Analysis of Policy Reform Impact on Energy Performance in Buildings
Case study Montenegro

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Energy for Sustainable Development

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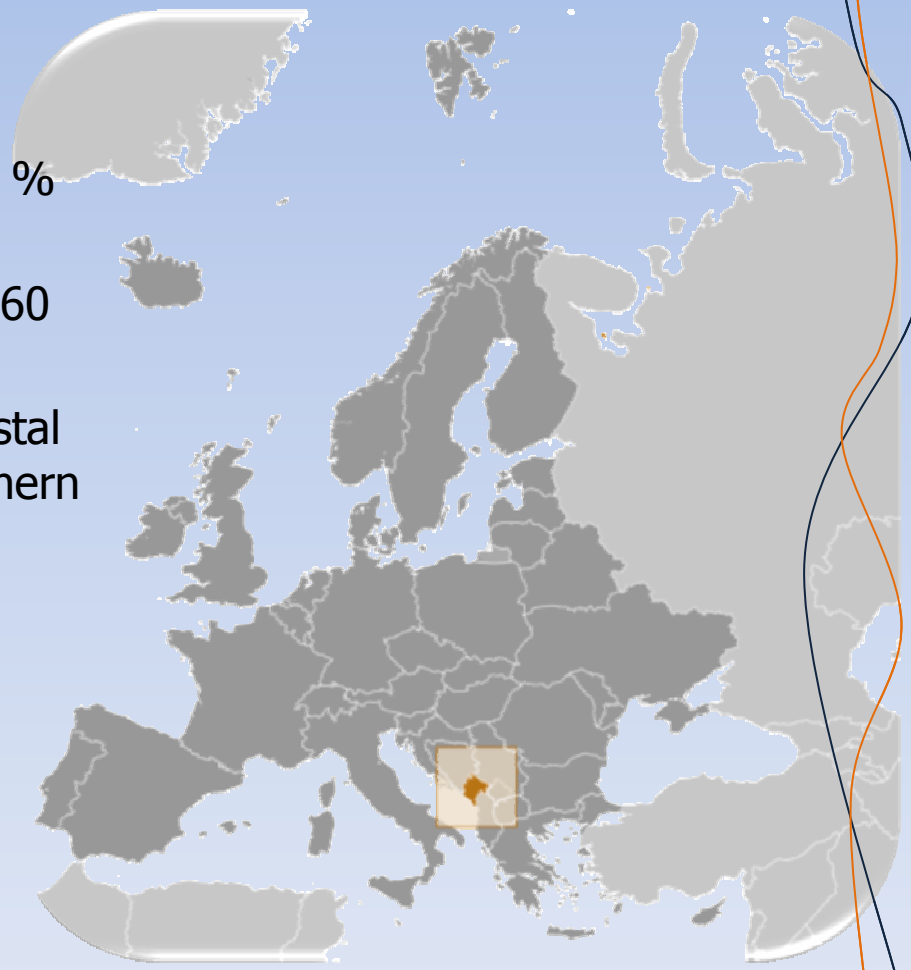
1. Montenegro – Country Facts

- **Southeast European country**
- **Regained independence in 2006**
- **Population: 625 266** people, where 30 % of population lives in capital Podgorica
- **Area: 13 812 km²**, of which more than 60 % is mountain region
- **Climate: 2 zones** – Mediterranean (coastal and central region) and continental (northern region)
- **70 % of GDP is from services**, while industry (aluminum, iron and coal) and agriculture are only around 15 % of GDP each
- **Candidate country for EU**



2. Energy Sector

- Natural resources: **hydropower, lignite, biomass and solar radiation**
- **Electricity producers: 2 HPPs, 1 TPP and 7 sHPPs (836 MW installed power) –** no new producers in past 30 years
- **Imports** around **30 % electricity and all fossil fuels**
- **No gas network or district heating systems** (except Municipality of Pljevlja)
- Final energy **consumption** ~ 30 PJ
- Large consumers such as **KAP** (Aluminum production industry) – **20-40 % of all energy consumption**

- **Unbundling of energy companies and opening of energy market**
- Interconnection undersea cable **Montenegro–Italy** – 1000 MW capacity

2. Energy Sector (2)

2.1. Energy Consumption

- **Consumption by sectors:**
  - Transport – 39 %
  - **Households and services – 36 %**
  - Industry – 24 %
- **Electricity price for households ~ 9 c€/kWh**
- **Energy savings** potential per sector:
  - Transport – 10 %
  - **Building – 30 %**
  - Services – 20 %
  - Industry – 15 %
- **Characteristics of energy use and generation in building sector:**
  - ✓ Inefficient thermal systems
  - ✓ Electricity or biomass used for heating
  - ✓ Inefficient lighting
  - ✓ Lack of automatic regulation
  - ✓ Increase use of heat pumps
  - ✓ Use of construction material with poor thermal qualities

3. Strategic and Legal Framework

3.1. Strategy

- **Montenegro is a contracting party of the Energy Community Treaty since 2005** – follow EU energy policy through obligations for implementation of directives regarding energy and environment
- In 2005 Montenegro adopted **Energy Efficiency Strategy** that sets priorities on **building sector** defining needed activities**:**
  - ✓ Quality **regulatory framework** for building sector
  - ✓ Improving **building envelopes**
  - ✓ Avoiding use of **electricity for heating**
  - ✓ Use of **automatic regulation for heating/cooling/ventilation**
  - ✓ Use of **renewable energy sources** (through heat pumps, solar thermal)
- In 2007 Montenegro adopted **Energy Development Strategy until 2025** that puts adoption of legislation and regulatory framework harmonized with EU **energy efficiency directives**, including 2002/91/EC on energy performance of buildings as its priority.
- In 2011 adopted **Energy Policy until 2030** that sets **sustainable energy development** as one of the three priorities

3. Strategic and Legal Framework (2)

3.2. Legislation

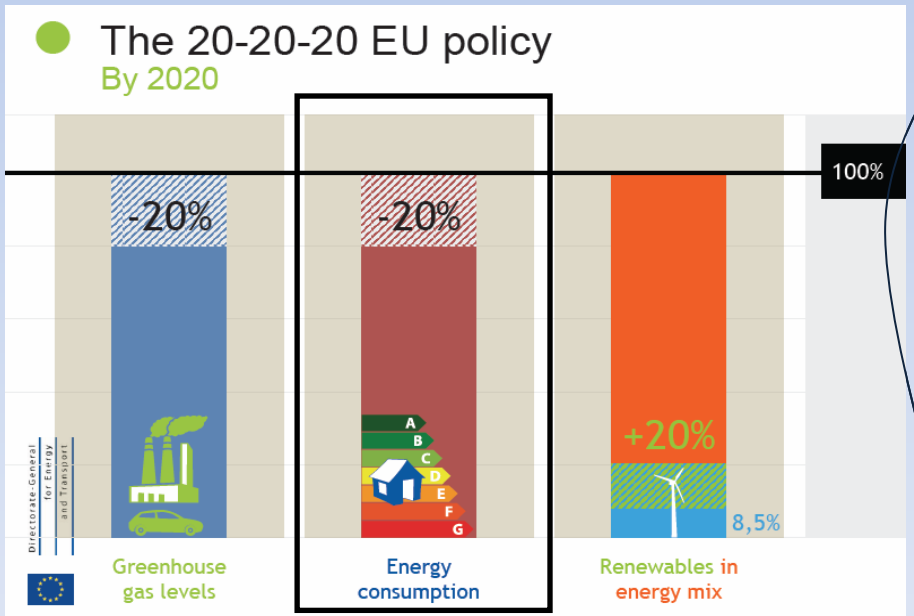
- **In 2010 Montenegro adopted**
  - ✓ **Energy Law –** defines renewable energy and **energy efficiency in energy generation and distribution**
  - ✓ **Energy Efficiency Law –** defines **energy efficiency in final consumption sectors** transposes EU directives:
    - o 2006/32/EC on energy efficiency and energy services,
    - o **2002/91/EC on energy performance of buildings (EPBD),**
    - o 2005/32/EC on ecodesign for energy using products
    - o 92/75/EEC on labeling of energy use in products
- Energy Efficiency Law defined **obligations of various stakeholders**, **energy management** on national and local level as well as, the general framework for **implementation of EPBD** including:
  - ✓ Energy characteristics of buildings
  - ✓ Certification of buildings
  - ✓ Energy audits procedures

3. Strategic and Legal Framework (3)

3.3. Regulation

- Based on **Energy Law** regulatory framework regarding **cogeneration,** including **incentives for high-efficient** cogeneration was adopted during 2011
- Based on Energy Efficiency Law Montenegro adopted indicative target for energy efficiency improvement of **9 % of final energy consumption until 2018** in comparison to 2002-2006 average

- In 2010 Montenegro adopted **National Energy Efficiency Action Plan 2010-2012** that puts a focus on:
  - ✓ Regulatory framework for EPBD
  - ✓ Educating energy auditors
  - ✓ Information campaign
  - ✓ Use of RES



4. Energy Savings Potentials

4.1. Public Building Sector

- Public building sector includes buildings used for:
  - ✓ **Education** (600 buildings/structures)
  - ✓ **Health** treatment (~ 30 buildings)
  - ✓ **National and local governments**
  - ✓ **Public services…**

- Energy Efficiency Strategy puts an accent on energy efficiency in public buildings with **savings potential of up to 30 %**
  - ✓ Energy menagment
  - ✓ Increasing comfort for improving the **quality of service**
  - ✓ **Good practice examples** for information and citizens' stimulation

4. Energy Savings Potentials (2)

4.2. Households

- Montenegro has 314,704 dwellings of which **40 % are for seasonal** use only or not always occupied and close to 1/3 is located in Podgorica

- Existing buildings are mainly constructed from steel structure followed by concrete and brick construction with **poor thermal qualities**
- Windows and doors in most of the buildings have **poor isolation**

- Existing building stock is **mainly built in 60-80s** with new construction boom during 2000s while most buildings have **no chimneys, no district heating option**
- **Ownership** of existing building was public until 90s when the apartments were bought by private owners – lack of maintenance since
- EnCT study done in 2011 shows that households, especially apartment buildings have energy **savings potential of even up to 45 %**

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5. Concrete Actions

5.1. World Bank Project

- Governmental **loan for implementing energy efficiency measures in educational and health buildings** (2009-2013)
- Implementation of the project involves cooperation of **Ministry of Economy, Ministry for Health and Ministry of Education and Sports**
- Based on detailed energy audits of buildings it was concluded that the most needed and feasible energy efficiency measures are:
  - ✓ **improvement of building envelope and**
  - ✓ **reconstruction of heating (HVAC) system**
- World bank procedure involves following steps per each object:
  - ✓ Detailed **energy audit**
  - ✓ **14-day measurement** of comfort parameters
  - ✓ **Technical design** based on national regulation and standards
  - ✓ **Construction works**
  - ✓ **Evaluation** and monitoring
  - ✓ Final **approval**

5. Concrete Actions (2)

5.1. World Bank Project (2)

Example Health Center "Boro Buncar", Mojkovac, Northwest Montenegro

5. Concrete Actions (3)

5.2. Municipality Podgorica Initiative

- Capital of Montenegro – Municipality Podgorica adopted a decision to give financial support to:
  - ✓ **Installing thermal isolation** on façade of existing apartment building with financial support for 50 % of the works
  - ✓ Cut communal tax **for new buildings installing solar systems** by 100-150 €/m^2
- In order to install thermal isolation apartment owners need to **organize and form committee** that will apply for the help at the local Agency for households – all apartments need to agree
- Thermal isolation includes **fixing of existing façade**, applying **5 cm Styrofoam** and redoing the **façade and paint** and could include **roof isolation**
- **Monitoring** is done by local Agency staff and the works take 2 months depending on the building size

5. Concrete Actions (4)

5.2. Municipality Podgorica Initiative (2)

Examples of buildings in Block V – part of Podgorica Muncipality

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6. Impact and Recommendations

- Development of strategic and legislative framework as well as aggressive information campaign during Energy Efficiency Year (GIZ 2008/2009) has showed **improvements in general awareness** on energy importance and use
- Realization of the projects have given **positive examples** to general public as well as to construction sector
- **New buildings** mainly have well thermally isolated envelopes

Recommendations

- **Regulatory framework implementing EPBD** is urgently needed since practice has already started with application of various energy savings measures
- Energy and construction frameworks need to apply adequate **standards** and define **reference buildings** in Montenegro
- **Continue and improve educating** new energy auditors as well as workforce in energy and construction sectors
- **More aggressive approach** towards implementation of EPBD 2010/31/EC

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Conclusions

- Montenegrin **Energy sector is changing** at and improving following trends of EU energy policy
- Since Montenegro is expected to achieve more demanding obligations over time there is a need for **more aggressive approach** regarding sustainable development, especially applying energy savings measures
- Montenegro has **positive examples** that show that practice has followed strategic and legislative leads even though clear and obligatory regulatory framework is not yet adopted
- Montenegrin **building sector has high energy savings potential** even if only cost-effective measures are applied – up to 45 % in case of apartment buildings
- **Inefficient lighting and electricity use for heating need to be minimized**
- Increase use of **district heating** systems where possible on renewable energy and **renewable energy use** for heating, domestic hot water and electricity

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Thank you for your attention!

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