«PROCUREMENT, INSTALLATION AND SUPPORT OF AN IT SYSTEM FOR THE SUPPORT OF THE GREEK CROSS BORDER SCHEDULING PROCESS»

ISSUE 7
TECHNICAL REQUIREMENTS

1 Contents

2 Project scope

The scope of this project is the procurement, customization, installation, commissioning and support of a software system which will be hosted in the hardware provided by ADMIE located in the datacenter of ADMIE headquarters. It will address and support the current ADMIE cross border scheduling processes, related to Long term and Day-Ahead explicit procedures, as well as the future scheduling processes, related to Day-ahead and Intra-Day implicit procedures.

The main functionalities ADMIE seeks to address through the procurement of the new Greek Cross Border Management System (XB MS), is the support of the procedures for the Cross Border Scheduling operations, related to the following markets in Greece:

- Forward capacity market,
- Day-Ahead market,
- Intra – Day market,

For the concerned neighboring borders, namely Italy, Albania, FYROM, Bulgaria and Turkey, relative functionality includes:

- Reception and storage of the Long/Short Term Right Documents of the participants from the relevant Capacity Allocation Offices and send the information to the Market Operator.
- Reception of the Long/Short Term Nominations from the traders, storage and validation according to predefined rules.
- Matching and confirmation of the validated nominations with the neighboring TSO, for each border.

- Calculation of the Available Transmission Capacity (ATC) and exchange with the relevant Capacity Allocation Office and the Market Operator for the Forward capacity market, the Day-Ahead market (DA) and the Intra – Day market (ID).
- Reception of the market results from the Market Operator.
- Notification, via the exchange of XML files in appropriate format, of the final cross border schedules to various interested parties (Verification Platform, ADMIE National Control Center, Balancing Platform, Remit, Transparency platform etc.).

2.1 Communication overview

The communication channels between ADMIE and the various actors that will have to be implemented in the current tender, are depicted in the following diagram:

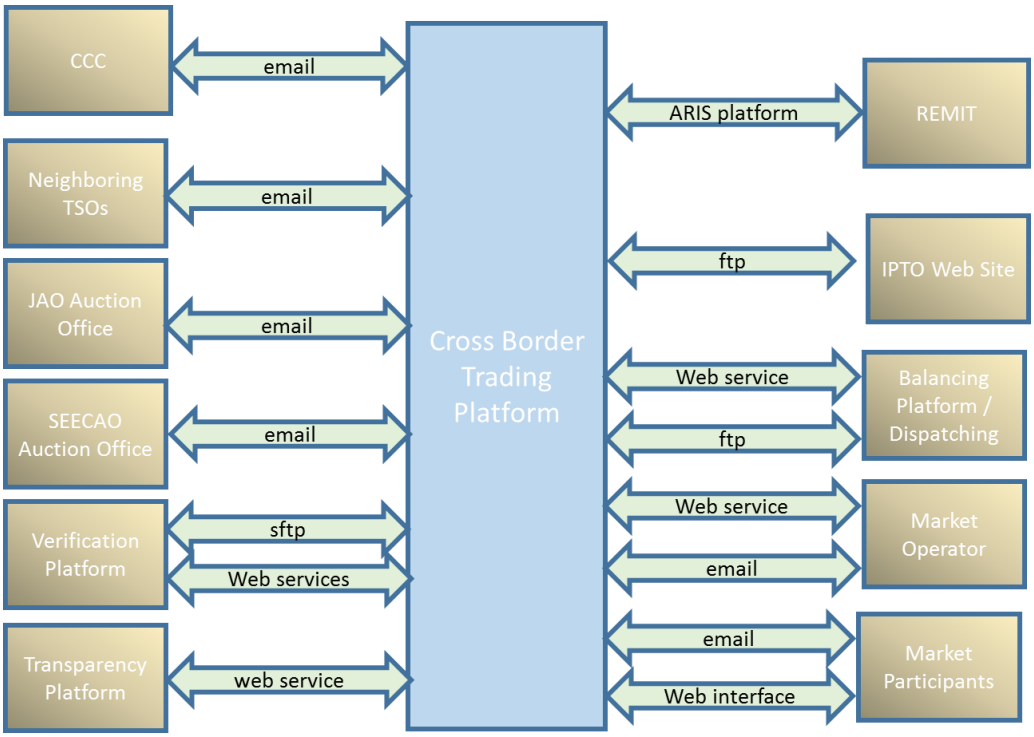


Figure 1 Current known as available communication channels with the various actors

Concerning the data exchange up to 15 different ENTSO-E XML formats or ENTSO-E like XML formats may have to be implemented. Indicatively, such formats will be:

- ECAN CapacityDocument
- ECAN CapacityAuctionSpecificationDocument
- ESS Anomaly Report
- ESS Acknowledgment
- ESS Confirmation Report
- ESS ScheduleMessage
- RGCE Reporting Market Document
- RGCE Status Request Market Document
- CZC - IEC 62325-451-3-capacity-8.0

In addition, the platform will have to implement 10 XLS files for the publication to ADMIE website.

2.2 Long Term and Day Ahead Explicit Procedures

This chapter describes the day ahead cross border scheduling process that will have to be implemented in the context of this project. ADMIE reserves the right to change one or more parameters during implementation (i.e. gates, matching rules etc.)

The day ahead scheduling process is comprised by different phases, which are analyzed in the following paragraphs. Generally, the phases are the same for all borders but in the case of differentiation, all alternatives are stated.

2.2.1 NTC Allocation

During the annual, monthly and daily capacity allocation process, ADMIE calculates the corresponding NTC and agrees it with the corresponding TSO. The final NTC values are stored in the system and then communicated via email to the corresponding Capacity Allocation Office with a Capacity Document. The system should offer the possibility for the NTC values to be entered or updated manually by an operator or by loading a CapacityDocument xml file. In both cases, it should be possible to enter values for a variable time period, denoted by a start date and an end date. All versions of the entered values must be kept.

2.2.2 Capacity Rights

Two days before the scheduling day, ADMIE receives from the Capacity Allocation Office the annual and monthly final capacity rights, which are aggregated into the Long Term Capacity Rights. They are received via email through a rights document. The system should receive these XML documents and store the long-term capacity rights in the database for the specific day. In case of receiving multiple versions (i.e. because of curtailment), all versions must be stored with the most recent one as valid, unless otherwise stated by the operator.

2.2.3 Long and Short Term Nominations

2.2.3.1 Nominated Schedules

The Traders or their counterparties inform ADMIE of the capacity they are going to use, based on their capacity rights documents (Long Term or Short Term).
These capacity usage Nominations are received by the system through a schedule message document via the communication path supported by the system (email or web interface).
The ADMIE Day Ahead scheduling process includes, at the moment, two phases of nominations submission: The Long Term Phase, when nominations based on Long Term rights are submitted. In the Short Term Phase the nominations based on both Long Term and Short Term rights are submitted.
In both phases, once a file is received, the correct syntax as well as the coherence of the document must be verified and a positive or negative acknowledgment must be sent back to the sender in the form of an acknowledgment document. In case of the negative acknowledgment the sender can send new version of its nomination after correcting it.
Once the nominations have been received successfully, the system must check that they do not exceed the amount of the relevant capacity rights (short / long term). In the case that a traders' nominations exceed this amount, they are rejected and an anomaly report is sent to its sender informing him of the errors.
The sender is then responsible for sending a new version of the nomination, containing the corrected time series.

In case the corrected nomination is not received within the specific time limits, the administrator will have the possibility to manually change the nomination and enter the correct values. This will have to be fully audited by the system and the schedule must be marked as manually modified.

It should be noted that the nomination files are inclusive, meaning that a new version includes the correct time series of the previous version and the

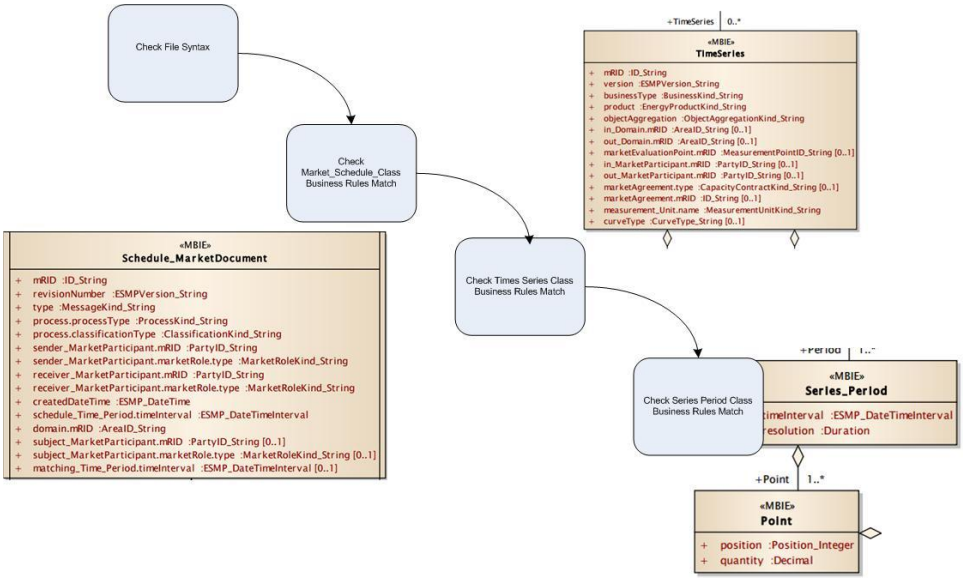
nominations based on the Short Term rights include the Long Term Nominations. In case of mismatch, the nominations will be rejected with a negative acknowledgment and will have to be sent again.

The XML file submitted by the market participant should follow the structure of CIM ESS (IEC 62325-451-2) The consolidated classes of the ESS file structure are depicted on the diagram above. There are four (4) basic phases in the validation process. These 6validation phases should be performed in a linear manner.
In the first stage each file is validated for its syntax integrity. In the following phases each element of the file structure is checked against a set of Business rules. If a rule is not met, a negative acknowledgement document should be send to the market participant.

2.2.3.1.1 Indicative validation of XML file

An indicative validation of an input Nomination file received by a Market participant is depicted in the following diagrams. These validation steps must be included in the validation of all XML file types processed by the system.

Validation Phase “Check Market Schedule Class Business Rules”



An indicative non-exhaustive set of checks performed are listed below:

Element	**Business Rules**
mRID	Should follow a structure defined by ADMIE

revisionMumber	The version of the file. Versions are integers starting from 1. They are related with the createdDateTime element. Each file with a version higher should have a later time value
process.processtype	Eg. Day-Ahead, intra-day etc. The system should check weather sender is involved in the specific process
processClassificationType	Indicated whether the values are relative or absolute. Will be decided per process by ADMIE in the future
sender_MarketParticipant.mRID	EIC Code of a registered Market Participant
sender_MarketParticipant.marketRole.type	Role of the sender party should be categorized and matched with EIC code (Market Operator, System Operator, Balance Responsible Party e.t.c.)
receiver_MarketParticipant.mRID	ADMIE EIC Code or the relevant party receiver party EIC code
receiver_MarketParticipant.marketRole.type	Should be A04 System Operator, or other as defined in ENTSO-E code lists
createdDateTime	The date and time of the creation of the document
schedule_Time_Period.timeInterval	The beginning and ending date and time of the period covered by the document containing the schedule should be valid (e.g. for day ahead it should 24 hours)
domain.mRID	The identification of the domain that is covered in the schedule document. Should be 10YGR-HTSO----Y if the domain is Greece
Senders Time.Series.Identification.mRid	A unique identification of the time series.
timeseries.revisionMumber	The version of the file. Versions are integers starting from 1. They are related with the createdDateTime element. Each file with a version higher should have a later time value
timeseries.businessType	as defined in ENTSO-E code lists

2.2.3.2 TSO Schedules and compensation programs

Special energy transfers (operative nominations) are frequently agreed between TSOs (e.g. counter-trading schedules, emergency programs, balancing energy, compensation programs). The resulted nominations are usually defined by the operators. Specific rules are usually defined for the matching of these TSO schedules. These programs could be manually entered by the operator through a user-interface provided by the system or received through a ScheduleMessage Document via the communication path specified.

It should be noted that the sum of all nominations per border direction (special nominations included) must not exceed the capacity limits (NTC) for the given business day. In the case that the NTC is exceeded, the operator has to be informed by the system and the operator will make the appropriate actions

2.2.3.2.1 Provisions for CGMA

Especially for the interconnection GR-IT, both TSOs launch a weekly compensation program for unintentional deviations between schedules and real flows. The compensation programs will be uploaded to the platform every week and will be exchanged and matched every day as TSO programs.
Additionally, for GR-IT interconnection will be implemented the provisions of the Common Grid Model Alignment (CGMA) for the HVDC interconnections. Consequently, the DC-link will be defined as a Virtual Scheduling Area and after the matching of the schedules in the border, the system will calculate flow at the 2 boundary points of DC-link (with respect to the table of the losses) and finally will send them to Pan-European Verification Function (PEVF).
Indicatively, according the provisions for Pre-Processing Data (PPD) of CGMA the system should make a provision (eg. for next week) for the preliminary DC flows, taking into account a formulation based on previous matched schedules. The exact formulation and the services needed to be applied by the system in the frame of CGMA will be given by ADMIE during the Work Statement phase of the project.

2.2.4 SO-SO Matching

At the moment, the SO-SO matching process is carried out twice a day, after the two nomination submission phases.

2.2.4.1 Matching based on the Long Term Nominations

After reception, validation and storage of the valid Long Term Nominations, are exchanged with the neighboring TSO through a ScheduleMessage Document that contains all the relevant time series via the communication path specified. The stored values of the valid nominations are compared with the values received by the other side of the border.

In case all values are matched, the neighboring TSO, as well as the corresponding traders, are informed of the matching result through a confirmation report document. In case of mismatch, the following rules are applied at the moment:

- For the northern Greek borders (AL, FY, BG, TR): the lower value prevails
- For the Greece Italian border: the export value prevails

The traders, whose nominations are not matched, are informed of the result through an anomaly report document and asked to send their corrected nomination again. In case the new nomination has not been received within the specific deadline, the operator modifies the corresponding time-series according to the prevailing rules. The resulted time series, is included in the final Schedule Message Document and sent to the neighboring TSO. The matched nominations should be marked as such by the system.

It is obvious that the SO-SO matching process may involve more than one iteration of document exchanges between the TSOs, until all the values are matched. All the versions of these files should be kept in the system with the operator having the opportunity to appoint the final version manually.

2.2.4.2 SO-SO Matching based on the Short Term Nominations

This procedure is carried out after the reception, validation and storage of the valid Short Term Nominations. In this case, all the nominations (both Long Term and Short Term) are exchanged with the neighboring TSO and all their values should be matched.

This matching procedure includes the same requirements and steps as the Long Term matching described above, with only one differentiation, regarding the prevailing rules:

For the northern borders (AL, FY, BG, TR): the same as Long Term

For the Italian border: the lower value prevails (same as the northern borders)

2.2.5 ATC Calculation and Matching

After the SO-SO matching of the LT nominations, the Available Transfer Capacity (ATC) must be calculated so that it can be auctioned during the daily auctions and the daily (short term) capacity rights can be allocated to the traders. Each Capacity Allocation Office requires different information in order to establish the daily ATC for each border:

SEECAO (AL, FY): The matched LT nominations (and ATC if so agreed) are sent to SEECAO, via email, with a Schedule Message Document. SEECAO, after calculating the ATC, submit it to ADMIE with a Capacity Auction Specification Document via email.

SEECAO (TR): The matched LT nominations (and ATC if so agreed) are sent to SEECAO by the Turkish TSO. ADMIE should be able to send nomination documents in case of an unavailability of TEIAS. SEECAO, after calculating the ATC, submit it to ADMIE with a Capacity Auction Specification Document via email.

JAO (IT, BG): The matched LT nominations are sent to JAO by each TSO. The ATC for the exports from Greece is calculated and sent to JAO through a Capacity Auction Specification document. The ATC for imports to Greece is calculated by TERNA and sent to JAO via email through a Capacity Auction Specification Document.

For each border b and for the direction d=i (import) and time period t the ATC calculation is based on the following formula:

Offered Capacity =NTC1DAILY- LT nominations (netted)

Offered Capacity = ATC

LT nomination (netted) for Allocation Border direction A->B is calculated as

$$\mathrm{FLOOR}(\mathrm{RF}_{\mathrm{A}\to\mathrm{B}} * \mathrm{LT\ nomination}_{\mathrm{A}\to\mathrm{B}}, 1) - \mathrm{FLOOR}(\mathrm{RF}_{\mathrm{B}\to\mathrm{A}} * \mathrm{LT\ nomination}_{\mathrm{B}\to\mathrm{A}}, 1)$$

Where $\mathrm{RF}_{\mathrm{A}\to\mathrm{B}}$ is a reduction factor applied in case of curtailment for Allocation Border direction from A to B. For Offered Capacity Calculation the last available nomination file will be used. In case the nomination file is considering a curtailment (identified by respective reason code) the Reduction Factor is automatically replaced with value 1.

The ATC must be calculated and stored by the system for all borders and directions independently of the ATC received by the Transmission Capacity Allocators. The received ATC must be stored and checked against the ATC calculated by the system. In case of mismatch, the operator must have the option to resend the new versions of the relevant files.

An analytic description of the timeline of the current procedure is depicted in the following table:

Procedure	**Time Gate**	**From**	**To**
Sending LT (Y,M) ATC (IT, BG)	2 hrs before deadline JAO Auction Calendar	ADMIE XBMS	JAO
Acknowledgement Reception of LT (Y,M) ATC (IT, BG)	JAO Timeline	JAO	ADMIE XBMS
OfferedLT (Y,M) ATC (IT, BG)Capacity Calculation, sending of Auction Specification document	JAO Timeline	JAO	ADMIE XBMS
LT (Y,M) ATC (IT, BG)auction results in form of Total Auction Results (TAR)	JAO Timeline	JAO	ADMIE XBMS
Sending Y NTC (FYROM, AL)	DY - 9 12:00	ADMIE XBMS	SEE CAO
Offered Y NTC (FYROM, AL) Auction Specification document	DY - 7 12:00	SEE CAO	ADMIE XBMS
Total Allocation Yearly Result Document (AL, FYROM, TR)	DY + 4 WD	SEE CAO	ADMIE XBMS
Sending M NTC (GR-FYROM, GR-AL)	DM - 7 12:00	ADMIE XBMS	SEE CAO
Initial Monthly Auction Specification Document	DM - 5 12:00	SEE CAO	ADMIE XBMS
Right Documents Resold	DM - 2 12:00	SEE CAO	ADMIE XBMS
Monthly Auction Specification Document - Final	DM - 2 12:15	SEE CAO	ADMIE XBMS
Total Monthly Allocation Result Document	DM + 4WD 12:15	SEE CAO	ADMIE XBMS
Receive Rights Document LT Transfers FYROM, AL, TR	D-2 12:02	SEE CAO	ADMIE XBMS
Acknowledgment for received LTRDs to Auction Tool	within 10 minutes	ADMIE XBMS	JAO
Receive LT Rights Documents FYROM,AL, TR	D-2 13:00	SEE CAO	ADMIE XBMS
Receive Participants LT Nominations for FYROM, AL, TR	From D-2 13:00 Until D-1 08:00	Market Participants	ADMIE XBMS

CAS send/receive to FYROM, TR, AL TSOs and CAS Matching	From D-1 08:00 Until D-1 08:30	MEPSO, OST, TEIAS	ADMIE XBMS
CAS send/receive to FYROM, TR, AL TSOs and CAS Matching	From D-1 08:00 Until D-1 08:30	ADMIE XBMS	MEPSO, OST, TEIAS
Submission of NTC Curtailed FYROM, AL, TR	D-1 07:00	ADMIE XBMS	MEPSO, OST, TEIAS
Submission of LT Noninations FYROM , AL, TR	D-1 08:30	ADMIE XBMS	SEE CAO
Acknowledgment, LT Noninations FYROM, TR, AL	Upon LT Nomination	SEE CAO	ADMIE XBMS
Initial Daily Auction Specification Document (Preliminary Offered Capacity)	D-1 08:36	SEE CAO	ADMIE XBMS
Reception of Curtailed Right Documents	D-1 08:55	SEE CAO	ADMIE XBMS
Final Daily Offered Capacity	D-1 08:57	SEE CAO	ADMIE XBMS
Auction Specification Document (Preliminary Offered Capacity)	D-1 08:57	SEE CAO	ADMIE XBMS
Receive Participants LT Nominations for IT, BG	From D-2 12:30 Until D-1 08:30	Market Participants	ADMIE XBMS
CAS send/receive to/from BG and CAS Matching	From D-1 08:00 Until D-1 08:30	ESO	ADMIE XBMS
CAS send/receive to/from BG and CAS Matching	From D-1 08:00 Until D-1 08:30	ADMIE XBMS	ESO
CAS send/receive to/from IT and CAS Matching	From D-1 08:30 Until D-1 09:00	TERNA	ADMIE XBMS
CAS send/receive to/from IT and CAS Matching	From D-1 08:30 Until D-1 09:00	ADMIE XBMS	TERNA
Submission of NTC curtailed IT BG	D-1 08:05	ADMIE XBMS	JAO
Acknowledgment for received Curtailment information	Within 3 minutes from Auto submission	JAO	ADMIE XBMS
Reception of Curtailed Right Documents	Within15 minutes from Auto submission	JAO	ADMIE XBMS
Submission of Counterpaties for Nomination procedure	D-2 12:00	Market Particip	ADMIE XBMS

		ants	
Submission of NTC curtailed IT BG	D-2 16:00	ADMIE XBMS	JAO
Submission of LT Nominations IT, BG exports	From D-1 09:00 Until D-1 14:00	ADMIE XBMS	JAO
Submission of Daily ATC GR-IT, GR-BG	D-1 09:30	ADMIE XBMS	JAO
Acknowledgment for received Daily ATCs	Within 5 minutes from Submission	JAO	ADMIE XBMS
Receive of Daily Product ATC GR-IT, GR-BG	D-1 09:30	JAO	ADMIE XBMS
Daily Allocation Result Document MEPSO, OST, TEIAS	D-1 10:02	SEE CAO	ADMIE XBMS
Daily Right Document FYROM, AL, TR	D-1 10:05	SEE CAO	ADMIE XBMS
Daily Allocation Result Document IT, BG	D-1 10:12	JAO	ADMIE XBMS
Daily Right Document IT, BG	D-1 10:30	JAO	ADMIE XBMS
Acknowledgment for received RD	Within 10 minutes from Receive	ADMIE XBMS	JAO
Daily PTRs FYROM, AL, TR, BG, IT	D-1 10:30	ADMIE XBMS	HEnEx
Long - Term Right Documents (D+2) IT, BG	D-1 12:30	JAO	ADMIE XBMS
Acknowledgment for received LTRDs	within 10 minutes	ADMIE XBMS	JAO
Reception of XB Schedules from DAM clearing and from LT and ST PTR margins (IT, BG, FYROM, AL, TR)	D-1 12:57	HEnEx	ADMIE XBMS
Sending of HEnEx Prices	D+1 23:59	ADMIE XBMS	JAO
Long - Term Right Documents (D+2) FYROM, AL, TR	D-1 13:00	SEE CAO	ADMIE XBMS
Reception of Total Nominations resulted DAM clearing and from LT and ST PTR margins (IT, BG, FYROM, AL, TR)	D-1 13:00 Until 15:25	Market Participants	ADMIE XBMS
CAS send/receive to FYROM, TR, AL , IT and BG TSOs and CAS	D-1 14:00 Until 15:25	TERNA, ESO	ADMIE XBMS

Matching		,OST, MEPSO TEIAS	
CAS send/receive to FYROM, TR, AL , IT and BG TSOs and CAS Matching	D-1 14:00 Until 15:30	ADMIE XBMS	TERNA, ESO ,OST, MEPSO TEIAS
SAX file to VP	D-1 14:30 Until 15:30	ADMIE XBMS	Verification Platform
XB Schedules DA Total	D-1 14:30 Until 15:30	ADMIE XBMS	EMS
XB Schedules DA Total	D-1 14:30 Until 15:30	ADMIE XBMS	ADMIE BMS
Submission to REMIT	D-1 14:30 Until 15:30	ADMIE XBMS	REMIT PLATFORM

2.3 Notification to the Verification Platform

After the final matching of the Long Term and Short Term Nominations, the Coordination Centre should be informed of all the nominated schedules through three different Reporting Market Documents:
Market Documents (one per border) per border containing the aggregated Day-Ahead netted market schedules

- One Market Document per border containing the Day-Ahead netted TSO schedules
- One Market Document per border containing the aggregated Intra-Day netted market schedules
- One Market Document per border containing the Intra-Day netted TSO schedules
- One Market Document containing the compensation schedules.

Upon reception, the coordination center sends the Acknowledgment Market documents, accepting or rejecting the relevant document. This information should be made visible to the operator, so that, in case of rejection, the appropriate actions will be taken and a second corrected version will be sent again to the coordination center.

2.4 Day Ahead Implicit Procedures

The Day Ahead implicit procedures will be implemented only for the Italian border in the context of this tender.

After receiving the DA NTC and the LT Nominations and the matching with the Italian TSO, during the pre-coupling operations, ADMIE will receive the Cross Zonal Capacities (CZC) (NTC/ATC or Flow Based constraints) from the relative Coordinated Capacity Calculator (CCC). ADMIE will send back the validation of CZC to CCC.

During the coupling operations, ADMIE will receive the following information from the NEMO performing the MCO resulting from the single Day Ahead coupling:

- Rounded and unrounded net position per Scheduling Area;
- Rounded and unrounded net position per Bidding Zone;
- Rounded and unrounded net position per NEMO Trading hub;
- A single clearing price for each Bidding Zone and market time unit in EUR/MWh
- Allocated capacities in form of Scheduled Flows for each bidding zone border

In addition, ADMIE will receive the following information from the NEMO performing the MCO resulting from the single Intra-Day coupling:

- Single net positions as specified in Article 52(1b) to all TSOs and all Scheduled Exchange Calculators;
- Allocated capacities, in the form of scheduled flows between bidding zones
- Allocated capacities, in the form of scheduled flows between scheduling areas
- Allocated capacities, in the form of scheduled flows between NEMO Trading hubs

At the end of coupling procedure, ADMIE will send to the neighboring TSOs the full-set of cross-border Scheduled Exchanges (cross-border energy quantities cleared in the Day-Ahead Market, along with the already matched nominations of long-term schedules) for matching purposes, in the Notification (nomination/scheduling) and congestion income process of the post-coupling phase.

For fallback purposes to the coupling procedures, ADMIE will also receive all the results from Shadow Auctions performing from Allocation Platform (JAO) for coupled borders.

The detailed daily procedure is depicted in the following table:

Procedure	Time gate	From	To
Reception of DA NTC from CCC	TBD	CCC	ADMIE XBMS
Reception of LT notification	D-1 8:30	Market Participants	ADMIE XBMS
CAS send/receive to/from IT and CAS Matching	From D-1 08:30 Until D-1 09:15	TERNA	ADMIE XBMS
CAS send/receive to/from IT and CAS Matching	From D-1 08:30 Until D-1 09:15	ADMIE XBMS	TERNA
Sending of nominated and matched LT PTRs of the Participants per border and per direction	D-1 8:35	ADMIE XBMS	HEnEx
CZC computation (for IT-GR and GR-IT borders)	D-1 9:30	ADMIE XBMS	
CZC computation (for IT-GR, GR-IT borders)		TERNA	
Sending of the CZCs valuen (for IT-GR and GR-IT borders)	D-1 9:40	ADMIE XBMS	TERNA
Sending of the CZCs value (for IT-GR and GR-IT borders)	D-1 9:40	TERNA	ADMIE XBMS
Matching of the CZCs (for IT-GR and GR-IT borders)	D-1 10:10	ADMIE XBMS	TERNA
Matching of the CZCs (for IT-GR, GR-IT borders)	D-1 10:10	TERNA	ADMIE XBMS
Sending of the CZCs (for IT-GR and GR-IT borders)	D-1 10:20	ADMIE XBMS	HEnEx
Sending of the CZCs (for IT-GR, GR-IT borders)	D-1 10:20	TERNA	GME
Check of the CZCs file and sending of acknowledgment	D-1 10:20	HEnEx	ADMIE XBMS
Check of the CZCs file and sending of acknowledgment	D-1 10:20	GME	TERNA
Sending and acknowledgement of the CZCs (for IT-GR border) for preparing the decoupling situation (Shadow Auctions)	D-1 10:20	ADMIE XBMS	JAO

Sending and acknowledgement of the CZCs (for IT-GR border) for publication to the publication platform	D-1 10:20	ADMIE XBMS	JAO
Sending and acknowledgement of the CZCs (for GR-IT border) for preparing the decoupling situation (Shadow Auctions)	D-1 10:20	TERNA (GR-IT)	JAO
Sending of the CZCs (for IT-GR and GR-IT borders)	D-1 10:30	HEnEx	GME
Sending of the CZCs (for IT-GR and GR-IT borders)	D-1 10:30	GME	HEnEx
Checking of the CZCs (for IT-GR and GR-IT borders)	D-1 10:30	HEnEx	GME
Checking of the CZCs (for IT-GR, GR-IT, border)	D-1 10:30	GME	HEnEx
Sending of the Network Data for both directions		HEnEx (PCR PX)	PMBs
Cross-checking of the Network Data by HeNex		PMB	
Cross-checking of the Network Data by GME		PMB	
Submission of orders by Market Participants (MPs)	D-1 12:00	MPs	HEnEx & GME
Sending of Order Data to the PMB	D-1 12:10	PXs	PMB
Computation of Preliminary Day Ahead Market Results (including shadow)		PMB	
Sending of Coordinator and shadow Results (Preliminary results) to PXs		PMB	PXs
Check Preliminary Results		PXs	
Confirmation of Preliminary Results to PMB		PXs	PMB
Centralisation of Preliminary Results check by Coordinator		PMB	
Creation and sending of global preliminary confirmation by the Coordinator to PXs		PMB	PXs
Receive of the Market Coupling Results file for the final validation to TSOs	D-1 12:42	HEnEx	ADMIE XBMS -BP
Final Confirmation process of the	D-1 12:42	ADMIE	

Market Coupling Results		XBMS	
Sending of the Final Confirmation of the Market Coupling Results file	D-1 12:47	ADMIE XBMS	HEnEx
Sending of the Final Market results to the TSOs	D-1 12:56	HEnEx	ADMIE XBMS -BP
Sending of the Final Market results to the TSOs	D-1 12:56	GME	TERNA
Computation of Scheduled Exchanges			
Sending Scheduled Exchanges to start the checking of nomination process (for IT-GR and GR-IT borders)		GME	TERNA
Sending and acknowledgement of the Scheduled Exchanges for Shipping	D-1 12:55	HEnEx (Athex clear)	ADMIE XBMS
Sending and acknowledgement of the Market Coupling Results to the Congestion Income Distributor (for IT-GR border)	D-1 13:05	HEnEx	JAO CRDS
Sending and acknowledgement of the Scheduled Exchanges to the Congestion Income Distributor (for GR-IT)	D-1 16:00	ADMIE XBMS	JAO CRDS
Sending and acknowledgement of the Scheduled Exchanges to the Congestion Income Distributor (for IT-GR border)	D-1 16:00	TERNA	JAO CRDS
Matching of cross-border notifications (Schedule Exchanges from Market + Final schedules from XBMS)	D-1 14:30 Until 15:15	ADMIE XBMS	TERNA
Matching of cross-border notifications (Schedule Exchanges from Market + Final schedules from XBMS)	D-1 14:30 Until 15:15	TERNA	ADMIE XBMS
XB Schedules DA Total	D-1 14:30 Until 15:30	ADMIE XBMS	EMS
XB Schedules DA Total	D-1 14:30 Until	ADMIE XBMS	ADMIE BP

	15:30		
SAX file to VP	D-1 14:30 Until 15:30	ADMIE XBMS	Verification Platform
Sending and acknowledgement of the Congestion Income report between CCPs		GME	HEnEx
Sending and acknowledgement of the Congestion Income report to Congestion Income Distributor		HEnEx	JAO CRDS
Sending and acknowledgement of the Congestion Income report to Congestion Income Distributor		HEnEx	JAO CRDS
Check and computation of Congestion Income report Distribution per TSO		JAO CRDS	JAO CRDS
Distribution of the Congestion Income report (for RTE, TERNA, ELES, ADMIE, APG, SwissGrid) and acknowledgement	JAO TIMELINE	JAO CRDS	ADMIE XBMS

2.5 Intraday Procedures

The High-level procedures of complementary intraday sessions are the following:

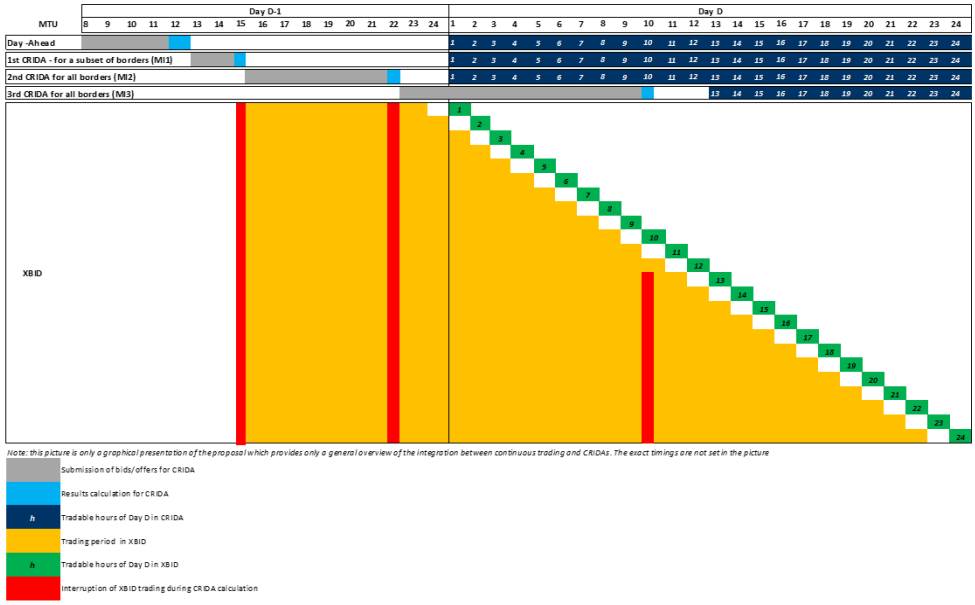
- A first complementary regional intraday auction **shall be performed at 15:00 in the day preceding the delivery day**. This auction shall allocate the intraday cross-zonal capacity for all 24 MTUs of the delivery day. The available cross-zonal capacities shall be provided by participating TSOs or coordinated capacity calculators of GRIT CCR to the relevant NEMOs no later than 14:45 in the day previous to the delivery day.
- Results of the complementary regional intraday auction shall be published no later than 15:30 in the day previous to the delivery day.
- A second complementary regional intraday auction **shall be performed at 22:00 in the day previous to the delivery day.** This auction shall allocate the

intraday cross-zonal capacity for all 24 MTUs of the delivery day. The available cross-zonal capacities as a result of an intraday capacity calculation shall be provided by participating TSOs or coordinated capacity calculators of GRIT CCR to the relevant NEMOs no later than 21:45 in the day previous to the delivery day.

- Results of the complementary regional intraday auction shall be published no later than 22:30 in the day previous to the delivery day.
- A third complementary regional intraday auction in day D **shall be performed at 10:00 in the delivery day**. This auction shall allocate the intraday cross-zonal capacity for the 12 MTUs of delivery starting from 12:00 to 24:00 of the delivery day. The available cross-zonal capacities shall be provided by participating TSOs or coordinated capacity calculators of GRIT CCR to the relevant NEMOs no later than 09:45 in the delivery day.
    - Results of the complementary regional intraday auction shall be published no later than 10:30 in the delivery day.

      The procedures for every intraday auction (session) will be similar to the procedures of the DA implicit auction (Market Coupling),

The following graph is representing the sequence of the markets for all MTUs of the day D:



The detailed communication and data exchanged are not yet defined, they will be fully specified during the implementation of the tender in the relevant phase.

Please note that the continuous SIDC trading periods (XBID) are also shown in the graph.

2.6 Publishing (EU 543/2013) of Transmission data to ENTSO-E Central Information Transparency Platform

According to the COMMISSION REGULATION (EU) No 543/2013 the following transmission data must be published to ENTSO-E Central Information Transparency Platform.

- Scheduled Commercial Exchanges (Explicit and Implicit)
- Forecasted Transfer Capacities - Day Ahead
- Forecasted Transfer Capacities - Month Ahead
- Forecasted Transfer Capacities - Year Ahead
- Total Nominated Capacity

The above data will be extracted in the specific XML format at the defined time gates according to the ENTSO-E Implementation Guide for the Transmission Transparency process for Central Information Transparency Platform and interfaced to ENTSO-E Central Information Transparency Platform by at least one of following ways:

- Using the Webservices based on the ENTSO-e protocol standard IEC TS 62325-504:2015
- Using the Web services of the MADES (IEC 62325-503) server. For this purpose, ADMIE will provide to the contractor an existing and functional ECP endpoint, already configured for communicating with ENTSO-E transparency platform. The Contractor shall use the web services of the ECP endpoint in order to send / receive XML files and acknowledgement messages to / from the ENTSO-E Transparency platform.

2.7 Publishing to REMIT platform

Similarly, the REMIT Market data should be gathered in a market data base schema, and will be extracted in the specific XML formats at the pre-defined time gates (by the ACER specifications) and sent to ACER site according to the specified

standards. In addition, the corresponding Web services clients to ACER site should be delivered.

As ADMIE has assumed the role of Registered Reporting Mechanism, it reports nomination schedules on a daily basis.

The data are reported to the Agency's REMIT Information System (ARIS). The contractor is expected to connect to ARIS.

1. On pre-specified (configurable) regular intervals, extract the necessary information from the market databases, create the XML, sign/encrypt the packages and submit to ACER via the web service interface. After submission, relevant data as well as metadata (submission timestamp, package filename XML version) should be persisted in a database schema.
2. Will retrieve, decrypt/verify and parse the receipts and store the acknowledgment status in the database.

The XML schemas, file-naming conventions and relevant documentation required to implement the project will be provided during the detailed design phase.

3 System Requirements

Along with the production system, a preproduction system will have also to be configured.

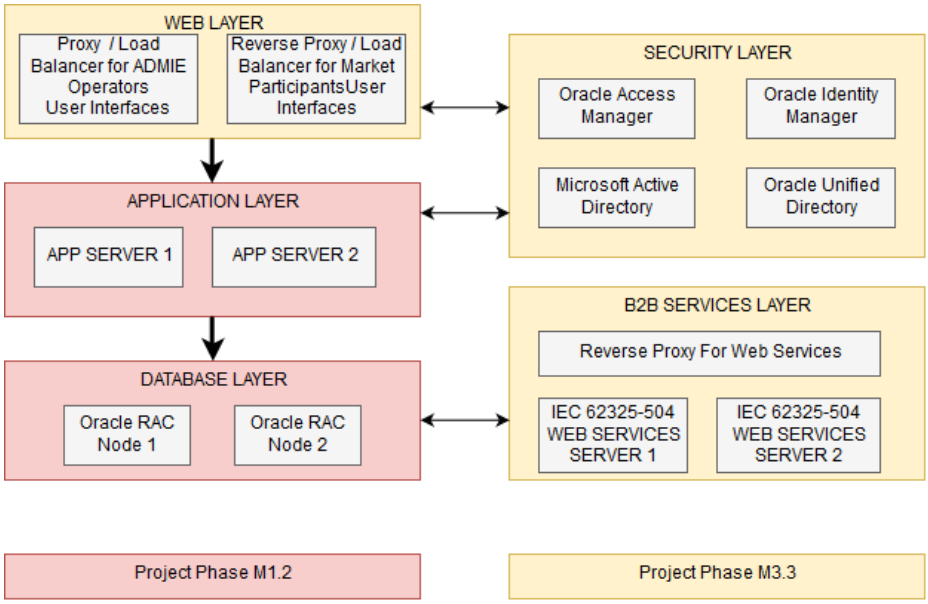
In respect of the production system, the System Database Infrastructure shall be implemented using a two-node Oracle 12c RAC. The System Application Server Infrastructure shall be implemented using a two node active – active cluster configuration either using a two node cold standby configuration (one node active - primary and one node passive - standby). In case of cold standby configuration implementation, switching between primary and stand by application servers shall have a maximum switching time of 3 minutes

In respect of the preproduction system, the system infrastructure shall be implemented using a single Oracle 12c database and a single application server, as high availability is not required.

The database servers for both the production and the preproduction system will be connected to the same storage subsystem procured in the context of the present project.

3.1 Provided System Architecture

ADMIE will provide a fully functional Oracle VM Server virtualization platform for the implementation of the system architecture. Part of the architecture will be implemented dusting phase M1.2 and the remaining part will be implemented in phase M3.3.



The production Cross Border Scheduling Platform Database will be "Highly Available" and implemented using a two node "active-active" Oracle Real Applications Cluster Database. ADMIE will provide a fully functional Oracle RAC implementation as well as DBA services to the prospective vendor.

The contractor shall offer application servers software licenses, as well as "Upgrade and Support" software license services for the complete guarantee and support period of the project, plus implementation services for the application servers infrastructure. ADMIE will provide fully functional Virtual Machines, either with Oracle Enterprise Linux or with Microsoft Windows Server and Operating System Engineering services.

For the web tier layer and the B2B services layers, ADMIE will provide fully functional Virtual Machines, either with Oracle Enterprise Linux or with Microsoft Windows Server and Operating System Engineering services. The contractor shall offer application & web tier servers software licenses, as well as "Upgrade and

Support" software license services for the complete guarantee and support period of the project, plus implementation services for the application & web tier servers infrastructure.

ADMIE will provide fully functional Oracle Access Manager, Oracle Identity Manager, Oracle Unified Directory and Microsoft Active Directory implementations as well as administration and configuration services, for these implementations, to the prospective vendor. The contractor shall configure the Cross Border Platform Web Interfaces Applications to utilize the authentication and authorization services offered by the Security Layer.

A test development system shall also be offered. There is no "High Availability" requirement for the test development system, but it shall consist of the same architectural layers as the ones of the production system. For the test/dev environment, ADMIE will provide fully functional virtual machines.

3.2 Backup & Recovery

ADMIE will be responsible for the file system backup as well as the rman database backup, which will be performed with the ADMIE backup software and according to ADMIE backup policy. ADMIE will incorporate the new system to the above backup policy in cooperation with the contractor.

The contractor will have to point out which system components must be backed up and in which frequency for the system to be fully restored in the same or another infrastructure in case of emergency.
In case of system malfunction where a system restore is needed, this will be performed by ADMIE. However, the relevant resources and cooperation must be available during this procedure by the contractor in order to ensure the full functionality of the restored system.
In case system recovery is required due to a contractor's task (e.g. apply an invalid patch update), this will be performed by the contractor.

3.3 System Performance

The system must be able to handle all the necessary file exchange and automatic checks per phase within the time limits denoted by the relevant time gates, giving also the time to the operator make any manual interventions necessary.

The system is expected to concurrently handle the schedules for maximum performance.
An acceptable time duration for the processing of one XML file (reception, syntax check, validation, generation and submission of the relevant response XML file) would be less than 10 seconds.

4 Training

Appropriate training should be provided to the operators as well as the system administrators.

4.1 Object of Training

The training should provide the necessary knowledge and skills needed to the ADMIE staff in order to keep the system in full operation eliminating the number of mistakes and malfunctions.
As long as the operators are concerned, training should cover at least the topics of the standing data administration (border registry, traders registry, gate administration), the manual input, the matching and validation processes.
As long as the system administrators are concerned, training should cover at least the topics of the system s/w architecture installation and maintenance as well as a detailed description of the database schema.
Bidders should provide at least training courses in the areas presented in the following table, with minimum, five training days (5x8 hours).

	Description	Number of ADMIE Staff
1	System Operation (process administration, registry administration etc.)	10
2	System Administration (System architecture, db structure etc)	8

The course for the operators should be provided in two sessions due to restrictions applied to the ADMIE staff that works in shift.
The above tutorial session should take place before the start of the testing production phase and after the installation and commissioning of the test, so that

a) The actual system can be used for training and
b) the trainees can then practice their knowledge in the installed to the ADMIE system during the testing and parallel production phase.

All training must be organized in ADMIE premises. The contractor will prepare and document the teaching course (time schedule, trainees names, subjects to be discussed, etc.)

4.2 Course Material

The Contractor shall provide all necessary training materials, including course manuals and reference material.
The bidder shall provide each trainee with individual hard copies of the training material and an additional set, in both hardcopy and softcopy form, shall be provided for the ADMIE archives.
Class materials, including documents sent before the training classes and class handouts, shall become the property of the Purchaser. Purchaser shall have the right to copy, without cost, all course materials for internal and/or, as appropriate, market participant distribution and will not release the materials to third parties, other than market participants.
ADMIE prefers all technical notes for the class be delivered to trainees at least two weeks prior to each course.

5 Project Implementation

The project duration will be 16 months long with three main milestones:

Milestone 1 (M1) – By the end of Month 8:
Implementation and go-live of the Explicit Day Ahead Procedures
Implementation of one communication channel per border and actor
Publishing to ADMIE website
Reporting to Verification Platform

Milestone 2 (M2) – By the end of Month 10:
Implementation of the Implicit Day Ahead Procedures and declaration for readiness for Market Coupling with Italy

Milestone 3 (M3) – By the end of Month 16:
Implementation and go-live of the intraday sessions
Implementation of the alternative communication channel per border and actor
Delivery of the Reporting tool and implementation of 10 initial reports
Reporting to the Transparency Platform
Reporting to REMIT
Provisions for CGMA

5.1 Phases

Bidders will have to submit with their proposal the overall project timeline, which will have to be comprised by at least the following phases:

Phase M1.1: Work Statement for Day Ahead Explicit Procedures
At the end of this phase, the contractor will submit to ADMIE the work statement, which will have been developed in cooperation with the denoted ADMIE staff and will include at least the following elements:

- Detailed software architecture
- Details for the reception of input files
- The software licenses to be delivered
- Validation rules to be implemented
- Communication channel to be implemented per border and actor
- Details for the creation of the output XML files
- The business types implemented for each XML input and output as well as the way of the implementation
- Testing procedures

taking into account the business rules and specific requirements (e.g. user interfaces) valid at the time of the statement development which may be different from the ones stated in this tender.

Phase M1.2: Customization and FAT
During this phase the contractor must complete, in cooperation in the denoted ADMIE staff, the software parameterization and customization needed to fulfill the requirements set in phase M1.1 and conduct the FAT according to the testing procedures set in phase M1.1. By the end of this phase, a design report will be delivered where the applied customization will be fully described along with a test acceptance document which will contain the results of the agreed testing procedures.

Phase M1.3: Installation, Commissioning and Training
During this phase the contractor must complete, in cooperation in the denoted ADMIE staff, the installation of the customized software on the hardware provided both for the production and preproduction systems, the migration of the master data and generally any action necessary for the system to be fully functioning. By the end of this phase, a report will be delivered stating all software components installed along with the steps taken for the installation and

commissioning. In addition, a tool and documented procedures for refreshing preproduction environments with production data will be delivered. It must be possible for such refreshes to be undertaken selectively (i.e. market participants registry only, borders registry only, LT ptrs for a specific time period only etc. or in combination).

After successful installation and commissioning, training will take place so that the trainees can then have the opportunity to use the knowledge acquired during the test phase and the parallel production phase.

In order for ADMIE to fulfill its reporting obligations to REMIT and Transparency Platform until their implementation by the contractor at the end of M3, 5 views of the database data will have to be provided (in cooperation with ADMIE staff) and be accessible by the ADMIE platforms which currently perform the corresponding reporting.

Finally, during this phase any training of the participants concerning their interaction with the new platform will have to be conducted. The contractor will have to provide the necessary instructions to the market participants necessary for their communication with the new system.

Phase M1.4: UAT Testing

The tests will start after the official ADMIE approval of the proposed scenarios which will have been delivered at the beginning of this phase at the latest. Within 10 days after the submission of the testing scenarios, these can be further changed and / or developed upon ADMIE comments, before the final approval.
These scenarios must cover at least the following issues:

- The integration of the system within the existing ADMIE infrastructure and its high availability
- The system performance
- The implementation of the data model agreed on the work statement and the relative data administration
- The implementation of the various user roles
- The implementation of the stated XML files along the relative business types
- The implementation of the agreed communication paths
- The time gate and process management

The communication with the various actors and the arrangement of a joint test must be taken into account.

At the end of this phase, a test acceptance document will have to be delivered where the results of the agreed testing procedures will be stated. This document will have to be officially approved by ADMIE.
The next phase will begin only if all tests have been successfully conducted. In any other case, the official ADMIE consent along with the relevant justification will be needed in order for the next phase to start.

Phase M1.5: Parallel production operation
During this phase, which will have to last at least one month, all input data will be processed by both systems (existing and new) and the validity of the output files will be checked against the actual output files, produced by the existing system (if applicable). All possible errors will be corrected in the preproduction system (which will be a copy of the production system) and, after the proper checks, the corrections will be transferred to the production system. A report of these errors, their importance (Important, trivial etc.) and their final state (fully resolved, to be resolved during guarantee phase etc.) will have to be delivered. After the successful end of this phase, which will be certified by the official approval of ADMIE based on the above document, the operation in production mode will start.

Phase M2.1: Work Statement for Day Ahead Implicit Procedures
At the end of this phase, the contractor will submit to ADMIE the work statement which will have been developed in cooperation with the denoted ADMIE staff and will include at least the following elements:

- Definition of input/output data
- Validation rules to be implemented
- Communication channel to be implemented per border and actor
- Testing procedures

taking into account the business rules valid at the time of the statement development which may be different from the ones stated in this tender.

Phase M2.2: Customization and FAT Testing
During this phase the contractor must complete, in cooperation in the denoted ADMIE staff, the software parameterization and customization needed to fulfill the requirements set in phase M2.1 and conduct the FAT according to the testing procedures set in phase M2.1. By the end of this phase, a design report will be delivered where the applied customization will be fully described along with a test acceptance document which will contain the results of the agreed testing procedures.

After the successful installation on ADMIE premises, the relevant training will take place (concerning the procedures implemented) so that ADMIE staff can conduct the tests imposed in phase M2.3.

The test scenarios conducted during FAT will be also be conducted on site.
At the end of this phase, a test acceptance document will have to be delivered where the results of the agreed testing procedures will be stated. This document will have to be officially approved by ADMIE.

Phase M2.3: Testing
During this phase the tests agreed among the Italian border market coupling parties agreement will be conducted. According to agreement valid during this tender the test duration is 4 months and the tests include the following steps:

- Isolated tests
- Master Test Plan
- Integration testing
- Simulation testing
- MRC testing
- Member testing
- Acceptance test

The tests will be conducted by ADMIE staff using the preproduction system. Any errors will be reported to the contractor, who will have the responsibility to correct them within the time limits imposed by the testing agreement. All corrections, after the successful proper checks approved by ADMIE, will be transferred to the production system. A report of these errors, their importance (Important, trivial etc.) and their final state (fully resolved, to be resolved during guarantee phase etc.) will have to be delivered. After the successful end of this phase, which will be certified by the official approval of ADMIE based on the above documents, the operation in production mode will start.

Phase M3.1: Work Statement for Intraday Sessions, Reports, Transparency and Remit
At the end of this phase, the contractor will submit to ADMIE the work statement which will have been developed in cooperation with the denoted ADMIE staff and will include at least the following elements:

- Definition of input/output data
- Validation rules to be implemented
- Alternative Communication channel to be implemented per border and actor for the procedures of the previous phases

- Two communication channels for the procedures all phases, when applicable
- Implementation of the possibility for the platform to offer web services
- Publication to the Transparency and REMIT Platforms Testing procedures (including test of previous phases with the new communication channels)

taking into account the business rules valid at the time of the statement development which may be different from the ones stated in this tender.

Phase M3.2: Customization and FAT

During this phase the contractor must complete, in cooperation in the denoted ADMIE staff, the software parameterization and customization needed to fulfill the requirements set in phase M2.1 (along with any new installations needed for the implementation of new communication channels on hardware provided) and conduct the FAT according to the testing procedures set in phase M2.1. By the end of this phase, a design report will be delivered where the applied customization will be fully described along with a test acceptance document which will contain the results of the agreed testing procedures.

Phase M3.3: Installation and Commissioning

During this phase the contractor must complete, in cooperation in the denoted ADMIE staff, the installation of the customized software on the hardware provided both for the production and preproduction systems, the migration of the master data and generally any action necessary for the system to be fully functioning. By the end of this phase, a report will be delivered stating all software components installed along with the steps taken for the installation and commissioning.

After successful installation and commissioning, training will take place so that the trainees can then have the opportunity to use the knowledge acquired during the test phase and the parallel production phase.

Phase M3.4: Testing

As Phase M1.4

Phase M3.5: Parallel Production operation

As Phase M1.5

5.2 Workshops

For every phase, at least the following workshops will be held in ADMIE premises:

- One 4 days workshop for requirements clarifications, platform related clarifications etc.
- One 2-3 days workshop for the approval of the deliverables.

5.3 Official Approval

Towards the end of each phase the contractor will prepare an aggregated view of the items delivered and previously addressed at the monthly operational meetings to be presented in the Steering Committee (directing layer composed of the Head of Market Management Director and IT Director and the Contractors Senior Management). Project Managers from ADMIE side and contractors side will also Participate in the Steering Committee meetings. The Steering Committee will be responsible for the official approval of the phase deliverables.
The Steering Committee will handle any escalation (risk or disagreement), and will be responsible for the approval of all the project items provided during the reporting period. ADMIE's approval at Steering Committee level is required prior to payment.
The contractor must provide minutes of the monthly operational meetings and the quarterly Steering Committee meetings within five working days immediately following the meeting.
Unless otherwise instructed by the ADMIE, all meetings (operational review and steering committee, contractual) are held on ADMIE premises and no travel costs, accommodation and daily allowances shall be reimbursed.

5.4 Project deliverables

The contractor shall provide all deliverables in the form and format specified by the ADMIE and shall guarantee their integration into the target informatics environment. The deliverables must be submitted on time and must conform to the specifications as described by the ADMIE.

Phase	Technical Deliverables
Phase M1.1	-Work Statement (Detailed Design and Functional Specification, Testing Procedures) -Software licenses

Phase M1.2	-Design Report -Testing Scenarios -FAT Acceptance Document
Phase M1.3	-Production system fully functional, integrated in the ADMIE environment -Preproduction system fully functional, integrated in the ADMIE environment - Database Views for Transparency and Remit -Installation report -Training manuals, fully functional
Phase M1.4	-Testing Scenarios. -UAT Test Acceptance Document
Phase M1.5	-Parallel production acceptance Document -Operational and maintenance manuals
Phase M2.1	-Work Statement (Detailed Design and Functional Specification, Testing Procedures)
Phase M2.2	-Design Report -Training manuals, fully functional -Testing Scenarios -FAT Acceptance Document -Installation of the new features on production and preproduction systems -Installation Report -UAT Acceptance Document
Phase M2.3	-Report for the outcome of each test step of the testing procedure. -Final Test Acceptance Document
Phase M3.1	-Work Statement (Detailed Design and Functional Specification, Testing Procedures) -Software licenses
Phase M3.2	-Design Report -Training manuals, fully functional -Testing Scenarios -FAT Acceptance Document
Phase M3.3	-Production system fully functional, integrated in the ADMIE environment -Preproduction system fully functional, integrated in the ADMIE environment -Installation report
Phase M3.4	-Testing Scenarios.

	-UAT Test Acceptance Document
Phase M3.5	-Parallel production acceptance Document -Operational and maintenance manuals

6 Warranty, Upgrade and Maintenance

The duration of the warranty period will be one year, will start the day after the provisional delivery and will the software components delivered, including any third party software. This cover will be extended to another two (2) years support period.

A project team will be appointed by the contractor which, during the warranty and support period will be responsible for the technical support of the whole system delivered. The contractor will make available all the information necessary (i.e. email, phones, fax) for the communication of ADMIE with the dedicated personnel as well the responsibility of each member.

During this period, the contractor shall upgrade the software as necessary to new releases or versions of third party solutions that are part of the platform. For example: Operating system, middleware and databases. The contractor shall also update platform solution as necessary to new versions of EDI implementation guides and EIC standards.

The bidders will have to offer the possibility, during this period, for future system changes and further development (i.e. system customization for intraday, introduction of new XML files) by reserving 150 engineering man-days. The cost of these man-days will have to be included in the bidder's offer.

For each change request for the part of ADMIE a team will be assembled with a commonly agreed structure, timeplan and budget, on specifications set by ADMIE.

The contractor shall provide tools and documented procedures for updating the preproduction environment with production data.

If, during the warranty or maintenance period, a restore is needed, the contractor will assign the relevant personnel for any clarifications needed during the restore procedures, so that the restored system will be fully functional.

6.1 Preventive system maintenance

The preventive maintenance will be performed twice a year, unless the hardware or software manufacturer proposes maintenance that is more frequent. In this case, the schedule proposed by the manufacturer will be followed.

Preventive maintenance will include any necessary checks and settings adjustment for the software offered, in order to assure the reliable and best

performance of the production and test/dev system. It will also include checks of the log files messages as well as the security and bug-fix updates or firmware updates.

Upon completion of any preventive maintenance a “Preventive System Maintenance Report” will have to be filled and signed by the supervisory Engineer. This report will be co-signed by the responsible ADMIE engineer and will be kept in the relevant ADMIE registry.

6.2 Troubleshooting

The software failures, based on their importance, are divided in two main categories. The category of the failure will be defined by ADMIE upon failure report.

After the failure has been restored and the system is fully functional, for both failure categories, a “Failure Restoration Report” will have to be filled and signed by the supervisory engineer. This report will be co-signed by the supervisory ADMIE engineer and will be kept in the relevant ADMIE registry.

Class A Malfunctions

In case of critical class A malfunctions, the Contractor shall be notified by IPTO’s staff at any time of the day (24 hours a day) throughout the week and at any day of the year. The Contractor’s staff shall begin (either remotely or by his physical access) the repair works within two (2) hours of the time of notification at the respective IPTO’s facilities. The operation should be rectified within four (4) hours from the time of beginning of repair by the Contractor’s staff. If the notification and restoration time has exceeded a time period of six (6) hours then the Contractor shall be subject to a penalty clause pursuant to respective Article for Penalties.

Class B Malfunctions

In case of critical class B malfunctions, the Contractor shall be notified by IPTO’s staff at any time of the day (24 hours a day) throughout the week and at any day of the year. The Contractor’s staff shall begin (either remotely or by his physical access) the repair works within eight (8) hours of the time of notification at the respective IPTO’s facilities. The operation should be rectified within four (4) hours from the time of beginning of repair by the Contractor’s staff. If the notification and restoration time has exceeded a time period of twelve (12) hours then the Contractor shall be subject to a penalty clause pursuant to respective Article for Penalties.

6.3 System availability

The contractor will guarantee the reliable and highly available operation of the system as well as the spare parts on its own expenses availability during the whole guarantee and maintenance period.

The contractor will guarantee 0.999 system availability per year for the whole guarantee and maintenance period.

For the availability calculation, the following are not taken into account:

1. The time period the system is not functioning because of damages caused by personnel not employed by the contractor
2. The time the system is not functioning because of damages caused by physical forces
3. The time the system is not functioning because of interventions scheduled by ADMIE
4. The time needed for the contractor personnel, upon notification, to reach ADMIE premises
5. The system jointly scheduled downtime for testing purposes
6. The calculation of the system availability will be performed on an annual basis, beginning at the maintenance period start date

6.4 Incident tracking and reporting

The contractor will have to maintain an incident tracking system, which will support incident report by ADMIE on a 24 hour basis by phone, fax, email or a web application. All incidents of the present tender (hardware and software) will be reported to the same tracking system, in respect to the telephone numbers, the email address or the web application.

7 Compliance matrices

Except from the full compliance with the above requirements, the contractor will have to fully comply with the following matrices which present the functional and hardware requirements that the system should meet so that it can both implement the described procedures and be extensible and customizable to support future business needs and changes.

7.1 FUNCTIONAL REQUIREMENTS

The functional requirements that the offered platform has to meet are summarized in the following tables:

A/A	SPECIFICATION	REQUIRED	ANSWER	REFERENCE
	The system will support cross border TSO operations regarding forward market process, day ahead process and intraday process.			
	As provision for the Target Model, the nomination platform should be extensible in order to receive nominations from internal production units (thermal plants, hydro plants, RES production, load representatives, aggregators etc.), additionally to already described cross border nominations. Business rules should be extendable in order to be able to accommodate schedules for Internal Nominations.			
	The system should be convenient and customized up to 15 bidding zones for internal Greece territory.			
	User Management			
	A user may be active or suspended. Suspended users have no access to the platform.			
	An organization is associated with MADES, web services protocol or e-mail for primary and backup communication. For MADES protocol, the ECP endpoint must be recorded. For web services, push or pull and endpoint are indicated. For e-mail communication e-mails addresses should be recorded. For web services and MADES channels, there may also be a link to a			

	certificate.			
	For human users, the following details may be recorded: - user ID and password - first and last name - email address - office and mobile telephone numbers			
	For every organization, the following details may be recorded: - Full name, display name, abbreviated name - EIC code - associated area(s) and border(s) - address - web site URL - contact persons with contact details			
	Every user is associated with one or several roles. The roles that platform administrator is allowed to assign to a user may be constrained by user's organization type (data provider or data consumer). The following roles are foreseen: - platform administrator - backend support - analyst (with read-only access to all data) -operator -market participant			
	Role as described above consist of a set of privileges. A privilege allows the user to perform a given action. Example of actions: Submit data, access a certain report, access specific parts of the system, modify reference data or define a new user role.			
	Platform administrator shall be able to configure sets of roles and associated privileges.			
	Users must be able to change or reset their passwords, in a secure way, without intervention by the platform administrator.			
	Security			
	Platform will be configurable as to which			

	signing Certificate Authorities it will trust.			
	IEC 62325-504 (Web Services) communications will be secured with the use of a Digital Certificate on the client and the server side.			
	IEC 62325-503 (MADES) communications will be secured with the use of a Digital Certificate on the client and the server side.			
	Access to the Web interface will be secured by the use of HTTPS and server side digital certificate.			
	Platform administrator shall be able to configure on the platform the certificate used by every data provider or data consumer.			
	Administrators' accounts for servers, operating system and databases shall be set up with the least possible privileges. Only those privileges that are necessary for the maintenance activities shall be enabled			
	Performance & Availability			
	When platform is running under normal operational circumstances, on-screen response times for web page queries must not exceed 5 seconds (measured at a point within the local network environment of the servers). This requirement applies both to initial query response and to refreshes.			
	When platform is running under normal operational circumstances, message processing in web service access shall take less than 1 second.			
	The validation process of each submitted scheduling file should fewer than 10 seconds. The system must handle peaks in workload – for example XML message submissions can be clustered into short periods just ahead of gate closure. The system should be able to validate up to 50 XML files concurrently.			

	An overall level of 99,9% availability is required. This corresponds to less than one hour of unplanned unavailability per year, in total.			
	Deployment time for new versions of the platform's software will be < 20 minutes, ideally without interruption to operation.			
	In the event of unscheduled outage, the system must be returned to service within 1 hour.			
	Dimensioning			
	The platform should be able to handle more than 30 interconnections linking more than 15 bidding zones.			
	The platform should be able to register and operate with more than 1000 registered market participants. The system should be expandable to incorporate more market participants.			
	The system should be able to handle more than 100 incoming and outgoing XML files per minute.			
	Integration & Workflow			
	The process shall be configured and executed independently for each border and timeframe (long term, day ahead, intraday).			
	The configuration of the workflow will included the communication with the verification platform , the transparency and the remit platform.			
	Every process is running continuously, 24 hours a day, for every day of the year.			
	The beginning and end of each phase in a process will be configurable, according to the low level design.			
	At least the following time gates should be handled for each scheduling phase for the day ahead process and for each border: -Long Term Phase			

	- End of receiving LT rights documents - End of receiving nominations - Matching interval - Warning messages -End of correction cycle - Final matching - Calculation and submission of ATC - Short Term Phase - End of receiving ST rights documents - End of receiving Nominations - Matching interval - Warning messages and timeouts - End of correction cycle - Final matching			
	The operator shall be able to manually modify a gate closing time during the execution of a process phase, for a specific day D, in cases of emergency			
	Each phase is associated with automatic the reception / dispatch of one or more file types per border. This must be configurable, i.e. in case of a process change for the ATC calculation with the SEECAO Capacity Allocation Auction Office for the Turkish border, the LT nomination files must be sent also to the SEECAO for the Turkish border			
	The recipients of each phase must be configurable (i.e. in case of the email communication path an email address could be added, modified or deactivated or in case of ftp and ftp site could be added, modified or deleted)			
	The platform has to support the automatic creation and submission of the relevant files upon approval of the operator. The manual submission of selected files or to selected recipients will also have to be supported and audited			
	Time Resolution and Time Zone			
	The system should support at least 15 minutes, 30 minutes and 1 hour time			

	resolution			
	The data in the database should be stored in 15 minutes resolution. In case the data received is in a lower resolution (namely 30 minutes or 60 minutes), the relative values should be transformed in 15 minutes values (i.e. a 60 minutes value is transformed in four 15 minutes values by dividing the value by 4).			
	The system should be able to receive and produce files in different time resolution and time zone, depending on the relevant parameters defined per border and filetype.			
	Time resolution and time zone must be configurable per border and file type			
	All data in the database should be stored in the same time zone, UTC or CET. However, different time zones should be supported, both for the operator interface and the input/output exchanged files			
	Platform shall take into account leap years			
	Platform shall take into account the transitions between winter and summer time.			
	The energy values should be stored in full precision but should be available with 3 decimal digits precision for the operator interface and the file creation, unless otherwise stated			
	Data Modelling			
	The system shall implement data models for • Operational Data (NTC, ATC, Capacity Rights, Market Schedules). Operational data shall be versioned. • Standing (Master) Data (Market Participants, Borders, Tielines / Interconnectors, Balance Areas, Bidding Zones). Standing data shall be effective dated. • Audit Log Data that capture			

	operator actions, standing data modifications and Input / Output events. Additionally, there shall be metadata describing incoming and outgoing data files, indicating sender and receiver, date and time received or sent, time period covered, versions, type of content and acknowledgement status.			
	ADMIE appointed personnel must be given access to read the database schema and the related data and run any sql scripts.			
	The contractor will have to consent to the possible connection (via a database link) of the production database with one of IPTO databases in case this is considered necessary by the IPTO personnel.			
	Market Participants Registry			
	The addition, modification and deactivation of a market participant should be supported. Data deletion should not be allowed, only activation / deactivation / modification during a specific time period			
	At least the following details should be kept per participant: -EIC CODE, Company Name, Contact Person(s), Telephone(s), email address (s), activation date, deactivation date, if registered in the Greek market or not valid counter parties per border)[1]			

[1] The counter parties of a valid participant registered in the Greek market are needed for the following cases for a specific registered participant A and for a specific border:
-The holder of the PTRs the nomination is based on is not registered in the Greek market. In this case, the counter party of the registered participant is the participant B registered to the neighboring market who has designated the registered participant as its counter party in the Greek market.
-The registered participant A is the holder of the PTRs the nomination is based on but is not eligible to nominate to the neighboring market. In this case the counter party B is a participant active on the other side of the border, eligible to nominated to the neighboring market.

	- In case a web interface is available for the communication with the participants, the credentials (username/password) of the person/persons allowed to user this interface.			
	Borders Configuration			
	A registry of valid borders should be maintained. At least the following details should be kept per border: ● Type of Link (HVDC or AC) ● Valid capacity allocator ● Valid matching system operator ● Valid timezone ● Valid time resolution ● Valid coordination centre ● Whether it is coupled or not to the target model (for future use)			
	Data deletion should not be allowed, only activation/deactivation/modification during a specific time period.			
	The must be the possibility for the interconnection lines per Bidding Zone Border to be modeled. Especially for the HVDC interconnection, technical constraints and losses should be taken into account.			
	Any Bidding Zone Border/ Interconnection should have the possibility to be configured as a virtual scheduling area.			
	Each border should be independently configured to obey different business rules, such as market coupling, implicit auctions, explicit auction etc.			
	Schedule Types			
	The various schedules must be distinguished at least between:			

-Depending on the nomination rules valid on each border and participant A can be on both sides of the concerned border (A t o A), the participant A may appoint one legal entity B on the counter TSO side (A to B) , the participant A may appoint several legal entities N on the counter TSO side (A to N)

	- Day Ahead schedules and - Intraday schedules Another differentiation must be between: TSO schedules Market schedules (Long & Short) Compensation schedules Concerning the TSO schedules a further differentiation has to be supported (emergency, countertrading, guarantee, return of guarantee etc.). The system must be extensible to support internal market schedules like plant production, load representatives, energy traders, RES aggregators, cross border balancing schedules, self-supplying customers etc.			
	System Input/Output			
	The platform must support all of the following communication methods: email, SFTP (connect to an SFTP server as a client and be able to put, get and list documents) Web Service according to IEC TS 62325-504 (connect as a client and implement the get/list/put documents methods) and IEC 62325-503 (MADES).			
	The platform must connect as client to ADMIE FTP server.			
	The platform must support the configuration of two alternative communication method with each type of actor and for each border			
	For the Market Participants the primary communication method will be email or web form.			
	The communication with Verification platform with be performed both by sftp and Web Service (IEC TS 62325-504).			
	The manual upload of an input file must be supported			

	The manual extraction of an output file should be supported. Namely the operator should be able to save one or more of the output files locally			
	The technical details of a communication path should be configurable (i.e. mail server, ftp server)			
	System Inputs			
	The XML files are received by the various actors via the specified communication methods. In case the type of the file received is not among the defined files types it should be rejected and not stored in the system database.			
	The XML files that will be received and processed by the platform will implement at least the following ENTSO-E standard data formats: ESS, ECAN, RGCE and generally all ENTSO-E standards required for the implementation of the required procedures.			
	At least the following validations shall be applied to all incoming messages: • receiver declared in file is ADMIE • data is expected from sender • sender is coherent with area(s) or border(s) described in the file • values for the whole relevant period are included • version is higher than previously received versions (when versioning is applicable) • applicable gate opening and closure times are respected • file format respects the applicable XSD • document ID is unique • all mandatory attributes are populated • codes are coherent with ENTSO-E			

	code list and the applicable EDI implementation guide • the market participants included in the file or their counter parties exist in the Market Registry			
	The platform must support the manual input by the operator (i.e. NTC, the Compensation schedules and the TSO schedules) through the provided user interface. To facilitate the data entry the following options must be given: ● Load the data by uploading the appropriate XML document ● Enter the data manually through a form provided by the system. In this case, there should be possibility to enter the same time series once for several consecutive days.			
	System outputs			
	The system outputs are basically XML files which will be communicated to the various actors via the communication paths specified. These files will be implement at least the following ENTSO-E standard data formats: ● ECAN CapacityDocument ● ECAN CapacityAuctionSpecificationDocument ● ESS Anomaly Report ● ESS Acknowledgment ● ESS Confirmation Report ● ESS ScheduleMessage ● RGCE Reporting Market Document ● RGCE Status Request Market Document and generally any ENTSOE standards required for the implementation of the required procedures.			
	Market Participants Interface			
	In case the system provides a web			

	participant interface for the communication with the market participants, this must include at least the following functionalities: -Import schedules as an XML file or submit them manually through an appropriate form -View the relative confirmation or anomaly reports -Download files -Denote its counter parties per border if applicable. This information will then be stored in the relevant fields in the Market Participants Registry. -The interface will be in english			
	Operator Interface			
	Through the interface provided the operator (depending on his/her role) will be able to -Administer all the registries -Administer the system gates -View the status of the daily system processes. The platform must provide the operator with a view of the current phase, the current active phase, its times gates, the previous phases and their status. (Finished with success, pending etc.) -Administer the rules of the nomination files validation per border -Administer the rules of the automatic matching process -Switch between manual and automatic matching -Switch between at least the two time zones s/he will be working on (Greek and CET) -View all the data stored in tabular format -View the status of the matching process per border. The matching state must be displayed with a color code, allowing the operator to see mismatches at a glance. -Manually edit and save schedules -View schedules per type (TSO, compensation, market) -View Reviewed capacity data (NTC, ATC,			

	offered capacity..) -View about the ongoing activities through a dashboard (gates in progress, last submitted files, last event logs etc.). - For a selected file, user will be able to view metadata: - sender - receiver - timestamp - number of time series (if applicable) -relevant time period - acknowledgement status - error(s). -There will be a link to the file itself and to the metadata of the associated acknowledgement that was either sent or received. -View the audit log. -Download files - The interface will be in english			
	Audit Log			
	All critical actions that have an impact in the system must be audited. More specifically, all operator interactions which cause a manual modification on system data should be kept. For each such action, at least the following information should be stored in the system's database: ● Date and time ● Action ● User Additionally, all data exchanges between the system operator and the traders must be logged. This log must be available to both the operators and the participants, when necessary.			
	User Roles			
	The system must be role based, allowing ADMIE to define the different roles and associated privileges required to execute system processes, modify master data, view			

	reports etc. The principles of "least privilege" and "separation of duty" shall be applied to every content of the system, including the databases and the application servers			
	Every user shall be associated with one or several roles. The roles are assigned by the administrator. At least the following roles shall be supported: • ADMIE operator performing the daily routine tasks • ADMIE Administrator supervising and changing the process according to the various needs (extending the time gates, changing the matching rules etc.). • ADMIE analyst with read-only access to all data • Market Participant submitting/reading XML files through a web User Interface, in case that such an interface is offered by the bidder.			
	Users must be able to change or reset their passwords without intervention by platform administrator			
	Reporting			
	The following predefined reports will be available in pdf and xl format : - LT ptrs - ST ptrs - Matched Schedules - Nominations The above reports must be available per Participant, time period (from date to date), border.			
	The contractor is expected to deliver 10 predefined reports (not including the above)			
	There must a be user interface through which the users can run the implemented			

	reports giving the parameters specified.			