

Municipal housing stock renovation

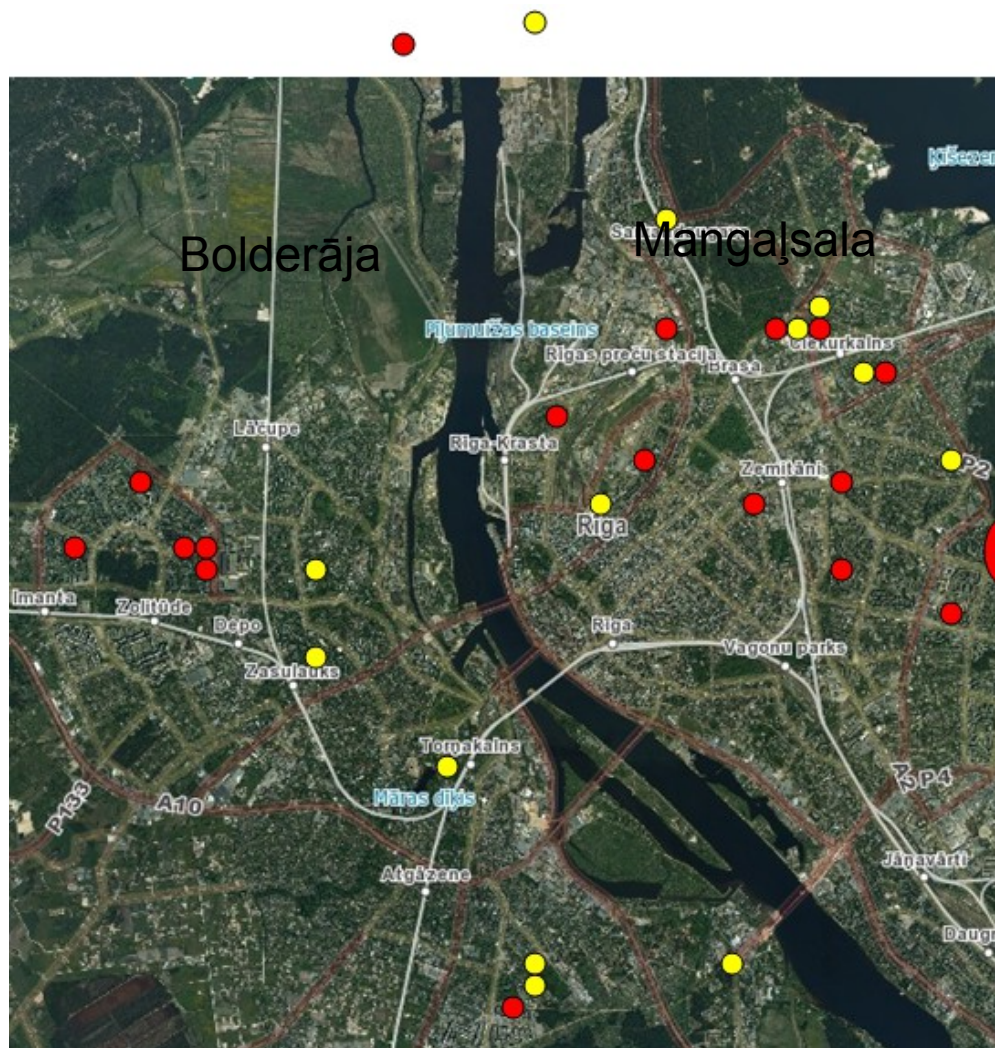
- Overall number of apartment houses urgent needs for renovation is 6 000 with total the total area about 12 billions m²
- By 2013 56 households with total area of 145 044 m² were renovated:
 - up to 2008 - 12 households (46 987 m²);
 - from 2009 to 2012 – 28 households (68 807 m²);
 - 2013 7 households (29 249 m²);
 - 9 social multi apartment houses (39 495 m²).
- By year 2013 the Latvian Innovation and Development Agency (LIDA) signed about 40 contracts for European Union structural renovations attracting co-financing. Entries shall be mainly completed in 2014.

Renovated multi apartment houses in Riga



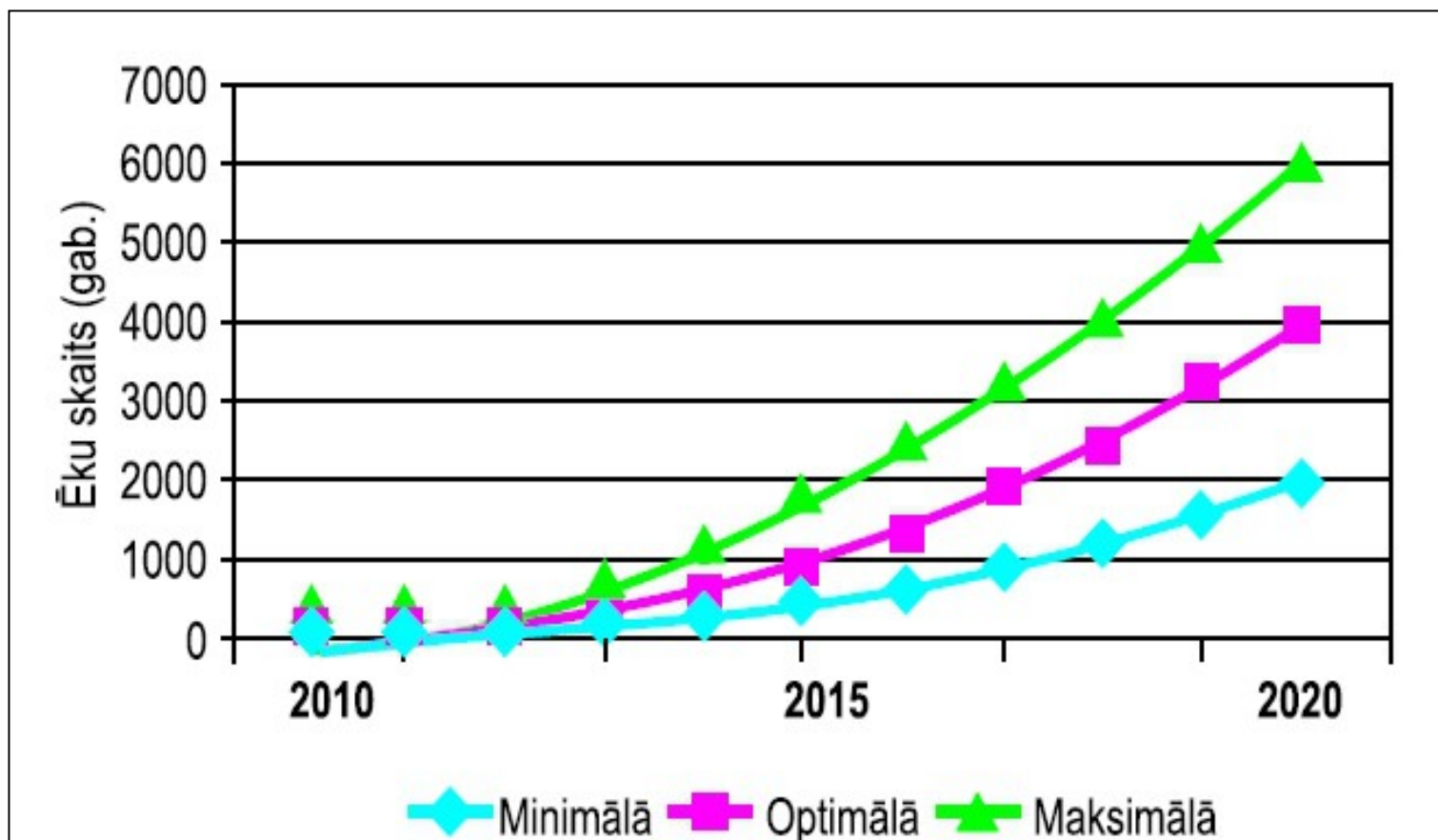
Renovated apartment house location within Riga municipality

● Renovated buildings 2012



● Renovated buildings 2013

Multi apartment house renovation dynamics

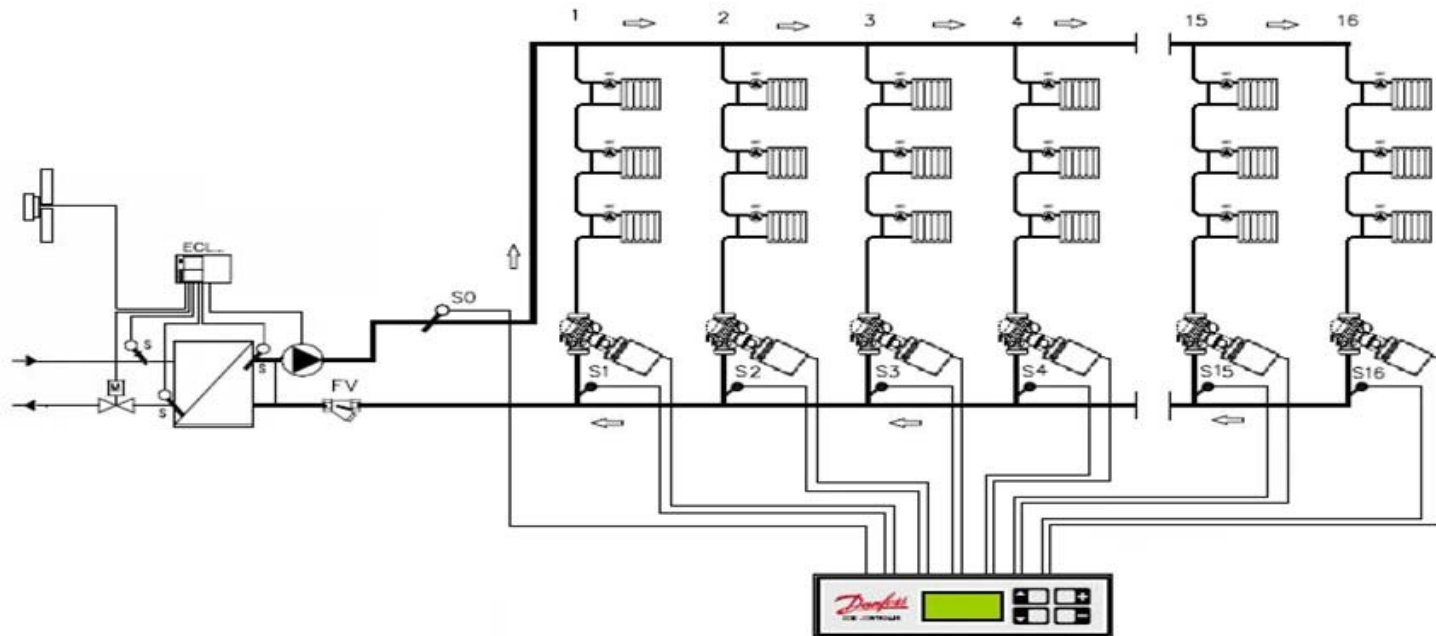


Main energy efficiency measures for multi apartment houses

- Attic, coupled roof, building's plinth also as basement slab and external wall insulation;
- Window replacement over common multi apartment areas;
- Exterior door replacement or insulation (under the current Latvian Construction Standard LBN 002-01 requirements);
- Ventilation system renovation without heat recovery;
- The hot water system renovation or replacement through the riser insulation;
- Home heating line renovation or replacement (all municipal multi apartment houses were equipped with modern heating hubs by 2008);
- Renovation of heating systems by replacing radiators with one-pipe systems equipped with a bypass thermostat and allocators (heat distributors) or other devices for racking heating consumption in case of the absence of the two-pipe system with heat controller;
- one-pipe systems approximation to a two-pipe system, t.i., thermostat installation for steady heating balancing using return risers with automatic temperature controllers.

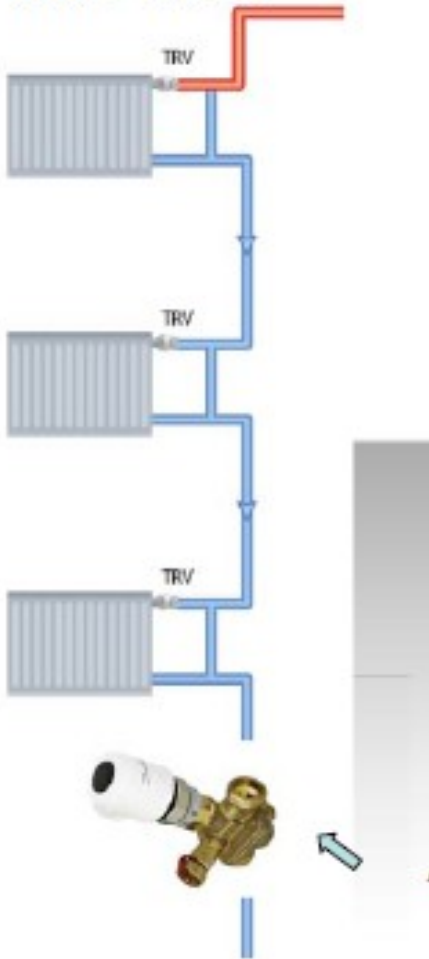
Main energy efficiency measures for multi apartment houses (2)

- Apartments are equipped with modern automated individual substations which allow to set the desired temperature;
- An innovative solution of system balancing problem is a riser return temperature controlling system with automatic load balancing mechanisms.

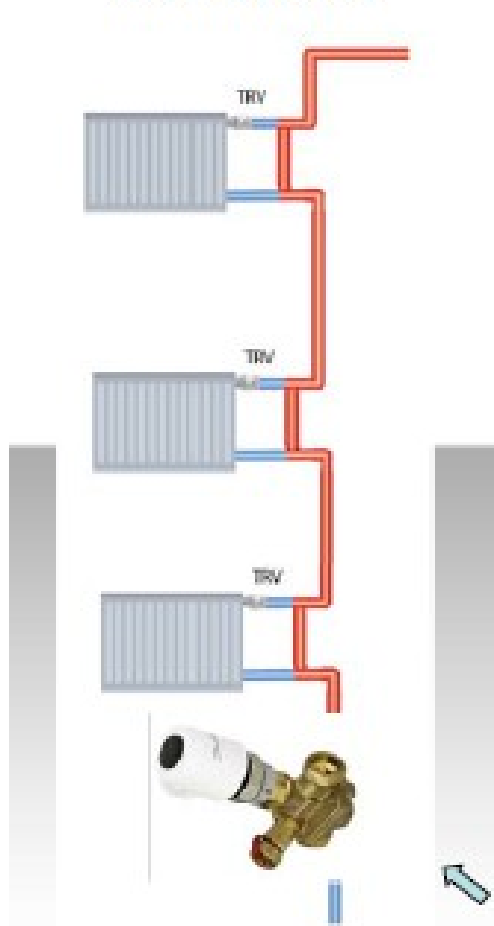


Measures for energy efficiency increase for residential block houses (3)

TRV ir atvērts



TRV aizveras



Thermostatic valve is mounted on the return riser cable allowing to set the desired return temperature (Ltd. "Danfoss")

Measures for energy efficiency increase for residential block houses (3)

Realized action Gauja
Street 29, Riga



Measures for energy efficiency increase for residential block houses (4)



Apartment individual consumption regulation within installation of a thermostat over the heaters and heat cost allocators:



Measures for energy efficiency increase for residential block houses (5)

Patēriņa sadalījuma pārskats

| | 1. kāpņu telpa | | | 2. kāpņu telpa | | | 3. kāpņu telpa | | | |
|-----------------------------------|----------------|-----------|-----------|----------------|-----------|-----------|----------------|-----------|-----------|----------|
| Dzīvoklis | 13 | 14 | 15 | 28 | 29 | 30 | 43 | 44 | 45 | 5. stāvs |
| Maksa par siltumu Lats | 10.92 | 6.93 | 9.16 | 9.67 | 6.17 | 6.7 | 9.27 | 11.24 | 13.62 | |
| Apkurināmā platība m ² | 47.77 | 35.33 | 47.95 | 47.85 | 38.11 | 47.41 | 47.32 | 52.84 | 64.82 | |
| Lats/m ² | 0.23 | 0.2 | 0.19 | 0.2 | 0.16 | 0.14 | 0.2 | 0.21 | 0.21 | |
| Dzīvoklis | 10 | 11 | 12 | 25 | 26 | 27 | 40 | 41 | 42 | 4. stāvs |
| Maksa par siltumu Lats | 8.04 | 8.83 | 7.72 | 7.88 | 5.91 | 6.66 | 7.08 | 9.81 | 16.21 | |
| Apkurināmā platība m ² | 49.93 | 35.45 | 47.92 | 47.96 | 38.14 | 47.15 | 47.53 | 52.52 | 65.1 | |
| Lats/m ² | 0.16 | 0.24 | 0.16 | 0.16 | 0.15 | 0.14 | 0.15 | 0.19 | 0.25 | |
| Dzīvoklis | 7 | 8 | 9 | 22 | 23 | 24 | 37 | 38 | 39 | 3. stāvs |
| Maksa par siltumu Lats | 10.99 | 5.61 | 7.91 | 6.89 | 11.41 | 12.29 | 10.32 | 7.97 | 14.09 | |
| Apkurināmā platība m ² | 50.1 | 35.37 | 47.92 | 47.88 | 38.17 | 47.47 | 47.35 | 52.55 | 65.2 | |
| Lats/m ² | 0.22 | 0.16 | 0.17 | 0.14 | 0.3 | 0.26 | 0.22 | 0.15 | 0.22 | |
| Dzīvoklis | 4 | 5 | 6 | 19 | 20 | 21 | 34 | 35 | 36 | 2. stāvs |
| Maksa par siltumu Lats | 11.51 | 8.57 | 8.71 | 8.62 | 14.16 | 10.01 | 10.05 | 11.07 | 9.23 | |
| Apkurināmā platība m ² | 49.96 | 35.15 | 47.96 | 48.05 | 38.09 | 47.46 | 47.34 | 52.62 | 64.81 | |
| Lats/m ² | 0.23 | 0.24 | 0.18 | 0.18 | 0.37 | 0.21 | 0.21 | 0.21 | 0.14 | |
| Dzīvoklis | 1 | 2 | 3 | 16 | 17 | 18 | 31 | 32 | 33 | 1. stāvs |
| Maksa par siltumu Lats | 16.68 | 5.72 | 9.02 | 7.16 | 6.76 | 9.69 | 9.49 | 14.07 | 15.62 | |
| Apkurināmā platība m ² | 49.99 | 35.51 | 47.93 | 47.81 | 38.34 | 47.21 | 47.11 | 52.7 | 64.94 | |
| Lats/m ² | 0.33 | 0.16 | 0.19 | 0.15 | 0.18 | 0.21 | 0.2 | 0.27 | 0.24 | |

Public apartment house energy efficiency database

- Riga Energy Agency implemented via website a publicly available database of residential buildings which are connected to the city district heating.
- The database records are arranged (by the street names) in alphabetical order showing the following data:

| N.p.k. | Adrese | Mājas lietderīgi izmantotā platība (dzīvokļi + nedzīvojamā izmantotā platība – n.f.) [m ²] | Apsaimniekotājs/pārvaldītājs | Faktiski patērētā siltumenerģija 2012.gadā | Faktiskais siltumenerģijas īpatnējais patēriņš 2012.gadā | Piezīmes |
|--------|----------------|--|------------------------------|--|--|----------|
| | | Apsaimniekotāju/pārvaldītāju dati | | [MWh/gadā] | [kWh/m ² /gadā] | |
| 1. | Vesetas iela 8 | 4794,88 | DzīB „Rakstnieku māja” | 967,61 | 202 | |
| 2. | .. | | | | | |
| 3. | .. | | | | | |

Saīsinājumi: n.f. – nedzīvojamais fonds

Public apartment house energy efficiency database (2)

- *For the comparison within the database an average actual specific energy consumption of 101 kWh/m² of year 2012 is taken*
- Example: Useless overdrawn and overpaid (as a percentage) heat in non-renovated house (Vesetas str.8, Riga, year 2012) with consumption of 202 kWh/m²

$$\frac{202 - 101}{202} \times 100 = 50\%$$

Initially the database included 2 856 multi apartment houses managed Ltd. "Rīgas namu pārvaldnieks"

- In 2012 average , average actual specific heat consumption over non-renovated multi apartment houses in Riga was 201 kWh / m²

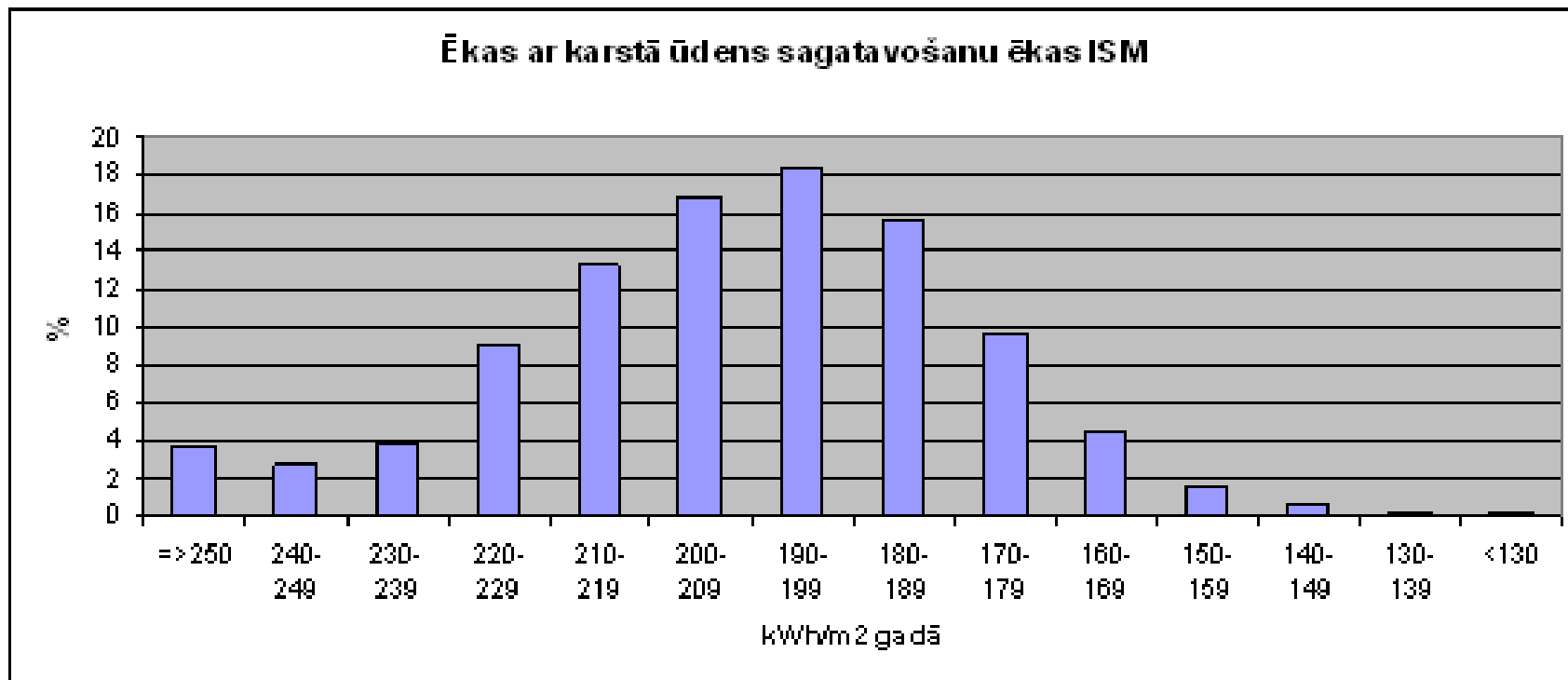
Public apartment house energy efficiency database (3)



Ēku skaits (2856)

Renovated buildings actual specific energy consumption compared with 7 sets of excessive profits by effective specific heat consumption (red line)

Data base on heat consumption by building(4)



REA database of 2 856 buildings distributed into specific energy consumption groups (year 2012)

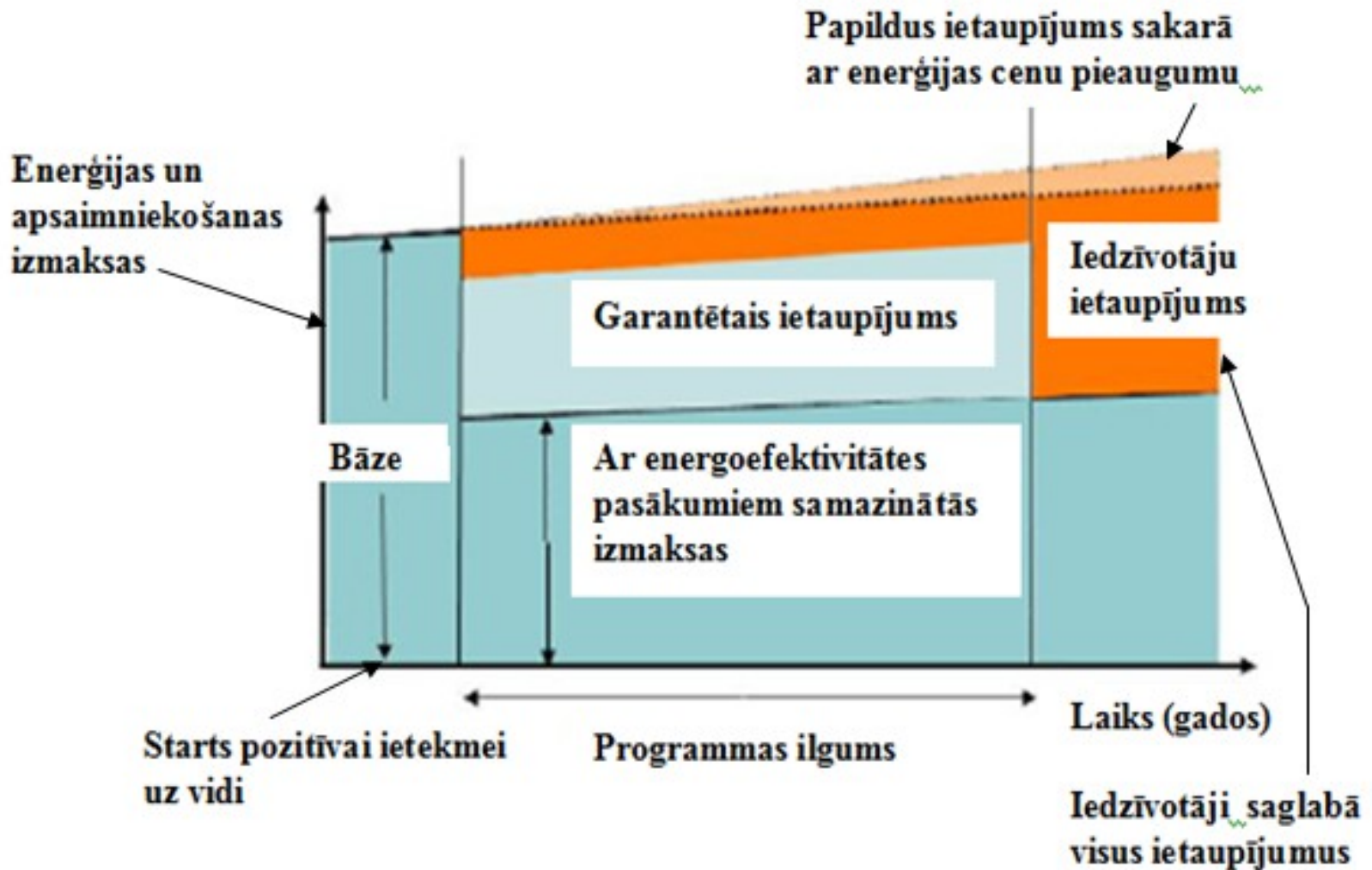
Municipal support measures for renovation

- REA implemented Energy Efficiency Information Center

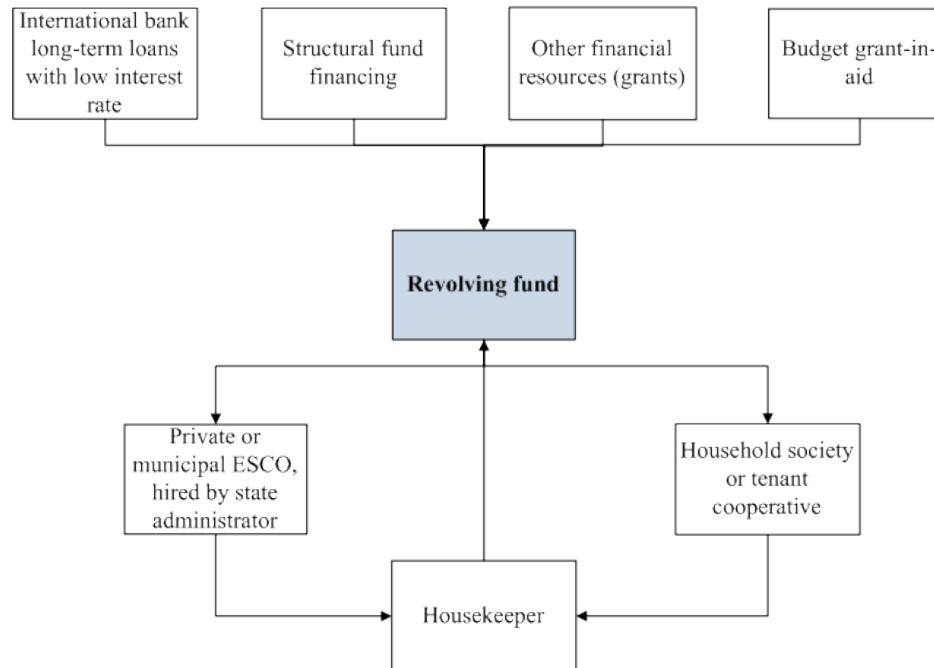
Riga City Council issued binding rules on the procedure for the Riga municipality provides assistance for energy efficiency measures in residential homes

- 80% co-financing on energy audits (102 audits already made)
 - Technical documentation such as forms for energy audits, technical surveys, technical renovation projects were developed (total 12 common forms);
- **REA is initiating the group of 3 energy auditors with aim to ensure actual energy performance indicators to reduce energy consumption to the extent possible**
- **From 2014 free municipal monthly newspaper about opportunities to increase energy efficiency is published**
- **Municipal Ltd. “Rīgas namu pārvaldnieks” (4300 buildings) offers renovation services as ESCO.**

ESCO and EPC operational scheme



Revolving fund



Support measures to finance renovations

- Cohesion and EU structural funds – in February 2014 Latvian government approved an operational program "Growth and Jobs" (indicative funding of 4.4 billion) with the program "The transition to a low carbon economy in all sectors" which is intended to support the national and improving energy efficiency in residential buildings:
 - national/public buildings - 100 billion EUR
 - multi apartment houses – 150 billion EUR
- National revolving fund for energy efficiency measures
- ESCO involvement
- Implementation of administrator service
- Involvement of power supply companies in order to increase household energy efficiency

Energy efficiency measures in public sector (1)

There are more than 400 municipal buildings in Riga including 136 schools and 159 kindergartens



In 2012 55 schools and 46 kindergartens were renovated, that is 36% from total number of educational institution buildings. It is aimed to finish mentioned sector's renovation in 5 years.

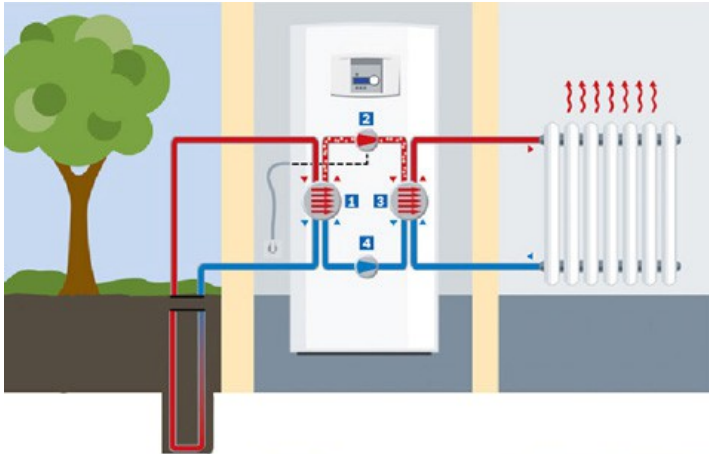
Energy efficiency measures in public sector (2)

There are unique cultural institution buildings (Opera House, City's theatre, etc.), sport complexes, governmental and public buildings in Riga. Renovation and modernization were partially implemented also in this segment (Russian Drama Theatre, cultural center "Ziemeļblazma", National museum and others).



Energy efficiency measures in public sector (3)

Riga municipality eliminated coal boiler houses and installed heating with geothermal pumps equipment in two pre-schools buildings:



PII “Kastanītis” Bišumuižā –
10 borehole with 120m
thermoprobes

Two-stage heat pump

57,5 kW



Energy efficiency measures in public sector (3)

Kindergartner Mežaparkā -

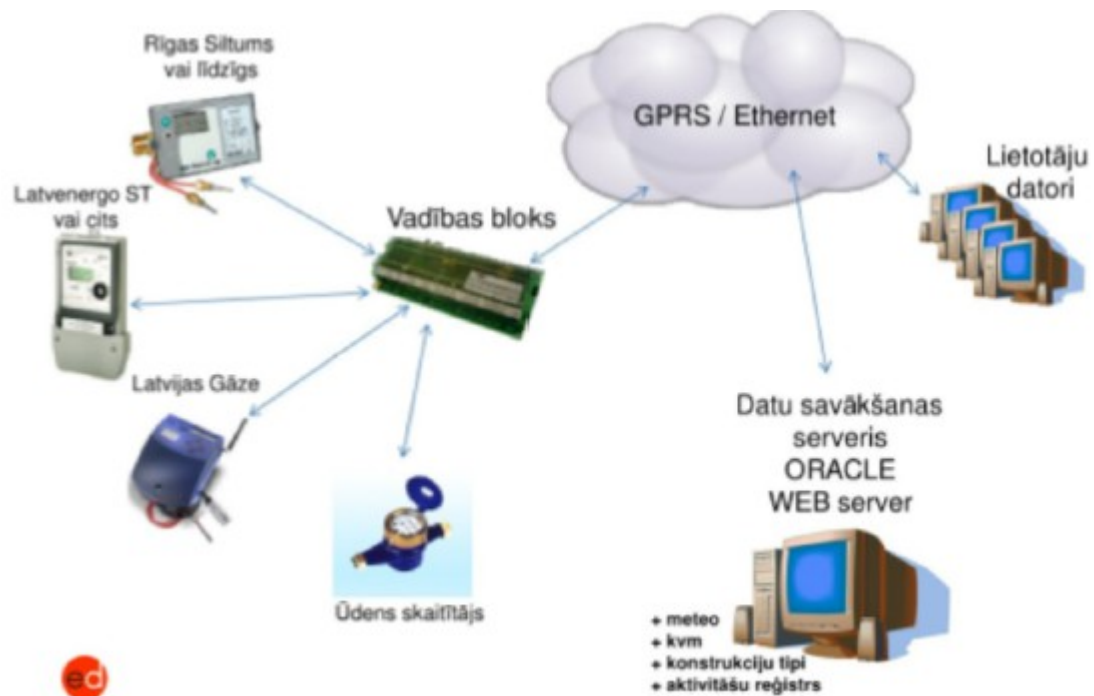
12 boreholes with thernoprobes – 80m;

Two 29 kW heat pumps



Energy efficiency measures in public sector (4)

Computerized energy consumption management systems



The new low-energy buildings

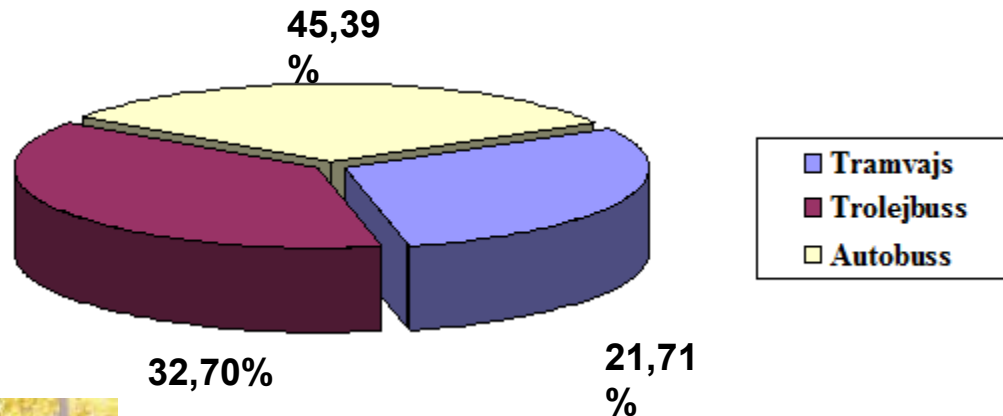


In 2013 in the competition “long-term sustainable building project i2013” two Riga projects were successful - the office building "Upmalas biroji" Mukusalas Street 101, and living house "Futuris" Antonijas street.

„Upmalas biroji energy efficiency - 110 kWh/m²/year (heat and electricity consumption); „Futuris” (7318,3 m²) – 55,52 kWh/m²/ year (heat and electricity consumption);

Urban transport development using zero-emission vehicles (1)

Passenger transport services, %
in 2012



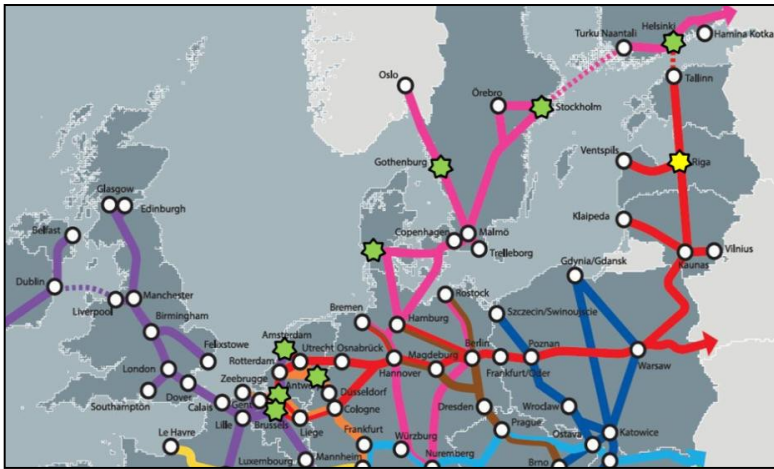
Predominant is electric transport -> 54%
19 trolley lines with 267 combinations
9 tram lines with 267 tram combinations, 26 low-floor trams
Fleet renewal and modernization is implementing
City buses are using fuel (2012) with 3.6% of biofuel. The biomass admixture in 2020 is planned near to 10%.

Urban transport development using zero-emission vehicles (2)



- electric vehicles used in the tourism sector
- Riga municipal technical services in 2013 used 8 electric vehicles
- public electric car charging infrastructure is developed
- It is planned to increase the number of electric vehicles in the municipality at least by 12 units until year 2020

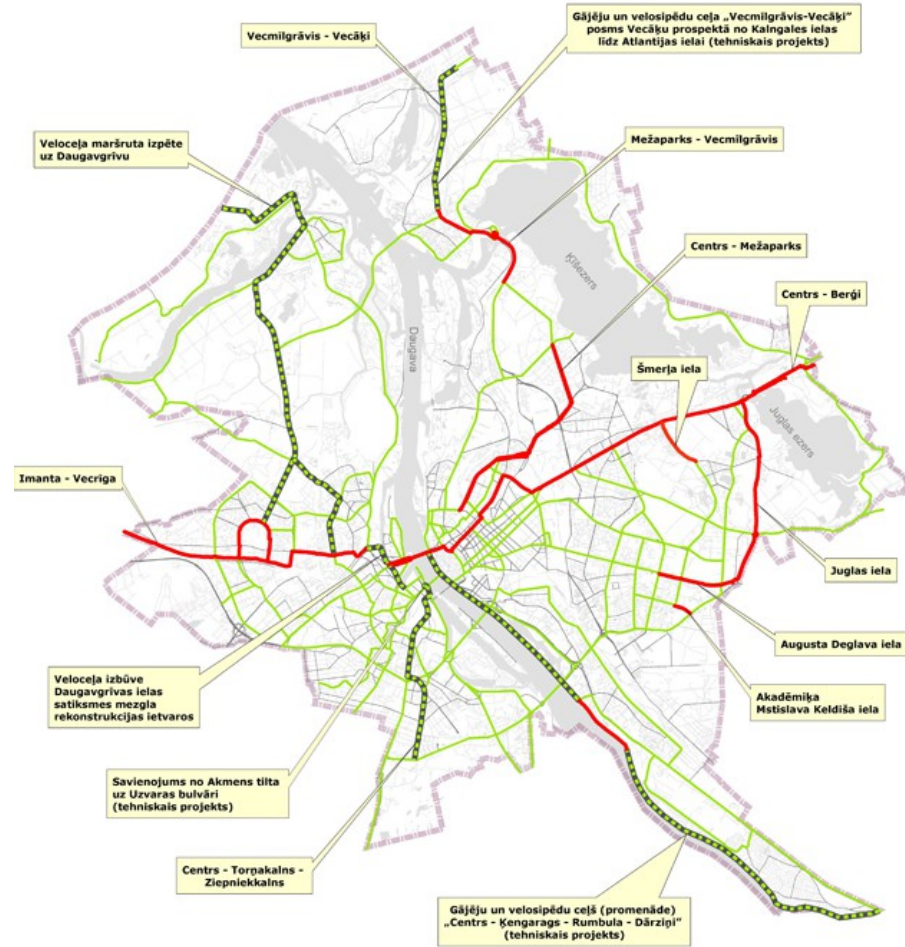
Urban transport development using zero-emission vehicles (3)



- In 2013 Riga has joined HyER as an associate member ;
- In 2014 Riga in cooperation with the partner has prepared and submitted to the TEN-T program project "HIT-2 - Korridors" designed to address the deployment of hydrogen filling stations network development
 - The local government solves the feasibility of introducing hydrogen vehicles



Urban transport development using zero-emission vehicles (4)



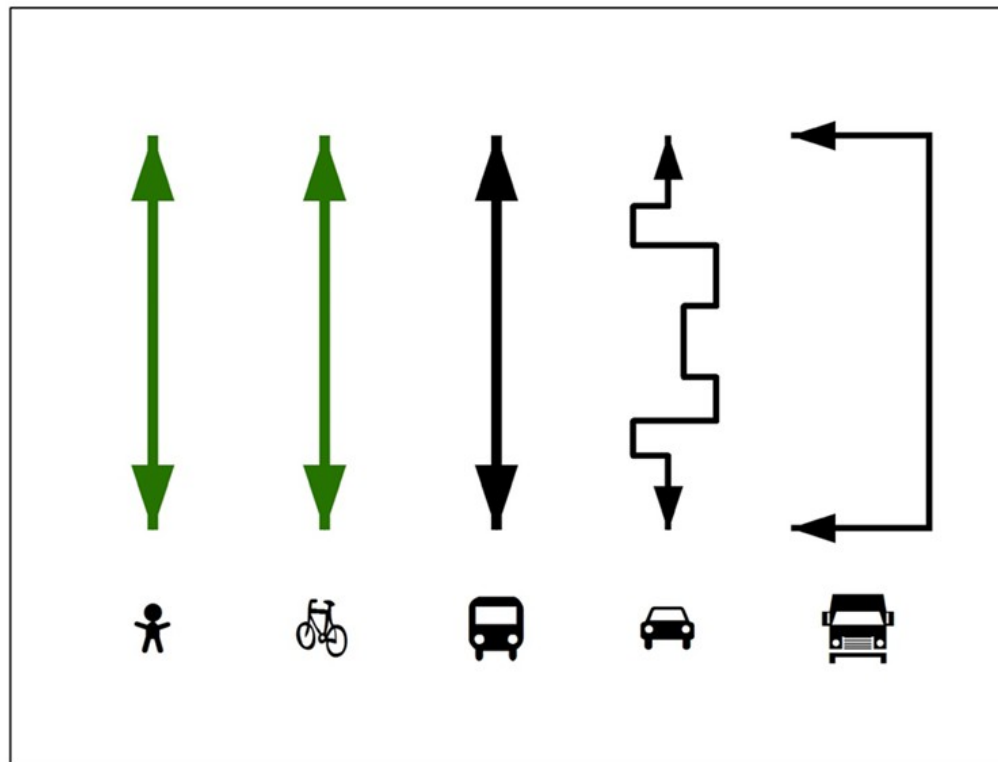
- Bicycles is an important component of urban transport in Riga
- 44 km of marked bicycle routes were constructed and the expected network will expand by 100 miles up to year 2020

Apzīmējumi

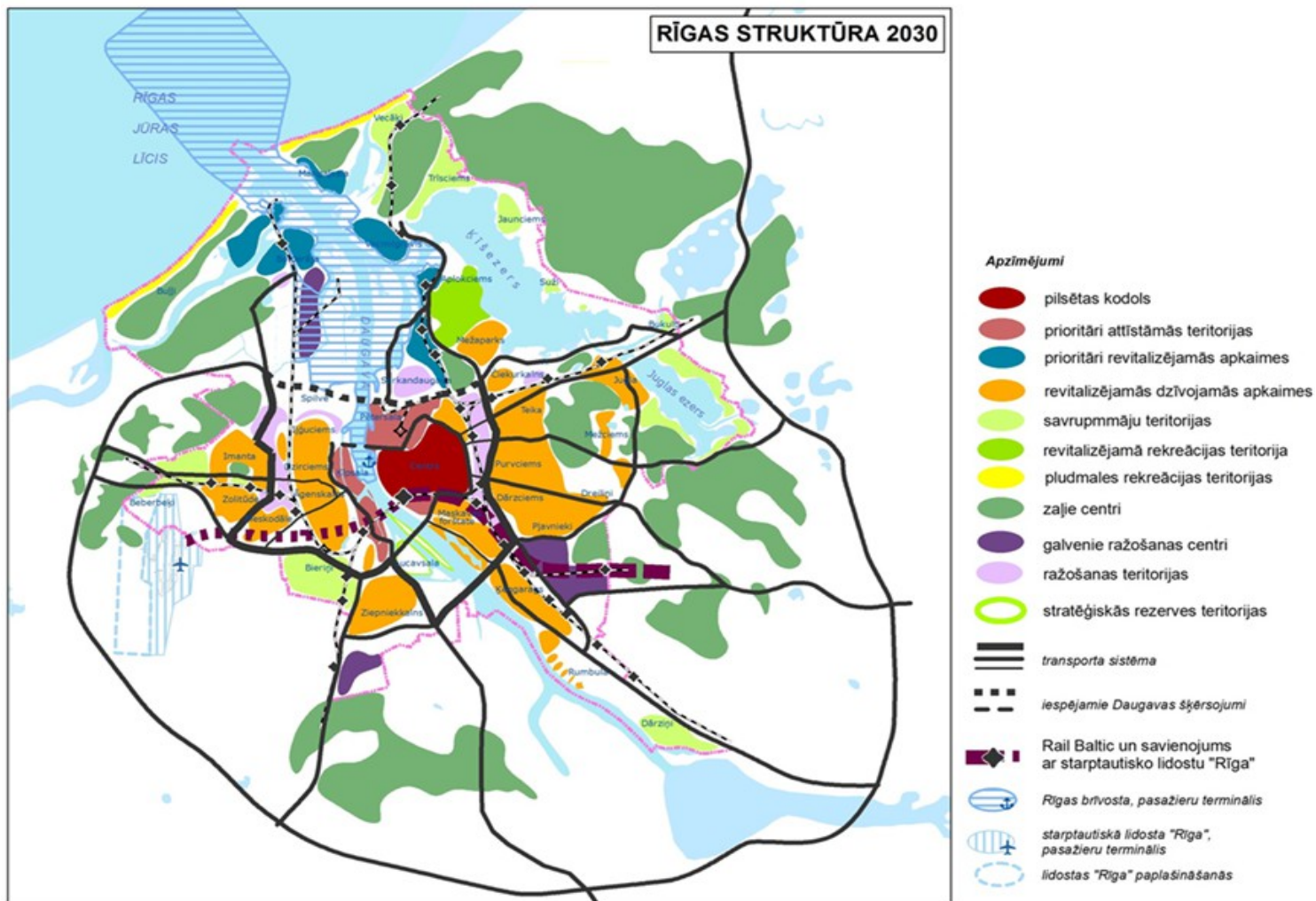
- Izbūvētie veloceļi
- Realizācijas stadijā esošie veloceļi
- Perspektīvie veloceļi (Rīgas Attīstības plāns 2006.-2018.gads)

Urban transport infrastructure development hierarchy

pedestrian - bicycle - public - private - freight transport



Riga's directions for strategic development



Criteria for Action Plan achievement evaluation



The following is adopted as a criterion for assessment of implementation of energy efficiency measures:

- 1) production of additional energy per year in MWh, without combustion of fuel;
- 2) decrease in consumption of energy in MWh per year;
- 3) extent of introduction of specific measures – % of the number of renovated buildings;
- 4) number of the renovated residential houses and public buildings in the city;
- 5) number of buildings in the city which have undergone energy audits;
- 6) electricity consumption savings from city lighting, % of the total consumption.

The following is adopted as a criterion for assessment of introduction of renewable energy sources:

- 1) share of biofuel used, % of the total fuel consumption in public road transport;
- 2) number of introduced electric cars and hybrid cars, and % of the total number of public road transport vehicles;
- 3) production of additional energy from renewable sources in MWh per year;
- 4) use of renewable energy sources for production of heat in the district heating system, % of the used volume of fuel (MWh) per year;
- 5) volume of energy in MWh produced from renewable energy sources per year;
- 6) number of heat pumps installed in the city for local heating;
- 7) number of buildings renovated.

**Thank you for Your
attention...**