Gas Pricing in Afghanistan

Sector Structure and Policy Questions

World Bank
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Why do we need to discuss gas pricing?

- Current prices are too low:
  - Production and transport costs are not fully covered
  - Expansion will require much higher prices
  - At current prices, gas sector development is not possible
- If prices are to be raised,
  - By how much?
  - What will be the basis for determining the price increase?
  - Who decides?

Why do we need to consider gas sector structure and policy?

- How prices are set depends on sector structure
  - Vertically integrated: one company produces gas, transmits it in pipelines, distributes it, and sells it to end-users (Afghanistan today)
  - Open access with wholesale competition
  - Unbundled with retail competition: production, transmission, distribution, and retail are separated, traders/suppliers buy from producers and sell to end users

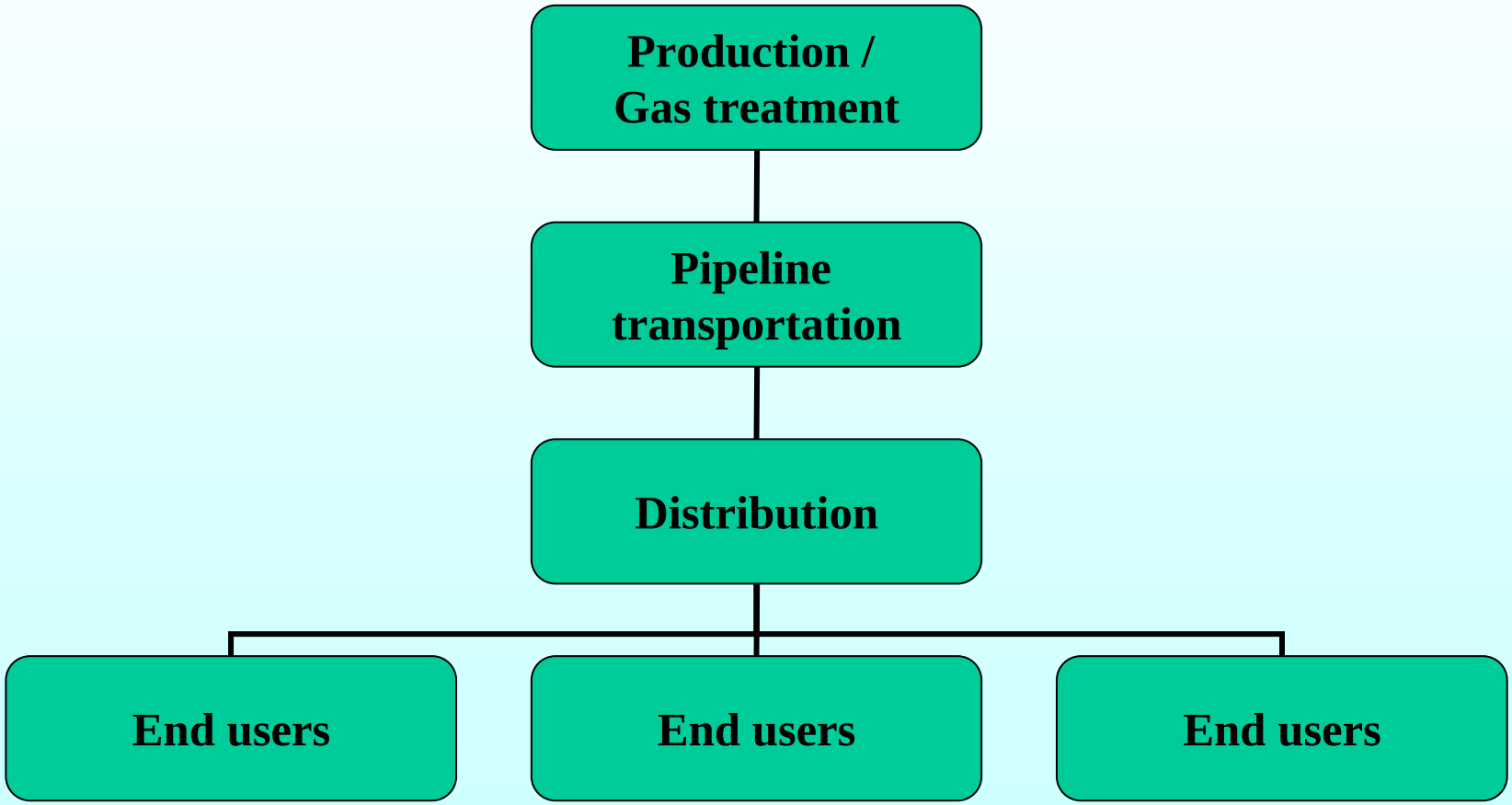
Objective

- To introduce issues that need to be considered in setting pricing principles that will promote growth of an efficient gas sector in Afghanistan
  - Quality of service (reliability of supply, gas quality)
  - Supply increase in response to growing demand
  - Least cost to consumers
  - Adequate returns to investors

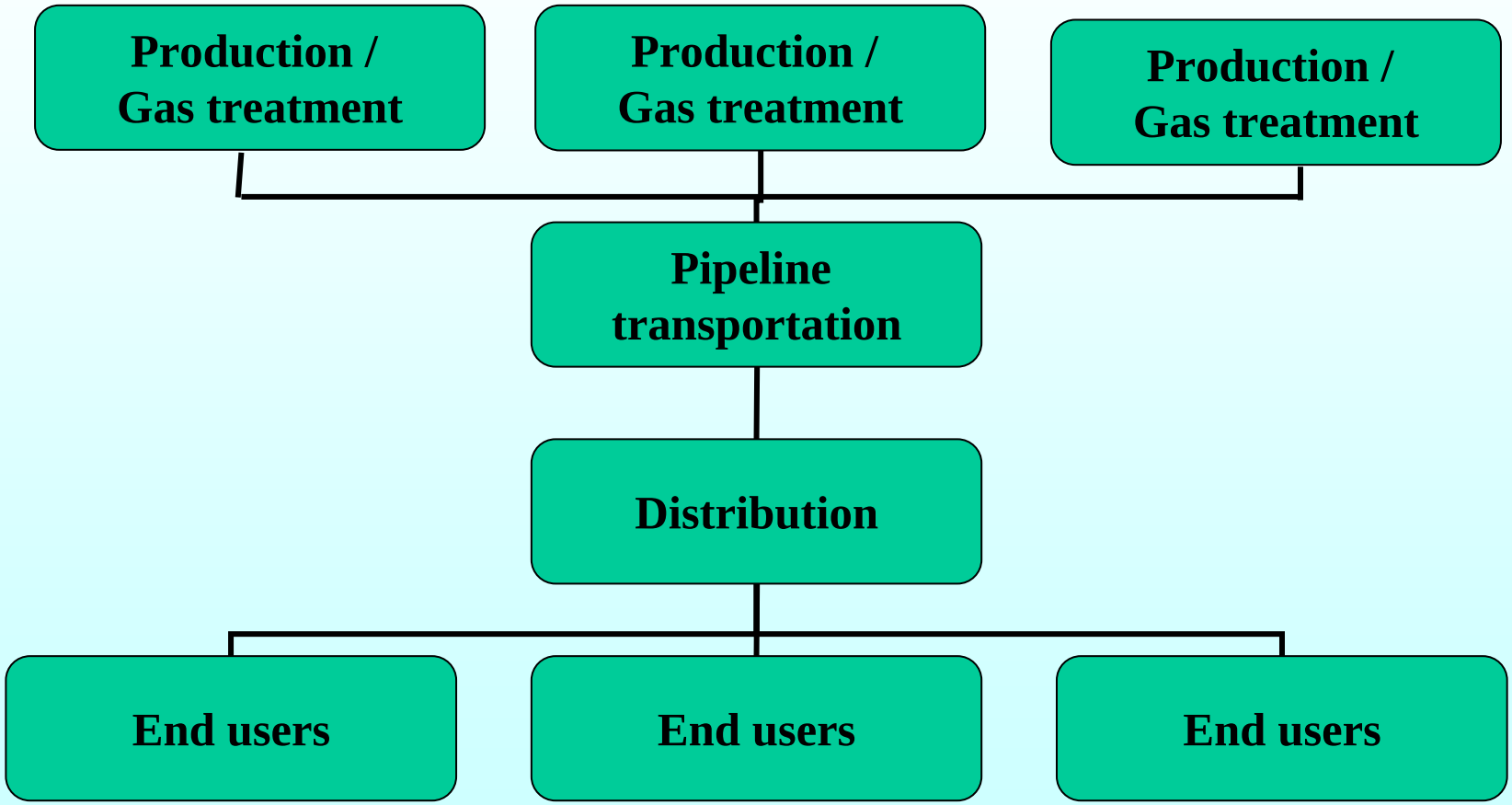
Basic background

- Gas and oil are very different
  - No large “rent” (difference between cost and price) for gas
  - Nearly 10 bcf (0.28 billion m^3) of gas flared daily worldwide
  - 87% of world’s gas production does not cross borders
  - Half of discovered gas in the world too far from markets to justify infrastructure needed for commercialization
- Gas discoveries take a very long time to develop
- Gas sales require a secure and predictable market for all or most production over project life
- Other gas use alternatives (methanol, fertilizer,) often require huge investments

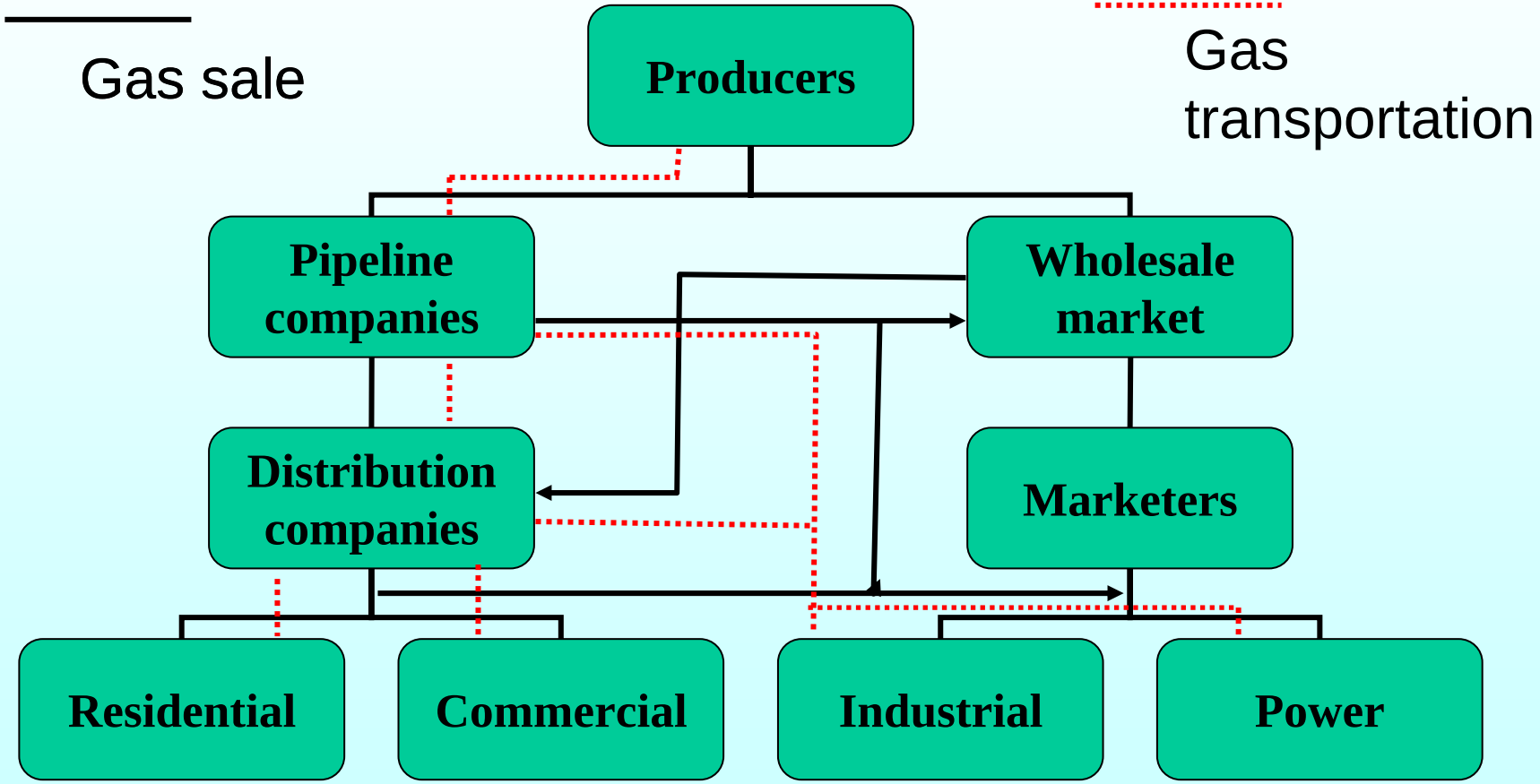
Supply chain: vertically integrated natural gas industry



Competition among producers



Open access and wholesale competition



Two markets

- Natural gas market: trading of gas as a commodity
- Transportation market: shipping of natural gas through pipelines
- Competition and open entry crucial for efficient functioning of these markets

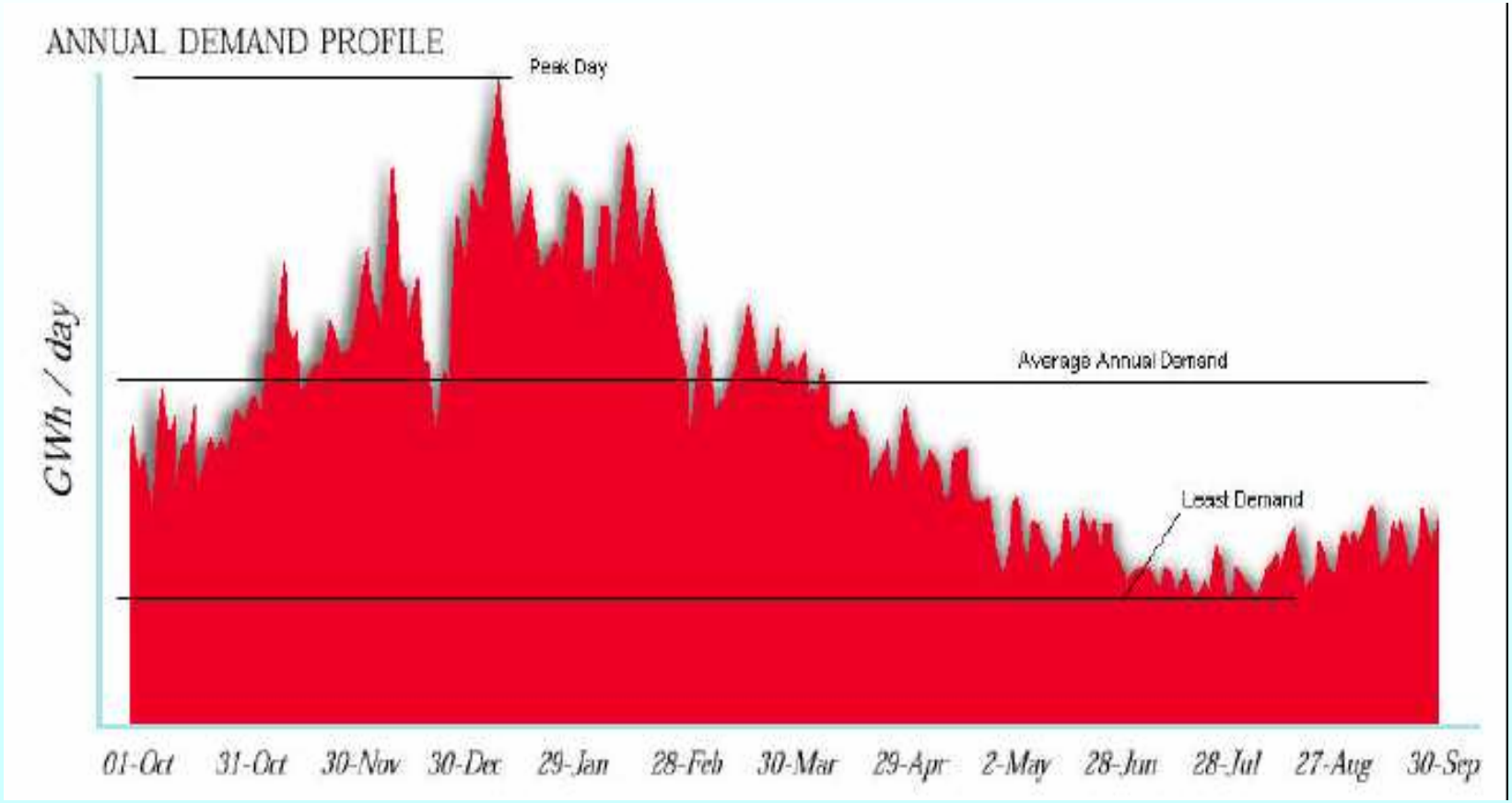
Regulate or not?

- T&D “natural monopolies,” and hence call for economic regulation
  - Main goal is promotion of economic efficiency
  - Regulation of prices, performance of regulated firms, and market entry
  - Regulated prices should reflect their “economic” costs and maximize social welfare
- Economic regulation needed wherever effective competition has not been established
- Technical regulation (environment, health, safety) needed for all segments of gas sector

Determinants of unit cost of gas for given installed capacity

- Consumption variation has a large impact on unit cost
- The higher the variation, the most costly to supply
- Relevant concepts are load factor and capacity factor

Consumption variation

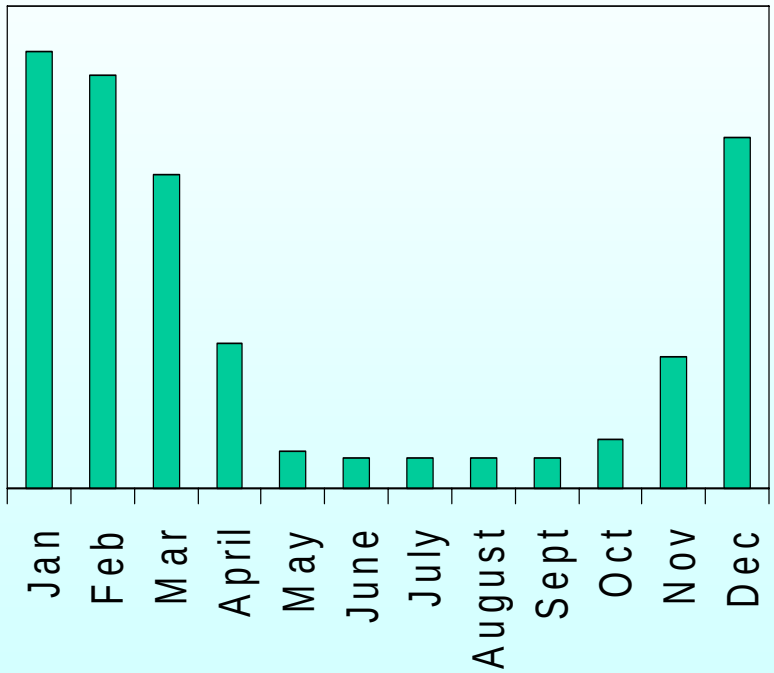


Load/capacity factors

- Load factor: ratio of average load to peak load
- Capacity factor: ratio of average load to the design capacity
- Key is peak demand
- The higher the capacity factor, the lower the unit cost of gas transport/distribution
- The larger the difference between met peak demand and average load, the lower the capacity factor and higher the unit cost of gas

Load factor

- Residential users have low load factor: much more gas used in winter, gas used only at certain times of day
- Large industrial users operate 24 hours a day, 7 days a week, resulting in high load factor



Load factor of 38%

If peak demand exceeds capacity

- Load shedding: cutting off or curtailing gas delivery to large users to balance demand with limited supply
- Interruptible service: some large consumers are able and willing to accept interruptible service
  vs. firm service: pay capacity reservation charge (per m^3 per day of reserved capacity) to guarantee supply

How large is a large-volume consumer?

- Minimum consumption needed to apply for interruptible and firm services is one indication. Examples from around the world—
  - Argentina in 1998: firm 10,000 m^3/day interruptible 3 million m^3 per year
  - Centra (Canada): 680,000 m^3 per year for interruptible
  - St. Lawrence Gas (NY): 5,700 m^3/day, ~700,000 m^3 per year for interruptible
- 150 MW power plant may use 220 million m^3 per year
- A modern 100,000 t/y fertilizer plant may use 70 million m^3 per year

Advantages of large-volume consumers

- Creditworthy large-volume consumers form a market base
- Consumption variation is relatively small, load factor large
- Some able and willing to accept interruptible service in exchange for tariff reduction, reducing system costs
- Less need for costly construction of complex distribution networks in early stages of market development

Example of gas market development: WAPP

West Africa Pipeline Project

- Gas flared in Nigeria for lack of gas market
- Pipeline will supply gas to Benin, Ghana, and Togo
- $590 million, 678 km, 6.2 million m^3/day, ramping up to 13.3 m^3/day at an additional $115 million
- WAPCo consists of ChevronTexaco, Nigerian National Petroleum Corporation, Shell, Gov of Ghana, and Benin and Togo gas companies
- Eventually open access pipeline
- WAPCo will operate as a provider of an unbundled transportation service only
- Pipeline project based on medium to large-volume consumers only

West Africa Pipeline Project

Gas markets

- Existing crude oil fired power plant at Takoradi in Ghana, 550 MW
- Existing 25 MW power plant in Benin
- Existing 25 MW power plant in Togo
- Gas purchase projections:

	2008	2010	2020	2026
Power	100%	84%	90%	87%
Commercial/industry	0%	16%	10%	13%

T&D issues

- Types of access to transmission pipelines
  - No open access
  - Regulated third party access (prices and conditions specified, needed if vertical integration, EU)
  - Negotiated third party access within a broad framework (US)
- Common carriage: obligation to carry, for a fee, gas that belongs to another party, also called mandatory carriage, one network code for all (example: UK)
- Contract carriage: terms of access specified in individual contracts (USA)

Why separate production, transmission, and distribution?

- Avoid potential conflict of interest
- Make it more difficult to shift costs between regulated and unregulated segments
- Enable more precise determination of cost structure
- Easier to introduce competition

Issues

- What should be regulated?
  - What should the gas sector structure look like
    in the next 5 years?
    10 years from now?
  - Should the goal be to separate production, transmission, and distribution?
- How should it be regulated?
- Who should regulate?