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

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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 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??