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**REPORT  
ON  
SOUTH EAST EUROPE MARKET MONITORING  
FOR THE PERIOD  
MARCH – MAY 2007**

Sponsored by

**United States Agency for International Development (USAID)**

And the

**National Association of Regulatory Utility Commissioners (NARUC)**

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## I. OVERVIEW

This is the second quarterly report providing an account of market monitoring activities under the South East Europe market monitoring Pilot Plan initiated by the United States Agency for International Development (USAID) and the National Association of Regulatory Utility Commissioners (NARUC). This report covers the period March - May 2007.

The Pilot Plan was originated at the 8<sup>th</sup> Athens Forum in June 2006 when the Forum invited USAID to move forward on its proposal for market monitoring. USAID, in conjunction with NARUC, assembled a team of consultants to develop the Pilot Plan. The consulting team includes Dr. Peter Kaderjak of the Regional Energy Policy Center (REKK) at Corvinus University in Budapest, Dr. David Newbery of the Energy Policy Research Group (EPRG) at Cambridge University in England, and Dr. Robert Sinclair of Potomac Economics in Fairfax, Virginia.

### A. The Market Monitoring Plan

The Pilot Plan was conceived in three phases.<sup>1</sup> In Phase I, which covered the period January - March 2007, we initiated data requests, established working relationships with the various regional Transmission System Operators (TSOs), published our first quarterly report, and presented at the Athens Forum in April 2007. Phase II, the current phase, began in April 2007. In Phase II, we continued to collect the data requested during Phase I and expanded our requests with the objective of improving and extending our monitoring activities.

### B. Objectives of the Pilot Plan

Consistent with the Treaty establishing the Energy Community which entered into force in July 2006,<sup>2</sup> the overall objective of the Pilot Plan is to advance the competitive structure of electricity markets in South East Europe. To this end, the Pilot Plan seeks to enhance market transparency,

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<sup>1</sup> The Market Monitoring Plan is located on the SEE Market monitoring website: [http://www.naruc.org/see\\_monitoring/docs/SEE\\_Market\\_Monitoring\\_Plan\\_DRAFT\\_12\\_01\\_06\\_Web.pdf](http://www.naruc.org/see_monitoring/docs/SEE_Market_Monitoring_Plan_DRAFT_12_01_06_Web.pdf)

<sup>2</sup> It is widely recognized that market monitoring can promote market competition by creating market transparency, facilitating open-access, and detecting market power and other market abuses. See, e.g., Newbery, D., and R. Green, "Review of the Monitoring of Market Power – The Possible Roles of TSOs in Monitoring for Market Power in Congested Transmission Systems", Report to the European Electricity Transmission System Operators, 2004.

facilitate open-access, and detect potential market failure. The Pilot Plan seeks ways to provide benefits to TSOs consistent with this objective. The monitoring reports, for example, provide the TSOs with a convenient source of regional market conditions and events. The Pilot Plan also addresses regional market issues that can assist the TSOs in developing effective competition policies. As in previous reports, we emphasize the collaborative nature of this project and invite comments and input at any stage of the Pilot Plan.

### **C. Summary of Report**

This report presents our monitoring activities for the period March-May 2007. It is our first report on our activities in Phase II of the Pilot Plan. Some of the data and information requested in Phase II continues to be assessed and follow-up with TSOs on certain issues is ongoing. Accordingly, while valuable information has been gathered during this Phase, some of the analyses will be presented in a subsequent report for the summer months June-August 2007. This report is scheduled to be published prior to and presented at the Athens Forum.

#### **1. Data Procurement**

Our data collection activities are facilitated through contact with the regional TSOs. There are nine participants in the Pilot Plan. This includes the United Nations Mission (UNMIK) in Kosovo who is a signatory to the Energy Treaty and is involved, like the other participants, by providing data for monitoring. The main data procurement activities in Phase II were the continuation of requests for data that were initiated in Phase I and an expansion of these requests to extend our analyses. Appendix A contains the standard data request for Phase II.

The TSOs in Bulgaria has not responded to our requests for data since the inception of the Pilot Plan. While this has been disappointing, we continue to seek cooperation from these two countries. Among the other participants, we are satisfied with the level of cooperation. The data was provided in a useful format and aside from a few claims of confidentiality of certain data, especially with respect to generator data, these objections did not prevent us from moving forward on our analyses.

## 2. Network Congestion

Our analysis of network congestion focuses on two indicators. We are first interested in the availability of cross-border transmission capacity through the capacity assessment, which is a procedure for calculating Net Transmission Capability (NTC) and Available Transmission Capacity (ATC). When ATC is zero or close to zero, this indicates limits on additional market activity and potential market failure.<sup>3</sup> We are also interested in congestion management procedures that may lead to curtailment of transactions. In Phase II we began collecting data on the instances of congestion management procedures undertaken in the operating horizon, i.e., day ahead.

*ATC Values.* NTC and ATC calculations are coordinated among TSOs in accordance with guidelines established by the UCTE and endorsed by the European Transmission System Operators (ETSO).<sup>4</sup> There are 22 interconnections linking the Pilot Plan participants. We collected ATC values on 14 of them.<sup>5</sup> On four interconnections, there was zero ATC in at least one of the months of the period (March-May).

*Congestion Management Procedures.* Congestion management procedures are designed to ensure reliable use of the transmission network when network transactions cannot be securely accommodated. Congestion management becomes a market monitoring issue in instances when transactions have to be curtailed or otherwise degraded in order to achieve network security. In this phase of the Pilot Plan, we have not sought data on this issue. During the three months March-May, there were only four days (all in April) on a single interconnection where the procedures were implemented.

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<sup>3</sup> As explained below, the standardized capacity assessment does not eliminate the possibility of unreasonably restrictive practices in establishing available capacity to the market. Monitoring of the underlying details of the NTC and ATC calculations may be initiated in latter phases of this Pilot Plan.

<sup>4</sup> See “Procedures for Cross-Border Transmission Capacity Assessments,” ETSO, October 2001; “Definition of Transfer Capacities in Liberalised Market”, *Id.* April 2001.

<sup>5</sup> The eight interconnections for which ATC was not available was the result of a lack of data on interconnections associated with Bulgaria.

### 3. Monitoring Activities

*Cross-Border Transmission Capacity.* The calculation of ATC values in South East Europe through the capacity assessment process is a critical component of the cross-border transmission capacity market. The main part of our monitoring was begun in Phase I, and we continue that analysis, which compares the posted capacity reservations to the actual line flows. This helps to determine if the flows are consistent with what is being set aside for “already-allocated” uses of the system in the capacity assessment process. In Phase II we incorporate additional information into the analysis, including loopflow estimates and more precise measures of allocated capacity. In general we continue to find allocations consistent with actual usage, although there is room to improve.

*Sales and Purchases.* Congestion occurs in the operating horizon when ATC is 0 and in the operating horizon when congestion management occurs through curtailments. Critical attention is given to periods of congestion in the context of market monitoring. It is at these times and locations that the market is most likely to fail, leading the way for anticompetitive conduct. The key data required for this analysis is the sales and purchases data. At this phase of the market monitoring Pilot Plan we have gathered preliminary information to assess the availability of sales and purchases data. TSOs vary substantially with respect to their access to sale and purchases data. We continue to process the information we have gathered and this will be presented in more detail in our next quarterly report.

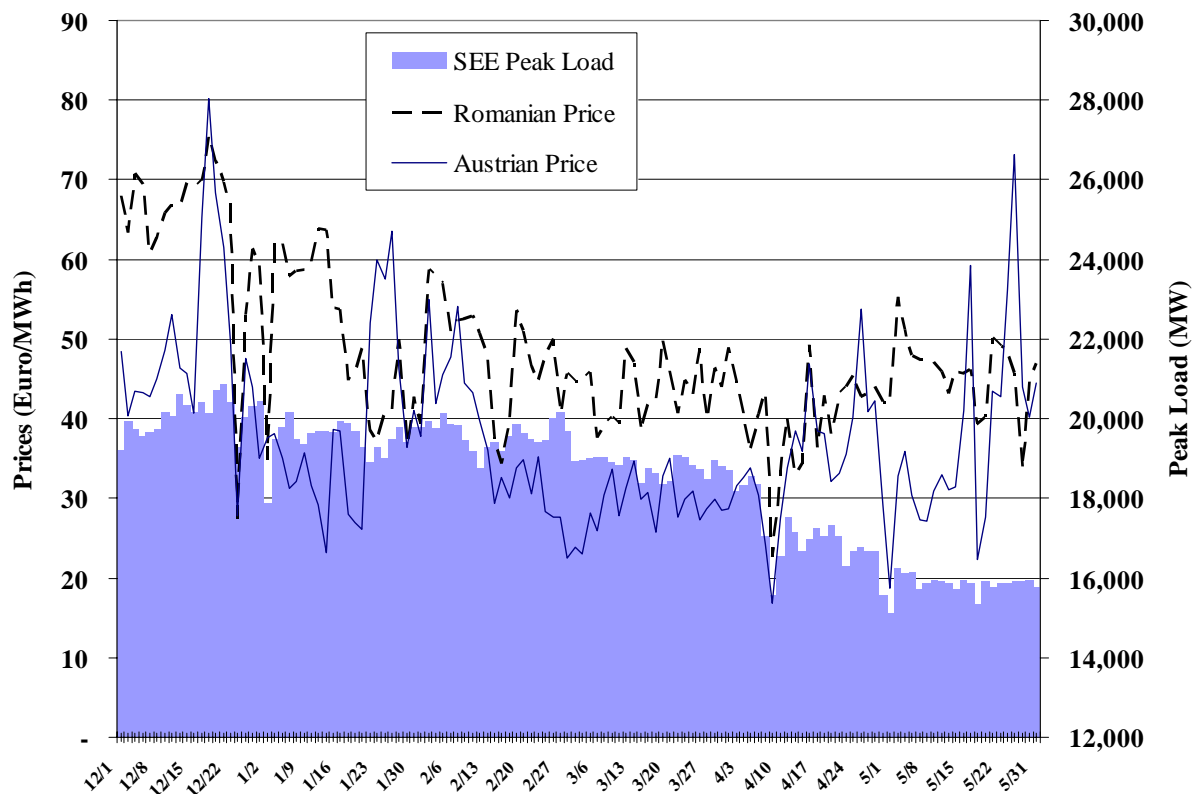
*Generation Market Modeling.* The consulting team continued preliminary work on developing a regional generation market model. This model will be used as a monitoring tool to identify (1) what outcomes (in terms of prices, production, trade etc.) an efficiently working market would yield; (2) what separated submarkets could develop in a geographically dispersed region; (3) whether any producer has the incentives and means to exercise its market power (if it exists); and (4) what the overall market outcome could look like if producers freely exercised their market power. The generation model will be a primary tool of the market monitoring of the generation sector in latter phases of the Pilot Plan. Progress on the generation modeling has progressed during Phase II and detailed results will be presented in our next quarterly report.

## II. WHOLESALE MARKET ACTIVITY

Summary statistics on overall regional market prices and volumes of transactions can contribute to effective market monitoring. Understanding price levels and patterns can provide insight into specific time periods and locations that can help focus market monitoring resources. South East Europe is not integrated into a centralized-spot market like other parts of Europe (e.g., NordPool in Northern Europe and National Grid in the U.K). Wholesale market activity in South East Europe is conducted mainly under bilateral contracts among utilities and traders. There is no publicly-available price index for bilateral trades on a region-wide basis. However, the Romanian and Austrian spot market prices provide an overview of the price movements during the time period of this report. While the spot prices will not always correspond to all wholesale trades, they should be highly correlated.

Figure 1 shows the daily average price of electricity in Romania and Austria along with the peak load each day for the entire SEE region.

**Figure 1: Regional Spot Market Prices and SEE Load  
December 2006 – May 2007**



The figure indicates some correspondence between regional load and the day-ahead spot prices. While this does not necessarily indicate the absence of market failure, it does show some degree of liquidity because prices are relatively responsive to load variation. It also reveals no serious market dislocation over the period studied.

The price-load relationship can provide an indication of a particular time period deserving special attention. What stands out is the divergence of prices between Austria and Romania at certain times, indicating the lack of market capacity (either physical or institutional) to arbitrage the regional markets. While this lack of arbitrage is related to the overall efficiency of trading in the region, it is not a direct concern of this monitoring plan at this time.

*Sales and Purchases.* Market activity in South East Europe is primarily conducted through bilateral contracts for cross-border trades. Some limited trade is also conducted within countries. The data on these sales and purchases is not public. In our Phase II data requests, we began

inquiring into the nature of recordkeeping of power supply contracts on each system for the purposes of determining the best way to ultimately procure this information. We will report the results of this inquiry in our next quarterly report.

### III. NETWORK CONGESTION

Network congestion can arise in the planning horizon as well as in the operating horizon. We use the term planning horizon to mean the time between when the monthly capacity assessment is made and the actual real-time operation. We use the term operating horizon to be the time between the day ahead and the real-time.<sup>6</sup> In the planning horizon, congestion arises when posted transmission capacity (ATC) is zero. In the operating horizon, congestion arises due to unit commitment or dispatch that is not feasible within the transmission operating parameters. We analyze congestion in both the planning horizon as well as the operating horizon. In the planning horizon, we use ATC as the indicator of congestion. In the operating horizon, we use curtailments of transactions pursuant to UCTE guidelines as indicators of congestion.

#### A. Planning Horizon Congestion

As noted above, NTC and ATC calculations are established pursuant to UCTE guidelines. We use monthly ATC values as indicators of constraints in the region. If ATC is zero at a particular interconnection,<sup>7</sup> the network is constrained because no incremental market activity can occur that relies on the particular interconnection. There are 22 interconnections that link the Participants in the Pilot Plan. Of these interconnections, we were able to obtain ATC data on 18 of them (lack of participation from Bulgaria prevented compiling data on the four other interconnections). The summary of these interconnections and monthly ATC values is shown in Table 1.

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<sup>6</sup> We use these terms for our discussion only and are not meant to correspond to any term of art that may be currently in use.

<sup>7</sup> By “interconnection” we mean what is commonly understood in the region as the electrical interface between two neighboring control areas.

**Table 1: Summary of Monthly ATC Values**

Interconnection	ATC		
	Mar 07	Apr 07	May 07
Albania to Montenegro	100	200	100
Albania to Serbia	210	210	210
Bulgaria to Romania	Unavailable		
Bulgaria to Serbia	Unavailable		
Bosnia & Herzegovina to Croatia	345	410	425
Bosnia & Herzegovina to Montenegro	135	170	6
Bosnia & Herzegovina to Serbia	200	115	114
Croatia to Bosnia & Herzegovina	165	151	185
Croatia to Serbia	355	150	200
Macedonia to Serbia	175	105	60
Montenegro to Albania	0	35	0
Montenegro to Bosnia & Herzegovina	485	390	150
Montenegro to Serbia	270	270	130
Romania to Bulgaria	Unavailable		
Romania to Serbia	137	0	125
Serbia to Albania	55	0	105
Serbia to Bulgaria	Unavailable		
Serbia to Bosnia & Herzegovina	140	115	25
Serbia to Croatia	200	150	200
Serbia to Macedonia	124	0	150
Serbia to Montenegro	250	125	125
Serbia to Romania	75	35	50

*Note: ATC Values reflect the result of monthly allocations. ATC for interconnections with Bulgaria were unavailable due to lack of data from this participant.*

These monthly values are adjusted for allocations from monthly auctions that have been initiated on many of the interconnections starting in 2007. Therefore, the ATC reported herein is that which would be available at the beginning of the month.

As the table indicates, on 4 paths ATC was 0 in one or more of the months studied. Otherwise capacity was generally available. However, large regional trades would be limited because on many paths (6 out of 18) capacity was below 50 MW in one or more of the months. We have not gathered the data at this stage of the monitoring plan that would enable us to indicate whether such transfers were abandoned as a result of too little ATC.

Finally, as explained below, the standardized capacity assessment does not eliminate the possibility of unreasonably restrictive practices in establishing available capacity to the market. Part of our monitoring effort seeks to test for this. Further monitoring of the underlying details of the NTC and ATC calculations that would illuminate these issues may be initiated in a latter phase of this Pilot Plan.

## **B. Operating Horizon Congestion**

In addition to congestion arising from the zero ATC values, we also collected congestion data associated with congestion management measures.

UCTE<sup>8</sup> Policy 4 of the UCTE Operations Handbook is titled “Coordinated Operational Planning”. This policy establishes practices to coordinate, among other things, the capacity assessment and day-ahead and real-time congestion management. These guidelines include the potential to withdraw interconnection capacity and thereby curtail transactions.

We requested from the TSOs any instances when this may have occurred starting for the month of April. While we have not received responses for all entities for all months, so far there has been only a single instance of curtailment reported, and this was for four days in April. The rarity of such instances may indicate one of two circumstances. First, it could be that actual system conditions are close to the modeled conditions in setting ATC. Under these circumstances, all transactions are accommodated, as planned. The second possibility is that the capacity set aside for insurance against unplanned events is so large that even large unexpected flows are accommodated.<sup>9</sup> Our monitoring at this stage is not detailed enough to distinguish these possibilities. This is a potential area of monitoring in the future.

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<sup>8</sup> UCTE is the acronym for “Union for Coordinated Transmission of Electricity”.

<sup>9</sup> While it may seem desirable to set aside sufficient capacity to accommodate even the extreme events, such insurance may be costly to the market and the overall cost-benefit may not be reasonable.

#### IV. MARKET MONITORING ANALYSES

In the previous sections, we examined overall market conditions and identified network congestion. Such analysis is to focus monitoring activities to times and locations when market power is most likely to occur as well as times and locations when it would be most costly to the market. In this section of the report we make direct analyses.

The monitoring plan seeks to evaluate three main areas. The first is the monitoring of interconnection capacity. This monitoring compares allocated transmission capacity to line flows. The second main area of the direct market monitoring is the analysis of sales and purchases data. We seek to detect correlation between prices and congestion to determine whether further investigation regarding anticompetitive conduct is warranted. Finally, the third area of direct monitoring is generation market modeling to determine its susceptibility to market failure.

We have initiated monitoring activities in all three of these areas. In this report, we present our monitoring of interconnection flows and congestion, which is a continuation and extension of Phase I activities. Data collection on sales and purchases is still ongoing and our findings will be presented in our next quarterly report to be presented at the Athens Forum. Likewise, while substantial work has been initiated on the generation market monitoring, an update on this effort will also be presented in our next quarterly report.

##### A. Interconnection Capacity

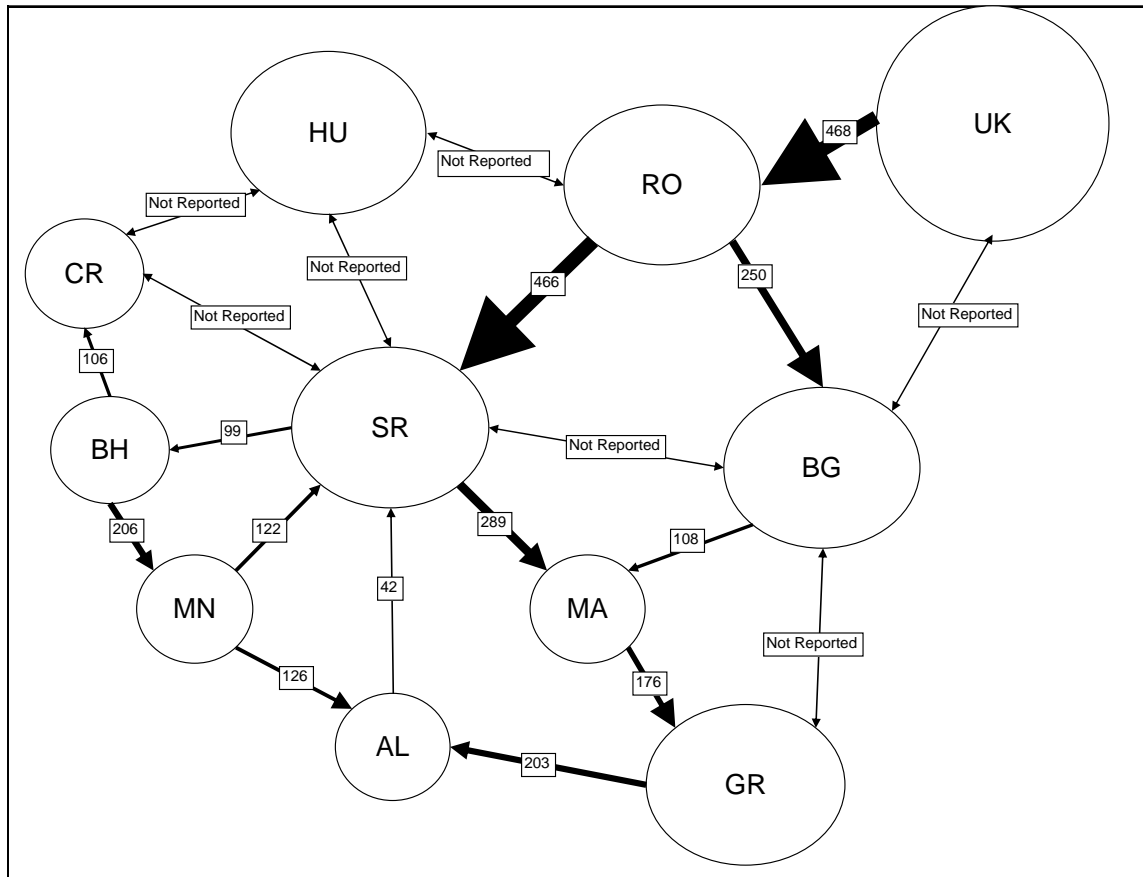
ATC in South East Europe is calculated pursuant to procedures set forth by UCTE and endorsed by ETSO. The estimates of NTC and ATC are based on projected uses of the system using a “base case”. The base case is a network model that contains the data meant to depict the electrical situation (load and resources) for the timeframe studied. These input data include the thermal ratings of transmission facilities, the output range of generators, and the expected integration of load and resources – i.e., the order in which resources will meet load in each hour of the study. The input data also includes cross-border transactions (base-case exchanges or “BCE”).

Our monitoring of the capacity assessment is centered on comparisons of the actual interconnection power flows and the NTC and ATC values to determine how the interconnections are being used.

As discussed above, there are 22 interconnections that link the Pilot Plan participants. Not all participants provided the line flow data that was needed to accomplish the analysis. However, if at least one party to the interconnection provided line flow data then it was possible to continue the analysis. In the case of the interconnections involving Bulgaria the analysis was not possible because of the lack of ATC data. We are still hopeful that cooperation from these entities will be forthcoming and we continue to seek ways to locate this data.

*Regional Peak Flows.* Our first analysis is a general indicator of regional conditions. We show the interregional flows among SEE TSOs and neighboring TSOs at the time of the regional peak load. We show the data for April because at the peak load in April, the regional flows were highest compared to the peak load in March and May. The diagrams for March and May are shown in Appendix B.

Figure 2: Regional Flows at April Peak Load



When the data is available (which is frequently not the case due to the lack of participation by some TSOs), the arrows Figure 2 indicate the direction of flows as well as their relative magnitude. While the magnitude of flows at the peak hour varies among the interconnections, the general flow, as most observers of the region would expect, is from Ukraine to the south and west into Bulgaria, Romania, and Serbia.

*Analysis of Individual Interconnections.* When the flow data is sufficient, we analyze the individual interconnections by comparing actual power flows with the amount of capacity that was allocated for various network uses. NTC is the maximum transmission capacity between two areas as estimated from a reference (simulated) base case. NTC is determined by estimating the maximum power flows that can safely be accommodated over the interconnection given forecast uses of the regional system (including loop flow) and a Transmission Reliability Margin (TRM).

The NTC, reduced by Already-Allocated Capacity (AAC) is the ATC, which is the transmission capacity available to the market.<sup>10</sup> AAC is the transmission that is reserved for anticipated exchanges and transactions. If these anticipated conditions are realized, then the actual power flows should correspond to the AAC, at least at the time of the monthly peak, which is the time horizon for which AAC and NTC are calculated.

If AAC and power flows do not match, then one or more of the following conditions may be true: (1) too much or too little is being allocated to serve the interconnection demand; (2) operational factors are in play that are not (or cannot be) accounted for in the modeling; and/or (3) loop flow on the interconnection is more than anticipated. If these conditions arise, then ATC could be understated and competition may be negatively impacted. Accordingly, our analysis seeks to determine the difference between AAC and actual flows in order to establish the starting point for considering the source of any significant divergence for future monitoring.

*Extensions Incorporated in Phase II.* In Phase II, we modified the analysis in two important ways. We now use AAC data that reflects allocations from the monthly auctions. This provides a more accurate indicator of the capacity available at the time when the power actual flows. Second, starting in April, we also use estimates of loopflow (in no instance below does the March data reflect loopflow). Loopflow estimates are simply the “natural flows” in the power flow base case used to model the NTC values. Our estimated loopflow is subtracted from the line flows.<sup>11</sup> This will mitigate the effect we have detected in the past where power flows exceed the NTC values on interconnections that experience dramatic loopflow, e.g., Romania to Serbia. It will also unmask situations where capacity is reserved (and not used) but loopflow in the power flow data provides a false indicator of the amount of capacity that is being utilized pursuant to an allocation of that capacity. Of course we realize that actual loopflow will depart

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<sup>10</sup> As discussed above, we use monthly NTC and ATC values but have not accounted for the results of monthly auctions on interconnections where these auctions take place. The monthly auctions will result in additional ATC being allocated. We have started to collect this data starting with the April data request. The analysis herein, as we note, will overstate ATC and understate AAC. Accordingly, we qualify our analysis to account for this missing data.

<sup>11</sup> The loopflow estimate is a monthly value and is subtracted from the line flow data in every hour. This will ensure that the peak hour of the month is properly adjusted but this will under estimate the flow in off-peak hours. However, because we are interested in the peak hour flow (to see if it matches the monthly AAC), this is not an analytical concern.

from estimated base case loopflow. However, using a monitoring metric which tests the actual performance with base case assumptions creates an incentive to use rigorously-developed assumptions in the base case.

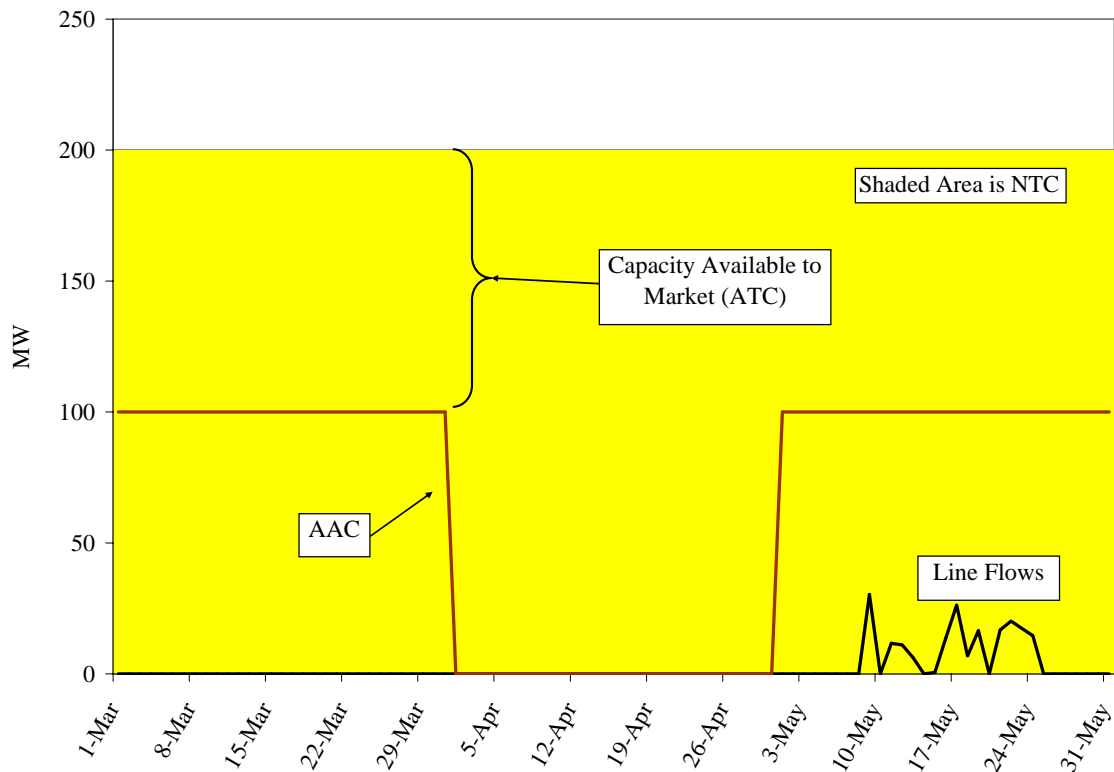
We do not adjust for loopflow in the analysis below for loopflow that provides counterflow, that is, that flows in the opposite direction of the interconnection being analyzed.<sup>12</sup> Loopflow that provides counterflow will reduce the power flow associated with reserved capacity. This will tend to falsely indicate that an interconnection is being under utilized relative to the capacity allocated on it.

Finally, at this point in time the loopflow data is still incomplete so not all of the analyses below include loop flow estimates. We will indicate these situations individually as we examine each interconnection. The analyses are presented in alphabetical order, beginning with Albania to Montenegro Interconnection, which is shown in Figure 3.

In this figure as well as the others that follow, the shaded area indicates the NTC, the amount of capacity on the interconnection estimated to be available. The NTC value is reduced by the allocated capacity (AAC) to obtain the ATC, as indicated by the bracket. The peak daily line flow is shown as a black line and is somewhat variable. When the line flow is below the AAC, this indicates a period when the actual usage is below what was allocated. It is during these periods when the market could be offered more capacity by way of a higher ATC.

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<sup>12</sup> We analyze each interconnection on a directional basis. For example, the Albania/Montenegro interconnection is analyzed in the Albania to Montenegro direction as well as the Montenegro to Albania direction.

**Figure 3: Power Flows on the Albania to Montenegro Interconnection**

In Figure 3, power flows occurred in this direction only during May, although a small amount of capacity was allocated for March. For both April and May, loopflow was negative, i.e., there was counterflow and, pursuant to the discussion above, it is not used to adjust actual flows. We see the situation on this interconnection as a reasonable outcome of the allocation process. While there was reserved capacity for March even though there was no flow in that direction, the amount reserved was small and there was positive ATC during the month.

**Figure 4: Power Flows on the Bulgaria to Romania Interconnection**

<<Analysis was not possible due to *Bulgaria* not responding to data requests>>

**Figure 5: Power Flows on the Bulgaria to Serbia Interconnection**

<<Analysis was not possible due to *Bulgaria* not responding to data requests>>

Figure 6: Power Flows on the Bosnia &amp; Herzegovina to Croatia Interconnection

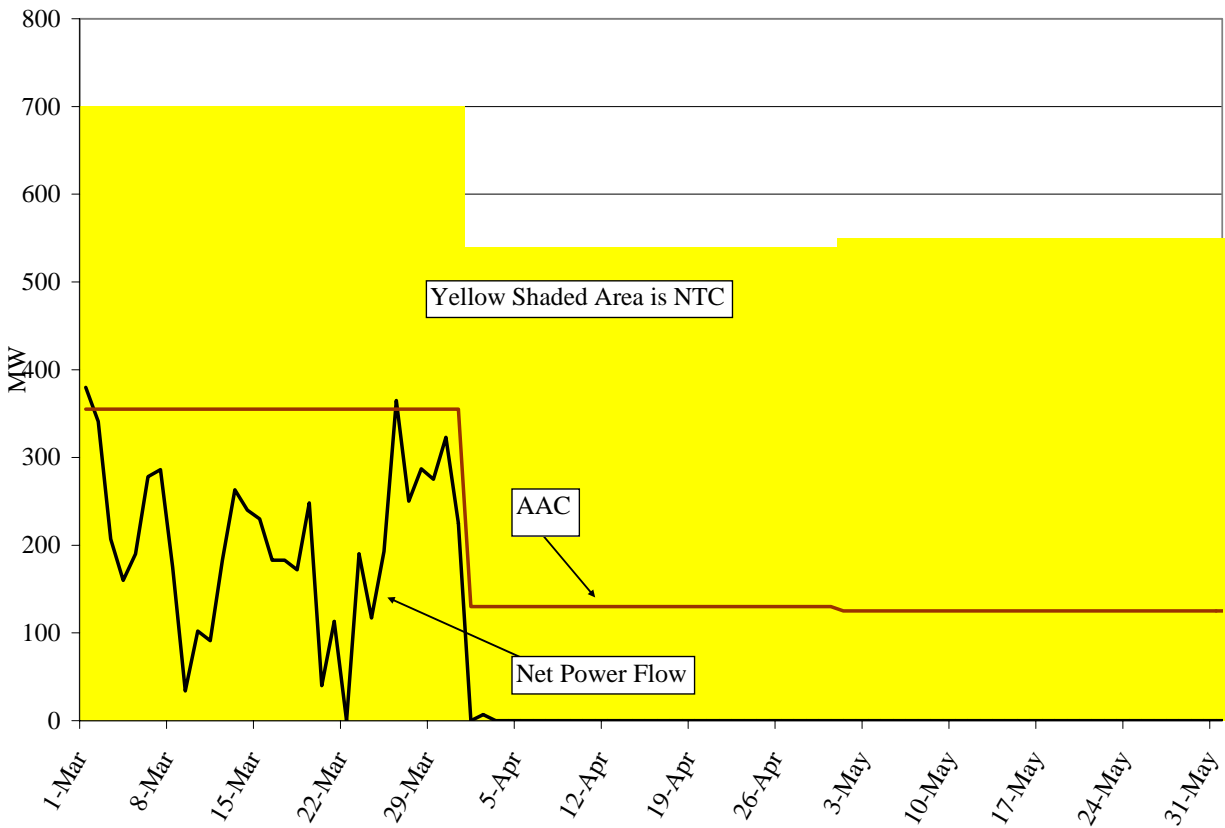
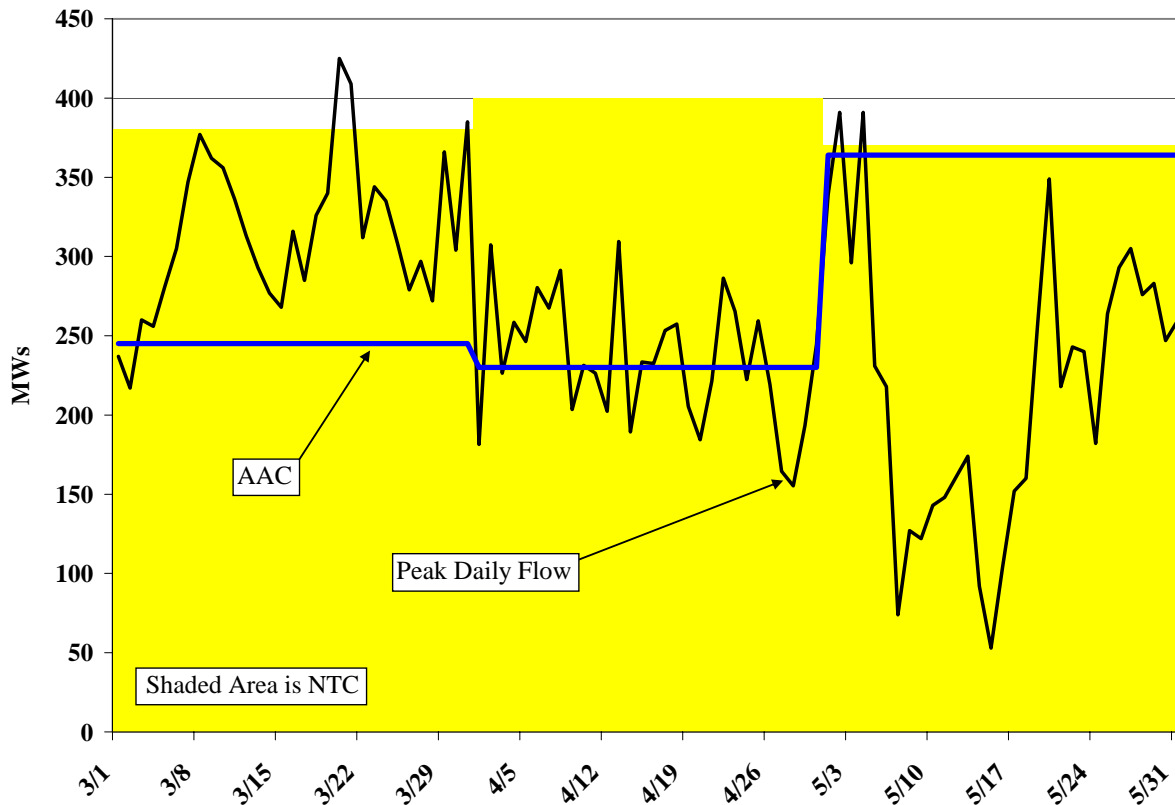


Figure 6 shows the net flows on the Bosnia and Herzegovina to Croatia interconnection. While there was more than 100 MW allocated during April and May (and no positive net flows), the amount allocated is small relative to the available capacity and, thus, raises no competitive concern.

Figure 7: Power Flows on the Bosnia &amp; Herzegovina to Montenegro Interconnection



For this interconnection, the April data but not the May data, is adjusted for estimated loopflow (which is minimal 21 MW). During all three months, line flows exceed the AAC in at least one day, indicating that the AAC and line flows match reasonably well. The March data is not adjusted for loopflow and this may explain why the line flows are often in excess of the AAC. While the line flows exceed AAC in some instances in April and May, it is not as frequent and not as large in magnitude.

Figure 8: Power Flows on the Bosnia &amp; Herzegovina to Serbia Interconnection

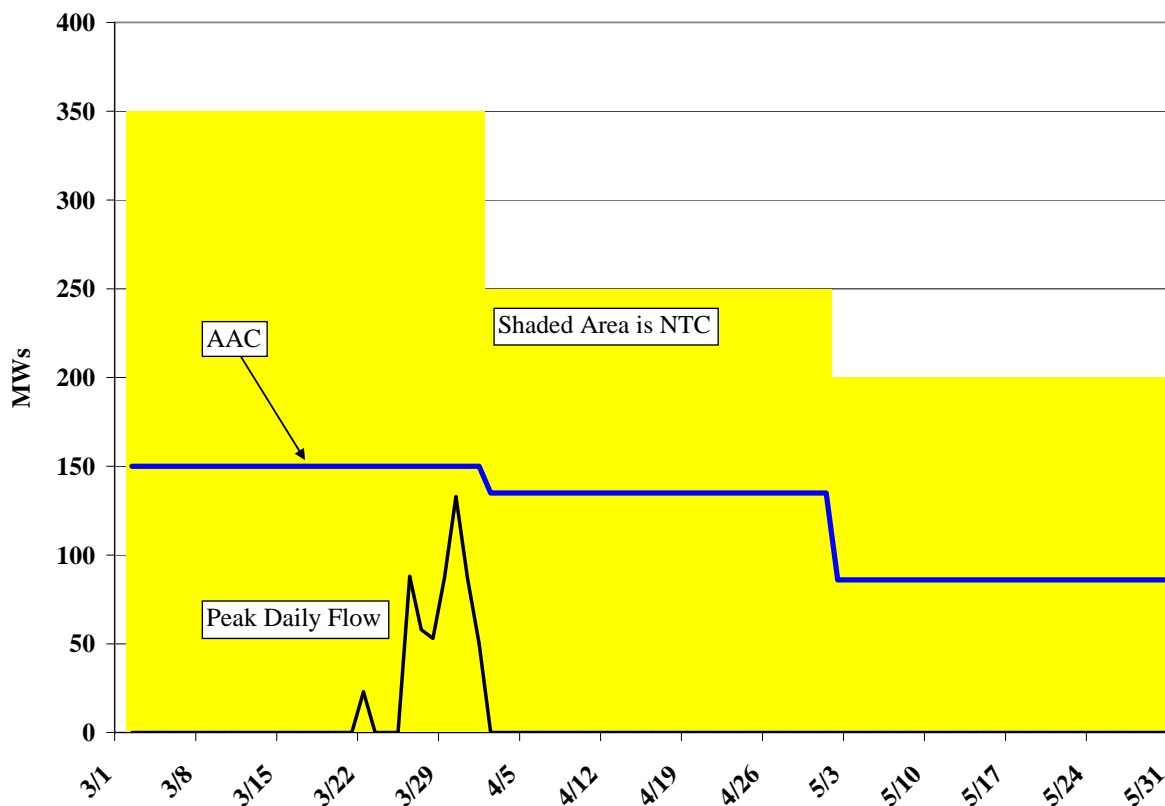


Figure 8 shows the analysis for the Bosnia and Herzegovina to Serbia Interconnection. Estimates of April loopflow were available but were in the opposite direction, i.e., counterflow and so were not incorporated into the analysis. There is ample ATC on this interconnection. Accordingly, we did not find a competitive problem. While the reserved capacity for March corresponds to the peak flow that month, the April and May reservations do not correspond to flows, but the allocated and apparently unused capacity was small in magnitude and, as noted, corresponded with periods of unused ATC.

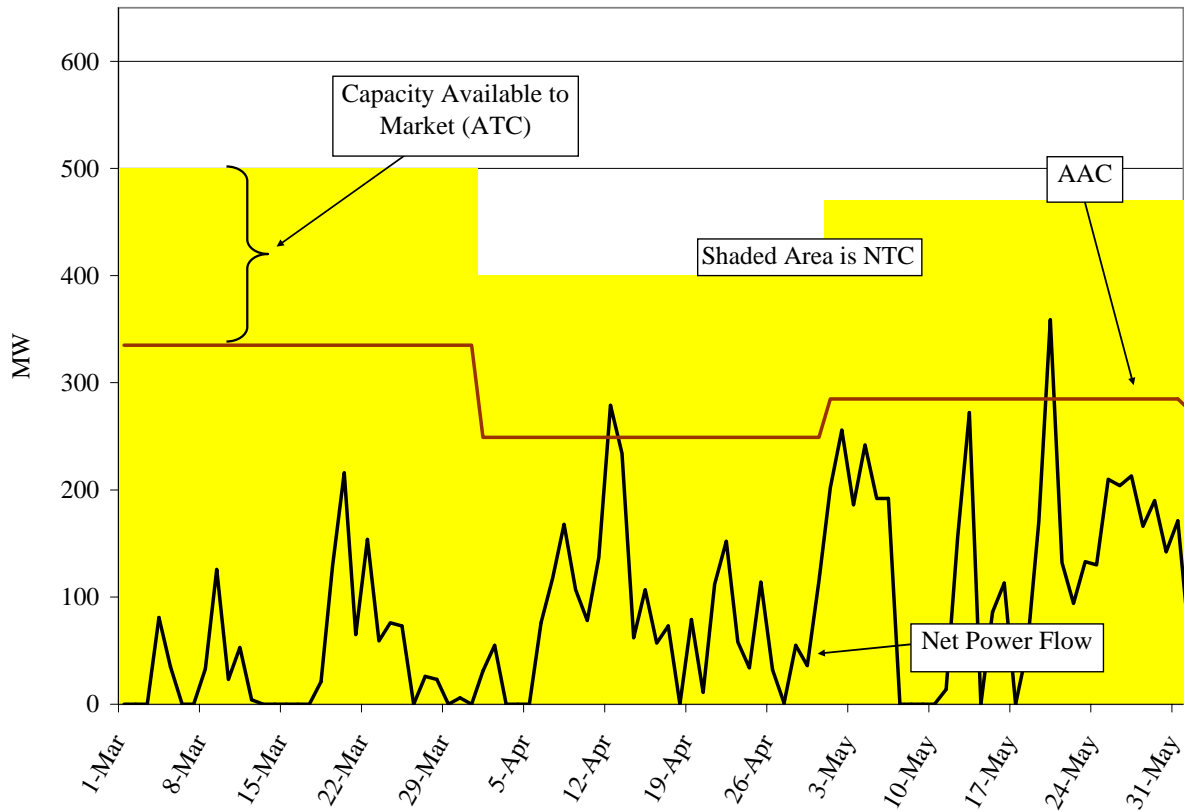
**Figure 9: Power Flows on the Croatia to Bosnia and Herzegovina Interconnection**

Figure 9 shows the net flows on the Croatia to Bosnia and Herzegovina interconnection. We find the allocated capacity to be reasonably consistent with the peak net flows in each month.

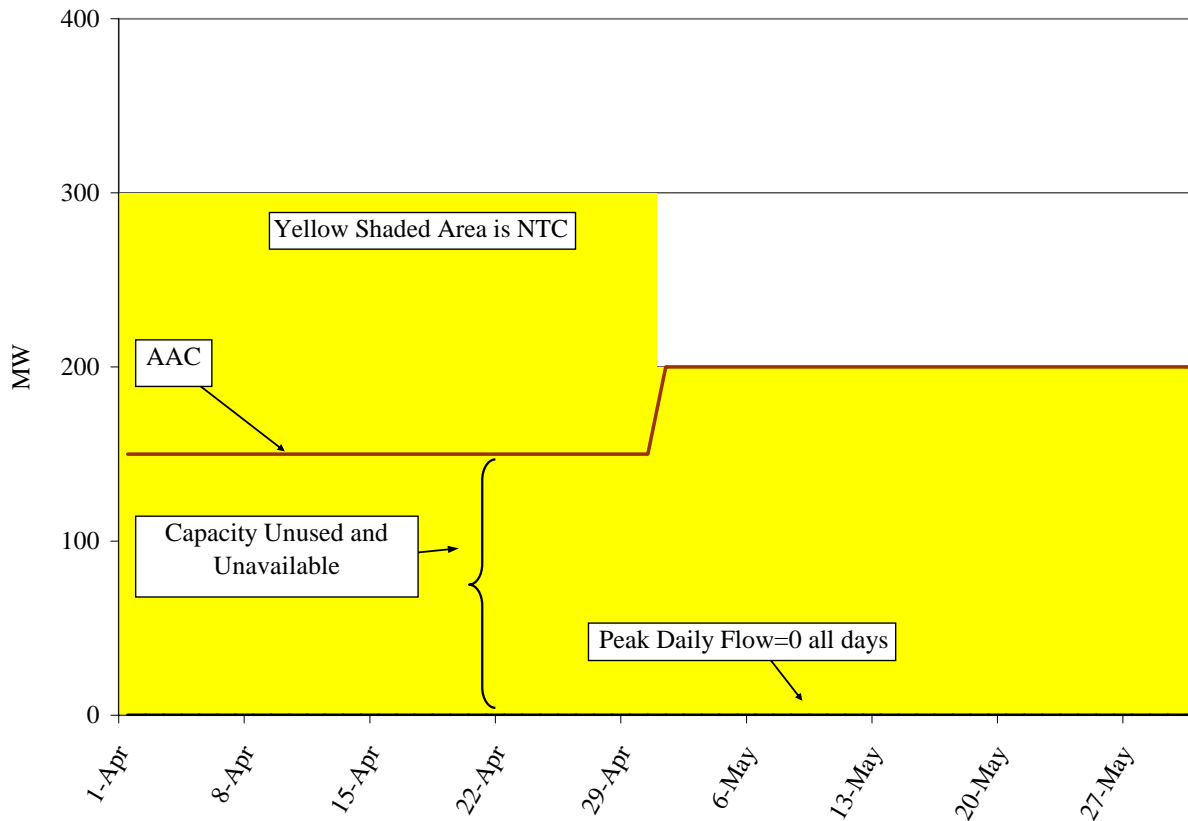
**Figure 10: Power Flows on the Croatia to Serbia Interconnection**

Figure 10 shows net flow on the Croatia to Serbia Interconnection. The allocated capacity in May was as high as 200 MW (with no net flow detected) and occurring at the same time ATC was 0. However, an analysis of this interconnection is not complete -- this situation could be the result of loopflow or base case exchanges in the opposite direction, but this data has not been provided to us at this point. We note, however, that flows generally do not occur in this direction (see Figure 24 in appendix B) so that profitable trades were likely not blocked as a result of the allocations.

Figure 11 shows the flows on the Macedonia to Serbia interconnection. No flows occurred in this direction on this interconnection. However, the allocations were relatively small and ATC existed in all three months.

Figure 11: Power Flows on the Macedonia to Serbia Interconnection

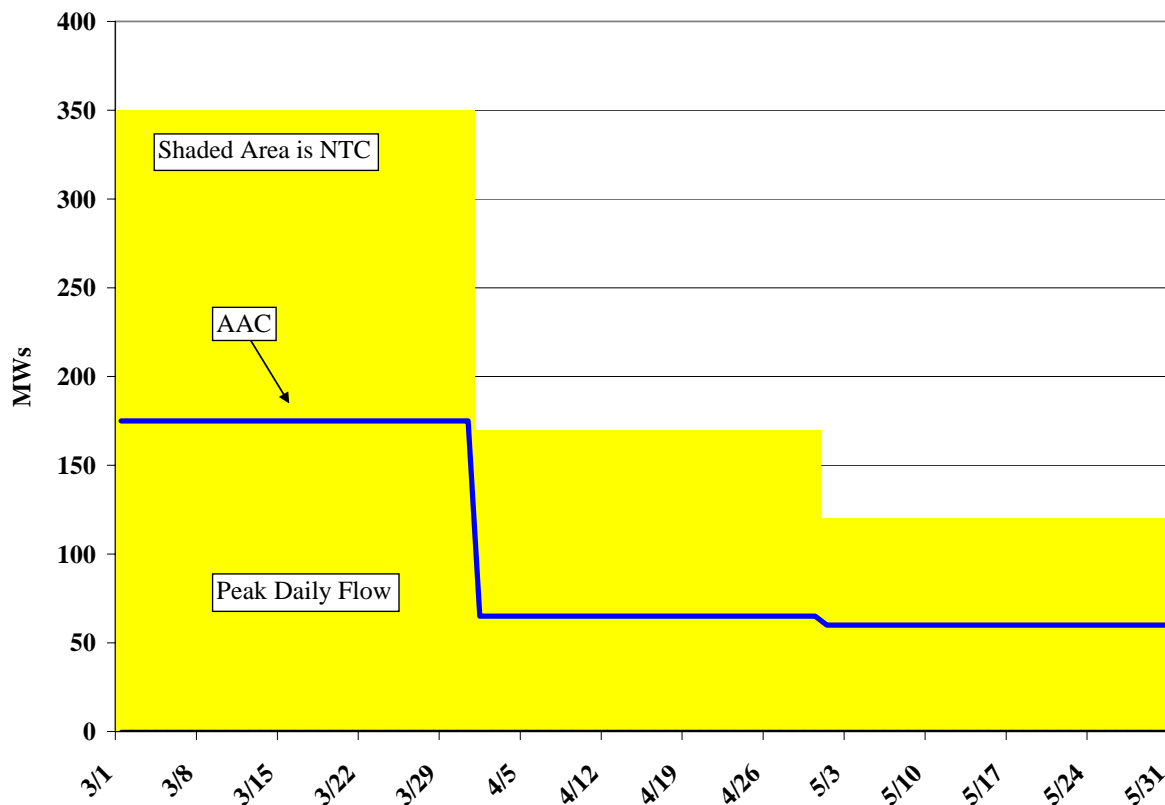
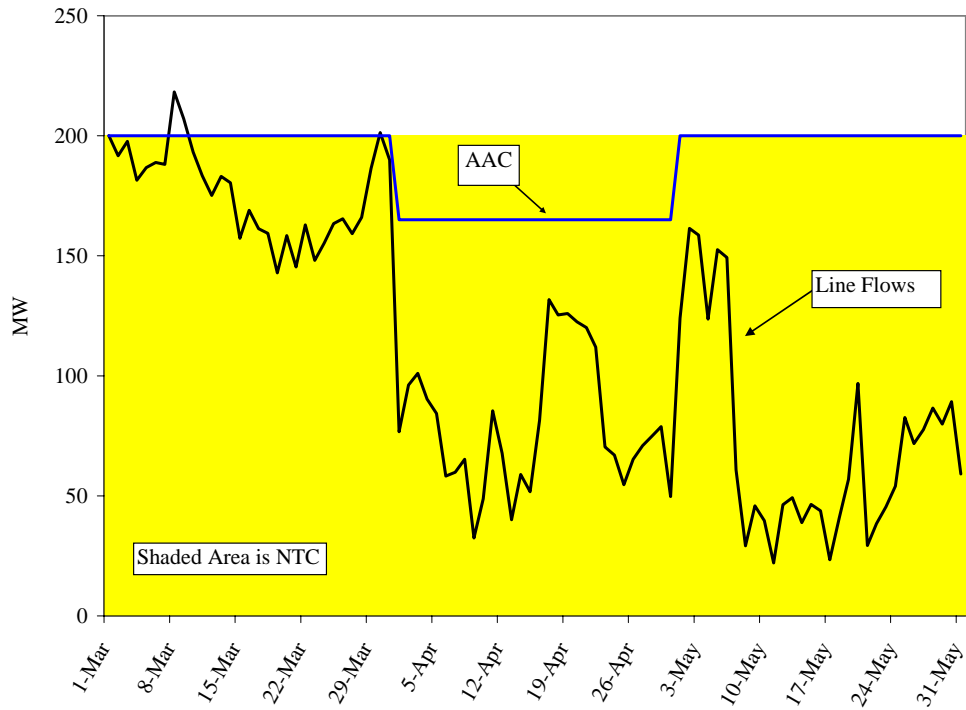
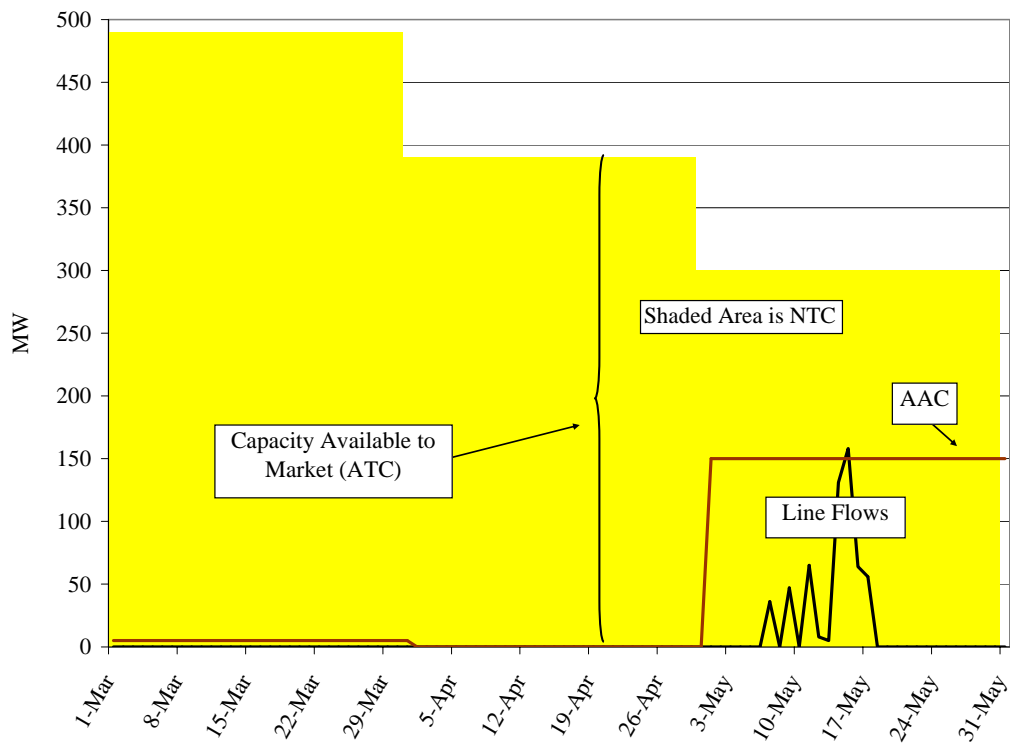


Figure 12 shows the flows on the Montenegro to Albania interconnection. The flows on this interconnection correspond well with the allocated interconnection capacity. April and May flows reflect 50 MW of loopflow. While no ATC was available for much of this period, this is reasonable given the high utilization of the allocations.

**Figure 12: Power Flows on the Montenegro to Albania Interconnection**



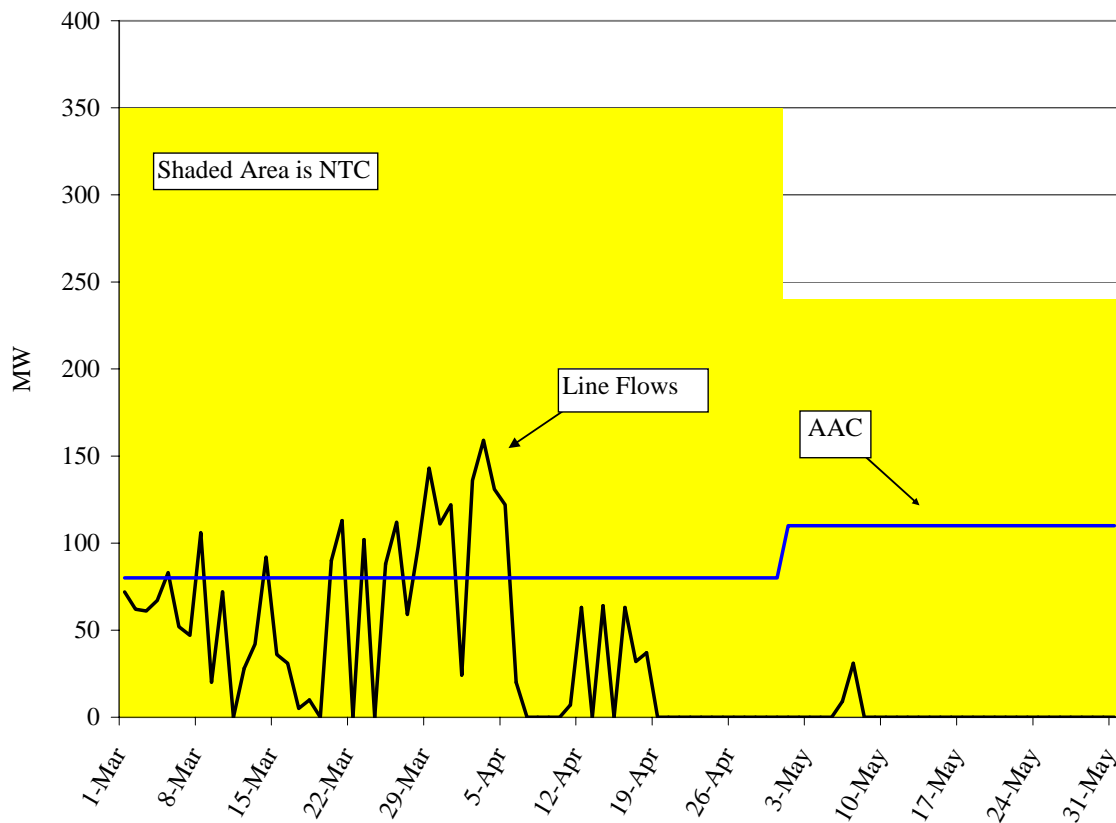
**Figure 13: Power Flows on the Montenegro to Bosnia & Herzegovina Interconnection**



The Montenegro to Bosnia and Herzegovina interconnection is shown in Figure 13. The figure indicates a good correspondence between what is reserved and what is utilized. There were 5 MW reserved in March and 0 MW in April and in both months no flow occurred on the interconnections. In April about 150 MW were reserved and this was very close to the monthly peak load. From a market monitoring perspective, the metric indicates good practices.

Figure 14 shows the capacity and flows on the Montenegro to Serbia interconnection. Flows exceeded the allocated capacity amount during March, but this could be the result of loopflow. The loopflow estimates were unavailable for April and May on this interconnection. In May, line flows declined while allocated capacity increased slightly. However, ample ATC exists, mitigating any competitive concern.

**Figure 14: Power Flows on the Montenegro to Serbia Interconnection**



**Figure 15: Power Flows on the Romania to Bulgaria Interconnection**

<<Analysis was not possible due to *Bulgaria* not responding to data requests>>

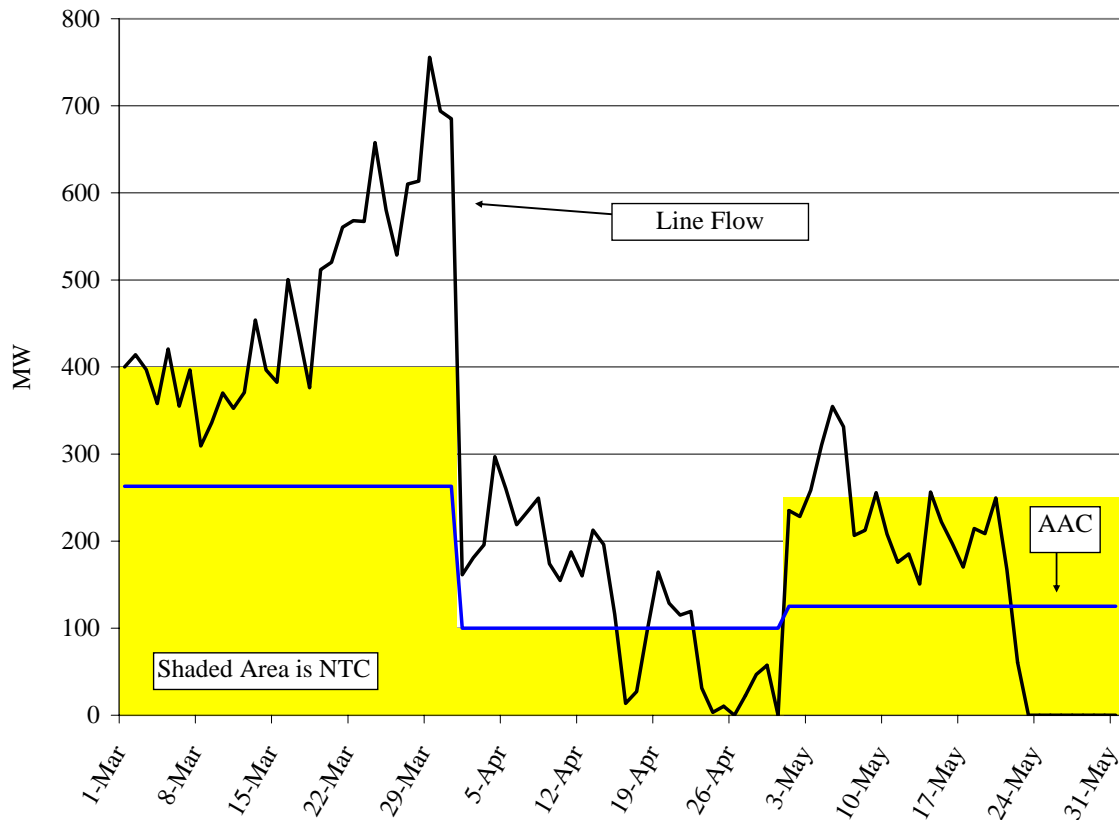
**Figure 16: Power Flows on the Romania to Serbia Interconnection**

Figure 16 shows the Romania to Serbia flows. In March, the interconnection flow substantially exceeds the allocated capacity and even exceeds NTC, which is the maximal transfer capability. We speculate that loopflow may account for this although we did not collect March loopflow data. In April, the loopflow estimate was over 250 MW and this is reflected in the April data, which indicates that the flows are more closely aligned to the capacity, although there is still substantial divergence. Part of this is explained by the fact that the NTC fluctuated in April. What is shown in the figure is the lowest value for the month, 100 MW. During the first part of April was as high as 200 MW. Overall this appears to be the inability of our loopflow estimate to reflect the actual loopflow conditions. Given the large loopflow that occurs on this interconnection, this is expected. In a full monitoring project, it would be reasonable to initiate

an inquiry as to whether higher loopflow estimates are appropriate for the base case in the capacity assessment.

### Figure 17: Power Flows on the Serbia to Bulgaria Interconnection

<<Analysis was not possible due to *Bulgaria* not responding to data requests>>

### Figure 18: Power Flows on Serbia to Bosnia & Herzegovina Interconnection

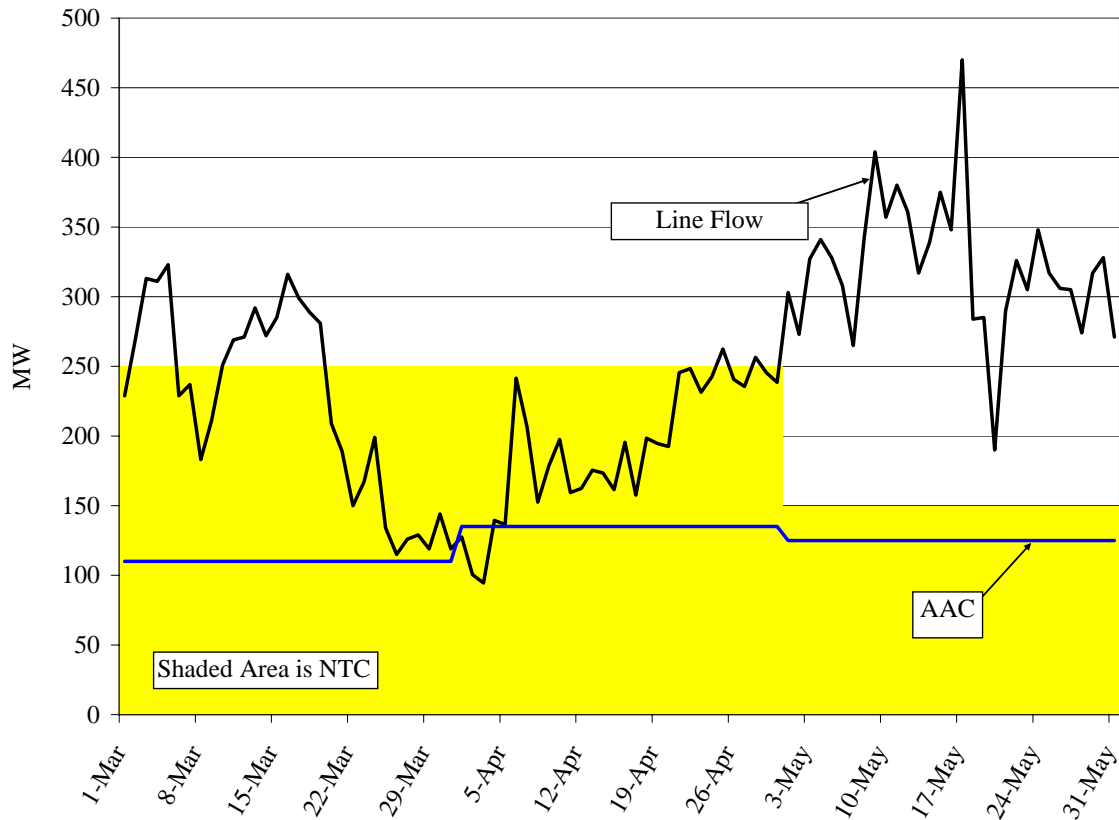


Figure 18 shows the Serbia to Bosnia and Herzegovina interconnection which, like the Romania to Serbia interconnection, is subject to significant loopflow. In April, the loopflow estimate was 100 MW. While the April data is adjusted for loopflow, the May estimate was unavailable. However, even with the April estimate included, the April flows significantly exceeded the AAC. It is difficult to make conclusions with respect to May because the loopflow data has not yet been received. However, flows were highly variable, which usually indicates the impact of a large amount of loopflow. It would be reasonable to consider the accuracy of the loopflow estimates in the base case for this interconnection.

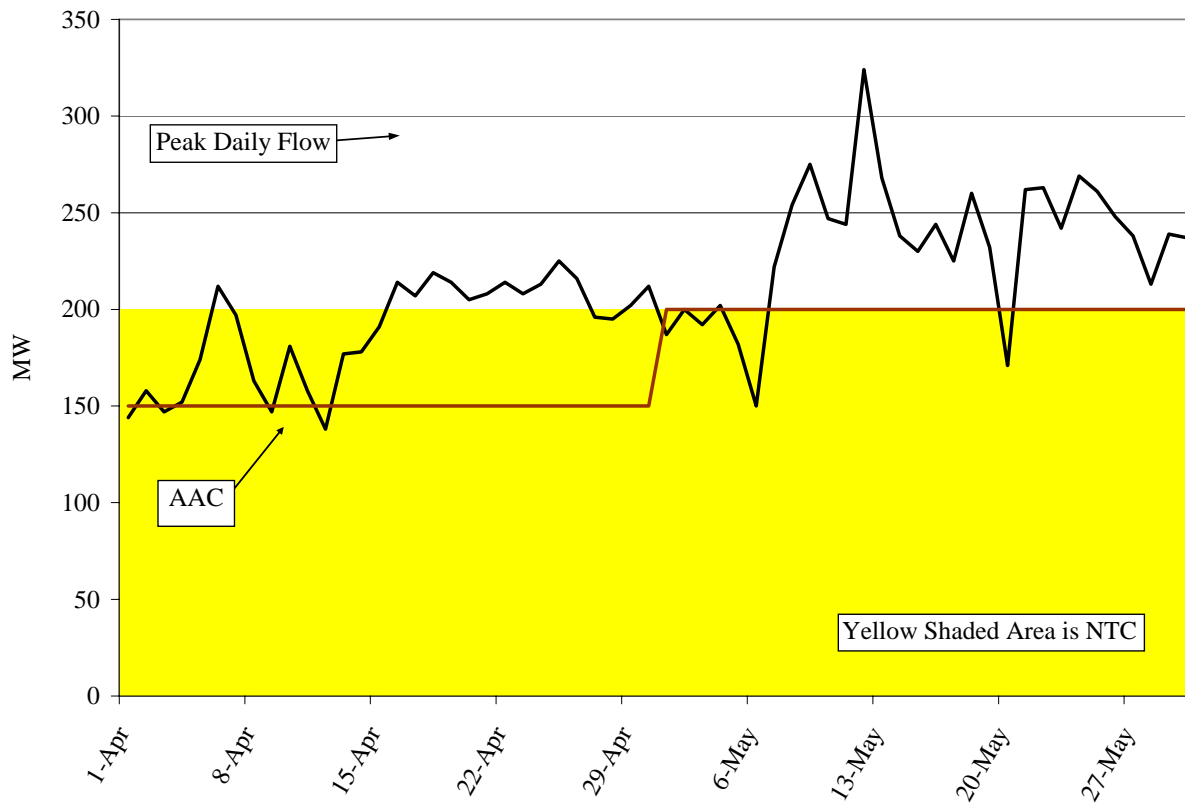
**Figure 19: Power Flows on the Serbia to Croatia Interconnection**

Figure 19 shows the power flow on the Serbia to Croatia interconnection. For this interconnection, power flow has not been adjusted for estimated loopflow. It is possible that this data would explain some or all of the net flow in excess of the allocated capacity in both months. We continue to attempt to secure this data, which will improve the analysis.

Figure 20: Power Flows on the Serbia to Macedonia Interconnection

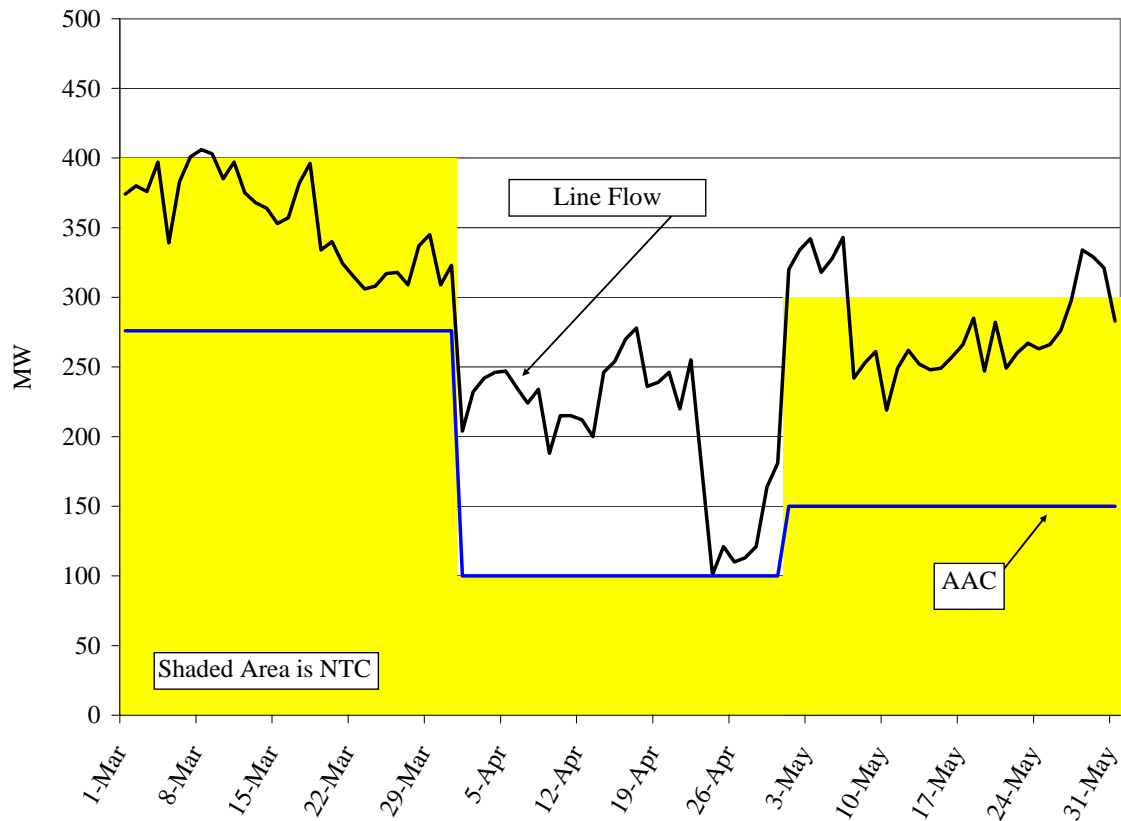
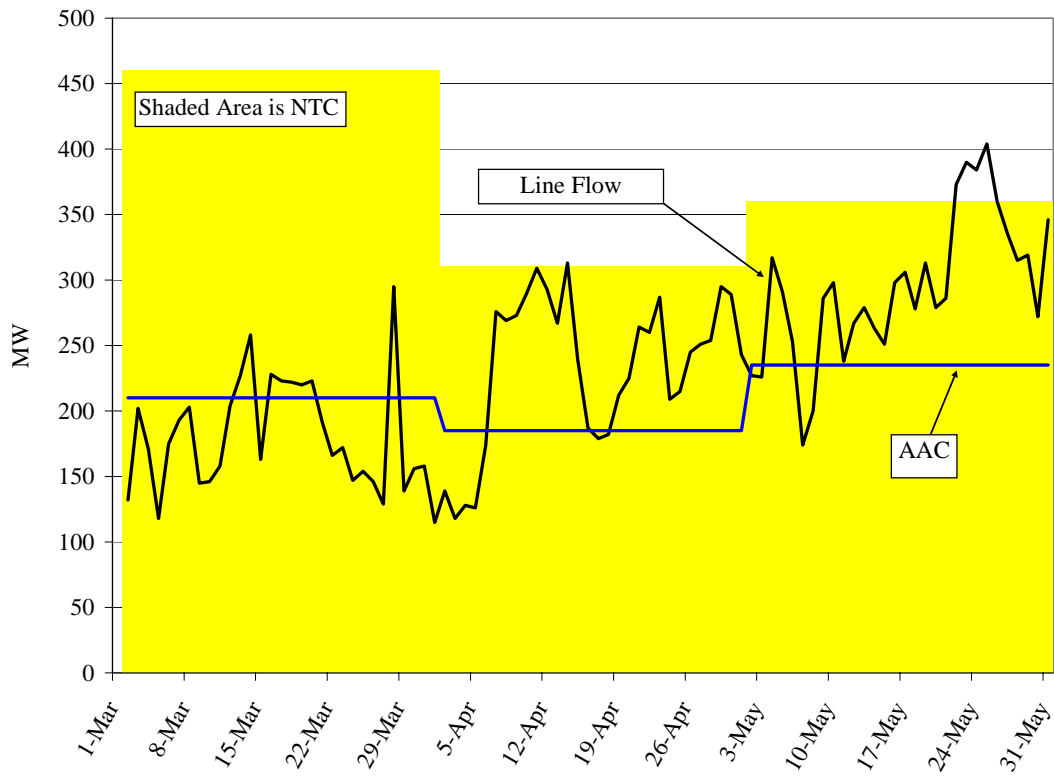


Figure 20 shows the power flows and capacity allocation on the Serbia to Macedonia interconnection. Loopflow in the amount of 60 MW for both April and May is reflected in the analysis. Even with this adjustment power flows exceed both the AAC and the NTC. For April, the figure exaggerates the situation because the 100 MW NTC limit was in effect for only part of the month. During other parts of the month the NTC was as high as 300 MW. This situation does not give rise to competitive issues in the sense of hoarding capacity. Instead, it appears, like in previous cases, loopflow may be understated in the base case model in the capacity assessment.

Figure 21 shows the power flows on the Serbia to Montenegro interconnection. In this case power flows exceed the AAC, but are generally below the NTC. We do not have loopflow data on this interconnection so the final analysis is indeterminate.

**Figure 21: Power Flows in the Serbia to Montenegro Interconnection**



**Figure 22: Power Flows on the Serbia-Romania Interconnection**

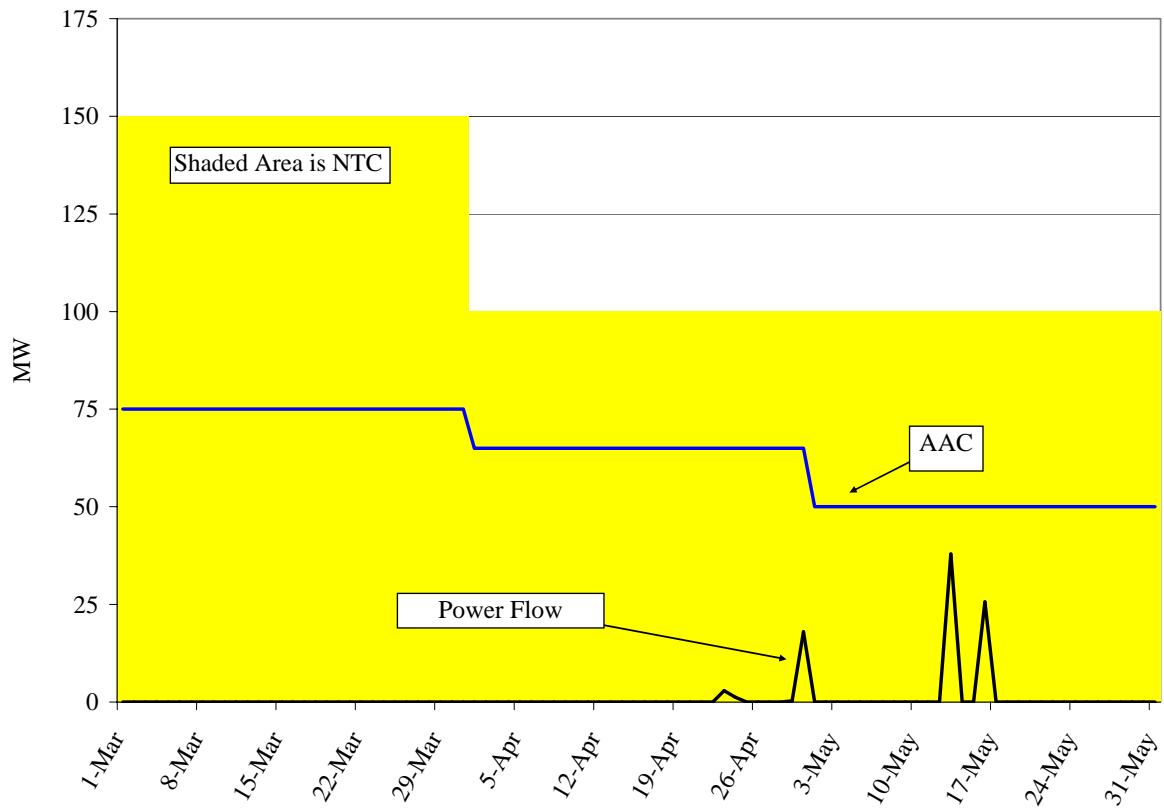


Figure 22 shows the analysis for the Serbia to Romania interconnection. The flows on this interconnection are minimal and the predominant direction of flows is in the opposite direction, (see Figure 16). Allocated capacity is also relatively small and although it is not utilized in March and April, the peak usage in May corresponds to the allocation. Accordingly, we do not find this to be a competitive issue.

Overall, we find the analysis of line flows to indicate a reasonable correspondence between capacity allocation and actual usage of the interconnections. We note some instances where further investigation may be worthwhile. Finally, we note that the analysis continues to evolve as data reliability improves.

## **B. Other Activities Underway**

In addition to continued monitoring of the interconnection capacity and the additional data that has been developed for that purpose, other activities continue and will be reported more fully in our next quarterly report.

*Wholesale Transactions.* The primary motivation for market monitoring is to help ensure competitive outcomes. As discussed above, congestion events on the system provide the most likely conditions for market failure. One way to detect market failure is to monitor sales and purchase prices when congestion arises. As indicated in our previous report, we have been collecting information to understand how the data on sales and purchases is recorded for each participating entity. We will present our summary of this investigation in our next report.

*Generation Modeling.* Our modeling of the generation market continues to advance. The modeling is an effort to identify the potential for market failure. As discussed in our previous report, the model is simulation that is designed as an *ex ante* tool which – among other things – attempts to establish a competitive benchmark to compare actual outcomes and to identify adverse incentives that arise from the market structure. Initial findings were presented in Phase I and during Phase II additional data has been collected to be incorporated into the model. The updated modeling results will be presented in our next report.

**Appendix A**

April Data Request for

**Phase II**

of the South East Europe Market Monitoring Pilot Plan

- **Request 4-07-1**  
Please provide actual load for the TSO control area for each hour for the month of April 2007.
- **Request 4-07-2**  
Please provide the actual hourly power flows over all interconnections for the month of April 2007. *Note: Please provide data on an individual interconnection basis, i.e., TSOs with multiple external interconnections should provide separate data for each external interconnection.*
- **Request 4-07-3**  
For all external interconnections for the month of April 2007, please provide NTC and AAC (including AAC present before any monthly auction and AAC from any monthly auction).
- **Request 4-07-4 (New request for Phase II)**
  - (a) Please provide a description of Congestion Management procedures (aside from allocation of monthly or daily transmission capacity) that could result in the full or partial curtailment of a cross-border transaction.
  - (b) Indicate whether any curtailment associated with the measures in (a) occurred during the month of April 2007.
  - (c) Indicate the date on which the event in (b) occurred and on which interconnection.

*Request 4-07-4 was revised in June to read:*

- **Request 6-07-4 (this request has been revised)**

With respect to UCTE Policy 4 part D “N-1 Congestion Management”, please indicate whether day-ahead or real-time measures were taken pursuant to the following Guideline

**G1.6.** Capacity reduction and curtailment: cross-border capacity can be withdrawn

- 

- **Request 4-07-5 (New request for Phase II)**

With respect to calculating NTC on each interconnection:

Please indicate the peak parallel (or loop) flow on each interconnection in UCTE reference base case for April 2007;

Please provide the Base Case exchange on each interconnection in the UCTE reference base case for April 2007;

Please provide the forecast load for the control area in the UCTE reference base case for April 2007;

Please provide a description of the procedure through which market participants can get transmission rights by which they fall into the “AAC right owner” category, e.g. grandfathering, auctions, etc.

Please indicate whether AAC rights are tradable or otherwise transferable under the procedures which guide any such process.

- ***Request 4-07-6 (New request for Phase II)***

Please describe the types of bilateral contract sales that can occur in the control area; in responding, please indicate the nature of the parties, e.g., generator, marketer; supplier (local distribution company), end-user (retail customer);

Please describe the process for recording bilateral sales contracts on the network.

Please indicate whether prices are recorded for these contracts.

Please identify the entity in possession of records of bilateral contracts.

If these records are in possession of the TSO, please indicate the circumstances under which they could be made available for purpose of market monitoring.

- ***Request 4-07-7 (Modified request for Phase II)***

For each generating unit in the TSOs control area, please provide

1. Unit name;
2. Unit rated capacity for April 2007 (i.e., maximum capacity available for dispatch during the month);
3. Outage derating for February, March (i.e., indicate whether and how much the unit was derated as a result of planned or unplanned outages for the month).
4. Unit (average) heatrate
5. Start-up costs
6. Average cost of Fuel
7. Long-term contracted capacity, other must-run obligations, Reserve, and balancing requirements

Appendix B  
Regional Flows for March and May 2007

Figure 23: Regional Flows at March Peak Load

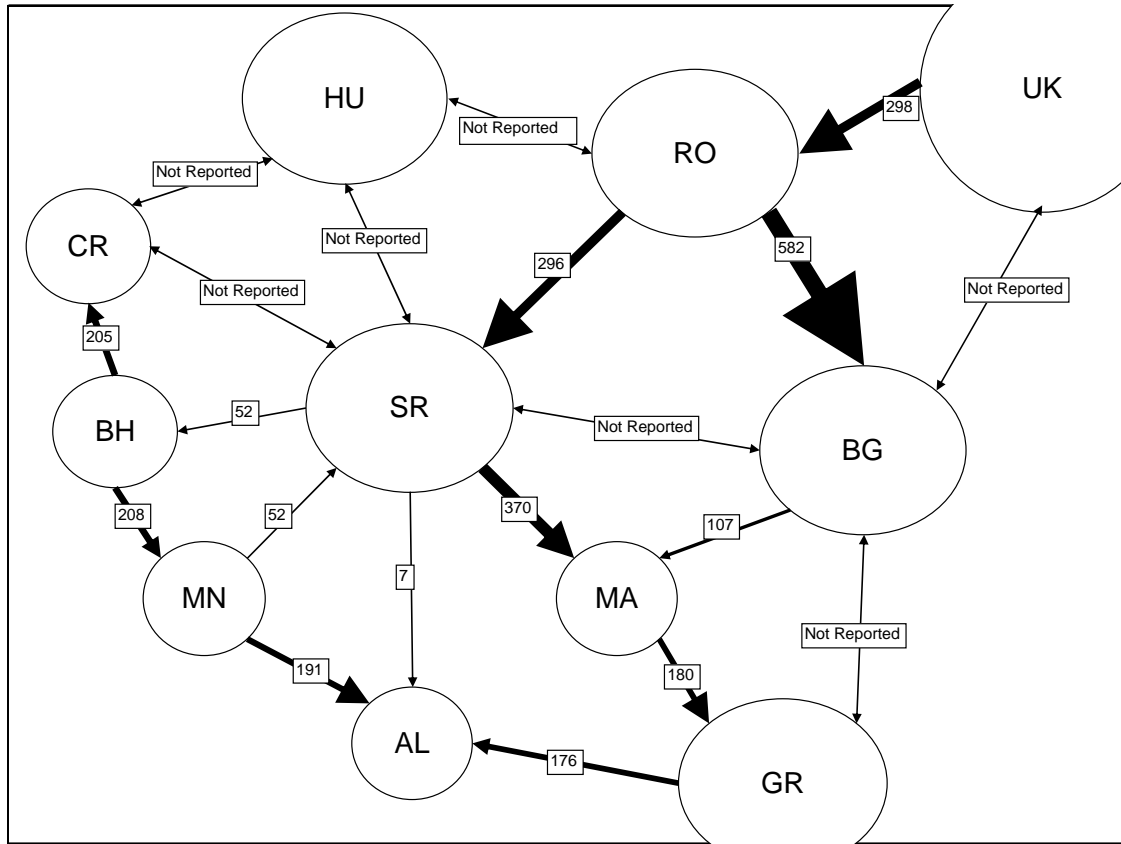


Figure 24: Regional Flows at May Peak Load

