REPORT

ON

SOUTH EAST EUROPE MARKET MONITORING

FOR THE PERIOD

DECEMBER 2007– FEBRUARY 2008

Sponsored by:

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POTOMAC ECONOMICS

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EXECUTIVE SUMMARY OF MAIN FINDINGS

This is the fifth quarterly report providing an account of market monitoring activities under the South East Europe (SEE) Market Monitoring Pilot Plan initiated by the United States Agency for International Development (USAID) and the National Association of Regulatory Utility Commissioners (NARUC).[1] This report covers the period December 2007 to February 2008.

The report is in two main parts: (1) monitoring of overall market indicators and (2) monitoring of interconnection capacity.

Overall Market Indicators

We monitor regional wholesale prices and regional congestion in order to provide an overview of market conditions and outcomes. We compare day-ahead spot market prices from Austria and Romania in order to track general price levels as well as to assess regional spot market efficiency. We find periods of sustained divergence of prices between the two markets. Romanian prices tended to be higher than Austrian prices during the past summer, but the opposite relationship prevailed during the fall. In the winter months, the prices were closer in magnitude. During the periods when price diverge, one of two hypotheses are possible: either binding transmission constraints prevent the arbitrage of prices or a poorly functioning wholesale market hinders traders from participating. We continue to monitor this situation to further explain it and identify potential changes to address it.

We monitor congestion over both the planning horizon congestion (week-ahead or longer) and over the operating horizon (shorter than week-ahead). Planning horizon congestion occurs when Available Transmission Capacity (ATC) on an interconnection is zero. This occurs relatively frequently, especially in the southwest part of the region, but the congestion spread to other areas as well during the winter months. Operating horizon congestion occurs when a TSO takes

[1] After an invitation from the Eighth Athens Forum in June 2006 to proceed with a Market Monitoring Pilot Plan, the monitoring became effective in December 2006 and has continued since that time. At the Twelfth Athens Forum in May 2008, we recommended continuing the market monitoring plan under a two-year transition phase that would lead to a permanent function within the Energy Community Regulatory Board (ECRB). The Athens Forum, after hearing from the ECRB, asked for extension of the project to support ECRB capabilities to carry out monitoring in the future.

actions to curtail transactions in the day-ahead or shorter time-frame in accordance with UCTE congestion management procedures. Surprisingly, this type of congestion rarely arises; for instance, it was not reported as occurring at all during the December-to-February period.

Monitoring of Interconnection Capacity

We monitor the market for cross-border capacity by comparing the allocation of interconnection capacity to the actual usage of that capacity. We use underlying inputs and results of the Capacity Assessment and estimate the actual flows that would result from reservation of interconnection capacity. More precisely, we estimate the physical flow that would be associated with Already Allocated Capacity (AAC) values, as well as the physical limit on interconnections that is implicit in the NTC values. These estimated values allow a more direct assessment of how the real-time physical flows compare to the capacity requirements that are established in the month-ahead capacity allocation process. Such a comparison provides a market monitoring screen that can detect potential market issues associated with cross-border trading. Our monitoring of the interconnections is not meant to imply that anticompetitive conduct is or is likely to be occurring.

Our analysis estimates the maximum potential physical flow from cross-border capacity reservations (i.e., from AAC). This physical flow arises both from the direct reservation between the two counterparties on the interconnection, as well as potential physical flows from transactions among other TSOs (i.e., loopflow). The analysis reveals the amount of physical capacity that is reserved by the counterparties to the interconnection, versus the physical capacity that potentially would be occupied by loopflow from reservations on other interconnections. We also estimate the physical capacity that is available for cross-border transactions and compare this to the maximum potential physical flows from all AAC (both the direct AAC from the counterparties and the AAC from all other regional interconnections). Our analysis illustrates that in many instances, the interconnection is over-reserved because the process for establishing capacity rights on the interconnection does not effectively coordinate potential “loopflow” from reservations elsewhere in the region. This shortcoming is a standard problem in a contract-path-based transmission reservation process like the one used in the SEE region (and throughout most of the rest of the EU).

We also estimate the physical limit on each interconnection, which enables us to monitor the physical flow related to the physical limit. This provides a way of identifying locations where larger NTC could be particularly beneficial and a way of detecting potential misuse. It also allows us to compare the actual physical flows to the estimated flows from the AAC, providing a screen that may indicate unscheduled uses of the system. Other means of evaluating scheduling issues are limited because we do not currently have access to scheduling data.

Of the 22 interconnections, six were not possible to evaluate because they involved a combination of two of the following TSOs: Bulgaria, Macedonia, Montenegro, or Serbia. None of these TSOs provided line flow. Of the sixteen we were able to evaluate, seven were inactive, meaning reservations were relatively small and little or no physical flow occurred in real-time. These relatively inactive interconnections are: Albania to Montenegro; Albania to Serbia; Bulgaria to Romania; Bosnia & Herzegovina to Serbia; Croatia to Serbia; Montenegro to Bosnia & Herzegovina; and Serbia to Romania. These interconnections tend to be ones that serve power transactions in the west to east direction, which is against the predominant flow in the region. Our screening did not detect potential market or efficiency problems associated with these interconnections.

The remaining nine interconnections were active, meaning they experienced both significant reservations and significant physical flows. In two cases, the physical flows were roughly equal to the flows that would be expected from transactions between the two parties to the interconnection. These two cases were the Croatia-to-Bosnia & Herzegovina interconnection and the Serbia-to-Albania interconnection.

In the seven other instances, the physical flows exceeded the flows that would arise solely from AAC between the two counterparties on the interconnection. Therefore, the physical flow above that expected between the counterparties arises form other sources. One source is other regional transactions that “loop” onto the interconnection. Indeed, on five of these seven interconnections, the flow was consistent with what would be expected if AAC between the counterparties as well as AAC between other TSOs in the region were to be scheduled. This was the case with the following interconnections: Bosnia & Herzegovina to Croatia; Bosnia & Herzegovina to Montenegro; Montenegro to Albania; Serbia to Croatia; and Romania to Serbia. The data associated with these interconnections is consistent with the hypothesis that flows arise from transactions scheduled in accordance with regional AAC values. However, without actual scheduling data, we cannot eliminate the hypothesis that only part of the flow arises from others' AAC and that some could be unscheduled transactions or from unexpected loop flow not accounted for in the base case. With scheduling data, which we are requesting going forward, the issues would become clearer.

On the remaining two interconnections: Serbia to Bosnia & Herzegovina and Romania to Bulgaria, the physical flow exceeded that which would arise from regional AAC alone while at the same time exceeding the implied physical limit on the interconnection. The data on these interconnections suggest other transactions are using the interconnection aside form the ones scheduled pursuant to regional AAC. These other transactions could be unofficial ones or ones that are creating unexpected loopflow not accounted for in the base case. Scheduling data would help to clarify the question.

I. OVERVIEW

After an invitation from the Eighth Athens Forum in June 2006 to proceed with a Market Monitoring Pilot Plan, the monitoring became effective in December 2006 and has continued since that time.[2] At the Twelfth Athens Forum in May 2008, we recommended continuing the market monitoring plan under a two-year transition phase that would lead to sustainable operations within the Energy Community Regulatory Board (ECRB). The Athens Forum, after hearing from the ECRB, asked for extension of the project to support ECRB capabilities to carry out monitoring in the future.

Since the inception of the plan, we have collected and analyzed market data, published regular quarterly reports, and presented our findings to the Athens Forum.

A. Objectives of the Pilot Plan

Consistent with the Treaty establishing the Energy Community, which entered into force in July 2006,[3] 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, facilitate open-access, and detect potential market failure. The Pilot Plan seeks ways to provide benefits to Transmission System Operators ("TSOs") consistent with this objective. The monitoring reports, for example, provide the TSOs with a convenient source of data for analyzing regional market conditions and events.[4] The Pilot Plan also addresses regional market issues that can assist the TSOs in developing effective competition polices. As in previous

2 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.

3 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.

4 Even though the key data comes from the TSOs themselves, combining the data to develop regional analyses can assist the TSOs in their own market analyses.

reports, we emphasize the collaborative nature of this project and invite comments and input at any stage of the Pilot Plan.

B. Summary of Report

This report presents our monitoring activities for the period December 2007 – February 2008. It is our fifth report under the Pilot Plan. This report continues the analyses from previous reports as well as provides updates to our ongoing analysis and data collection.

1. Data Procurement

Our data collection activities are facilitated through contact with the individual participants. There are nine participants in the Pilot Plan. 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, the objections did not prevent us from moving forward on our analyses. The main exception to otherwise broad participation was Bulgaria. The TSO in Bulgaria has not responded to our requests for data since the inception of the Pilot Plan. However, Bulgaria has begun to post useful cross-border capacity data which allows some limited evaluation of market activities on its borders. Since January, we have also not received data from FYR of Macedonia or from Montenegro.

2. Network Congestion

Our analysis of network congestion focuses on two indicators of congestion. The first indicator relates to 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.[5] The second indicator is the invoking of congestion management procedures that may lead to curtailment of transactions.

[5] 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.

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).[6] There are 22 interconnections[7] linking the Pilot Plan participants. In at least one of the months of the period, we collected ATC values on all of them. On thirteen of the paths, ATC was zero in one or more of the months during the period. This is an increase in congestion compared to previous periods.

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 reduced in order to achieve network security. In this phase of the Pilot Plan, we requested data on this issue. During the three-month period of the report, there were no reported incidences of the procedures being implemented.

3. Monitoring Activities

Cross-Border Transmission Capacity. The cross-border transmission capacity market is the major focus of our market monitoring. We are interested in detecting conduct or structure that inhibits the development of competition in the region. These concerns include over- or under-reserving capacity, understated cross-border-capacity values, and other circumstances. We do not have *a priori* evidence that any such anticompetitive activities are occurring and our monitoring is not meant to imply that any such activity is or is likely to occur.

Our monitoring focuses on the Capacity Assessment, the process used in the region to establish and allocate cross-border capacity values. We compare the allocation of interconnection capacity to the actual usage of that capacity. Our analysis considers estimates of physical flows associated with cross-border capacity values produced in the Capacity Assessment. More precisely, we estimate the maximum physical flow that would be associated with the Already

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6 See "Procedures for Cross-Border Transmission Capacity Assessments," ETSO, October 2001; "Definition of Transfer Capacities in Liberalised Market", *Id*. April 2001.

7 By "interconnection" we mean what is commonly understood in the region as the electrical interface between two neighboring control areas.

Allocated Capacity (AAC) values, as well as the physical limit on the interconnection implied by the NTC values. This allows a more direct assessment of how the real-time physical flows compare to the capacity requirements that are established in the month-ahead capacity allocation process. Such a comparison provides an effective market monitoring screen that can detect potential market issues associated with cross-border trading.

Our analysis estimates the maximum potential physical flow from cross-border capacity reservations (i.e., from AAC). This physical flow arises both from the direct reservation between the two counterparties on the interconnection, as well as potential physical flows from transactions among other TSOs. The analysis reveals the amount of physical capacity that is reserved by the counterparties to the interconnection, versus the physical capacity that potentially would be occupied by loopflow from reservations on other interconnections. We also estimate the physical capacity that is available for cross-border transactions and compare this to the maximum physical flows from all AAC (both the direct AAC from the counterparties and the AAC from all other regional interconnections).

Our analysis illustrates that in some instances, the interconnection is over-reserved because the process for establishing capacity rights on the interconnection does not coordinate loopflow effectively. This shortcoming is a standard problem in a contract-path-based transmission reservation process like the one used in the SEE region.

We also estimate the physical limit on each interconnection, which enables us to monitor the physical flow relative to the physical limit. This provides a way of identifying locations where larger NTC values could be particularly beneficial and a way of detecting potential misuse. It also allows us to compare the actual physical flows to the estimated flows from the AAC, providing a screen that may indicate over- or under-scheduling. Other means of evaluating scheduling issues are limited because we do not currently have access to scheduling data.

Of the 22 interconnections, six were not possible to evaluate because they involved a combination of two of the following TSOs: Bulgaria, Macedonia, Montenegro, or Serbia. None of these TSOs provided line flow. Of the sixteen we were able to evaluate, seven were inactive, meaning reservations were relatively small and little or no physical flow occurred in real-time. These relatively inactive interconnections are: Albania to Montenegro; Albania to Serbia;

Bulgaria to Romania; Bosnia & Herzegovina to Serbia; Croatia to Serbia; Montenegro to Bosnia & Herzegovina; and Serbia to Romania. These interconnections tend to be ones that serve power transactions in the west to east direction, which is against the predominant flow in the region. Our screening did not detect potential market or efficiency problems associated with these interconnections.

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On the remaining two interconnections: Serbia to Bosnia & Herzegovina and Romania to Bulgaria, the physical flow exceeded that which would arise from regional AAC alone while at the same time exceeding the implied physical limit on the interconnection. The data on these interconnections suggest other transactions are using the interconnection aside form the ones scheduled pursuant to regional AAC. These other transactions could be unofficial ones or ones that are creating unexpected loopflow not accounted for in the base case. Scheduling data would help to clarify the question.

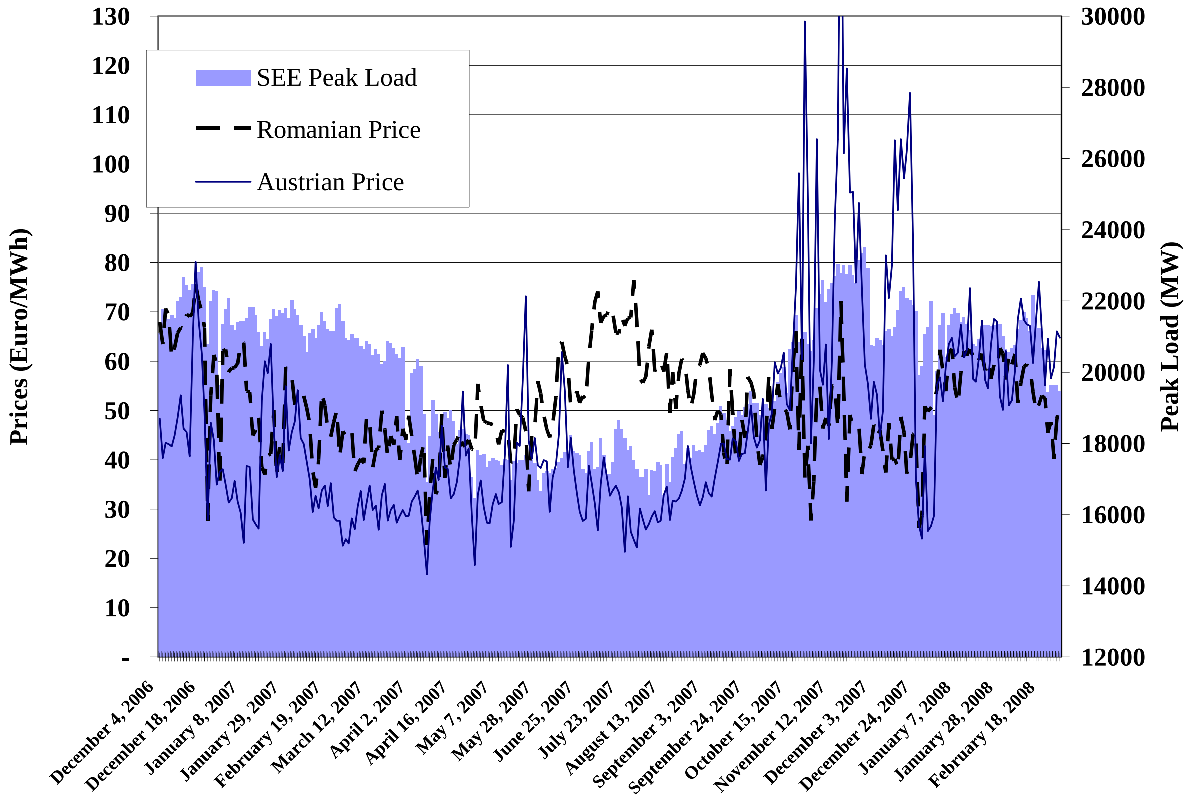
II. WHOLESALE MARKET ACTIVITY

Summary statistics on overall regional market prices 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. The exception is in Romania where both a day-ahead spot market and a centralized bilateral contracts market exist. There is also a day-ahead spot market in Austria that, like the Romanian spot market, provides daily prices.[8]

These regional markets can provide a good indicator of regional market conditions. Accordingly, Figure 1 provides the Romanian and Austrian prices, as well as daily peak load in the SEE region. This provides two indicators of market performance. First, there is the price comparison between Romania and Austria. Second, there is the correlation of price levels to load levels.

8 The Romanian bilateral contracts prices are published on a monthly basis.

Figure 1: Regional Spot Market Prices
December 2006 – February 2008

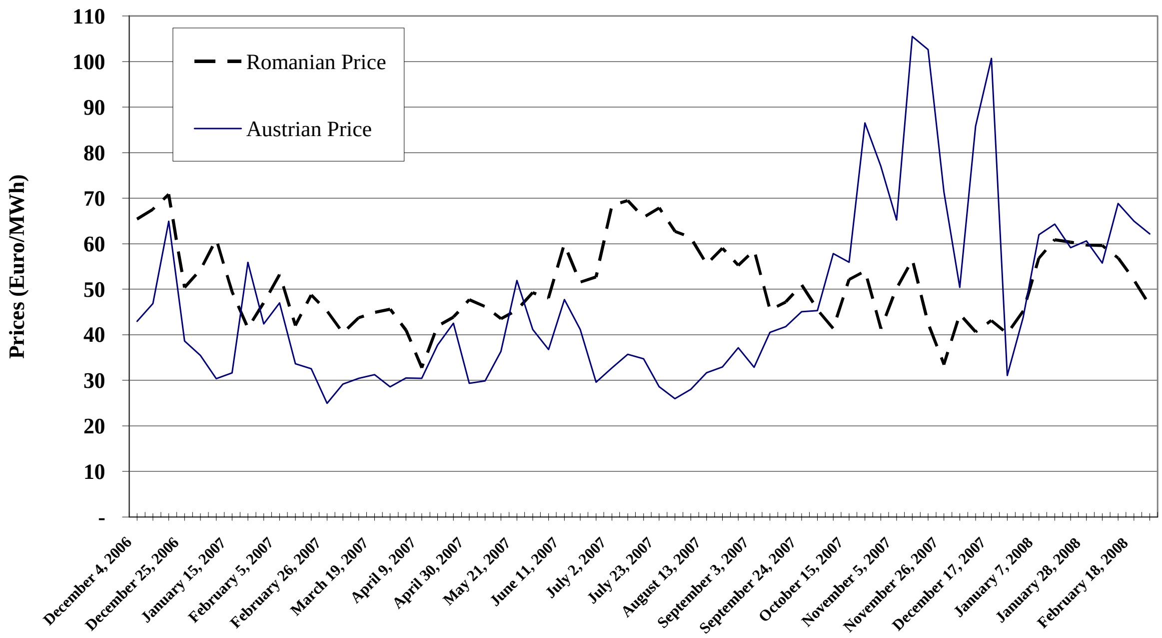


Note: Excludes Bulgarian load data.

As the figure shows, there are relatively long periods when prices exhibit a sustained divergence. For example, during the summer of 2007, prices were higher in Romania than in Austria but the situation changed in the fall, when volatility and high prices were experienced in Austria. During the winter 2007-2008, prices moved more closely together. As indicated in previous reports, the prices between Romania and Austria diverge significantly in many instances. This may indicate the absence of effective price arbitrage between the regions, which is either caused by the lack of transmission capacity or by poor market integration. At this point in time, we have not sought to determine the underlying causes of the divergence. We note that Austrian price exhibit a greater volatility than the Romanian prices

In order to smooth the volatility in the series, we calculated average weekly prices and these are presented in Figure 2. With the removal of daily volatility, the series shows more clearly periods when prices were divergent between the two locations.

Figure 2: Comparison of Romanian and Austrian Prices -- Weekly Average



In previous reports, we hypothesized that one explanation for price divergence may be related to access to west-to-east transmission capacity through the transmission systems in the western part of the SEE region. However, the hypothesis would have to be expanded to include congestion in the opposite direction as well because the prices are higher in Austria in recent months. We continue to investigate whether better price data is available and will continue to monitor prices in order to illuminate the situation.

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 allocation is made and the day-ahead time frame. We use the term operating horizon to be the time between the day ahead and the real-time.[9] 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

9 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.

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 in the Capacity Assessment pursuant to UCTE guidelines. We use monthly ATC values as indicators of constraints in the region. If ATC is zero at a particular interconnection, the network is constrained because no incremental market activity can occur that relies on the particular interconnection.

Table 1: Summary of Monthly ATC Values

	ATC		
Interconnection	Dec 07	Jan 08	Feb 08
Albania to Montenegro	Unavailable	100	200
Albania to Serbia	210	210	210
Bulgaria to Romania	Unavailable	0	0
Bulgaria to Serbia	Unavailable	0	150
Bosnia & Herzegovina to Croatia	175	250	185
Bosnia & Herzegovina to Montenegro	Unavailable	0	0
Bosnia & Herzegovina to Serbia	78	119	74
Croatia to Bosnia & Herzegovina	5	0	0
Croatia to Serbia	10	75	0
Macedonia to Serbia	Unavailable		100
Montenegro to Albania	Unavailable	0	0
Montenegro to Bosnia & Herzegovina	Unavailable	275	425
Montenegro to Serbia	Unavailable	40	185
Romania to Bulgaria	Unavailable	0	0
Romania to Serbia	0	0	0
Serbia to Albania	0	0	0
Serbia to Bulgaria	0	10	0
Serbia to Bosnia & Herzegovina	22	117	22
Serbia to Croatia	10	0	6
Serbia to Macedonia	Unavailable		0
Serbia to Montenegro	Unavailable	0	10
Serbia to Romania	35	35	10

Note: ATC Values reflect the result of monthly allocations. ATC for interconnections with Bulgaria, Macedonia, and Montenegor were unavailable for December 2007 and for Macedonia for January 2008 due to lack of data from these participants.

There are 22 interconnections that link the participants in the Pilot Plan. Of these interconnections, we were able to obtain ATC data on all of them for at least some of the three-month period of the report. A summary of these interconnections and monthly ATC values is shown above, in Table 1.

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 for additional monthly purchases or for weekly and daily purchases.

As the table indicates, ATC was zero in one or more of the months studied on thirteen of the paths. This means that on more than half of the interconnections, transmission for incremental transfers would not be available. We have not obtained data at this stage of the monitoring plan that would enable us to indicate whether incremental transfers were abandoned as a result of insufficient ATC.

Finally, the standardized Capacity Assessment does not eliminate the possibility of unreasonably restrictive practices in making capacity available to the market. This issue is discussed in more detail below. Part of our monitoring effort seeks to detect such issues. We seek to initiate further monitoring of the underlying details of the NTC and ATC a latter phase of the Pilot Plan.

B. Operating Horizon Congestion

In addition to congestion arising in the planning horizon when ATC is zero, we also collected data associated with congestion management measures.

UCTE[10] 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 curtail transactions.

[10] UCTE is the acronym for “Union for Coordinated Transmission of Electricity”.

We requested that the TSOs identify any instances when this may have occurred, starting with April 2007. While we have not received responses for all entities in all months, there have been no curtailments reported for the period December to February. Since we began collecting this data in April, only one instance of curtailments has been reported. The reported curtailment occurred for four days in April. We have learned that TSOs may take measures to avoid day-ahead or real-time congestion by coordinating with the generating companies scheduling changes. We continue to be interested in these processes and will continue to monitor and gather new information as to these operating procedures.

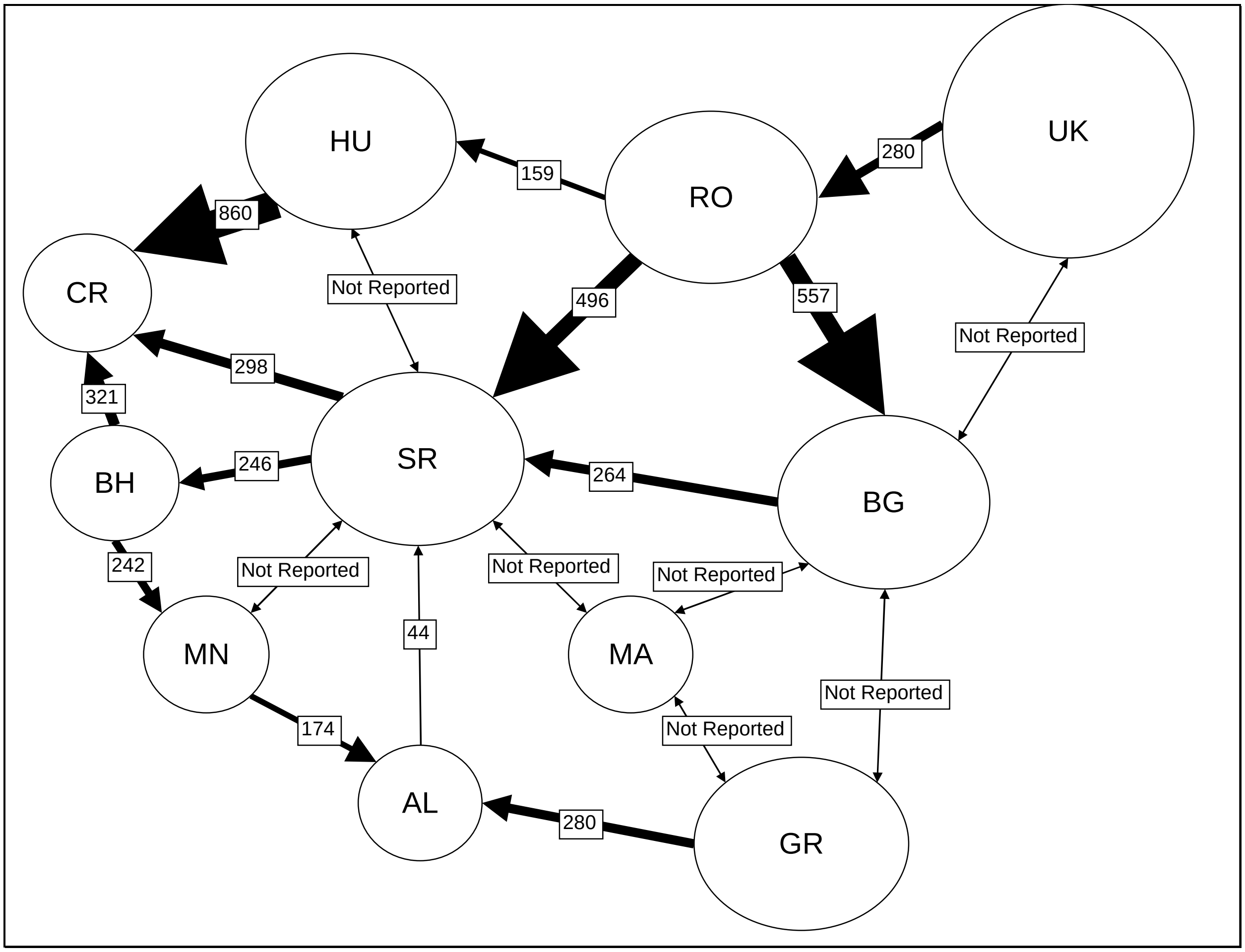
C. Regional Peak Flows

As a final indicator of regional market conditions and transmission system utilization, we illustrate the peak physical exchanges among TSOs for each of the months December, January, and February. We calculated the peak interconnection flow between each country on the day of the month when regional peak load was the highest. Figure 3 shows the interregional flows for January. We show January because both regional load and flows between TSOs was highest in January. Comparable figures for December and February are presented in Appendix B.

Where the data is available, the arrows in Figure 3 indicate the direction of flows as well as their relative magnitude. While the magnitude of flows at the peak hour varies across the interconnections, the general flow is from Ukraine to the south and west into Bulgaria, Romania, and Serbia.[11] The pattern is consistent with what most observers of the region would expect.

[11] The Bulgaria-to-Serbia interconnection was estimated using monthly exchange volumes, which were available on the UCTE website. We assumed the ratio of peak flow to total volume on the Bulgaria-to-Serbia interconnection was the same as the ratio on Romania-to-Serbia interconnection. We had the data on the Romania-to-Serbia interconnection to calculate the ratio and so we applied the ratio to the Bulgaria-to-Serbia monthly volumes to get the estimated peak flow.

Figure 3: Regional Flows at January Peak Load



Note: Bulgaria to Serbia peak flow is estimated based on monthly volume, see footnote in text.

IV. MARKET MONITORING ANALYSES

In the previous sections, we examined overall market conditions and identified network congestion. Such analysis is designed to focus monitoring activities on times and locations when market power is most likely to occur. In this section of the report, we provide market monitoring analyses that calculate the utilization of interconnections and seek to detect competitive concerns. We evaluate the usage of the interconnected network in South East Europe with the objective of identifying potential areas for improvement that can advance the development of the market.

We have identified two other critical market monitoring issues beyond the monitoring of the interconnections. In particular, we seek monitoring of sales and purchases and analysis of generation markets. With respect to sales and purchases, we seek to detect correlation between prices and congestion to determine whether further investigation regarding anticompetitive conduct is warranted. So far, we have been unsuccessful in collecting the required data to accomplish this monitoring. We anticipate further efforts to gather this data at later phases of the project. However, given the conclusions of the Twelfth Athens Forum, which required use of public data going forward, our attempts to collect confidential data is indefinitely suspended.

A. Capacity Assessment

Power is traded among participants in South East Europe using cross-border transmission capacity. Therefore, the availability of cross-border capacity is critical to a vibrant regional market. Access to transmission capacity on interconnections that link TSOs in the region is allocated in accordance with procedures set forth by UCTE and endorsed by the European Transmission System Operators (ETSO). The procedures currently employed to allocate this capacity, known as the Capacity Assessment, is based on an estimate of the maximum potential power transfers between two TSOs. This estimates is derived from a “base case” power flow model that reflects anticipated load and generation conditions for the timeframe of interest, e.g., the month ahead. The input data includes the thermal ratings of transmission facilities, the forecast load, and the output range and costs of generators.

The underlying basis of the Capacity Assessment is the estimate of Total Transmission Capacity (TTC). TTC is the maximum possible flows that can be safely accommodated over the interconnection given these base case assumptions about load, generators, transmission conditions, and estimated exchanges among TSOs (called *base case exchanges* or "BCEs"). Essentially, the TTC is estimated by modeling an increasing transfer of power between two TSOs and detecting the maximum transfer amount at the point where transmission constraints are reached. Net Transmission Capacity (NTC) is defined as TTC less Transmission Reliability Margin (TRM). TRM is a margin of capacity that is reserved by TSOs in order to respond to operational uncertainties. It typically accounts for only a fraction of the NTC, but can be up to 25 percent of the TTC.

NTC is then divided between capacity that which is allocated through yearly and monthly auctions (Already-Allocated Capacity (AAC)), and Available Transmission Capacity (ATC). Hence:

TTC = maximal safe power transaction between two TSOs;

NTC = TTC -TRM;

NTC = AAC + ATC;

The Capacity Assessment estimates the maximum transfer between two TSOs without regard to the maximum transfers between any other TSOs. In other words, it is a *non-simultaneous* estimate of the maximum transfer capacity and does not account for the fact that the interconnection's physical capacity can be used up by transactions between neighboring TSOs (a phenomenon known as loop flow). This is the standard short-coming of *contract-path*-based estimates like those in the Capacity Assessment: the estimated transfer capability is estimated in isolation of transactions between other TSOs.[12] In reality, the estimated capacity on an interconnection could be substantially used up in real time by transactions on other systems and

[12] This is mitigated somewhat by using base case exchanges in the TTC calculations, which are meant to reflect potential regional transactions.

the actual physical capacity could be insufficient to accommodate all transfers. When this happens, real-time congestion management is necessary.

The alternative to a contract-path-based system is a flow-based system where the transfer capability on an interconnection reflects the other uses on the system. In a flow-based system, all regional transactions are taken into account to determine the regional capacity that is available for a particular transaction.[13] We highlight some of the differences between the contract-path-based allocations and flow-based allocations in our analysis below.

B. Physical Flows, NTC, and AAC

Our monitoring of the cross-border transmission capacity focuses on comparing the transmission capacity that is made available to the physical usage of the system. Our analysis seeks to illuminate the process of reserving and scheduling on the interconnection with the goal of identifying potential impediments to competition. Using values from the Capacity Assessment and data on actual physical flows, we seek to develop meaningful comparisons between reserved uses of the system (AAC) and actual physical flow. To do this, we calculate certain measures of capacity from a flow-based perspective. More precisely, we identify potential physical flows associated with the various contract-path-based estimates in the Capacity Assessment (*viz*., NTC and AAC) using Power Transfer Distribution Factors (PTDFs).

PTDFs indicate what portion of a transaction between two TSOs will physically flow over various interconnections. Typically, most of the physical flow associated with a transaction between two TSOs will flow on the interconnection between them. However, a significant portion can flow over other interconnections. For example, only 64 percent of a transaction from Serbia to Montenegro will flow on the Serbia to Montenegro interconnection. Seventeen percent of it will flow on the Serbia to Croatia Interconnection and ten percent will actually flow easterly to Romania.

Therefore, with respect to AAC, if all AAC on an interconnection is actually scheduled in real time, only a portion of it actually flows on the physical facilities. For example, if the PTDF on

[13] The coordinated auction office that is under consideration in the SEE region is a flow-based system.

an interconnection is 60 percent and the AAC is 100 MW, then a maximum of 60 MW would actually flow on the interconnection from those reservations. However, the interconnection would experience physical flow from AAC over other interconnections, i.e., loopflow. Accordingly, we use the AAC values on each interconnection to estimate the maximum flow from AAC by other TSOs. We refer to these measures as flow-based AAC values because they indicate the physical flows that would arise from the AAC if scheduled in every hour.[14]

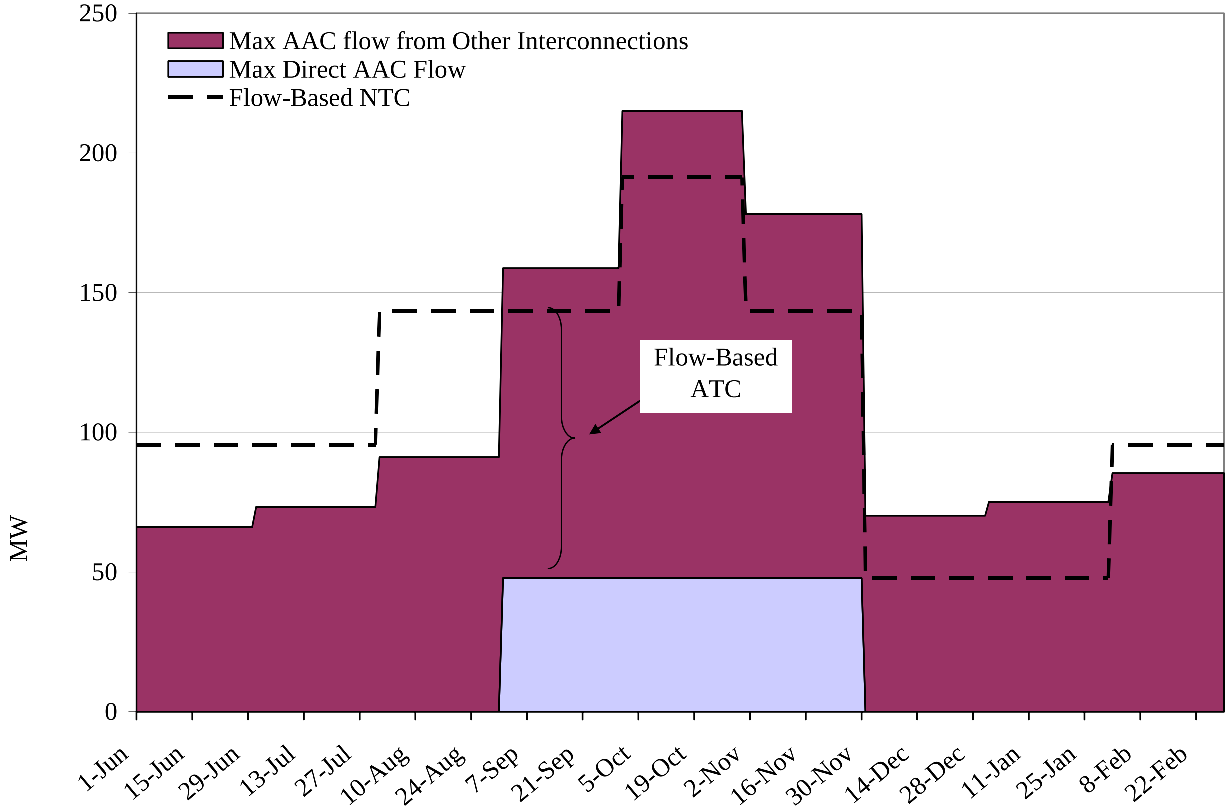
We also calculate a “flow-based NTC”. A flow-based NTC indicates the amount of incremental physical flow that will occupy the interconnection if all NTC were to be reserved and scheduled. Not all of the incremental transactions that reserve NTC will physically flow on the interconnection between two such TSOs. The amount that would flow on the interconnection, corresponds to the physical flow-based capacity available on the interconnection, is the NTC times the PTDF between the two TSOs. Hence, if the PTDF is 60 percent and the NTC is 50 MW, 30 MW of incremental physical capacity is available on interconnection.[15] A comparison of flow-based NTC to the flow-based AAC discussed above provides important insight into the capacity allocation process in the region.

In order to clarify the nature of these metrics, an example from the analysis is helpful. Consider the Albania-to-Montenegro interconnection as an instructive example. We use this interconnection because it is the first in alphabetical order.

14 As explained below, we refer to these as “maximum” because we do not consider the physical flow from other interconnections that flow in the opposite direction (i.e., counterflow).

15 As indicated above, some physical capacity is set aside for TRM. Hence, our flow-based NTC slightly underestimates the true incremental capacity available. Because we seek to monitor for broad and persistent discrepancies, we do no see this as a problem.

Figure 4: Flow-Based AAC and NTC Values
Albania-to-Montenegro Interconnection



The red-colored area is the Maximum flow associated with AAC from other interconnections (i.e., loopflow). It represents what would flow on the Albania-to-Montenegro interconnection if all TSOs with AAC on other interconnections that have positive PTDFs with respect to the Albania-to-Montenegro interconnections fully-scheduled their AAC. Using only TSOs with positive PTDFs in relation to the interconnection implies that no counter-flow is considered -- only physical transactions associated with AAC on interconnections that would flow in the Albania-to-Montenegro direction are included. This is why the term “maximum” is used. In most instances, of course, transactions that contribute to physical power flow in both directions will be in effect at any given time.

The lightly-colored blue area is the figure is the maximum direct flow associated with AAC on the Albania-to-Montenegro interconnection. It represents what would physically flow if all the reservations from Albania to Montenegro were scheduled. It is the “maximum” because we assume the AAC is fully scheduled. The sum of the blue area and the red area provides the maximum potential flow over the interconnection. Hence, the top of the red-colored area represents the total maximum AAC flow.

The dashed line on the figure is the flow-based NTC. As described above, this is the maximum amount of physical capability that would be available to accommodate incremental transfers, i.e., AAC. When the sum of the red areas and the blue areas exceeds the NTC flow, the interconnection is over-allocated. This would have been the case in September, October, and November. This is not unexpected because there is very little direct coordination of the AAC on different interconnections. In the event the actual flows associated with maximum AAC was realized, real-time congestion management measures would be necessary to maintain reliability of the system. This is not likely to be frequently needed because not all reservations are ultimately scheduled, and some schedules will provide counterflow and relieve the physical loading on the interconnection. This is the value of real-time congestion management – it allows the operators to respond to unforeseen circumstances, such as the event when schedules are heavily weighted toward reservations that contribute to flow in one direction.

In order to avoid encumbering the figure with additional data series (and potentially obscuring the results), ATC is not shown explicitly. However, as Figure 4 shows, the flow-based ATC is the difference between the Flow-Based NTC and the Max Direct AAC Flow.[16] Therefore, because ATC=NTC-AAC, when Flow-Based NTC equals Max Direct AAC Flow, then ATC is zero. When Flow-Based ATC is greater than Max Direct AAC, then ATC is non-zero. On this particular interconnection, ATC is greater zero in each month.

The figure also reveals that outside transactions (red shaded area) have the potential to contribute to power flows in greater proportion than the direct transactions between TSOs (light-blue shaded area). Given the current system of allocating and compensating for transmission capacity, other TSOs' are using this interconnection for transactions yet not paying for it. Additionally, because ATC values generally ignore flows caused by AAC on other interconnections, the parties to an interconnection may post substantial ATC when the flow-

[16] Actual contract-path ATC (the value that is posted on the interconnection) is the flow-based ATC divided by the PTDF between the two parties to the interconnection. Because this PTDF is less than one, this conversion results in an ATC value greater that the Flow-Based ATC.

based capability off the interconnection is already fully allocated. This is a standard shortcoming of the contract-path-based allocation methodologies and is reminiscent of justifications for flow-based methods.

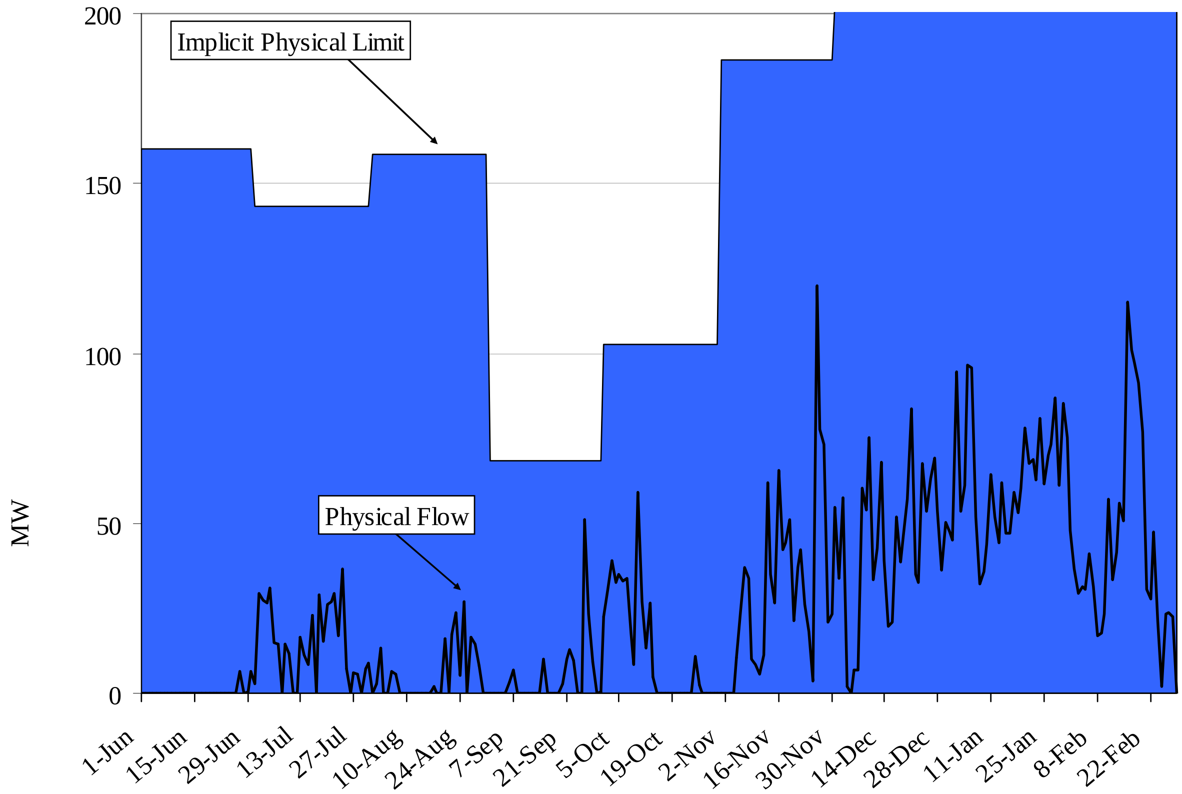
On each interconnection, we also compare actual physical flow to the implicit physical limit on the interconnection. Actual physical flow is provided by participating TSOs. The implicit physical limit is derived from the flow-based NTC and base case assumptions regarding "base loopflow". Recall that the flow-based NTC, which is shown in Figure 4 for the Albania-to-Montenegro interconnection, is the amount of additional physical flow that can be accommodated on the interconnection above the base case model, essentially the base loop flows. Therefore, the flow-based NTC plus any physical flows on the interconnection from the base case model represents the physical limit on the interconnection.

Physical flows on the interconnection in the base case rise from "base loop flow". Base loop flow, called *natural flow,* is the flow on the interconnection in the base case prior to any exchanges between TSOs. It is the flow from the base dispatch. These values are provided to us by the TSOs on a monthly basis. The flow-based NTC discussed above indicates the maximum amount of physical capacity available for incremental transfers beyond the base case. [17] Therefore, the sum of NTC flow and the natural flows represents the implicit physical limit on interconnection. We call it an implicit limit because we have derived it from these underlying values; as opposed to receiving such data directly form the base case models.

Figure 5 shows an example of our analyses on the Albania-to-Serbia Interconnection. We use this as an example because it is the first interconnection in alphabetical order that had non-trivial flows on the interconnection.

[17] We treat negative values for natural flows as zero. By including negative values we would improperly under estimate the physical capacity.

Figure 5: Physical Flow and Implicit Physical Operating Limit Albania-to-Serbia Interconnection



The figure is relatively straightforward. It shows the daily physical flows on the interconnection compared to the implicit physical operating limit. For this particular interface, the physical flows are within the operating limit. In most months, the flows were somewhat below the limit. This could be explained by the unreserved capacity (i.e., positive ATC) that remained on the interconnection, as shown in Figure 4. If it had been the case that ATC was zero during time periods when flow was significantly below the physical limit, the data would suggest that additional transmission capacity could be made available in the Capacity Assessment or that interconnection capacity has been reserved and not used.

The implied physical limit on the Albania-to-Serbia interconnection, like other interconnections we evaluate below, fluctuates substantially, which may indicate potentially modeling concerns if it cannot be explained by changes in system topology. Ideally, we would like seek physical operating data on each interconnection that will permit further evaluation. However, given the recent instruction provided at the Twelfth Athens Forum, we will confine ourselves to public data in the immediate future.

In the following subsection, we use the analysis developed in Figure 4 and Figure 5 for each interconnection. This provides a basis for our discussion of key observations and conclusions on a case-by-case basis.

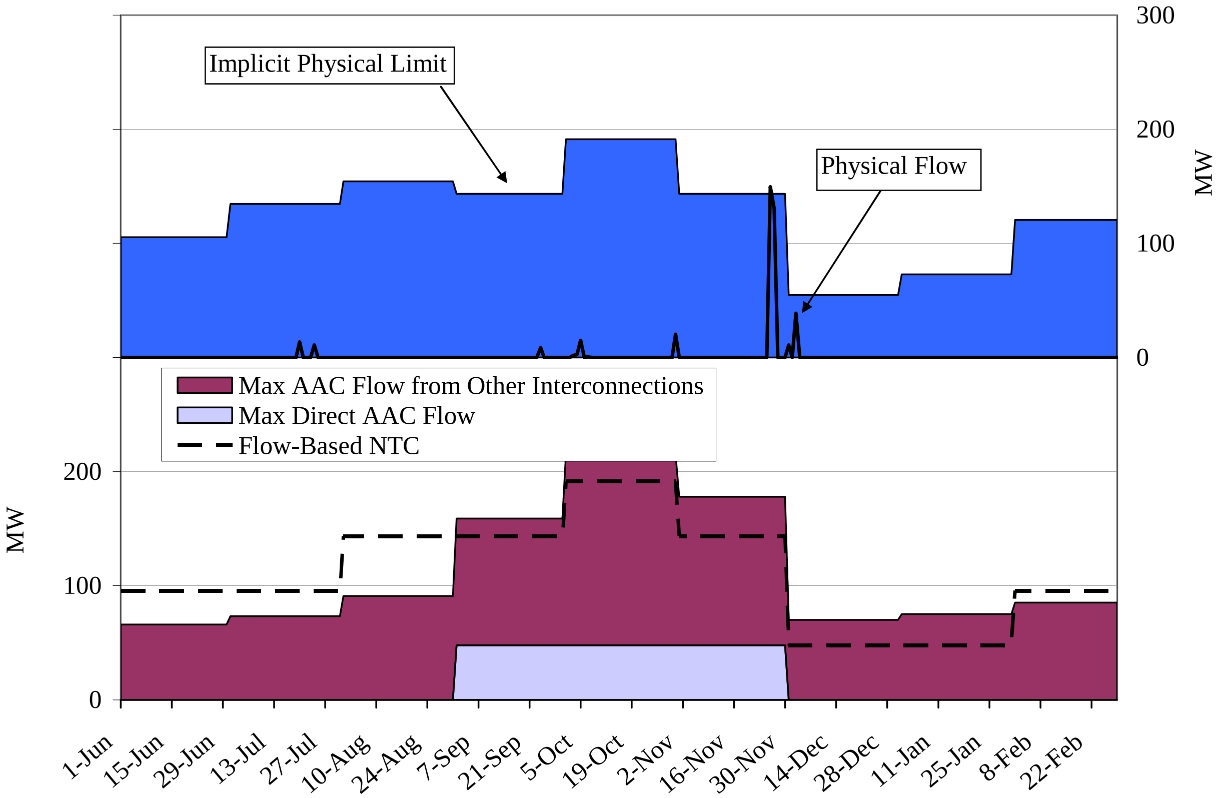
C. Analysis of Individual Interconnections

In this subsection, we conduct individual analysis of each interconnection using the methods described in the previous subsection. As discussed above, there are 22 interconnections that link the Pilot Plan participants. Not all participants provided the necessary data to conduct our analysis. However, if at least one party to the interconnection provided data, then it was possible to perform the analysis. The interconnections that were not possible to evaluate were the interconnections between Serbia and Bulgaria, Serbia and Macedonia, and Serbia and Montenegro. Neither Serbia, Bulgaria, Macedonia, nor Montenegro provided the physical flow data necessary to conduct the analysis.

We seek to identify three primary outcomes that have potential competitive or efficiency implications. The first outcome is one in which ATC is zero or close to zero while physical capacity remains unused. In such a situation, the unused capacity could be made available through ATC. The second outcome is one in which physical flows exceed both the physical limit and the maximum flow expected from AAC. Such a scenario would be consistent with unscheduled use of the system by parties within the region or excessive loop flow from outside the region. The third outcome is one in which the ATC is zero and the physical flows are close to or exceed the physical limit. On these interconnections, the transmission constraint is binding and, therefore, additional interconnection capacity would benefit the market. Accordingly, we recommend careful review of the Capacity Assessment in order to determine whether higher TTC values are possible.

The analyses of individual interconnections are presented in alphabetical order, beginning with the Albania-to-Montenegro Interconnection shown in Figure 6.

Figure 6: Analysis of the Albania-to-Montenegro Interconnection



The lower panel in the figure was used as the example in Figure 4. We described how the interconnection has the potential to become over allocated due to the lack of coordination related to AAC on other interconnections. However, the upper panel in the figure shows that there was little physical flow on this interconnection. The non-zero ATC on this interconnection is consistent with the physical flows being substantially below the physical limit. The analysis does not indicate to us circumstances that give rise to efficiency issues or competitive concerns.

Figure 7: Analysis of the Albania-to-Serbia Interconnection

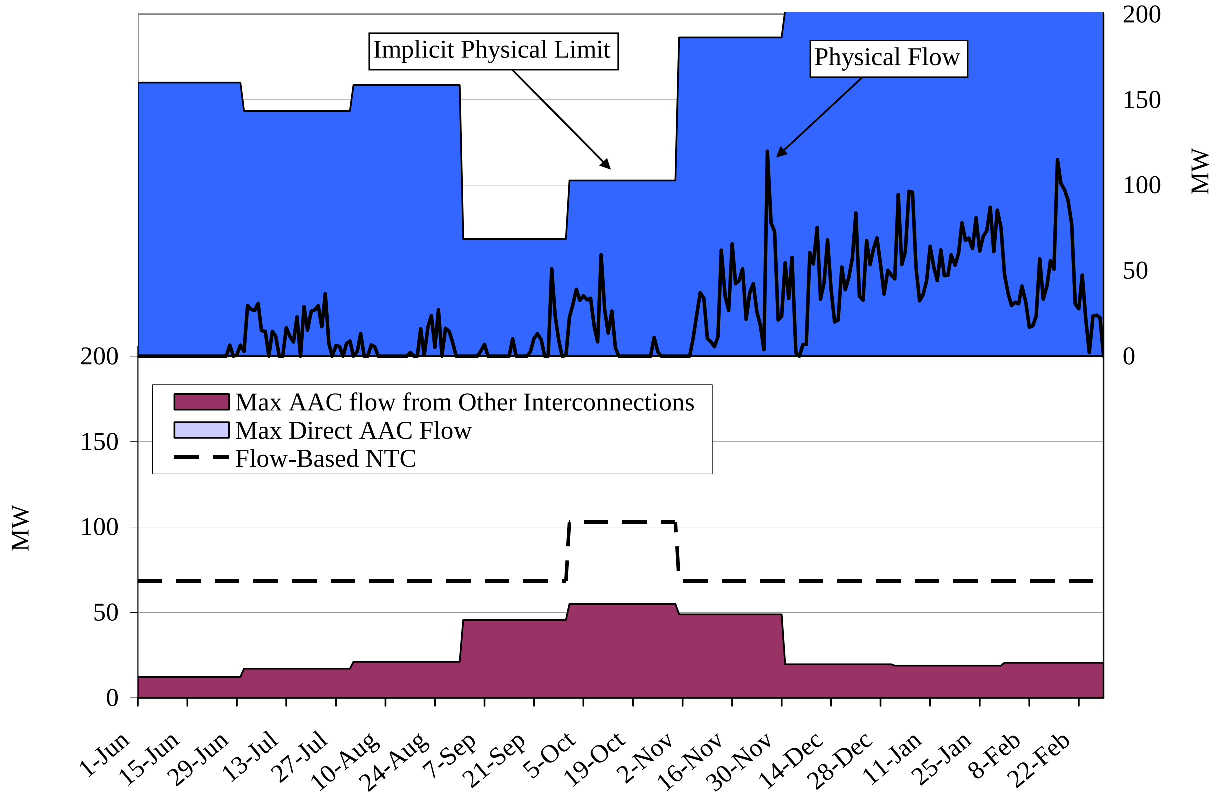


Figure 7 shows the Albania-to-Serbia interconnection. There is no direct flow from AAC on this interconnection (i.e., no reservations were made) and there is ample flow-based ATC (the difference between Flow-Based NTC and Max Direct AAC Flow, see Figure 4). We also see that physical flows are well within the physical limit, likely explained by positive amounts of ATC throughout the period. In general, this interconnection is not reserved and does not experience significant physical flow. The analysis does not indicate to us circumstances that give rise to significant efficiency or market issues.

Figure 8: Analysis of the Bosnia & Herzegovina-to-Croatia Interconnection

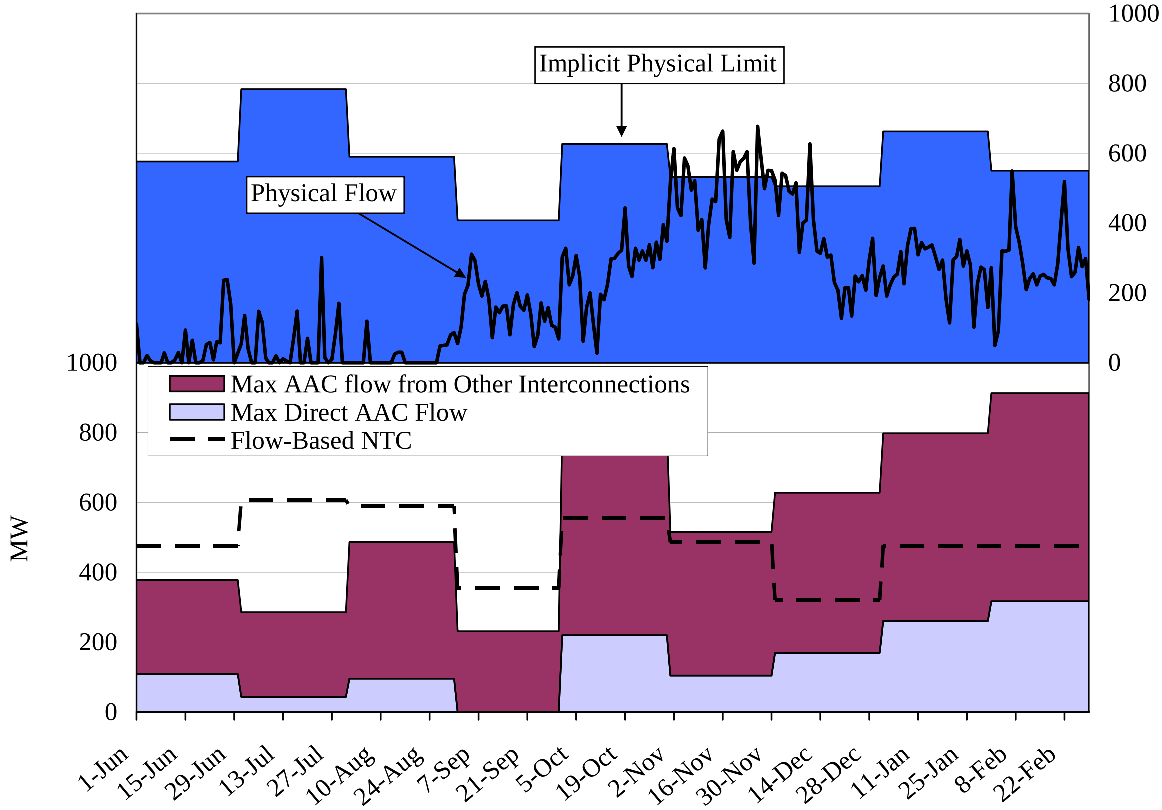
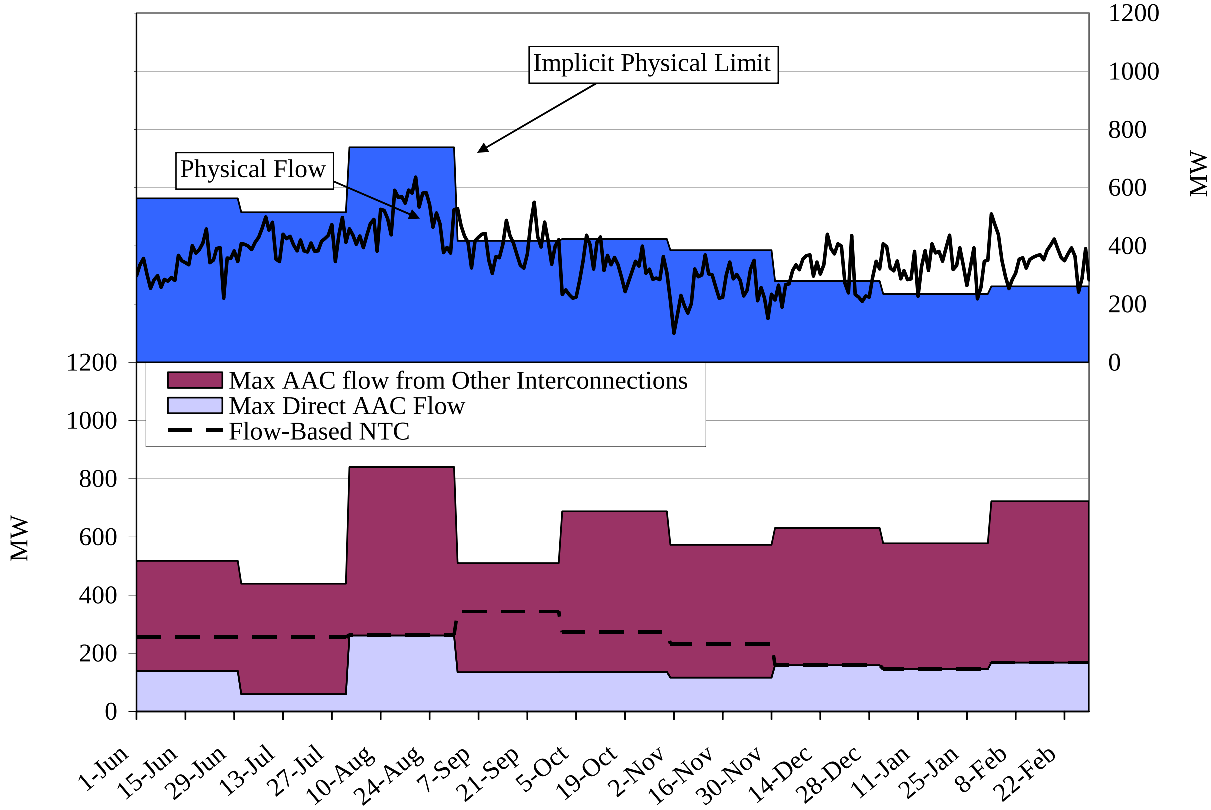


Figure 8 shows the analysis of the Bosnia and Herzegovina to Croatia interconnection. There is generally ATC on this interconnection. This is evident, as discussed above, from the lower panel of the figure which shows NTC Flow is greater than Max Direct AAC flow on a sustained basis during the period. We also note that loopflow from other interconnections could be substantial. Indeed, in many instances during the period, physical flows (shown in the top panel) were significantly greater than Max Direct AAC (lower panel). This is consistent with the hypothesis that flows arise from transactions scheduled in accordance with regional AAC values. However, without actual scheduling data, we cannot eliminate the hypothesis that only part of the flow arises from AAC and that some could be from unofficial usage of the system, i.e., unscheduled transactions or from unexpected loop flow not accounted for in the base case. With scheduling data, which we are requesting going forward, the issues would become clearer.

There was a notable increase in physical flow during November (in some instance exceeding the physical limit). However, this situation was transient, as the flows eased below the implicit physical limit in later periods. We will monitor this situation to determine whether the excess flows develop in subsequent periods. Altogether, the analysis does not indicate to us circumstances that give rise to efficiency or market concerns.

Figure 9 shows the analysis of the Bosnia & Herzegovina-to-Montenegro interconnection.

Figure 9: Analysis of the Bosnia & Herzegovina-to-Montenegro Interconnection



On this interconnection, during most of the time period, ATC was relatively small and for the most recent months it was zero. The lower panel again reveals the potential for significant loopflow form other interconnections (large red area in excess of the dashed line which represents flow-based NTC). The physical flow data, which reaches up to 600 MW, is consistent with the hypothesis that flows arise from transactions scheduled in accordance with regional AAC values. However, without actual scheduling data, we cannot eliminate the hypothesis that only part of the flow arises from AAC and that some could be from unofficial usage of the system, i.e., unscheduled transactions or from unexpected loop flow not accounted for in the base case. With scheduling data, which we are requesting going forward, the issues would become clearer.

Figure 10: Analysis of the Bosnia & Herzegovina-to-Serbia Interconnection

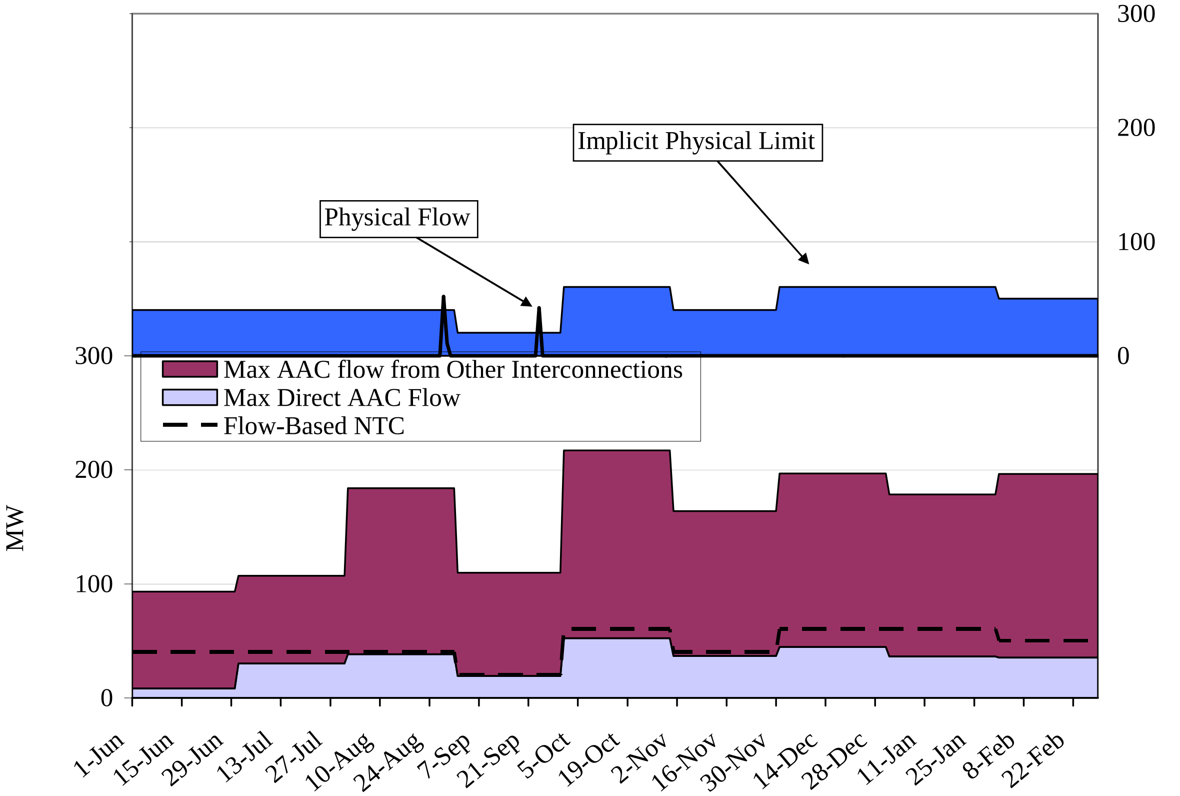


Figure 10 above shows the analysis of the Bosnia & Herzegovina to Serbia interconnection. This interconnection is relatively inactive. Only a small amount of capacity is reserved and physical flow is minimal. We do observe on the lower panel a potential for large physical impact from other TSOs (red area in excess of dashed line). But this is not evident in the physical flow data.

Figure 11 below shows the Bulgaria-to-Romania Interface. NTC Flow in this figure is exactly equal to the Max Direct AAC Flow (the NTC Flow line exactly follows the top of the light-blue area). This means ATC was zero throughout the time period. However, during July and August, there was significant physical capacity available. This could be the result of capacity being reserved, but not utilized. This situation was transient, however, as the implicit limit declined in later months.

Finally, the lower part of the chart indicates that there is a potential for significant loopflow from other TSOs on this interconnection, although the physical flow data does not indicate this to be the case in fact.

Figure 11: Analysis of the Bulgaria-to-Romania Interconnection

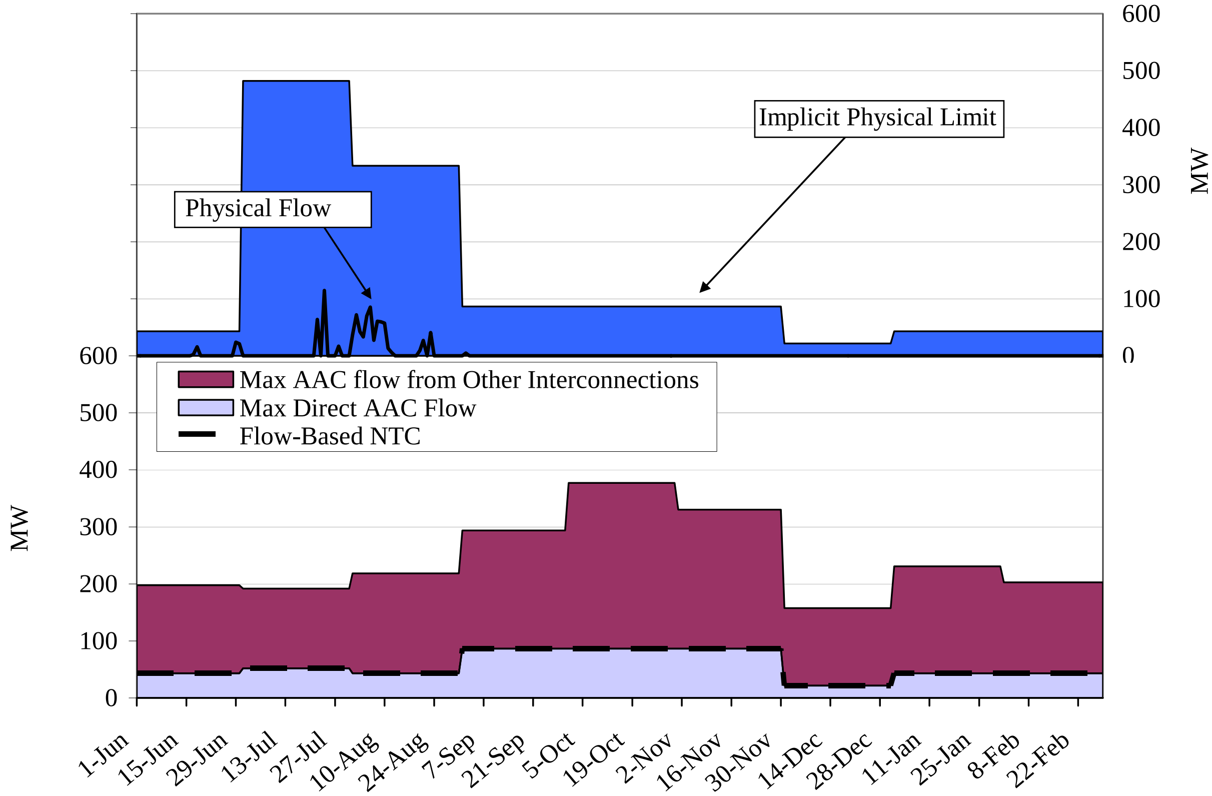


Figure 12: Analysis of the Bulgaria-to-Serbia Interconnection

<<Analysis was not possible due to lack of key data from *Bulgaria* and *Serbia* >>

Figure 13 below shows the analysis of the Croatia to Bosnia and Herzegovina interconnection. On this interconnection, ATC is relatively low and is zero during the winter. Like many of the other interconnections, the potential for physical flows from others' AAC is substantial. However, the physical flows during the period studied were relatively consistent with the direct AAC on the interconnection. The analysis does not indicate to us circumstances that give rise to efficiency or market concerns.

Figure 13: Analysis of the Croatia-to-Bosnia & Herzegovina Interconnection

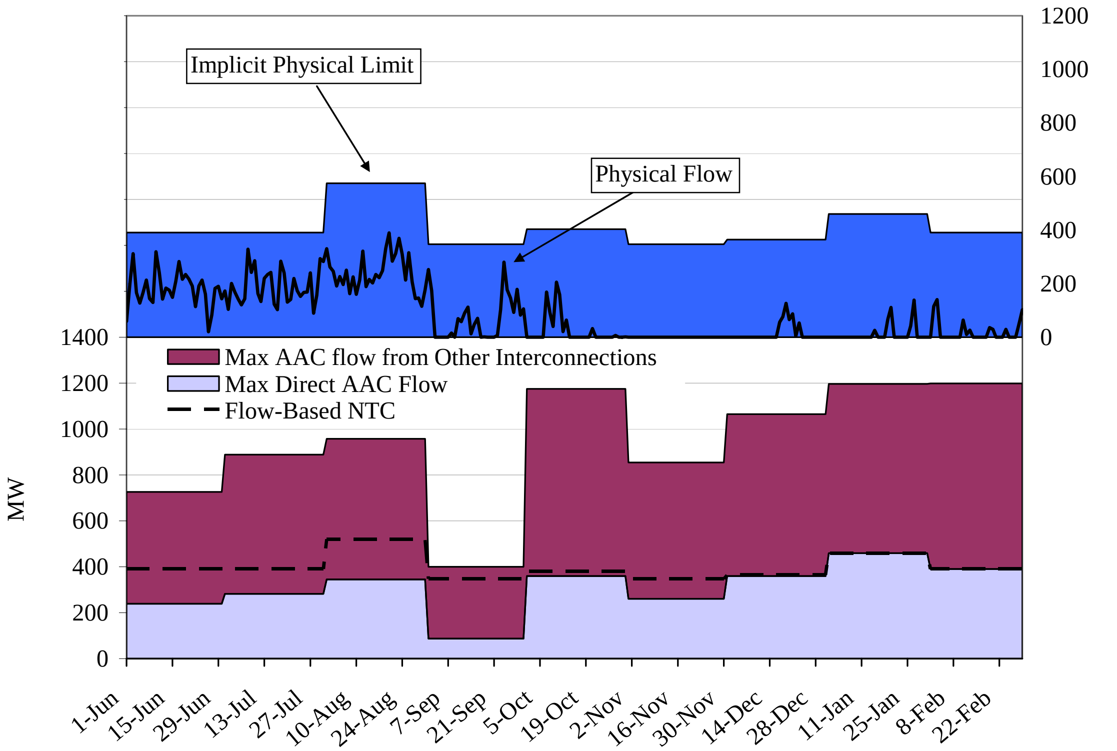


Figure 14: Analysis of the Croatia-to-Serbia Interconnection

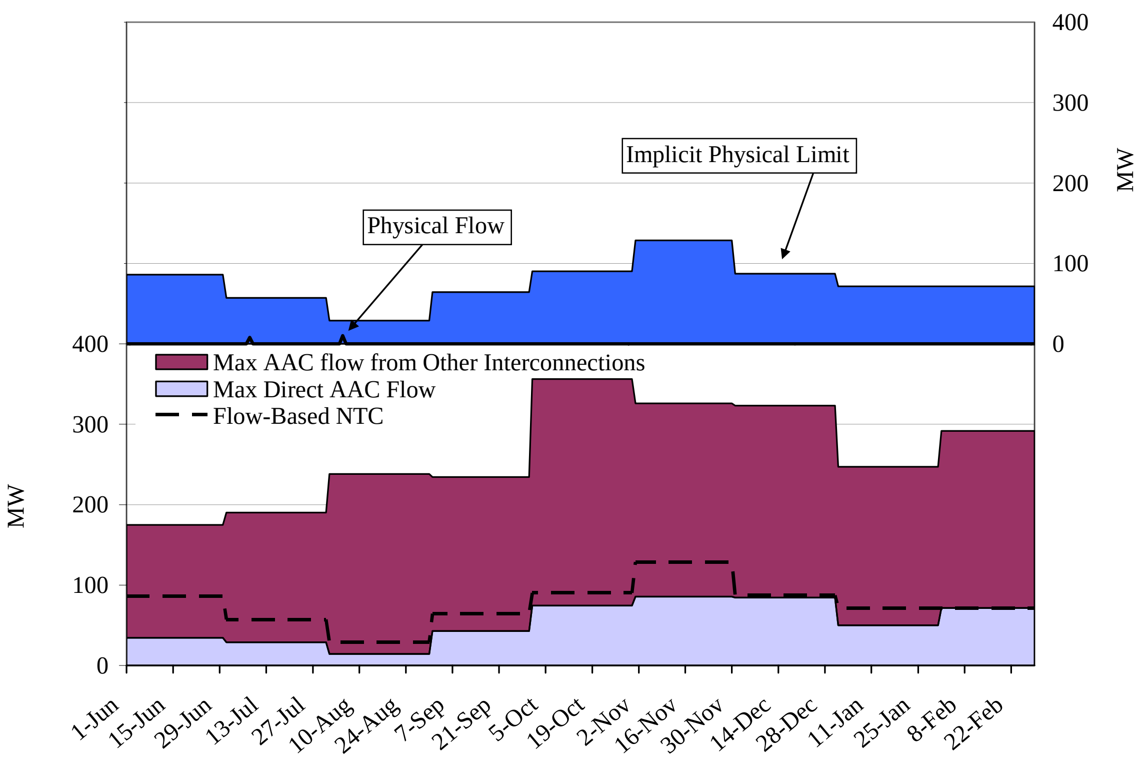


Figure 14 above shows the analysis of the Croatia-to-Serbia interconnection. This interconnection is relatively inactive. It has very little direct AAC and very little physical flow. The analysis does not indicate to us circumstances that give rise to efficiency or market concerns.

Figure 15: Analysis of the Macedonia-to-Serbia Interconnection

<<Analysis was not possible due to lack of key data from *Macedonia* and *Serbia* >>

Figure 16 below shows the analysis of the Montenegro-to-Albania interconnection. It shows that over the time period, the ATC was often zero. The actual physical flow is higher than what would be expected from direct AAC (i.e., from transactions between the counterparties to this interconnection). The physical flow data, which reaches up to 200 MW, is consistent with the hypothesis that flows arise from transactions scheduled in accordance with regional AAC values. However, without actual scheduling data, we cannot eliminate the hypothesis that only part of the flow arises from AAC and that some could be from unofficial usage of the system, i.e., unscheduled transactions or from unexpected loop flow not accounted for in the base case. With scheduling data, which we are requesting going forward, the issues would become clearer.

Figure 16: Analysis of the Montenegro-to-Albania Interconnection

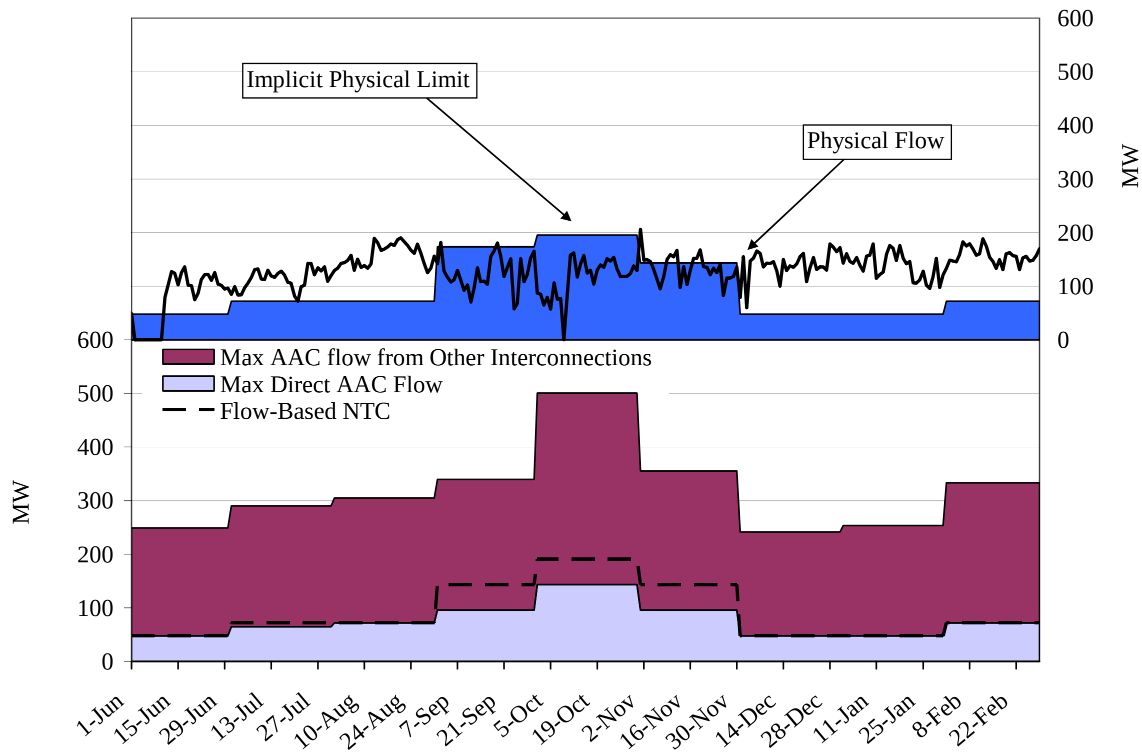
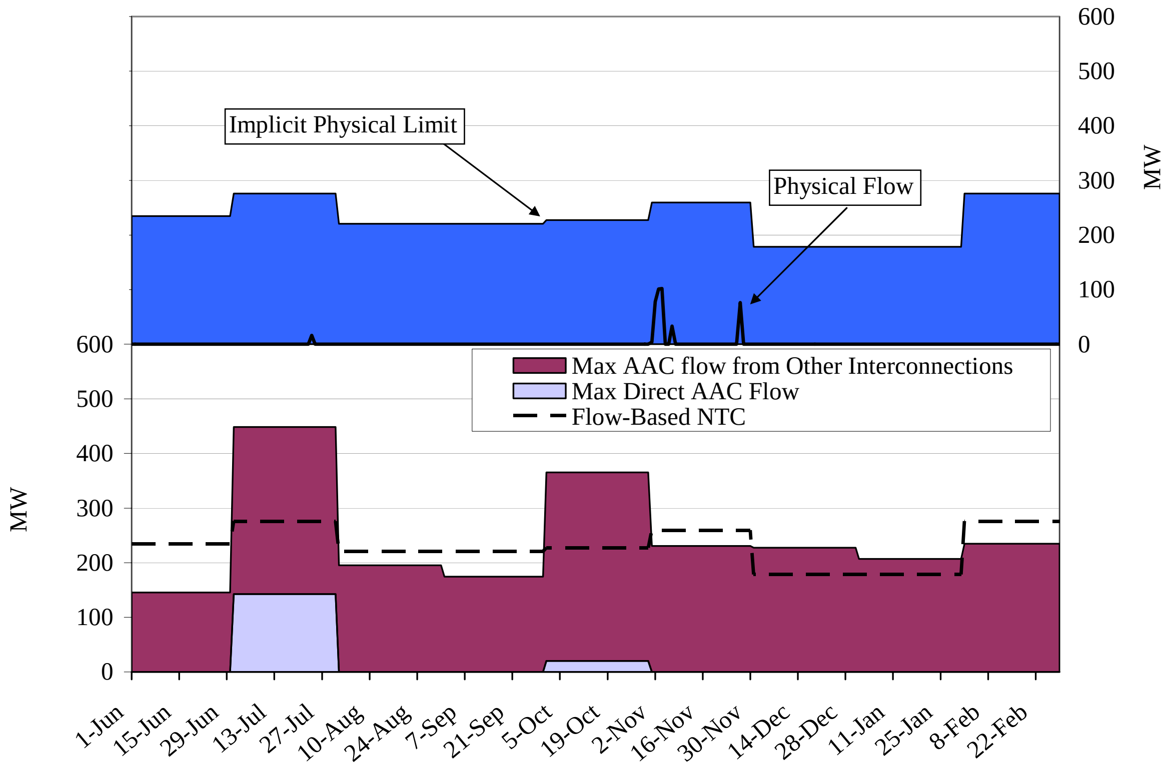


Figure 17: Analysis of the Montenegro-to-Bosnia & Herzegovina Interconnection



The analysis of the Montenegro-to-Bosnia and Herzegovina interconnection is shown in Figure 17 above. This interconnection is relatively inactive -- there is not much capacity reserved, ATC is abundant, and there is also not much physical flow. We do not detect circumstances that give rise to competitive concerns on this interconnection.

Figure 18: Analysis of the Montenegro-to-Serbia Interconnection

<<Analysis was not possible due to lack of key data from *Montenegro* and *Serbia* >>

Figure 19 below shows the analysis of the Romania-to-Bulgaria interconnection. This is a fairly active interconnection. Physical power flows extend up to 1,000 MW during the period studied. The capacity is fully reserved in all months, i.e., ATC is zero. Like the Bulgaria-to-Romania interconnection analyzed above, we estimated the Bulgarian AAC on this interconnection for months prior to January 2008 because Bulgaria did not make its ATC value readily available for those periods.

In the most recent months, the physical flows far exceeded the implicit physical limit. Part of this excessive flow could be explained by loop flow from other interconnections, as shown in the red area of the lower panel. However, the maximum impact from other interconnections combined with the flows from direct AAC is less than the physical flows. This additional physical flow could be from unexpected transactions or from unscheduled or unofficial flows. We will continue to monitor this situation.

Figure 19: Analysis of the Romania-to-Bulgaria Interconnection

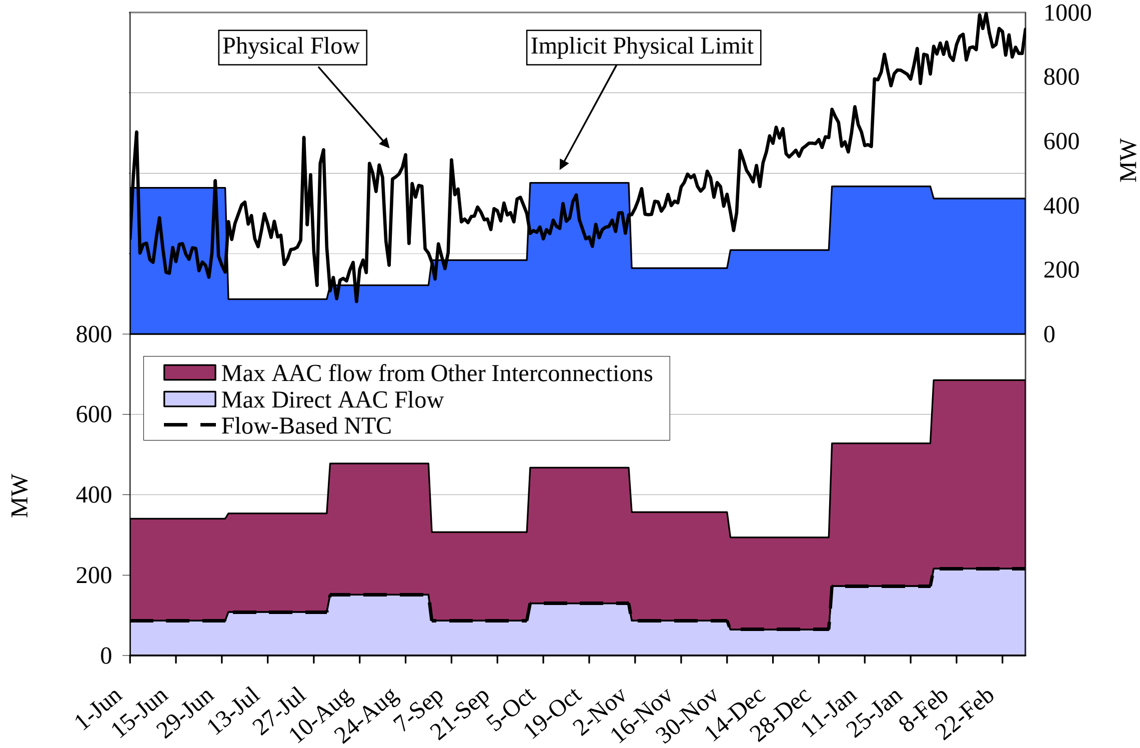


Figure 20 below shows the analysis of the Romania-to-Serbia interconnection. Like the Romania-to-Bulgaria interconnection, this interconnection is fully reserved and has large physical flows, often approaching physical limit. The physical flow is relatively consistent with the maximum AAC flow (red-area plus the blue area), consistent with the hypothesis that flows arise from transactions scheduled in accordance with regional AAC values. However, without actual scheduling data, we cannot eliminate the hypothesis that only part of the flow arises from AAC and that some could be from unofficial usage of the system, i.e., unscheduled transactions or from unexpected loop flow not accounted for in the base case. With scheduling data, which we are requesting going forward, the issues would become clearer.

Figure 20: Analysis of the Romania-to-Serbia Interconnection

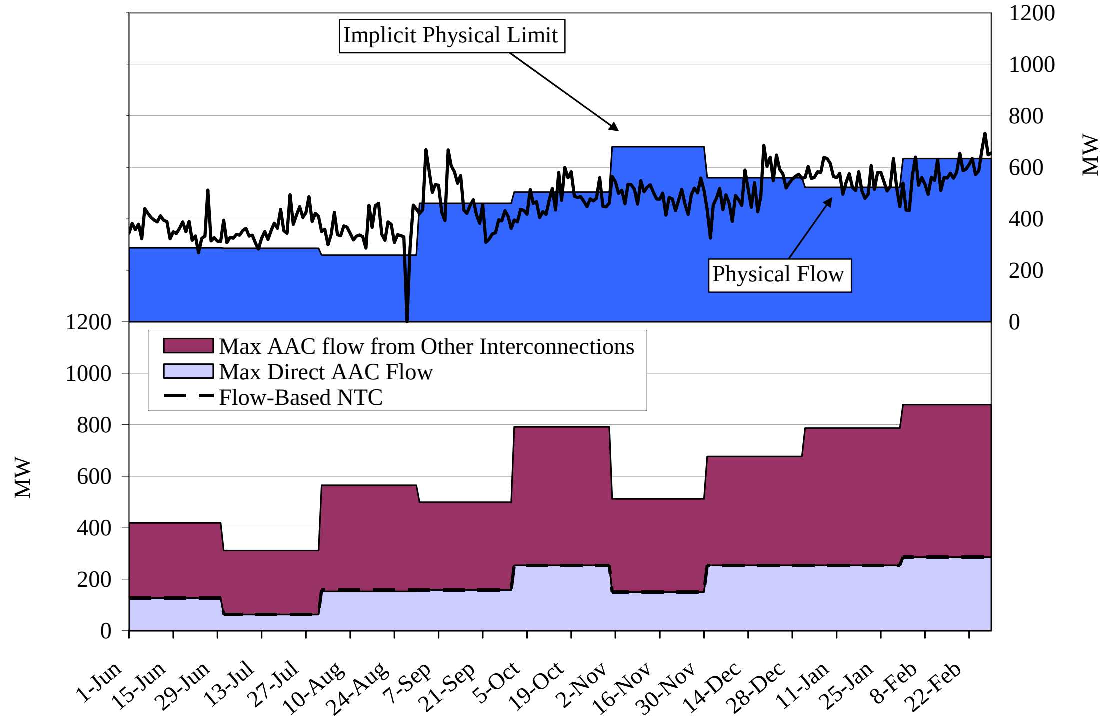


Figure 21: Analysis of the Serbia-to-Albania Interconnection

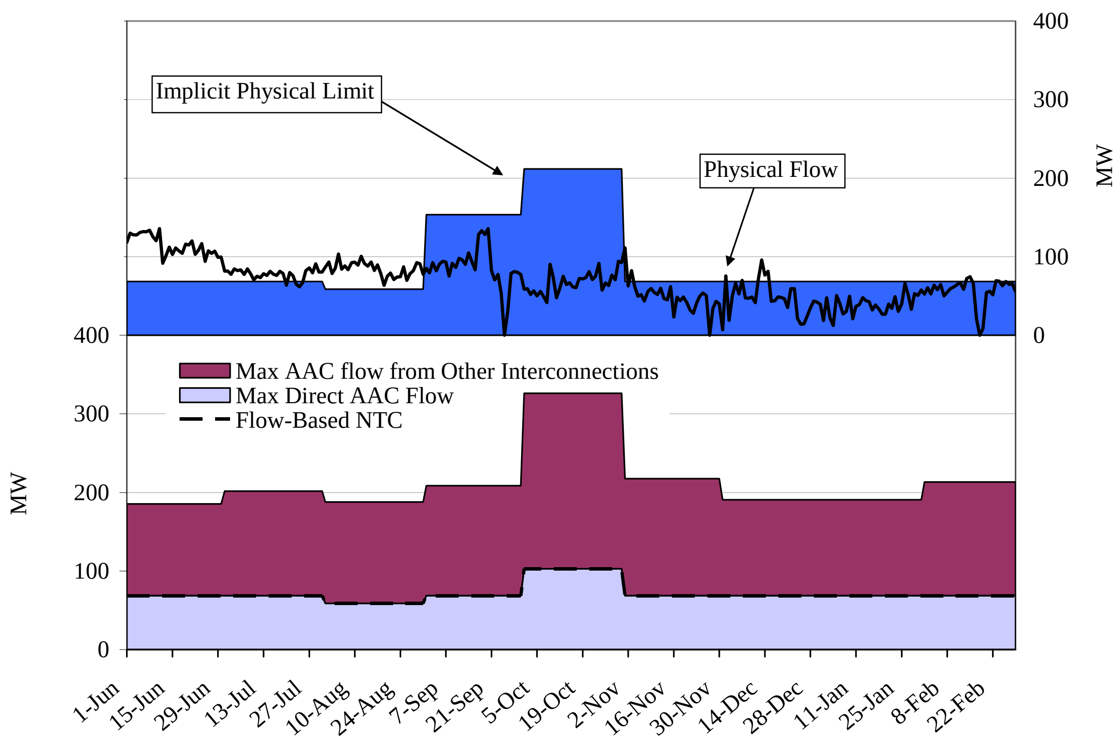


Figure 21 above shows the analysis of the Serbia-to-Albania interconnection. This interconnection is fully-reserved in all months shown. The physical flows are consistent with these direct reservations. Because the physical flows also approach the physical limit, additional NTC on this interconnection would likely contribute to increased efficiency.

Figure 22: Analysis of the Serbia-to-Bulgaria Interconnection

<<Analysis was not possible due to lack of *Serbia* and *Bulgaria* data >>

Figure 23 below shows the Serbia-to-Bosnia & Herzegovina interconnection. As the lower panel shows, only small amounts of capacity are made available via NTC and ATC. However, large physical flows occur, even in excess of the maximum flow that would occur as a result of all AAC. Moreover, the physical flow exceeds the physical limit. It is possible that loopflow or other unexpected events have occurred over the period, but such contingencies would not support a sustained pattern as shown. One possibility is that additional physical flow is occurring from transactions that are not associated with AAC, either ones for internal dispatch or cross-border ones that are unscheduled. We have not obtained clarity concerning this situation.

Figure 23: Analysis of the Serbia-to-Bosnia & Herzegovina Interconnection

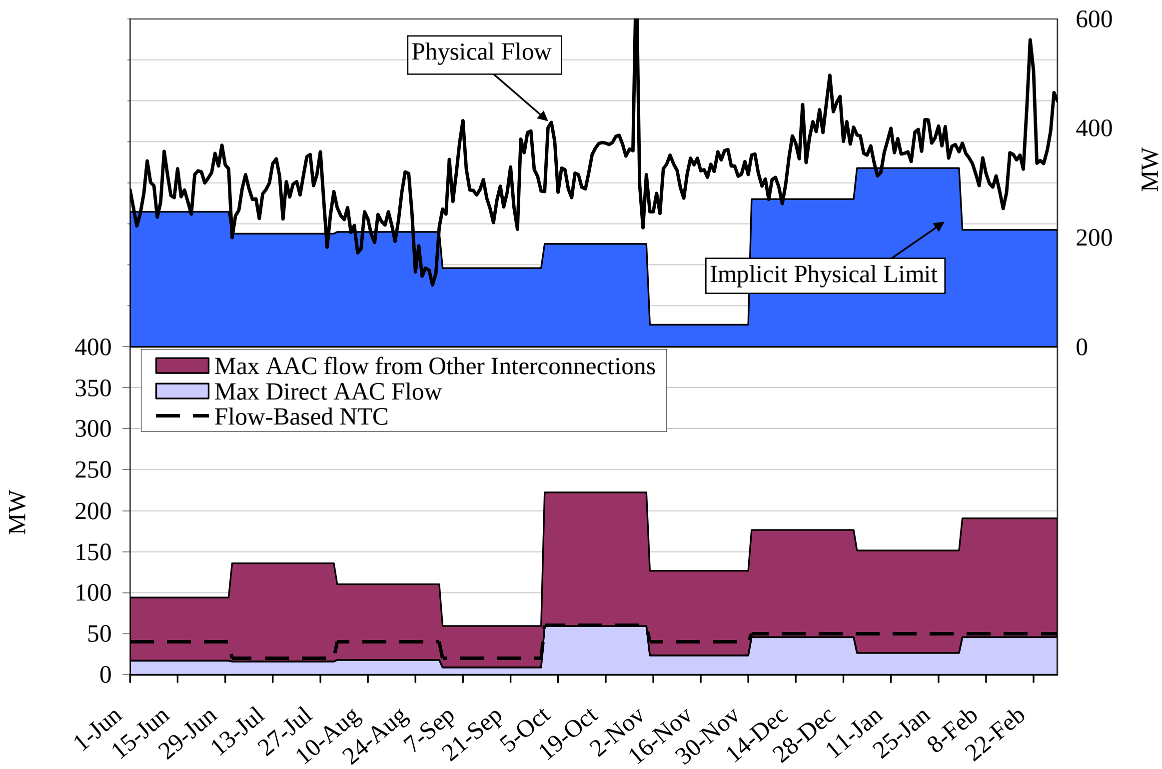


Figure 24: Analysis of the Serbia-to-Croatia Interconnection

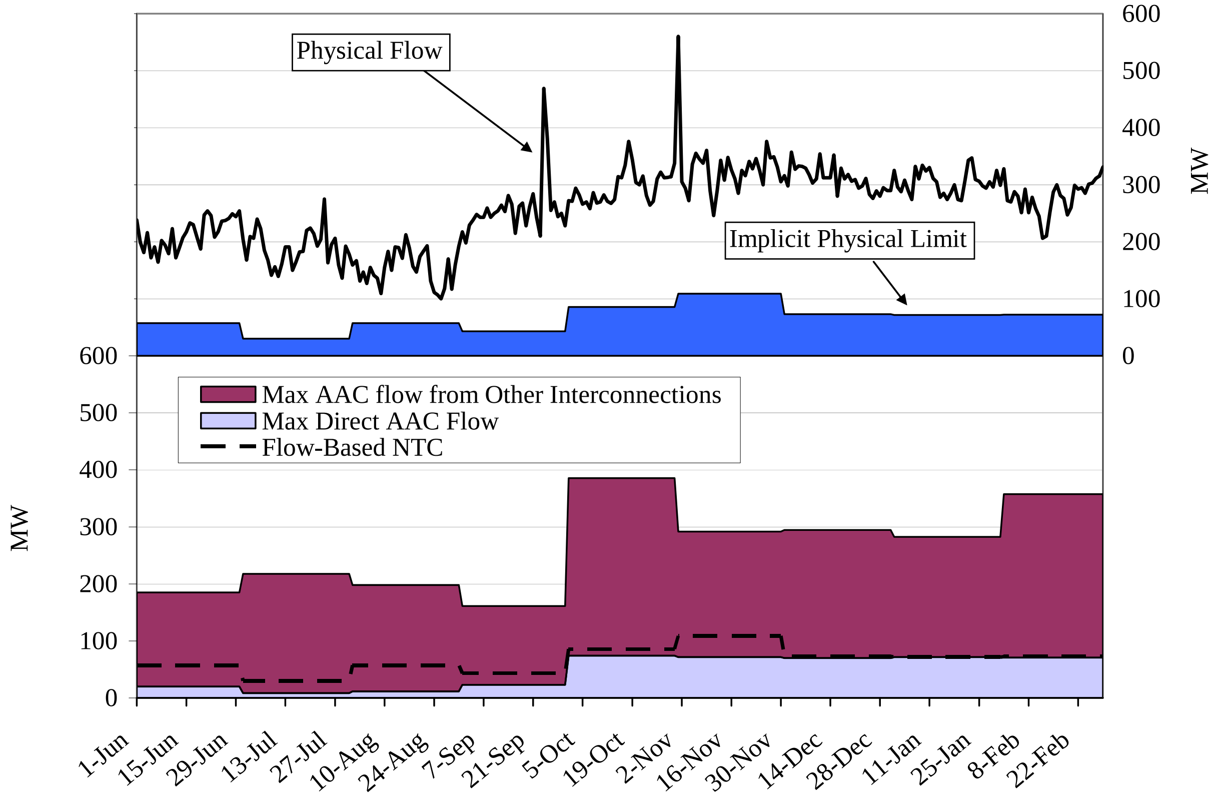


Figure 24 above shows the analysis of the Serbia-to-Croatia interconnection. As the lower panel of the figure shows, only a small amount of capacity is estimated to be available via NTC and this corresponds with a small amount reserved. However, large physical flows occupy the facilities. With the exception of two transient events in October and November, these flows are relatively consistent with maximum AAC flows (i.e., flows that would occur is all regional reservations were scheduled both direct by the TSOs on the interconnection and from other TSOs. It could also be from base case natural flows. However, we did not receive data from either Croatia or Serbia relating to natural flows. We were able to estimate BCEs from the indicative winter 2007-2008 values and are comfortable we have accounted for that missing piece of information.

If the circumstances indeed reflect large physical flows from other TSOs, then this is a case where substantial physical usage of the interconnection from others is occurring without compensation the parties to the interconnection.

Figure 25: Analysis of the Serbia-to-Macedonia Interconnection

<<Analysis was not possible due to lack of *Serbia* and *Bulgaria* data >>

Figure 26: Analysis of the Serbia-to-Montenegro Interconnection

<<Analysis was not possible due to lack of *Serbia* and *Bulgaria* data >>

Figure 27: Analysis of the Serbia-to-Romania Interconnection

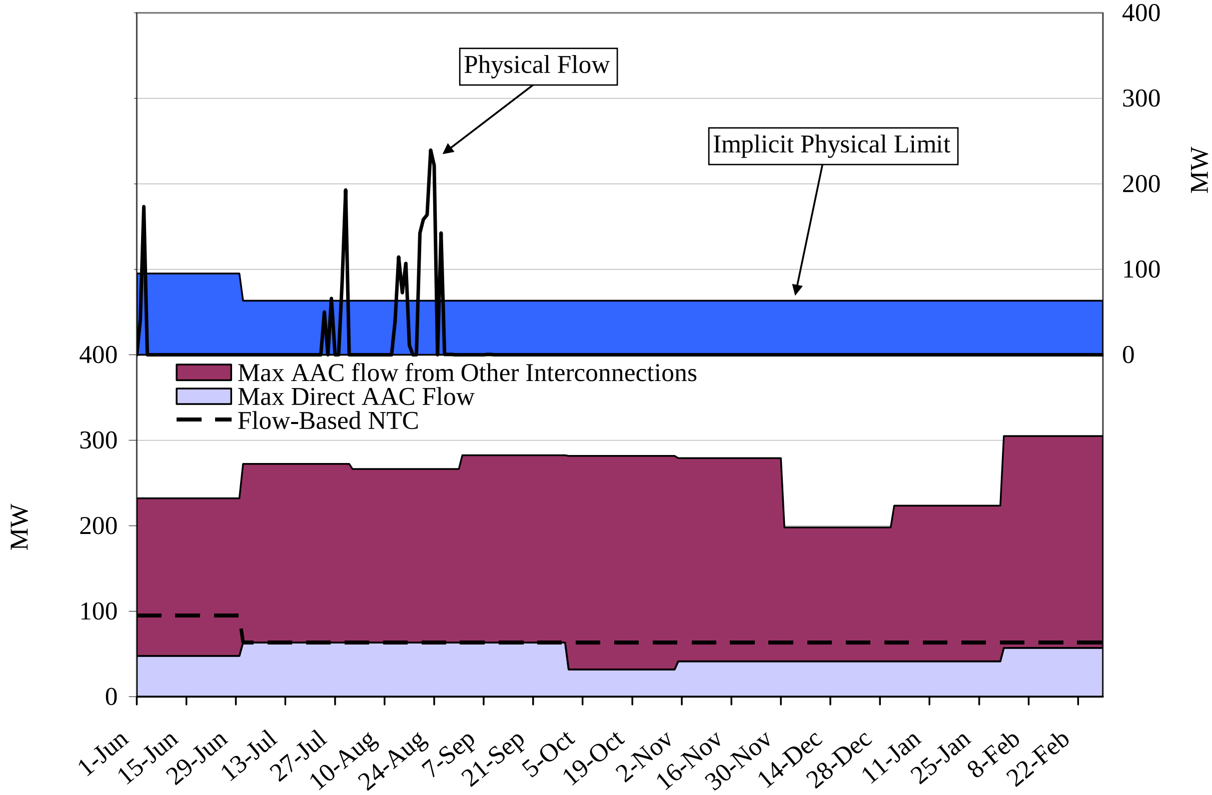


Figure 27 above shows the analysis for the Serbia-to-Romania interconnection. This is a relatively inactive interconnection. Most activity is in the opposite direction (see Figure 20). Very little is reserved on this interconnection and there are very little flows. We do note the transient instances when power transfers peaked above the physical limit during the summer, but this did not occur since that time. Besides the summer events, the analysis does not indicate to us circumstances that give rise to efficiency concerns.

D. Summary of Interconnection Capacity Analysis.

Overall, we find in many instances the actual physical usage to be consistent with physical usage associated with reservations and base case activity. Of the 22 interconnections, six were not possible to evaluate because they involved a combination of two of the following TSOs: Bulgaria, Macedonia, Montenegro, or Serbia. None of these TSOs provided line flow. Of the sixteen we were able to evaluate, seven were inactive, meaning reservations were relatively small and little or no physical flow occurred in real-time. These relatively inactive interconnections are: Albania to Montenegro; Albania to Serbia; Bulgaria to Romania; Bosnia & Herzegovina to Serbia; Croatia to Serbia; Montenegro to Bosnia & Herzegovina; and Serbia to Romania. These interconnections tend to be ones that serve power transactions in the west to east direction, which is against the predominant flow in the region. Our screening did not detect potential market or efficiency problems associated with these interconnections.

The remaining nine interconnections were active, meaning they experienced both significant reservations and significant physical flows. In two cases, the physical flows were roughly equal to the flows that would be expected from transactions between the two parties to the interconnection. These two cases were the Croatia-to-Bosnia & Herzegovina interconnection and the Serbia-to-Albania interconnection.

In the seven other instances, the physical flows exceeded the flows that would arise solely from AAC between the two counterparties on the interconnection. Therefore, the physical flow above that expected between the counterparties arises form other sources. One source is other regional transactions that "loop" onto the interconnection. Indeed, on five of these seven interconnections, the flow was consistent with what would be expected if AAC between the counterparties as well as AAC between other TSOs in the region were to be scheduled. This was the case with the following interconnections: Bosnia & Herzegovina to Croatia; Bosnia & Herzegovina to Montenegro; Montenegro to Albania; Serbia to Croatia; and Romania to Serbia. The data associated with these interconnections is consistent with the hypothesis that flows arise from transactions scheduled in accordance with regional AAC values. However, without actual scheduling data, we cannot eliminate the hypothesis that only part of the flow arises from others' AAC and that some could be unscheduled transactions or from unexpected loop flow not accounted for in the base case. With scheduling data, which we are requesting going forward, the issues would become clearer.

On the remaining two interconnections: Serbia to Bosnia & Herzegovina and Romania to Bulgaria, the physical flow exceeded that which would arise from regional AAC alone while at the same time exceeding the implied physical limit on the interconnection. The data on these interconnections suggest other transactions are using the interconnection aside form the ones scheduled pursuant to regional AAC. These other transactions could be unofficial ones or ones that are creating unexpected loopflow not accounted for in the base case. Scheduling data would help to clarify the question.

Appendix A

Regional Flows December 2007 and February 2008

Figure 28: Regional Flows at December Peak Load

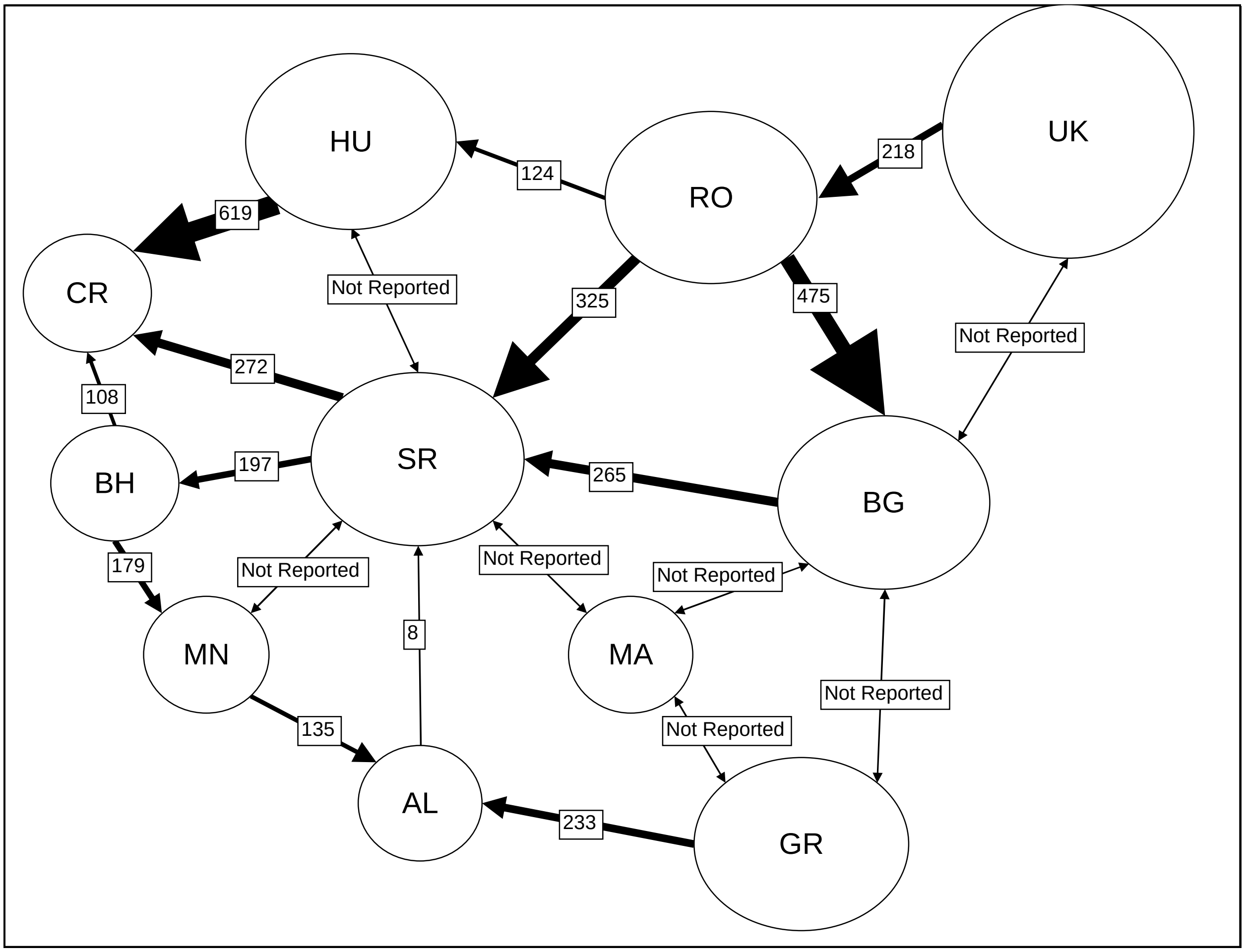


Figure 29: Regional Flows at February Peak Load