Cost Benefit Analysis of Residential Insulation in Kosovo

HONOR SOCIETY SENIOR CAPSTONE PROJECT

ANILA QEHAJA

FEBRUARY, 2015
Agenda

- Residential Energy Efficiency and its Saving Potential
- Thermal Losses
- The Survey
- Wall Insulation, Roof Insulation and EE Windows
- Data Examination
- Typical Household Sizes
- Cost Benefit Analysis Assumptions
- Costs of Insulating Houses of 3 Typical Sizes
- Recommendations
Residential Energy Efficiency

- Energy efficiency: a reduction in individual energy consumption; vital to sustainable resource management
- Residential insulation: the cheapest and most effective mode of saving energy
Residential Sector’s Energy Saving Potential

Total Energy Consumption Distribution in Kosovo

Source: Energy Regulatory Office, 2013
Residential Sector’s Energy Saving Potential Contd.

- Space heating accounts for 80% of the total energy consumption in households in Kosovo (Bowen et al. 2013).

- Residential Insulation: cut down fire wood consumption; minimize electricity imports volume
Thermal Losses

Heat Lost from an Uninsulated Home in Kosovo

Source: KOSID, 2015
The Survey

Goals of the survey:

- To define the supply chain for energy efficiency products available in the marketplace
- To obtain prices of EE products from construction and materials businesses throughout Kosovo
- To identify the various characteristics of such products
Wall Insulation

- 16 out of 95 businesses sell Styrofoam
- Mostly produced in Kosovo, with raw materials from Taiwan
- Sometimes imported from Poland, Romania, Macedonia, Austria, and Croatia
- “PoFix”
- Average price is €0.55 per cm of thickness
- Mostly used for the residential sector
Roof Insulation:
- 6 out of 95 businesses sell mineral wool; imported from Romania
- Average Price: €8.3 per m² of roof (2.7 cm of thickness)

Energy Efficient (EE) Windows:
- 9 out of 95 businesses sell EE windows
- Average price of a double-glazed window: €95.63, triple-glazed: €124
Data Examination

- Building Stock of Pristina
- 13,243 households out of 44,223 buildings
- 25% of homes in Kosovo are insulated (INDEP, 2014)
- 75% of homes (9,932) of the original sample was bootstrapped
- 100 averages, minimums, and maximums
Typical Household Sizes

- Size of a typical average household in Pristina: 148.4 m²
- Size of a typical large household: 2,402.5 m²
- Size of a typical small household: 21.1 m²
Cost Benefit Analysis Assumptions

- Project Lifespan: 25 years
- Interest Rate: 3.7% (Kosovo Banking Association, 2013)
- Wall Insulation Thickness: 5 cm and 10 cm
- Roof Insulation Thickness: 2.7 cm
- Types of EE Windows: Double- and Triple-Glazed
- Average Electricity Bills: €500, €100, €20 monthly
- Average Wood Consumption: 10.24 m³ for 7 months (CENR, 2014)
Costs of Insulating Houses of 3 Typical Sizes

Typical Average Sized Household:
• Total: €2,065.84
• Payback Period: 7 years, 10 months

Typical Small Sized Household:
• Total Cost: €1,167.61
• Payback Period: 15 years, 6 months

Typical Large Sized Household:
• Total Cost: €11,686.77
• Payback Period: 12 years, 2 months
Recommendations

The Government of Kosovo should:

- Provide subsidies for building efficiency improvements;
- Provide subventions in the form of machinery;
- Raise awareness about the many benefits of residential insulation;
- Consider exempting energy efficiency products from taxes.
Thank you for your attention.

- Bowen et al. (2013), Kosovo Household Energy Consumption; Facts and Figures
- CENR (2014), Availability of Renewable Energy and Energy Efficient Products and Services in Kosovo; Wood Fuel Study
- Energy Regulatory Office (2013), Statement of Security of Supply for Kosovo
- INDEP (2012), Economies of Energy Efficiency in Kosovo
- KOSID (2015), Thermal Losses