Energy efficiency and renewable energy sources status regarding Riga city Sustainable Energy Action Plan

Juris Golunovs, Head of Energy Efficiency Information Centre of Riga Energy Agency

City of Riga

- City of Riga:
  - area 307km²;
  - population 650 640;
  - population density 2 119 residents/km².
Riga city Sustainable Energy Action Plan 2010-2020 (SEAP)

- Riga – as the first capital city - signed The Covenant of Mayors in September, 2008 and assumed an obligation

  20-20-20 at 2020

- SEAP was approved by the Riga City Council in 2010

- The first progress report of the SEAP was worked up in 2011. There was pointed out that CO₂ emissions decreased by 49% compare to the 1990. The second progress report of the SEAP - which was worked up in 2012 – outlined CO₂ emissions reduction by >50% compare to the 1990.
Riga SEAP structure

Main chapters:
• Emissions inventory, base year choice, emissions forecast until 2020,
• Energy consumption reduction and EE improvement measures,
• RES use

Chapters of supporting measures:
• Management structures of Riga SEAP implementation,
• Society involvement in the SEAP implementation,
• Possible financial tools and necessary funding for SEAP implementation,
• EU, state and local government supporting measures,
• Necessary regulations and laws for SEAP implementation
Potential sources of funding of energy efficient renovation of buildings (SEAP)

<table>
<thead>
<tr>
<th>Complex renovation of multi-apartment buildings</th>
<th>Structural Funds, loan resources, revolving fund, national and municipality aid measures, ESCO, MESCO</th>
</tr>
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<tbody>
<tr>
<td>Complex renovation of municipal public buildings in Riga</td>
<td>Funding from the flexible mechanisms of the Kyoto Protocol, budget of the municipality</td>
</tr>
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</table>
Tools: SEAP & CO2 Baseline Inventory

- Signature of the Covenant of Mayors
- Creation of adequate administrative structures
- CO₂ Baseline Emissions Inventory
- SEAP development with stakeholders

1st year

- Implementation of SEAP

3rd year

- Monitoring and reporting

- 20% CO₂ by 2020
The baseline CO$_2$ emission Inventory for Riga

• The baseline emission have been calculated for year 1990; 1995; 2005; 2008 (CO$_2$ emissions);
• Projection of emissions for year 2010; 2015 and 2020 have been evaluated;
• Standard emission factors in line with the IPCC principles have been chosen;
• Country specific CO$_2$ EF for primary energy have been implemented
Calculated CO₂ emissions in Riga 1990 - 2008
Evaluated potential of demand side emission reduction measures, year 2020

**thous t CO₂**

- **Min**
  - Electric cars in transport
  - Biofuel in transport
  - Solar heat collectors
  - Heat pumps in decentralised heat supply
  - Renovation of municipal buildings
  - Renovation of multi dwelling residential buildings
  - Total "Rigas Siltums"

- **Opt**
  - Electric cars in transport
  - Biofuel in transport
  - Solar heat collectors
  - Heat pumps in decentralised heat supply
  - Renovation of municipal buildings
  - Renovation of multi dwelling residential buildings
  - Total "Rigas Siltums"

- **Max**
  - Electric cars in transport
  - Biofuel in transport
  - Solar heat collectors
  - Heat pumps in decentralised heat supply
  - Renovation of municipal buildings
  - Renovation of multi dwelling residential buildings
  - Total "Rigas Siltums"
Projected CO₂ emissions in Riga for different scenarios

thous t CO₂

- reference scenario
- Scenario Min
- Scenario Opt
- Scenario Max
Energy consumption reduction and EE improvement measures (SEAP)

- Energy production and supply sector:
  - Heat supply
  - Elektricity supply
  - Fuel consumption, incl. decentralized heat supply.

- Energy consuming (demand side) sector:
  - City housing sector
  - Public buildings sector of the city
  - Streets and parks lightening
  - The public transport of the city.

- Urban development planning measures for energy consumption reduction.
Heat supply in Riga city

Main type of heat supply – district heating (DH) - covers 76% of total heat demand

Main fuel - natural gas

70% of heat for Riga DH system is supplied by CHP plants TEC-1 and Rīgas TEC-2

30% of heat energy is produced in JSC “Rīgas siltums”:
- 5 heat plants
- 38 gas-fired boiler houses (BH)

➢ 90% of consumed heat energy is produced in high efficient combined heat & power (CHP) mode

➢ Heat distribution losses is reduced below 13%
Energy efficiency improvement measures in the DH system:

- Flue gas condensing equipment installation in heat plants for flue gas heat utilization
- EE improvement in the CHP “Imanta” by installation of absorption type heat pump (2 MW)

Key rehabilitation measures of DH system:

- decommissioning of central heat substations (185)
- installation of prefabricated building heat substations (>8,000)
- heat distribution network rehabilitation by use of prefabricated isolated pipes
- heat meters remote reading introduction for heat billing & energy management needs (8,000 pcs)
Main demand side measures for EE improvement & CO₂ emission reduction in Riga

<table>
<thead>
<tr>
<th>Measure</th>
<th>Energy saving or substitution, year 2020, Max scenario, GWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renovation of multi-apartment residential buildings</td>
<td>780</td>
</tr>
<tr>
<td>Renovation of municipal buildings</td>
<td>81</td>
</tr>
<tr>
<td>Solar collectors in decentralized heat supply</td>
<td>25</td>
</tr>
<tr>
<td>Heat pumps in decentralized heat supply</td>
<td>48</td>
</tr>
<tr>
<td>Biofuel for transport</td>
<td>330</td>
</tr>
</tbody>
</table>
Refurbishment of Riga city public buildings - annual energy savings of around 12,5 thous. MWh

Investments in energy efficient refurbishment of public buildings – schools and kindergartens

100 - number of Riga city public buildings which were refurbished until 2013
RES use in Riga:

- hydroenergy – Riga HES (Daugava cascade) connectioned to the power supply system of Riga
- biogas
- solid biomass
- subsurface ground heat
- solar energy
- electric cars
Solid biomass – wood chips

JSC “Rīgas siltums” - main operator of centralized district heat supply in Riga

The target – increase the share of solid biomass up to the 20% in the heat supplier fuel balance before the year 2015
Riga municipality installed space heating based on the ground heat pumps in the two kindergardens, thereby closed the two coal-fired boiler houses:

Kindergarden “Kastanītis” – 10 thermal probes in vertical boreholes with depth – 120m;

Two stage heat pump 57,5 kW
ELECTRIC CARS IN RIGA

First in Latvia registered electric cars (9) are in Riga, incl.:

- Riga municipality – 6 pcs;
- JSC “Latvenergo” – 2 pcs
- electric cars sales dealer – 1 pcs

There was registered in Riga also the car with both electrical and gasoline engines, which is worlds famous OSCAR - first electric car – participant of Dacara international rally competitions.
EU “green city” index of Riga (Siemens evaluation)
Upgrading SEAP: roadmap to the status of smart city

Example of data remote reading for commercial invoices preparation

System provides automatic remote reading of heat consumption data from 8,000 heat meters
- No necessity of monthly visits of consumer substations in order to make manual records of heat meters data
- No necessity of manual data input into system interface
- Data automatic input transmittance allows automatic preparation of consumers invoices
- Remote evaluation possibility of heat consumption

The project is realized by Ltd. “Citrus Solutions” together with Miltel Communications, which provides management software, the installation and construction of all equipments, both base stations and end-connection devices, as well as overall project management and integration.
SMART CITIES partnership in cities and regions covers three sectors
Hydrogen in the city: smart technology for smart city

International Conference “Hydrogen technology opportunities for sustainable development of cities”
Riga, 20.03.2013
Thank you for your kind attention!

http://www.rea.riga.lv