New Action Plan development for Smart City Riga

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STEP UP

www.stepupsmartcities.eu

Co-funded by the European Union

SEVENTH FRAMEWORK PROGRAMME

Europe's new energy policy for promotion of energy efficiency

Climate change mitigation objective - >20-20-20 to 2020

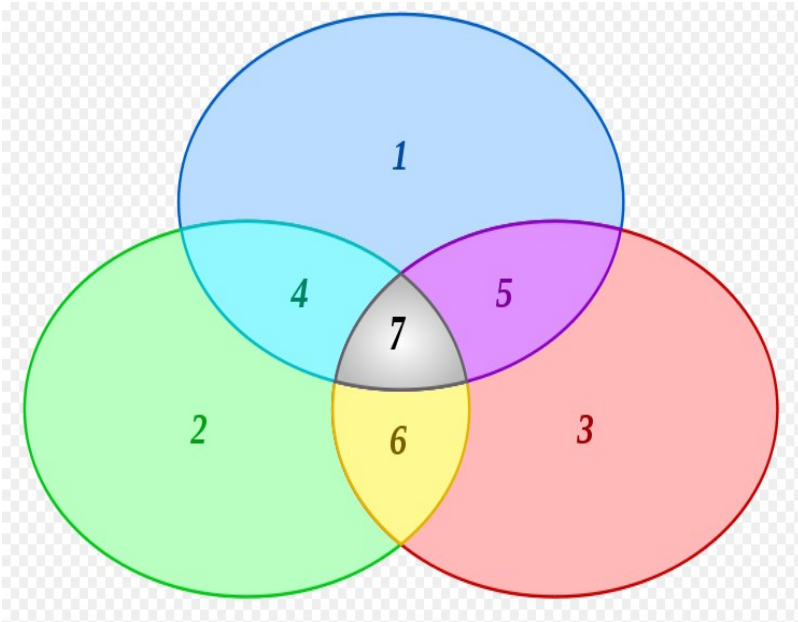
Initiatives involving municipalities - Covenant of Mayors (Cities long-term sustainable energy action plan until 2020)

Signed by 5500 cities around the world, 17 from Latvia - Rīga, Jelgava, Jēkabpils, Liepāja, Jūrmala, Balvi, Ikšķile, Kārsava, Ķegums, Līvāni, Ludza, Ogre, Salaspils, Saldus, Tukums, Valka, Viļāni

- SMART CITIES and districts (Smart Cities)

- Riga signed Covenants of Mayors on 30th of September 2008 (as a first EU capital city)
- In 2010 "Riga City Sustainable Energy Action Plan 2010-2020" were approved
- Every year monitoring reports are prepared and submitted (2010, 2011)
- Every year Riga Energy Days events is organized (October)

Sustainable development in cities



1 – Society
2- Environment
3 - Economy

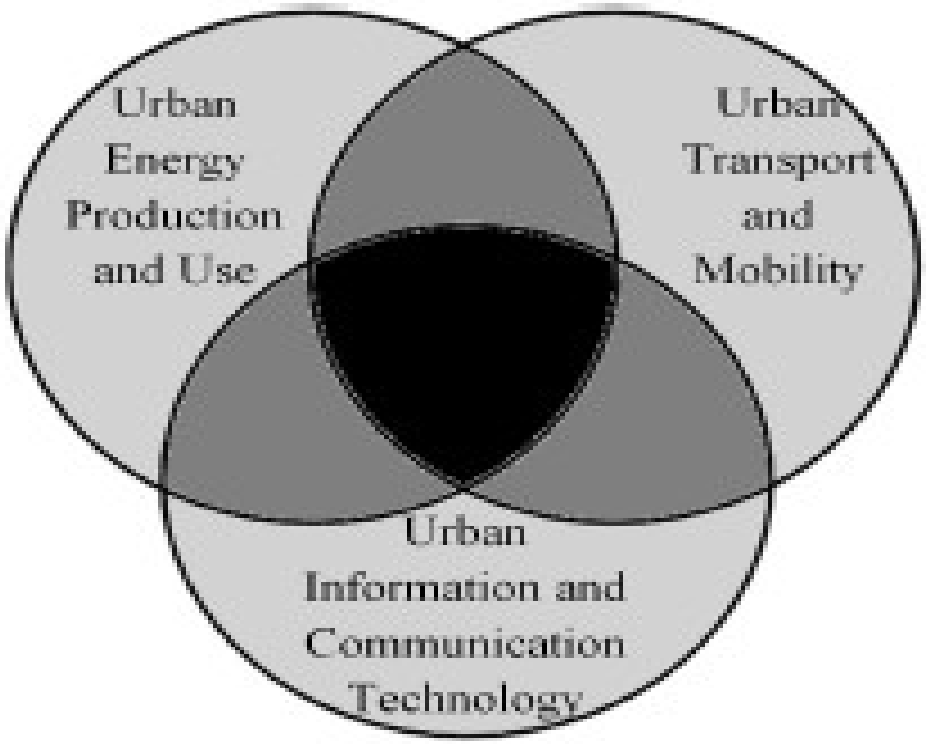
Interaction results:
4- endurable
5- equal
6- viable
7- sustainable

City's sustainable development ensures today's public needs, without threats for future generation's opportunities to satisfy their needs

Sustainable development involves interacting public (social), environmental and economic dimensions.

SMART CITIES status

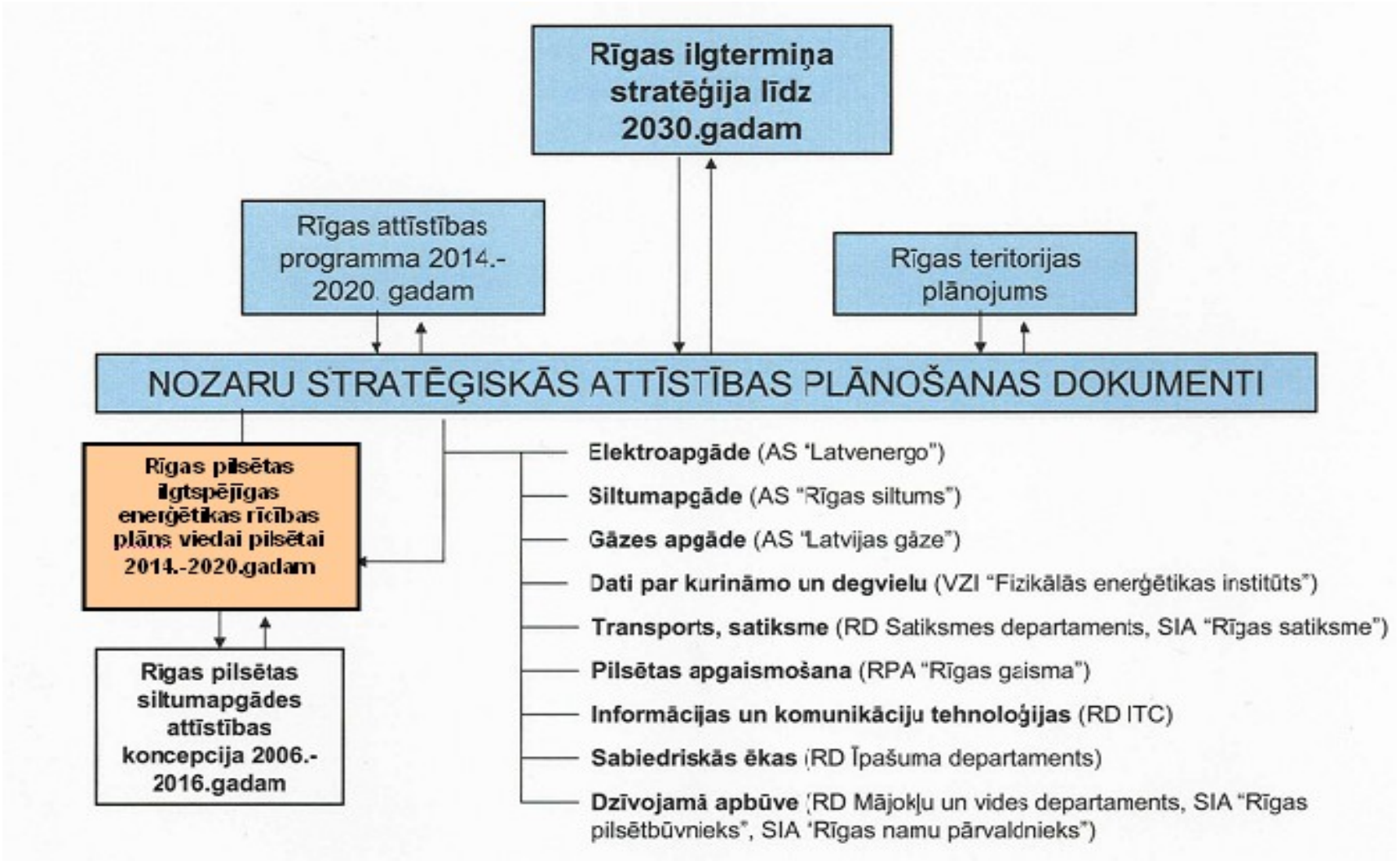
Smart cities and districts as the innovative partnership of the European Commission (EC) initiative is formulated in the EC 10.07.2012. document C (2012) 4701 final. Partnership cities and districts (cities) covers three areas - energy, transport and information and communication technologies. EC schematically represented this interaction between the smart cities as follows:



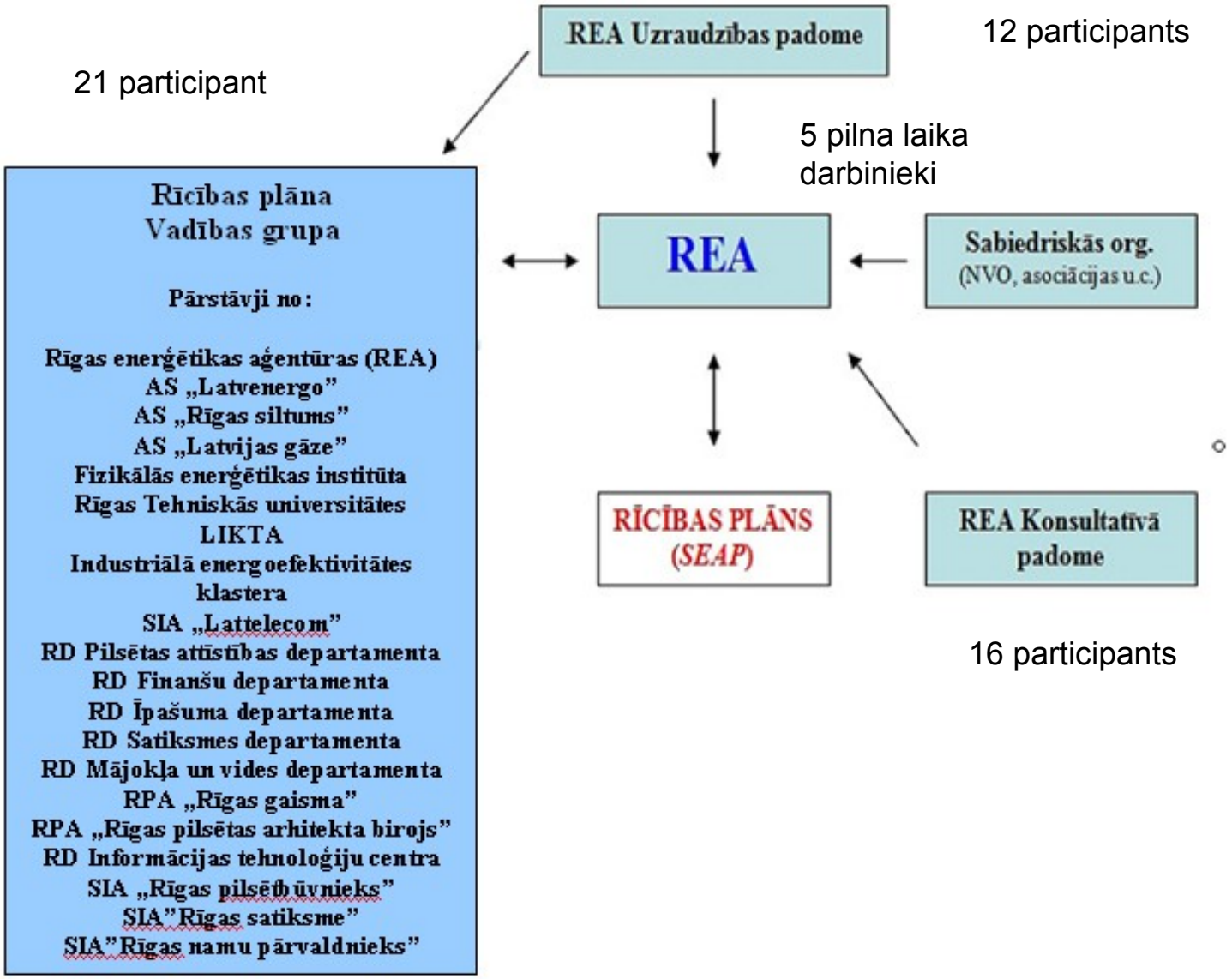
SMART CITIES status (2)

Joining the 7th Framework first call within smart city partnership municipality of Riga along with co cities - Glasgow (United Kingdom), Ghent (Belgium) and Gothenburg (Sweden) supported the international project STEP - Up (Energy Efficiency Strategic tools for urban planning) creating "Riga City Sustainable Energy Action Plan for Smart Cities 2014 to 2020" with objective to approach smart city status.

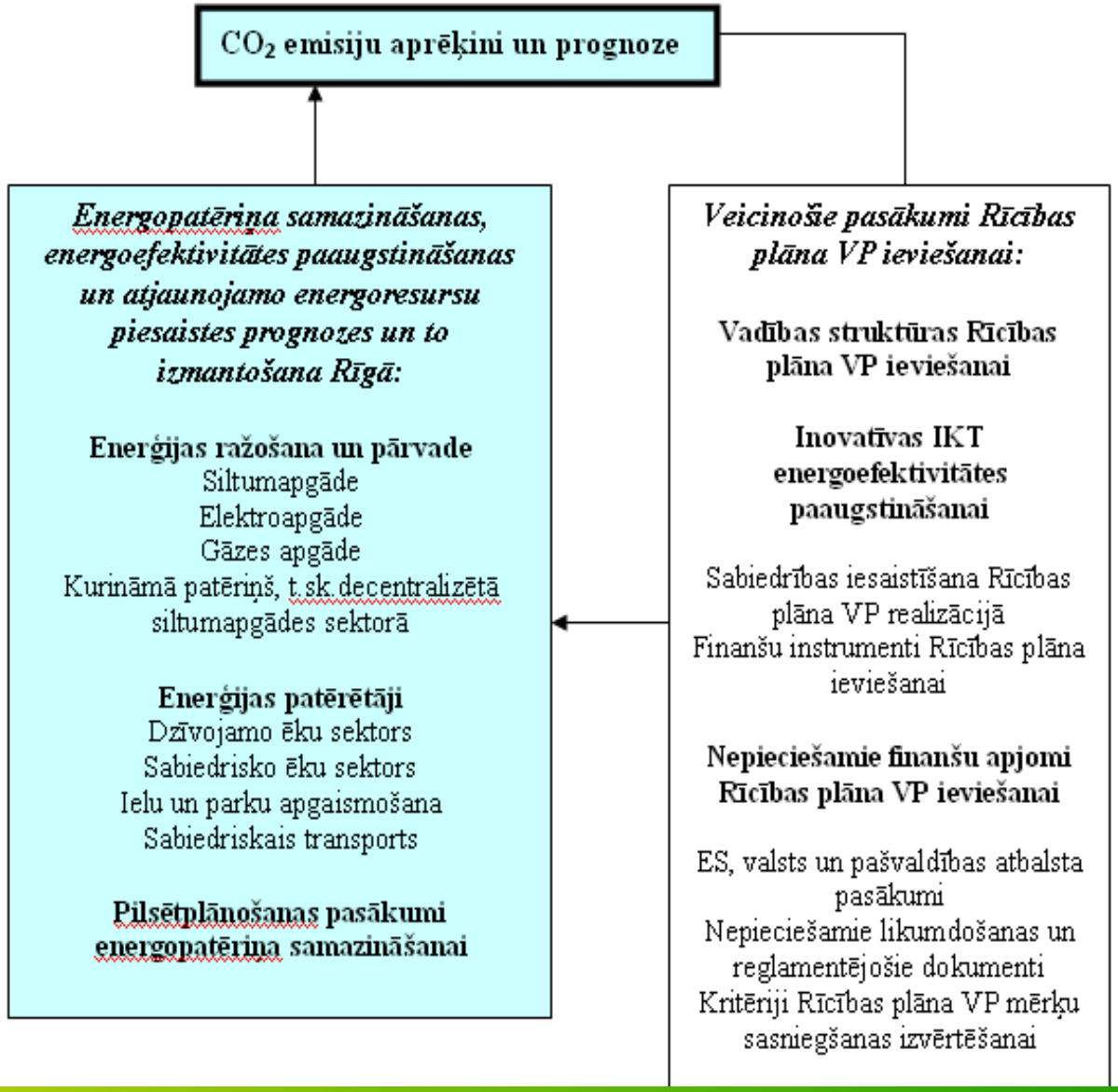
Action plan connection to Riga Council strategic planning



Actions Plan management structure



Structure of the Action Plan



Action plan's introduction part

- Progress by parts, year 2012
- Innovative Smart City projects with integrated ICT solutions

* Aims defined in Action Plan

Tabula Nr. 9.4.

Rīcības plāns			
Pasākums	**Ieviešanas laiks**	**Atbildīgais par ieviešanu**	**Ieviešanas apjoms**
1. Izveidot pilsētā decentralizēto siltuma avotu uzskaites sistēmu, iekļaujot tajā koksnes granulu katlu, saules kolektoru, siltumsūkņu ar dziļurbuma termozondēm, dziļurbuma ģeotermālo siltuma avotu u.c. objektus	**2013.-2020.g.**	**REA, Sadarbības partneri**	
2. Veicināt pilsētā saules kolektoru uzstādīšanu uz ēku jumtiem karstā ūdens sagatavošanai darbam sasaistē ar centralizēto u.c. veida siltumapgādes sistēmu	**2013.-2020.g.**	**REA, Sadarbības partneri**	
3. Saules enerģijas piesaistīšana karstā ūdens sagatavošanai ēkās, tūkst. MWh/gadā	**2020.g.**	**Ēku īpašnieki**	**___/____/____***
4. Veicināt siltumsūkņu ar dziļurbuma termozondēm uzstādīšanu ēku siltumapgādei	**2013.-2020.g.**	**REA, Sadarbības partneri**	

*) minimālā, optimālā, maksimālā prognoze

Innovative Smart City projects with integrated ICT solutions (included in REA project e-catalogue)

1) Energy consumption management in multi apartment buildings

2) Energy consumption management in public buildings

3) Local biogas cogeneration with heating in greenhouse complex

4) Programmed LED city lightning with distance control function

5) Heat recover from the flue gas within district heating system

6) Automated energy consuption distance data mining within district heating system

7) E-ticket system implementation and reduced price tickets available for different social groups using public transport

8) Database for Riga living households

9) Thermal pump with heat controllers for efficient building heating

10) Automated wood chips biomass boilers with output value over 100%

11) Electric cars for municipal technical units

12) Sun battery system on building roofs over the city

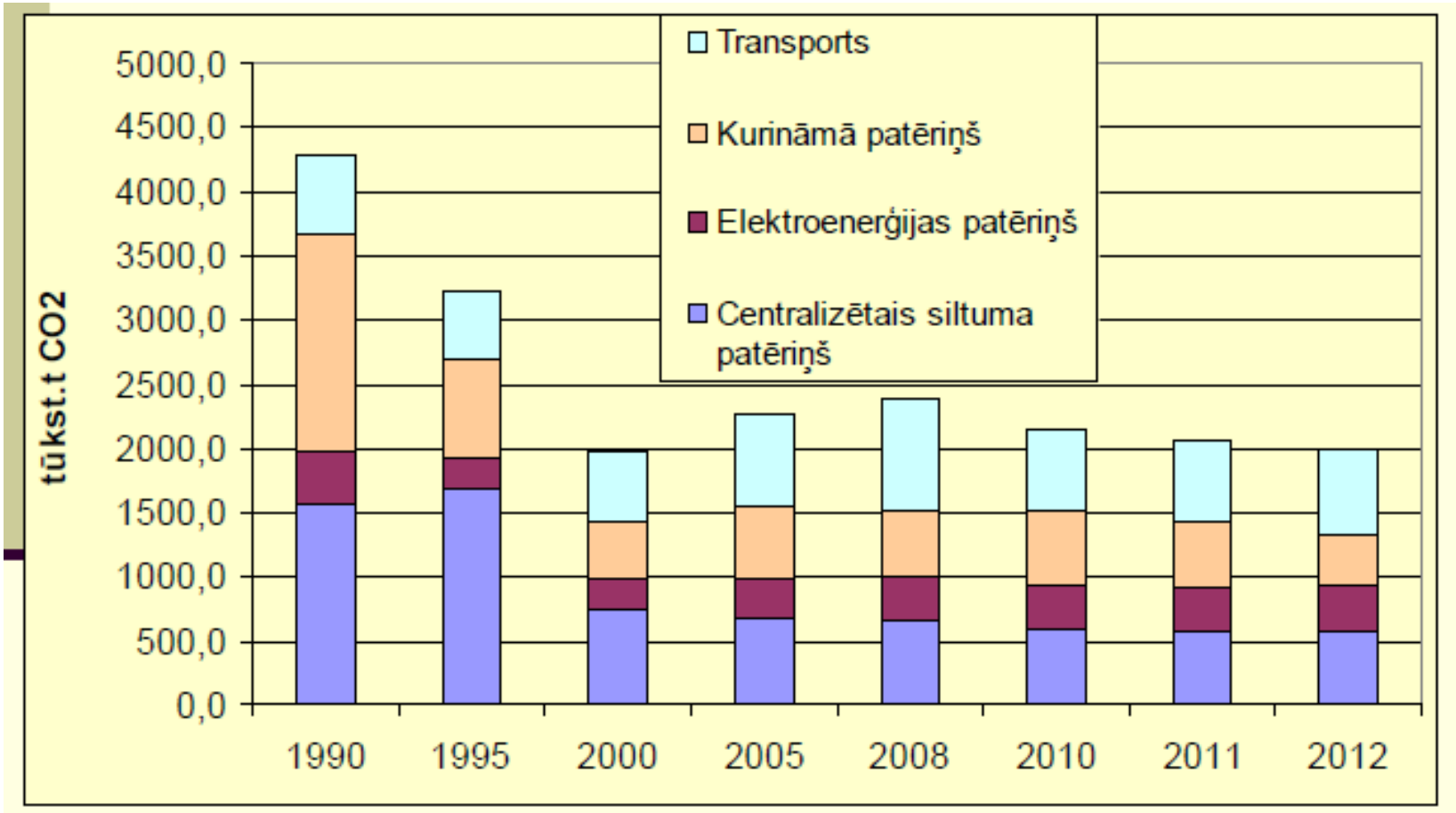
13) Energy Efficiency for household using Smart technologies

14) Solar pumps for building heating

15) Heat recover from waste water in multi apartment houses

16) Smart distance controllers for electricity supply data gathering

CO_2 emission reduction between 1990 and 2012



1990 is the base year (reference) selected by Riga municipality un Kioto protocol guidelines. C02 emission (by defined calculation method) in Riga reached 51.85% in year 2012.

2013 - 53%. Forecast: 2020 - 55-60%; 2030 - 70%; 2050 – up-to 90%.

Riga municipality electricity supply

Electricity supply in Riga municipality is implemented by JSC “Latvenergo” using 3 main sources:

Rīgas TES-1 (modernized - 144 MW_{el}.-88%)

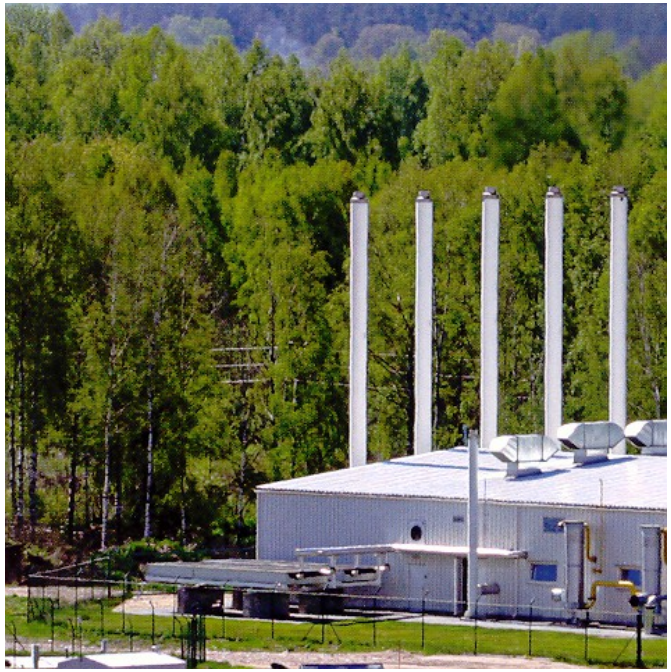
Rīgas TES-2 (outside Riga borders– 833 MW_{el}.-89%)

Rīgas HES (outside Riga borders– 402 MW)

Renewable energy resources produced by cogeneration stations

Cogeneration stations using biogas:

- **Wastewater filtering station "Daugavgrīva" (Ltd. "Rigens") – 2,1 $MW_{el.}$ (2,6 MW_{th})**
- **Ltd. "Getliņi EKO" hard-waste (sadzīves) polygon – 5,3 $MW_{el.}$ (6,8 MW_{th})**

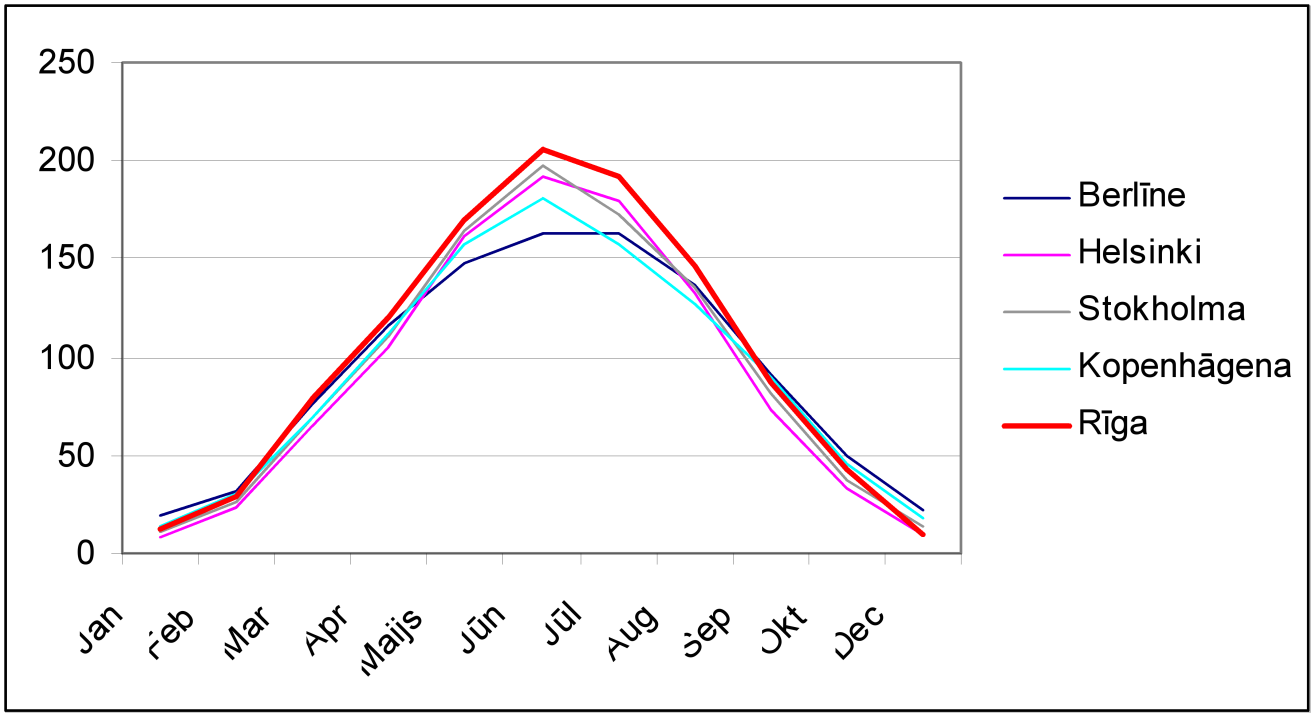


Cogeneration station using biomass (wood chips):

- **HC "Daugavgrīva" – 0,6 $MW_{el.}$**
- **HC "Ziepniekkalns"- 4 $MW_{el.}$ (22 MW_{th})**

Solar energy in energy production

Monthly solar radiation total amount over North Europe (kWh/m²)



Largest solar battery is installed by Ltd "Zaļā Latvija" with total of 1200 m² (120kW)

In 2012 more then half of energy consumption was ensured using renewable energy resources

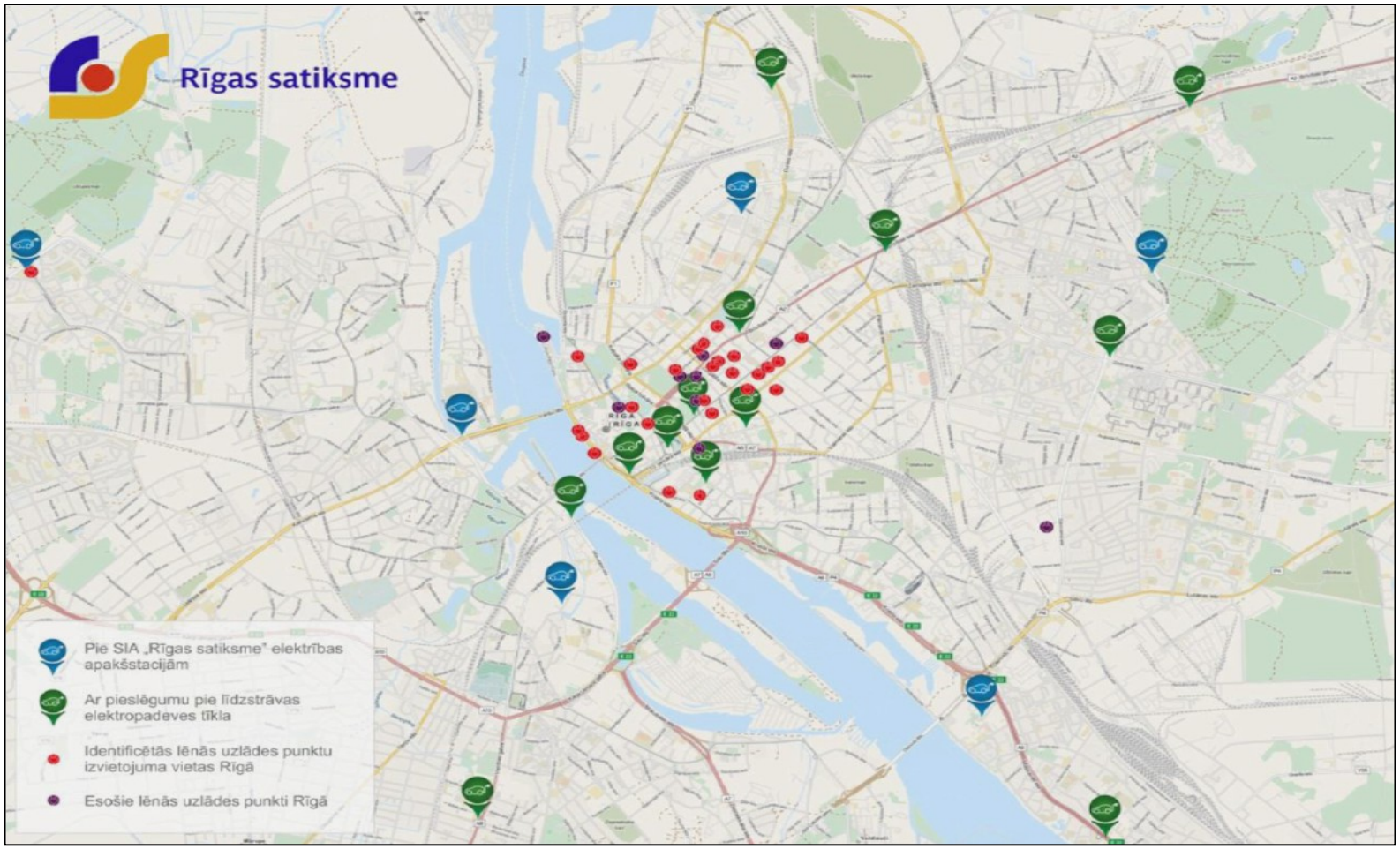
Electro energy consumption in 2012 increased by 2.6% to year 2011

Electro energy for eco-transport development

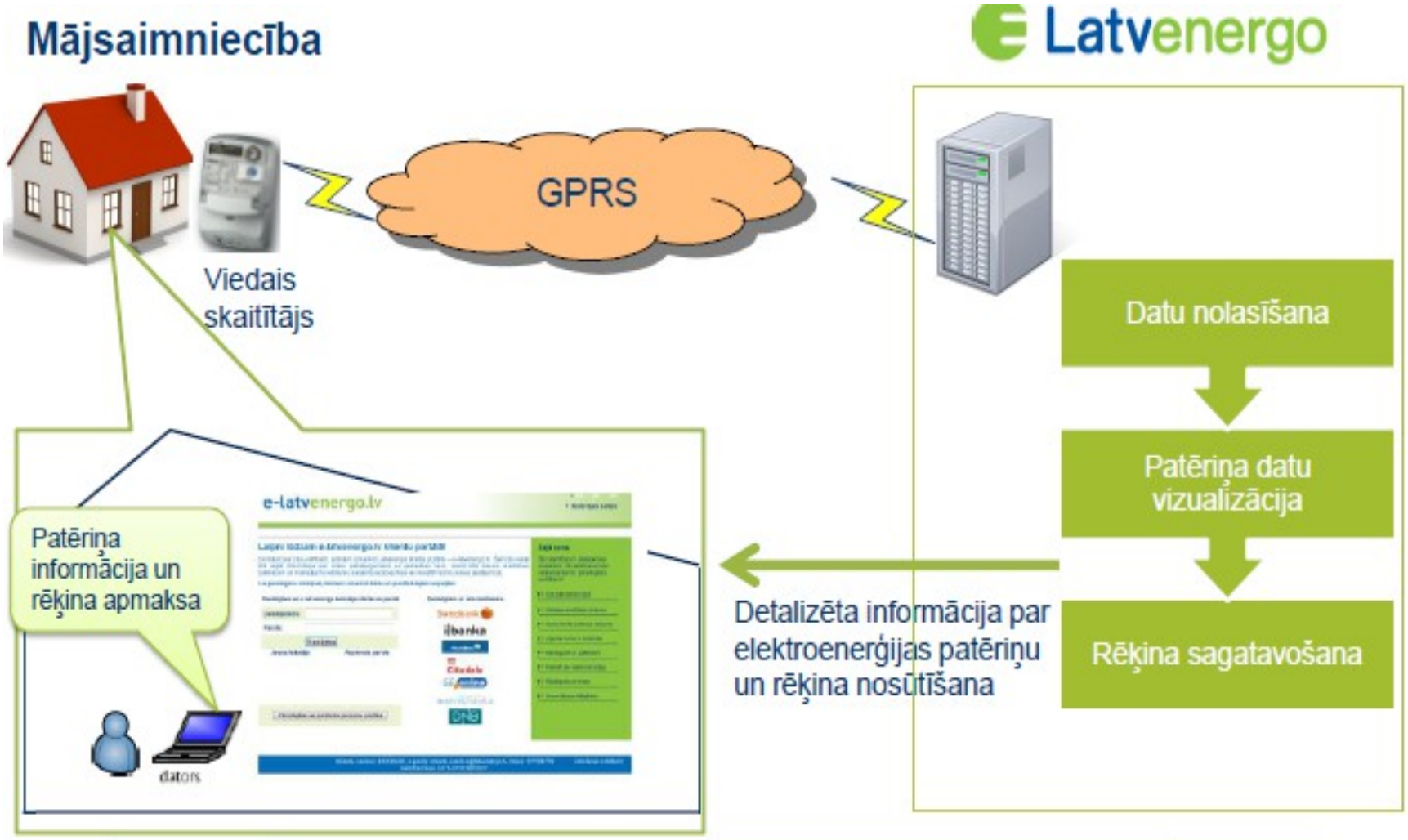
http://www.latvenergo.lv/portal/page/portal/Latvian/latvenergo/main_page/korp_atbildi/UZLADES_PUNKTU_KARTE

http://www.bimab.lv/darbiba-2011.php

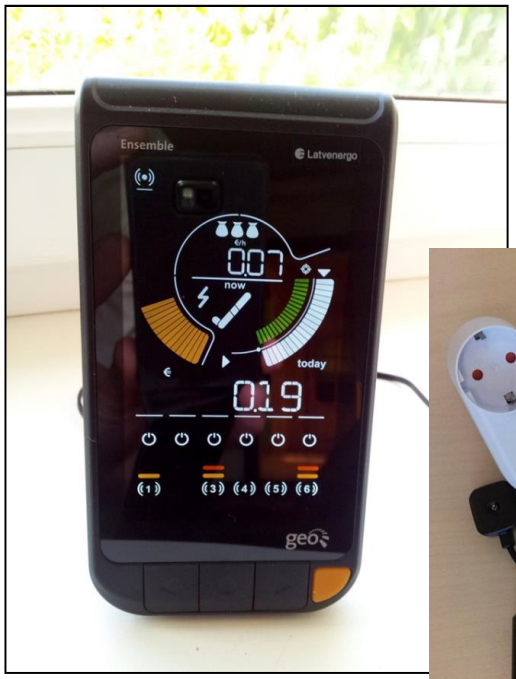
Fast-refuel and slow-refuel station infrastructure



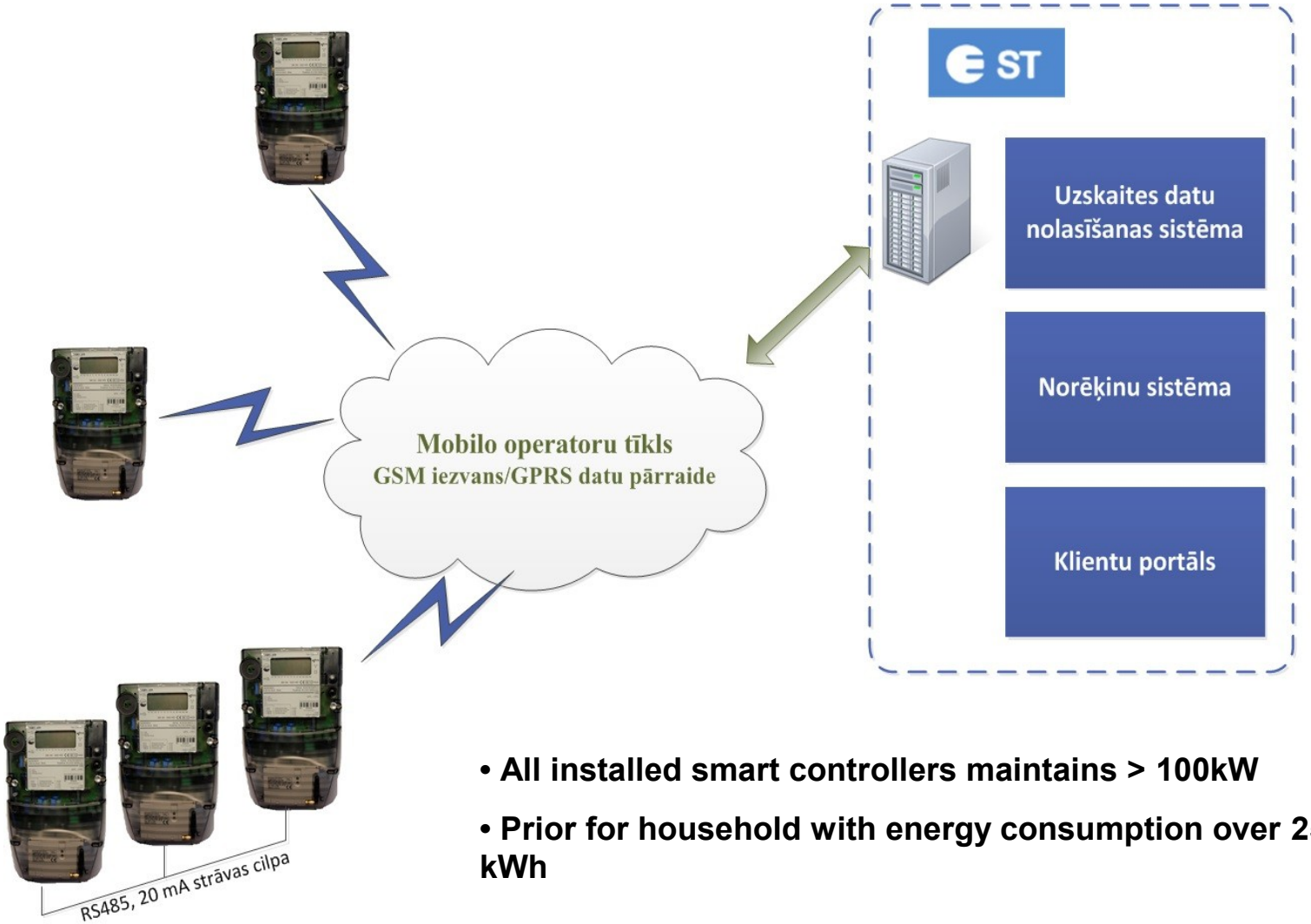
Households energy consumption management system



Controllers for household energy consumption measurement

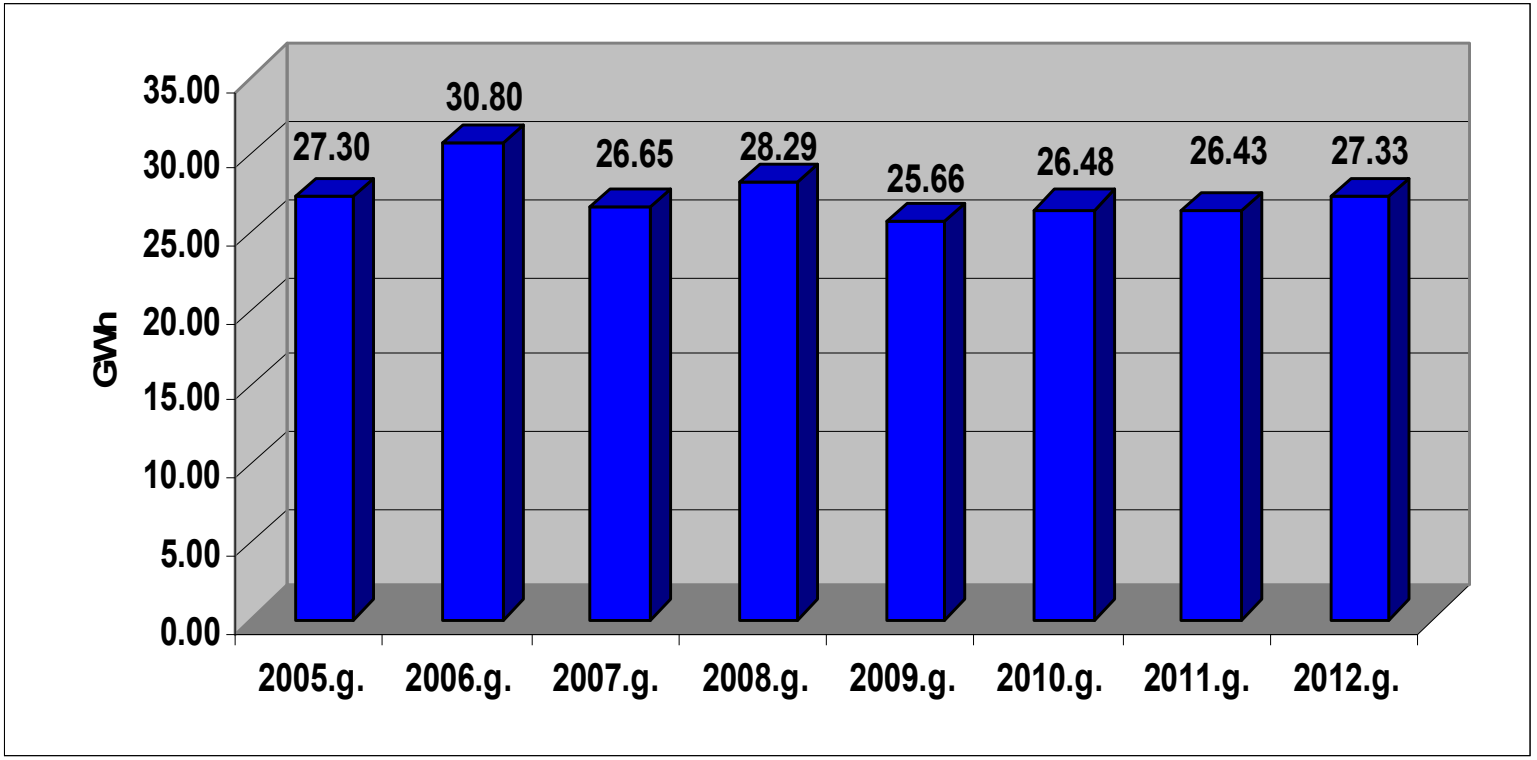


Smart controller with distance data gathering function



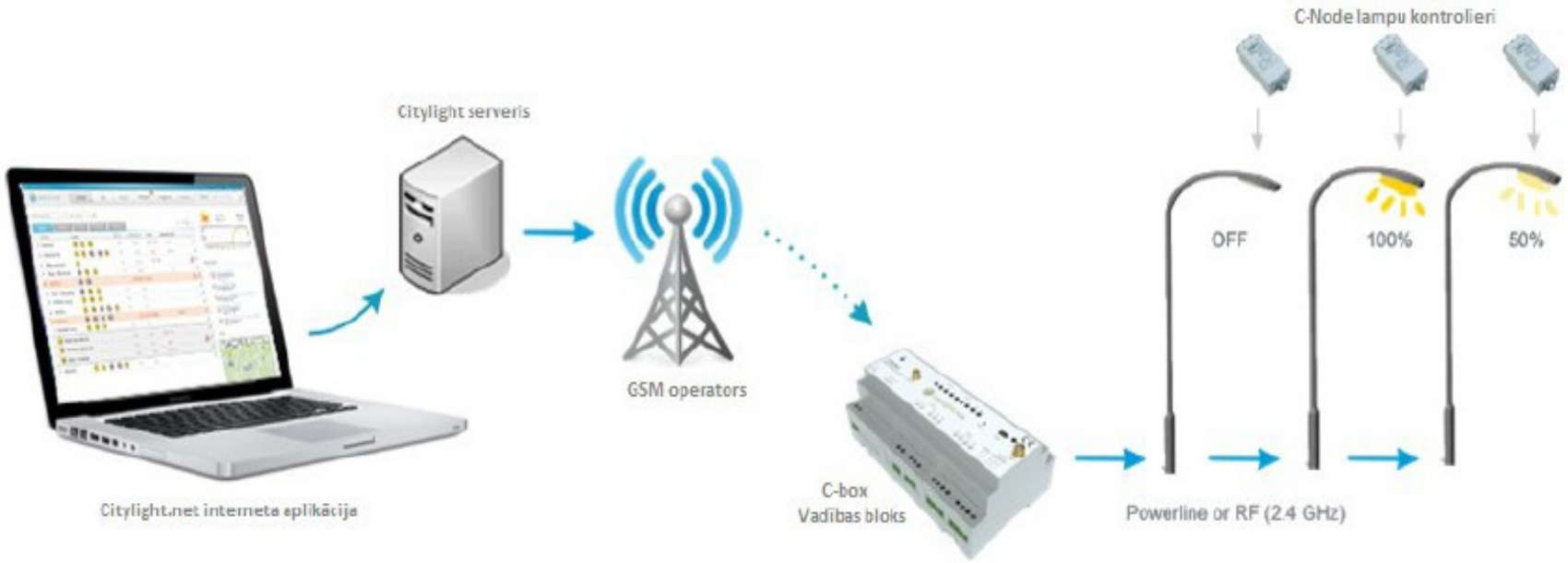
- **All installed smart controllers maintains > 100kW**
- **Prior for household with energy consumption over 2500 kWh**

Energy consumption for municipal lighting



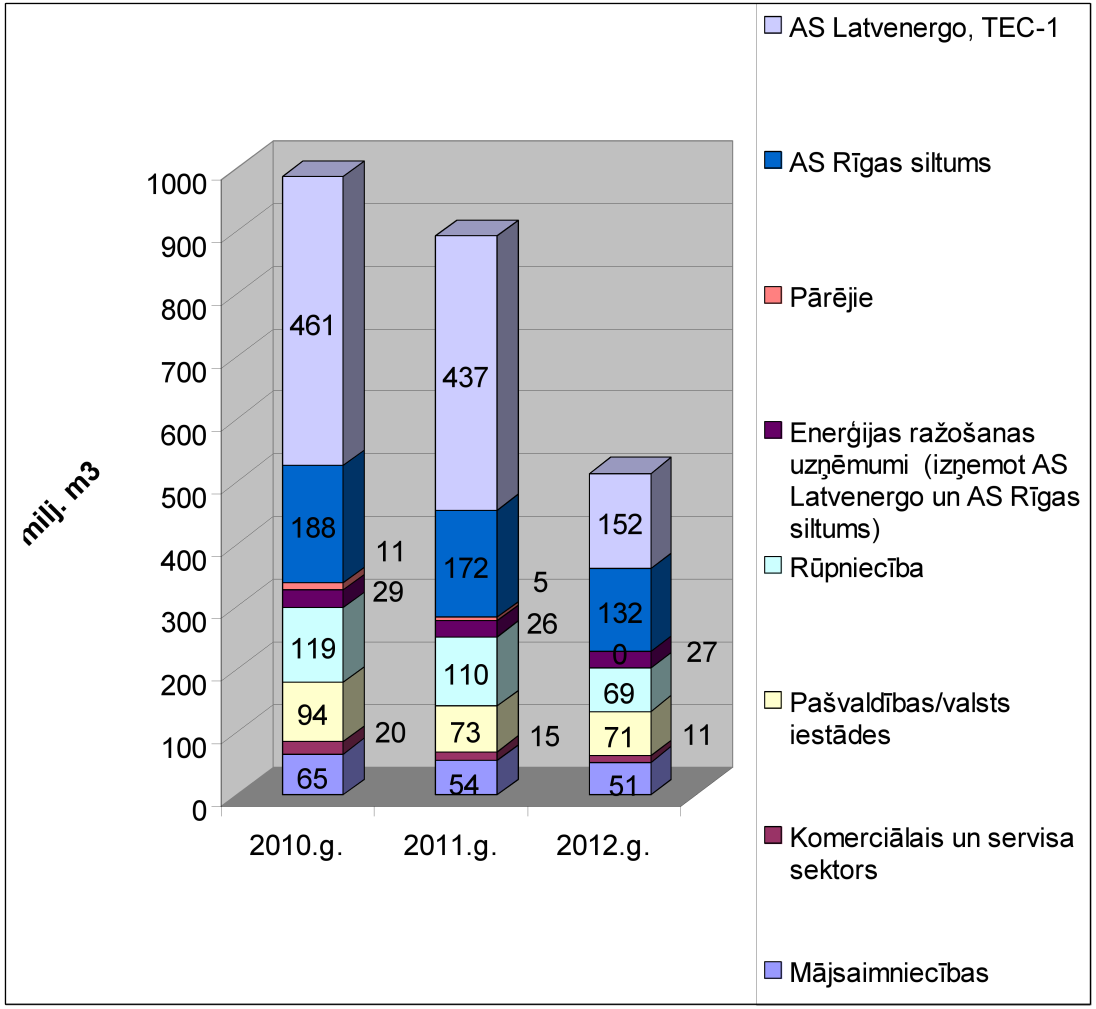
Municipal lighting energy efficiency increase

Riga lighting system uses single-case programming method also as implemented distance management system to control lighting intensiveness



- **In 2013 amount of lighpulps reached 2000**
- **In is planned to install 7000 LED lighpulps by year 2017**

Natural gas consumption dynamics



- **Natural gas consumption dropped by over 49% within 3 years period**
- **Also TES-2 consumption decreased by 28% over past 3 years.**

Riga municipality heating 2012

Main type of heat supply - central heating 76% of total consumption;

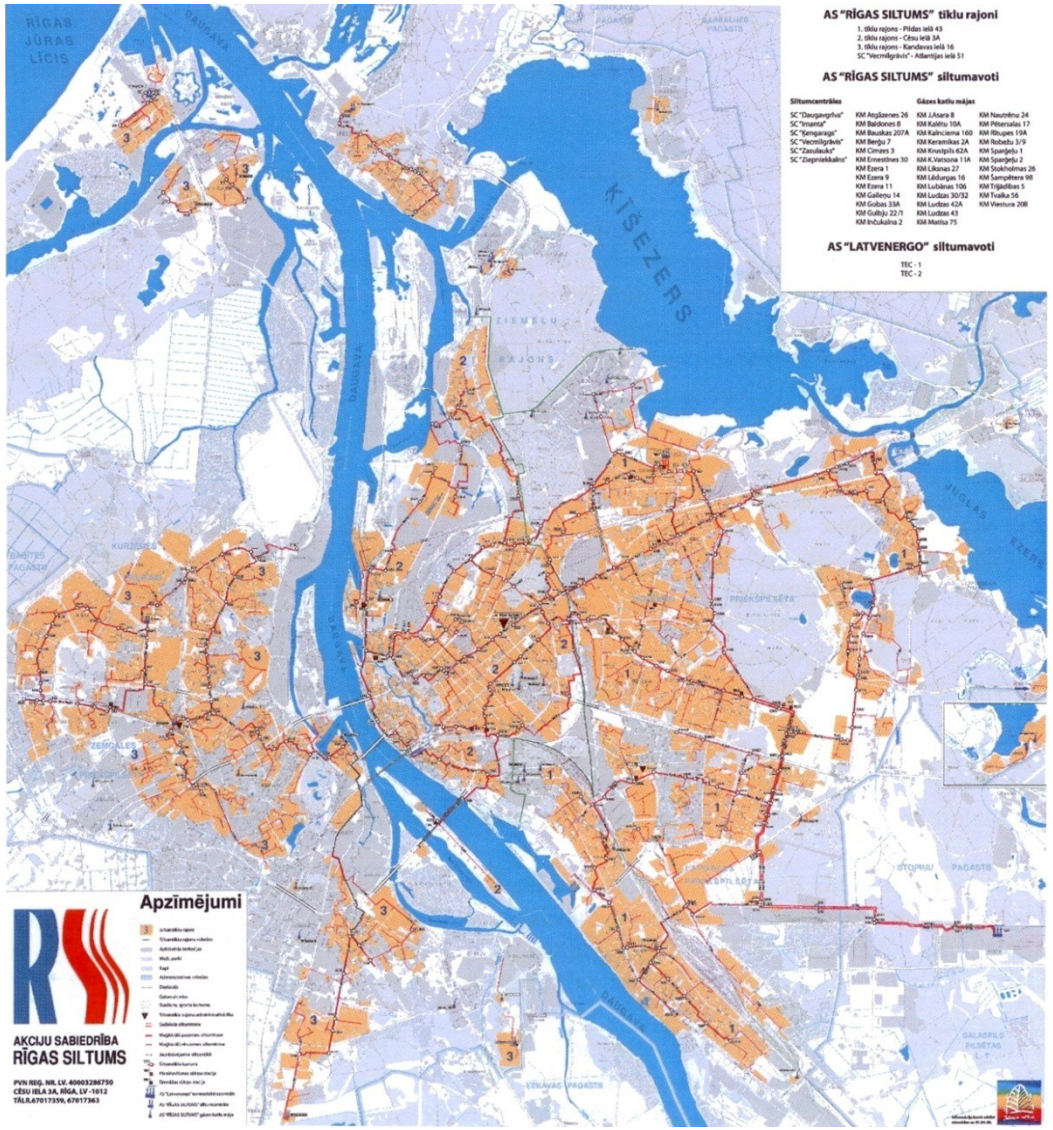
Main fuel - natural gas;

70% of the heat supplied Riga TEC-1 and Riga TEC-2;

30% of heat developed by "Rigas Siltums":

- 5 heating plants
- 38 gas boiler houses;

90% of of heat developed within highly efficient cogeneration process;
Heat losses in heating networks reduced down to 13%.

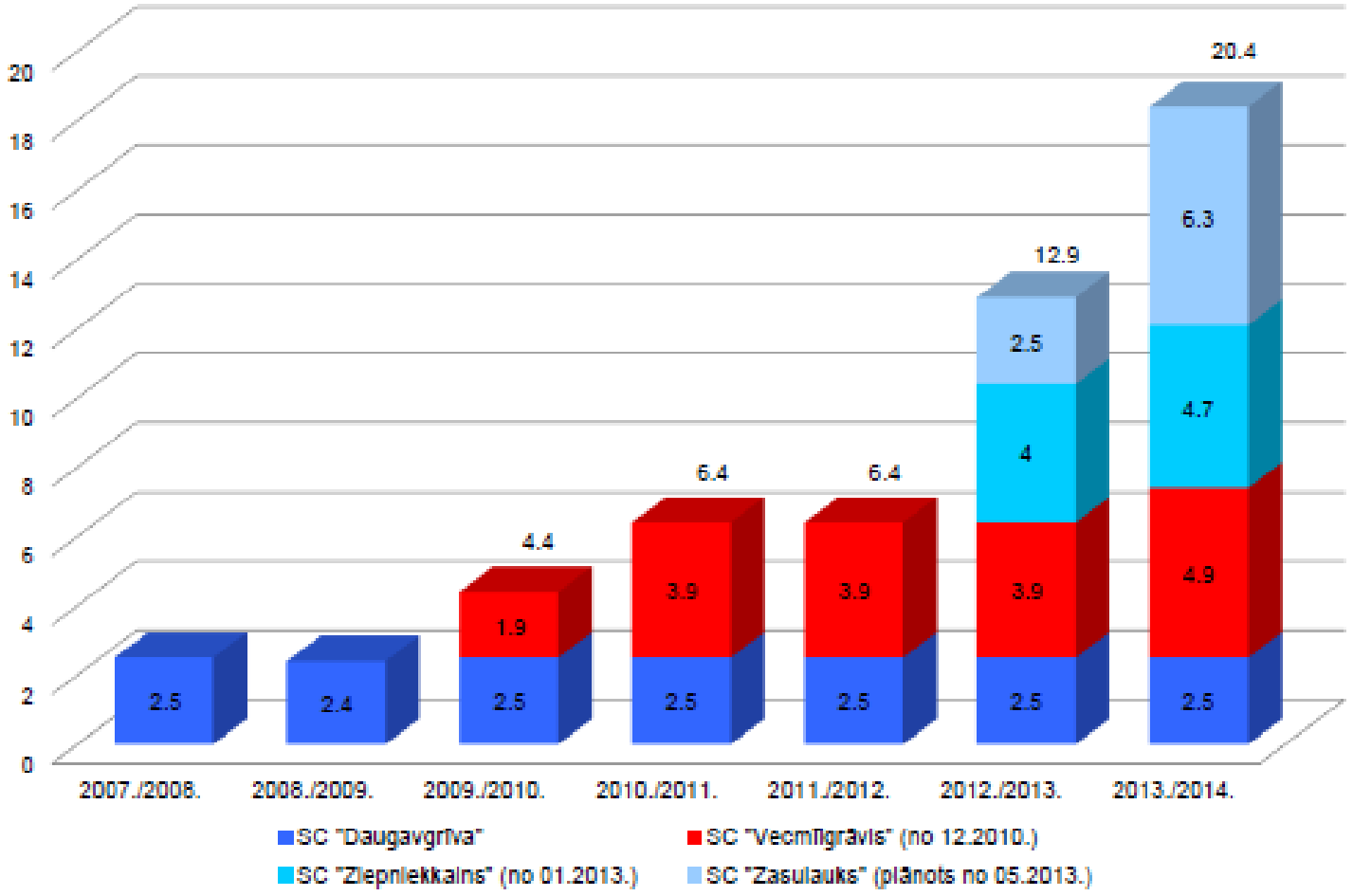


BIOMASS - timber woodchip for heat production

The aim by year 2015 is to increase the share of biomass in the operator's fuel balance by 20%:

- **28.02.2013 fully automated bio-fuel CHP was put into operation in heating plant "Ziepniekkalns“;**
- **On May 2013 water supply heating boilers with total heat capacity of 20 MW (110% efficiency) were put into operation water in HP "Zasulauks“;**
- **There is a large modernization over the next several years designed for HP „Daugavgrīva” to increase energy production efficiency (for heating boilers with heat capacity of 20 MW and condensate economizers with capacity of 1MW).**

Biomass use dynamics



Energy efficiency improvement measures in the district heating system

◙ condensate economizers were implemented in heat sources to recover heat from the flue gas;

◙ **Powerful absorption-type heat pump for heat recovery from cogeneration block cooling flow was installed in heating plant "Imanta"**

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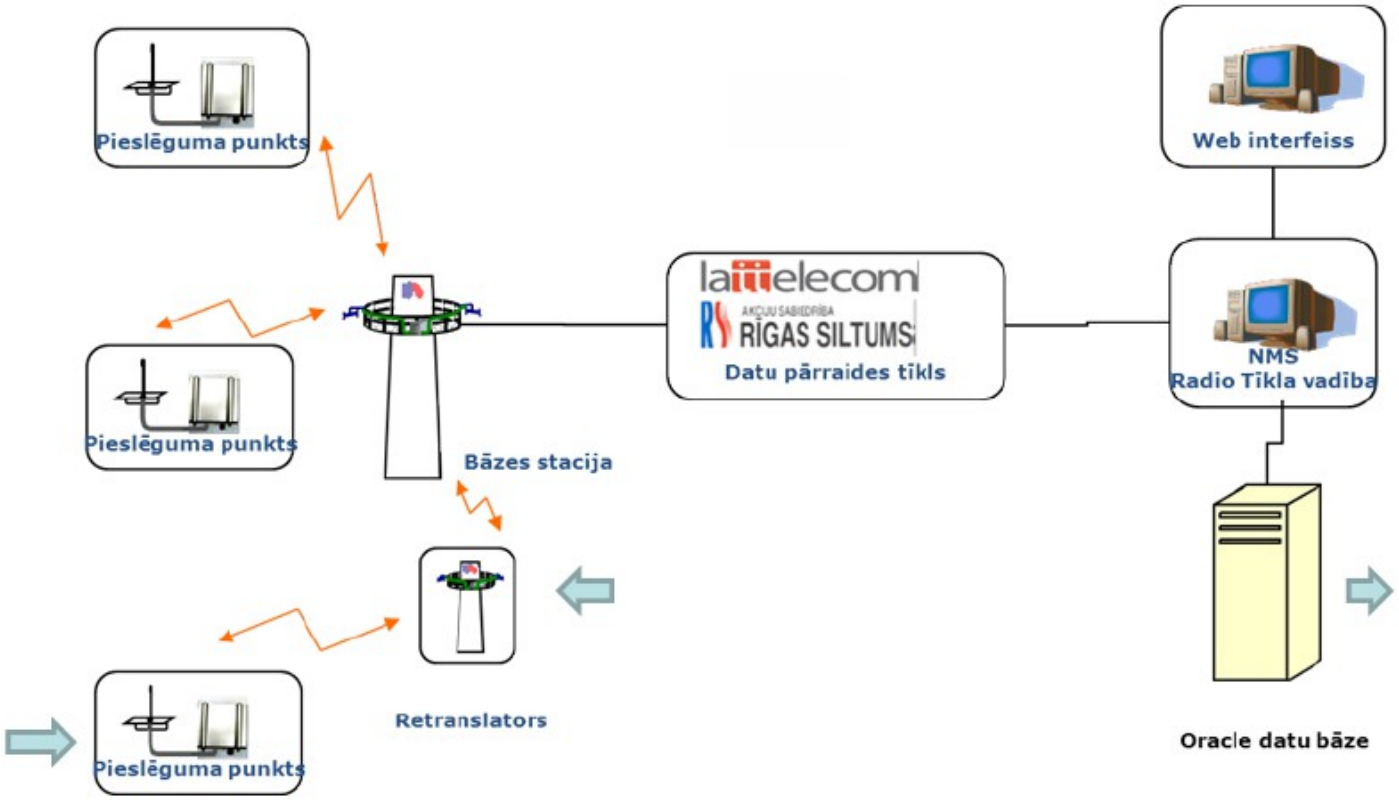
District heating system automated remote data reading used by “Rigas Siltums” (1)

Principle scheme



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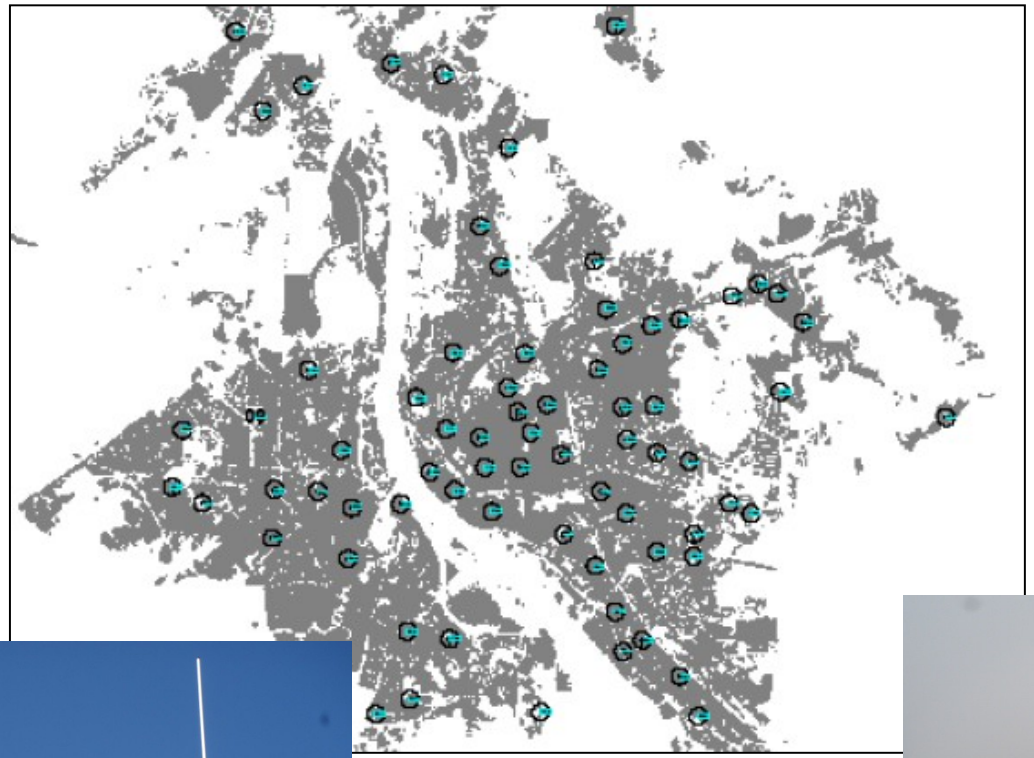
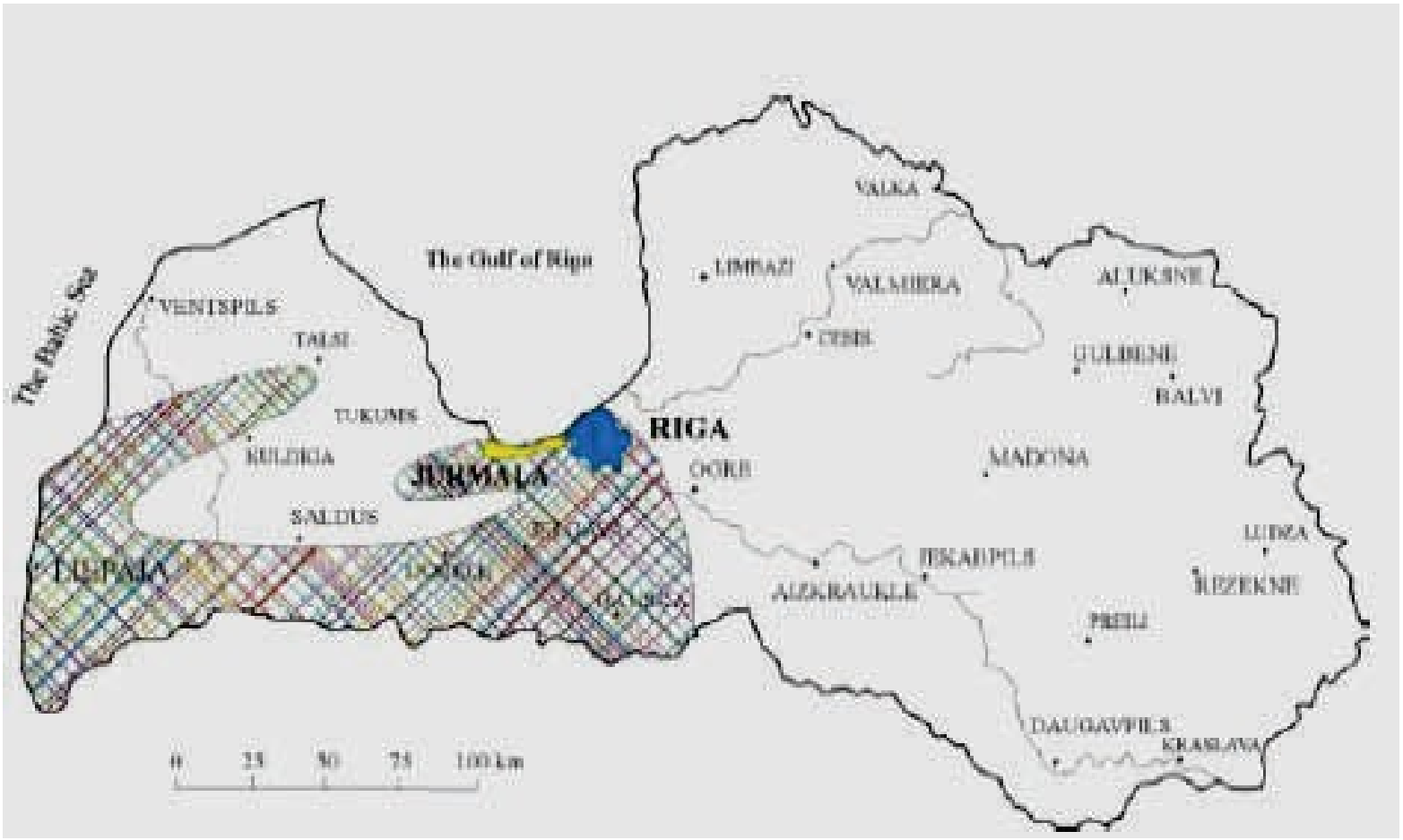


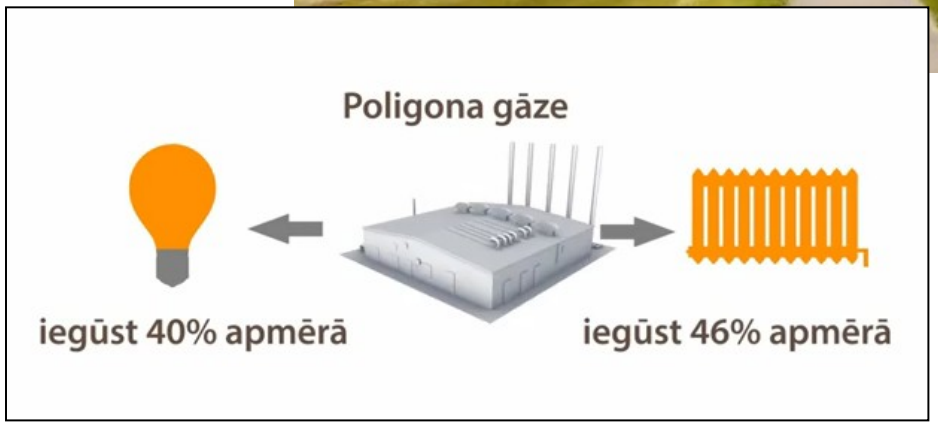
86 base stations and transponders network:

Ground thermal resources



Waste and waste water as a resources for heat energy production

Biogas cogeneration polygon “Getliņi” with thermal complex (300 000 tons of waster per year)



Riga waste water filtering complex “Daugavgrīva” – 350 tonn/m³ (8-15ºC) per daynigh