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System-Wide Impact of Energy Efficiency in the Industry Sector: A Comparative Study between Canada and Denmark

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Abstract : In light of the international efforts to comply with the Paris agreement and emission targets for future energy systems, Denmark and Canada are among the front-runner countries dealing with climate change. The experiences in the energy sector have seen both countries coping with trade-offs between investments in renewable energy technologies and energy efficiency, thus tackling the climate issue from the supply and demand side respectively. On the demand side, the industrial sector is going through a remarkable transformation, with implementation of energy efficiency measures, change of input fuel for end-use processes and forecasted electrification as main features under the spotlight. By looking at Canada and Denmark's experiences as pathfinders on the demand and supply approach to climate change, it is possible to obtain valuable experience that may be applied to other countries aiming at the same goal. This paper presents a comparative study on industrial energy efficiency between Canada and Denmark. The study focuses on technologies and system options, policy design and implementation and modelling methodologies when implementing industrial energy savings in optimization models in comparison to simulation models. The study identifies gaps and junctures in the approach towards climate change actions and, learning from each other, lessen the differences to further foster the adoption of energy efficiency measurements in the industrial sector, aiming at reducing energy consumption and, consequently, CO_2 emissions.

Keywords : industrial energy efficiency, comparative study, CO_2 reduction, energy system modelling
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