Real Flow - A New Congestion Management System (CMS)
Frequently Asked Questions

FERC Policy on CMS

➤ How receptive is FERC to alternative CM approaches (non-nodal LMP)?

*In Order No. 2000 FERC states: “While our experience has shown that, in specific situations, some approaches to congestion pricing appear to have advantages over others, we have not yet identified one approach as being clearly superior to all others...we will allow considerable flexibility to propose a congestion pricing method that is best suited to each RTO’s individual circumstances.”*

*Order No. 2000, Section III E.2 at 384*

➤ Has FERC expressed any policy regarding decentralized dispatch within an RTO?

*Yes. In Order No. 2000, FERC states: ”We will not at this time require the RTO to operate what traditionally has been thought of as a single control area for its region...We recognize that the feasibility of consolidating existing control areas into a single such area may be limited by cost and technical considerations... However, we note that physical consolidation may be unnecessary when a hierarchical control structure is used to define a single control area by making existing control areas subject to RTO direction (and so avoiding the high costs and technical uncertainty associated with centralization of physical control for a very large RTO region).”*

*Order No. 2000, Section III D.3 at 280*

Physical Flowgate Rights

➤ How are the Physical Transmission Rights (PTRs) determined in the initial auction?

*Real Flow will define capacity limits based on the simultaneously feasible thermal/stability limits of flowgates in the event of flowgate interactions. This approach has to be coupled with linking transactions to flowgates based on distribution factors.*

➤ Which set of simultaneously feasible rights is chosen for PTR auctions, given that there are infinite combinations?

*The RTO can sell the least amount of rights feasible under all conditions and auction incremental capacity as operational conditions permit. Alternatively, the RTO can sell the full non-simultaneous capacity and buy back capacity as required.*

➤ If a flowgate is added, how are the other flowgate ratings adjusted so that the set remains simultaneously feasible? How are losers of rights compensated?

*The addition of a flowgate, with no change in topology, will not change the PTDFs for the existing flowgates, since all system impedances are used for PTDF determination. Thus, existing flowgate rights will not be harmed.*
Further, it is anticipated that PTR auctions would occur on a systematic schedule, such as annually, and rights in any auction would be valid between auction periods. Under these circumstances, new flowgates would be added (or subtracted) from the set at the time of each primary auction. As a result, there would be no commercial impact on existing rights since there would be none in force. All distribution factors would be recalculated prior to the primary auction.

- Will market participants have to deal with constantly changing flowgate rights due to changing distribution factors?

  Market Participants will not have to deal with constantly changing flowgate rights. The market will be designed to insulate participants from random PTDF variations by selecting a threshold of significance. Within this range, the market will be insulated from changes, and the RTO will deal with discrepancies in real time. Outside this range, the RTO will release and buy back incremental capacity as changes occur to the system. Changes due to new system additions will be both forecastable and predictable.

  In any case, PTDFs do not vary significantly because they depend on network impedance. Thus, they change only with certain physical changes to the grid such as transmission line outages. Dispatch changes, load variations and other operating conditions do not impact PTDFs.

- How can a party that constructs a transmission facility receive compensation for adding capacity?

  New investments would add transmission capacity either directly (transmission additions) or by creating counterflows on constrained flowgates, which effectively allow more capacity to be scheduled on constrained flowgates. The investing party would receive PTRs in the amount of the capacity create, indirectly or directly, by the investment. The advantage of Real Flow is that physical rights will allow sponsors of expansion projects to evaluate the long-term value of such rights, due to the price certainty offered by PTRs.

Energy Pricing

- Will there be a mandatory, forward spot market? If not, how will energy prices in forward markets be determined?

  No. Trading in forward markets will be strictly bilateral/multilateral. Energy prices will be determined accordingly in the exchanges, and will be posted at hubs by the exchanges.

- How does the RTO provide a forward market for congestion management?

  Congestion is self-managed in forward markets by virtue of defining and trading physical flowgate rights. The market for congestion management is thus the market for tradable transmission rights
Real-Time Balancing Market

How and when does the RTO price imbalances in the real-time balancing market?

Prices in the balancing market would be developed within the hour, and can be nodal. Real Flow can be implemented with zonal price aggregation to enable easier after-the-fact trading of imbalances and for market simplicity. These prices would be known ex-post in either case.

If the balancing market will calculate nodal prices, why would Real Flow be less complicated than LMP?

Nodal prices would be calculated only for balancing energy, which will be a very small component of overall transaction volume. The primary reason why Real Flow will be significantly less complex than LMP is that the forward markets will be greatly simplified. Transmission rights would be simpler and liquid, and market participants would not need to learn how to bid into centralized energy pools.

Will market participants be able to trade their imbalances after the fact?

Yes. Real Flow can be implemented to allow trading after-the-fact. Trading rules will have to be defined so as to ensure meaningful trades across the RTO that may have different locational values.

Future Market Developments

What is the difference between Real Flow and the method currently implemented by the SPP?

There are two key differences:

a) Congestion is resolved by market mechanisms (bid-based) rather than through rationing (TLRs and socialized redispatch). The benefits are better cost allocation and economically more efficient outcomes (those who value the rights most get them).

b) Transmission capacity rights are traded at market prices, not cost. A liquid secondary market for transmission is therefore expected, unlike the current situation under Order No. 888.

Retail Competition

How should we incorporate the anticipation of retail choice in our decision criteria for selecting a CM?

Retail choice will introduce a new set of market players, retail aggregators, who will face little understood (poorly metered) and constantly varying load profiles. Retail aggregators will likely have dynamic portfolios (supply and demand) that can change on a daily basis. In such circumstances, liquidity and price certainty in forward markets for energy and transmission capacity are vital.
Why is Real Flow more suitable to prepare us for these developments?

A requirement to purchase a different transmission right for every single contract/transaction in a market that is not particularly liquid (e.g., point-to-point FTRs in a nodal system) will hinder trade. Real Flow will provide both liquidity and price certainty due to the market simplicity and well-defined transmission rights.

This scheme can be likened to the gas industry, where pipeline rights are traded in a similar manner in a vibrant and liquid secondary market.

Given the potential for significant changes in flow patterns with retail choice, how can we ensure a robust selection of flowgates?

Competitive market simulation and load flow analysis tools can be used to determine the expected patterns and value of congestion under conditions of perfect competition and retail choice. These, together with an analysis of historical congestion patterns, can yield a good estimate of commercially significant flowgates. Adjustments to this selection will be made on an annual basis.

Equity

Will native load receive an allocation of these PTRs?

Awarding rights to native load is a decision independent of the CMS adopted. In any case, if native load is not awarded rights, the revenues from PTR auctions will pay down the embedded costs of the transmission owners, thereby reducing native load’s access charges.

Will trading through exchanges require a level of sophistication that may disadvantage less experienced market participants?

Market participation in the exchanges will be simple and highly automated. The level of sophistication required to participate in bilateral exchanges in Real Flow would be significantly less than the sophistication required to learn bidding strategies in centralized pools, especially since the former resembles current form of trading more closely than the latter.

Implementation Issues

RTO Structure

How much centralization in control area functions is needed to implement Real Flow?

Real Flow will not require consolidation of all control areas in an RTO. Control areas will relinquish control of but serve as agents for certain functions (balancing, dispatch, reserves and regulation), while retaining other functions (voltage control, black start, transmission system monitoring and control). This will enable the RTO to utilize existing control area infrastructure and staff, and minimize transition costs.
Flexibility/Adaptability

- Is there a migration path from Real Flow to other CMSs?
  
  Yes. Real Flow can be modified to a zonal or an LMP approach. A transition to zonal would require minimal effort and no wasted capital investment. This is because the forward markets could remain, and the real-time balancing market would develop zonal prices based on a set of zone definitions. A transition to LMP would be feasible, but would require additional effort for complete control area consolidation. In the transition to LMP from Real Flow, most control area infrastructure could be retained and used, although the investment in the exchanges may not be fully transferable.

- Is it possible to design a system that can be scaled in accordance with the magnitude of the congestion problem?
  
  Real Flow is easily scalable. Scaling would essentially require adding or eliminating flowgates. Geographic scaling of the system would only require defining new flowgates and subsuming additional control areas under the RTO.

- Does market complexity increase with the size of the system and number of flowgates that are defined on the system?
  
  No. In Real Flow, the transaction costs associated with purchasing PTRs do not increase proportionately with the number of PTRs required for any transaction. This is because PTR purchase requirements for energy trades will be automated and packaged in the secondary markets, and will not be affected by the required number of PTRs. Regardless of the CMS, participants in larger markets may have larger portfolios of PTRs and customers.

Bilateral Markets

- How will the bilateral markets be affected by a change in the congestion management system?
  
  Under Real Flow, bilateral trade is expected to be the dominant form of transaction. The simplicity of physical rights and the absence of a 'middle-man' in the energy, transmission and ancillary service forward markets will facilitate bilateral trade. Market participants therefore should not face much of a learning curve in the transition.

- Why will trading physical rights and energy through exchanges be any simpler than arranging bilateral contracts with Contracts for Differences (CfDs), which also do not require intervention of the RTO?
  
  RTO intervention is required to accomplish any reconfiguration trade in most LMP markets today. CfDs also require the additional step of bidding into the pool. More important, bilateral energy markets in LMP systems have no liquidity. This is primarily because FTR secondary markets have no liquidity due to the complexity and sheer number of products. The lack of liquidity in FTR markets directly impacts
bilateral energy markets, since without a reliable forward hedge against congestion, bilateral forward energy contracts are risky and difficult to structure.

In contrast, the price certainty and simplicity of Real Flow products will facilitate liquid, bilateral trading in exchanges.

Seams Issues

- How will we handle loop flows from regions outside our RTO?

  Real Flow has the distinct advantage over LMP of having a natural solution to handling loop flows outside the RTO. Market participants would be required to purchase rights on flowgates in neighboring RTOs if these flowgates are impacted by purchases within the RTO, and vice versa. This is made possible by the fact that flowgates in other RTOs are equivalent to flowgates within an RTO from the perspective of congestion management, since the distribution factors on which flowgates are based are calculated by NERC for the entire Eastern Interconnect.

- Can Real Flow co-exist with a nodal system and FTRs under the same RTO?

  Yes, but this will require a split tariff that delineates the rules for transmission access and market participation in the two regions to recognize the different CMSs. Effectively, the tariff will have to treat the two regions as if they had a seam running between them. The key implementation challenge is the sale and definition of transmission property rights (physical vs. financial) for the interconnecting flowgates. One possible solution is that both areas treat interconnecting flowgates as physical rights on which schedules have to be fixed and matched to PTRs in the forward markets. In the event of real-time congestion on these flowgates, the RTO would have to pro-rate existing rights. This will allow the LMP region to treat imports and exports on interconnecting flowgates as bilateral contracts, and therefore not require dispatch optimization across the entire RTO.

- Will market participants be able to trade across two regions, one with Real Flow (Region A) and another with LMP (Region B)?

  Yes, but not seamlessly. Trades would likely take place at the border, potentially at a hub, where bundled energy were bought and sold. For example, a participant from Region B selling into Region A may arrange for delivery at the border, but have the buyer take the risk/cost of delivery (purchasing PTRs) from the border. The challenge to cross-region trades is not the protocol as much as it is the ability of participants to manage their risks in both systems so as to structure and value cross-regional transactions comfortably.