Hydropower, small hydropower plants - is there a need for rehabilitation of old plants? Who are the owners?

– November 8, 2017 –

Bogdan POPA

University Politehnica of Bucharest
Romanian Small Hydropower Association – ARmHE/ROSHA

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ROMANIA

- mid distance between the Equator and the North Pole
- surface 238,391 km²
- population ~ 20 mill. inhabitants

Interior resources:
- 1,700 m³/year inhabitant, or
- 3,250 m³/year inhabitant taking into account the Danube
- 4,864 watercourses 78,905 km long (inventoried and coded)

Accession to the European Union on the 1st of January 2007, together with Bulgaria
HYDROGRAPHICAL NETWORK – MAIN RIVERS

Concentric distribution of the Carpathian mountains and

Radial distribution of rivers

Main rivers:
- Prut, Mureş  (716 km)
- Olt          (698 km)
- Siret        (592 km)
- Ialomiţa     (414 km)
- Someş        (345 km)
- Jiu          (348 km)
- Argeş        (339 km)
MAIN RIVER BASINS

There are 9 river basins, attached to the main rivers, within Romania and the whole territory of the country lies in the river basin of the Danube river, with only some small rivers flowing directly into the Black Sea

I. Tisa-Someş
II. The three Criş rivers
III. Mureş
IV. Timiş-Nera-Bârzava
V. Cerna-Jiu
VI. Olt
VII. Argeş
VIII. Ialomiţa
IX. Siret-Prut
X. Danube
PERCENTAGE FROM TECHNICALLY FEASIBLE POTENTIAL ALREADY DEVELOPED

<table>
<thead>
<tr>
<th>Region</th>
<th>GAUP [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Someș-Tisa</td>
<td>16%</td>
</tr>
<tr>
<td>Crișuri</td>
<td>39%</td>
</tr>
<tr>
<td>Mureș</td>
<td>24%</td>
</tr>
<tr>
<td>Banat</td>
<td>21%</td>
</tr>
<tr>
<td>Jiu</td>
<td>20%</td>
</tr>
<tr>
<td>Olt</td>
<td>79%</td>
</tr>
<tr>
<td>Argeș-Vedea</td>
<td>48%</td>
</tr>
<tr>
<td>Buzău-Ialomița</td>
<td>78%</td>
</tr>
<tr>
<td>Siret</td>
<td>35%</td>
</tr>
<tr>
<td>Prut-Bârlad</td>
<td>34%</td>
</tr>
<tr>
<td>Dobrogea Litoral</td>
<td></td>
</tr>
</tbody>
</table>
EVOLUTION OF INSTALLED CAPACITY AND ELECTRICITY PRODUCTION IN HYDROPOWER PLANTS IN ROMANIA
National Power System Pi ~ 25 GW

Installed capacity in different technologies for electricity production and in NPS in 2013 and at 1st of October 2014, in MW and

Capacity in operation in specified days in November, in MW
Installed capacity in RES, in MW; end 2012, end 2013, Feb. 2015
NEW AND EXISTING HPPs IN THE DEVELOPMENT STRATEGY OF HIDROELECTRICA FOR THE PERIOD 2004-2025, PROPOSED FOR REFURBISHMENT, REHABILITATION OR MODERNIZATION
NEW HPPs IN THE DEVELOPMENT STRATEGY OF HIDROELECTRICA FOR THE PERIOD 2004-2025, BY REGIONAL WATER BRANCHES - RWB

- RWB BANAT - HPP Herculane;
- RWB JIU - HPP Dumitra, HPP Bumbești;
- RWB JIU - HPP Valea Sadului, HPP Curtișoara, HPP Turcinești;
- RWB OLT - HPP Făgăraș;
- RWB OLT - HPP Racovița, HPP Lotrioara, HPP Câineni;
- RWB BUZĂU-IALOMIȚA - HPP Nehoiașu II;
- RWB MUREȘ - HPP Răstolița;
- RWB MUREȘ - HPP Bretea, HPP Strei, HPP Călan, HPP Băcia, HPP Simeria;
- RWB SOMEȘ-TISA - HPP Firiza I, HPP Firiza II, HPP Runcu;
- RWB SIRET - HPP Cosmești;
- RWB SIRET - HPP Pașcani.

\[ P_i = 385 \text{ MW} \]
\[ E_{\text{prod}} = 1231 \text{ GWh/an} \]
EXISTING HPPs IN THE DEVELOPMENT STRATEGY OF HIDROELECTRICA FOR THE PERIOD 2004-2025, PROPOSED FOR REFURBISHMENT, REHABILITATION OR MODERNIZATION

- RWB ARGEȘ-VEDEA - HPP Vidraru;
- RWB SIRET- HPP Stejaru;
- RWB SOMEȘ-TISA - HPP Mărișelu;
- RWB SOMEȘ-TISA - HPP Retezat.

\[
\begin{align*}
  P_i &= 986 \text{ MW} \\
  E_{\text{prod}} &= 1697 \text{ GWh/an}
\end{align*}
\]
SHPPs

- Old, non-refurbished: Hidroelectrica + Others
- Old, refurbished incomplete: Others, bought from Hidroelectrica
- Old, refurbished
- New: starting with 2006
SHPPs RECENT EVOLUTION

- **Auctions organized by HIDROELECTRICA**

In 2002, enforcing GD 554 (2002), 279 HPPs totalising an installed capacity (Pi) of 451 MW were included in the patrimony of Hidroelectrica, which was put in charge of preparing the task book and selling them by public auction.

<table>
<thead>
<tr>
<th>Pi per HPP (MW)</th>
<th>Number</th>
<th>Pi [MW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pi below 1 MW</td>
<td>187</td>
<td>82</td>
</tr>
<tr>
<td>Pi between 1 and 10 MW</td>
<td>83</td>
<td>249</td>
</tr>
<tr>
<td>Pi above 10 MW</td>
<td>9</td>
<td>120</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>279</strong></td>
<td><strong>451</strong></td>
</tr>
</tbody>
</table>
## Auctions organized by HIDROELECTRICA

<table>
<thead>
<tr>
<th>Year, month</th>
<th>No. SHP An Outcry Auction</th>
<th>$P_i$ [MW]</th>
<th>No. SHP sold</th>
<th>$P_i$ [MW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016, November</td>
<td>21</td>
<td>16</td>
<td>???</td>
<td>???</td>
</tr>
<tr>
<td>2015, November</td>
<td>31</td>
<td>25.7</td>
<td>8</td>
<td>8.6</td>
</tr>
<tr>
<td>2015, June - July</td>
<td>34</td>
<td>29.35</td>
<td>2</td>
<td>2.33</td>
</tr>
<tr>
<td>2015, February - March</td>
<td>29</td>
<td>23.1</td>
<td>3</td>
<td>2.81</td>
</tr>
<tr>
<td>2014, September</td>
<td>27</td>
<td>20.6</td>
<td>2</td>
<td>0.76</td>
</tr>
<tr>
<td>2014, June - August</td>
<td>27</td>
<td>20.96</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2014, January</td>
<td>14</td>
<td>11.24</td>
<td>3</td>
<td>2.08</td>
</tr>
<tr>
<td>2013, June</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>2.73</td>
</tr>
<tr>
<td>2008, February, June, December</td>
<td>88</td>
<td>58.11</td>
<td>14</td>
<td>9.41</td>
</tr>
<tr>
<td>2006, October</td>
<td>10</td>
<td>10.82</td>
<td>10</td>
<td>10.82</td>
</tr>
<tr>
<td>2005, November</td>
<td>49</td>
<td>35.19</td>
<td>39</td>
<td>24.37</td>
</tr>
</tbody>
</table>
SHPPs inventory, other owners than Hidroelectrica, at 27th of September, 2017 (www.transeletrica.ro)

<table>
<thead>
<tr>
<th>GC/MWh</th>
<th>0.5</th>
<th>0.5&lt;GC&lt;2</th>
<th>2</th>
<th>GC &lt; 2 Old SHPPs</th>
<th>GC &gt; 2 New SHPPs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owners</td>
<td>17</td>
<td>10</td>
<td>24</td>
<td>51</td>
<td>91</td>
<td>-</td>
</tr>
<tr>
<td>SHPPs</td>
<td>30</td>
<td>19</td>
<td>83</td>
<td>132</td>
<td>143</td>
<td>275</td>
</tr>
<tr>
<td>Pi [MW]</td>
<td>0</td>
<td>31</td>
<td>87</td>
<td>118</td>
<td>177</td>
<td>295</td>
</tr>
</tbody>
</table>
Examples
Examples
Thank you!

Networking event:

The answer is
YES!
There is a need for rehabilitation of old plants!

www.rosha.ro
ELI-NP Magurele (Romania) – The largest shallow geothermal application in Europe
List of contents

- Acknowledgement and disclaimer
- ELI-NP Facility
- Brief overview over ELI-NP Project
- ELI-NP Ground Source Heat Pump System
- Present day status and future perspectives
Aknowledgement and disclaimer

- This presentation is an adaptation of the presentation elaborated by Mr. Razvan Silviu Stefan (the Facility Manager) for the Astana World Exhibition on July 24, 2017.
- The ELI-NP research laboratory facility is rated as “nuclear facility”, and therefore it is subject to special security measures with regard to the infrastructure itself and with regard to the intellectual property rights.
- The information from this presentation is publicly available.
Nuclear Physics Facility with ultra-intense laser and brilliant gamma beams (up to 19 MeV) enabling novel photonuclear studies
Magurele, ROMANIA
ELI-NP Facility

Gamma Building, hosting a very intense brilliant monochromatic gamma beam system with $E_\gamma < 20$ MeV

November 08th, 2017 – Bucharest (Romania)
Laser and Laboratory Building, hosting:
- High Power Laser System (10 PW, 1 PW, 100 TW)
- Workshops and Laboratories

ELI-NP Facility
ELI-NP Facility

Laser and Laboratory Building, hosting:
- a High Power Laser System (10 PW, 1 PW, 100 TW)
- Workshops and Laboratories

November 08th, 2017 – Bucharest (Romania)
**Brief overview over ELI-NP Project**

<table>
<thead>
<tr>
<th>BUILDINGS</th>
<th>Ground floor area sqm</th>
<th>Built-up area sqm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>RESEARCH DUTY BUILDINGS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GAMMA BUILDING (basement and ground floor)</td>
<td>7,130.25</td>
<td>12,738.70</td>
</tr>
<tr>
<td>LASER BUILDING (basement, ground floor, first floor)</td>
<td>4,448.10</td>
<td>8,659.00</td>
</tr>
<tr>
<td>LABORATORY BUILDING (ground floor)</td>
<td>2,593.60</td>
<td>2,884.40</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>14,643.73</td>
<td>24,753.88</td>
</tr>
<tr>
<td><strong>DOMESTIC BUILDINGS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OFFICE BUILDINGS (basement, ground floor + five floors)</td>
<td>738.94</td>
<td>4,528.33</td>
</tr>
<tr>
<td>GUEST HOUSE (basement, ground floor + two floors)</td>
<td>735.51</td>
<td>2,290.78</td>
</tr>
<tr>
<td>Canteen (ground floor)</td>
<td>123.70</td>
<td>123.70</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>1,875.77</td>
<td>7,220.43</td>
</tr>
</tbody>
</table>

Over 32,000 sqm of built-up area and 270,000 cubic meters of air to condition.
Brief overview over ELI-NP Project

November 08th, 2017 – Bucharest (Romania)
### Brief overview over ELI-NP Project

#### Parameters, Utilities and Special Requirements

<table>
<thead>
<tr>
<th>Laser and Laboratories Building</th>
<th>Electrical Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature in the HPLS room:</td>
<td>5 electrical transformer substations</td>
</tr>
<tr>
<td>Relative humidity of the HPLS room:</td>
<td>2 separated distribution lines</td>
</tr>
<tr>
<td>Over-pressure ventilation in HPLS room:</td>
<td>Bus-bar power distribution system</td>
</tr>
<tr>
<td>Clean room requirements of HPLS room:</td>
<td>Absorbed Power: 5.625 kW</td>
</tr>
<tr>
<td>Protection against floor vibration:</td>
<td>(at a simultaneity factor of 0.7)</td>
</tr>
<tr>
<td>22 ± 0.5 °C</td>
<td>Installed power: 10.016 kW (100% load)</td>
</tr>
<tr>
<td>35-50 %</td>
<td>8.013 kW (80% load)</td>
</tr>
<tr>
<td>40 Pa</td>
<td></td>
</tr>
<tr>
<td>[class 7 - ISO 14644]</td>
<td></td>
</tr>
<tr>
<td>[≤1 x 10⁻¹⁰ g²/Hz at less than 200 Hz.]</td>
<td></td>
</tr>
<tr>
<td>Temperature in Laboratories:</td>
<td></td>
</tr>
<tr>
<td>20 ± 0.5 °C</td>
<td></td>
</tr>
<tr>
<td>Relative humidity of Laboratories:</td>
<td></td>
</tr>
<tr>
<td>30 ± 10 %</td>
<td></td>
</tr>
<tr>
<td>Over-pressure ventilation in Laboratories:</td>
<td></td>
</tr>
<tr>
<td>40 Pa</td>
<td></td>
</tr>
<tr>
<td>Clean room requirements of Laboratories:</td>
<td></td>
</tr>
<tr>
<td>[class 6 - ISO 14644]</td>
<td></td>
</tr>
<tr>
<td>Gamma Building</td>
<td></td>
</tr>
<tr>
<td>Temperature in the Accelerator Bay:</td>
<td></td>
</tr>
<tr>
<td>22 ± 0.5 °C</td>
<td></td>
</tr>
<tr>
<td>Relative humidity of the Accelerator Bay:</td>
<td></td>
</tr>
<tr>
<td>35-50 % condensation free</td>
<td></td>
</tr>
<tr>
<td>Depression in the Accelerator Bay:</td>
<td></td>
</tr>
<tr>
<td>14 Pa</td>
<td></td>
</tr>
<tr>
<td>Protection against floor vibration:</td>
<td></td>
</tr>
<tr>
<td>±1 mm at less than 10 Hz.</td>
<td></td>
</tr>
</tbody>
</table>


November 08th, 2017 – Bucharest (Romania)
## ELI-NP Ground Source Heat Pump System

### List of large GSHP systems in Europe (>10 km BHE length)

<table>
<thead>
<tr>
<th>Country</th>
<th>City, Name</th>
<th>No. BHE</th>
<th>Depth BHE (m)</th>
<th>Total BHE (m)</th>
<th>Year</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>RO</td>
<td>Magurele near Bucharest, ELI-NP</td>
<td>1080</td>
<td>125</td>
<td>135000</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>CH</td>
<td>Zurich, FGZ Wohnquartier Friesenberg</td>
<td>500</td>
<td>250</td>
<td>125000</td>
<td>2015</td>
<td>under constr.</td>
</tr>
<tr>
<td></td>
<td>of which BHE-field FGZ Grünmatt</td>
<td>150</td>
<td>250</td>
<td>37500</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td>CH</td>
<td>Zurich, ETH-Campus Hönggerberg</td>
<td>425</td>
<td>200</td>
<td>85000</td>
<td>2015</td>
<td>under constr.</td>
</tr>
<tr>
<td></td>
<td>of which BHE-field ETH HC4</td>
<td>126</td>
<td>200</td>
<td>25200</td>
<td>2015</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of which BHE-field ETH HPL</td>
<td>101</td>
<td>200</td>
<td>20200</td>
<td>2014</td>
<td></td>
</tr>
</tbody>
</table>

**November 08th, 2017 – Bucharest (Romania)**
Generally a GSHP system consist of a:

- heat exchange component called a ground heat exchanger (GHX);
- and one or more ground source heat pumps (GSHP).

The heat exchange component passively heats or cools water by circulating water through pipes installed in the ground. The heat exchange process uses solar radiation stored in the ground and provides stable temperatures that are the approximate equivalent of average annual air temperature for that location (approximately 12 °C for Romania).

For the ELI-NP a closed loop installed in vertical boreholes solution was chosen considering the following benefits:

- The system circulates the same water continuously;
- Closed loop systems are environmentally benign. They are sealed so that no fluid is exchanged with the environment;
- The vertical bore configuration is a popular choice for systems of all sizes because of its efficient use of space;
- Leaks are rare, generally occurring because of a contractor latter cutting a buried pipe.
HEAT PUMPS
Water to air Heat Pumps: 43
Water to water Heat Pumps: 123

AHU
Gamma Building: 2 x 80,000 m³/h
Laser and Laboratories Building: 8 x 54,000 m³/h

Fan Coil Units: 192
Plate Heat Recovery: 26
De-stratification Fans: 16

Direct Digital Control DDC
The HVAC system control is fully automated

Building Management System
Gathering Data, Monitoring, Identifying trouble spots regarding:
- Life safety
- Fire protection
- Security
- Energy management
- Lighting schedules
- Equipment monitoring and maintenance
The Heat Exchange Process in the ELI-NP Ground Source Heat Pump System

COOLING CYCLE

- 2 circuits of 12 Water to Water HP units that supply cooling agent for 2 AHU units
- 3 circuits of 16 Water to Water HP units that supply cooling agent for 50 FCU, 16 destratification fans and 60 cooling coils
- 6 circuits of 34 Water to Water HP units that supply cooling agent for 8 AHU
- 2 circuits of 10 Water to Water HP units that supply HPLS

November 08th, 2017 – Bucharest (Romania)
The Heat Exchange Process in the ELI-NP Ground Source Heat Pump System

HEATING CYCLE

- 2 circuits of 12 Water to Water HP units that supply heating agent for 2 AHU units
- 3 circuits of 16 Water to Water HP units that supply heating agent for 50 FCU, 16 destratification fans and 60 cooling coils
- 6 circuits of 34 Water to Water HP units that supply heating agent for 8 AHU
- 2 circuits of 10 Water to Water HP units that supply heating agent for 50 FCU
- 2 circuits of 18 Water to Air HP units heating the main hall of the GAMMA BUILDING
- 2 circuits of 2 Water to Air HP units heating the control room of NPS

November 08th, 2017 – Bucharest (Romania)
The Heat Exchange Process in the ELI-NP Ground Source Heat Pump System

COOLING WATER FOR THE GBS AND HPLS

2 circuits of 2 Water to Water HP units that supply cooling water for the GBS

2 circuits of 20 Water to Water HP units that supply cooling water for the HPLS

Gamma Building capacity to evacuate heat

Temperature of the supplied technological water in the heat exchangers:
- 7 °C on the input
- 11 °C on the output

The capacity to evacuate the heat dissipated by the equipment:
- 2 x 750 kW


November 08th, 2017 – Bucharest (Romania)
Heat pump units and pipelines
Present day status and future perspectives

- GSHP system completed and functional – boreholes, hydraulics, heat pump units, fan coils, AHUs;
- "Civil" buildings (office building, guest house and cafeteria) - operational;
- Adjacent spaces to lab facilities (access hallways, offices) – completed and functional;
- Lab spaces – equipment still needs to be installed, building & HVAC finished.
- January 1st, 2019 – the whole ELI-NP facility must be fully operational!
- Romanian Geoexchange Society intend to cooperate with the facility management in monitoring and improving the energy performance of the GSHP system.

November 08th, 2017 – Bucharest (Romania)
THANK YOU!

VISIT www.egec.org!
VISIT www.geoexchange.ro!

Presented by Mr. Silviu STRACHINESCU
Project Manager – SRG ROMANIA

November 08th, 2017 – Bucharest (Romania)
ENERGY EFFICIENCY IN ROMANIA-
PRIORITIES AND REGULATORY FRAMEWORK

November 8, 2017 - Bucharest
### EUROPE 2020 STRATEGY HEADLINE INDICATORS, EU28

<table>
<thead>
<tr>
<th>Headline Indicator</th>
<th>Past situation</th>
<th>Current situation</th>
<th>2020 Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment rate, total (of the population aged 20-64)</td>
<td>70.3</td>
<td>69.2</td>
<td>70.1</td>
</tr>
<tr>
<td>R&amp;D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gross domestic expenditure on R&amp;D (of GDP)</td>
<td>1.84</td>
<td>2.04</td>
<td>2.03p</td>
</tr>
<tr>
<td>Climate change &amp; energy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greenhouse gas emissions* (index 1990=100)</td>
<td>90.31</td>
<td>77.39</td>
<td>77.88</td>
</tr>
<tr>
<td>Share of renewable energy in gross final energy consumption (%)</td>
<td>11.0</td>
<td>16.1</td>
<td>16.7</td>
</tr>
<tr>
<td>Primary energy consumption (Million tonnes of oil equivalent)</td>
<td>1,692.4</td>
<td>1,508.3</td>
<td>1,529.6</td>
</tr>
<tr>
<td>Final energy consumption (Million tonnes of oil equivalent)</td>
<td>1,179.7</td>
<td>1,059.6</td>
<td>1,082.2</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early leavers from education &amp; training, total (of population aged 18-24)</td>
<td>14.7</td>
<td>11.2b</td>
<td>11.0</td>
</tr>
<tr>
<td>Tertiary educational attainment, total (of population aged 30-34)</td>
<td>31.1</td>
<td>37.9b</td>
<td>38.7</td>
</tr>
<tr>
<td>Poverty or social exclusion** People at risk of poverty or social exclusion (Cumulative difference from 2008 in thousands)</td>
<td>:</td>
<td>4759</td>
<td>1956</td>
</tr>
</tbody>
</table>

* Total emissions, including international aviation, but excluding emissions from land use, land use change and forestry.

** People at risk of poverty or social exclusion are in at least one of the following three conditions: at-risk-of-poverty after social transfers (income poverty), severely materially deprived or living in a household with very low work intensity. Persons are only counted once even if they are present in several sub-indicators. The overall EU target is to lift at least 20 million people out of risk of poverty or social exclusion by 2020 with 2008 as a baseline year. All data refer to EU27.

* estimate p provisional b break in time series Data not available
### EUROPE 2020 – ROMANIAN AND EUROPEAN OBJECTIVES

<table>
<thead>
<tr>
<th>Energy from renewable sources (E-RES)</th>
<th>Energy from renewable sources (E-RES) in gross final energy consumption</th>
<th>2015</th>
<th>2020 - RO</th>
<th>2030 - UE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Energy efficiency</strong></td>
<td><strong>Primary energy consumption</strong> [Mtoe]</td>
<td><strong>31.3</strong></td>
<td><strong>43</strong></td>
<td><strong>27 %</strong></td>
</tr>
<tr>
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<td><strong>Increasing energy efficiency</strong> (Expressed as a reduction in primary energy consumption)</td>
<td><strong>19 %</strong></td>
<td><strong>19% (7 Mtoe ) (ANRE estimation)</strong></td>
<td><strong>30%</strong></td>
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<tr>
<td><strong>Greenhouse gas emissions (GHG)</strong></td>
<td><strong>Greenhouse gas emissions (GHG): 20% lower than 1990 level (1990=100)</strong></td>
<td><strong>43.68%</strong></td>
<td><strong>20%</strong></td>
<td><strong>40%</strong></td>
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<td><strong>(Eurostat - 2014)</strong></td>
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EUROPEAN AND NATIONAL ENERGY AND ENVIRONMENT LEGISLATION

Major milestones in EU energy and climate policy

CLEAN ENERGY FOR ALL EUROPEANS 2016
CLEAN ENERGY FOR ALL EUROPEANS

ENERGY EFFICIENCY FIRST PRINCIPLE

WHY?

• The cheapest energy is the one that we do not consume

• Energy efficiency should be considered as a source of energy in itself:
  ➢ It is endless
  ➢ It is available everywhere
CLEAN ENERGY FOR ALL EUROPEANS

It’s not a dream...

EU 28 - Primary energy consumption and GDP

www.anre.ro
“I congratulate Romania for having already met its 2020 renewables target and for making excellent progress towards its energy efficiency target and I look forward to discussing how the Clean Energy for All Europeans package can further help Romania pursue its energy transition. Let me also stress the need to continue with plans to reform its energy market, including the development of a forward-looking regulatory framework, in addition to improving interconnectivity with neighbouring countries”.

European Commission Vice-President for Energy Union Maroš Šefčovič
Bucharest, 27 September 2017 - Energy Union tour
Romania’s mandatory 2020 target of 24% share of energy from renewable sources in the final consumption was reached in 2015 (24.8%). Same year, Norway reached a share of 69.4% while the set 2020 target is 67.5% (EUROSTAT)
Country Report Romania 2017
SWD(2017) 88 final:
Even if Romania has already achieved levels of primary (31,3 mill. toe) and final energy consumption (21,9 mill. toe) which are below the indicative national 2020 targets, it would need to make an effort to keep these levels until 2020.

The Romanian National Energy Regulation Authority (ANRE) is an autonomous administrative body under Parliamentary control, entirely self-financed and independent as regards its decision-making process, organisation and functioning, whose scope of activity is to issue, approve and monitor the implementation of the national-wide binding regulatory framework required for the proper functioning of the electricity, heat and natural gas sectors and markets in terms of efficiency, competition, transparency and consumer protection.


In accordance with the provisions of Law no. 121/2014 on energy efficiency, within the Romanian Energy Regulatory Authority was established the Energy Efficiency Department, by Order of ANRE’s President no. 95/2014.
MAIN ATTRIBUTIONS AND RESPONSIBILITIES OF THE DEPARTMENT FOR ENERGY EFFICIENCY

Department for Energy Efficiency - ANRE

- Elaboration of policy proposals and secondary legislation on energy efficiency
- Monitoring the implementation of NEEAP 2014-2020
- Market surveillance of energy efficiency equipment and appliances
- Submission to the Government, with a view to informing the European Commission, of the Country Progress Report
- Authorization of energy auditors in industry and certification of energy managers

SEE NEXT SLIDE

ANNUAL MONITORING REPORT ON THE IMPLEMENTATION OF THE NATIONAL ACTION PLAN ON ENERGY EFFICIENCY (NEEAP)

ANNUAL MONITORING REPORTS OF FINAL ENERGY CONSUMERS WITH AN ANNUAL CONSUMPTION OF MORE THAN 1,000 TOE/YEAR

ANNUAL REPORT ON THE PROGRESS REGISTERED IN ACHIEVING THE NATIONAL TARGETS FOR ENERGY EFFICIENCY

ANRE DECISION NO. 2794/12.17.2014 (WITH SUBSEQUENT AMENDMENTS)
ROMANIAN LEGISLATION ON ENERGY EFFICIENCY

- Government Decision No. 122/2015 for the approval of the National energy efficiency Action Plan for 2014-2020 (NEEAP III); next NEEAP IV in 2017

- ANRE Decision No. 2123/2014 regarding the approval of the Energy Audit Development Guide;
- ANRE Decision No. 2794/2014 regarding the approval of the Regulation for the certification of energy managers and the approval of energy service companies and of the Regulation for the authorization of energy auditors in industry, modified by the ANRE Decision No. 1111/2017;
- ANRE Decision No. 7/2015 regarding the approval of the Model for the elaboration of the Energy Efficiency Improvement Program for the localities with a population of more than 5,000 inhabitants;
- ANRE Decision No. 8/2015 regarding the approval of the Model for the elaboration of the Energy Efficiency Improvement Program for industrial units;
- ANRE Decision No. 1033/2016 on the approval of minimum clauses to be included in energy management service provision contracts for economic operators and energy management service contracts for local public administration authorities applicable to energy service companies and authorized natural persons;
- ANRE Decision No. 860/2017 on the approval of models for the annual energy consumption declaration and for the energy analysis questionnaire for energy consumers.
In accordance with Art. 3 paragraph (2) letter e) of Law No. 121/2014 on energy efficiency, the Department for Energy Efficiency within the National Energy Regulatory Authority shall send to the Government of Romania, with a view to informing the European Commission, by 30 April of each year, starting in 2015, the Report on the progress registered in achieving the national targets for energy efficiency:

http://www.anre.ro/ro/eficienta-energetica/rapoarte/rapoarte-de-progres

In accordance with Art. 3 paragraph (2) letter b) and Art. 8 paragraph 8 of the Law No. 121/2014 on energy efficiency, the Department for Energy Efficiency prepares until 30 April, an Annual Monitoring Report on the implementation of the National Action Plan on Energy Efficiency for the previous year, based on the reports received from the institutions involved in the implementation of Law no. 121/2014 on energy efficiency by March 30:


In accordance with Art. 3 paragraph (2) letter j) correlated with Art. 9 of the Law No. 121/2014 on energy efficiency, the Department for Energy Efficiency within ANRE prepares a Monitoring report of the final energy consumers with an annual consumption of more than 1000 toe/year:

ENERGY POLICY MEASURES ON ENERGY EFFICIENCY - SUPPORTING THE DEVELOPMENT OF ENERGY SERVICE COMPANIES ESCO

- EUROSTAT Guidance Note from 19 September 2017 - The recording of energy performance contracts in government accounts;
- Energy performance contracts in the public sector offer a practical solution to make public buildings and other public infrastructures more energy efficient, as the initial investment can be covered by a private partner and repaid by guaranteed energy savings. However, frequently this type of contract simultaneously contains elements of a rental, service, lease, purchase or loan agreement, making its recording complex;
- At the request of the Member States, Eurostat has worked with National Statistical Institutes (NSIs) to reflect on the most appropriate recording of EPCs in government accounts, resulting in the guidance note;

The European Energy Network EnR is a voluntary network of national energy agencies within Europe and in neighbouring countries. Established in Strasbourg in 1991, EnR currently numbers 24 member agencies, each one with national responsibility for promoting and actively contributing to energy efficiency, renewable energies and environmental protection.

Starting February 2017, the EnR Presidency & Secretariat for one-year period is assured by ANRE (Romania).

The EnR management is jointly formed by the EnR Presidency & Secretariat and the EnR Troika. The EnR network Troika consists of mandated agency representatives for the previous (DENA Germany), current (ANRE Romania) and next Presidencies (ENEA Italia).

Focus topic: Energy poverty in EU and MS – benchmarking of the relevant documents and reports and Clean Energy Package proposals
### ANRE - EnR PRESIDENCY 2017/2018

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<tr>
<th>Event</th>
<th>Date</th>
<th>Location</th>
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<tr>
<td>EnR Regular &amp; Full Meeting</td>
<td>22-23 February 2017</td>
<td>Zurich</td>
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<tr>
<td>Joint workshop of Energy Agencies (EnR) and Environment Protection Agencies (EPAs) in Europe on GHG mitigation and decarbonisation</td>
<td>8 March 2017</td>
<td>Brussels</td>
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<td>EnR Regular Meeting with the support of the Romanian Energy Center</td>
<td>14-15 June 2017</td>
<td>Bucharest</td>
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<td>World Energy Council - Romanian National Committee Conference: “Romanian Legislation and new European orientation on vulnerable consumers and energy poverty”</td>
<td>14 September 2017</td>
<td>Bucharest</td>
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<tr>
<td>EnR Thinking Group Meeting</td>
<td>27-28 September 2017</td>
<td>Salzburg</td>
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<tr>
<td>EnR Regular &amp; Full Meeting Handover of EnR Presidency to ENEA, Italy</td>
<td>21-22 February 2018</td>
<td>London</td>
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ANRE - EnR PRESIDENCY FUTURE ACTIVITY 2017/2018

- ANRE continued the EnR former Presidencies activities concerning the revision of structure and strategic accents of the network and introduced new Focus Areas:
  - 2017 EnR Factsheet (http://enr-network.org/about-enr/)
  - EU Transparency Register Registration 2017 – 2018
  - Management and update of EnR website

- EnR activities during ANRE’s Presidency were intended to contribute to increasing visibility of the network in the member countries and towards the European Commission;

- ANRE aimed at increasing the continuity in management and strategy of the network in order to strengthen EnR in the long run and help focusing and planning EnR’s work and activities;

- ANRE’s focus topic represented the starting point for elaborating an EnR Position Paper which identified relevant approaches and best practices of the EnR members and European partners for addressing energy poverty and will be further developed during the ENEA Presidency 2018/2019.

Beginning with February 2018, ANRE will handover the EnR Presidency & Secretariat to the Italian Energy Agency – ENEA and continue its activity as Troika Member until February 2019.
THANK YOU FOR YOUR ATTENTION!

Romanian Energy Regulatory Authority (ANRE)
Energy Efficiency Department
Constantin Nacu no. 3, sector 2
Bucharest, Romania

www.anre.ro
http://enr-network.org/about-enr/
Energy Audits and Energy Efficiency in practice
(focus on EE in industry processes and buildings)

Dr. Ioan BITIR-ISTRATE
Energy Faculty Politehnica University of Bucharest
VicePresident of Romanian Society of Energy Auditors and Managers
Auditor ELSACO ESCo
Law 121/2014 regarding Energy efficiency

- Big energy consumers >1,000 toe/year has the obligation to perform an Audit every 4 years

- About 600 big energy consumers make a market of 150 Energy Audits in Romania
Energy contribution in total cost of production

- Transportation
- Aluminum
- Ceramic tiles
- Telecommunications
- Ice cream
- Shipyards
Energy contribution in total cost of production

800 euro/toe
300 euro/toe
1000 euro/toe
EE Measures in Romanian Industrial Audits

Problems in Energy consumptions monitoring systems

- Electricity
- Natural Gas
- Water
- Compressed Air
EE Measures in Romanian Industrial Audits

Problems in process automation (losses in productivity and energy consumption)
EE Measures in Romanian Industrial Audits

Problems in Compressed Air distribution system over 80% losses in electricity
EE Measures in Romanian Industrial Audits

Problems in electricity internal distribution system (losses in electricity)
EE Measures in Romanian Industrial Audits

Problems in using natural gas in industrial furnaces (losses in natural gas)
EE Measures in Romanian Industrial Audits

Problems in industrial buildings insulation (losses in natural gas)
What were the factors to influence the EE measures implementation?

- High level of investments with low ROI
- Relatively low level of energy cost
- No obligation according to the Law
- Huge administration effort for small projects
- End of life for equipments
- Orders for the Headquarters
- Incentives from the Government HG 495/2014
- European Funds
What will have to be the EE measures supported by Funds?

- Monitoring energy consumption
- Automation for industrial processes
- Compressed air systems rethink
- Change of industrial furnaces
- Industrial buildings insulation
- Replacing lighting with LED
- Variable speed drivers
- Cogeneration/Trigeneration
- ORC using exhausted gases
EE Measures in Romanian Industrial Audits

Thank you for your attention!