Annual statement of transmission system operator

01.10.2013
Riga

The Report is prepared in accordance with the regulations No. 322 "Regulations on the TSO's annual statement" by Latvian Cabinet of Ministers from April 25, 2006, taking into account "Energy Development Guidelines for years 2007-2016 in Latvia" approved by the Latvian Cabinet of Ministers.

1. Electricity and power demand in the country last year

1.1. Electricity consumption (including losses) by week for year 2012 shown in the Table 1

Total annual energy consumption including losses equals 7 889 528 MWh.

Table 1

Week	1	2	3	4	5	6	7	8
Consumption, MWh	161569	168530	171336	175647	190672	196143	183405	171514
Week	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Consumption, MWh	165951	165672	157194	152564	152214	145825	141306	145857
Week	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Consumption, MWh	140035	121581	132725	133091	130926	127607	129717	132887
Week	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**
Consumption, MWh	130112	129639	132766	132359	127594	134350	133469	133233
Week	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
Consumption, MWh	138605	137691	139904	135932	140159	138606	144132	144372
Week	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**
Consumption, MWh	152111	150018	156028	162930	161192	163867	164315	171728
Week	**49**	**50**	**51**	**52**				
Consumption, MWh	187827	189192	199289	164140				

1.2. Maximum winter peak load and minimum summer load (data integrated from SCADA, MWh/h)

Minimum load: 396 MW 03.06.2012. 06.00
Maximum load: 1365 MW 19.12.2012. 17.00

1.3. System load in control measurement days shown in Table 2 (24 hours)

Table 2

2012	June 3rd.	December 19th.
h	**MWh**	**MWh**
01:00	518	886
02:00	469	844
03:00	445	828
04:00	424	818
05:00	401	818
06:00	396	865

07:00	422	989
08:00	470	1149
09:00	547	1262
10:00	622	1304
11:00	666	1300
12:00	664	1296
13:00	687	1250
14:00	685	1280
15:00	685	1287
16:00	659	1304
17:00	666	1365
18:00	657	1359
19:00	667	1335
20:00	678	1299
21:00	674	1258
22:00	673	1201
23:00	662	1096
00:00	618	985
Total	**14 055**	**27 378**

2. Electricity and power demand in the coming years (minimum forecast period - 10 years), including the annual electricity consumption and peak loads by scenarios

Maximum power system load is calculated (normalized) based on the Latvian Ministry of Economics submitted Latvian GDP growth forecast to average regulatory outdoor temperature during winter period (December-February) -3.5°C (Table 3). Changes in outdoor temperature also changes the maximum load. Electricity consumption of the system is forecasted for two scenarios - conservative and optimistic.

Table 3

Year	Annual consumption for conservative scenario	Annual consumption for optimistic scenario	Peak load
	GWh	GWh	MW
2013	8056	8056	1397
2014	8135	8217	1425
2015	8189	8339	1452
2016	8267	8480	1481
2017	8319	8624	1510
2018	8370	8806	1542
2019	8403	8902	1575
2020	8478	9062	1607
2021	8508	9170	1639
2022	8586	9348	1673
2023	8620	9467	1706

3. Generation and consumption compliance rating during the reporting period and forecast for the future years (minimum forecast period - 10 years)

3.1. Annual power consumption and possible sources of power supplies

Electricity and electrical power balances as well as electricity consumption forecast is developed for two scenarios:

- **Scenario A "Conservative Development"**: generating capacity development that takes into account the power plants, which are placed in service or closed in accordance with the information in possession of transmission system operator (hereinafter referred to as - TSO);

- **Scenario B "optimistic development"**: This forecast takes into account the future development of the base electric power stations, whose commissioning, according to information available to the TSO, is regarded as possible.

In **Scenario A** second unit of RigaCHP2 is commissioned at September 24, 2013 with an installed capacity of 439 MW (licensed installed capacity). Total installed electric capacity of RigaCHP2 power plant is 881 MW.

In **B Scenario** additional to Scenario A until year 2023, due to public support for electricity produced from renewable energy sources a faster wind, biomass and biogas power development is predicted. New high-power base power plant development Latvian for next 10 years is not planned.

Note: *Power plant output is presented in net values and takes into account the power plant planned annual maintenance schedules.*

Assumptions and explanations for the tables:

[1)] Daugava cascade hydropower plant (hereinafter - the Daugava HPP) multi-annual average net output according to the statistical data are 2700 GWh per year.

[2)] The available capacity of the Daugava HPP from January 2010 to September 2013 for the Latvian electricity needs are kept less for 100 MW because of "Latvenergo" AS agreement for 100 MW of emergency backup provision for Estonian transmission system operator "Elering" AS needs. In year 2012 the transmission system operator "Elering" AS with total electricity consumption of 29.393 GWh has used emergency reserve 543 times.

[3)] In 2010, a five-party agreement of BRELL ring between the Estonian, Latvian, Lithuanian, Russian and Belarusian TSO provides for the mutual provision of emergency reserves from the beginning of the realization and up to 12 hours. Emergency reserve of Latvia provides BRELL five-party agreement on a common emergency reserve maintenance for each of the parties involved, maintaining 100 MW each, which consists of the sum of 500 MW, but after "Nord Pool Spot" AS Latvian electricity market bidding area opening on June 3, 2013 , Latvian, registered traders no longer carries out cross-border electricity supply to/from neighboring countries (import/export), but it is done in the power exchange and TSOs can no longer accurately predict the volume of electricity supplies in his area from local power generators and neighbors. This means that the Latvian, Lithuanian and Estonian bidding area for each of the three Baltic TSOs are fully guaranteed market transactions carried out in its license area. Given the above, as well as the largest generating unit load in Latvia, Latvian power system needs of the emergency reserve is ensured according to the maximum generating units planned load, ie up to 442 MW (RigaCHP2 largest unit).

4) On 2011 aggreement signed on emergency replacement reserve provision after receiving command from TSO Dispach deptment (reserve capacity is 100 MW).

5) Power system regulation reserve assessed as 6% of the system peak load and 10% of the installed wind power station capacity for winter peak load day.

6) For power balance monthly assessment it is necessary to account in-flow for DaugavaHPP in Daugava river. For January least average inflow has been 125 m^3/sek, which corresponds to 220 MW of power for covering peak demand.

7) Installed capacities of power plants in the table are presented, including their own self-consumption (gross), but the rest of the tables are shown excluding self-consumption (net). Gross output is the total capacity of the power plant developed by all main generator units and generators for self-consumption. Net power output is gross output minus the power of the self-consumption equipment required for feeding power and power losses in transformers.

8) Available capacity to cover peak load at Daugava HPP and RigaCHP2 presented, including a long term reserves available (emergency, replacement and regulation reserves).

9) Wind power installed capacity and net capacity for conservative scenario assumed on the basis of the information report "Latvian Republic Action for renewable energy in the European Parliament and of the Council of 23 April 2009 Directive 2009/28 / EC on the promotion of energy from renewable sources and amending and subsequently repealing Directives 2001 / 77 / EC and 2003/30 / EC by 2020", the optimistic scenario - based on technical requirements issued by "Augstsprieguma tikls" AS and "Sadales tikls" AS. In the conservative scenario, biomass and biogas power plant capacity assessed on the basis of the information presented in the report "Latvian Republic Action for renewable energy in the European Parliament and of the Council of 23 April 2009 Directive 2009/28 / EC on the promotion of energy from renewable sources and amending and subsequently repealing Directives 2001/77 / EC and 2003/30 / EC by 2020", but in optimistic scenario - based on technical requirements issued by "Augstsprieguma tikls" AS and "Sadales tikls" AS.

10) In electricity balance tables RigaCHP1 and RigaCHP2 power generation is assessed as possible, for both RigaCHPs developing the maximum possible amount of electricity in annual terms.

Installed rated capacity (bruto) of power stations is shown on Table 4, MW

Table 4

		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Power stations with installed capacity above 40 MW	**1**	**2414**	**2633**	**2638**	**2648**	**2659**	**2660**	**2661**	**2662**	**2663**	**2664**	**2664**
Including: Daugava HPPs	*1.1*	*1560*	*1560*	*1565*	*1575*	*1586*	*1587*	*1588*	*1589*	*1590*	*1591*	*1591*
Riga CHP1	*1.2*	*144*	*144*	*144*	*144*	*144*	*144*	*144*	*144*	*144*	*144*	*144*
Riga CHP2	*1.3*	*662*	*881*	*881*	*881*	*881*	*881*	*881*	*881*	*881*	*881*	*881*
Imanta CHP	*1.4*	*48*	*48*	*48*	*48*	*48*	*48*	*48*	*48*	*48*	*48*	*48*
Installed capacity of small power stations (conservative scenario)	**2**	**270**	**340**	**390**	**441**	**490**	**539**	**588**	**639**	**700**	**747**	**798**
Including: Natural gas co-generation stations	*2.1*	*94*	*96*	*97*	*99*	*100*	*102*	*104*	*105*	*107*	*108*	*110*
Hydro power stations	*2.2*	*27*	*27*	*27*	*28*	*28*	*28*	*28*	*30*	*30*	*30*	*30*
Wind power stations (conservative scenario) [9)]	*2.3*	*59*	*103*	*147*	*191*	*235*	*280*	*324*	*368*	*412*	*456*	*500*
On shore	*2.3.1.*	*59*	*103*	*147*	*191*	*235*	*280*	*288*	*294*	*313*	*346*	*360*
Off shore	*2.3.2.*	*0*	*0*	*0*	*0*	*0*	*0*	*36*	*74*	*99*	*109*	*140*
Wind power stations (optimistic scenario) [9)]	*2.4*	*59*	*123*	*187*	*251*	*315*	*380*	*444*	*508*	*572*	*636*	*700*
On shore	*2.4.1.*	*59*	*123*	*187*	*196*	*214*	*258*	*302*	*345*	*389*	*432*	*452*
Off shore	*2.4.2.*	*0*	*0*	*0*	*55*	*101*	*121*	*142*	*162*	*183*	*203*	*248*
Biomass and bio gas power stations (conservative scenario) [9)]	*2.5*	*90*	*113*	*117*	*120*	*123*	*126*	*128*	*130*	*145*	*146*	*150*
Biomass and bio gas power stations (optimistic scenario) [9)]	*2.6*	*90*	*120*	*133*	*146*	*159*	*172*	*185*	*198*	*211*	*224*	*250*
Solar power stations (conservative scenario)	*2.7*	*0.15*	*0.94*	*1.72*	*2.51*	*3.29*	*4.08*	*4.86*	*5.65*	*6.43*	*7.22*	*8.00*
Solar power stations (optimistic scenario)	*2.8*	*0.15*	*1.14*	*2.12*	*3.11*	*4.09*	*5.08*	*6.06*	*7.05*	*8.03*	*9.02*	*10.00*

Latvian power system balance for winter peak load hours is shown in the Table 5 , MW (neto)

5. Table 5

Scenario A		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Maximum load	**1**	**1397**	**1425**	**1452**	**1481**	**1510**	**1542**	**1575**	**1607**	**1639**	**1673**	**1706**
Power stations with installed capacity above 40 MW	**2**	**2372**	**2584**	**2589**	**2599**	**2609**	**2610**	**2611**	**2612**	**2613**	**2614**	**2614**
Including: Daugava HPPs	*2.1*	*1552*	*1552*	*1557*	*1567*	*1578*	*1579*	*1580*	*1581*	*1582*	*1583*	*1583*
Riga CHP1	*2.2*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*
Riga CHP2	*2.3*	*639*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*
Imanta CHP	*2.4*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*
Small power stations	**3**	**252**	**318**	**367**	**417**	**466**	**514**	**562**	**612**	**671**	**718**	**767**
Including: Natural gas co-generation power stations	*3.1*	*85*	*87*	*88*	*90*	*91*	*93*	*94*	*96*	*97*	*99*	*100*
Hydro power stations	*3.2*	*26*	*26*	*26*	*27*	*27*	*27*	*27*	*29*	*29*	*29*	*29*
Wind power stations	*3.3*	*58*	*102*	*146*	*189*	*233*	*277*	*320*	*364*	*408*	*451*	*495*
On shore	*3.3.1.*	*58*	*102*	*146*	*189*	*233*	*277*	*285*	*291*	*310*	*343*	*356*
Off shore	*3.3.2.*	*0*	*0*	*0*	*0*	*0*	*0*	*35*	*73*	*98*	*108*	*139*
Biomas and bio gas power stations	*3.4*	*82*	*103*	*106*	*109*	*112*	*114*	*117*	*118*	*132*	*133*	*136*
Solar power stations	*3.5*	*0.14*	*0.84*	*1.55*	*2.25*	*2.96*	*3.67*	*4.37*	*5.08*	*5.79*	*6.49*	*7.20*
Available capacities for peak load and reserve guaranteeing	**4**	**1348**	**1680**	**1688**	**1696**	**1703**	**1711**	**1718**	**1725**	**1741**	**1747**	**1755**
Including: Daugava HPPs (incl. reserve) [2)6)]	*4.1*	*400*	*500*	*500*	*500*	*500*	*500*	*500*	*500*	*500*	*500*	*500*
Riga CHP1	*4.2*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*
Riga CHP2	*4.3*	*639*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*
Imanta CHP	*4.4*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*
Natural gas co-generation power stations	*4.5*	*60*	*61*	*62*	*63*	*64*	*65*	*66*	*67*	*68*	*69*	*70*
Hydro power stations	*4.6*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*6*	*6*	*6*	*6*
Wind power stations	*4.7*	*6*	*10*	*15*	*19*	*23*	*28*	*32*	*36*	*41*	*45*	*50*
Biomas and biogas power stations	*4.8*	*57*	*72*	*74*	*76*	*78*	*80*	*82*	*83*	*92*	*93*	*95*
Solar power stations	*4.9*	*0.05*	*0.34*	*0.62*	*0.90*	*1.18*	*1.47*	*1.75*	*2.03*	*2.31*	*2.60*	*2.88*
Power system emergency reserve [3)]	**5**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**
Power system regulating reserve [5)]	**6**	**90**	**96**	**102**	**108**	**114**	**120**	**127**	**133**	**139**	**146**	**152**
Total reserve in Latvia	**7=5+6**	**490**	**496**	**502**	**508**	**514**	**520**	**527**	**533**	**539**	**546**	**552**
Power deficit	**8=4-1-7**	**-538**	**-241**	**-266**	**-293**	**-321**	**-352**	**-384**	**-414**	**-438**	**-472**	**-503**
Power adequacy	**9=(4-7)/1**	**61%**	**83%**	**82%**	**80%**	**79%**	**77%**	**76%**	**74%**	**73%**	**72%**	**71%**

Latvian power system balance for winter peak load hours is shown in the Table 6, MW (neto)

Table 6

Scenario B		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Maximum load	**1**	**1397**	**1425**	**1452**	**1481**	**1510**	**1542**	**1575**	**1607**	**1639**	**1673**	**1706**
Power stations with installed capacity above 40 MW	**2**	**2372**	**2584**	**2589**	**2599**	**2609**	**2610**	**2611**	**2612**	**2613**	**2614**	**2614**
Including: Daugava HPPs	*2.1*	*1552*	*1552*	*1557*	*1567*	*1578*	*1579*	*1580*	*1581*	*1582*	*1583*	*1583*
Riga CHP1	*2.2*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*
Riga CHP2	*2.3*	*639*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*
Imanta CHP	*2.4*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*
Small power stations	**3**	**252**	**345**	**422**	**501**	**578**	**656**	**734**	**813**	**891**	**968**	**1058**
Including: Natural gas co-generation power stations	*3.1*	*85*	*87*	*88*	*90*	*91*	*93*	*94*	*96*	*97*	*99*	*100*
Hydro power stations	*3.2*	*26*	*26*	*26*	*27*	*27*	*27*	*27*	*29*	*29*	*29*	*29*
Wind power stations	*3.3*	*58*	*122*	*185*	*249*	*312*	*376*	*439*	*503*	*566*	*630*	*693*
On shore	*3.3.1.*	*58*	*122*	*185*	*194*	*212*	*256*	*299*	*342*	*385*	*428*	*448*
Off shore	*3.3.2.*	*0*	*0*	*0*	*55*	*100*	*120*	*141*	*161*	*181*	*201*	*245*
Biomas and bio gas power stations	*3.4*	*82*	*109*	*121*	*133*	*145*	*156*	*168*	*180*	*192*	*204*	*227*
Solar power stations	*3.5*	*0.14*	*1.02*	*1.91*	*2.79*	*3.68*	*4.57*	*5.45*	*6.34*	*7.23*	*8.11*	*9.00*
Available capacities for peak load and reserve guaranteeing	**4**	**1348**	**1686**	**1702**	**1719**	**1734**	**1750**	**1766**	**1783**	**1799**	**1815**	**1839**
Including: Daugava HPPs [2)6)]	*4.1*	*400*	*500*	*500*	*500*	*500*	*500*	*500*	*500*	*500*	*500*	*500*
Riga CHP1	*4.2*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*	*139*
Riga CHP2	*4.3*	*639*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*	*850*
Imanta CHP	*4.4*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*	*42*
Natural gas co-generation stations	*4.5*	*60*	*61*	*62*	*63*	*64*	*65*	*66*	*67*	*68*	*69*	*70*
Hydro power stations	*4.6*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*6*	*6*	*6*	*6*
Wind power stations	*4.7*	*6*	*12*	*19*	*25*	*31*	*38*	*44*	*50*	*57*	*63*	*69*
Biomas and biogas power stations	*4.8*	*57*	*76*	*85*	*93*	*101*	*109*	*118*	*126*	*134*	*143*	*159*
Solar power stations	*4.9*	*0.05*	*0.41*	*0.76*	*1.12*	*1.47*	*1.83*	*2.18*	*2.54*	*2.89*	*3.25*	*3.60*
Power system emergency reserve [3)]	**5**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**
Power system regulating reserve [5)]	**6**	**90**	**98**	**106**	**114**	**122**	**130**	**138**	**147**	**155**	**163**	**172**
Total reserve in Latvia	**7=5+6**	**490**	**498**	**506**	**514**	**522**	**530**	**538**	**547**	**555**	**563**	**572**
Power import (-) / export(+)	**8=4-1-7**	**-538**	**-236**	**-255**	**-276**	**-298**	**-322**	**-347**	**-370**	**-395**	**-421**	**-439**
Power adequacy	**9=(4-7)/1**	**61%**	**83%**	**82%**	**81%**	**80%**	**79%**	**78%**	**77%**	**76%**	**75%**	**74%**

Possible power balance for A scenario (annual values) is presented in the table 7, GWh

Scenario A *Table 7*

Years		**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Energy demand	**1**	**8056**	**8135**	**8189**	**8267**	**8319**	**8370**	**8403**	**8478**	**8508**	**8586**	**8620**
Output in power stations with installed capacity above 40 MW	**2**	**7773**	**9514**	**9510**	**9531**	**9552**	**9558**	**9563**	**9568**	**9574**	**9579**	**9579**
Including: Daugava HPPs [1)]	*2.1*	*3023*	*2767*	*2763*	*2784*	*2805*	*2811*	*2816*	*2821*	*2827*	*2832*	*2832*
Riga CHP [10)]	*2.2*	*894*	*894*	*894*	*894*	*894*	*894*	*894*	*894*	*894*	*894*	*894*
Riga CHP [10)]	*2.3*	*3566*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*
Imanta CHP	*2.4*	*290*	*290*	*290*	*290*	*290*	*290*	*290*	*290*	*290*	*290*	*290*
Small power stations	**3**	**1223**	**1412**	**1487**	**1563**	**1634**	**1703**	**1771**	**1843**	**1985**	**2041**	**2119**
Including: Natural gas co-generation power stations	*3.1*	*555*	*565*	*574*	*584*	*593*	*603*	*612*	*622*	*631*	*641*	*650*
Hydro power stations	*3.2*	*77*	*77*	*77*	*80*	*80*	*80*	*80*	*86*	*86*	*86*	*86*
Wind power stations	*3.3*	*58*	*102*	*146*	*189*	*233*	*277*	*320*	*364*	*408*	*451*	*495*
Onshore	*3.3.1.*	*58*	*102*	*146*	*189*	*233*	*277*	*285*	*291*	*310*	*343*	*356*
Offshore	*3.3.2.*	*0*	*0*	*0*	*0*	*0*	*0*	*35*	*73*	*98*	*108*	*139*
Biomas and biogas power stations	*3.4*	*532*	*668*	*690*	*709*	*727*	*743*	*757*	*770*	*859*	*862*	*886*
Solar power stations	*3.5*	*0.04*	*0.25*	*0.46*	*0.68*	*0.89*	*1.10*	*1.31*	*1.52*	*1.74*	*1.95*	*2.16*
Possible annual export/import	**4=(2+3)-1**	**940**	**2792**	**2809**	**2827**	**2867**	**2891**	**2931**	**2933**	**3051**	**3034**	**3078**
Spring flood period export	**5**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**
Annua adequacy	**6=(2+3-5)/1**	**105%**	**128%**	**128%**	**128%**	**128%**	**129%**	**129%**	**129%**	**130%**	**130%**	**130%**

Possible power balance for B scenario (annual values) is presented in the table 8, GWh

Scenario B *Table 8*

Years		**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Energy demand	**1**	**8056**	**8217**	**8339**	**8480**	**8624**	**8806**	**8902**	**9062**	**9170**	**9348**	**9467**
Output in power stations with installed capacity above 40 MW	**2**	**7773**	**9514**	**9510**	**9531**	**9552**	**9558**	**9563**	**9568**	**9574**	**9579**	**9579**
Including: Daugava HPPs [1)]	*2.1*	*3023*	*2767*	*2763*	*2784*	*2805*	*2811*	*2816*	*2821*	*2827*	*2832*	*2832*
Riga CHP [10)]	*2.2*	*894*	*894*	*894*	*894*	*894*	*894*	*894*	*894*	*894*	*894*	*894*
Riga CHP [10)]	*2.3*	*3566*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*	*5563*
Imanta CHP	*2.4*	*290*	*290*	*290*	*290*	*290*	*290*	*290*	*290*	*290*	*290*	*290*
Small power stations	**3**	**1237**	**1520**	**1702**	**1887**	**2069**	**2251**	**2434**	**2621**	**2803**	**2985**	**3244**
Including: Natural gas co-generation power stations	*3.1*	*555*	*565*	*574*	*584*	*593*	*603*	*612*	*622*	*631*	*641*	*650*
Hydro power stations	*3.2*	*62*	*62*	*62*	*64*	*64*	*64*	*64*	*69*	*69*	*69*	*69*
Wind power stations	*3.3*	*88*	*183*	*278*	*373*	*468*	*564*	*659*	*754*	*849*	*944*	*1040*
Onshore	*3.3.1.*	*88*	*183*	*278*	*291*	*319*	*383*	*448*	*513*	*577*	*642*	*672*
Offshore	*3.3.2.*	*0*	*0*	*0*	*55*	*150*	*180*	*211*	*241*	*272*	*302*	*368*
Biomas and biogas power stations	*3.4*	*532*	*709*	*786*	*863*	*940*	*1016*	*1093*	*1170*	*1247*	*1324*	*1477*
Solar power stations	*3.5*	*0.1*	*1.0*	*1.9*	*2.8*	*3.7*	*4.6*	*5.5*	*6.3*	*7.2*	*8.1*	*9.0*
Possible annual export/import	**4=(2+3)-1**	**954**	**2817**	**2873**	**2937**	**2997**	**3003**	**3094**	**3127**	**3207**	**3216**	**3357**
Spring flood period export	**5**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**	**500**
Annua adequacy	**6=(2+3-5)/1**	**106%**	**128%**	**128%**	**129%**	**129%**	**128%**	**129%**	**129%**	**130%**	**129%**	**130%**

Power demand and possible sources of guaranteeing, hourly balance for Scenario A (peak load), MW

Scenario A

Year 2014. January, Wednesday of the third week. Working day peak load (Table 9)

Table 9

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
01:00	139	604	42	72	61	5	6	0.00	0	0	929
02:00	139	560	42	72	61	5	6	0.00	0	0	885
03:00	139	543	42	72	61	5	6	0.00	0	0	868
04:00	139	533	42	72	61	5	6	0.00	0	0	858
05:00	139	533	42	72	61	5	6	0.00	0	0	858
06:00	139	582	42	72	61	5	6	0.00	0	0	907
07:00	139	712	42	72	61	5	6	0.00	0	0	1037
08:00	139	850	42	72	61	5	6	0.00	30	0	1205
09:00	139	792	42	72	61	5	6	0.34	206	0	1323
10:00	139	812	42	72	61	5	6	0.34	230	0	1367
11:00	139	850	42	72	61	5	6	0.34	104	84	1363
12:00	139	850	42	72	61	5	6	0.34	0	184	1359
13:00	139	850	42	72	61	5	6	0.34	0	136	1310
14:00	139	850	42	72	61	5	6	0.34	0	167	1342
15:00	139	850	42	72	61	5	6	0.34	66	108	1349
16:00	139	850	42	72	61	5	6	0.34	73	119	1367
17:00	139	850	42	72	61	5	6	0.00	140	117	1431
18:00	139	850	42	72	61	5	6	0.00	205	45	1425
19:00	139	850	42	72	61	5	6	0.00	206	19	1399
20:00	139	850	42	72	61	5	6	0.00	80	107	1362
21:00	139	850	42	72	61	5	6	0.00	0	144	1319
22:00	139	850	42	72	61	5	6	0.00	0	84	1259
23:00	139	824	42	72	61	5	6	0.00	0	0	1149
00:00	139	708	42	72	61	5	6	0.00	0	0	1033

Scenario A

<u>**Year 2018. January, Wednesday of the third week. Working day peak load (Table 10)**</u>

Table 10

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
01:00	139	651	42	80	65	5	23	0.00	0	0	1005
02:00	139	603	42	80	65	5	23	0.00	0	0	958
03:00	139	585	42	80	65	5	23	0.00	0	0	940
04:00	139	574	42	80	65	5	23	0.00	0	0	928
05:00	139	574	42	80	65	5	23	0.00	0	0	928
06:00	139	627	42	80	65	5	23	0.00	0	0	982
07:00	139	768	42	80	65	5	23	0.00	0	0	1122
08:00	139	850	42	80	65	5	23	0.00	30	69	1304
09:00	139	850	42	80	65	5	23	1.47	206	21	1432
10:00	139	850	42	80	65	5	23	1.47	230	44	1480
11:00	139	850	42	80	65	5	23	1.47	104	165	1475
12:00	139	850	42	80	65	5	23	1.47	0	265	1471
13:00	139	850	42	80	65	5	23	1.47	0	213	1419
14:00	139	850	42	80	65	5	23	1.47	0	247	1453
15:00	139	850	42	80	65	5	23	1.47	66	189	1461
16:00	139	850	42	80	65	5	23	1.47	73	201	1480
17:00	139	850	42	80	65	5	23	0.00	140	205	1549
18:00	139	850	42	80	65	5	23	0.00	205	133	1542
19:00	139	850	42	80	65	5	23	0.00	206	104	1515
20:00	139	850	42	80	65	5	23	0.00	80	189	1474
21:00	139	850	42	80	65	5	23	0.00	0	223	1428
22:00	139	850	42	80	65	5	23	0.00	0	158	1363
23:00	139	850	42	80	65	5	23	0.00	0	39	1244
00:00	139	763	42	80	65	5	23	0.00	0	0	1118

Scenario A

Year 2023. January, Wednesday of the third week. Working day peak load (Table 11) *Table 11*

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
01:00	139	715	42	95	70	6	45	0.00	0	0	1112
02:00	139	662	42	95	70	6	45	0.00	0	0	1060
03:00	139	642	42	95	70	6	45	0.00	0	0	1040
04:00	139	630	42	95	70	6	45	0.00	0	0	1027
05:00	139	630	42	95	70	6	45	0.00	0	0	1027
06:00	139	689	42	95	70	6	45	0.00	0	0	1086
07:00	139	844	42	95	70	6	45	0.00	0	0	1242
08:00	139	850	42	95	70	6	45	0.00	30	165	1443
09:00	139	850	42	95	70	6	45	2.88	206	129	1584
10:00	139	850	42	95	70	6	45	2.88	230	157	1637
11:00	139	850	42	95	70	6	45	2.88	104	278	1632
12:00	139	850	42	95	70	6	45	2.88	0	377	1627
13:00	139	850	42	95	70	6	45	2.88	0	319	1569
14:00	139	850	42	95	70	6	45	2.88	0	357	1607
15:00	139	850	42	95	70	6	45	2.88	66	300	1616
16:00	139	850	42	95	70	6	45	2.88	73	314	1637
17:00	139	850	42	95	70	6	45	0.00	140	327	1714
18:00	139	850	42	95	70	6	45	0.00	205	254	1706
19:00	139	850	42	95	70	6	45	0.00	206	222	1676
20:00	139	850	42	95	70	6	45	0.00	80	303	1631
21:00	139	850	42	95	70	6	45	0.00	0	332	1579
22:00	139	850	42	95	70	6	45	0.00	0	261	1508
23:00	139	850	42	95	70	6	45	0.00	0	129	1376
00:00	139	839	42	95	70	6	45	0.00	0	0	1237

Power demand and possible sources of guaranteeing, hourly balance for Scenario B (peak load), MW

Scenario B

Table 12

Year 2014. January, Wednesday of the third week. Working day peak load (Table 12)

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
01:00	139	593	42	76	61	5	12	0.00	0	0	929
02:00	139	549	42	76	61	5	12	0.00	0	0	885
03:00	139	532	42	76	61	5	12	0.00	0	0	868
04:00	139	522	42	76	61	5	12	0.00	0	0	858
05:00	139	522	42	76	61	5	12	0.00	0	0	858
06:00	139	571	42	76	61	5	12	0.00	0	0	907
07:00	139	701	42	76	61	5	12	0.00	0	0	1037
08:00	139	839	42	76	61	5	12	0.00	30	0	1205
09:00	139	782	42	76	61	5	12	0.41	206	0	1323
10:00	139	801	42	76	61	5	12	0.41	230	0	1367
11:00	139	850	42	76	61	5	12	0.41	104	73	1363
12:00	139	850	42	76	61	5	12	0.41	0	173	1359
13:00	139	850	42	76	61	5	12	0.41	0	124	1310
14:00	139	850	42	76	61	5	12	0.41	0	156	1342
15:00	139	850	42	76	61	5	12	0.41	66	97	1349
16:00	139	850	42	76	61	5	12	0.41	73	108	1367
17:00	139	850	42	76	61	5	12	0.00	140	106	1431
18:00	139	850	42	76	61	5	12	0.00	205	35	1425
19:00	139	850	42	76	61	5	12	0.00	206	8	1399
20:00	139	850	42	76	61	5	12	0.00	80	96	1362
21:00	139	850	42	76	61	5	12	0.00	0	133	1319
22:00	139	850	42	76	61	5	12	0.00	0	73	1259
23:00	139	813	42	76	61	5	12	0.00	0	0	1149
00:00	139	697	42	76	61	5	12	0.00	0	0	1033

Scenario B

<u>**Year 2018. January, Wednesday of the third week. Working day peak load (Table 13)**</u>

Table 13

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
01:00	139	607	42	109	65	5	38	0.00	0	0	1005
02:00	139	560	42	109	65	5	38	0.00	0	0	958
03:00	139	541	42	109	65	5	38	0.00	0	0	940
04:00	139	530	42	109	65	5	38	0.00	0	0	928
05:00	139	530	42	109	65	5	38	0.00	0	0	928
06:00	139	583	42	109	65	5	38	0.00	0	0	982
07:00	139	724	42	109	65	5	38	0.00	0	0	1122
08:00	139	850	42	109	65	5	38	0.00	30	25	1304
09:00	139	827	42	109	65	5	38	1.83	206	0	1432
10:00	139	850	42	109	65	5	38	1.83	230	0	1480
11:00	139	850	42	109	65	5	38	1.83	104	121	1475
12:00	139	850	42	109	65	5	38	1.83	0	221	1471
13:00	139	850	42	109	65	5	38	1.83	0	168	1419
14:00	139	850	42	109	65	5	38	1.83	0	202	1453
15:00	139	850	42	109	65	5	38	1.83	66	144	1461
16:00	139	850	42	109	65	5	38	1.83	73	157	1480
17:00	139	850	42	109	65	5	38	0.00	140	161	1549
18:00	139	850	42	109	65	5	38	0.00	205	89	1542
19:00	139	850	42	109	65	5	38	0.00	206	60	1515
20:00	139	850	42	109	65	5	38	0.00	80	146	1474
21:00	139	850	42	109	65	5	38	0.00	0	179	1428
22:00	139	850	42	109	65	5	38	0.00	0	115	1363
23:00	139	846	42	109	65	5	38	0.00	0	0	1244
00:00	139	720	42	109	65	5	38	0.00	0	0	1118

Scenario B

Year 2023. January, Wednesday of the third week. Working day peak load (Table 14)

Table 14

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
01:00	139	627	42	159	70	6	69	0.00	0	0	1112
02:00	139	575	42	159	70	6	69	0.00	0	0	1060
03:00	139	554	42	159	70	6	69	0.00	0	0	1040
04:00	139	550	34	159	70	6	69	0.00	0	0	1027
05:00	139	550	34	159	70	6	69	0.00	0	0	1027
06:00	139	601	42	159	70	6	69	0.00	0	0	1086
07:00	139	757	42	159	70	6	69	0.00	0	0	1242
08:00	139	850	42	159	70	6	69	0.00	30	77	1443
09:00	139	850	42	159	70	6	69	3.60	206	40	1584
10:00	139	850	42	159	70	6	69	3.60	230	69	1637
11:00	139	850	42	159	70	6	69	3.60	104	189	1632
12:00	139	850	42	159	70	6	69	3.60	0	288	1627
13:00	139	850	42	159	70	6	69	3.60	0	231	1569
14:00	139	850	42	159	70	6	69	3.60	0	268	1607
15:00	139	850	42	159	70	6	69	3.60	66	211	1616
16:00	139	850	42	159	70	6	69	3.60	73	226	1637
17:00	139	850	42	159	70	6	69	0.00	140	239	1714
18:00	139	850	42	159	70	6	69	0.00	205	167	1706
19:00	139	850	42	159	70	6	69	0.00	206	135	1676
20:00	139	850	42	159	70	6	69	0.00	80	215	1631
21:00	139	850	42	159	70	6	69	0.00	0	244	1579
22:00	139	850	42	159	70	6	69	0.00	0	173	1508
23:00	139	850	42	159	70	6	69	0.00	0	41	1376
00:00	139	752	42	159	70	6	69	0.00	0	0	1237

Power demand and possible sources of guaranteeing, hourly balance for A scenario (minimum load), MW

Scenario A

June 2018. – minimum load (Table 15)

Table 15

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
00:00	139	279	0	80	65	5	20	0.00	0	0	588
01:00	139	223	0	80	65	5	20	0.00	0	0	532
02:00	139	196	0	80	65	5	20	0.00	0	0	505
03:00	139	172	0	80	65	5	20	0.00	0	0	481
04:00	114	171	0	80	65	5	20	0.00	0	0	455
05:00	108	171	0	80	65	5	20	0.00	0	0	449
06:00	138	171	0	80	65	5	20	0.00	0	0	479
07:00	139	224	0	80	65	5	20	0.00	0	0	533
08:00	139	272	0	80	65	5	20	1.18	38	0	621
09:00	139	283	0	80	65	5	20	1.18	112	0	706
10:00	139	297	0	80	65	5	20	1.18	148	0	756
11:00	139	284	0	80	65	5	20	1.18	159	0	754
12:00	139	378	0	80	65	5	20	1.18	91	0	780
13:00	139	377	0	80	65	5	20	1.18	90	0	777
14:00	139	365	0	80	65	5	20	1.18	102	0	777
15:00	139	349	0	80	65	5	20	1.18	88	0	748
16:00	139	388	0	80	65	5	20	1.18	57	0	756
17:00	139	375	40	80	65	5	20	1.18	20	0	746
18:00	139	406	40	80	65	5	20	1.18	0	0	757
19:00	139	420	40	80	65	5	20	0.00	0	0	769
20:00	139	416	40	80	65	5	20	0.00	0	0	765
21:00	139	414	40	80	65	5	20	0.00	0	0	764
22:00	139	402	40	80	65	5	20	0.00	0	0	751
23:00	139	352	40	80	65	5	20	0.00	0	0	701

Scenario A

June 2023. – minimum load (Table 16)

Table 16

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
00:00	139	251	40	95	70	6	50	0.00	0	0	650
01:00	139	189	40	95	70	6	50	0.00	0	0	589
02:00	128	170	40	95	70	6	50	0.00	0	0	559
03:00	102	170	40	95	70	6	50	0.00	0	0	532
04:00	73	170	40	95	70	6	50	0.00	0	0	503
05:00	66	170	40	95	70	6	50	0.00	0	0	497
06:00	99	170	40	95	70	6	50	0.00	0	0	530
07:00	139	190	40	95	70	6	50	0.00	0	0	590
08:00	139	284	40	95	70	6	50	2.88	0	0	687
09:00	139	378	40	95	70	6	50	2.88	0	0	781
10:00	139	396	40	95	70	6	50	2.88	38	0	836
11:00	139	319	40	95	70	6	50	2.88	112	0	834
12:00	139	332	40	95	70	6	50	2.88	128	0	863
13:00	139	318	40	95	70	6	50	2.88	139	0	860
14:00	139	367	40	95	70	6	50	2.88	91	0	860
15:00	139	335	40	95	70	6	50	2.88	90	0	827
16:00	139	332	40	95	70	6	50	2.88	102	0	836
17:00	139	334	40	95	70	6	50	2.88	88	0	825
18:00	139	378	40	95	70	6	50	2.88	57	0	837
19:00	139	432	40	95	70	6	50	0.00	20	0	851
20:00	139	427	40	95	70	6	50	0.00	20	0	846
21:00	139	425	40	95	70	6	50	0.00	20	0	845
22:00	139	431	40	95	70	6	50	0.00	0	0	831
23:00	139	376	40	95	70	6	50	0.00	0	0	776

Power demand and possible sources of guaranteeing, hourly balance for Scenario B (minimum load), MW

Scenario B

June 2018. – minimum load (Table 17)

Table 17

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
00:00	80	231	0	109	65	5	38	0.00	60	0	588
01:00	80	235	0	109	65	5	38	0.00	0	0	532
02:00	80	208	0	109	65	5	38	0.00	0	0	505
03:00	60	204	0	109	65	5	38	0.00	0	0	481
04:00	40	198	0	109	65	5	38	0.00	0	0	455
05:00	40	192	0	109	65	5	38	0.00	0	0	449
06:00	40	222	0	109	65	5	38	0.00	0	0	479
07:00	50	266	0	109	65	5	38	0.00	0	0	533
08:00	50	314	0	109	65	5	38	1.83	38	0	621
09:00	90	319	0	109	65	5	38	1.83	78	0	706
10:00	90	326	0	109	65	5	38	1.83	121	0	756
11:00	90	290	0	109	65	5	38	1.83	154	0	754
12:00	90	318	0	109	65	5	38	1.83	153	0	780
13:00	90	325	0	109	65	5	38	1.83	143	0	777
14:00	90	327	0	109	65	5	38	1.83	141	0	777
15:00	90	308	0	109	65	5	38	1.83	131	0	748
16:00	90	325	0	109	65	5	38	1.83	122	0	756
17:00	90	325	0	109	65	5	38	1.83	111	0	746
18:00	110	328	0	109	65	5	38	1.83	100	0	757
19:00	110	344	0	109	65	5	38	0.00	98	0	769
20:00	110	339	0	109	65	5	38	0.00	99	0	765
21:00	110	329	0	109	65	5	38	0.00	107	0	764
22:00	120	325	0	109	65	5	38	0.00	89	0	751
23:00	90	321	0	109	65	5	38	0.00	73	0	701

Scenario B

June 2023. – minimum load (Table 18)

Table 18

h	Riga CHP1	Riga CHP2	Imanta CHP	Biomass and biogas	Gas fueled co-generation	Small HPP	Wind power	Solar power	Daugava HPPs	Import	Load
00:00	128	170	0	159	70	6	69	0.00	48	0	650
01:00	115	170	0	159	70	6	69	0.00	0	0	589
02:00	85	170	0	159	70	6	69	0.00	0	0	559
03:00	58	170	0	159	70	6	69	0.00	0	0	532
04:00	40	170	0	159	59	6	69	0.00	0	0	503
05:00	40	170	0	159	53	6	69	0.00	0	0	497
06:00	40	170	0	147	50	6	69	0.00	48	0	530
07:00	98	170	0	159	70	6	69	0.00	18	0	590
08:00	139	202	0	159	70	6	69	3.60	38	0	687
09:00	139	256	0	159	70	6	69	3.60	78	0	781
10:00	139	268	0	159	70	6	69	3.60	121	0	836
11:00	139	233	0	159	70	6	69	3.60	154	0	834
12:00	139	263	0	159	70	6	69	3.60	153	0	863
13:00	139	270	0	159	70	6	69	3.60	143	0	860
14:00	139	272	0	159	70	6	69	3.60	141	0	860
15:00	139	250	0	159	70	6	69	3.60	131	0	827
16:00	139	267	0	159	70	6	69	3.60	122	0	836
17:00	139	267	0	159	70	6	69	3.60	111	0	825
18:00	139	291	0	159	70	6	69	3.60	100	0	837
19:00	139	310	0	159	70	6	69	0.00	98	0	851
20:00	139	304	0	159	70	6	69	0.00	99	0	846
21:00	139	297	0	159	70	6	69	0.00	105	0	845
22:00	139	327	0	159	70	6	69	0.00	61	0	831
23:00	139	333	0	159	70	6	69	0.00	0	0	776

3.2. Information on energy cross-border trade amounts for year 2012 presented in the Table 19

Table 19

	Amounts of energy trade (MWh)
Import	4 935 455
Export	3 243 632

3.3. TSO evaluation for the time periods of insufficient power adequacy and suggestions for power supply guarantee in forcoming years (i.e. generation development on certain locations, demand side management, new infrastructure creation)

Since 3 June 2013 Latvia is operating according to "Nord Pool Spot" AS energy market principles and electricity trading takes place jointly and consistent throughout the Baltic Sea region. Power supply and demand in Latvia is regulated by Latvian electricity market and Latvian TSO provides market transactions in Latvian bidding area, as well as the balance of power in the region and the generation and interconnection capacity available. Since the European Union's Energy Action Plan 2050 was adopted, which states that the generation and development of national capacity adequacy should be focused on areas with the potential for renewable energy to stimulate the reduction of CO2 emissions and greenhouse gas reduction, and promote a more efficient and competitive development of the power plant, the power base of the adequacy of one within a country is not necessarily an indication of the adequacy of generating capacity, but it must take into account the complex with the available throughput capacity to / from the State or region. Working in the above circumstances, in recent years there has not been a situation where Latvia would need to disable any consumer or regions due to insufficient generating capacity or insufficient capacity on interconnectors with Lithuania, Estonia and Russia. Working synchronously with Russia, Latvian TSO in all modes has been able to ensure the adequacy of the Latvian electricity system, regardless of the existing generating units in the Latvian territory. At the same time, looking at the adequacy of the state and a regional level, the generating capacity of the Latvian electricity system is insufficient to cover the peak load and cover self-consumption.

Analyzing the capacity adequacy for the coming years, the conservative scenario (A) of power (MW) security analysis tables (Table 5) shows that the generating capacity is insufficient to cover the Latvian electricity peak load, not only this year but also in 2023, when second unit has already been implemented in Riga CHP2 (439 MW) and the planned construction of wind power installed capacity could reach 495 MW. It is planned that 139 MW of total wind power installed capacity could be on offshore wind parks, the pace of development at the moment it is difficult to predict. For conservative scenario, electricity demand can be covered at 100% throughout the whole study period, because of the large gas power plants RigaCHP1 and RigaCHP2 are able to cover the electricity consumption (Table 7). Looking at the Latvian TSO forecast, the market studies of European transmission system operators associacion (ENTSO-E) and "Nord Pool Spot" AS market principles, meaning power generation for RigaCHP1 and RigaCHP2 is practically impossible, but theoretically, in the isolated operation mode from the neighboring power systems, and taking into account the high gas price for RigaCHP1 and RigacHP2 in the analysed period are able to produce the specified amount of electricity. The optimistic scenario (B) of power (MW) security analysis tables (Table 6) shows that with the rapid wind, biomass and biogas power stations development at the year 2018 Latvian power system will not be able to cover the peak load, but only the forecasted electricity consumption (79% self-sufficiency capacity and 128% provision of electricity supply, if RigaCHP1 and RigaCHP2 will be operated outside the liberatsid market conditions) and even in 2023, the Latvian power system will not be able to cover the peak load (74%), but will allow electricity to produce 130% (RigaCHP1 and RigaCHP2 operating outside the electricity market conditions). In the optimistic scenario (B), increasing the share of wind power in Latvian electricity system, the need for reagulating reserve will be increased, due to unpredictable operation, for the achievement of which it is recommended to implement power station projects with solid gaseous or liquid fuels.

3.4. Information on required and available emergency reserve capacities in year 2012 is shown in the Table 20.

Table 20

Month	Max required	Available
	MW	MW
January	100	100
February	100	100
March	100	100
April	100	100
May	100	100
June	100	100
July	100	100
August	100	100
September	100	100
October	100	100
November	100	100
December	100	100

3.5. TSO conclusions on generation capacity and power availability for the needs of Latvian consumers

Despite the growing power balance currently Latvian power station capacities are not sufficient, but after the completion of RigaCHP2 second block, theoretically, Latvia will be able to provide the electricity demand for the next 10 years. Due to the fact that power stations need to maintain reserve capacity, the available capacity is insufficient to gauarantee the Latvian demand, especially in winter and summer periods, characterised by low water inflow in the river Daugava. Daugava HPP mode of operation (the largest generation source) is directly dependent on the water inflow in the river. State power supply is dependent on the base mode of Latvian and neighboring power plants.

Energy Development Guidelines states that in 2012 the Latvian power system has to achieve 80% self-sufficiency, and in 2016 it must be at 100% level. Table 5 shows that in 2013 in the conservative scenario (A) Latvian power system capacity to self-sufficiency has not reached the 80% level, but is only 61%, and the provision of electricity (Table 7) is 105%, the same as in optimistic scenario (B). In 2018 the capacity self-sufficiency of Latvian power system in conservative scenario (A) is 77% (Table 5) and the provision of electricity (Table 7) is 129%, but in the optimistic development scenario (B) the capacity self-sufficiency (Table 6) is 79% and the provision of electricity (Table 8) is 128%. Adequacy in conservative scenario (A) for year 2023 is projected to be 71% (Table 5) and the provision of electricity to 130% (Table 7), but the optimistic scenario (B) adequacy reaches 74% and the provision of electricity to 130%. Adequacy of electricity in the power system significantly affected by the need for emergency reserve maintenance and adjustment reserve maintenance, as well as the increase in the proportion of wind power in the electricity system requires increase of regulation

reserve to 10% of the installed wind power capacity. Currently, Latvia is supporting production of electricity from renewable energy sources, so it is important to realize some of the high-power production projects with Latvian participation in it - either Latvian or the Baltic States, and not only to increase the security of the Latvian electricity system with a capacity but also to diversify the elctricity production. The current situation of the Latvian electricity system depends on Russian gas import options, conditions and prices.
New base power plant comissioning by 2018 and 2023 is not expected since the Energy Strategy 2030 provides the preconditions for the development of only economically viable regional low-carbon emission base power station projects and is steering away from direct public support for base power stations projects. Taking into account past experience, has no reason to consider that the technical requirements submitted to the system operators for the construction of small power plants will be realized in full. By now the suspense of the Renewable Energy Law and reworking mandatory procurement components calculation methodology development and validation of these two documents to the Cabinet of Ministers, Government is delaying the development of renewable energy sources - wind, solar, biomass and biogas, and does not contribute to their development as it was planned in advance. In this context, TSO believe that actually built station number and power will be considerably less than the specified in technical requirement issued, but there are not available any criteria by which to objectively assess and monitor the planned power plant construction process.

4. Transmission system adequacy for demand and maintenance quality

4.1. TSO conclusions on the power transmission system adequacy for the tasks of transportation of electricity and the ability to provide noninterrupted functioning of the power system in outage of one of the systems facilities and activities (individually and jointly with other transmission system operators) for the reliable operation of the transmission system for the coming years (minimum forecast period - 10 years)

By the end of 2009 the transmission capacity of the network provided for the Latvian electricity consumers of electricity demand with an adequate sufficient rezerve during normal modes of operation. From 2010, the situation significantly changed with closure of Ignalina NPP and as the result was significantly reduced capacity in cross-border in Estonia-Latvia and Russia-Latvia, due to the reason that Estonian TSO “Elering” AS established increased or critical conductor slack for number of interconnections and internal 330 kV transmission lines. Cross-border transmission capacity of 1150 MW to Latvian direction is reduced to 900 MW and towards the Estonian direction to 850 MW at an outdoor temperature of 0°C or lower, and down to 700 MW in Latvian direction and down to 750 MW in Estonia direction at an outdoor temperature of 25°C, taking into account existing capacity, as well as during the summer conductor thermal limits. Estonian TSO carried out lenghty investigations and line survey at different outdoor temperatures and line loads, receiving help from professionals from Scandinavian companies. On this basis "Elering" AS made conclusions of the examination and now "Elering" AS has prepared a timetable for internal and external 330 kV transmission line reinforcement to prevent critical slacks. Starting from 2018 "Elering" AS plans to start a transmission lines reconstruction for slack prevention and plans to invest additional money for the cause. All necessary lines planned to be reconstructed by the 2030. This mentioned cross-border capacity constraint significantly complicates the possibility for Latvian and Lithuanian consumers, as well as in some cases the Kaliningrad region consumers to import electricity from cheaper electricity prices areas of Estonian and Scandinavian countries, as a result, Lithuanian and Latvian average electricity price is higher than in Estonia and the Nordic electricity prices. After Ignalina NPP closure loads increased on the cross-section between Russia and Belarus, where during repair and emergency modes, cross-border transmission capacity has to be limited, leading to problems with power supplies from Russia as well.

4.2 Information about the planned system interconnections (minimum forecast period - 10 years)

On September 22, 2011, the three Baltic TSOs "Augstsprieguma tīkls" AS, "Elering" AS and "Litgrid" AB signed a cooperation agreement on research work carried out in regard of the Baltic States energy integration in the EU internal electricity market and the possible synchronous interconnection with continental Europe networks. Research has received financial support from the European Union Trans-European energy networks funds (hereinafter - TEN-E) development. This research is a prerequisite for the elaboration of technical requirements of possible Baltic States power system synchronization with the continental European synchronous zones. The study is planned to determine the expected costs and economic benefits from the construction of the Baltic grid interconnection to the continental European synchronous zone, as well as to explore the legal documentation and legal obstacles and identify aspects that need to be improved and changed for the disconnection of the IPS / UPS system and joining to the power systems of continental Europe. In 2012 an agreement with the Swedish consulting company "Gothia Power" for study accopmlish was signed. Exploration work planned to be completed by the end of 2013 and, based on the results of the study, a decision could be made on development of each of the Baltic state power systems towards a common goal. Currently, Lithuania has made a political decision and confirmed the long-term development strategy, which provides electric power system synchronous work with Central European networks and asynchronously with the Russian power system. Latvia and Estonia currently are in the political debate on the future development of the energy system in this direction.

In 2010, with the European Union and AS "Latvenergo" co-financing the 330 kV transmission network Project Kurzeme ring construction has been started. Step 1: Riga 330 kV ring construction – the expected comissioning before October 2013 with reconstruction of the 330 kV substation RīgaCHP1 and Imanta and construction of 330kV cable line between RigaCHP1 and Imanta substations, which will increase the security of supply of the city of Riga, including the network maintenance modes. Without the implementation of the project, some of Riga transmission network repair and emergency modes will be more difficult for the reliabilitiy requirements to meet. In year 2012 continued intensively cable route design and cable construction works. In year 2013 the design work and the cable line civil engineering works completed. The provision of the project due to the need for strengthening the Riga node to the next step to ensure a close connection to the Western part of Latvia (Kurzeme) 330 kV circuit development. In addition, the increase in power transit reliability in the western region of Lithuania direction, which means reduced transmission network limitations at this area. Under the framework of Kurzeme Ring 1st stage is reconstructed the 110 kV transmission line in Riga "Mīlgrāvis-Bolderāja", rebuilding the transmission line from the overhead to cable construction. 110 kV transmission line Mīlgrāvis-Bolderāja is put into operation in 2012. Implementation of the project will facilitate the Riga Freeport operation and reduce the unexpected disconnections of the line. Stage 2: 330 kV line Grobiņa-Ventspils. In 2010, with the EU co-funding the environmental impact assessment (hereinafter referred to as - EIA) study and right-of-way (hereinafter-RoW) study procedures has been lauched for public consultations with all the necessary institutions affected by the Project. On December 6, 2011 the EIA study and RoW procedures had been completed and received the positive Environment State Bureau decision to these activities.

Transmission line design work started in 2012 and construction work started in 2013. 3rd stage: 330-kV line Ventspils Tume-Imanta construction is expected before the end of 2018. In 2011, preparatory work has been made for the procurement announcement at stage 3 of the EIA and RoW studies. In 2012 with EU co-financing launched the EIA and RoW research activities that should be finalized in 2013. 330kV line construction development depends on the EU co-financing amount of CEF (European Connection Facilities) Regulation. Kurzeme Ring project will provide the necessary infrastructure for the planned wind farms and the possible growing demand load in the Kurzeme region, connecting two larger (Western and Central) Latvian production and consumption regions, as well as providing a possible increase in transfer capacity, for 700 MW DC interconnection between Sweden and Lithuania

Together with the Estonian transmission system operator the feasibility study has been carried out for a new interconnection options between Estonia and Latvia. This interconnection will increase the available interconnection capacity between the Latvian and Estonian power systems. Estonian-Latvian third interconnection is part of the Pan-European transmission network 10-year development plan for 2012 and under development for 2014, and part of the Latvian electricity transmission system 10-year development plan, which was approved by the Public Utilities Commission on August 22, 2012 with decision No. 195. Interconnection is included in the list of Projects of Common Interest and is considered one of the most important projects for the whole Baltic Sea region. As the best option for Estonian-Latvian third interconnection according to technical and economic criteria has been selected option Killing Nomme (Sindi) - Riga CHP2 (Riga). Sindi-Riga route has lower construction costs and the greatest transfer capacity increase in both the normal scheme of up to 500/600MW and in isolated scheme up to 300/500 MW. This route option is crossing densely populated areas and nature protected areas, which could affect the coordination and construction period.

"Augstsprieguma tīkls" AS, "Elering" AS and "Latvijas elektriskie tīkli" AS in February 2012 signed a Memorandum of Understanding stating that all parties seek to attract co-financing from the European grants, since the implementation of the project is characterised by a major investment disproportion between the Latvian and Estonian TSO`s where on a geographical basis Estonian TSO cover only 11% of the total costs, but the Latvian TSO 89% of the total costs. "Latvijas elektriskie tīkli" AS have applied request for the TEN-E co-financing of the EIA and RoW studies un Latvian territory. In 2013 positive decision has been received from the European Commission for the TEN-E co-financing for the EIA study and RoW for the third Estonian-Latvian interconnection and in 2013 launched a process of research and consultation with local governments and the public for the possible routes in the Latvian territory. Futurw Project development is depend on the EU co-financing amounts under CEF (European Connection Facilities) Regulation. The project is expected to be realized by 2020.

Estonian and Finnish TSO until the end of 2013 are planning to commission a second DC interconnection Estlink2 with 650 MW capacity. By the end of 2016 it is also planned to implement the Lithuanian-Swedish (NordBalt) DC interconnection with a 700 MW transmission capacity, thereby providing further Baltic transmission network integration with Scandinavian transmission networks and electricity market integration in the Scandinavian market. Lithuanian TSO and Polish TSO are planning to construct DC interconnection LitPol Link 1 with 500 MW of transmission capacity (Phase 1) by the end of 2015 and with a total 1,000 MW of transmission capacity (Phase 2) by 2020. It should be noted that these connections were based primarily on major power generation development plans in the Baltic States and these connections will result in additional Latvian transmission system load and will demand for reserve capacity increase in the Baltic region.

4.3. PSO conclusions on the electricity transmission system reliability and adequacy of all consumers to provide secure power supply in the previous year and the following years (minimum forecast period - 10 years)

Annual statement paragraphs 3.6. and 4.2. contain descriptions of the projects providing for the adequacy of transmission networks in the face of increasing electricity consumption, installed power plant capacity and power transit. At present significant challenges for operation of power system are created by capacity reduction in cross-border Estonia-Latvia, where one of the possible solutions is of interest to all Latvian and Lithuanian power plants to participate in the electricity market and after "Nord Pool Spot" AS bidding area opening in Latvia to promote the Latvian electricity market liquidity. At present, the power exchange Nord Pool Spot bidding areas are open in all three Baltic countries - Estonia, Lithuania and Latvia.
330kV and 110kV transmission network is planned to be reconstructed, modernized and developed in accordance with "Augstsprieguma tikls" AS (AST) developed and the Public Utilities Commission (PUC) approved electricity transmission system development plan, which is published in the AST and PUC websites. Parallel to the development of 330 kV transmission network it is planned to developed 110 kV transmission network, especially in places that can not provide N-1 criterion to be fulfilled, such as the Latvian North Vidzeme region. In 110 kV transmission network there are planned 110 kV substations reconstruction, which does not meet the technical criteria set out in development policy, as well as the planned replacement of aged transformers. In addition to the 330 kV cable line RigaCHP1-Imanta construction, which will complete the 330 kV ring around the Riga city, in Riga region it is necessary to develop the 110 kV network in order to increase security of power supply.

4.4. Existing generation capacities, greater than 1 MW

Latvian power system power stations with installed capacity above 1 MW are presented in the Table 21:

Table 21

	Station name	Installed capacity (MW)
Natural gas co-generation stations		
1	BK ENERĢIJA, SIA	3.9
2	Daugavpils siltumtīkli, PAS, SC1	3.9
3	Dobeles enerģija, SIA	1.5
4	Elektro bizness, SIA	3.6
5	Energy & Communication, AS	3.9
6	JUGLAS JAUDA, SIA	14.9
7	LIEPĀJAS ENERĢIJA, SIA	4
8	Līvbērzes enerģija, SIA	1.644
9	Mārupes siltumnīcas	1.999
10	Olenergo, SIA	3.12
11	RĪGAS SILTUMS, AS	2.4
12	SABIEDRĪBA MĀRUPE, SIA	2
13	Sal-Energo, SIA	3.99
14	SALDUS SILTUMS, SIA	1.3
15	Uni-enerkom, SIA	1.998
16	VANGAŽU SILDSPĒKS, SIA	2.746

17	VALMIERAS ENERĢIJA, AS	1.99
18	VALMIERAS ENERĢIJA, AS	1.99
19	Betula Premium, SIA	1.9
20	Enefit power un Heat Valka, SIA	2.4
21	RTU enerģija, SIA	1.56
22	Olainfarm enerģija, AS	2
23	RĪGAS SILTUMS, AS	47,7
24	WINDAU, SIA	3.86
Biomas and biogas power stations		
1	AD Biogāzes stacija, SIA	1.96
2	Agro Iecava, SIA	1.95
3	Conatus BIOenergy, SIA	1.96
4	Bioenerģija-08, SIA	1.98
5	Biodegviela, SIA	2
6	BIO ZIEDI, SIA	2.5
7	DAILE AGRO, SIA	1
8	Getliņi EKO, BO SIA	5.24
9	Grow Energy, SIA	1.995
10	KŅAVAS GRANULAS, SIA	1
11	LIEPĀJAS RAS, SIA	1
12	RIGENS, SIA	2.096
13	Zaļā Mārupe, SIA	1
14	GRAANUL INVEST, SIA	6.492
15	Krāslavas nami, SIA	1
16	Liepājas Enerģija, SIA	2.5
17	GAS STREAM	1
18	BIO FUTURE, SIA	1
19	MC Bio, SIA	1.095
20	Pampāļi, SIA	1
21	EcoZeta, SIA	1.3
22	Saldus enerģija,SIA	1.862
23	BIOEninvest, SIA	1
24	Priekules Bioenerģija, SIA	1
25	Piejūras energy, SIA	1.6
26	Agro Lestene, SIA	1
27	OŠUKALNS, SIA	1.4
28	Fortum Jelgava, SIA	22.996
Wind power stations		
1	Baltnorvent, SIA, Alsungas VES	2
2	BK Enerģija, SIA	1.95
3	Enercom Plus, SIA	2.75
4	Impakt, SIA Užavas VES	1
5	Lenkas energo, SIA Lenkas VES- 1	2
6	VĒJA PARKS 10, SIA	1.8
7	VĒJA PARKS 11, SIA	1.8

8	VĒJA PARKS 12, SIA	1.8
9	VĒJA PARKS 13, SIA	1.8
10	VĒJA PARKS 14, SIA	1.8
11	VĒJA PARKS 15, SIA	1.8
12	VĒJA PARKS 16, SIA	1.8
13	VĒJA PARKS 17, SIA	1.8
14	VĒJA PARKS 18, SIA	1.8
15	VĒJA PARKS 19, SIA	1.8
16	VĒJA PARKS 20, SIA	1.8
17	WINENERGY, SIA	20.7
Hydro power stations		
1	Spridzēnu HES, SIA	1.2
Latvenergo power stations		
1	Kegums HPP	240
2	Riga HPP	402
3	Plavinas HPP	894
4	RigaCHP1	144
5	RigaCHP2	662

4.5. Actions during maximum demand or supply deficit periods

In the event of the deficit of power and energy in Latvian territory and in the neighboring countries to cover the consumption of the Latvian power system, the TSO will be forced to disable from the network a certain number of consumers in order to balance the power consumption and the generation in Latvian power system. In this case, the TSO will act according to Latvian legislation and will inform the Ministry of Economy of the problem of ensuring the balance of power.

On behalf of „Augstsprieguma tīkls” AS

Chairman of the Board V. Boks