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Assessment of reasonably achievable GHG emission reduction target in Lithuanian households



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ABSTRACT

Lithuania has developed several important climate change mitigation policy documents however there are no attempts in Lithuania to develop local climate change mitigation policies or to decentralize climate change mitigation policy. The aim of the paper is to analyse climate change mitigation policies in households. The paper presents the framework for the assessment of reasonably achievable GHG emission reduction (RAER) potential in households based on behavioral changes related to energy consumption. The paper presents the results of empirical application of developed framework in Lithuanian households. Community based social marketing approach was implemented and GHG emission reduction potential was assessed in focus groups of Kaunas region county during preparation of sustainable development strategy and long-term strategic development plan for Kaunas region county.

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1. Introduction

Individual behaviour has significant impact on environment and GHG emissions. The choices of individuals related to products and life style have tremendous direct and indirect impact on energy savings and GHG emission reductions [1–5]. Though sustainable consumption is the core element of sustainable development and there are many global agreements on sustainable development, the changes in life styles are very slow. At the same time, energy consumption is the main source of GHG emissions

and shifts towards environmentally responsible behaviour can provide tremendous significant benefits in successful implementation of climate change mitigation and sustainable development policies at no costs or in the cheapest way.

GHG mitigation policies require some understanding of not just economics, but also behavioral and psychological factors. Behavioral experiments show that the monetary initiatives are not enough to implement climate change mitigation policies. Scientists proved [5–9] that giving people a shared responsibility and appealing directly to a sense of the common good is a much more effective way of gaining acceptance for climate change mitigation and other environmental policies. There are several recent behavioral change studies conducted in field of energy consumption [10–13], which provide assessments of GHG emission reduction due to sustainable energy consumption.

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Fossil fuel burning is the main source of GHG emissions [14]. The major source of GHG in Lithuania is the energy sector, which is responsible for 61% of all GHG emissions in Gg of CO₂ equivalent (GgCO₂eq), not taking into account removals/emissions from LULUCF sector.

Households consume 1/3 of the total energy in Lithuania. Household greenhouse gas emissions are directly related to the amount of energy consumed in households. However, different fuel sources have different carbon intensities. For example, electricity used from coal-fired power stations is far more greenhouse-polluting than the usage of gas delivering the same amount of useful energy. Within each area of household energy use, there will be different strategies for the reduction of GHG emissions through changes in behavior and purchasing, and energy conservation applied to existing appliances [15].

Energy efficiency improvement is the cheapest way to reduce GHG emissions as it also allows to save energy and to reduce energy costs. In addition, energy efficiency improvements have positive impact on security of supply and reduction of energy dependency of the country [16].

In addition, when implementing policy packages targeting household behavioral change, it is essential to keep in mind that households may adjust only after a significant time-lag. Taking into account this delayed responsiveness to price incentives is particularly important when addressing certain environmental concerns, where consumption is affected by choices related to investment in capital goods (such as appliances or vehicles) and choices of environmentally responsible behaviors [17].

The aim of the paper is to assess GHG emission reduction potential in households in terms of behavioral changes towards sustainable consumption. The main tasks to achieve this target are

- To develop a technique for assessment of GHG emission reduction potential in households through interventions targeting behavioral changes.
- To apply a developed framework for assessment of reasonably achievable GHG emission reduction potential in residential sector during preparation of local sustainable energy development strategy and community based social marketing.
- To create two focus groups representing households living in individual houses and multi-flat buildings, select intervention measures targeting behavioral changes and to perform records of energy use based on two scenarios – baseline and GHG emission reduction scenario with implemented intervention.
- To assess and compare energy saving and avoided GHG emissions of the two focus groups.
- To formulate recommendations to promote household behavioral changes towards sustainable consumption.

The paper consists of six sections including introduction: one describing community based social marketing approach, the second, on the main targets of local sustainable energy development strategy, the third, dealing with main assumptions of experiment and its results, the fourth devoted to the analysis of results achieved, and finally the conclusions and recommendations.

2. Community based social marketing for promoting behavioral changes

The most prevalent models of energy behavior change have relied on motivations based upon either economic self-interest or establishing positive attitudes toward taking action. Yet these models alone have proved insufficient in affecting energy efficiency behavior change. The same can be said about programs based on traditional advertising methods, which can be effective

in raising awareness, but not in promoting more sustainable behaviors. However, these barriers can be readily overcome when we place the desired actions or behavior changes in a context that reinforces group solidarity. By making the connection between individual self-interest and the greater social context, we are able to overcome barriers to participation (such as cost and complexity) that have proven insurmountable when actions were defined as “on–off” programs. This ability to connect individual actions and the development of new social norms is the domain of Community Based Social Marketing [18,19].

Community-based social marketing (CBSM) is a social-science-based alternative approach to behavior change. It focuses on the identification of barriers to participation and fosters the development of locally-defined strategies to overcome those barriers. CBSM is most successful in practice when existing networks of community influencers and leaders are engaged to help incorporate the concerns and interests of the community the program is designed to serve. These leaders, then, are empowered (and in many cases hired) to be the local champions of the program messages and prescribed actions [17].

Community based social marketing (CBSM) is a framework that is increasingly being used by organizations and governments to change behavior and to develop GHG emission reduction programmes in local communities [20]. The CBSM framework is a sequential process that identifies behaviors to change, and then requires research to uncover the barriers and benefits related to the new behaviors and the existing behaviors. It is only then that tools of change are matched to overcome the barriers, and amplify the benefits of the more sustainable behaviour being promoted. In this, it is important to note that barriers lie with specific activities that make up behaviors. It is also worth mentioning that barriers are not homogenous to groups, so it requires a proper segmentation of the population into target groups of like-individuals (for example, by socio-demographic, or gender). Once tools are identified, a strategy is matched to the tools. CBSM places great emphasis on the extensive research work associated to uncovering barriers to behaviour change, as well as on the sequential process that places the design of the strategy (for example advertisements, home audits, workshops) as the final piece of the puzzle before piloting the strategy [21].

This approach is easy to implement then developing local sustainable energy development strategies or local energy action plans.

3. Local sustainable energy development strategy

Policy implementation at the local level allows for greater flexibility to meet local needs. Local governments' knowledge of their constituents' needs can help frame the local discussion surrounding clean energy in a way that demonstrates the potential benefits it can have to address local issues. Citizens are also more likely to interact directly with their local government, providing greater opportunities for addressing local issues [22]. Decentralized climate change mitigation policy allows for greater experimentation as each government designs the policy to best fit the locality's unique context [23]. Policy implementation at the local level can provide insight into the effectiveness of innovative policies and unique policy design components that can be adopted by other governments, at the local or state, levels [24]. Framing the energy saving and GHG emission reduction issue as a local issue increases citizen involvement in the clean energy discussion because they have the possibility to be more directly involved in the local decision-making process [25].

The first step in developing a local sustainable energy development plan should be the selection of the main themes relevant to climate change mitigation at local level [26]. The targets for Kaunas Region County were selected taking into account the targets based

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