



NORDIC ENERGY MARKET DOMAIN MODEL

Version:	1.0.A
Status:	Approved by Nordic Ediel Group (NEG)
Date:	February 15 th , 2010

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1 INTRODUCTION

1.1 Background

Today the Nordic TSOs exchange messages based on several different formats and standards, such as Ediel (DELFOR, MSCONS etc.), NOIS XML messages based on ENTSO-E IGs (but with several modifications and additions) and Excel documents. In addition the Nordic TSOs have communications towards other European countries, such as Germany, the Netherlands and Poland, using even more standards, such as NorNed xml and ENTSO-E standards.

For efficiency reasons the four Nordic TSOs and Nord Pool Spot have set up a project for migration of the message exchanges towards one common message standard. The project is run as a Nordic project with the Nordic Ediel Group as the steering group. The aim is to define message exchange models that can be used for all message exchanges between the Nordic TSOs and Nord Pool Spot, and also between the TSOs and the actors in the downstream Nordic energy market.

This document shows a Nordic Energy Market Domain model, giving an overall overview of the structure and processes used in the Nordic Energy Market. The *Business Areas* shown in this document are further elaborated in a series of *Business Requirement Specifications*. These BRSs are based on the ENTSO-E implementation guides as far as suitable processes have been defined [1] and the ebIX[®], EFET and ENTSO-E Harmonised role model [2]. The focus of the BRSs is the business aspects of the message exchanges and the basis are the ENTSO-E Implementation Guides [1].

When the term TSO is used in this document it includes also Nord Pool and Nord Pool Spot.

1.2 Project organisation

The project is organized as a project group within Nordel.

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1.3 References

- [1] ENTSO-E implementation guides, see <http://www.ENTSO-E-net.org/Activities/edi/>:
- ENTSO-E Modelling Methodology (EMM)
 - ENTSO-E UCTE SO-SO Process
 - ENTSO-E Scheduling System, ESS
 - ENTSO-E Settlement Process, ESP
 - ENTSO-E Reserve Resource Planning, ERRP
 - ENTSO-E Capacity Allocation and Nomination, ECAN
 - ENTSO-E Publication Document, EPD
 - ENTSO-E Status Report, ESR
 - ENTSO-E Acknowledgement process
- [2] The Harmonised Role Model, ENTSO-E, ebIX[®] and EFET, see <http://www.entsoe.eu/resources/edi/>
- [3] UN/CEFACT Unified Modelling Methodology (UMM), see <http://umm-dev.org/>
- [4] Nordic Ediel Group, BRS for the Nordic TSO Determine transfer capacity process, see <http://www.ediel.org/>
- [5] Nordic Ediel Group, BRS for the Nordic TSO Scheduling and Ancillary Services Process, see <http://www.ediel.org/>

1.4 Change log

Ver/rel/rev	Changed by	Date	Changes
1.0.A	Ove Nesvik	20100215	First official version.

2 OVERVIEW OF BUSINESS AREAS IN THE NORDIC ENERGY MARKET

This chapter gives a brief overview of the structure of the Nordic Energy market as seen from the Nordic TSOs, i.e. the business areas where the Nordic TSOs are involved and have common message exchanges.

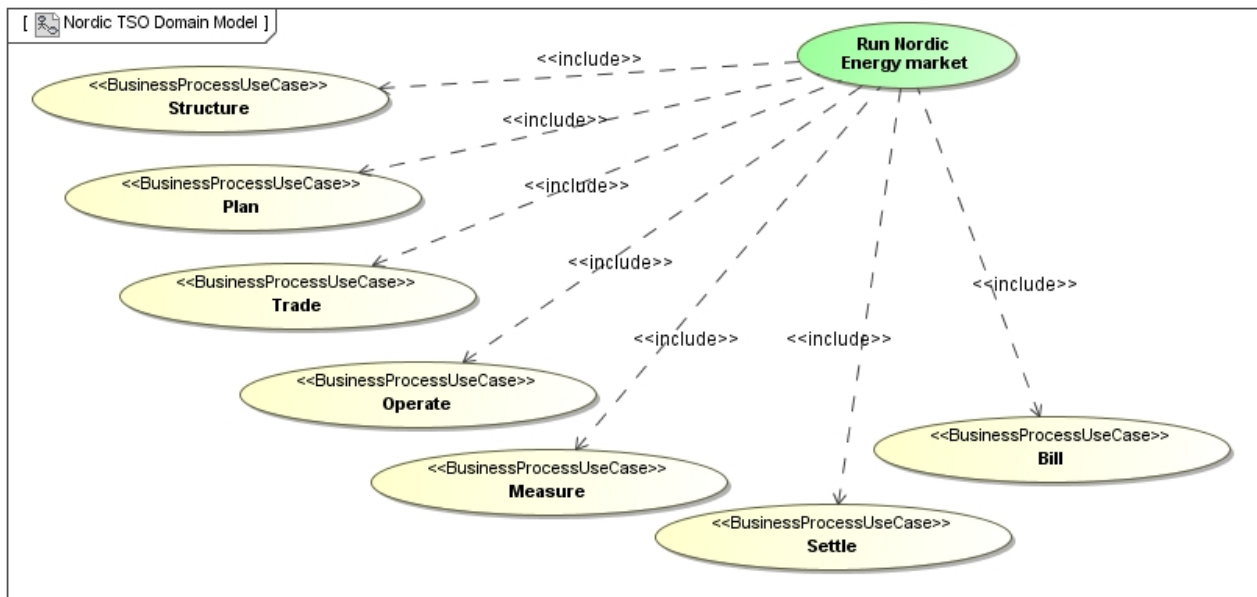


Figure 1: Overview of the Nordic Energy market

The top level structure of the Nordic Energy market as shown in *Figure 1* is based on the ebIX[®] Energy market domain model. The domain model splits the market into phases that logically occur in a timeline, however with some overlaps. An example of overlap is the business area *Plan*, where parts of the input to the *Balance settlement* are generated.

2.1 Structure

In the structuring phase the actors exchange information (master data) necessary for the later business processes. The different parties request creation of, changes to or deletion of energy market business objects, such as metering points, meters, contracts etc, or to its attributes. Thereafter the information related to the created, changed or deleted business object or its attributes is exchanged between relevant parties (roles). The alignment of master data between the actors in the energy market should result in all participants having the needed information to fulfill their obligations to the market.

Currently the processes used in the structuring phase in the Nordic market are defined on national bases, however based on common Nordic Ediel implementation guides. There are discussions on a political and regulatory level discussions related to the creation of a common Nordic end user market, which on a later stage may lead to a common Nordic process description.

2.2 Plan

The messages defined in these business processes enable Balance responsible parties (i.e. trade responsible, production responsible and consumption responsible parties) to send their schedules (planned consumption, production, capacity, transport, exchange etc.) to the System operators and/or the Transmission capacity allocator, for congestion management, the day ahead. The messages may also be used for the transmission of intraday schedules associated with day-ahead schedules and for prognosis and Ancillary services (reserve resources).

The structure shown in the UseCase diagram in *Figure 1* is broken down in a UML model according to UMM [3] by using a hierarchy of packages as shown below.

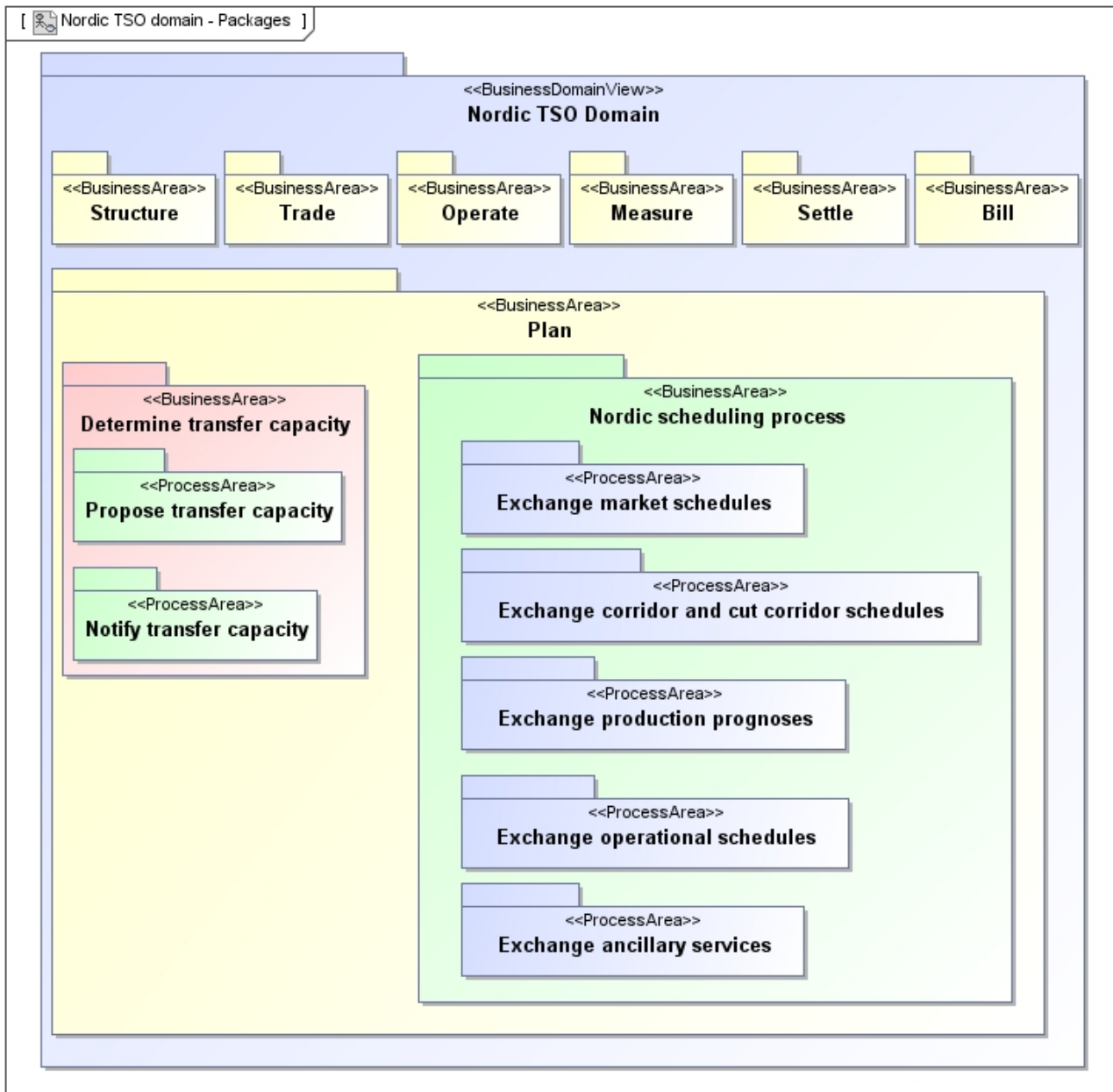


Figure 2: Overview of the Nordic TSO Energy Market domain

Detailed process descriptions can be found in [4] and [5].

2.3 Trade

In the Trading phase, the Balance responsible parties (or actors having a contract with Balance responsible parties) are buying and selling energy for fulfilling their contractual obligations. The Trading phase includes trade through the Market operators (e.g. Power exchanges). The UseCase Trade has so far not been elaborated by any common European projects.

2.4 Operate

The business process operate includes the message exchanges to handle the Balance regulation market and Ancillary services markets, e.g. the System operator orders up and down regulation to keep the balance in the system. Examples of processes are Bids from Producers or Traders to the System operator for the Balance regulation market and Ancillary services markets, and the processes of ordering up and down regulation to the Producers or orders to the Grid operators for disconnecting disconnectable installations.

2.5 Measure

The Measure phase (Exchange of metered data) covers all stages from the collecting of the metered data until the settlement and reconciliation phase, with a focus on the exchange of information between Metered data collectors, Metered data aggregators, Imbalance settlement responsible and Balance responsible parties. E.g. the Metered data collectors read Registers (within Meters) and distribute metered data (transport, production, consumption). Thereafter the metered data are validated, aggregated and distributed to relevant roles.

2.6 Settle

The messages defined in this phase enable Imbalance settlement responsible parties to receive aggregated executed schedules, regulation- and metered information, and to send imbalance reports and bills (invoices) to the Balance responsible parties (consumption, production, capacity, etc.). The Reconciliation responsible party makes the final reconciliation and distributes data to relevant roles.

2.7 Balance settlement

A central part of the electricity market is that each market participant in the market shall be in balance. This means that the amount of electricity produced and consumed through bilateral agreements are balanced.

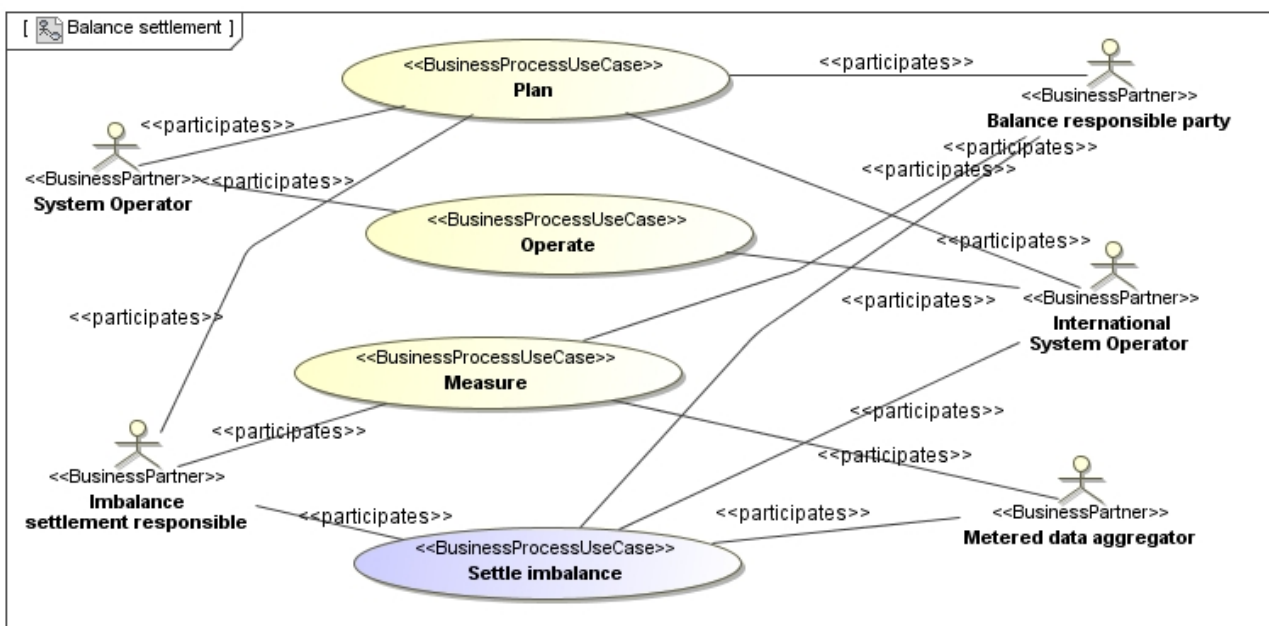


Figure 3: Overview of the Nordic TSO Balance settlement

The procedure to calculate this balance and the invoicing of any differences is called *Balance settlement*, which can be broken down into four phases:

1. A planning phase, where balance responsible parties (e.g. trade responsible, production responsible, consumption responsible parties, etc.) calculate in advance the consumption and production and trade.
2. An operation phase, where the schedule that has been determined during the planning phase is executed. The system operator, to ensure system balance at any moment, handles any deviations between production, consumption and unforeseen congestion.
3. A measure phase, where metered data needed for the following settlement is obtained.
4. A settlement phase, where following the date of operation, the metered data aggregator sends the data to the imbalance settlement responsible. The imbalance settlement responsible, along with complementary data received from other sources, then carries out the imbalance settlement itself.