

Response to the RTO West Benefit Cost Study Critique Dated April 19, 2002

PREPARED BY TABORS CARAMANIS & ASSOCIATES

EXECUTIVE SUMMARY

In September 2001 the nine northwest utilities considering establishment of a Regional Transmission Organization (RTO) for the Pacific Northwest (RTO West) retained Tabors Caramanis and Associates (TCA) to evaluate its benefits and costs. TCA worked under the direction of a Benefit Cost Work Group (BCWG) representing all of the major stakeholders in the region. In March 2002 TCA published a report documenting its analysis and results. In April 2002 a few affected parties, including three who participated in the BCWG, released a critique of the March report outside the benefit cost study process. TCA has prepared this paper in response to that critique. It identifies several major flaws in the critique, and confirms the results presented in our March benefit cost study report.

- ❖ The critique fails to justify the majority of its proposed corrections to TCA's modeling assumptions and many of the justifications it does provide are factually incorrect. For example, the critique asserts that
 - generating maintenance is scheduled for economic market conditions, when it is not;
 - spinning reserves are provided almost entirely by hydro resources, when they are not;
 - there is complete reserve sharing today, when there is not;
 - hydro reserves have minimal value, when they clearly have significant value; and
 - the cost of losses will increase because exports increase, when in fact exports decrease.
- ❖ The critique implies that TCA has misapplied an abstract, unaccepted methodology to produce erroneous results. In reality, TCA's methodology and results are consistent with those of numerous other similar studies.
- ❖ The critique fails to acknowledge the substantial savings to consumers that would result from formation of RTO West. The estimated savings to buyers in the first year of operation range from \$2.5 billion to \$4 billion.
- ❖ The critique fails note that TCA's estimate of the benefits of an RTO is deliberately conservative. The additional benefits that TCA modeling did not include:
 - savings in capital costs for new generation and transmission capacity;
 - increased savings that would result if today's actual (not ideal) markets were modeled;
 - increases in savings to the extent hydro schedules are more flexible than modeled (contrary to what the critique suggests);
 - improvements in reliability and the resulting economic value of less outage time.
- ❖ The critique fails to recognize the policy issues associated with reduced transmission bottlenecks (i.e., lower "congestion rents"). TCA's study explicitly demonstrates that congestion rents, will be lower with the formation of RTO West relative to continuation of the status quo. The critique notes that this reduction in congestion rents represents a "loss" according to the narrow definition of social welfare used by economists, when in fact a future with less congestion represents a benefit from a broader policy perspective.

TCA worked closely with the BCWG to develop consensus on the assumptions and methodology used to evaluate the costs and benefits of RTO West and believes its results are still valid. TCA also encourages parties to seek constructive dialog around these issues and to consider whether there are broader issues that need to be addressed directly.

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JUNE 4, 2002

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INTRODUCTION

In September 2001 a group of nine utilities considering establishment of a Regional Transmission Organization (RTO) for the Pacific Northwest (RTO West) retained Tabors Caramanis and Associates (TCA) to evaluate its benefits and costs. A Benefit Cost Work Group (BCWG) was formed to provide direction to TCA on all aspects of the Benefit/Cost study (the study), including its scope, input assumptions, methodology, and scenarios. The BCWG included representatives from each of the sponsoring utilities and another twenty members representing the major affected parties within the region such as public power systems and major industrial customers. The results of the TCA analysis are documented in its 149 page *Final Report Presented to RTO West Filing Utilities* dated March 11, 2002¹ (Final Report).

In April of 2002, eight affected parties, three of whom were members of the BCWG, released a critique (referred to here after as "critique") of the Benefit/Cost study. This critique was prepared outside the BCWG process and has not been endorsed by either the BCWG or any RTO West stakeholder other than the authoring group.

TCA has prepared this response because the critique is seriously misleading. In addition to misrepresenting the Benefit/Cost study, and in some instances presenting incorrect assertions, it is counter-productive to the consensus building process that has been employed by the BCWG. Our paper identifies five major flaws in the critique, explains why its proposed corrections are not valid, and confirms the validity of the fundamental conclusions expressed in our Final Report.

In summary, the critique

1. Fails to justify the majority of its proposed corrections to TCA's modeling assumptions, and is factually incorrect and misleading.
2. Fails to admit that the methodology used by TCA, and the results of its study, are consistent with those of numerous other similar independent studies.
3. Fails to acknowledge the substantial savings to consumers from formation of RTO West;
4. Fails to note the conservative nature of TCA's estimate of benefits from the formation of RTO West; and
5. Fails to recognize the policy issues associated with the reduced cost of managing transmission bottlenecks (i.e., congestion) and to address the key question of whether society would be better off, or worse off, if there was less congestion impact in the future.

¹ The TCA report is available electronically at www.tca-us.com.

BACKGROUND

In the study TCA used a computer model to simulate the operation of the western regional wholesale electric market for one year under two cases. The first case, “Without RTO”, reflects a continuation of the status quo while the second case, “With RTO” reflects operation of the market after formation of an RTO. Additional scenarios were simulated to test the sensitivity of the results to changes in the assumptions regarding market operation with an RTO

The results of the first two cases indicate that the cost of energy to serve load at hourly market prices would be nearly \$3 billion per year less in the With RTO case relative to the Without RTO case. The resulting net benefit to society, while less, was still hundreds of millions of dollars of year.²

The primary insight TCA drew from the analysis is that the magnitude of potential savings to consumers, and to society in general, when compared to the magnitude of potential costs of forming and operating an RTO (about \$125 million to \$150 million per year), suggests that the benefits of forming RTO West could outweigh the costs. The qualitative impacts of forming the RTO West strengthen this conclusion. The Final Report recognizes that producers and consumers in the Northwest must ultimately determine whether the sum of the quantifiable and unquantifiable benefits justify the implementation of RTO West.

The critique maintains that the TCA study “...can be misinterpreted”. Specifically, its authors disagree with TCA’s presentation of part of the savings (the “congestion rent” savings) as well as with four of its modeling assumptions. Based on their proposed corrections to those five components, the memo suggests that the net benefit to society “...could be only \$49 million per year” (compared to the hundreds of millions in the TCA study).

It is the authors of the critique who have misinterpreted the Benefit/Cost study. Our review of their critique, presented below, has found nothing to cause us to change the fundamental conclusions expressed in our Final Report.

² The overall impact of the RTO is to reduce hourly prices. As a result, consumers pay lower costs, while generators receive less revenue. After netting the loss in generator revenues against the reduction in consumer costs, however, there are still hundreds of millions of dollars of savings to the Northwest region.

1. THE CRITIQUE'S ASSERTIONS ARE FACTUALLY INCORRECT AND THE
AUTHORS FAIL TO JUSTIFY THE MAJORITY OF THEIR PROPOSED
"CORRECTIONS" TO TCA'S MODELING ASSUMPTIONS

TCA worked closely with the BCWG to develop a set of input assumptions and a market simulation methodology that was fair, unbiased, and technically sound. The critique authors, on the other hand, put forth a variety of assumptions, most of which are either unsupported or factually incorrect. To corroborate the validity of the assumptions used in its analysis, TCA solicited feedback on them in late April from control areas in the Northwest via a simple survey³.

Following are assertions made in the critique and their factual counterparts.

Critique's Assertion	Factual Reality
Generating plant maintenance is currently scheduled for strictly based on regional economic market conditions (page 2 and Summary of Corrections, page 7), with no regard for maintaining local generating reserve margins.	Per the TCA survey, several utilities report that maintenance is currently scheduled based on <i>both</i> market conditions and requirements to maintain control area generating reserves.
"spinning reserves are provided almost entirely by hydro generation units" (page 3).	Per the TCA survey, a significant fraction of utilities in the Northwest reported that spinning reserves are not all carried on hydro reserves.
Hydro reserves have minimal value: "spinning reserves are available today and in the near future in the Northwest at virtually no incremental cost" (page 3).	It is widely recognized that the value of reserves provided by hydro in the Northwest is based on their market value or opportunity costs, which is significant (see discussion below).
There is complete reserve sharing today, as there would be with an RTO (page 3 recommendation to treat reserves the same in both cases).	Per the TCA survey, many utilities do not fully share reserves today.
That the benefits are necessarily overstated because losses go up due to exports.	No analysis has been performed that could report on impacts from losses. The data do in fact show that exports decrease in the With RTO case, suggesting that losses should be lower.
That various elements of benefits are linear and additive (mathematics demonstrated in the "Summary of Corrections" table, page 7).	Attributes and benefits of the Northwest energy system are not linear or directly additive.

The above are examples of the factual misrepresentations. This following discussion examines several of these in detail.

TCA worked closely with the BCWG when developing the input assumptions used to simulate the operation of the market in each scenario. The Final Report clearly stated the

³ In mid-April TCA submitted a survey by email to each of the filing utilities. The survey included questions such as: Do you carry your operating reserves requirements on your own units in your control area or buy these from other control areas? and Do you carry your operating reserves requirements on your hydro generation resources only? TCA received responses from each of the nine utilities.

input assumptions and ran a sensitivity case on each to identify its relative contribution to the benefits.

The authors of the critique now disagree with several of the modeling assumptions used by TCA, including the following.

A. Operating Reserves Assumptions

One of the large expenses of reliably operating a transmission system is the cost of maintaining sufficient operating reserves in standby to provide power should a generator trip or a transmission line go out of service. The cost of providing the reserves depends on what resources are providing the reserves, their costs, and the lost value of the energy they would be providing if not in standby. To the extent an RTO would allow more efficient allocation of resources the cost of providing the reserves will decrease. Absent an RTO or alternative sharing arrangements utilities are left to serve all of their own reserves from their own units.

The Benefit/Cost study assumed that utilities were providing all of their reserves with their own resources in the Without RTO case, and that all resources could be freely shared across the Northwest to provide the region's total reserves in the With RTO case. The shift to meeting reserves on a regional basis via the formation of an RTO results in substantial economical benefits, as it effectively allows reserves formerly provided by thermal resources to be provided by less expensive hydro resources.

Further, the study assumed in both cases that only 20% of the spare hydro capacity could provide reserves. System operators at BPA provided this assumption. This latter assumption potentially causes more of the reserves to be carried by more expensive thermal resources (though it is possible that this effect could be present in both cases).

In the critique, the authors attempt to discredit all savings resulting from moving to a regional reserve market. The critique challenges the reserve assumptions by claiming that nearly all of the reserves are currently provided from hydro generation at virtually no incremental cost.

We address each aspect of this assertion separately.

- i. The claim that nearly all reserves are currently provided from hydro generation called into question the Without RTO assumption that the BCWG had provided TCA. To investigate the validity of that claim, TCA conducted a survey of prospective utility members of RTO West in late April. The study results confirm that most member utilities, with the exception of BPA, do provide reserves from their thermal units. These results contradict the critique authors' assertion and confirm that a regional market would offer the benefit of having hydro resources provide a larger share of the reserves.
- ii. The claim that reserves on hydro systems are available at virtually no incremental cost ignores *the market value, or "opportunity cost"*, of those reserves. The Northwest has always recognized the value of its hydro resources and has worked hard to

communicate that the Northwest, with these hydro resources, is different than the balance of the country as a result of the fact that hydro cannot realistically be valued at marginal cost. For example, the market value of ancillary services, the bulk of which are reserves, in the California market was more than \$1.7 billion during 2000⁴. To the extent that hydro resources can provide such reserves they have a value comparable to this.

B. Losses associated with Incremental Power Exports

The critique also asserts that there is a technical basis for reducing the benefits as a result of increased losses. However, the authors have provided no independent analysis to support that assertion. In fact TCA found that one of the fundamental premises of the critiques assertion is completely opposite to what the data show.

As TCA explained to the BCWG, the modeling of losses requires the use of non-linear optimization tools. Since the tool used to perform the analysis, GE-MAPS, is a linear optimization tool it cannot determine whether losses increase or decrease. Thus, there is no easy or obvious way to tell whether the physical losses on the system will increase or decrease. In fact, it is possible that there would be a net reduction in physical losses in the With RTO case because local generation will be used more efficiently to meet local load.

Further, in response to the critique's assertions, TCA examined the flows between the Northwest and California and the southwest. Though the authors of the critique suggest they could determine in fact that losses were higher due to increased exports, TCA finds a predominantly opposite case. Upon examination of the intertie flows, TCA found that exports are in fact slightly lower in the With RTO case, and that it is a larger reduction in imports that reflects in the higher *net* export. (Since losses are created by actual flows, however, one needs to examine actual flows rather than net flows to determine whether losses are expected to increase or decrease.) So, in fact, with reduced imports and reduced exports, the With RTO case will result in lower losses between adjacent regions, a conclusion counter to what the authors of the critique assert.

C. Transactions between utilities within RTO West

The critique states, "The RTO Case incorrectly and inconsistently treats certain transactions that cross control-area boundaries." The modeling assumptions that TCA used were provided by BPA, as a good representation of their average transaction costs. TCA trusts that BPA understands its pricing policies, and the critique authors offer no stronger evidence to suggest otherwise.

⁴ Source: "Third Annual Report on Market Issues and Performance," Department of Market Analysis, California ISO, January 2002.

2. THE BENEFIT/COST STUDY'S RESULTS HAVE BEEN REPRODUCED, AND
METHODOLOGIES ENDORSED THROUGHOUT THE INDUSTRY, YET THE CRITIQUE
IMPLIES THAT THE STUDY APPROACH AND FINDINGS ARE UNUSUAL AND
INACCURATE.

The critique tries to lead the reader to believe that the study is based upon unreasonable modeling assumptions, that methods have been used that lead to unsound results, and that the results will not be valid until the analysis is "corrected" using the authors' modeling assumptions.

The modeling assumptions, methodology and results from the TCA study are consistent with those of similar studies of RTOs undertaken by other analysts. Benefit/Cost studies of RTOs have been, and continue to be, performed throughout the industry. Attachment A summarizes the major Benefit/Cost studies of RTOs undertaken over the past several years. The studies are similar in methodology and all show the same trends in results.

The most recent study, performed on behalf of the NY and NE ISOs by General Electric, examined the benefits of a regional RTO in the Northeast in exactly the same manner as that used by TCA in its conduct of the RTO West study. Organizations throughout the country are using these same techniques to investigate benefits of more regional markets. In addition, the results are comparable in direction and approximate order of magnitude.

3. THE FORMATION OF RTO WEST WOULD RESULT IN SUBSTANTIAL ENERGY
SAVINGS.

TCA estimated the potential benefits of forming an RTO by simulating the operation of the western wholesale electric market under several scenarios. In each scenario the simulation model calculated the marginal cost of generating electricity and transmitting it to customers in one future year, 2004. The marginal cost of providing electricity to customers is substantially lower under the "With RTO" case, and each of the sensitivity cases,⁵ when measured relative to the "Without RTO", or status quo case, with the great majority of the scenarios showing energy cost savings of at least \$2.5 billion and as much as nearly \$4 billion.

Loads procuring energy have the possibility of saving billions of dollars a year on energy as a result of the RTO West and this fact seems to get lost. The numbers that are discussed more often are the net benefits – those benefits net of impacts to suppliers (since prices decrease with the RTO suppliers generally make less profits). However, if parties are going to suggest that end users will be harmed it is important to stay in touch with the order of magnitude difference in savings to energy buyers: billions of dollars per year rather than millions of dollars per year.

⁵ Sensitivity cases are run to calculate the impact of changing key input assumptions and to test the robustness of the results given extreme conditions.

4. TCA'S ESTIMATE OF BENEFITS FROM THE FORMATION OF RTO WEST ARE
CONSERVATIVE

In preparing the Benefit/Cost study, TCA consistently used techniques and assumptions that were conservative, thereby erring on the side of underestimating benefits rather than overestimating benefits. TCA's modeling conservatisms include the following.

- A. One year time horizon. The study only involved simulating the operation of the generation and transmission market for one year, 2004. As a result, our estimates of benefits do not include the long-term savings that would be achieved with an RTO through more efficient use of new generation and transmission facilities and more appropriate siting of new generation.

As demonstrated in the study, generating resources and transmission lines are used more effectively with an RTO. The study, however *did not quantify* the capital cost savings associated with having to build fewer new generating plants and more appropriate types of plants. Further, plants will be able to be sited more effectively with regional markets and price transparency.

- B. Without RTO assumed to be perfect market. TCA's representation of the status quo in the "Without RTO" case tends to under-estimate the cost of providing generation and transmission service under the present market structure. Our simulation assumes that there are no inefficiencies in the operation of the existing market structure. (As a result, the criticism in the critique that the study does not address existing contracts is moot, as the study essentially inherently assumes an infinite number of contracts are in place and that trading arrangements are performed to the fullest.) In modeling the Without RTO case TCA assumed that all rational economic trades were occurring and that there were no transaction costs associated with those trades.

To any degree that utilities serve load with their own generation rather than comparing the cost of every MW of their own generation to the cost of energy on the open market, today's world has economic inefficiencies, and these efficiencies if captured would show higher RTO benefits. As an example of inefficiencies in transmission scheduling, in the RTO West Benefit/Cost study performed previously, documented in the report "RTO West Potential Benefits and Costs, final Draft, October 23, 2000" the authors list for example the West of Hatwai path, where the line is reported to have no capacity available for scheduling. In actuality, however, this path is fully loaded less than 25% of the year, showing that current scheduling practices miss the availability of 75% of this line's capacity. If even a single economic transaction is missed in today's market that would occur given more open markets and more transparent prices with an RTO, or if any additional transmission capacity can be utilized under an RTO environment, then the benefits of the RTO would be higher than what is captured in the Final Report.

- C. Fixed Hydro Schedule. The claim in the critique that "...a more accurate representation of the hydro system would show less benefit due to formation of the RTO, because many of the benefits the TCA model attributes to the RTO in the model are achieved in

both cases” is not supported by any analyses. TCA’s main reason for using the fixed hydro schedule was to capture all environmental constraints that govern the dispatch of hydro resources in the Northwest. If the hydro system does have “immense flexibility” as the critique authors claim, then the benefits under the With RTO will be *even higher* than TCA estimated. This is because the current markets do not have transparent locational hourly clearing prices, which makes optimizing hydro schedules on hourly basis impossible, whereas with an RTO hydro optimization will be much more valuable.

TCA did not estimate the benefits associated with efficiency gained from optimizing hydro schedules in response to hourly and five-minute prices. Most prospective utility members of RTO West member utilities have the technical capability to do this but TCA found they are not currently taking full advantage of this ability⁶, possibly due to the complexities in executing such short term arrangements. The formation of the RTO West, and the resulting improvement in transparency of hourly and intra-hourly prices, will give most utilities the ability to capture benefits by optimizing their resources in response to locational prices. Such similar benefits could be obtained from thermal units due to an increase in the transparency of intra-hourly market clearing prices.

- D. Available Transmission Capacity. TCA did not estimate the benefits of an increase in Available Transmission Capacity due to the elimination of existing transmission reservations in the With RTO scenario. Currently, most Northwest utilities reserve a portion of their transmission system capability⁷. These reservations can be any where from 5% to 10% of transmission system capability. Moving to a single control area for RTO West would eliminate the need for these reservations. The elimination of this requirement would free-up this transmission system capability for use by the utilities. The benefit of any freed up transmission would be in addition to those benefits quantified in the study. These benefits if implemented in the modeling would increase the level of RTO benefits.
- E. Regulating reserves. The benefits from the reduced level of required regulating reserves were not factored into the quantified benefits in this study, though the last Benefit/Cost study addressed the ability to reduce the quantity of regulating by nearly 300 MW, representing a substantial area of savings for end users.
- F. Reliability. TCA’s study did not address the added benefits in terms of reliability and the reduced cost of down time associated with grid outages, though the RTO is strongly viewed as able to increase the coordination, frequency control and ability to recover from outages.

⁶ Based on utility survey responses.

⁷ TCA survey responses indicate that a significant number of utilities do reserve capacity in order to implement cross control area scheduling today, in a similar manner to the Transmission Reserve Margin (TRM) and Capacity Benefit Margin (CBM) practices in eastern markets.

G. Emissions. TCA did not quantify emission impacts, but it is generally recognized that the more efficient operation of the system results in more efficient generation usage and therefore less emissions. This externality also was not valued financially.

None of the above benefits are included in the estimated level of benefits contained in the Final Report. Their effect would be to increase the level of benefits.

5. FORMATION OF RTO WEST WOULD RESULT IN MORE EFFICIENT USE OF THE TRANSMISSION SYSTEM AND REDUCED CONGESTION COST, POTENTIALLY DELAYING THE EXPANSION OF THE GRID – A BENEFIT CHARACTERIZED AS NEGLIGIBLE BY THE CRITIQUE AUTHORS

TCA found that a significant fraction of the societal impact of the RTO was in the area of reduced costs of transmission flow, or “congestion”, management.

Recall that in the analyses TCA simulated the operation of the wholesale electric market without an RTO, to reflect continuation of the status quo, and with an RTO, to reflect the improvements in economic efficiency that could be achieved through the formation of an RTO. As part of the RTO design, individual Northwest utilities would no longer charge each other to move electricity across their respective transmission systems, rather there would be one regional transmission market. This would eliminate multiple layered, or “pancaked”, transmission fees. A regional transmission market would allow generators to be economical to a greater number of loads, leading to a more economically efficient use of the transmission system, hence lower congestion costs. Lower congestion costs mean that loads or energy consumers can buy power at closer to the cost of generation at their location, rather than having to pay additional costs to manage around the transmission bottlenecks.

The critique states that the reduction in congestion rents in the With RTO case should not be counted as a benefit "because these costs still must be paid by consumers. The costs do not go away as the model appears to show." This rationale is simply not correct. The costs go away. Moreover, the criticism of TCA’s treatment of congestion rents reveals a basic misunderstanding of the purpose of its analyses.

The authors of the critique dispute the validity of that \$171 million congestion savings benefit because they think consumers will still need to pay it to the transmission owners. The \$171 million costs to loads and generators do disappear due to better system utilization. TCA acknowledges explicitly in its Final Report that the reduction of \$171 million in congestion rents does represent an intermediate transfer of funds from the transmission owners to the loads and resources. To the extent the benefits and costs include also the transmission owners the funds net out.⁸

⁸ Of course this is a fundamental construct of any study of impacts, especially for ones that impacts distributions of wealth, that what may be seen as a “benefit” may net out if the boundary of the study is made larger. For example, extending this effect would say that the **cost** of establishing the RTO West would net out if the boundary of the “winners and losers” was extended to include those parties receiving the financial payments (i.e. software vendors) to set up and run the RTO.

However it is not reasonable to completely ignore this as a benefit to society. Take as an analogy the medical industry. Imagine for example one day a much more effective treatment for a critical illness is discovered, where patients' hospital stays can be reduced from two weeks to one week, and thereby reducing the cost of treatment by 50%. Would we claim that this does not represent a benefit to society because hospitals would then receive 50% less revenues from patients with that illness? Of course not. By discovering a more effective treatment, the need for hospital space in the future has been reduced, and if that itself threatened somehow the viability of the hospitals we as a society would address that issue, but we would not fail to take advantage of a medical breakthrough because of the need to keep hospitals in business.

This situation is the same as that of the transmission congestion cost. Formation of an RTO will result in lower congestion rents. This is a benefit in and of itself; lower congestion rents are preferable to society as compared to higher congestion rents. Therefore, the fact that congestion rents decline by \$171 million in the With RTO case is good for society – it means that the existing transmission system is being used more efficiently and hence that the need for expansions in that system to meet load growth will be delayed.

SUMMARY

TCA has worked closely with the BCWG over several months to develop consensus on the assumptions and methodology to be used to evaluate the costs and benefits of RTO West. It is disappointing therefore, that a few parties who were actively involved in directing the study would – once the results were released – act independently to criticize the assumptions and approach used in preparing the study and to present a mis-representative perspective of the study and its results. This is particularly concerning and counter-productive given the flaws in the published critique.

We recognize that various parties have legitimate concerns regarding the specific costs and benefits that they will see from the formation of an RTO, as distinct from the total costs and benefits to society in general. TCA encourages parties to seek *constructive* dialog and policy analyses around these issues, and to consider whether there are broader issues that need to be addressed directly.

ATTACHMENT A: SYNOPSIS OF RTO BENEFIT/COST STUDIES

Study	Methodology	Results
TCA RTO West Study (March 2002)	Production Cost Model using GE MAPS software	<ul style="list-style-type: none"> • Millions of dollars a year net benefits • Overall decrease in energy prices • Additional benefits stated but not quantified
NE ISO/NY ISO Northeast RTO Cost and Benefit Study (May 2002)	Production Cost Model using GE MAPS software	<ul style="list-style-type: none"> • Millions of dollars a year net benefits • Overall decrease in energy prices • Benefits include production cost savings and congestion savings similar to TCA study • Organizational benefits quantified • Reliability benefits cited
ICF Study performed for FERC (February 2002)	Production Cost Model using proprietary software	<ul style="list-style-type: none"> • Tens of billions of dollars nation-wide over time • Overall decrease in energy prices • Additional benefits • RTO costs are a “wash” given reduced control area operating costs
PJM Study: Regional RTO in the Northwest (Early 2002)	Production Cost Model using GE MAPS software	<ul style="list-style-type: none"> • Millions of dollars a year net benefits
Previous RTO West study (October 2000)	Production Cost Model using AURORA software	<ul style="list-style-type: none"> • Millions of dollars a year net benefits • Overall decrease in energy prices • Additional benefits including lower regulating reserves and higher reliability
Supporting Analysis for the Comprehensive Electricity Competition Act (1999)	Production Cost Model	<ul style="list-style-type: none"> • Potential savings of billions of dollars a year nation-wide, including lower transmission access charges and reduced transmission capacity reserve margins (the later item conservatively assumed to be zero in the TCA study)
FERC 888 Study (April 1996)	Multi-year Least Cost Production Model	<ul style="list-style-type: none"> • Potential savings of billions of dollars a year nation-wide, including lower transmission access charges and reduced transmission capacity reserve margins (the later item conservatively assumed to be zero in the TCA study)

Corrections to the Benefits/Costs Study for RTO West

April 19, 2002

This analysis was prepared by Linc Wolverton, Industrial Customers of Northwest Utilities; Kevin O'Meara, Public Power Council; Lon Peters, Public Generating Pool; Ray Bliven, aluminum companies; Anna Falcon, Engineering & Economic Services; and Eric Christensen, Snohomish PUD. It was reviewed by Geoff Carr, Northwest Requirements Utilities; and Terry Mundorf, Western Washington Public Agencies Group.

Tabors Caramanis & Associates has produced the "final" report, RTO West Benefit/Cost Study. One component of the study is an analysis of potential reduced congestion costs and generation savings in the Western Systems Coordinating Council (WSCC) area due to formation of RTO West. We believe that the TCA Study, commissioned by the RTO West Filing Utilities, can be misinterpreted. As corrected, the value of RTO West over the entire Western Systems Coordinating Council (WSCC) area could be only \$49 million instead of \$410 million per year.⁹ The Filing Utilities have declared that they intend that no corrections be made to the study's results despite the problems we continue to see in the analysis. Further analysis of these issues could provide a better estimate of the potential costs or benefits of RTO West.

The TCA estimate of generation and congestion savings is distorted in two principal ways:

- The model assumes, in its Without RTO base case, that Pacific Northwest and other West-coast utilities are making irrational, costly operational decisions today that those utilities are not, in fact, making. The result is to overstate the cost of today's system and thereby make the RTO option look better.
- Nearly half of the benefits estimated for the RTO—the so-called Congestion Rents—are not a result of cost reductions but of a shift of who pays for the transmission of power.

The study uses assumptions and modeling techniques that overstate the potential benefits of RTO West, and derive from a misinterpretation of the study results. As participants in the Cost Benefit working group, we are compelled to provide the following analysis.

⁹ As a very rough approximation for the RTO West area alone, using the same ratio of RTO to the total West benefits as calculated in the initial study, the RTO West benefits would be \$36 million instead of \$305 million.

RTO West Study Results as Presented and With Corrections

	Avoided Congestion Rents	Generation Savings	Total Benefits
WSCC area by TCA ¹⁰	\$171 Million	\$239 Million	\$410 Million
WSCC area with corrections	\$ 2 Million	\$47 Million	\$49 Million

The following corrections were made to the model to obtain a more realistic view of the potential transmission and power benefits of RTO West.¹¹ These results must be considered in the context of other potential benefits and costs, including the operating costs of the entity, the substantial risks that still remain, including the exercise of market power and localized impacts on specific utilities or subregions within the Northwest.

- The Without RTO Base Case should assume current practice for scheduling generation-plant maintenance rather than assuming fundamentally irrational behavior by West-coast utilities. The result of this change: Power cost benefits attributable to RTO West are reduced by approximately \$27 million.**

Northwest utilities schedule the maintenance of their generation facilities in order to take advantage of opportunities in power markets for what are called “economy” purchase and sales, while also meeting their obligations to serve. The highest-price market opportunities generally occur in August on the West Coast. Expected revenues from those sales are used to reduce power rates for native-load customers.

The Without RTO base case assumes that utilities schedule their maintenance with no regard to market opportunities. The result is exemplified by the maintenance schedule for WNP-2, which the model calculates would occur in August, the best time of the year to have extra power to sell and the worst time of the year to schedule maintenance. The Without RTO assumption does not reflect reality. Scheduling maintenance the same way in both cases, as might be expected when utilities look at market opportunities, reduces generation costs savings due to RTO West by \$27 million, according to TCA’s own sensitivity study. (TCA Study, Maintenance Schedule sensitivity, pages 34)

¹⁰ The analysis uses the West-wide changes for a specific reason. Using just the RTO West-area results introduces an unnecessary complication in interpretation, because the With RTO case includes significantly higher exports of power to British Columbia and California. As a consequence of the increased exports, there is actually a generation-cost increase in the RTO West area in the With RTO case, making it appear that creation of RTO West brings no benefit in terms of generation savings. That conclusion is wrong and is more confusing than illuminating. Use of the WSCC-wide results more clearly demonstrates the impact of the corrections.

¹¹ The various corrections, based largely on the TCA report itself, are assumed to be additive. In fact, there may be interactions among them that would modify the results—but probably only slightly. Until the TCA model is run with all of these corrections, the complete result won’t be known.

- **The Without RTO Base Case should reflect the fact that Northwest utilities actually provide operating reserves from the hydro system today rather than from costly thermal plants. Change in generation cost savings due to RTO West: minus \$150 million.**

For reliability, any power system requires that some generation capability be kept in reserve (“spinning reserves”). In the Northwest today, these spinning reserves are provided almost entirely by hydro generation units, because there is no fuel cost to having them available and because hydro units are often most efficient when they are not operated at full capability. As a result, spinning reserves are available today and in the near future in the Northwest at virtually no incremental cost. Nearly all the Northwest utilities use the hydro system to provide their reserves today. That fact should have been reflected in the Without RTO base case.

It was not. The Without RTO case does not mirror reality. TCA made two unrealistic assumptions. First, the study assumed that the investor-owned utility shares of Columbia River hydro projects were not available to meet their spinning reserve requirements. (Source: Teleconference with TCA.) Second, the study also used only a portion of the (unloaded) hydro that was available for such reserves, forcing unrealistically high reliance on thermal units for reserves. Treating reserves in the same way in both studies (with and without RTO West) reduces generation costs by \$150 million. (TCA Study Operating Reserves Sensitivity, page 34)

- **In the With RTO Case, generation costs should be increased to reflect the fact that there will be power losses when the region generates the additional 1000 aMW of exported power that the model says will be produced in and exported from the Northwest. We have calculated the effect on the With RTO generation cost to be about \$14 million.**

With an RTO, the TCA model says the Northwest will increase exports of power from its coal and gas-fired plants by 1000 aMW per year. In reality, a generator planning to transmit that additional power to California and British Columbia would have to produce more power than is actually delivered in order to account for real power losses that occur when power is transmitted anywhere, but, in particular, over long distances. The With RTO case assumed that power is generated without those losses; thus, it understates the generation costs of the With RTO case, making the With RTO result more attractive than it should be.

Adding an estimate of the costs of the losses to the With RTO Case increases generating costs by about \$14 million, using the model’s assumption of power losses and a \$30 / MWh cost of power. This additional cost reduces the overall benefits of RTO West by the same amount.

- **Almost 92 percent of the RTO benefit called “Congestion Rents” derive from shifting the responsibility for the costs of transmission losses from power prices in the Without RTO case to some other cost-recovery mechanism. This cost shift cannot be counted as a “benefit” in the With RTO Case, because these costs still must be paid by consumers. The costs do not go away as the model appears to show. Accounting for these costs reduces congestion rents and the alleged benefits of RTO West by \$157 million.**

In the With RTO scenario, costs that are currently paid by consumers through one line item on their electricity bill—energy—would, in effect, be shifted to a different line item on the bill—transmission. The cost/benefits study incorrectly attributes as a benefit the change in how costs are paid, making no allowance for the fact that the end users still must pay those fixed costs one way or the other.

A TCA sensitivity case can be used to correct for this problem. The study estimates the difference in congestion rents assuming that losses are treated the same way in both the With and Without RTO cases. That sensitivity case indicates that avoided congestion rents fall by \$157 million. Thus, the treatment of losses accounts for 92 percent of the benefit labeled “avoided congestion costs.” (TCA Study, Transmission Line Losses sensitivity, page 30) That is, the benefits of RTO West are overstated by \$157 million annually. It is misleading to regional decision makers to attribute these cost shifts as benefits of RTO West.

- **The RTO Case incorrectly and inconsistently treats certain transactions that cross control-area boundaries. Removing the inconsistency and treating the transactions correctly will result in a \$1 million savings in generation costs and a \$12 million savings in Congestion Rents.**

In the Without RTO case, tariffs and loss charges generally are assigned to transactions that cross control area (usually utility) boundaries and not to transactions that take place within a control area. For example, in the model there are no transmission charges assigned to a transaction where a PGE resource in the PGE control area goes to a load in the same control area. However, when a resource in the PacifiCorp control area moves to a PGE destination, that transaction would be charged the PacifiCorp transmission tariff and loss charges, and there would be no additional charges once the power was delivered to the PGE system. Given the way the model analysis is designed, it is equally appropriate either to charge for transactions entirely within a control area or not to charge for them at all, as was done for most utilities in this study. (In the latter case, they would be accounted for in Company Rate charges.)

What is not appropriate is to treat BPA and the Imperial Irrigation District (IID) differently from the rest of the utilities in the WSCC. For those two utilities, a second level of tariff and loss charges is applied to a transaction that starts outside the BPA (or IID) control area and ends up at a BPA (or IID) load. The second level of tariffs is not charged when other transactions cross two control areas. Such a modeling treatment is inconsistent and is incorrect. The result is to make the Without RTO results more costly, and therefore the existence of an RTO more favorable. (The inconsistent treatment is noted at page 9 of the study and is footnoted on that page.)

The corrections come from the March 5, 2002, version of the study (footnote, page 9) contains the estimated amount of this error, which is \$1 million for generation costs and \$12 million in Congestion Rents. Though that version was withdrawn, the adjustments are assumed to remain valid.

- **The remaining generation-cost savings are a high or generous estimate of the generation benefits—reduced fuel costs--of forming an RTO.**

There are two factors that suggest that the benefits that are measured are generous and represent the high range of value to the RTO.

First, the TCA model assumes that all transactions are completed at what are called Locational Marginal Prices (LMP). This LMP measure approximates the spot market price at each pricing point or node in the WSCC. In the Without RTO case, the model calculates an LMP that assumes that all *power* transactions face a *transmission* charge that is based on kilowatt hours transmitted. All transactions have to recoup sum of their (per-kWh) transmission and generation costs in order for the resource to operate.

In reality, many transmission contracts specify long-term payments that do not vary with the amount of power produced and transmitted. These contracts are based on annual payments or contract charges that must be made whether or not power is actually transmitted. Because of the fixed-cost nature of these transmission contracts, the marginal cost of transmitting another MWh of power is zero (except for losses), the same as in the With RTO case. As a consequence, the kWh charge attached by the TCA model to each and every marginal transaction in the Without RTO case is too high, and the resulting operation of the plant is inefficient. From a societal benefit point of view, there should be no significant difference in the With and Without RTO results of plants using fixed-price transmission contracts.

These existing transmission contracts do not impede economic efficiency despite the fact that the Without RTO model analysis shows that they do. There would be no generation-cost savings associated with units that rely on long-term transmission contracts despite the TCA analysis calculation to the contrary. The TCA results do not, and, without considerable effort, cannot take into account the extent of fixed-price transmission contracts. Almost all the contracts that connect distant generation resources to loads, such as Colstrip, are of this sort.

There is a second reason that the final result may overstate the benefits of RTO West. Because of limitations of the TCA model in representing the hydro system, it is likely that it does not recognize the immense flexibility of the hydro system in any of its base or sensitivity cases. As a result, the TCA modeling could not reflect the full benefits of the hydro system.

Indeed, a more accurate representation of the hydro system would show less benefit due to formation of the RTO, because many of the benefits the TCA model attributes to the RTO in the model are achieved in both cases.

As a consequence of fixed-price transmission contracts and the hydro flexibility that is not measured, the \$49 million in benefits should be considered at the top of the range of benefits.

The following table provides a summary of the corrections discussed above:

Summary of Corrections

	Avoided Congestion Rents	Generation Savings	Total Benefits
TCA Result	\$171 Million	\$239 Million	\$410 Million / year
Correcting scheduled maintenance		(\$27 Million)	(\$27 Million)
Recognizing hydro is used to produce NW spinning reserves		(\$150 Million)	(\$150 Million)
Providing losses for increased exports		(\$14 Million)	(\$14 Million)
Recognizing that losses must still be paid	(\$157 Million)		(\$157 Million)
Using consistent rules for transactions among utilities	(\$12 Million)	(\$1 Million)	(\$13 Million)
Corrected Result	\$ 2 Million	\$47 Million	\$49 Million / year