The role of energy statistics and modeling in developing of framework for assistance to low income households in energy consumption in Croatia

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Strategic Role of Energy Statistics in National and International Policies
23 - 24 April 2013, Copenhagen
‘Zagreb Energy School’ heritage – more than 50 years of work and experience.

Established in 1994. Since then EIHP is a central scientific institution for planning and the development of energy sector in Croatia. EIHP has 72 employees.
Energy System Planning in Croatia

Department for Energy System Planning implements following activities:

- Research impacts of different scenarios on energy system and formulation of the sustainable energy strategies and policies
- Integrated planning of the energy needs, energy resources, available technologies and their environmental impacts using least cost approach
- Development of natural gas, oil and petroleum products system
- Energy statistics and energy balances
The starting point for social energy policy

- “social energy” is the energy which households must have at their disposal to satisfy their need for an adequate standard of living (minimum living standard conditions)

- The support to “social energy” is based on the principles of solidarity

- Providing energy services to the final users is a market-driven activity
Initial problems

- Is a household which has the status of a “social household” vulnerable to the changes in energy prices? How to identify poor households and energy poor households? Where are we going to find consistent data?

- What is the minimum of energy needs of the households?

- How to finance the energy needed for the achievement of the minimum living standard conditions?

- How to ensure the use of allocated funds?
Energy affordability threshold

<table>
<thead>
<tr>
<th>Source</th>
<th>Electricity</th>
<th>Heating</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO (2004)</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPA energy (2003)</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UN/ECE</td>
<td></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>UK</td>
<td></td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>US</td>
<td></td>
<td>6</td>
<td>2.5</td>
</tr>
<tr>
<td>Asian Development Bank</td>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

The share of energy costs in household incomes depends on the present situation in a country (current economic situation, etc.).
• 40% of households spend more than 10% of their income on energy costs

• what is the energy affordability threshold in Croatia?

• what is the needed fund assistance?

• income classes are classes the size of which amounts 10% of the total number of households,

• income classes are listed by income, from the poorest to the wealthiest

Source: National Statistics Burro
Living Standard Measurement Surveys, annual researches, 2005 - 2011
Development of the Croatian model

1. Identifying main parameters of the model (regional characteristics, income classes - energy consumption)
2. Calculation of the energy needs and costs
3. Financing options
4. Institutional organisation
5. Implementation
1. Identifying main parameters (1)

- **number of household members;**
- **dwelling size - surface area (m2)*:**
  - for families with 1 household member – 35 m2;
  - for every other additional member 10 m2;
  - additional 20 % for disabled person;
- **available energy infrastructure;**
  - natural gas, district heating, fuel wood
- **household’s income.**

*minimum living standards according to the Law on Social Care*
Spatial characteristics of energy consumption

Number of households:
- Region North: 1,010 tis. (66 %)
- Region Center: 97 tis. (6 %)
- Region South: 426 tis. (28 %)
- TOTAL: 1,534 tis.

Source: National Statistics Burro, Census 2011
Energy structure for the heating in households

In addition:

Except income, energy consumption also depends on:
- energy availability
- climatic and weather circumstances

Region: NORTH

Region: CENTER

Region: SOUTH

Source: National Statistics Burro, Living Standard Measurement Survey, sample 3000 households
1. Identifying main parameters (2)

- **heating (room heating)** depends on the region (climatic and weather circumstances, living standards, living habits, etc.) – specific norms for heating were developed and adopted (MJ/m²)

- **cooking & hot water** – specific norms were adopted according to the average consumption in a household in Croatia (kWh/household member), MJ/household member

- **non-thermal consumption (appliances, lighting)** – specific norm is considered as a social consumption which amounts 80% of the average household in Croatia, MJ/household member.
2. Calculation of energy needs and costs (1)

Example for one household

<table>
<thead>
<tr>
<th>INPUT DATA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General data</td>
<td></td>
</tr>
<tr>
<td>Number of household members</td>
<td>4</td>
</tr>
<tr>
<td>Total monthly income, kn</td>
<td>3000</td>
</tr>
<tr>
<td>Energy Affordability Thresholds</td>
<td>15%</td>
</tr>
<tr>
<td>REGION</td>
<td>NORTH</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>能源形式/能源使用</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Natural gas</td>
<td>Light fuel oil</td>
<td>District heating</td>
<td>Fuel wood</td>
<td>Electricity</td>
</tr>
<tr>
<td>heating</td>
<td></td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>cooking</td>
<td>100</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>hot water</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>non thermal consumption</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Energy Institute Hrvoje Pozar
(energy end-use energy planning models and results of the surveys on energy consumption)
### RESULTS OF THE MODEL

| dweling surface area, m² | 65 |

### 3. Energy needs

<table>
<thead>
<tr>
<th>energy form/energy use</th>
<th>Natural gas</th>
<th>Light fuel oil</th>
<th>District heating</th>
<th>Fuel wood</th>
<th>Electricity</th>
<th>Liquid petroleum gas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m³</td>
<td>lít</td>
<td>kWh</td>
<td>m³</td>
<td>kWh</td>
<td>kg</td>
</tr>
<tr>
<td>heating</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6,9</td>
<td>0,0</td>
<td>0</td>
</tr>
<tr>
<td>cooking</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,0</td>
<td>790</td>
<td>0</td>
</tr>
<tr>
<td>hot water</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1,036</td>
<td>0</td>
</tr>
<tr>
<td>non thermal</td>
<td></td>
<td></td>
<td></td>
<td>2,480</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total consumption</strong></td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>4,306</td>
<td>0</td>
</tr>
</tbody>
</table>

### 4. Total costs, kn

<table>
<thead>
<tr>
<th>Costs, kn</th>
<th>0</th>
<th>0</th>
<th>0</th>
<th>1,962</th>
<th>3,918</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total annual costs, kn</strong></td>
<td><strong>5,880</strong></td>
<td><strong>kn</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Share of energy costs in income: 19.6%
- Share of subvention in energy costs: 23%
- The marginal monthly income: 3,267 kn

**TOTAL ANNUAL SUBVENTION**: 1,380 kn
2. Presentation of results

Assumption: the household with same characteristics

Fuel wood consumption, m3

Costs for the fuel wood, kn

Regija Sjever  Regija Centar  Regija Jug

Regija Sjever  Regija Centar  Regija Jug
PRELIMINARY CONCLUSIONS:

• decision on energy threshold depends on the government’s ability to finance the program

• the preferable energy affordability threshold for Croatia is 15 %, it should be revised annually according to the current economic situation

• selection of the correction factor for non-thermal energy consumption can also be a part of the social policy
3. The financing scheme

- Energy companies
- Local authorities
- State budget (responsible Ministry)

**SOLIDARITY FUND**

- Local Social Care Centres
4. Institutional organisation

- **Local Centres for Social Care** – implement social policies in Croatia at local level

- proposed tasks and responsibilities of a Local Centre:
  - receives requests for the subvention of energy costs from households (requests include the main data on households characteristics)
  - calculates energy needs and assumes the needed financial support,
  - co-operates with energy suppliers, carries out and controls financial transactions for energy support for each household.
5. Proposed implementation concepts

- Local Centres for Social Care communicates directly with the energy supplier and informs the household on the amount of the subvention

- “vaucher” scheme – the representative of the household brings the voucher directly to the energy supplier which proves that the Local Centre covered a part of the energy costs

- “smart cards” scheme - similar to the “voucher” scheme; but the energy supplier has to provide devices for the use of the smart card
Needed prerequisites for the proposed model implementation

- adoption of criteria which make the households eligible to apply for energy consumption subsidy – energy affordability threshold;
- development of the regulation with definitions of the technical, social and energy criteria;
- establishment of the Solidarity Fund;
- add in the existing Law on Energy the possibility that energy subjects contribute to the Solidarity Fund;
- development of the appropriate IT support for the data exchange, verification and monitoring of the model results.
Main conclusions

- consistent energy data are necessary for the evaluation and monitoring of the model results
- the proposed model allows a just and fair allocation of funds intended for assistance to the households in energy consumption in Croatia;
- the model contributes to the realization of the minimum living standard conditions in Croatian households;
- model contributes to the complete liberalization of the energy market in Croatia, the funds are allocated, other.
Thank you for your attention!

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