



# **The Missing Markets: Where They Are (Not) and What (If Anything) To Do About It**



INTERNATIONAL

**Larry E. Ruff**

**Harvard Electricity Policy Group**

**La Jolla, CA**

**2 March 2006**

# AGENDA

- **Missing markets and their implications**
- **Some electricity examples and history**
- **Conclusions**

# **Markets and Prices Are Wondrous Things**

- **Everybody I hang out with loves them**
  - The theory of perfectly competitive markets is logically neat and, for some of us, an aesthetically pleasing
  - Experience shows that even imperfect markets and prices are usually better than the imperfect alternatives
  - Economic history is the story of the growing scope and sophistication of markets and prices
- **So, when a new opening for markets and prices arises, we true believers naturally:**
  - Assume and argue that this is surely a good thing
  - Try to maximize the role of markets and prices

# **But There Are Logical and Practical Limits**

- **Even in theory, the extent to which it is possible or sensible to rely on prices is limited by, e.g.:**
  - Scale economies, externalities and transaction costs
  - Important social values other than “efficiency”
- **In practice, many economic decisions are made with little direct reference to prices, e.g., within:**
  - Family, cooperative, non-profit, regulated and government entities – inefficient though these may be
  - Firms – who increase efficiency by internalizing transactions, i.e., removing them from the market
- **The Big Question is: Where to draw the line**

# Electricity Has Been a Tempting Target

- **An integrated electricity system inherently:**
  - Needs large facilities and centralized dispatch that, historically, were seen as incompatible with competition
  - Uses mathematical planning and dispatch processes that naturally produce “things” that look a lot like prices
- **So, when competition began to look politically and commercially attractive, we market wonks:**
  - Knew there must be a market in there somewhere
  - Soon realized that centralized dispatch and its “things” could be converted into markets and prices
  - Tried to create markets and prices for the many separate services (or constraints) in the dispatch models

# **At the Risk of Insulting the Audience:**

- **Economically and mathematically, markets/prices and constraints are logically inseparable**
    - Market prices arise naturally when something is scarce, i.e., when demand would otherwise exceed supply
    - Mathematical optimization produces the “things” that look like prices only when a constraint is binding
  - **Dealing efficiently with constraints on an electricity system requires:**
    - Maximizing the value of real-time operations within the the constraints that exist at any time
- AND**
- Investing to ease a constraint when, but only when, the benefits of doing so exceed the costs

# Constraints Can Be Managed Two Ways

- **System constraints can be managed by either:**
  - Pricing the constraints so that “the market” will:
    - Operate within the constraints with little need for intervention
    - (Perhaps) motivate investments to relieve constraints
  - Regulating and/or “incentivizing” some monopoly to:
    - Intervene in – or replace – in the market when necessary to meet operational constraints
    - Decide when and where to invest to relieve constraints
- **In practice, some combination is always best**
  - It is not practical to price every constraint accurately
  - No monopoly can do everything without help from prices
  - Either approach can be more more or less efficient than the other, depending on ...

# Electricity Illustrates the Point Well

- **Traditionally, integrated monopolies did it all**
  - Central dispatchers and planners managed real-time operations and investment
  - Prices did little except collect money from customers
- **As markets developed, the monopoly shrank**
  - PURPA, and other forms of the “single buyer” model, (tried to) let the market choose generation
  - In the SMD/ISO/RTO model, the monopoly
    - Operates markets for (e.g.) energy, some AS, maybe VARs, ...
    - Is a single buyer of some A/S, grid services, maybe grid assets
- **But the advance of markets has not been uniform; not everyone has joined, or stayed in, the parade**



# An ISO/Gridco Tries to Price “Everything”

- **In this model:**

- The Gridco(s) own and maintain the grid, but operate and invest in it as directed by the ISO/grid planner
- The ISO operates:
  - An integrated dispatch/pricing (and perhaps FTR) process that prices energy, congestion, A/S, ... as far as practical
  - As a monopoly only where efficient markets are not practical determine efficient prices

- **This model, for better or for worse:**

- Maximizes the role of markets – and hence the need for sophisticated/complex markets and commercial players
- Divides activities between two entities – both creating “checks and balances” and diffusing responsibility

# A “Transco” Relies Less on Markets

- **A “Transco” (e.g., NGC in the UK):**
  - Owns, maintains, operates, plans and invests in the grid
  - Manages operations by:
    - Scheduling bilateral transactions and pricing/penalizing deviations and contract imbalances
    - Managing and paying for A/S, congestion relief, ...
  - Covers its costs through user fees, with financial incentives to keep (some measure of) costs down
- **This model, for better or for worse:**
  - Requires less sophisticated/complex markets
  - Combines system ops and the grid in a logical way
  - Creates an opaque, powerful, hard-to-control (and often very profitable) monopoly

# Electricity Pricing Started To Evolve

- **1982: Chile started a crude pool-based market**
  - Regulated, full-requirements contracting by LSEs
  - Generator “club” (cartel?) dispatches system and prices imbalances, A/S and congestion internally (somehow)
- **1991: UK introduced “gross” Pool and ISO (NGC)**
  - All energy bought/sold by NGC at single “market-clearing” Pool Price (PP); bilateral contracting via CfDs
  - A/S and congestion internalized within NGC
- **Mid-1990s: Development of LMP/FTRs**
  - Congestion (and, later, A/S) priced in the market
  - Implemented in NZ, PJM, NYISO, NEPOOL, ...

# Then the Trend Slowed/Regressed

- **Late 1990s: California tried its own approach**
  - Penalized buys/sells in ISO-operated markets
  - Disastrous A/S markets and no congestion pricing
- **Early 2000s: UK scrapped Pool for NETA/BETTA**
  - Penalizes buys/sells in Balancing “Mechanism” (BM), explicitly to force decentralized bilateral contracting
  - A/S and congestion still internalized within NGC; trying (with no luck or hope) to develop “entry/exit” rights
- **Today: Europe is stuck at “Open Access” level**
  - Bilateral markets based on “TPA,” day-ahead scheduling and punitive imbalance pricing
  - Physical transmission rights at (mostly) international borders, with the predictable unpredictability and risks

# My Conclusions on Missing Markets

- **Of course, more “good” markets are always better**
  - I was trained to believe: “If it moves, price it”
  - I still think that well-designed markets can do much more
- **But I know that not everybody buys this – and why**
  - There really are important natural monopoly elements in electricity, particularly in the grid
  - It is not easy to design “good” markets, and getting it wrong can be disastrous (ask Gray Davis)
  - Others have more taste for monopoly/oligopoly than I do
- **So I am not as evangelical as I once was: If NETA/BETTA can “work” (at least well enough for the Brits), what do I know??**