A regional method for increased resource-efficiency in industrial energy systems

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Introduction

The impact of global climate change as a result of greenhouse gas emissions (GHG), primarily from the use of fossil fuels, is demanding actions from all sectors of society. The industry sector is one of the world's largest energy using sectors and GHG emitters. Improved energy efficiency in industry is one of the foremost means of improving energy efficiency and reducing GHG emissions. Research shows that despite large untapped potentials for improved energy efficiency in industry, cost-efficient energy efficiency measures are not always implemented, explained by the existence of barriers to energy efficiency, e.g. information imperfections and asymmetries (). Moreover, research shows that a major energy efficiency potential lies in the energy system and the way it is governed). For regional governments, the industrial energy use is difficult to affect as they only have indirect power to influence the decisions in those organizations. This underlies the importance of developing methods on how a region can support and effectively contribute to energy efficiency improvements in the local industry. So far, methods are limited related to regional governance of industrial energy systems.

Objective

The paper presents a method on how administrative boards are targeting industry today exemplified with a case from a Swedish region – the Gävleborg county. The reason for choosing the county was due to its high degree of energy-intensive companies. Finally, means to improve the method is proposed together discussion on its applicability, major with а advantages as well as its limitations.

Method applied today in the Gävleborg county

To obtain information about local conditions meetings and discussions with local representatives are required. A PM on the prerequisites for the industrial sector in the specific county was written by board officers, exemplifying the perspective of the county administrative board. The PM, that included ideas proposed on how to reach increased resource-efficiency was sent out with an invitation to participate in the development of the action plan to the larger energy-intensive industrial companies in the region, representatives from the regional energy agency and the local authority energy- and climate adviser, representatives from energy service companies, and one researcher.

Five meetings were then held during a five month period, ending up with a number of suggested measures for the industrial sector. Two major areas of importance were found: (1) industrial excess heat utilization, and (2) energy audits.

proposed:

ii) Work to ensure that electricity produced from industrial excess heat can be covered by the electricity certificate system

iii) Work for an investigation into the utilization of waste heat becomes mandatory in environmental impact assesment for heat and electricity production

iv) Investigate the feasibility of producing electricity from, or otherwise exploit, industrial excess heat where no district heating networks are present, or are not sufficiently developed

Five meetings were held and after the meeting the following actions were

i) Promote the continued expansion and densification of district heating networks

General recommendations

In the following section, proposed improvements of the method applied today in Swedish counties are presented. The improved method is in brief suggested to be the following:

i) Determine the primary energy factors and emission levels for the various energy carriers

ii) Conduct an overview of major energy end-using industrial sectors in the county

iii) Conduct a mapping of the major national energy end-use policies and its effect in the county

iv) Conduct a study on industrial energy efficiency potential in the county

v) Based on 1-3, conduct a review of the scientific literature of the major technologies of interest to improve energy efficiency in the largest energy end-using sectors

vi) Based on 1-4, create an action plan with strategic measures related to the county and the national environmental goals

Concluding discussion

Based on the already applied method in the studied county, the authors propose a novel approach on how to combine industry, the public sector, and the research society. The current model including respondents from industry, the regional energy agency, the local authority energy- and climate adviser, representatives from energy service companies, one researcher, and officers from the county administrative board means that it already includes a Triple Helix inspiration. However, the proposed model would include a more active and direct input from the research community. In particularly, this is related to the decision of primary energy factors, the potential study, and the technology review. The suggested model moreover, provides a more structured method on how to work with increased resource-efficiency in industrial energy systems. In conclusions, methods to improve energy efficiency in industry from the county perspective are scarce, and the proposed method in this paper, inspired by the Triple Helix Model, is one means towards filling this gap. Further research is suggested in applying the proposed method.

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