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Infrastructure Reform: Summary of Leading Approaches

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Outline

- How do we define the term infrastructure?
- What kind of programs does USAID implement?
- Goals of reforms (Kessides)
- Lessons: power, telecoms & water
- Case study:
 - Guatemala: power sector reform & privatization
- Conclusions

What is Infrastructure?

- **Public utilities:**
 - Power
 - Telecommunications
 - Piped water supply & sanitation (WATSAN)
 - Piped gas
 - Heat
- **Public works:**
 - **Transport infrastructure** including highways, secondary roads, rural roads, railroads, urban transport, ports and waterways & airports
 - Major dam & canal works for **irrigation & drainage**
- **All those infrastructure services have the characteristics of networks**

What Kind of Programs does USAID Implement?

Laws & regulations;
PSP



Credit Enhancements
\$

Efficiency



Construction

Construction
without reform
leads to
unsustainable
infrastructure

Access for the poor: slum electrification



Renewable energy



Goals of Reforms (Kessides, 2004)

Old Model	New Model
Underinvestment	Increased investment
Low rates & revenue	Cost-reflective tariffs
Low productivity & high costs	Incentives for efficiency
Poor service quality	Increased quality
Long queues & shortages	Increase investment & supply
High losses (tech & non-tech)	Reduced losses
Political interference with SOEs	Privatization
Lack of transparency	Citizen participation

Results reasonably good but negative perceptions by public

Characteristics of Public Utilities

- Characteristics of **natural monopolies**: economies of scale, scope and density
- Sector specific, sunk investments
- Services deemed essential by a broad range of users; pricing politically sensitive
- Monopolies can result in higher prices & lower quantities
- **Regulate only where there is monopoly power & promote competition elsewhere**
- **Regulator:**
 - Protect investors
 - Protect consumers

**A delicate
balance**



Regulator should have independence and accountability

Continuum between Totally Public and Totally Private

	Support existing managers	Operating contracts			
P U B L I C	TA and/or outsourcing contracts	Management contracts with incentives	Leases	Concessions	P R I V A T E
	Will only work with cooperation from present managers	Managers must have full control	Private firm operates & maintains; investment by public sector	Private firm operates & maintains; investment by private firm	

Regulation is necessary for monopoly segments

Lessons Learned



Private Participation Possible in All Sectors

Sector	Impact of Technology	Technological change and difficulty of reform
Energy	Significant	Low cost, smaller generation units: competition in generation but need to regulate transmission & distribution; medium difficulty, can take 3-6 years
Telecom	Revolutionary	Wireless technology reduces local loop monopoly; need to allocate spectrum efficiently; need to establish interconnection rules; easiest, can be accomplished in one year
Water	Moderate	Telemetry and satellite imaging; SCADA; most difficult; main possibility contracts, leases and/or concessions; consolidation of municipal water works
Transport	Moderate to significant	Use of ICT in logistics; GPS; bar codes; RFIDs; ports & airports easier:foreign exchange risk lower

Different approaches are needed; regulation required

Different Power Sector Models

- **Model 1: (monopoly)** no competition at all, only monopoly at all levels of the supply chain. A single monopolist produces and delivers electricity to the users. Can be private or state-owned
- **Model 2 (purchasing agency)** allows a single buyer or purchasing agency to encourage competition between generators by choosing its sources of electricity from a number of different electricity producers (Independent Power Producers. IPPs)

Different Power Sector Models (cont)

- **Model 3. (wholesale competition)** allows distribution companies to purchase electricity directly from generators they choose, transmit this electricity under open access arrangements over the transmission system to their service area, and deliver it over their local grids to their customers
- **Model 4 (partial retail competition)** Like Model 3 but large customers can negotiate prices directly with generators **Guatemala case study**
- **Model 5 (full retail competition)** allows all customers to choose their electricity supplier, which implies full retail competition, under open access for suppliers to the transmission and distribution systems

Power Sector Lessons Model #2

(purchasing agency also called single buyer model)

- **Objective:** Attract new private investments in generation; often in countries facing unscheduled load-shedding
- **Key lessons:**
 - Consider only if market is too small to sustain competitive model
 - Rules should be developed by the regulator; if one does not exist, by the relevant ministry
 - Contracts should be awarded using transparent & competitive processes
 - Directly negotiated contracts should be prohibited
 - If possible, contract should include provisions that would enable movement towards the competitive model

Power Sector Lessons Model #4 (partial retail competition)

- **Objective:** introduce competition where feasible (generation) and regulate distribution & transmission; promote private investment
- **Key lessons:**
 - Many buyers & sellers required
 - Allow large buyers to purchase directly from generators
 - Demand & supply responsive to prices
 - hourly metering for large customers with high elasticity of demand
 - Equal access to essential facilities (transmission & distribution wires)
 - Subsidies & environmental controls that go with the “grain of the market”

Telecommunications Sector Lessons

- **Objective:** Competition & private sector participation
- **Key lessons:**
 - Light regulation; may consider freeing rates
 - Regulation only where monopoly power may exist
 - Spectrum auctions
 - Obligation to interconnect; alternate dispute resolution mechanism for interconnection disputes
 - Access to essential facilities including underwater cable
 - Regulatory body with limited discretion
 - Agile procedures for licensing companies
 - Introduce competition before privatization

Water Sector Lessons

- **Objective:** Separation between policy, regulation and operation; encourage private sector participation, at least in management
- **Key lessons:**
 - High capital requirements & natural monopolies
 - Regionalization & corporatization are key trends
 - Regulatory reform advanced far more than PSP: in LA 41% of urban consumers enjoy regulatory protection but only 15% under PSP
 - Many international companies leaving LAC: change in corporate strategy, change in national policies, populism, social conflict, devaluations
 - Need to improve contract design & bidding processes, increase tariffs before privatization, conflict resolution mechanisms established *a priori*, strengthen regulation

Most difficult sector to privatize

Sequence of Reforms is Important for Power & Telecommunications

- **General:** develop strategy
- **Power:**
 - Enact law & establish regulator
 - Corporatize & unbundle (separate distribution from transmission & from generation)
 - Privatize distribution & increase tariffs
 - Privatize generation after DISTCOS viable financially
 - Transmission may or may not be privatized: key issue is how to price services & how to give adequate incentives for investment
- **Telecommunications:**
 - Enact law & establish regulator
 - Introduce competition, including interconnections
 - **Privatize AFTER competition in place**

Guatemala: Successful Power Sector Reform in the Middle of a Regional Conflict



Guatemala: Situation Before Reforms

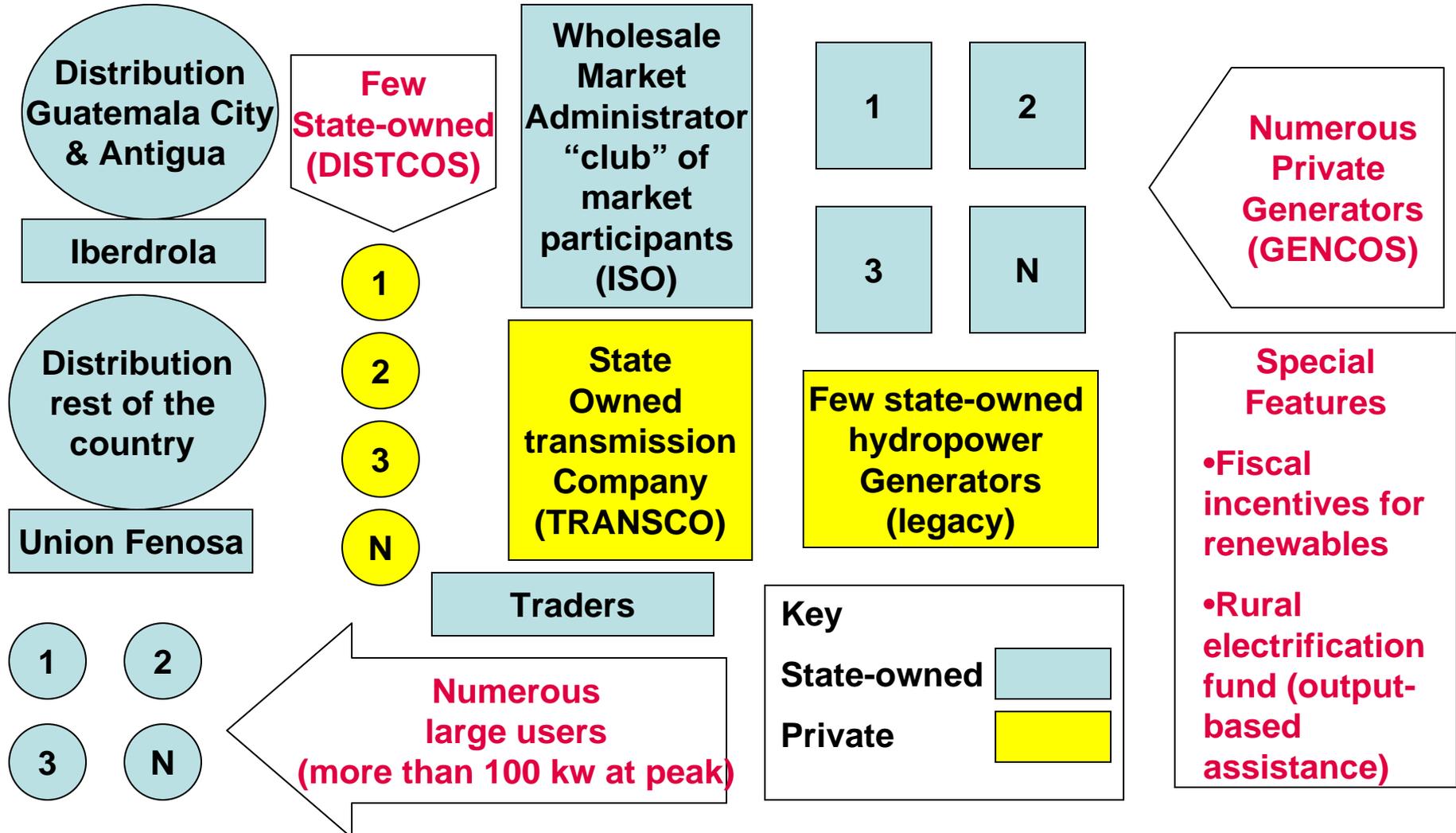
- Financial crisis of the power sector
- Insufficient capital investment to satisfy demand resulted in extensive load shedding (blackouts) in early 1990s
- Low electricity service coverage, particularly in rural areas
- Electricity tariffs not covering costs
- Political interference in management & operation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

Guatemala: USAID Support During the Conflict and After the Conflict

- **Legal/regulatory reforms to promote private investment**
 - TA to open private sector participation in Cogeneration
 - Seminars with civil society, the press, Congress
 - TA to draft electricity law & regulations (mid 90s)
 - Training of regulators & other market participants
 - TA for unbundling and privatization
- **Increased access to modern energy services (rural)**
 - TA to create action plan to provide rural access
 - Access funded by privatization proceeds (\$101m placed at trust Fund at B. of NY for output based assistance)
- **Promotion of clean and sustainable energy**
 - TA to prepare the Renewable Energy Incentives Law

Guatemala Adopted the Prevailing Model of the Region: a low Cost Intervention (up to privatization less than \$250 k)

Ministry establishes sector policy; Regulator establishes the Value-added for distribution (VAD) & transmission rates; monitors long term contracts & spot market



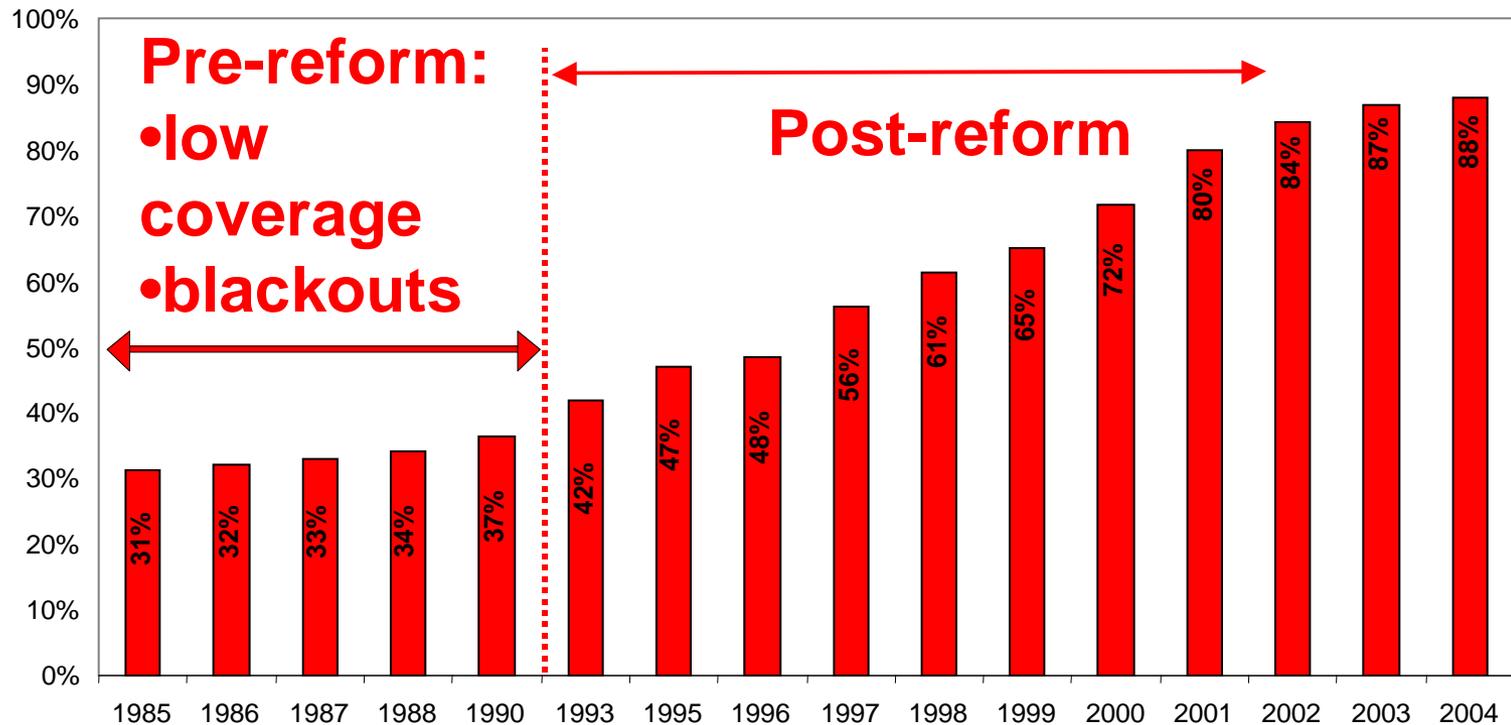
Guatemala: Results

- Over \$2 billion in **private investments** in power sector
- Dramatic Increase in **access** to electricity
 - Programa de Electrificación Rural (PER) – US\$333 million (\$151 million for transmission, \$182 million distribution), related to the Peace Accords
 - “Output-based assistance (OBA) scheme for new connections (US\$650 per residential connection) funded partially by proceeds from privatization (\$101 m were deposited at trust fund)
- Over \$ 180 million in private investment in **renewable energy** (30% geothermal, 70% hydropower)

Guatemala: A Success Story

Electricity Coverage

Sources: CEPAL, PA Estimate



Electrification an element of the Peace Accords

Concluding Comments

1. Infrastructure programs not necessarily costly; great results can be achieved by improving the enabling environment & commercializing public service providers
2. Network industries require regulation: need to protect consumers & investors
3. Regulator: must be independent, accountable, competent
4. Promote competition whenever possible; introduce competition in telecoms before privatization
5. Reform easier in some sectors: easiest is telecommunications & hardest are water & roads
6. USAID can play a very positive role in infrastructure, particularly in partnership with other donors

Any questions?

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