RnR DP2 ANALYSIS:
PANCAKING
7/05 Draft – J. Schmidt

I. Problem Statement

Pancaking refers to the practice of recovering the embedded costs of transmission on a control area by control area basis. This practice can unnecessarily increase the cost of delivered power by creating the appearance of incremental costs where there are virtually none (transmission investments to carry load have already been made). This, in turn, can bias the system against lower cost resources whose output must cross multiple control area boundaries, but whose delivery causes no new fixed transmission costs.

Put another way, including fixed transmission costs in a marginal decision would be akin to including the cost of a car payment in an estimate of how much it costs to reach a given destination by car. If the car has already been purchased (as has the existing transmission system), only the cost of fuel, equipment wear, and time (and perhaps environmental impacts of emissions) should be included in this calculation – the car payment must be made whether or not the trip is taken. It is a sunk cost.

Transmission pancaking can also have a deleterious effect on resource siting – generation resource developers must sometimes work with several transmission owners to secure access to load. As such, they must often perform multiple transmission impact studies, negotiate multiple long term transmission contracts, and anticipate pancaked short term rates for any surplus sales they wish to make. It is possible that this might prevent construction that would be reasonable were price signals more reflective of the incremental costs they would be imposing on the system.

In addition to transmission rate pancaking, there is the potential problem of *transactional* pancaking. This occurs when buyers of transmission must contact multiple transmission owners to coordinate the delivery of power. The time requirements, information barriers, and administrative burdens created by this practice may limit efficient trade across multiple control areas.

Respondents to the 2005 risk reward survey had various opinions as to the effect that rate pancakes have on the efficiency of dispatch.

II. Baseline Scenario

There are currently 14 control areas in the Grid West region, each of which imposes a separate charge on transactions to recover its fixed cost of transmission. There are two broad categories of contracts – the first being network contracts which allow the user to inject and withdraw power at any point on a particular control area's system. These contracts are usually limited to use for a utility's native load and are extensive within the Bonneville System. These transmission rights cannot be traded. The second transmission contract covers Point to Point

injections and withdrawals for a given capacity and period of time. The point to point contracts are tradable and can be used to "shelter" unanticipated transmission needs. A "sheltered" transmission transaction can take place if the user has unused PTP transmission rights anywhere on a transmission owner's system *and* there is space available for the newly configured transaction. PTP contracts must be secured for every control area encountered on a "contract path."

Currently, about X% of BPA transmission is sold on a PTP basis, 20% of PacifiCorp's system is sold on that basis. The following table summarizes the wheeling rates charged by Major Transmitting Utilities in the region.

Transactions involving multiple rates:

	$/KW/month	$/MW-hour
Avista:	$1.40/kW/month	$1.89/MWh
BPA (2 segments)		
PTP-06:	$1.216/kW/month	$1.64/MWh
IS-06:	$1.211/kW/month	$1.63/MWh
BCTC: ($US)	$3.60/kW/month	$4.86/MWh
Idaho Power:	$0.97/kW/month	$1.31/MWh
NorthWestern:	$3.10/kW/month	$4.19/MWh
PacifiCorp:	$2.025/kW/month	$2.74/MWh
PGE:	$0.52/kW/month	$0.71/MWh
Puget:	$0.32/kW/month	$0.31/MWh
Sierra/Pacific		
Zone A:	$2.88/kW/month	$3.89/MWh
Zone B:	$1.40/kW/month	$1.89/MWh

III. Grid West Approach

The proposed Grid West approach, (see Grid West white paper "Pricing and Cost Recovery," June 2005) shifts responsibility for sales of new service from participating Transmission Owners to Grid West. Grid West will administer the short term sales (sales of a duration less than 1 year) of available flowgate capacity for all new sales. These sales will be for injection and withdrawal rights and will *not* be a function of a contract path, per/control area charge. Instead a purchaser will see one price for transmission service regardless of the number of control areas over which the generation will theoretically travel. Grid West has not settled on a pricing approach for this service, in that they have not determined the exact determinants of the rate that will be charged. It is, however, clear that these short term sales will not be subject to pancakes.

Long term service will also be sold by Grid West, but with much more active participation by the transmission owners. Existing long term service will continue in its current form – with contracts for either network or point to point service. New long term service (service not provided for under existing contracts) will be paid for as either a network injection withdrawal right (IWR) – wherein the contract allows for classic network service within a given control area

– or as "IWR pairs" which is analogous to today's point to point rights, except that there will be one charge for service over the entire Grid West footprint.

Thus, Grid West will eliminate pancaking for all short term transactions and for some long term transactions.

The Consolidated Control Area will correct for many of the remaining dispatch inefficiencies that may arise from the remaining rate pancakes. The CCA's real time balancing market will provide opportunities for economic redispatch, based on inc and dec offers provided by consolidators. The system operator will determine if the system physics allow for deals to be made, and then matches incs and decs to one another. As such, it provides an opportunity to correct for dispatch inefficiencies that may result from pancaking – its ability to correct for those inefficiencies will be a function of how actively and thoughtfully participants bid into this real time market. The caveat to this observation is that the dynamics of a pancaked transmission rate based market may lead to a less than optimal unit commitment of generating resources, and the CCA's dispatcher will be limited to facilitating redispatch on committed resources.

IV. Alternatives

The Transmission Issues Group (TIG) has no immediate plans to eliminate rate pancaking. It is, however, looking at reducing pancaked *transaction* costs as much as possible through the creation of a single OASIS. They may also explore some form of common discounting for incremental schedules after pre-schedule, to increase use of existing transmission assets.

V. Analytical Issues

Since the Northwest began restructuring discussions, there has been considerable debate about the degree to which transmission rate pancakes distort dispatch decisions in the region. The 2002 Tabors Caramanis study conducted for RTO West estimated that roughly $90 million of annual benefits would accrue to the WECC were Northwest pancakes to be eliminated. The 2004 Henwood study conducted for Snohomish PUD estimated only $3million in annual depancaking benefits to the Grid West region. The 2000 Aurora study (conducted for RTO West stage 1) estimated about $30 million in depancaking dispatch benefits to the WECC.

If one were to want to resolve these differences in expectations and accurately estimate the regional benefits of eliminating rate pancakes, one would ideally have answers to the following questions:

1. What is the extent of existing rate pancakes?

   The simplest step in answering this question is accounting for the various transmission rates imposed on transactions delivering to and through the Northwest. One must then take on the complicated task of assessing what percentage of transmission transactions are really influenced by the pancaked rate.

If transmission customers have purchased adequate long term reservations of transmission capacity across multiple control areas, they may have effectively unpancaked transmission themselves and will have no reason to consider anything other than the marginal cost of dispatch in their purchase/sales decisions.

However, if these long term transmission rights can be traded (i.e., if they are point to point) then the value of their use/sale can be affected by pancakes. This is because the ability to sell a long term transmission right creates an opportunity cost of holding the transmission right, and that opportunity cost is a function of the degree of pancaking throughout the regional transmission system. Thus, one needs to also understand the quantity and characteristics of existing PTP transmission contracts if one is to derive a precise estimate of the extent of pancaking.

2. Are the actual pancaked rates high enough to affect dispatch?

The distorting effect of pancakes on dispatch decisions is a function of the cost of the resources facing pancaked rates, the cost of the pancaked charges that would be imposed on a delivery to load, and the value of the resource at its point of delivery. To the extent that the marginal cost of a resource plus the pancaked transmission rates is less than the market rate of power at the node of delivery, those pancaked rates will not affect dispatch. For example, if a resource with a very low marginal cost (say $5/MWh) were being transported to a $30 market and faced $10 in rate pancakes to get it to market, the delivered cost would still be well below the market cost and that pancake would have no effect on a decision to dispatch the $5 resource. However, a resource with a marginal cost of $25 wanting to deliver to a $30 market through a $10 pancake would be affected by the pancake, as it would render that transaction uneconomic from the generator's perspective.

Thus one needs to know the marginal cost of generation in the region by location and the likely price of energy at the delivery nodes in order to precisely estimate the effects of pancakes.

3. Do pancaked rates distort economic resource siting decisions?

One needs to determine whether anticipated rate pancakes are high enough to affect resource siting decisions. In other words, *after* a builder has taken into consideration the cost of construction, the cost of fuel, the cost of labor and O&M, and the cost of any needed transmission reinforcements/new construction, and the cost of congestion, - is the anticipated cost of rate pancakes across existing and available transmission lines high enough to discourage construction that would otherwise be financially viable?

4. To what extent does the transactional cost of rate pancaking distort dispatch?

Does the cost, in time and money, of lining up transmission over multiple control areas deter efficient dispatch?

A few survey respondents specifically cited their reluctance to transact power when the deal involves more than 2 transmission reservations. The following reasons were enumerated by the survey respondents:

(a) Scheduling requires acquisition of transmission capacity from multiple OASIS nodes and transmission providers. This is both resource-consuming and risky since one path in the chain may be unavailable thus wasting your entire effort and potentially losing the sale.
(b) Multiple login requirements, registration requirements, and user interfaces of the OASIS nodes require time and training and a good long-term memory for sites that are used infrequently.
(c) Potential for variances in product quality or curtailment practices between providers creates additional risk that the transaction will be cut along a single piece of the path.
(d) Variance in loss factors applied to usage of the purchased capacity factors into the cost of the product and your ultimate ability to sell the product.
(e) Requirement for approval by the various transmission providers who frequently require different, and very specific, notations to be made in e-tag fields that are neither required nor defined thus adding time and risk that the transaction will fail.
(f) Overhead (verification of their billing based on their unique tariffs, billing multiple parties, and credit checks) associated with paying multiple transmission providers adds time.

5. Adequacy of data and modeling capabilities.

It is unlikely that all of this data will be available and will lend itself to modeling, so the final analytical issue is one of adequacy of data and assumptions – do we have enough data and modeling capability to make a reasonable estimate of the effects of pancaking?

V. Related Analyses

Though not the primary reason for restructuring electricity markets, a lot of modeling has been done in the past to estimate the effects of pancaking. This is because it is one of the restructuring benefits that is most easily captured in modeling (though getting there does require making a good deal of assumptions). The results to date are summarized below:

1. TCA Study – Spring 2002
   - *i. Methods*
     TCA, at the request of the RRG for RTO West, used GE MAPS to estimate the effects of rate depancaking in the RTO West region for 1 year – 2004.
   - *ii. Assumptions*
     100% of transactions face pancakes.
     This assumption is founded on the idea that rate pancakes aren't high enough to affect the dispatch of low-cost base loaded resources – the resources that are currently scheduled on long term transmission contracts. Further, it assumes that high cost resources are dispatched on the margin – for surplus trades – and that their dispatch is affected by pancakes.

iii. Results

TCA did not separate out all of the effects of their various assumptions/tests. It would seem that the total estimate came to about $90 million per year in production cost savings to the WECC as a whole resulting from depancaking and single-control area dispatch.

iv. Applicability to Grid West

Similar foot print to Grid West, different pancaked rates than at present, different cost of fuel (especially gas).

2. Henwood/Snohomish Study – Fall, 2004

i. Methods

Henwood used their MARKETSYM model together with the PowerWorld AC transmission and optimal power flow model.

ii. Assumptions

Assumes that pancaking only occurs "when BPA paths are full and other non - BPA facilities must be used."

iii. Results

$4,000,000/year in savings.

iv. Applicability to Grid West

Same footprint, not clear if/how Gridwest will depancake.

3. Gridview Study – Spring 2005

VI. Potential Wealth Transfer Impacts

Control area specific transmission rates have been around for a long time – they have been used to finance our existing transmission infrastructure. This gives rise to several equity issues which have lead some in the region to declare that depancaking is a cost-shift, rather than an efficiency issue:

a. To suddenly impose a uniform transmission access fee across all of a region's Control Areas would cause some potentially large cost-shifts. Everyone paying for transmission access would go from paying a control area average to a regional average transmission rate. For those who use mostly high-cost transmission, costs would decrease. For those who use mostly low-cost transmission, costs would rise. Recent Pricing Group data would suggest that this policy would lead to a Grid-West wide transmission rate of $31/kWyr, which would be a very high rate for Idaho whose customers pay roughly $9/kWyr. This is not likely to be perceived as "fair" by all parties.

b. Those who already paid for their system (or most of it) would be sharing the benefits at no cost with those who haven't.

A partial fix for the first allocation problem was derived during RTO West Stage 2 process. Analysts created a "license plate" based rate intended to eliminate much of the cost shift by establishing a "company rate" for transmission (based on historical rates) then imposing transfer payments between control areas to account for historical cross-CA payments for transmission. Customers end up making a single transmission payment for a single schedule, regardless of the number of control areas that schedule crosses – and the transmission charge is based on the customer's historical share of the regional transmission grid.

This license plate rate is not a perfect solution, as future use of transmission will not be the same as current use – regardless of industry structure. And, there is no way to perfectly determine or offset cost shifts. Furthermore, it is difficult to determine and implement a license plate rate that will maintain even the status quo wealth distribution.

Equity issue b – sharing the benefits of infrastructure that has already been paid for (or the portion that has been paid for) is addressed differently. One can argue that this is not a new phenomenon – that outside users of existing systems do not currently pay for the embedded value of facilities that have already been depreciated – they pay a cost-based rate based on the existing revenue requirements of transmission owners. One can also charge a connection fee to new entrants which allows them to "buy in" to the new system and offset the costs already paid by existing participants.