Федеральная Сетевая Компания

Единой Энергетической Системы

Energy and capacity market in the Russian Federation. Current market conditions. Development trends.

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Energy (capacity) market in the territory of Russia

Both wholesale market and retail markets do exist

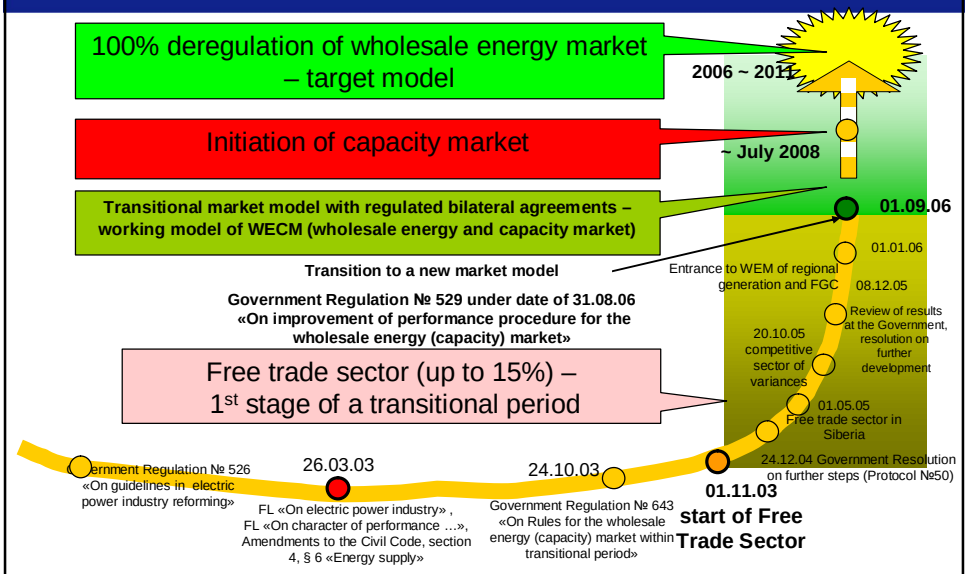
Price zones – Ciscaucasian Russia, Ural, Siberia ~ 90-95% of the whole output electric energy is sold through the wholesale market

Non-price zones – the Far East, Komi, Arkhangelsk, Kaliningrad

Retail markets only

Isolated territories – Sakhalin, Kamchatka (total 7I)

Development stages of the RF wholesale energy market



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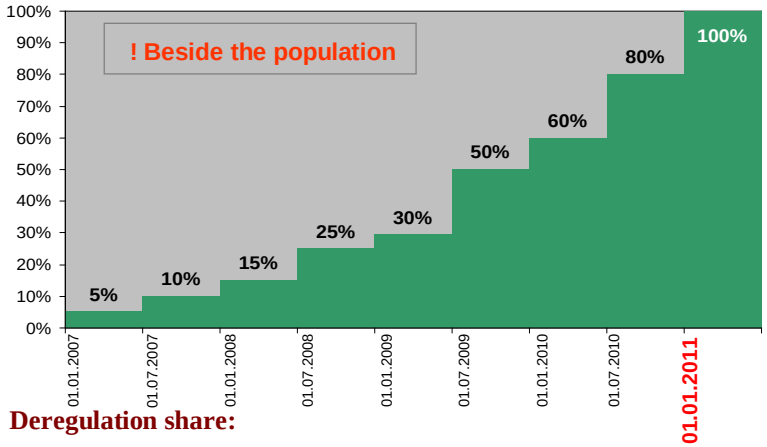
Prospects for deregulation of electric energy market

Government Regulation № 205 under date of April 7, 2007.



Deregulation share:

- **Reduction of electric energy volumes traded in regulated contracts +**
- **Increase in actual consumption as compared to the plan for 2007.**

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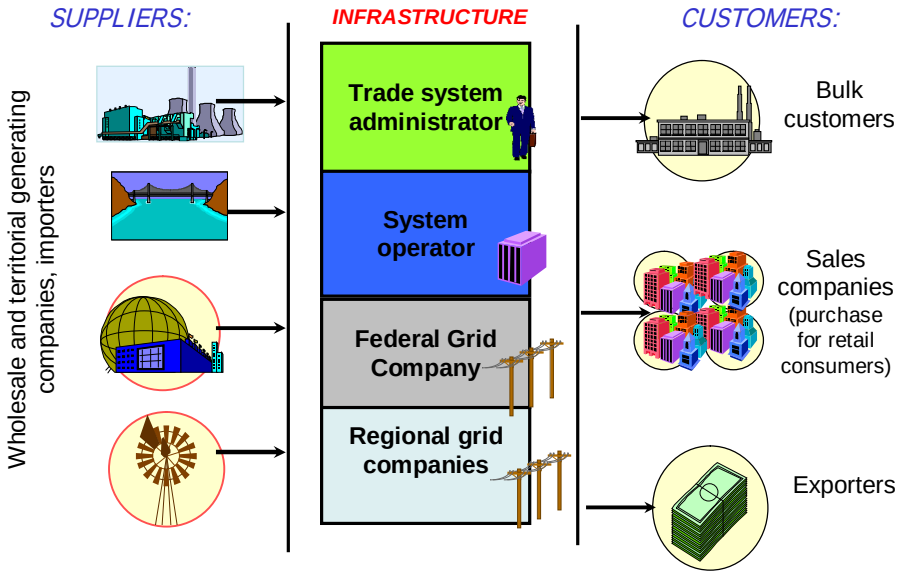
Agents of the wholesale energy market



Agents of the wholesale energy market

Major suppliers

- 7 generating companies in the wholesale energy market (OGC – wholesale generating companies), among them six companies include largest thermal power plants, and the one – hydroelectric power plants;
- 14 territorial generating companies (TGC – territorial generating companies).

Bulk customers

- 113 providers of last resort;
- 95 retail suppliers.

- 11 Interregional Grid Companies (MRSKs), which cover 57 Regional Grid Companies (RSKs)

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Latest modifications

Nonprofit Partnership «Trade System Administrator»
(organization performing operation of trade system
in the wholesale energy and capacity market)

Beginning on April 1, 2008, revised version of article 33 in the Federal law "On electric power industry" under date of March 23, 2003 № 35-FL will become effective

Nonprofit Partnership
«Market Board»
(organization providing
performance of the commercial
infrastructure)

JSC «ATS –
Administrator of Trade System »
(commercial operator in
the wholesale energy
and capacity market)

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Supervisory Board in Nonprofit Partnership «Market Board»

**Supervisory Board in Nonprofit Partnership «Market Board»
(collegial management body in the Partnership)**

Chamber of commercial
(representatives of NP «Market Board» And Commercial operator) and technological
(representatives of JSC «SO UES» and JSC «FGC UES»)
infrastructure in the wholesale market

Chamber of vendors

Chamber of customers

Chamber of representatives from Public authorities

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Key functions of Nonprofit Partnership «Market Board»

- ✓ **Drawing-up a form for Contract of affiliation to trade system in the wholesale market, wholesale market regulations, standard forms of contract providing trading on wholesale market of energy, capacity, other goods circulated, on the wholesale energy market.**
- ✓ **Organization of a system for pretrial dispute resolution among agents on the wholesale market.**
- ✓ **Participate in preparation of draft rules for wholesale and retail markets and proposals on their modifications.**
- ✓ **Exercising control on observance of rules and regulations designed for wholesale market by wholesale market agents and organizations of commercial and technological infrastructure.**
- ✓ **Coordination of infrastructural organizations activity.**
- ✓ **Representing interests of the industry agents to regulatory agencies.**

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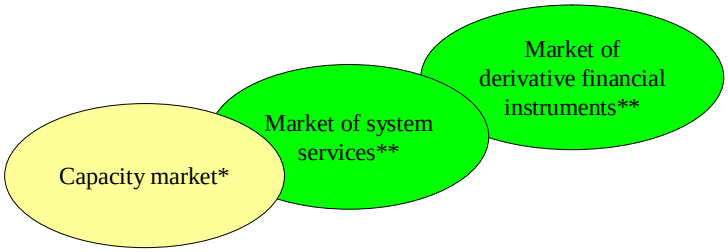
Architecture of energy market

Market for a day ahead

Regulated sector (regulated contracts)

Balancing market (BM)



*- initiation is expected in the nearest future
** - not yet initiated

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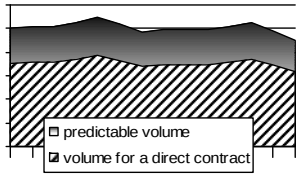
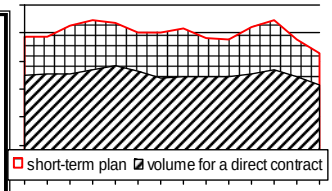
Major sectors on WEM

Long-term market of bilateral agreements



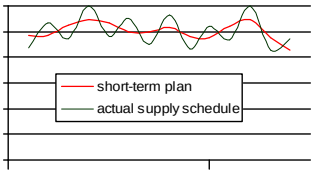
Free bilateral agreements: parties in agreements fix prices and supply schedule, pay nodal price spread
Regulated contracts: price (tariff) and subjective compositions are established by the government, volume is restricted and reduces

Short-term market «for a day ahead»



- Participants in general auction enter into competition for full volume of generators production / customers consumption on basis of filed price applications
- Nodal marginal price formation by taking into account losses and system restrictions
- Auction results – hourly planned schedules for production / consumption for the following day

Balancing market



- Payment of variances of a fact from a plan based on competitive price formation
- Applications on market "for a day ahead" received from generators, customers with controllable load + operating price accepting applications do participate

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Additional elements in wholesale energy market

Moreover, the important additional elements in a new model of WEM will be as follows:

- capacity market
- market of system services
- market of derivative financial instruments
- market of rights to electric energy transmission (FTR)

Over a transitional period (beginning in 2007) it is planned perform step-by-step development of these additional markets

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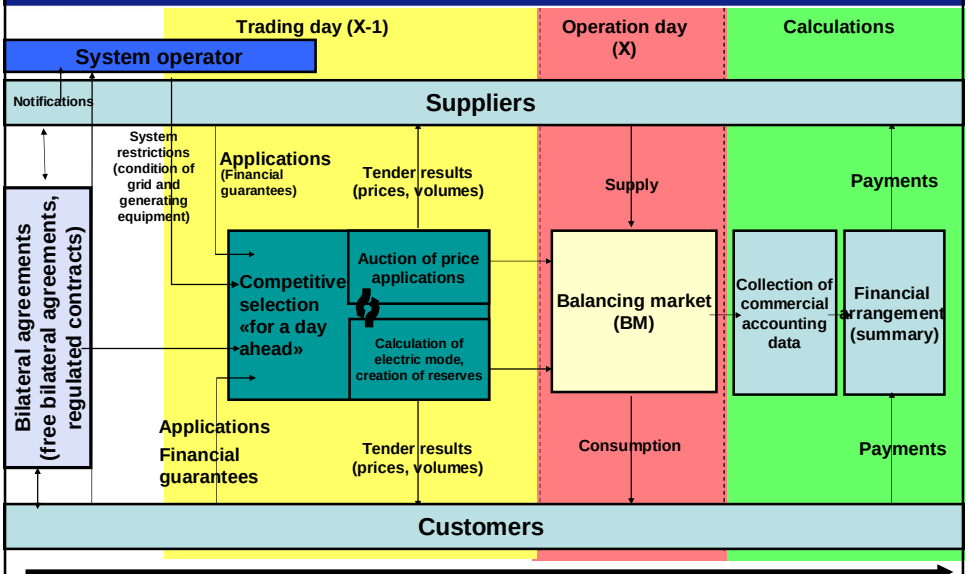
Operation scheme for a competitive wholesale energy market (business-process)



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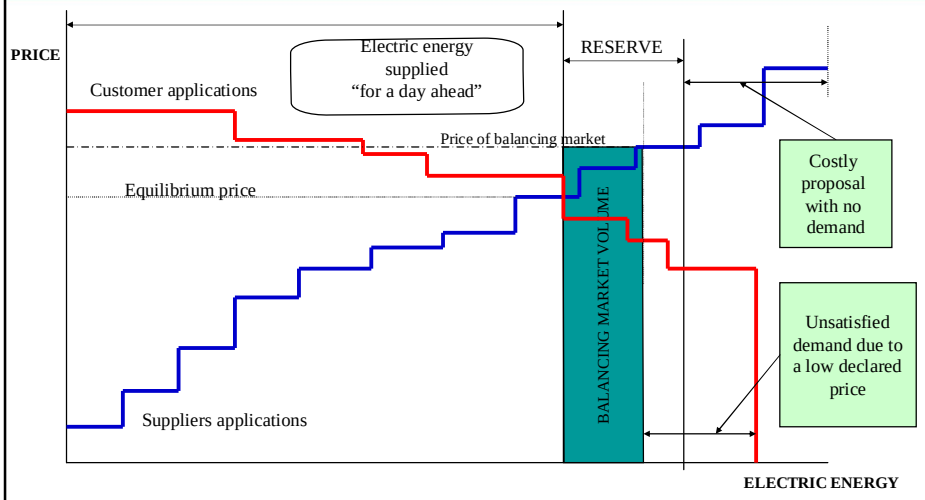
Equilibrium price determination (for one hour)



Objective - is to find prices and volumes for electric energy purchase / sale with a view to achieve maximum mutual advantage for suppliers and customers from trade

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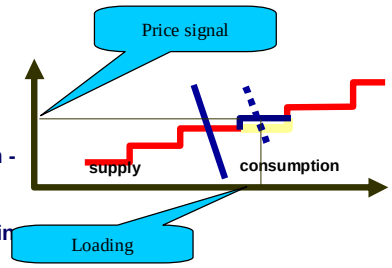
Balancing market

Balancing market is based on hourly calculations of a new dispatch schedule per day X on basis of price applications from generators (customers with controllable load) and forecast for system conditions of SO (system operator)

BM provides unity of market mechanism and mode control technologies

Market mechanism – is a formalized optimal choice of suppliers / customers of balancing electric energy based on applications from participants, it creates economic motivation to dispatcher commands execution

Modes control – is a package of measures providing maintenance of balance for production - consumption and reliability standards on a real time basis, primarily owing to forming of control actions on generation (normal operating modes in UES)



! *Cost of participant variances is determined based on value of required action on system, which will compensate occurring imbalance.*
Closely optimality criteria during planning for a day X-1 and modes control

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Variances of market participants

2 categories of variances for the wholesale market participants

Unregulated variances of participants, which form imbalance :

- **Variances in consumption (except for customers with controllable load)**
- **Forced variances in generation, including variances caused by unscheduled equipment outage**
- **Variances of exporters – importers;**

+ change of restrictions in controlled sections when grid topology is altered (unscheduled outage of grid elements)

Controlled variances of participants, which provide balance of production and consumption

- **Variances for generators and customers with controllable load designated by the System operator**

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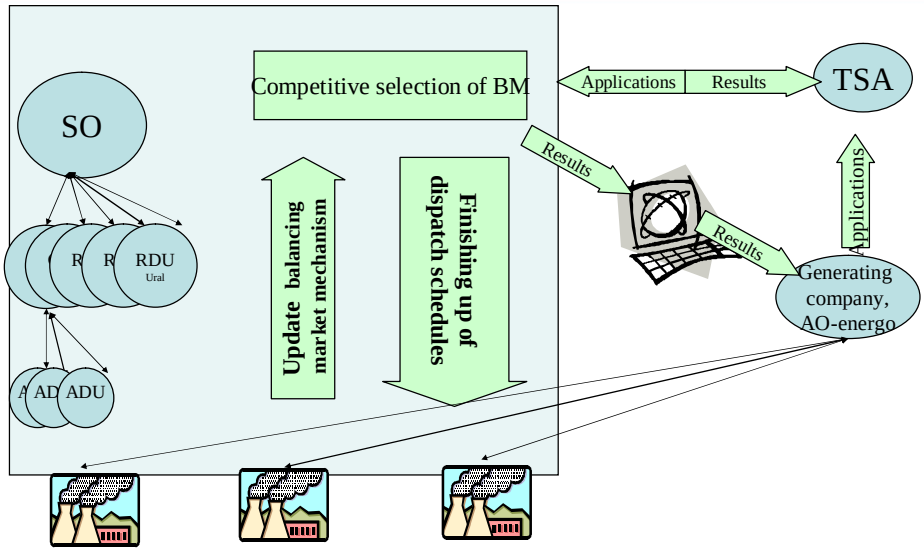
Process flow sheet of BM performance



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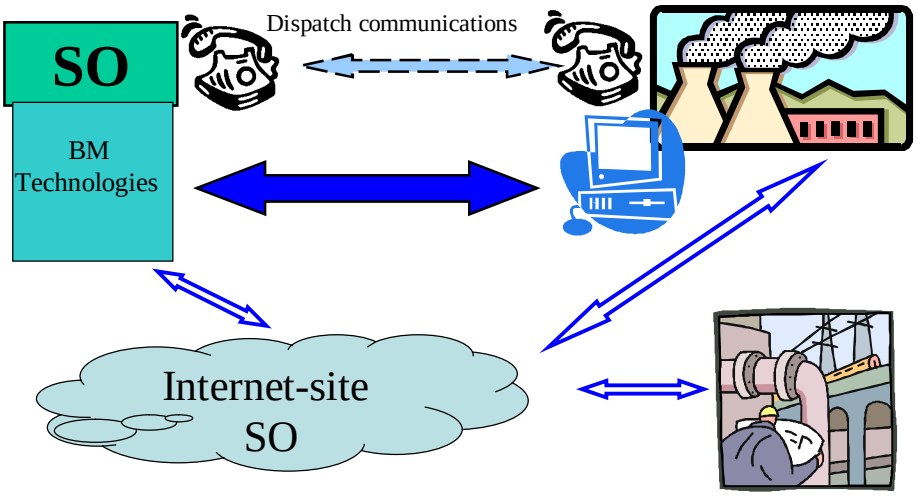
Information exchange with participants



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BM: calculation of financial liabilities and requirements

- BM – balancing market.
- Articles on BM – electric energy.
- Volume of sector - «surplus/deficiency» electric energy volumes from volumes fixed in trading schedule are sold / purchased.
- Contracts in BM, as in market for a day ahead, are concluded with a unified party – CJSC «Financial Arrangement Centre».
- *Financial liabilities are balanced by a system for cost imbalance distribution*

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Participation of grid operator, principle of loss payment

Customer of JSC "FGC UES" services

Pay the actual losses after deduction of losses taken into account in WEM prices

Take up for standard losses after deduction of losses taken into account in WEM prices

JSC "FGC UES"

Nonprofit partnership "Trade System Administrator"

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«Capacity market»

Why do we need capacity market?

•Decision:

-Through a price for electric energy (when energy markets are formed):

- Price in peak hours at a minimum must become in 10 times greater that full costs of Suppliers
- Does not create an incentive for «new» construction (cost recovery occurs after commissioning only)
- Insufficient influence of peak prices on a daily consumption schedule
- There is no signal to determine required level of capacity reserve

-Through capacity market:

– Stable source of income for electric energy producer to cover fixed costs
– Creates signals for construction of new installed capacities prior to deficiency occurrence
– Damper for price bursts on the energy market

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Capacity market in Russia

- Beginning on September 1, 2006 capacity – is a commodity item on WECM
  - Regulated contracts provide mechanism for capacity purchase / sale
  - Average share of proceeds from capacity sale in total receipts of suppliers is as follows
    - Thermal plants: HPP ~31.1% ,TPP ~33.9%, Gas turbine plants ~76.8%, Combined cycle plants ~ 56.0%
    - Hydroelectric power plants ~65.4%
    - Nuclear power plants ~78.0%
  - Average share of customer expenses incidental to capacity ~ 44.0%

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Competitive selection of capacity suppliers

- **For customers:**
  - are obliged to pay capacity upon real consumption
  - can, but not obliged to purchase capacity in advance through bilateral agreements, including «address» bilateral agreements for bulk retail customers
- **For suppliers:**
  - competitive selection of suppliers for 4 and more years ahead – suppliers with lowest prices in applications are selected
  - selected suppliers have 10-year guarantee for capacity payment on their applications + payment of electric energy on tariff (tariff variant) EITHER
  - refuse from tariff variant AND have free bilateral agreements for capacity + market price for electric energy

TOTAL: mechanisms for capacity purchase / sale

- on unregulated prices through bilateral agreements supplier - customer
- through the unified party (Trade System Administrator / Financial Arrangement Centre):
  - customers - for weighted average prices in applications of «tariff» suppliers
  - suppliers – for a price in application for competitive selection and electric energy tariff

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Market of system services

It is planned to initiate market of system services for system reliability with a view to provide reliable performance of UES of Russia and maintain quality of electric energy in the second quarter in 2007.

System services to be paid within market limits :

- 1) Service for standardized primary frequency regulation;
- 2) Service for automatic secondary regulation of frequency and active power flows;
- 3) Service for additional reactive power control;
- 4) Service for on-board starting of generating equipment with a view to deliver electric energy into electric grid and provide starting of other generating equipment (hereinafter – service for zero start);
- 5) Service for acceptance and execution of control actions from centralized emergency regulation systems,

Thank you for
your attention !