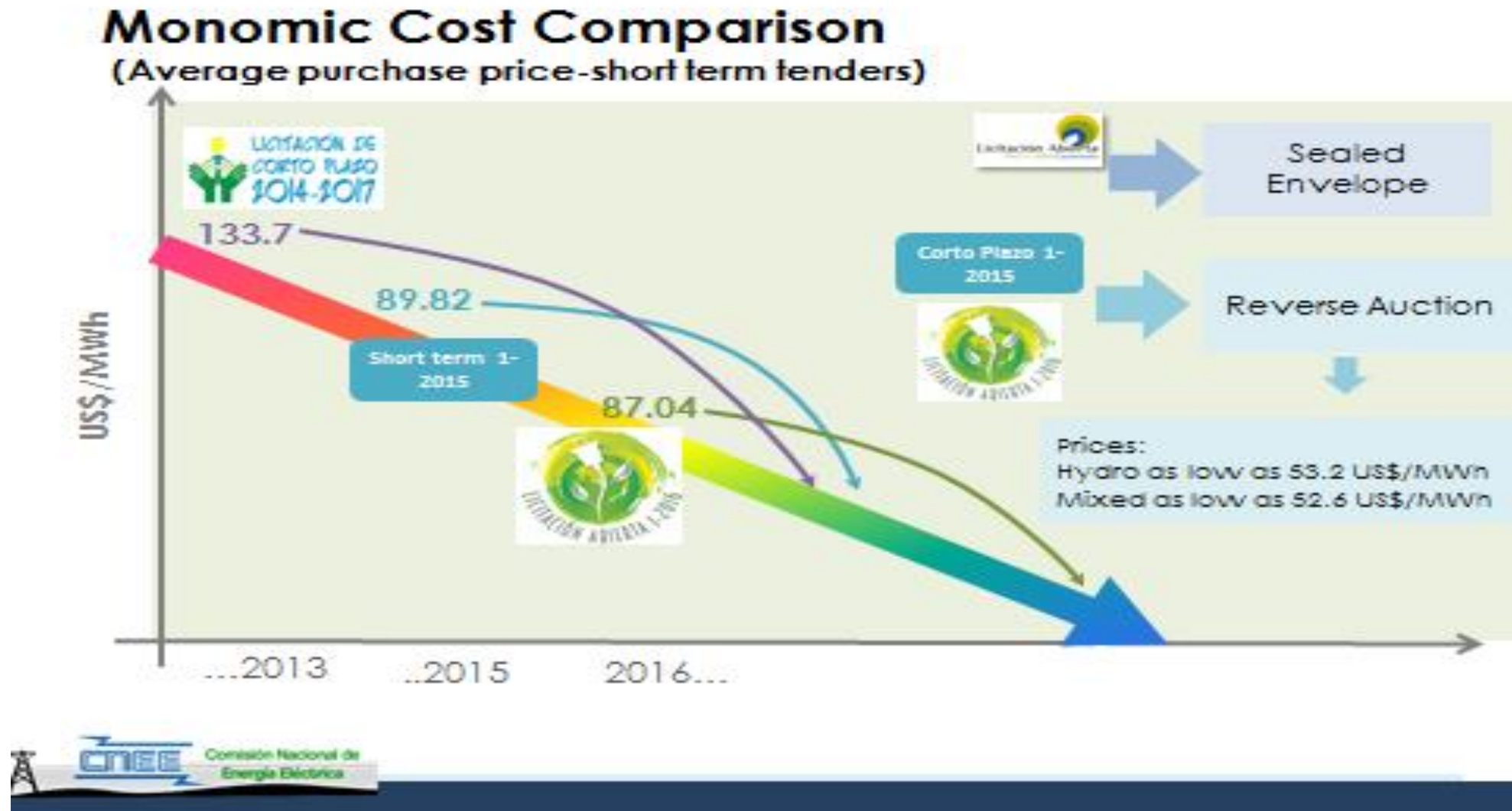
- All costs incurred by DISCOs but financed through sales of bidding docs
 - Consulting fees: US\$50,000
 - Computers (100) & other auction costs: US\$50,000
 - TOTAL Cost for third auction: US\$100,000
- Time required:
 - Least cost modeling: 3 months (required regardless of whether ICB or DN)
 - All other times: 6 – 8 months
 - Total time: 9-11 months
- Amount contracted long term:
 - Capacity 250 MW
 - Value of investment \$500 million
- Cost of auction as % of value of investment: 0.02%

Guatemala: Reduction in Prices Long Term Tenders

Monomic Cost Comparison (average purchase price)



Guatemala: Reduction in Prices Short Term Tenders



Guatemala: Tenders for Transmission Expansion

Characteristics	PET-1	PETNAC
Year of Auction	2009	2014
Investment (US\$ million)	370	255
Length (km)	845	546
Capacity	230 kV	69, 138, 230 kV
New Substations	12	21
Increased capacity substations	15	19
Annual Payment (US\$ million)	32.3	33.3

Purpose PET-1: Extend the National Interconnected Transmission System to areas that had the strongest generation potential for renewables

PETNAC: Connect 2,100 communities presently lacking access

Guatemala: Main Challenges Ahead but a Positive Outlook

Challenges

- Delays of new projects issues related to Indigenous and Tribal Peoples Convention, 1989 (No. 169)
- Excess generation capacity & depressed generation prices
- Long term vision needs to be maintained but current political crisis is affecting investment climate in general, not only in the power sector
- Electricity Theft: organized theft in rural areas needs to be controlled

Positive Outlook

- Powerful industry has been developed with numerous players & mature sector institutions and associations; almost all investment by nationals

Guatemala: Power Sector Achievements

- Over US\$1,200MM of private sector investment in distribution
- Over US\$400 million private investment in transmission
- Over US\$7 billion of private investment in new generation
- Generation capacity now double peak demand
- Explicit long-term policy to promote renewables
- Renewable generation increased from 49% in 2006 to 69% in 2017.
- Net exporter to Regional Electricity Market (MER) & Mexico
- Increase in the coverage of electricity services from 63 to 92%
- Residential end user tariff declined 50% from 2000
- The lowest spot prices in the Central America

Guatemala 20th Anniversary Enactment of Electricity Law: Speakers Recognized USAID's Contribution



Power Sector Authorities: Minister, Regulators, ISO President, DISCOS CEOs and main advisors to Reform

Over 400 attended main event



Future Activities

- Can it be generalized that you can have a well-functioning power sector in a country that lacks high level conditions?
- Econometric analysis to test the hypothesis that auctions lead to lower prices
- Determining the applicability of Central America experience to similar countries in Africa, Asia, & the Middle East
- ASIA USG Indo Pacific Strategy an Opportunity for NARUC, USEA
 - EDGE Enhancing Development and Growth through Energy
 - ITAN Infrastructure Transaction and Assistance Network

Thank you

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