

**THE FERC
STANDARD MARKET DESIGN
PROPOSAL**

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PSERC Research Research Issues Seminar

Pacific Gas and Electric Company

San Francisco, CA

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OUTLINE

- The scope of the NOPR**
- The basic thrusts**
- Key issues**
- Major research needs**
- The White Paper on Wholesale Power Market**

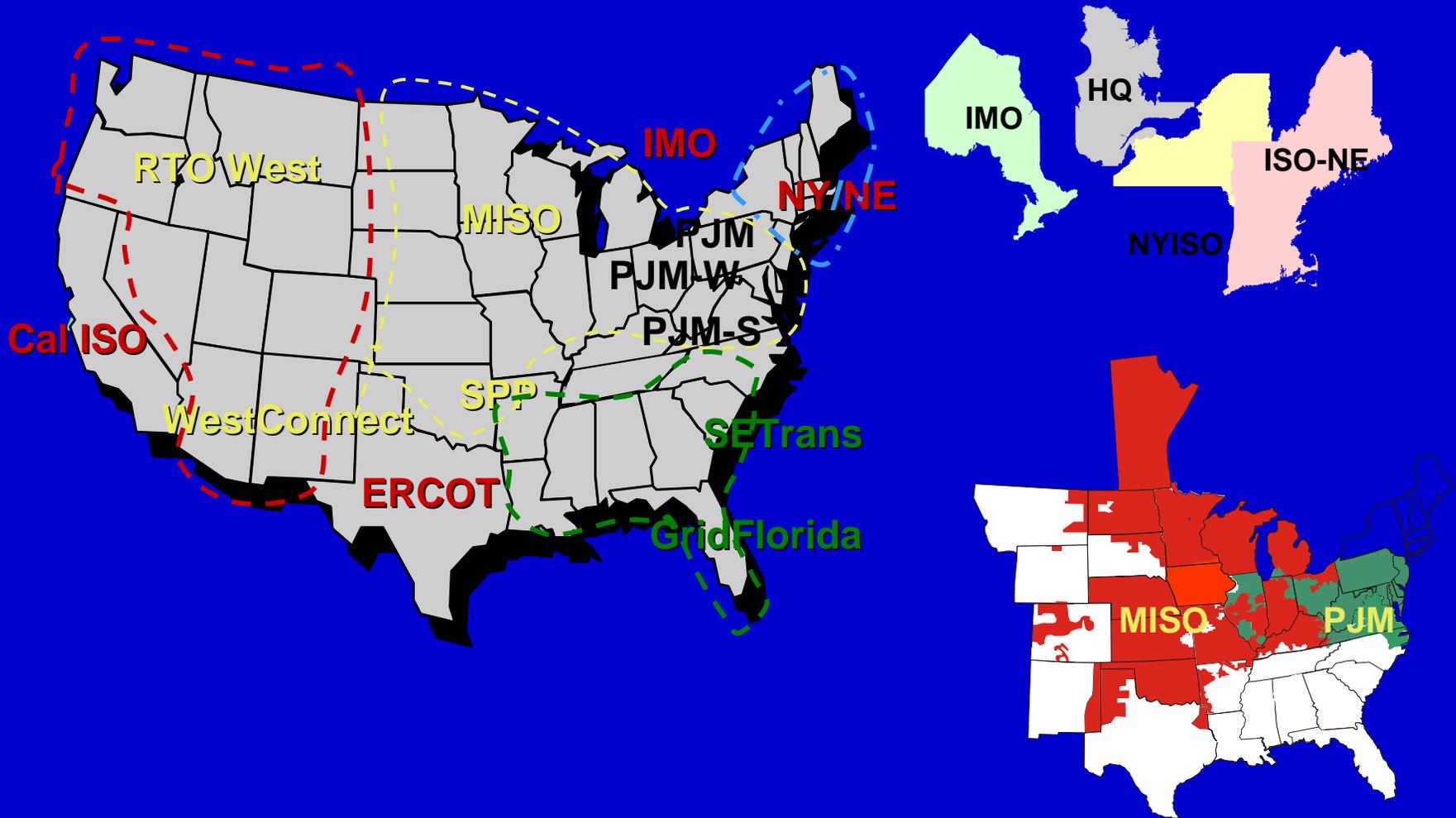
STANDARD MARKET DESIGN OVERVIEW

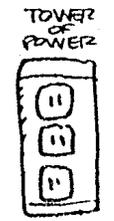
- ❑ A single set of rules proposed for all wholesale electric markets
- ❑ A fundamental industry restructuring proposal
 - structure of wholesale energy markets
 - transmission ownership and operations
 - transmission pricing
 - generation and transmission planning and expansion
 - market power monitoring and mitigation
 - corporate governance structure

FERC'S PROGRESSION TOWARD SMD

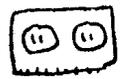
- ❑ **1996: Orders No. 888 (open access transmission)
and 889 (OASIS)**
- ❑ **1999: Order No. 2000 (RTO)**
- ❑ **2002: SMD NOPR**
- ❑ **2003: White Paper on Wholesale Power Market
Platform**

EXISTING AND EMERGING RTOs

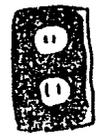




GREEN POWER
~~GREEN'S GO-OP~~



SURFER DUDE
ELECTRIC



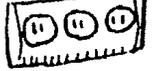
CAPTAIN JACK



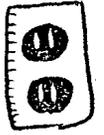
FLOWER POWER



REDDY GIGAWATT



E1
ENERGY ENRON ONE



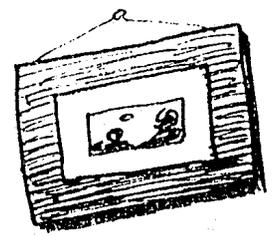
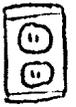
INDUSTRIAL
LIGHT & GAS



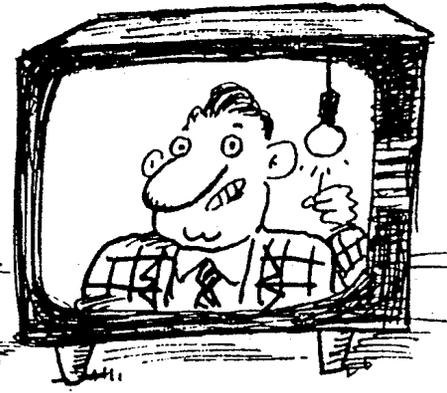
ACME POWER



ZAPCO L&P



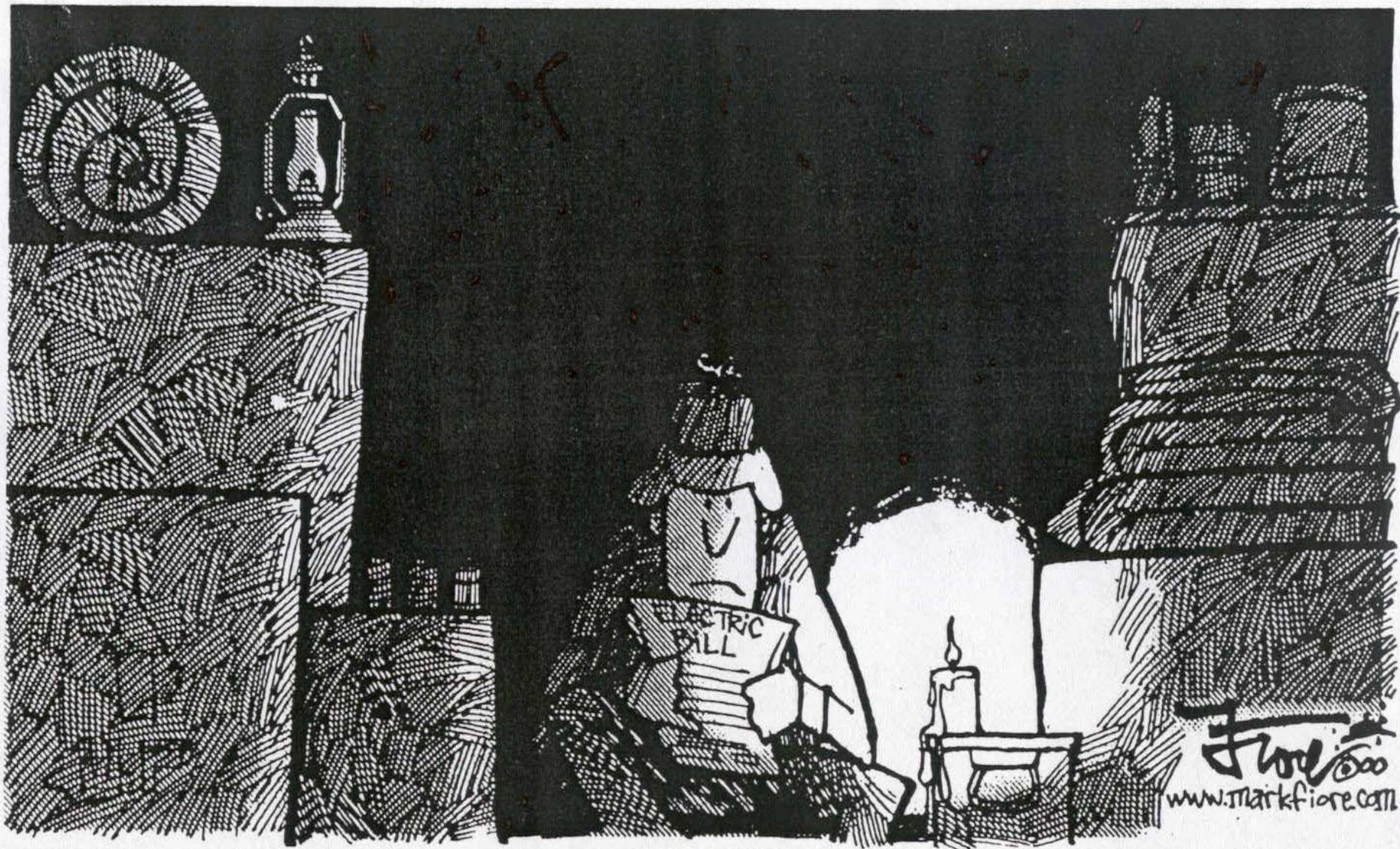
HI!
CRAZY PETE
HERE WITH
A FRIENDLY
PLUG
FOR PETE'S
POWER
"LOWEST PRICE
PER KILOWATT
HOUR"-WE
SHOCK THE
COMPETITION!...



WILKIS © 1994
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MERCURY NEWS

CALIFORNIA CUSTOMER CHOICE



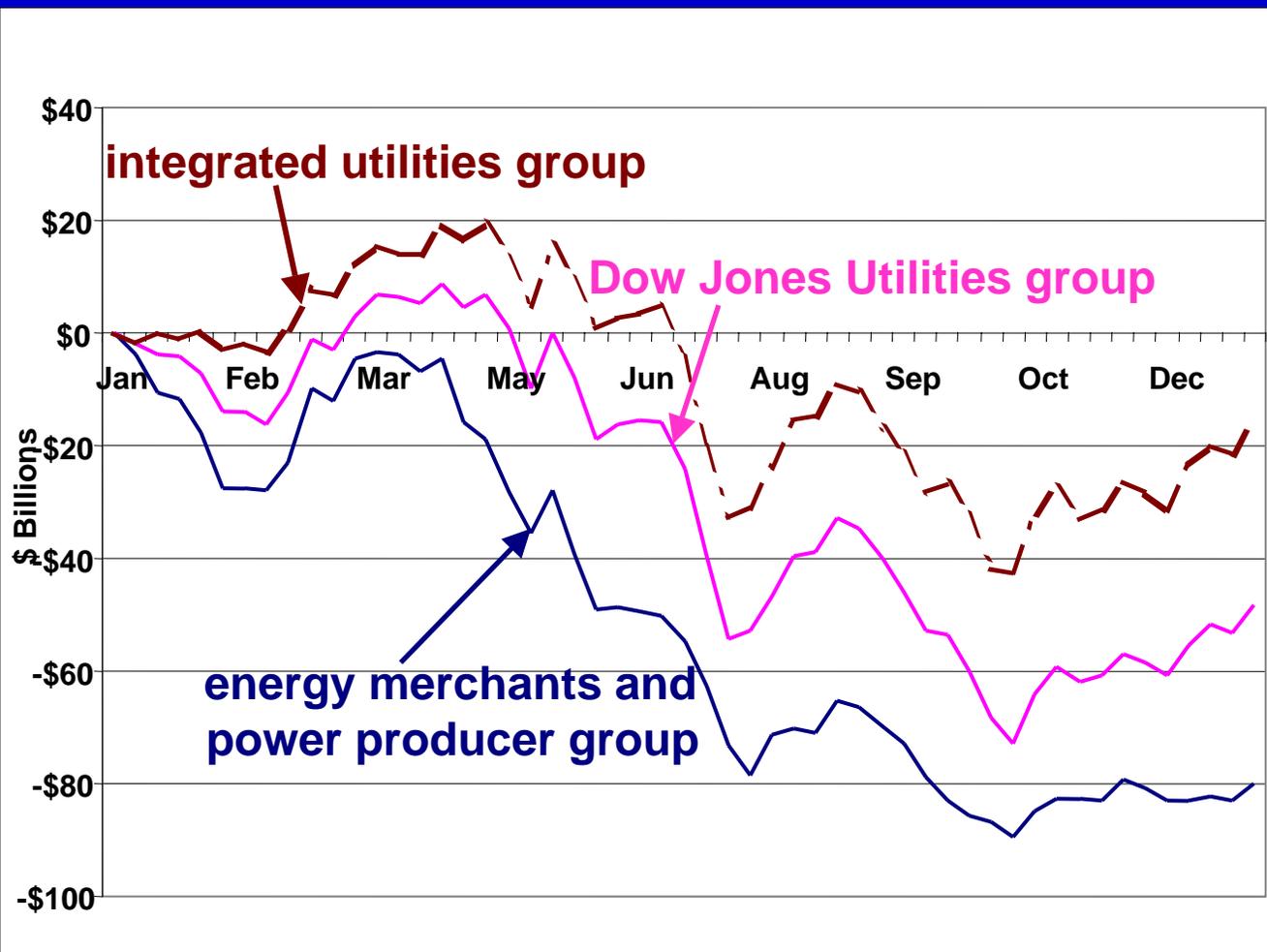


MARK FIORE, San Francisco

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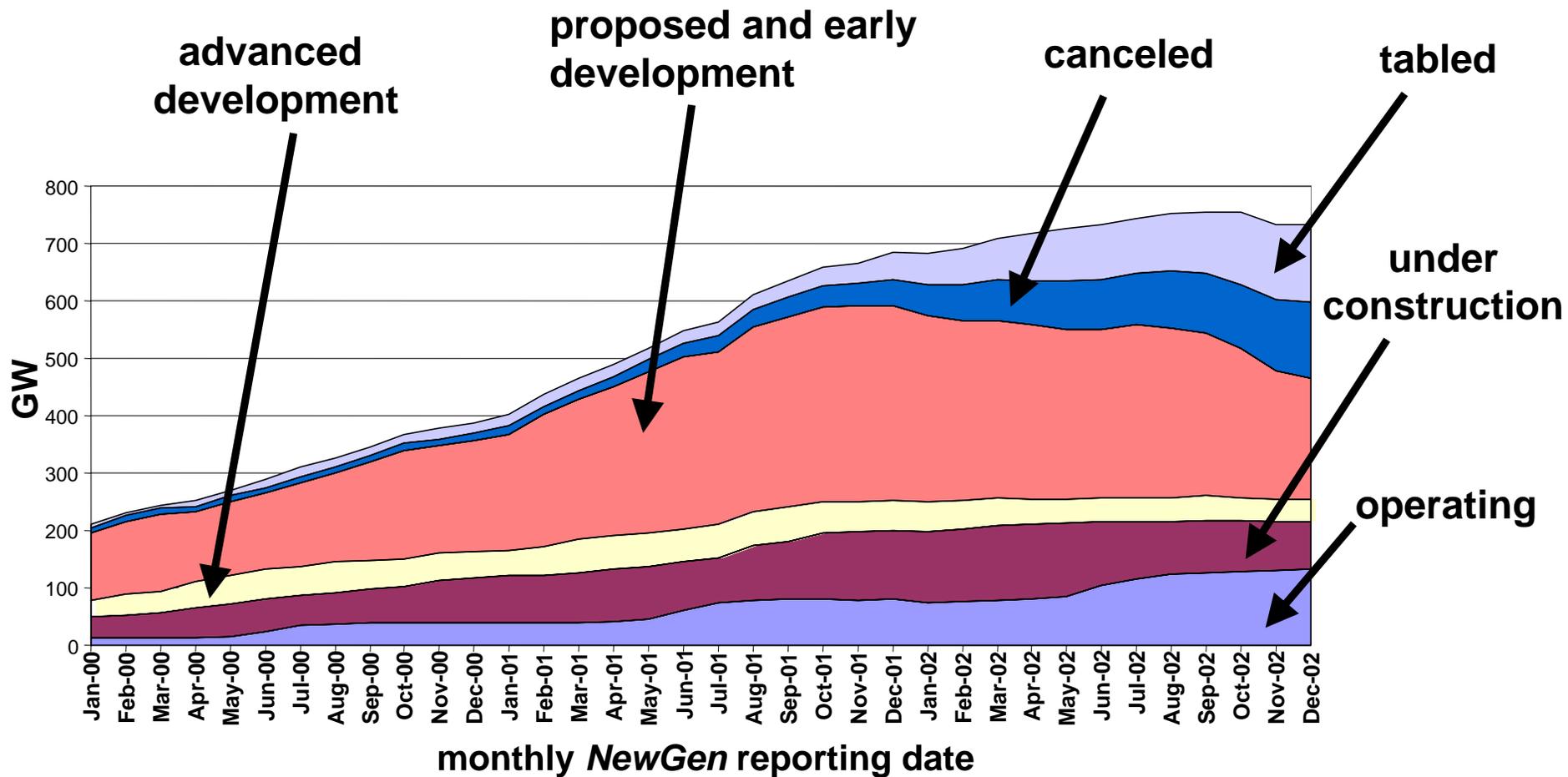
CHANGES IN MARKET CAPITALIZATION



The huge market capitalization declines in 2002 result in major dislocations in the industry; virtually, every energy merchant is impacted

Note: integrated utilities, energy merchants and power producers as defined by Salomon Smith Barney

PROJECT STATUS OF CUMULATIVE CAPACITY OF NEW BUILDS



PROJECT STATUS OF CUMULATIVE CAPACITY OF *NEW BUILDS*

DECEMBER 2002	
tabled	135 GW
cancelled	133 GW
•early development and proposed	211 GW
advanced development	40 GW
under construction	82 GW
operating	133 GW

FERC OBJECTIVES

- ❑ Prevent discriminatory practices in the provision of transmission services to ensure the smooth functioning of vibrant electricity markets
- ❑ Set up rules to facilitate economically efficient electricity trade by standardizing the design and operation of markets in wide geographic regions
- ❑ Facilitate the timely addition of new transmission *capability*
- ❑ Establish a regulatory backstop to protect customers against the exercise of *market power*

INDEPENDENT TRANSMISSION PROVIDER (ITP)

- ❑ ITP is the *new* transmission provider
 - participation no longer voluntary
 - all shareholder-owned utilities **must** turn over control and operations of transmission to ITP
- ❑ NOPR contains very specific ITP corporate governance rules ; in effect the ITP cannot be *for-profit* because rules do not allow the setting up of a shareholder elected board
- ❑ In addition to running the wholesale market and providing transmission service, the ITP has broad roles in two areas:
 - regional resource adequacy
 - regional transmission planning

INDEPENDENT TRANSMISSION PROVIDER (ITP)

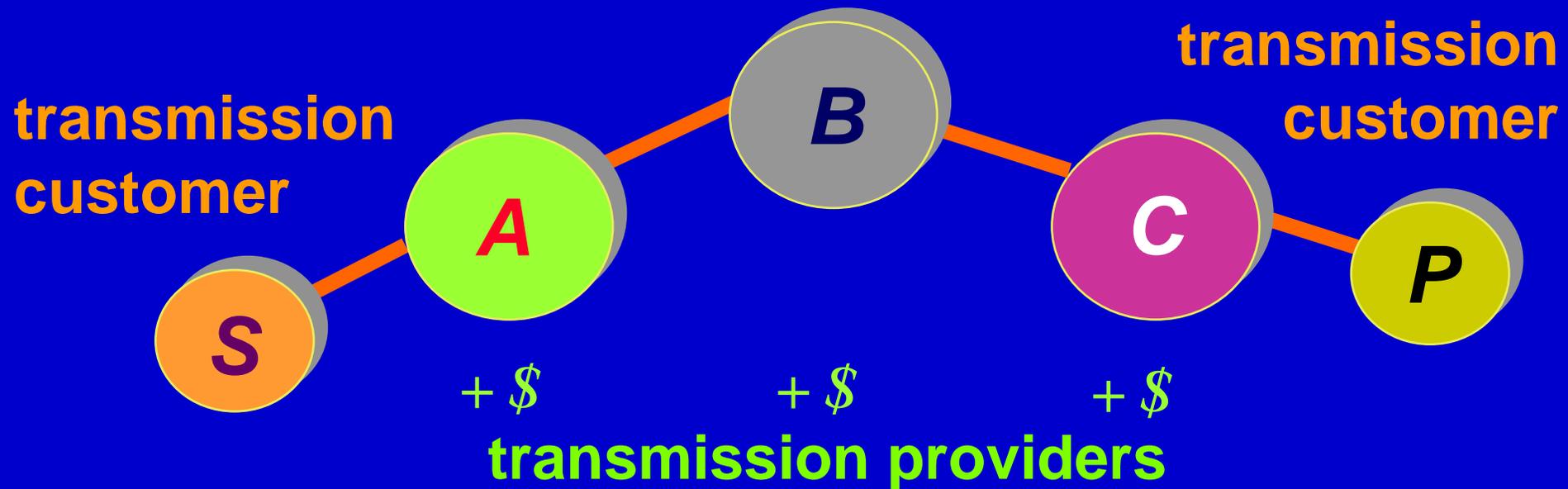
- ❑ ITP Board selected by a stakeholder committee from the following six classes:
 - generators and marketers
 - transmission owners
 - transmission dependent utilities
 - public interest groups
 - alternative energy suppliers
 - end users and retail providers that do not own T or D assets
- ❑ ITP receives non-binding advice from the
 - Stakeholder Advisory Committee; and the
 - Regional State Advisory Committee (RSAC)

MARKETS, TRANSMISSION AND PLANNING

- ❑ Market approach based heavily on the functioning and design in PJM, NY ISO and ISO New England
- ❑ Day-ahead and real-time spot energy markets
- ❑ *Network access service* for transmission including bundled retail transmission
- ❑ Financially-based congestion management using locational marginal pricing (*LMP*) signals
- ❑ FERC extends its jurisdiction beyond markets and transmission to the areas of
 - resource adequacy
 - transmission planning

TRANSMISSION SERVICES / PRICING

- ❑ Single network access transmission service for all users to provide grid-wide access without rate “pancaking”



- ❑ Price consisting of two charges – an access charge and a congestion charge for usage

TRANSMISSION SERVICES / PRICING

- ❑ Load serving entities get congestion revenue rights (CRR) for four years for their *native load* and existing wholesale contracts
- ❑ Options for pricing new transmission:
 - participant funding (direct assignment)
 - rolled in embedded cost

CONGESTION REVENUE RIGHTS

- ❑ Tools for hedging *congestion rents*
- ❑ May incorporate physical “scheduling priority”
- ❑ Must provide full payout to holders with any revenue shortfalls allocated to transmission owners
- ❑ Initial stage to have *point-to-point* obligations; subsequent stages to provide options and flowgates

RESOURCE ADEQUACY REQUIREMENTS

- ❑ ITP forecasts the demand, helps determine adequate levels of resources, and assigns each LSE a share of the resource requirements
- ❑ ITP administers tariff and curtailment penalties if LSEs fail to meet their resource requirements
- ❑ In the past, the states made decisions on planning, reliability, and adequacy of service
- ❑ Under SMD, states establish overall reserve margin that has to be at least 12%
- ❑ FERC non-jurisdictional entities are *not* required to meet resource requirements

TRANSMISSION PLANNING AND EXPANSION

- ❑ Establishment of a market-driven regional planning process allowing competition among generation, transmission and demand response
- ❑ Transmission owner is the “builder of last resort” if market does not respond
- ❑ ITP is ultimate resource decision maker
- ❑ States provide non-binding input into ITP planning process
- ❑ States’ role on siting and retail cost recovery continues

MARKET MONITORING

- ❑ Set up of a market monitor **independent** of all the market participants
- ❑ Market monitor reports to the ITP Board and to **FERC**
- ❑ Market monitor responsibilities include
 - identification of market power
 - design of mitigation plans
 - investigation of market manipulations/abuses
 - enforcement of penalties

PROPOSED IMPLEMENTATION SCHEDULE

- November 15, 2002** : **initial comments**
- December 20, 2002** : **reply comments**
- January 10, 2003** : **second stage of comments**
- February 17, 2003** : **second stage of reply comments**
- March 2003 (projected)** : **Final Rule issuance**
- September 2003 (6 months):** **planning process initiation**
- March 2004 (1 year)** : **initial regional transmission plan issuance**
- September 2004** : **full ITP/SMD implementation**

SOME KEY ISSUES

- ❑ Lack of uniformity on the application of SMD with exemption for non-jurisdictional entities opens the door to *leaning* on the grid: reciprocity provision may not be adequate
- ❑ Comprehensiveness/completeness of the market structure is necessary: SMD provides for short-term energy market, but no capacity market and no appropriate economic signals for transmission investment; significant increase in uncertainty
- ❑ The need for flexibility in corporate structures should allow *for-profit* models such as ITCs

SOME KEY ISSUES

- ❑ The process for transmission expansion and investment is unclear and inequitable by not giving the current transmission owner the first right of refusal to build
- ❑ The move from the current state/local planning to ITP regional planning is a significant shift
 - transition needs to be clearly specified
 - breaks the historical regulatory compact between the state and the utility on generation and transmission service and the state-based cost recovery is jeopardized
 - state support and involvement not specified

MAJOR RESEARCH NEEDS

- Data issues
- ITP organizational structures
- Market design and implementations
- Validation of market design
- Congestion revenue rights
- Market monitoring
- Transmission planning
- Resource adequacy
- Inter-ITP *seams* issues

THREE CLEAR THEMATIC NEEDS

- ❑ **Integration of economics and power engineering to develop efficient competitive electricity markets**
- ❑ **Collection and deployment of data to ensure adequate information in competitive markets**
- ❑ **Development of incentives in all relevant aspects of electricity market operations and planning**

DATA ISSUES

- ❑ The gathering, dissemination and wide availability of data for smoothly functioning markets is a well-recognized need
- ❑ Guidelines are required for data
 - acquisition
 - release and dissemination
 - availabilityfor all participant and various stakeholders
- ❑ Development of incentives/penalties is required to ensure data availability, timeliness and accuracy
- ❑ Implementation of secure computing systems and tools to protect data sensitivity and integrity are a must for markets

ITP STRUCTURES

- **Formulation of effective incentive schemes for the efficient operation of the system by an ITP**
 - **overcoming the constraint of a not-for-profit organization**
 - **investigation of the feasibility of a for-profit independent transmission company (ITC) to transition to an ITC**
- **The integration of additional interdependent markets under the ITP structure**

MARKET DESIGN

- ❑ **Development of transparent rules and procedures that effectively integrate and coordinate system operations with market administrative functions**

- ❑ **Development of**
 - **day-ahead and real-time energy markets**
 - **financial transmission rights markets****to operate side-by-side with bilateral contracts**

VALIDATION OF MARKET DESIGN

- ❑ The validation of different market designs is a critically important missing part of SMD
- ❑ Verification necessary to ensure the proper behavior of proposed design under various conditions
- ❑ Major areas of need encompass development of
 - tools and metrics to perform market validation
 - test systems to validate a market design
 - experimental economic testing

CONGESTION REVENUE RIGHTS

- ❑ ***Liquidity of CRR:*** in principle, CRR are *point-to-point* rights so secondary markets for them may be limited
- ❑ ***Revenue adequacy:*** it is necessary to develop mechanisms to deal with the differences between the *congestion charges* collected and the targeted value of the CRR

MARKET MONITORING

□ The smooth functioning of markets and the need for continuous improvements create a clear necessity to monitor the

- structure

- performance

- behavior

of markets, as well as, of each market player, including the demand response participants

MARKET MONITORING

- A primary need is the development of effective metrics to monitor market performance
 - formulation of appropriate measures
 - computational aspects
 - tool implementation
 - sanity checks to detect fraud or manipulation
 - measures for the assessment of market power
 - load pockets
 - robustness of demand response
 - metrics for inter- and intra- ITP performance assessment
 - tools to perform inter-market assessments

MARKET MONITORING

- ❑ **Long-term competitive benchmark analysis**
 - **trend identification and reference price determination**
 - **development of mitigation measures**
 - **formulation of criteria for market access**
 - **development of guidelines for the implementation of maintenance schedules to ensure that market power is not exercised**
- ❑ **Short-term competitive benchmark analysis**
 - **hourly and daily activity monitoring**
 - **transaction monitoring**
 - **identification of players causing anomalies**

TRANSMISSION PLANNING

- Development of long-term economic signals that can serve as effective incentives for transmission investments
- Development of methodology to identify the beneficiaries of a given expansion and an equitable criterion to decide how project costs should be allocated to them
- Investigation of the viability of the participant funding for new transmission expansion projects concept through analytical studies and tool and software development

RESOURCE ADEQUACY

- ❑ **The reliability evaluation needs to establish a strong linkage between reliability and economics**
 - **outage costs**
 - **reliability criteria**
 - **willingness to pay by customers**
- ❑ **Definition of the allocation of the reserve margin requirements among all the LSEs**
- ❑ **Formulation of incentives to provide new capacity**
- ❑ **Definition of penalties in cases of failure to provide the required level of reliability**
- ❑ **Definition of the curtailments process in case of system outages**

INTER - ITC *SEAMS* ISSUES

- ❑ The creation of the geographically extensive ITPs requires the careful study and management of the *seams* problems between the ITPs
- ❑ These problems encompass all aspects of market and system operations and planning
 - interchange metering
 - data availability
 - impacts on *LMP* calculations
 - coordinated reliability/planning among ITPs
- ❑ Schemes and tools for the management of *seams* issues are needed

THE FEDERAL ENERGY REGULATORY COMMISSION (FERC) IS PUSHING A SCHEME TO TAKE ELECTRICITY MANAGEMENT OUT OF THE HANDS OF LOCAL AND STATE AUTHORITIES. CAN YOU GUESS WHY? . . .



HAVE YOU BROUGHT ME ALL THEIR TRANSMISSION LINES?

YES, MASTER!

HORSEY
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THINK WISE SPEAK

FERC SMD WHITE PAPER

- ❑ **FERC issued its “White Paper: Wholesale Power Market Platform” on April 28, 2003**
- ❑ **The White Paper**
 - **identifies revisions to the SMD proposal**
 - **compares the RTO requirements set out in Order No. 2000 with those proposed in the White Paper**
 - **sharply alters the course set forth in the SMD proposal**

FERC SMD WHITE PAPER

- **The major thrust is to revert to the regional approach of the Order No. 2000 and away from the uniform nation-wide approach of the SMD proposal**
 - **reduced scope and configuration of existing and new ISOs/RTOs**
 - **mandatory participation in an RTO to replace the voluntary approach of Order No. 2000**
 - **flexibility for and accommodation of, regional differences**
 - **deference to and larger roles for, state authorities in the development of RTOs**

WHOLESALE POWER MARKET PLATFORM

- ❑ **The platform is a conceptual framework for fair, competitive bulk electricity markets**
 - **no nation-wide standardization**
 - **primary reliance on bilateral contracts with markets operated by the RTO designed to supplement these contracts**
 - **regional approach and increased roles for the yet to be set up “Regional State Committees”**

WHOLESALE POWER MARKET PLATFORM

❑ Principal shifts in several areas

- *LMP* is not the only congestion management scheme
- uniform approach to resource adequacy is abandoned
- FERC's jurisdiction over bundled transmission rates is not asserted

WHOLESALE POWER MARKET PLATFORM COMPONENTS

- Regional independent grid operation
- Regional transmission planning process
- Fair cost allocation for existing power mitigation
- Spot markets for real-time energy balancing
- Transparency and efficiency in congestion management
- Firm transmission rights
- Resource adequacy approaches

CONCLUDING REMARKS

- ❑ The FERC vision gives rise to a wide range of challenges and exciting new opportunities for power system engineers**
- ❑ The solution of the various problems will require the effective marriage of economics and power system engineering**
- ❑ The SMD area provides an unparalleled opportunity to contribute to the effective design of the future electricity industry**