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ANALYSIS OF ENERGY DEMAND for RESIDENTIAL Sector IN ITALY: A CASE STUDY FOR MUNICIPALITY OF MILAN

Author Esraa Elmaddah

Univesity School for Advances Studies-IUSS Pavia

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1. Context

Italy has been working towards implementing the different energy efficiency and security instruments in all sectors including households. The residential sector represented around 20% of the final consumption of energy as per 2016. Accordingly, this study provides an analysis of the penetration of different energy resources in households demand in the municipality of Milan based on 2011 ISTAT census data as base-year and the following years of 2016,2021,2026 and 2031. The study took into account "the Integrated National Energy and Climate Plan" targets.

2. Aim

Analyze the targeted energy reduction in the household sector based on the "Integrated National Energy And Climate Plan" targets.

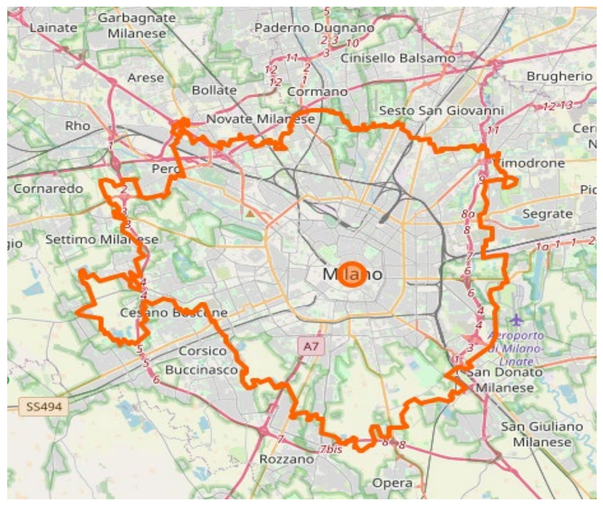

Figure 1. Munaciplity of Milan

3. Methods & Scenarios

The study used the Model for Analysis of Energy Demand(MAED) to analyze the evolution of energy demand of the residential sector for the municipality of Milan .In this study the base year was 2011 based on the census conducted by ISTAT (see Figure 2) and the scenario analysis was conducted for the period 2011:2031. The scenario analysis was conducted based on Integrated National Energy And Climate Plan" targets. And took into account the following assumptions:

- The population growth was based on the historical population growth between 2011 and 2021.
- The heating degree days was calculated for the historical years while for the future scenario , it was assumed to decrease.
- The penetration of energy forms for the future years took into account the "Integrated National Energy And Climate Plan" of Italy with assuming decrease on reliance on fossil fuels (e.g. natural gas) and more reliance on electricity, heat pumps, and solar thermal.

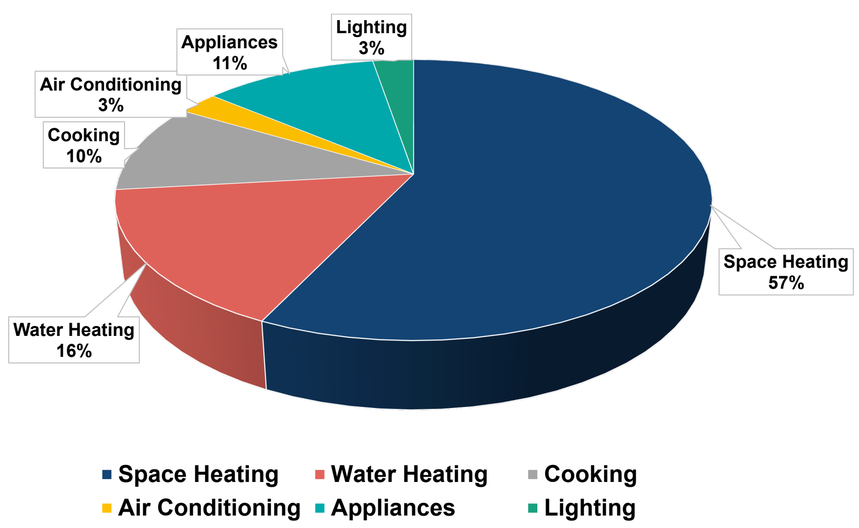

Figure 2. Final Energy Demand in households sector of the base-year 2011

4. Results

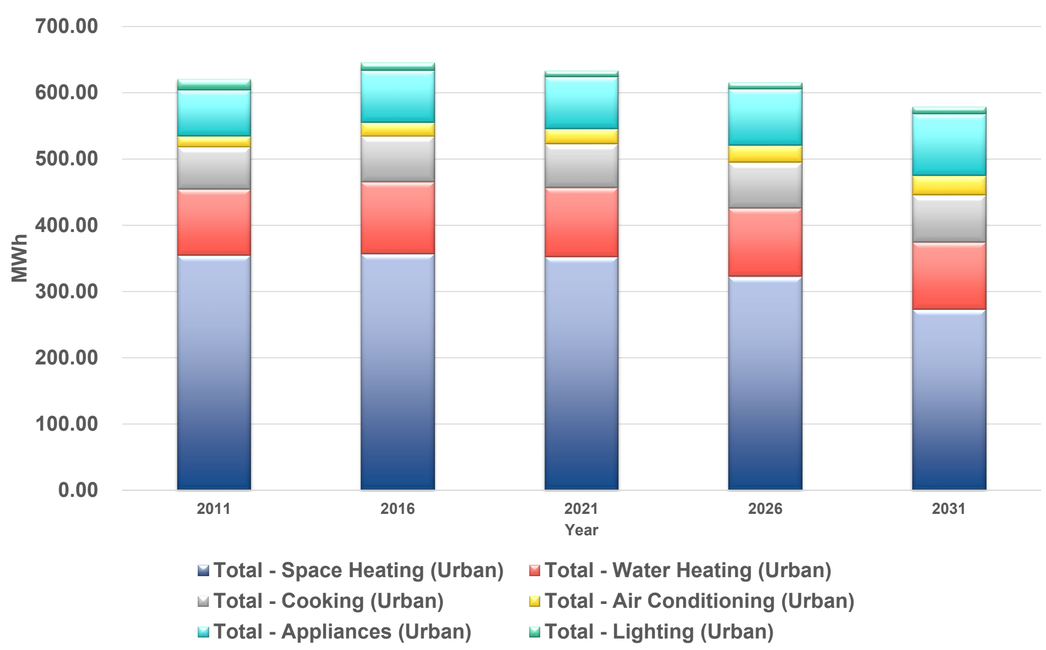

Figure 3. Final Energy Demand in household sector for between 2011 and 2031

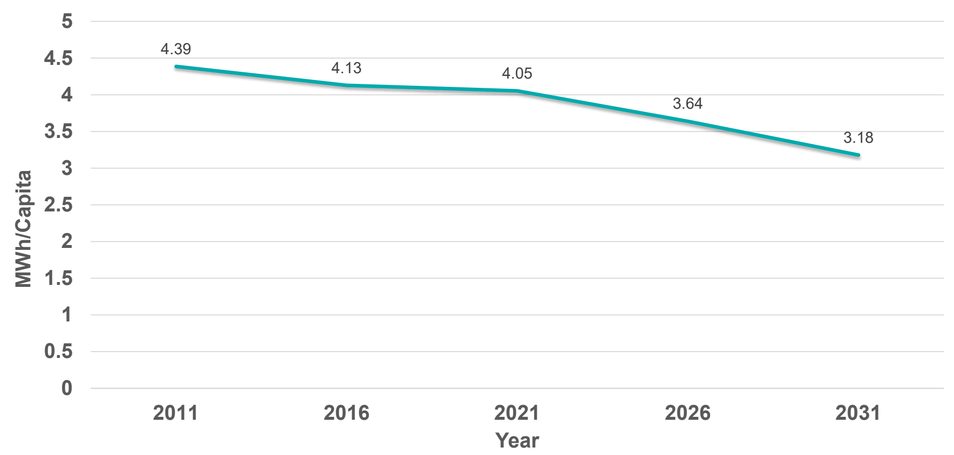

Figure 4. Final Energy Demand in household sector per capita between 2011 and 2031

5. Policy insights, conclusions and future work

This analysis has shown the targeted energy reduction in the household sector based on the NECP . It also showed the expected decrease in the heating demand. Additionally, incentives such as white certificates and thermal energy account would help even more in reaching the reduction in heat demand target .Furthermore, utilizing solar thermal energy for district heating and district cooling will contribute more in the total energy reduction for household sector in the light of implementing provision of Italian Law 172/2017 which establishes subsidies for cogeneration installation.

For future work, Further analysis should be undertaken to develop two scenarios one that would be BAU that follows RCP 8.5 and one moderate scenario RCP 4.5 taking into account temperature changes in both cases which will accordingly impact degree days and accordingly heating and cooling demand. In addition, an updated census will much help to confirm the assumptions of 2021 and accordingly this shall impact the future scenarios .Last but not least, a more detailed analysis shall be conducted regarding district heating and cooling potential and expected growth till 2055 this shall take into account both fit for 55 and the new NECP Plans.

6. References

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Contact: Esraa Elmaddah (esraa.elmaddah@iusspavia.it)