4i TRACTION
innovation · investment
infrastructure · integration

National case study report #2

Voluntary Energy Efficiency Agreements in Finland

Katri Varis, University of Eastern Finland

31 March 2023

Abstract

Designing transformative climate policies needs to consider existing policy implementation practices to assess how they should be elaborated or adjusted to achieve the long-term goal of climate neutrality. This case study is part of the ex-post evaluations conducted in the 4iTRACTION project to learn from existing policy instruments and national practices what effective climate and energy policies should consider in the future and what kind of policy instruments could work. The Finnish voluntary energy efficiency agreements have delivered the targeted energy savings and was in place already before any legally binding energy efficiency obligation was set by the EU. Therefore, it provides a good example on how national existing instruments can be used and adjusted to implement EU climate policies.

Content

List of abbreviations

EEA	Energy Efficiency Agreement
EED	Energy Efficiency Directive
EGD	European Green Deal
ESD	Energy Services Directive
EU	European Union
EU ETS	EU Emissions Trading System
NECP	National Energy and Climate Plan
NEEAP	National Energy Efficiency Action Plan
SME	Small and medium-size enterprise

Executive summary

Energy efficiency has become a significant part of EU climate and energy policies and its efforts to limit the temperature increase to 1.5°C. Increasing the share of renewable energy and phasing out coal and fossil fuels simultaneously with energy efficiency improvements are crucial to support the transition towards a sustainable energy system. In addition, energy efficiency plays a crucial role in all sectors of the energy chain from energy production to transport and consumption, and European energy efficiency policy thus has an impact on several sectors. The Energy Efficiency Directive enshrines the key energy efficiency obligations for member states.

Art. 7 EED requires member states to achieve yearly energy savings through an energy efficiency obligation scheme, but member states may opt for alternative measures. In Finland, the main policy instrument to implement the obligations set in the EED is voluntary energy efficiency agreements. This case study seeks to identify and understand the factors that have made the Finnish system of voluntary EEAs successful and effective in delivering energy savings. The EEAs are used across sectors (energy, industry, services, municipalities) and have proved significant in delivering the required energy savings.

Voluntary EEAs are a flexible system of separate energy efficiency agreements and action plans for each sector. The obligations and commitments of participants are listed in the agreement and each participant chooses how and when they implement the measures. Extensive support for identifying possible measures is offered, as well as some financial support to adopt new energy efficient technology. One of the key features of the EEAs is its flexibility in integrating new requirements, actors, and sectors to it. It has proved very cost-effective in delivering the targeted energy savings.

Many of the features of the EEAs are aligned with the needs of transformative climate policies. One of the key challenges of transformative climate policy is the need to involve actors across all sectors and different phases of the process, and this case study demonstrates how the EEAs include various actors from different levels and sectors. Another key feature of the EEAs is a wide and network and practice of exchanging information between participants, thereby encouraging others to implement further energy efficiency measures.

1. Introduction

Moderation of energy demand is one of the main pillars of the Energy Union[1], and improving energy efficiency throughout the energy chain benefits the environment, reduces greenhouse gas emissions, and improves energy security by reducing the dependence on energy imports.[2] This is in line with the EU commitment to the global climate agenda to keep the increase of the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.[3]

Energy efficiency has become an increasingly important area of EU climate and energy policy.[4] Increasing the share of renewable energy and phasing out coal and fossil fuels simultaneously with energy efficiency improvements are crucial to support the transition towards a sustainable energy system.[5] Energy efficiency plays a crucial role in all sectors of the energy chain from energy production to transport and consumption[6], and European energy efficiency policy thus has an impact on several sectors.

Several legal and policy instruments have been adopted under art. 194 TFEU with the aim of promoting energy efficiency.[7] The Energy Performance of Buildings Directive was adopted in 2010 and amended in 2018 aim to modernise the building stock as 40% of EU energy consumption is used in buildings.[8] In addition to the Energy Performance of Buildings Directive, the Energy Efficiency Directive (EED) enshrines the key energy efficiency obligations for member states.[9]

---

[1] The Energy Union Strategy, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank, "A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy", COM(2015)80 final, 25.2.2015.

[2] Directive 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, OJ L 328, 21.12.2018, p. 210-230, recital 1.

[3] Council Decision (EU) 2016/1841 of 5 October 2016 on the conclusion, on behalf of the European Union, of the Paris Agreement adopted under the United Nations Framework Convention on Climate Change, OJ L 282, 19.10.2016, p. 1–3.

[4] Rosenow, Jan and Kern, Florian, EU energy innovation policy: the curious case of energy efficiency, in Leal-Arcas, Rafael and Wouters, Jan (Eds.), *Research Handbook on EU Energy Law and Policy*, Edward Elgar Publishing, Cheltenham, 2017, p. 501.

[5] Schomerus, Thomas, Energy Efficiency and Energy Savings- The "First Fuel", in Peeters, Marjan and Eliantonio, Mariolina (Eds.), *Research Handbook on EU Environmental Law*, Edward Elgar Publishing, Northampton, 2020, p. 461.

[6] Ibid. In the production sector, combined heat and power units can help save energy by generating a higher share of heat in peak demand times. In the energy-transport sector, high voltage direct current power lines can lower the occurrence of energy losses. Smart grids in the distribution network provide a better interconnection between energy supply and demand, which leads to a reduction in the frequency of demand peaks. Product design in the consumption sector can promote energy saving. For heating, electric and thermal heat pumps can reduce heating based on fossil fuels in the building sector.

[7] Consolidated version of the Treaty on the Functioning of the European Union, OJ C 326, 26.10.2012, p. 47–390.

[8] Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (recast), OJ L 153, 18.6.2010, p. 13-35. Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency, OJ L 156, 19.6.2018, p. 75-91.

[9] Directive 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, OJ L 328, 21.12.2018, p. 210-230.

The EU's energy efficiency target for 2020 enshrined in art. 3 EED corresponds to a 20% reduction in the EU's primary and final energy consumption compared to the energy consumption projected in the 2007 PRIMES scenario for 2020.[10] This refers to a primary energy consumption of 1312 Mtoe and for final energy consumption 959 Mtoe. In 2020, these targets were overachieved, albeit with COVID-19 having its effect.[11] In 2018, the EU updated the energy efficiency target for 2030 of at least 32,5%, translating into 956 Mtoe of final energy consumption and 1273 Mtoe on primary energy consumption by 2030. Under the Governance Regulation, Member States are required to establish a 10-year integrated national energy and climate plan outlining how they intend to contribute to the 2030 target.[12]

Art. 3 of the EED requires member states to set an indicative national energy efficiency target based on either primary or final energy consumption, primary or final energy savings or energy intensity. The national energy efficiency target set according to art. 3 EED for 2020 in Finland was for final energy consumption 310 TWh and primary energy consumption 417 TWh.[13] To support the achievement of the EED goals, art. 7 EED requires member states to achieve the targeted energy savings through an energy efficiency obligation scheme. It would oblige energy distributors and/or retail energy sales companies to achieve a cumulative end-use energy savings target. However, the article also allows member states to opt to take alternative measures to achieve energy savings, and many member states have used these alternative measures. Voluntary agreements are recognised in art. 7 EED as one possible alternative.

In Finland, the main policy instrument to implement the EED goals is voluntary energy efficiency agreements (EEAs). Voluntary agreements play an important role in Finland in reaching the national energy efficiency target and have led to important energy savings over the years.[14] This case study was chosen to better understand how the voluntary system has been designed, why it has worked so well and what models and lessons it can offer to other EU Member States. The Finnish case study is particularly interesting against the background that voluntary energy

[10] For details of the PRIMES model, see https://e3modelling.com/modelling-tools/primes/, (last accessed 14.3.2023).
[11] In 2020, the primary energy consumption amounted to 1236 Mtoe and final energy consumption to 907Mtoe. These values were significantly influenced by the lockdown measures imposed by national authorities, which led to lower activity and reduced the energy demand. Consequently, some rebound effects are expected. However, a decreasing trend was visible already in 2019 values. Report from the Commission to the European Parliament and the Council, 2022 report on the achievement of the 2020 energy efficiency targets, COM(2022)641 final, 15.11.2022.
[12] Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council, OJ L 328, 21.12.2018, p. 1-77.
[13] National Energy Efficiency Action Plan NEEAP-4, 28.4.2017. Available at https://energy.ec.europa.eu/system/files/2017-05/fi_building_renov_2017_annex_4_of_neeap_fi_0.pdf, (last accessed 14.3.2023).
[14] As this case study examines the implementation of the EED in Finland, the definitions of energy savings and energy efficiency follow the ones expressed in the EED; 'energy efficiency' refers to the ratio of output of performance, service, goods or energy, to input of energy, whereas 'energy savings' means an amount of saved energy by measuring consumption before and after implementation of an energy efficiency measure.

efficiency agreements have not always worked very well, and it is useful to study the detailed design of the Finnish system to understand whether they can explain the system's success.

Previous research has shown that the voluntary approach in implementing environmental policy can be effective when used in concurrence with traditional policy instruments.[15] The complementing role of voluntary approaches has been recognised, but as the primary solution to a specific policy problem their suitability has been questioned.[16] Nevertheless, public-private partnerships offer a market-oriented approach instead of traditional command-and-control type of environmental management approaches.[17] In Finland, voluntary energy efficiency agreements are negotiated between the government and industrial sector associations/trade associations and include an energy efficiency target for the sector.

The voluntary start of this win-win policy instrument is the prominent feature, enabling and encouraging the companies to go beyond the mandatory requirements of energy efficiency set by laws and regulations.[18] Voluntary agreements are currently in place in nine EU member states, but their scope and characteristics vary significantly.[19] Literature on the use of voluntary energy efficiency agreements in the EU is scarce, but suggests that for the voluntary agreements to be successful, they should include an energy savings target that is ambitious enough, and impose commitments to individual participants instead of the targeted sector as a whole.[20] In addition, incentives for participation and adequate monitoring and verification processes have been regarded essential, although flexibility has also been considered a success-factor. A culture of mutual trust between the government and the industry with representation of the sector seem important, as well as the technical assistance for the participants.[21] This case study examines the Finnish voluntary agreements system from these premises.

In section 2, the policy context of this case study is explained. This case study focuses on one particular policy instrument in the field of energy efficiency but acknowledges the variety of energy efficiency policies employed in the EU and member states. The transformative potential of voluntary energy efficiency agreements is described and methodology for the analysis on the policy instrument is explained. The description and analysis of the chosen policy instrument are

[15] Arimura, Toshi H, Hibiki, Akira and Katayama, Hajime, "Is a voluntary approach an effective environmental policy instrument? A case for environmental management systems", 55 *Journal of Environmental Economics and Management* (2008), p. 281-295.
[16] Sullivan, Roy, Voluntary approaches: an assessment and overview, Presentation at the Royal Institute of International Affairs Conference, Corporate Social Responsibility: From Words to Actions, Chatham House, London, 15-16 October 2001, available at https://pubs.iied.org/sites/default/files/pdfs/migrate/G00879.pdf, (last accessed 8.2.2023).
[17] Zhang, Mingshun, Cui, Ying, ter Avest, Erik and van Dijk, Meine Pieter, Adoption of voluntary approach: Can voluntary approach generate collective impacts for China achieving ambitious energy efficiency targets?, 29(2) *Energy & Environment* (2018), p. 282.
[18] Ibid.
[19] Rezessy, Silvia and Bertoldi, Paolo, "Voluntary agreements in the field of energy efficiency and emission reduction: Review and analysis of experiences in the European Union", 39 *Energy Policy* (2011), p. 7121-7129.
[20] Cornelis, Erwin, "History and prospect of voluntary agreements on industrial energy efficiency in Europe" 132 *Energy Policy* (2019), p. 572.
[21] Ibid.

explained in section 3, as is the transformative character. In section 4, implications for transformative climate policies are presented.

2. Case study design

2.1 Background

The Commission first truly put energy efficiency on its agenda when preparing the proposal for the Energy Service Directive (ESD).[22] This was the first time the EU set any binding energy efficiency obligations to the member states.[23] The ESD applied to the distribution and retail sale of energy, the delivery of measures to improve end-use energy efficiency (excluding activities falling under the EU ETS), and to a certain extent the armed forces. It targeted the retail sale, supply and distribution of extensive grid-based energy carriers, such as electricity and natural gas but also other types of energy such as district heating, heating oil, coal and lignite, forestry and agricultural energy products and transport fuels.[24]

In 2007, the European Union adopted the first energy and climate policy package to ensure the EU meets its climate and energy targets for the year 2020. The key targets were set: 20% cut in greenhouse gas emissions from 1990 levels, 20% of the EU energy from renewables and 20% improvement in energy efficiency.[25] The Energy Efficiency Directive established a set of binding measures to help reach the 20% energy efficiency target by 2020.[26] The amended EED, as part of the Clean Energy for All Europeans-package, came into force in 2018 and introduced a new energy savings target of 32.5% as part of the 2030 package, and new obligations to promote energy efficiency.[27]

As part of the EU's intermediate target of reducing net greenhouse gas emissions by at least 55% by 2030 compared to the 1990 levels and the European Green Deal (EGD) objective of climate

[22] Proposal for a Directive of the European Parliament and of the Council on energy end-use efficiency and energy services, COM(2003)739 final, 10.12.2003. Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC, OJ L 114, 27.4.2006, p. 64-85.
[23] Article 4 of the Energy Services Directive set an overall national indicative energy savings target of 9% for the ninth year of application of the Directive. In addition, it required Member States to submit Energy Efficiency Action Plans describing the energy efficiency improvement measures planned to reach the target.
[24] Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC, OJ L 114, 27.4.2006, p. 64-85.
[25] Council of the European Union, Brussels European Council 8/9 March 2007, Presidency Conclusions, 2, May 2007, 7224/1/07.
[26] Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC, OJ L 315, 14.11.2012, p. 1-56.
[27] Directive 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency, OJ L 328, 21.12.2018, p. 210-230. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank, Clean Energy for All Europeans, COM(2016)860 final, 30.11.2016.

neutrality in the EU by 2050, the Commission adopted in 2021 its proposal for a recast of the Energy Efficiency Directive.[28] The directive puts forward a binding EU energy efficiency target of 9% in 2030 compared to the 2020 Reference Scenario, corresponding 787 Mtoe in final energy consumption and 1 023 Mtoe in primary energy consumption. The recast EED also establishes the legally binding energy efficiency first principle.[29] In 2022, Russia's war against Ukraine disrupted the global energy market and placed additional pressure for security of supply. In the REPowerEU Plan, Commission's plan to make Europe independent of Russian fossil fuels well before 2030, proposed a further increase to the energy efficiency target, the new target being 13% compared to the 2020 Reference Scenario.[30]

As energy efficiency targets are mainly set in directives, member states are left margin of discretion in the implementation. While art. 7 EED requires member states to achieve yearly energy savings through an energy efficiency obligation scheme, but member states may opt for alternative measures. All in all, proper implementation of EU's energy efficiency efforts is needed.[31] However, there have been some issues with the member states' implementation of EED energy efficiency targets. The national energy efficiency targets for 2020 notified to the Commission differed e.g. in target items and reference points.[32] Clear definitions and common rules for the measuring of energy efficiency seem to have been challenging during the years.[33] Nevertheless, the amended EED of 2018 still refers to "the freedom of member states to set their national contributions based either on primary or final energy consumption or primary or final energy savings, or on energy intensity".[34]

In its 2020 assessment report on member states' progress towards the national energy efficiency targets for 2020, the Commission found that some member states achieved far lower energy savings that what would be needed to reach their cumulative savings requirements, and risk not

[28] Proposal for a Directive of the European Parliament and of the Council on energy efficiency (recast), COM(2021)558 final, 14.7.2021.
[29] Art. 3 of the recast EED. The introduction of a legally binding energy efficiency first principle is supported in the Commission Recommendation (EU)2021/1749 of 28 September 2021 on Energy Efficiency First: from principles to practice – Guidelines and examples for its implementation in decision-making in the energy sector and beyond. For an analysis of the Fit for 55-package in EU energy law, see e.g. Huhta, Kaisa,"The "Fit for 55"-package in the Context of the EU Energy Law and Policy", 20 *Oil, Gas & Energy Law Intelligence* (2022), p. 1-14.
[30] Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the regions, REPowerEU Plan, COM(2022)230 final, 18.5.2022.
[31] Schomerus, Thomas, Energy Efficiency and Energy Savings- The "First Fuel", in Peeters, Marjan and Eliantonio, Mariolina (Eds.), *Research Handbook on EU Environmental Law*, Edward Elgar Publishing, Northampton, 2020, p. 472.
[32] Member states notified their targets in primary and/or final energy consumption/savings or energy intensity and reference points varied according to historical base year or baseline scenario, Knoop, Katharina and Lechtenböhmer, Stefan, The potential for energy efficiency in the EU Member States – A comparison of studies, 68 *Renewable and Sustainable Energy Reviews*, 2017, p. 1098.
[33] Scholmann, Barbara, Rohde, Clemens and Plötz, Patrick, "Dimensions of energy efficiency in a political context", 8 *Energy Efficiency* (2015), p. 98.
[34] Recital 6 of the EED.

to meet their national energy savings obligation by 2020.[35] However, some member states, Finland included, were considered very likely to achieve more energy savings than required.

In Finland, the energy saving obligation under art. 7 EED for 2014-2020 was 49 TWh. The main energy efficiency measures for the energy savings are listed in Finland's Integrated Energy and Climate Plan.[36] The majority of energy savings is expected through the use of voluntary energy efficiency agreements. Based on a literature review of relevant policy documents, the aim of this case study is to demonstrate how Finland has implemented its national energy efficiency target, including art. 7 of the EED, and why has the main policy instrument, voluntary energy efficiency agreements, proven successful. This case study is part of an ex-post assessment of EU energy and climate policies in 2005-2020. The seven case studies each focus on the national implementation of an EU policy.

2.2 Research questions

As explained above, in Finland, the main national policy instrument for enhancing energy efficiency and implementing the national energy efficiency target is voluntarily energy efficiency agreements.

This case study seeks **to identify and understand the factors** that have made the Finnish system of voluntary EEAs successful and effective in delivering the energy savings. In Finland, EEAs have been used across sectors (energy, industry, services, municipalities) since the 1990's and have delivered significant energy savings. Thus, the main research question guiding this case study is **what are the factors that explain the success of the EEAs as a policy instrument** to implement EU energy efficiency policy in Finland – whether this can be explained by their design features, national circumstances or a combination of these. After having identified the relevant factors, the case study aims **to assess if such a system could be recommended for other EU member states**. Limitations for a wider use of a voluntary EEA system may also exist and should be identified.

[35] Report from the Commission to the European Parliament and the Council, 2019 assessment of the progress made by Member States towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive as required by Article 24(3) of the Energy Efficiency Directive 2012/27/EU, COM(2020)326 final, 20.7.2020.
[36] Finland's Integrated Energy and Climate Plan, Publications of the Ministry of Economic Affairs and Employment, Energy, 2019:66, available at https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/161977/TEM_2019_66.pdf?sequence=1&isAllowed=y, (accessed 10.2.2023).

2.3 Relevance for transformative climate policy

As part of the ex-post assessment of EU climate and energy policies, the selected national case studies under Task 2.3 aim to shed light into national implementation of certain policies and showcase the variety of adopted policy instruments. The Finnish case study on voluntary energy efficiency agreements was chosen for three specific reasons. First, EEAs are the main policy instrument in Finland to implement the energy efficiency targets and obligations set in EU energy efficiency policies. Second, despite its voluntary nature, the EEA system has proven successful and has enabled Finland to exceed its energy efficiency objectives. Finally, EEAs were created well before the EU introduced energy efficiency obligations and thus provide an example on how existing practices and policies in member states could be utilised when designing and implementing new policies.

Transformative climate policies require the involvement of a large number of actors in all sectors.[37] Achieving the long-run objective of climate neutrality calls for coordinated measures in different sectors to account for interdependencies. Integration across sectors means also that efforts are aligned across different government departments and units. The EEAs have engaged a broad range of actors from municipalities to private companies and have resulted significant energy efficiency measures and energy savings. The system involves different ministries and authorities, who negotiate with trade associations on the targets and measures for different sectors.

From governance perspective, active support and participation of stakeholders should be facilitated. Voluntary EEAs engage actors by allowing them to commit to energy efficiency targets and measures in a way and pace they feel comfortable. The responsible authorities provide extensive support for identifying and implementing the measures. In addition, as will be discussed later, one factor enabling the success of the system seems to be the creation of a well-functioning network of actors, where participants can exchange information and experiences in energy efficiency measures. Together with the continuous improvement and development of the system, this provides the participants predictability and by avoiding coercive measures the system has attracted a growing number of participants. At the same time, this policy instrument is flexible and new features and targets have been added relatively easily, in negotiation with the participants.

[37] About the aspects of transformative climate policies and definitions of the 4 I's in 4iTRACTION-project, see Görlach, Benjamin, Anuschka Hilke, Bettina Kampmann, Kati Kulovesi, Brendan Moore and Tomas Wyns, Transformative climate policies: a conceptual framing of the 4i's, 2022. 4i-TRACTION Deliverable D 1.1. Ecologic Institute; Berlin, available at https://www.4i-traction.eu/sites/default/files/2022-02/4iTraction_2022_Report_Concept%20transformative%20climate%20policies.pdf, (last accessed 14.3.2023).

2.3.1 The 4i's as key challenges for transformative climate policy

The 4i-TRACTION project is organised around four cross-cutting challenges, which need to be addressed for the transformation to climate neutrality: stimulating **innovation** to transform the material base of the EU economy, rolling out the **infrastructure** for a resilient, climate-neutral economy, shifting **investment and finance** and achieving **integration** of policies and technologies across sectors.

Voluntary EEAs in Finland have proven to be a cost-effective instrument to achieve the energy efficiency requirements set by EU policies. The flexibility of the system has enabled its wide use also in different sectors. Individual participants have also committed to energy efficiency measures across their operations. EEAs are also used to implement obligations set in other policies beyond the EED. Efficient use of energy boosted by the EEA is integrated as part of management systems of a company and thus guides the operations to become more energy-efficient on a continuous basis. Consequently, energy efficiency actions are not limited to the measures listed directly in the EEAs but the commitment to energy efficiency potentially triggers also further climate actions. Therefore, this case study has a strong link to **integration**.

Voluntary EEAs also incentivise **investments** on energy efficient technology. Energy aid is usually granted for the development of new technology but EEA participants may be eligible for the aid also for conventional technologies promoting energy efficiency. Energy audits for SMEs and municipalities committed to EEAs are also subsidised. These audits aim at identifying possible energy efficiency measures for companies and push the companies towards engaging in more energy efficient actions, including developing and adopting technological **innovation** in energy efficiency. Thus, technological advancements and innovation are in the heart of energy efficiency.

The current energy crisis in Europe puts pressure for further energy savings to secure energy supply. The EEAs cover most of the energy production and energy services companies in Finland, with the aim of covering 85% of energy production and 80% of electricity distribution to end-users by 2025. Energy **infrastructure** is highly committed to energy savings to secure self-sufficiency and security of supply.

2.4 Methodology used in case study

2.4.1 Data collection

This case study examines how EU-level energy efficiency requirements are implemented in one particular member state and why the chosen voluntary policy instrument has proven so successful. Data is collected from a range of data sources (academic literature, legal and official documents,

expert interviews) to complement initial results. This kind of approach is typical for a case study in empirical legal research.[38]

The case study also includes a review of relevant academic literature and other materials. This review shows that voluntary energy efficiency agreements are not widely used, and their design and scope vary, as a result of which academic literature on voluntary energy agreements as such and especially in Finland is rather scarce. Therefore, the literature review serves in this case study more as mapping out the existing knowledge and basis for further inquiries.[39] This case study relies on the expert interviews to determine the exact scope of the research questions.

Expert interviews are used as an important source of data collection. For this case study, key informants were selected to gain deeper knowledge on the functioning of the system.[40] Interview invitations were directed to the representatives from the Ministry of Economic Affairs and Employment, the Finnish Energy Authority and Motiva, which is a state-own Sustainable Development Company. It provides the public sector, businesses, municipalities and consumers with information, solutions and services that allow them to make resource-efficient, effective, and sustainable choices. Motiva coordinates and administers the energy efficiency agreements and energy audits in Finland. It is involved, for example, in preparing the EEAs, enforcing the related action plans with parties, monitoring and impact assessment.[41] Overall, three semi-structured interviews took place in October 2022.[42]

2.4.2 Designing the interview instrument

Policy documents are used in establishing the facts, which are later validated in the interviews. The process of implementing EU energy efficiency policy at national level is explained. Based on this background, the interview instrument is created. We are specifically interested in the interviewees perceptions on the functioning of the EEAs system and thus considered semi-structured and open questions appropriate. The aim was to see to what extent the experts held the key characteristics behind the success same as the literature and policy document review had suggested.

[38] Webley, Lisa, "Stumbling Blocks in Empirical Legal Research. Case Study Research", *Law and Method* (2016), 10.5553/REM/.000020, p. 3.
[39] This alternatively approach is described e.g. in Yin, Robert K. *Case Study Research and Applications: Design and Methods*, Sage Publications Inc, 2018, London, pp. 3-4.
[40] Key informants are expected to be knowledgeable about the EEAs, Meyer, Christine Benedichte, A Case in Case Study Methodology, 13 *Field Methods,* 2001, p. 338.
[41] Government proposal to the Parliament for Energy Efficiency Act and other related Acts (HE 182/2014 vp), p. 4.
[42] Invitations were sent by email and interviewees approved their participation by email. A link to an online meeting was sent and the interview was transcribed via Teams-application. Interviewees received in advance a data protection document explaining the details of the use of the data, including data storage, in line with the GDPR and UEF internal data protection rules.

2.4.3 Data analysis

The data acquired through the legal and policy documents is chronologically presented to showcase the evolution of energy efficiency policy during the evaluation period. Special attention was given on establishing the links between EU level energy efficiency targets and national climate and energy objectives. The main policy instrument stayed the same, i.e. EEAs were used during the whole period as main tool to implement the energy efficiency targets. The ambition of set targets varied, but otherwise only smaller changes were introduced.

During the literature review, key characteristics were collected and grouped according to their nature. Some factors affecting the use of EEAs related to the structure of the EEA system, others were linked to benefits received by the participants. These benefits were written up according to themes (economic, operational, environmental) to form an overview of the multiple benefits. Based on the interviews, the emphasis and value of these benefits was slightly changed, but in general the experts validated the literature review findings.

While EEAs have been used in Finland for decades, the number of studies available on EEAs is limited. Main authorities responsible for informing companies on the benefits of joining to the EEAs have conducted some surveys, but no deeper analysis on the reasons and key factors behind the success of EEAs was found. Therefore, the discussion on previous findings remains relatively limited.[43]

2.4.4 Validity

In this case study, the approach is based on the review of relevant legal and policy documents. Understanding the evolution of energy efficiency policy was central to be able to explain the energy savings targets, policy choices and results achieved through the chosen instrument. Academic literature on voluntary energy efficiency agreements is scattered but based on the findings of the legal and policy document review certain themes and aspects of interest were identified. These features of the EEAs were then discussed in more detail during the interviews.

Interviews were semi-structured, and it was a deliberate choice to form the interview instrument around certain themes, which the experts then explained from their point of view. The aim was to validate the earlier findings derived from literature, but to enable our experts also bring up aspects, which were not identified based on the literature. The interviewees did emphasise some of the features of the EEAs that were only marginally mentioned in the policy documents. The semi-structured nature of the interview enabled the interviewer also to ask further questions and clarification especially on the interlinkages and causal relations of these features.

[43] Case study methods often include an aspect of generalisation, Yin, Robert K. *Case Study Research and Applications: Design and Methods*, Sage Publications Inc, 2018, London, pp. 37–38. However, the existing literature on voluntary energy efficiency agreements is not extensive and characteristics of EEA systems vary significantly across states. The literature review was used to limit the scope of interviews on themes that would deserve attention.

The aim was to explain how EU energy efficiency policy is implemented in Finland. The case studies conducted under Task 2.3 all consider different policies and therefore comparing the case studies in detail may prove problematic.

3. Results

3.1 Case findings

3.1.1 Relevant policies and policy instruments

To answer the research question on how art. 7 EED requirements have been implemented in Finland during the period 2005-2020, the evolution of energy efficiency legislation and policies at EU level as well as at national level should be examined. Description of the national implementation and especially the use of EEAs is presented to identify and understand the factors that have made the Finnish system of voluntary EEAs successful and effective in delivering the targeted energy savings.

EU energy efficiency policies have been implemented in Finland primarily with the Energy Efficiency Act implementing the EED and it entered into force on 1 January 2015.[44] The act amending the Energy Efficiency Act entered into force at the beginning of 2017.[45] This amendment included the provisions of EED regarding energy efficiency requirements for products, services and buildings procured by public bodies, and the role of the public sector in promoting energy efficient procurements was strengthened. Market-based approach to energy efficiency and energy surveys form the core of Finland's energy efficiency actions, and in addition to the Energy Efficiency Acts, other instruments, such as Energy Efficiency Agreements between the government and different actors, is used.[46]

The single most important policy instrument on the implementation of the energy and climate strategy in Finland is the **wide use of voluntary energy efficiency agreements**. Finland's Integrated Energy and Climate Plan is based on a comprehensive look at the energy and climate policy in different sectors from the perspectives of emissions reduction, energy policy, growth, and employment.[47] Energy efficiency agreements are negotiated in cooperation by the

[44] Energy Efficiency Act 1429/2014, 30.12.2014.
[45] Act amending the Energy Efficiency Act 1338/2016, 21.12.2016. The Energy Efficiency Act has been amended also later twice, Acts amending the Energy Efficiency Act 112/2019 and 787/2020, but these provided only minor changes and were mainly clarifications of existing terminology.
[46] Government proposal to the Parliament for Energy Efficiency Act and other related Acts (HE 182/2014 vp), p. 4.
[47] Finland's Integrated Energy and Climate Plan, Publications of the Ministry of Economic Affairs and Employment, Energy, 2019:66, available at

Government and industrial or municipal associations. There are separate energy efficiency agreements for industry, municipal sector, building sector and oil-industry. For each EEA, there are separate action plans for different industries. For example, under the EEA for Industries, there are 10 action plans that better define the obligations for participants in these industries.[48] If there is no branch-specific action plan available, the company may join the General Action Plan for Industry or Services.

3.1.2 Energy efficiency targets and results

The ESD required Member States to draft action energy efficiency plans every three years. Finland's National Energy Efficiency Action Plan (NEEAP) 2008-2010 submitted in June 2007 was based on the Energy Services Directive's requirement of an overall national indicative energy savings target of 9%. The calculation basis used for the target was the average official data of 2001-2005 for the end-use of energy falling within the scope of the directive. The first NEEAP of Finland was primarily a description of the starting position, and the results of already implemented actions could be counted in the 9% energy savings target.

The indicative 9% energy savings target in Finland equalled 17.8 TWh by 2016. An interim target in line with the total target was set for 2010 and was 5.9 TWh. It was estimated that these targets would require new energy efficiency actions for 5-6 TWh in 2016, of which new energy efficiency agreements would cover 2.8-4.7 TWh. However, there was some unclarity with calculating the savings effects of the actions, and if these would have been counted in, the amount of additional savings required would have been reduced. It was stated in the first NEEAP also that the long-term experience in Finland in monitoring energy conservation actions and evaluating their effects, and good insight into the energy conservation potential of the industry and the private and public sectors indicated that an additional savings amounting to 5-6 TWh through the new actions would be challenging.[49]

In Finland's National Energy and Climate Strategy from 2005, **a target of 5% energy consumption reduction was set for 2015**. This would have been achieved by efficiently implementing EU directives and other energy conservation actions but without any new actions.[50]

https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/161977/TEM_2019_66.pdf?sequence=1&isAllowed=y, p. 13, (last accessed 15.3.2023).

[48] Action plans have been created for energy intensive industry, food and drink industry, chemical industry, technology industry, wood product industry, energy production, energy services, motor trades and repairs, commerce sector and hotel and restaurant sector.

[49] Finland's National Energy Efficiency Action Plan (NEEAP 2008-2010), 26.6.2007. Available at https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/national-action-plans-and-annual-progress-reports_en#previous-energy-efficiency-action-plans. The NEEAP shows also the end-use of energy within the scope of the ESD by sector as well as the share of the indicative savings target of 9% of each sector. Main users of energy were households, transportation, industry and services, p. 14, (last accessed 15.3.2023).

[50] Short-term energy and climate policies. National Strategy for the Implementation of the Kyoto Protocol. The Council of State report submitted to the Parliament 24 November 2005, Ministry of Trade and industry, VNS 5/2005 vp.

The new Government Programme issued in 2007 included the Government's commitment to draw up a long-term climate and energy strategy taking into account the EU's 20% energy efficiency target by 2020. One of the key measures was the preparation of a new energy savings programme.[51]

The ESD required Member States to prepare the second Energy Efficiency Action Plan and notify it to the Commission by the end of June 2011. The second Finnish NEEAP was based on the long-term climate and energy strategy that set **an energy savings target of 37 TWh for energy end-use by 2020**.[52] With the calculation method in the ESD, **the energy saving for 2010 turned out 12.1 TWh, equivalent to 6.1%, i.e. app. double of the interim target** set in the first NEEAP. The estimated energy saving achieved through the actions in place raised to 13% by 2016 (24.7 TWh) and over 17% by 2020 (33.7 TWh).[53]

NEEAP-3, Finland's National Energy Efficiency Action Plan from 2014, now pursuant to the Art. 24(2) of the EED, focused more on describing the implementation of specific obligations laid down in the EED instead of describing the energy efficiency measures and energy savings as in previous reports under the ESD. The 9% energy savings target by 2016 laid down in the ESD was upheld but was reported under the new requirements set in the EED.[54] The energy savings projection for 2016, equal to 25.4 TWh, exceeded the ESD target by 43%. The energy savings estimation for 2020 was 37.6 TWh.

The revised climate and energy strategy of 2013 confirmed **the national target of final energy consumption to 310 TWh in 2020**.[55] Finland's notification of the implementation of art. 7 of the EED in 2013, as supplemented in 2014 with the latest data, stated that the average final energy consumption under art. 7 in 2010-2012 was 154.75 TWh. The annual new energy saving was 2.32 TWh. For 2008-2016, the energy efficiency agreement scheme aimed at the 9% energy saving target. For 2014-2020, a cumulative energy saving target of 49 TWh was set.[56] The cumulative energy saving in 2014-2015 was already almost 40 TWh and **the 2014-2020 target was exceeded by over 85%**. Therefore, Finland achieved its national energy saving obligation set by the EED two years in advance.[57] During the implementation period 2014-2020 of art. 7 EED, **EEAs covered more than half of the binding national energy savings target**. The

[51] Government Programme 2007, available at https://valtioneuvosto.fi/en/government/history/government-programmes-since-1917-new, (last accessed 15.3.2023).
[52] Long-term climate and energy strategy, The Council of State report submitted to Parliament on 6th November 2008, VNS 6/2008 vp.
[53] Finland's Second National Energy Efficiency Action Plan (NEEAP-2), 27.6.2011. Sector-specific targets and measures are listed in the plan.
[54] EED obligates Member States to submit EED annual reports based on indicators and changes in the same. Finland's National Energy Efficiency Action Plan (NEEAP-3), 29.4.2014.
[55] Energy and climate strategy 2013, based on the guidance of the ministerial working group on energy and climate policy and a Government report, VNS 2/2013 vp, submitted to the Parliament of Finland on 20 March 2013.
[56] Annual Report on the EED 2017, 28.4.2017. Referred to the new national energy and climate strategy of 2016.
[57] https://tem.fi/en/-/finland-clearly-exceeded-the-eu-s-2020-energy-efficiency-targets, (last accessed 15.3.2023).

EEAs also support the implementation of other EED articles as well as some of the Energy Performance of Buildings Directive.

The European Council set in 2014 an indicative target of at least 27% energy efficiency in 2030. In 2016, the Finnish Government anticipated a 30% target from the Commission in the National Energy and Climate Strategy for 2030 and estimated a primary energy use of 418TWh and end-use energy consumption of 314 TWh in 2030.[58] With the amended Energy Efficiency Directive, the EU set **a new energy efficiency headline target of 32.5% for 2030**. Finland's Integrated Energy and Climate Plan of 2019 set an energy savings target for **final energy consumption of 290 TWh, corresponding to 405 TWh of primary energy consumption for 2030**.[59] The binding target under art. 7 EED for the period of 2021-2030 is 105-130 TWh. In addition to this, there is a need for a safety margin of 10-15 TWh. The estimated energy savings for the period is 153 TWh. The biggest potential lies in the energy efficiency agreements.[60]

3.1.3 Results of the EEAs

The previous chapter introduced the national energy efficiency targets especially during the period 2005-2020 and results achieved in total. This chapter focuses on the results delivered through the use of EEAs.

The 2008-2016 energy efficiency agreements covered different sectors: business, municipalities, and oil sector. Business sector included industry, energy sector and private services sector. The oil sector agreement included the distribution of heating and transport fuel and oil heating. The energy efficiency agreement for property sector (buildings) was introduced for the period of 2010-2016. In total, the energy efficiency scheme covered in 2011 app. 70% of Finland's total energy use.

[58] https://tem.fi/documents/1410877/3570111/Government+Report+on+the+National+Energy+and+Climate+Strategy+for+2030/16a629e1-4ad6-4a58-96a6-347a7581177d/Government+Report+on+the+National+Energy+and+Climate+Strategy+for+2030.pdf?t=1485434481000, (last accessed 15.3.2023). However, the Government has acknowledged that measuring energy efficiency only by measuring primary energy may not give an appropriate image of energy efficiency. It has called for other indicators to be added, as the low-emission and mainly renewables-based energy system does not automatically lead to the decrease of total energy consumption.

[59] Finland's Integrated Energy and Climate Plan, Publications of the Ministry of Economic Affairs and Employment, 2019:66. Available at https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/161977/TEM_2019_66.pdf?sequence=1&isAllowed=y, (last accessed 15.3.2023). The plan recognises some factors influencing the level of energy consumption. First, weather conditions; heating demand may vary substantially, more than 5% in final energy consumption between cold and mild winters. The energy intensive industry influences also greatly; when industry is running flat out, its final energy consumption accounts for almost 50% of the energy demand in Finland. The competitiveness of Finnish energy intensive industry on the global market thus significantly affects the level of final energy consumption.

[60] MEE Publications 53/2019, https://julkaisut.valtioneuvosto.fi/bitstream/handle/10024/161811/TEM_53_2019_Energiatehokkuustyoryhman_raportti_WEB.pdf, p. 105 and more specifically in Table 8 on p. 106.

During the 2008-2016 reporting period, significant results were delivered through the EEAs. A total of 667 companies, 134 communities and joint municipalities joined the EEAs for 2008-2016. Over 21 000 energy efficiency measures were implemented. These measures **decreased Finland's annual energy consumption** (=annual cumulative energy savings**) by 15,9TWh by the end of 2016**. 75% of the saved energy (11,9TWh) was in heat and fuels and the remaining 4 TWh (25%) was in electricity. Annual savings equal heating energy consumption for all residential block of flats in Finland. During this period, the EEAs covered approx. 2/3 of total energy use in Finland. Energy savings were delivered mainly in the industrial sector (68%) and in the energy sector (25%), the remaining 7% in other sectors.[61]

During the period of 2017-2021, more than 650 companies and 121 municipalities and joint municipalities have joined voluntary EEAs and have **improved their annual energy use by a total of 10.3 TWh,** which equals to the annual energy use of 515 000 electrically heated single-family houses. The share of new energy saving was 81% in heat and fuels and 19% in electricity.

Nearly 19 000 individual energy efficiency measures were carried out and more than 1007 million euros invested in energy efficiency over the period. The **savings equal to 2,9% of Finland's total energy consumption in 2020**. The nearly 19 000 energy savings measures implemented reduced annual CO2 emissions by 2,3 million tonnes. These measures also reduced participants' annual energy costs in total by 431 million euros.

Average annual new saving in 2017-2021 was 2.6 TWh, in comparison to previous period when it was 1,8 TWh. This significant rise in annual savings arose from a couple of exceptional savings measures implemented in energy intensive industry. Energy savings were delivered mainly in energy intensive industry (57%) and energy sector (26%). The biggest investments in energy efficiency were also made in these sectors. The number of individual energy efficiency measures adopted was greatest in private services sector and building sector.[62]

3.1.4 Description of the EEAs

The largest energy efficiency agreement is the Energy Efficiency Agreements for Industries. The Energy Efficiency Agreement for Industries is a framework agreement between the responsible ministry, Ministry of Employment and Economic Affairs, and the Confederation of Finnish Industries EK and member associations. The Agreement is negotiated for each reporting period, currently for 2017-2025. The Agreement defines the obligations and measures of the joined companies. A company joins the energy efficiency agreement by signing the accession document and thus commits to the measures listed in the agreement and set an indicative target for quantitative energy savings (MWh) for the period 2017-2025 and an intermediate target for 2020.

[61] Information excerpted from https://energyefficiencyagreements2008-2016.fi/mita-saavutimme-vuosina-2008-2016, and https://www.motiva.fi/files/14645/ets2008-2016_eng_FINAL.pdf. Sector specific reports available at https://www.motiva.fi/ajankohtaista/julkaisut/energiatehokkuussopimukset_2008-2016 (accessed 14.2.2023).
[62] Information excerpted from https://energiatehokkuussopimukset2017-2025.fi/en/results/ (accessed 14.2.2023).

The target is calculated based on the energy use of the current volume representing the normal annual use valid at the time of accession. For 2025, the target equals 7,5% and the target for 2020 was 4% of the participant's current annual energy use.[63]

The obligations for parties are listed in the agreement. It includes continuous improvement in energy efficiency as part of the existing or planned management systems or operating plans. To meet their energy saving targets, the participant is committed to organising and planning the measures, clarifying the possibilities for improvement in energy efficiency, implementing cost-effective improvement measures of energy efficiency, taking energy efficiency into consideration in planning and purchasing, training the staff and communicating on energy efficiency matters, annual reporting, striving to implement new energy-efficient technology and increase the use of renewable energy sources, use the EEA monitoring system for annual reporting of the energy use and the related improvement measures and implementation of other relevant actions.

Each participant carries out their measures from their own premises and agree to do their best to achieve the targets. Company-specific measures and obligations are described in detail in each Action Plan. For municipal sector, the obligations are described in the Energy Efficiency Agreement for Municipalities.

3.1.2.1 Joining procedure

A company, municipality, city or a joint municipality can join the Energy Efficiency Agreement for the new period, when the relevant Ministries and industrial and/or municipal associations sign the framework agreement. It is desirable that a significant number of companies and municipalities join for the new agreement period at the same time.

A company should examine first the energy saving possibilities. Energy surveys aim to analyse how energy is used at the surveyed company, to find out the potential for energy savings and to map out cost-effective measures to improve the overall energy efficiency of the company. With the help of Motiva, an energy audit to find out most suitable and profitable measures for energy saving should be done. SMEs and municipalities are eligible for an aid for executing energy audits and energy surveys.

To join the EEA, a company familiarises itself with the EEA and the Action Plan of their own branch, with the Accession document (both the Company Accession Document and the Accession Data form). Municipalities, cities and joint municipalities check first the Accession Documents (EEA and its Accession Data form). Next, the participant collects the data required on the Accession Document and determines the indicative targets as requested on the Accession Data form. After the Company Accession Document is filled out and signed, they are delivered to the industrial

[63] The savings achieved by energy efficiency measures implemented and reported for 2014-2016 can be considered by setting a 2025 target for quantitative energy improvement, which equals to 10,5% and an intermediate target for 2020 equals to 7% of the participant's annual energy use. https://energiatehokkuussopimukset2017-2025.fi/en/join-the-agreement/. It should also be noted that the Action plans of Energy-intensive industry, energy production and energy services differ from these general principles.

association in question to the address given in the document. Municipalities, cities or joint municipalities deliver their EEAs enclosed with the Accession Data to the Energy Authority. The Company Accession Documents and accession data are checked and approved by the industrial association. For municipalities and cities, the check is done by the Energy Authority.

A company finally becomes a participant in the EEA after the approval of the Company Accession Document and Accession Data form and copies of each are delivered to Motiva for entry into the participant register. For Municipal sector, this validation is done by the Energy Authority.

3.1.5 EEA for Municipal Sector and its multiple benefits as an example

Energy efficiency agreement for Municipal Sector is a framework agreement between the Ministry of Economic Affairs and Employment, Energy Authority, and the Association of Finnish Municipalities. Individual cities, municipalities or joint municipalities join the Energy Efficiency Agreement for Municipal Sector by signing the individual accession form as described above.

Currently, there are 121 municipalities, cities, or joint municipalities in the EEA for Municipal Sector.[64] By the end of 2021, around 75% of Finnish residents lived in cities, municipalities or joint municipalities that have joined the EEA. During the reporting period of 2008-2016, 117 municipalities and 15 joint municipalities participated. In total, there were 4188 energy efficiency measures in 2008-2016, investments on energy efficiency for 159 million, energy savings of 0,45 TWh, costs saved 34 million and reduced CO2 emissions 0,14 million tons.[65] During 2017-2021, 2975 energy efficiency measures were implemented, 273 GWh saved annually and 57 million euros in investments.[66]

In addition to the national carbon neutrality target, municipalities have their own ambitious climate targets, and energy efficiency plays a crucial role in these. Over 45% of Finnish municipalities are systematically working on climate issues. Every municipality with more than 50 000 inhabitants, is working towards reducing emissions. Around 45% of Finnish people live in municipalities that aim to be carbon neutral by 2030. Most of these municipalities have adopted climate strategies and many of them have joined the energy efficiency agreement for municipalities.[67]

When assessing possible energy efficiency investments, municipalities want to calculate direct payback time, i.e. what is the time investment costs have been saved in reduced energy costs. Similarly to the energy efficiency investments of companies, investment cost calculations often

[64] 65 cities, 45 municipalities and 11 joint municipalities. https://energiatehokkuussopimukset2017-2025.fi/tulokset/kunta-ala/, (last accessed 15.3.2023).
[65] https://energiatehokkuussopimukset2008-2016.fi/kunta-ala, (last accessed 15.3.2023).
[66] https://energiatehokkuussopimukset2017-2025.fi/tulokset/kunta-ala/, (last accessed 15.3.2023).
[67] https://www.motiva.fi/files/16968/Energiatehokkuuden_oheishyodyt_kunnissa_ja_kuntayhtymissa.pdf, pp. 5–6, (last accessed 15.3.2023).

ignore other benefits. Motiva has studied the benefits for municipalities by interviewing and surveying municipalities' representatives.[68]

Almost all representatives mentioned cutting emissions as the main energy efficiency benefit if direct cost savings were excluded. Second benefit mentioned was the benefits for maintenance and use. For example, increasing the share of automation enables the identification of malfunction and it is faster to react to it. During the energy survey and possible audit, additional need for reparations may occur and by changing them to more energy efficient, maintenance is not needed so often.

Third category of benefits mentioned, was reputation related. Energy efficiency measures as part of the municipality's sustainability actions improves the image and vitality of the municipality. These are crucial for attracting new people and companies to the area. Municipalities seem to acknowledge their role in showing example and influencing people's behaviour. Many municipalities have ongoing projects to showcase and inform children environmental and energy issues. Energy efficiency investments made by municipalities can attract companies by showing the municipality's willingness to invest and maintain a vital environment for business. EEA participation is seen also as a way to implement corporate social responsibility.

Especially smaller municipalities work relatively isolated and being part of a larger energy efficiency network bring them support and ideas for actions. Many interviewees regarded the cooperation and exchange of information between municipalities increased and important. Energy efficiency projects and cooperation can also engage public and companies operating in the area to strive for a common good. Individual employees also saw participation in energy efficiency work as means to develop own knowledge and skills.

Typical energy efficiency measures relate to lighting, heating, or air conditioning. These directly affect positively to the working conditions. Some measures also improve safety at work. Properly working air conditioning also makes sure employees can rely on having clean and healthy air inside the buildings they work in. Lighting and air conditioning of public buildings also affect customers. This applies to municipality-owned residential buildings as well. Proper outside lighting also improves safety and comfort of citizens.

Energy efficiency may increase the value of buildings, or at least help maintain it. By focusing on sustainable solutions in the building phase also attracts investment gains. More efficient energy use also cuts the peaks in energy consumption. This may lead to a better contract for electricity and even energy self-sufficiency. Avoiding peak consumption and better management of energy consumption help the whole energy system.

Communication of energy efficiency measures and the results obtained through the implementation was seen essential. First, it is essential to spread the experiences of benefits other than direct cost savings. To identify all the benefits, communication, and exchange of information

[68] Ibid.

between municipalities or other actors is important. The reputation of municipalities as vital is crucial to attract new citizens and companies to the area. The role municipalities in promoting environment and energy related education is an opportunity to act as an example of desired behaviour. Energy efficiency related projects help engage citizens and companies to work together.

3.1.6 Key features of the EEA system

Energy efficiency agreements provide multiple benefits for the participants. The long-standing tradition in Finland on energy efficiency work has formed a uniquely successful system that enables cost-efficient energy efficiency measures to be adopted. The key factors have been identified in some previous studies conducted by Motiva and are used as basis in this case study.[69] Results from expert interviews are incorporated in the following presentation and analysis of the key factors. The main characteristics of the system and factors can be roughly divided in three categories: factors related to the structure of the EEA system, economic aspects and environmental issues.

The structure of the EEA system relies on **flexibility**; it has been one of the key drivers for its extensive use. Avoiding legislation and other coercive means has been the basis in the development of the EEAs.[70] Voluntary EEAs scheme helps to maintain and improve competitiveness of Finnish companies by creating a more open environment in terms of legal obligations. Flexibility here refers to the flexibility of the system in integrating new obligations set in EU policies in the EEAs, but also to the flexibility of participants to commit with from their own premises.

The specific obligations for parties are listed in the sector specific agreement and action plans. These include the requirement of **continuous improvement** in energy efficiency as part of the existing or planned management systems or operating plans. To meet its energy savings target, a participant is committed to organising and planning the measures, clarifying the possibilities for improvement in energy efficiency, implementing cost-effective improvement measures of energy efficiency, taking energy efficiency into consideration in planning and purchasing, training the staff and communicating on energy efficiency matters, annual reporting, striving to implement new energy-efficient technology, and increase the use of renewable energy sources, use the EEA

[69] Motiva has conducted some studies on how participants perceive the benefits of energy efficiency. For these studies, they interviewed representatives of companies and of municipalities. Multiple benefits of energy efficiency in companies (2018), https://www.motiva.fi/files/15389/Energiatehokkuuden_oheishyodyt_yrityksissa.pdf (accessed 14.2.2023), Benefits for municipalities (2019), https://www.motiva.fi/files/16968/Energiatehokkuuden_oheishyodyt_kunnissa_ja_kuntayhtymissa.pdf (accessed 14.2.2023). In addition, Motiva has identified key factors enabling success, https://www.motiva.fi/files/14643/ets2008-2016_fin_FINAL.pdf, (last accessed 15.3.).

[70] Report of the energy efficiency working group stated that art.7 EED requirements can be achieved through the EEAs. It was also found that an energy efficiency obligation scheme would be administratively burdensome and difficult to implement cost-effectively. Instead, EEAs have delivered the targeted energy savings well previously. Publications of the Ministry of Economic Affairs and Employment, 2019:53.

monitoring system for annual reporting of the energy use and the related improvement measures and implementation of other relevant actions.

Each participant carries out their measures from their own premises and agree to do their best to achieve the targets. Company-specific measures and obligations are described in detail in each Action Plan. During the expert interviews, it was indicated that the experts had received feedback from the companies and municipalities on the possibility to set the targets and plans themselves. It seemed more motivating for the companies to commit to the targets that they have had set in cooperation with the authorities.

In relation to the voluntary nature of the EEAs, the experts raised an interesting point during the interviews. They stressed the importance of **voluntary measures** in how the whole system is perceived. When there is no mandatory obligations or measures to be adopted, there seems to be less criticism in the media towards the system. When the public image of the energy efficiency agreements scheme is based on mutual benefits, it is easier to accept the common targets. This seems to be clearly different from many other EU member states, where the discussion is focused on more how the government or the EU is responsible and should act. In Finland, when companies see how others benefit from being part of the system and doing their share of the energy efficiency work, it is easier to jump in and contribute. The experts held it unlikely that adopting a legal obligation for energy efficiency for actors would create such a positive atmosphere around the energy efficiency work.[71]

The good experiences of both companies and authorities have made it easy for the government to rely continuously on the energy efficiency agreements scheme in its energy efficiency policy.[72] The expert interviews confirmed that **good results and mutual benefits** for all parties are crucial for the energy efficiency agreements scheme to continue to be the main energy efficiency policy instrument in Finland.[73] The Working Group on Energy Efficiency found in 2019 that there is only few new measures to be adopted for energy efficiency, instead the current energy efficiency measures should be further developed and used more efficiently.[74] It stated that the majority of energy savings under art. 7 EED can be achieved through energy efficiency

[71] When representing Finland in EU energy efficiency discussions, the experts have continuously met strong opposition for voluntary systems. There seems to be countries that would like all targets and implementing measures to be adopted in law. The experts agree on having certain issues adopted in law, e.g. energy labels, but they stressed that the member states' should be given the flexibility to implement other issues in a way more appropriate for them, especially if there is long-term good experiences of a certain behaviour.
[72] See e.g. The National Energy and Climate Strategy from 2016, where the government continues to support and commits to reinforce the energy efficiency measures in place.
[73] Voluntary EEAs have been used in Finland since the 1990s' and have so far delivered the targeted energy savings. The experts clearly indicated during the interviews that if the use of EEAs would not have delivered expected results, it would have been ceased already. It was considered highly unlikely that the government would have committed to such a system for many reporting periods if the success was doubted. The continuous use and the fact that joined parties generally also continue their participation for the next reporting period as well suggest that the parties to the EEAs are happy with the benefits they have received.
[74] Working Group in Energy Efficiency Report, MEE Publications 2019:53.

agreements and therefore the current agreements should be extended to 2030 or new agreements should be negotiated starting from 2026.[75]

Previous good experience and mutual benefits relate also to the **wide and comprehensive communication** by the authorities to inform companies about their possible energy efficiency measures. By spreading experiences of benefits beyond direct cost savings both by the authorities but also through the **exchange of information** especially between municipalities seems to be important. To be truly effective, the EEAs need to cover the majority of actors in a certain sector. The joining procedure is relatively straightforward as the framework agreements have been negotiated by the government and the sectoral association for each period, but the role of extensive cooperation and exchange of information plays also a role in attracting new participants when they hear the good experiences from others.

Education and training in energy efficiency have been continuously included in the national energy efficiency action plans. Energy efficiency is linked in sustainable development issues already in general education. Sustainable development has been a subject in the curricula for secondary education since 2004. In addition, energy efficiency related topics are discussed in vocational schools, provided in higher education and promoted e.g. through youth centres.

Motiva is the government-own company responsible for monitoring and administrating energy efficiency agreements and energy audits in Finland. It also coordinates the national energy service for consumers. Concerning the EEAs, Motiva is engaged in the preparation, implementing the management plans with contracting parties, developing and maintaining the monitoring system, impact assessment, and general energy efficiency agreement guidance and service as well as training. Advice, communication, and networking of operators as well as the production of information materials form the key parts of Motiva's activities.

Exchange of information is based on the **strong network** involving all main actors. Public authorities can inform the participants widely and participating companies and municipalities can share their experiences in what works and what is challenging. The experts held it also important that individual people responsible for example the municipalities energy efficiency measures could get help and guidance not only from the authorities but also from their peers. This relates to the scarce resources that companies and municipalities have for organising their energy efficiency work. The **low hierarchy and openness** in exchange of information has enabled the creation of a network, where it is easy to contact the authorities for instructions. This, on the other hand, strengthens the trust between actors and makes the discussions between parties more open. According to the experts, this forms a unique environment for the energy efficiency work in Europe.

It should be noted that the network created for implementing energy efficiency measures can and is used for other purposes also. As an example, after the Russian invasion of Ukraine and the energy crisis that followed, the Finnish government needed to get a perception of the energy

[75] Ibid. p. 97.

demand flexibility to secure energy supply for the new heating season. A query was sent to 80 participants and within a short period of time 69 had answered the query.[76] This illustrates the functioning of a good relationship between the participants and enables wide cooperation beyond the original purpose of the system. The wide, active network of participants, including energy intensive industry and energy production and energy services sectors, play a crucial role also relating to the energy infrastructure and the security of supply and self-sufficiency of energy.

The flexibility of the EEAs can be demonstrated by the fact that the EEAs implement not only the obligations set in the EED but also for example some obligations set in the Energy performance of buildings directive.[77] New sectors and requirements for participants can be negotiated based on the need of the government and the companies and municipalities without adopting new legislation. The experts emphasised during the interviews that while in many member states for example webinars and advice are considered separate measures for implementing the EED, in Finland many of these measures are built in the EEA system with a close monitoring by the authorities enabling detailed reporting to the EU and further development of the system.

The second category of characteristics of the system relate to economic benefits. The most obvious economic benefit is the **reduction of energy costs** that new energy efficient technology or operations bring. This is for the participants the most important incentive for committing to the EEA.

In the very beginning of the joining procedure, companies should undergo an energy audit or survey with the help of national authorities to identify possible energy efficiency measures. Energy audits for conventional technology are eligible for **energy aid** of up to 50% if the company has committed to the energy efficiency measures stated in the EEAs. Participants are also eligible for **energy subsidies** for the introduction of new more energy efficient technology, but joining an EEA is not a prerequisite. However, only participants in EEAs continue to have a possibility to apply for discretionary energy subsidies granted by the government on conventional energy efficiency investments. Energy subsidies play a crucial role for companies to get their energy efficiency investments going. This has been recognised by the industry, and the experts confirmed that especially SMEs often rely on the subsidies when committing to new energy efficiency measures.

The government also supports financially SMEs and municipalities in their energy audits and surveys to establish possible measures for energy savings. Previous experience has shown that

[76] Study on energy intensive companies' possibilities for demand-side flexibility measures, https://tem.fi/documents/1410877/2132100/Selvitys+suurten+energiank%C3%A4ytt%C3%A4jien+mahdollisuuksista+kulutusjoustoihin_2022.pdf/59d6f019-de1f-cb80-901b-b8dbfa766d86/Selvitys+suurten+energiank%C3%A4ytt%C3%A4jien+mahdollisuuksista+kulutusjoustoihin_2022.pdf?t=1666002238627, (last accessed 15.3.2023).

[77] Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency, OJ L 156, 19.6. 2018, p. 75–91.

the EEAs form a relatively **cost-efficient** way for energy savings making it attractive for both companies and the government.

Previous studies have also found that in addition to the direct **economic benefits** of reducing the energy consumption, companies have identified several other benefits. Energy efficiency measures seem to **raise the production capacity** without any additional investments. Regarding production and operation, longer lifetime and maintenance periods for systems or machines can be achieved with energy efficiency measures.

Companies have put more and more weight also on **environmental benefits** and the **reputation** of being "sustainable". Reducing the amount of carbon dioxide is fundamentally tied with the better and more efficient use of energy. Companies are also exempted automatically from certain environmental permitting processes if they have joined the EEAs. In the municipal sector, the image of being a vital city or municipality helps cities and municipalities to attract companies and people to its area, and sustainability actions seem to play a clear role in establishing such image.

To sum up, there are multiple benefits for participating companies ranging from economic benefits by reducing the consumption of energy to the value derived from being climate-friendly or sustainable. Each company assesses the benefits individually and decides whether it is worth committing to the EEA. The national authorities are key actors in educating and supporting companies and municipalities in their energy efficiency work. These benefits are also the main factors why participants choose to commit to the energy efficiency measures through the EEAs; when companies and municipalities realise the potential of energy efficiency, it engages them without any legal obligation.

3.1.7 Challenges identified

Participants commit themselves to certain energy efficiency measures by joining the EEA. As part of the functioning of the system, detailed reporting is required. Every energy efficiency measure adopted should be reported. However, participants sometimes neglect their reporting duties. Challenges in reporting arise when the level of details provided by the companies or municipalities is not precise enough. This also risks the measuring of savings and hinders the delivery of precise data and reports. Usually the deficiencies in reporting concern resources but often participants just do not know what they should report and how. To tackle this problem, additional support is available for the companies.

According to the experts, companies generally commit and adopt the planned measures, but the biggest challenge is to get the reporting done properly. The latest framework agreements also introduced a clear process enabling the authorities to deal with the reporting deficiencies quickly. This has decreased the number of companies neglecting their reporting duties significantly. Experts found this very useful and claimed it saves resources at their end when the process is

clear and simple. The threat of companies being removed from the system if they do not comply with the reporting duties seems to work well.

While relevant authorities provide support and advice for reporting, experts also reminded of the role of trade associations as parties to the EEAs. Trade associations are partly responsible for the enforcement of the EEA and should guide participants in the adoption and implementation of energy efficiency measures and they also participate in the preparing for reporting. In the participating companies, energy efficiency measures under the EEAs are often in the responsibility of one or a few persons. If the key persons leave the company, new people replacing them may not be aware of all the requirements related to the reporting. Experts emphasise that this concerns a very marginal number of companies, and most participants deliver their reports in time and with precision.

When the EEAs were first created, attracting participants, and informing the possible benefits for companies was challenging. As mentioned above, for the EEAs to deliver significant energy savings in a certain sector, majority of actors in the sector should commit to the energy efficiency measures. This required in the 90's hard work from the authorities to involve them in the EEAs. Currently, most companies join the framework agreement for next period, and attracting new participants no longer forms a big challenge for the functioning of the EEAs. However, it should be acknowledged that continuous work on attracting and engaging companies into acting should be ensured.

The most obvious grievance of the framework agreement system is that it is not the most convenient tool for small companies to adopt energy efficiency measures. EEAs are open to all actors in the sector irrespective of size, but the reporting duties may prove to be heavy for very small companies. Motiva Oy and some regional actors offer energy efficiency advice and help for identifying possible measures for energy savings, and the experts consider this more meaningful for small companies to approach energy efficiency work than joining the EEAs.

The latest energy efficiency requirements set by the Fit for 55-package are very ambitious, and many member states struggle in adapting their existing policy instruments to the new targets. Finland and the EEAs are no exception. Experts held it important to remember that EEAs harmonise the different interests of parties and each participant should gain somehow from participating in the EEA. When the system is based on voluntary approach, it might be difficult to attract participants to commit to extremely ambitious targets, if they do not feel that they also benefit from it significantly. Experts reminded that the companies are not liable for reporting only to the authorities but to their shareholders as well. If a company would have a high energy efficiency target but fails to meet it, it might be questionable why such a target has been adopted in the first place.

The new ambitious targets and obligations may require new actions beyond the framework agreement system, although majority of them related to providing advice and training and can relatively easily be integrated in the EEAs. The experts also did not find it meaningful to bring in law requirements relating to communication activities or actions for different stakeholders in

Finland; as described above, these are largely already included in the EEAs or can be integrated easily.

3.2 Transformative character of the studied case

This case study describes the implementation of EU energy efficiency policy in one member state. It focuses on one specific policy instrument, and it should be noted that other instruments are used in parallel. However, there are some insights the case provides for transformative climate policies.

Voluntary energy efficiency agreements exist in nine member states, but they vary significantly in content. The Finnish system covers widely different sectors and actors. The different experiences between member states on the EEAs are strongly linked to the different functioning and characteristics of the systems. The EEAs are based on the participants to reduce their energy consumption, meaningful in the large energy intensive industry in Finland. The key incentive for the participants is to reduce their own energy costs. National authorities are responsible for providing guidance and assistance in identifying possible energy efficiency measures and informing companies on the benefits of energy efficiency in general.

Energy efficiency first-principle is gaining importance in the context of the Fit for 55-package. Integrating energy efficiency across sectors is one of the key solutions to achieve climate neutrality, and member states should consider the principle in their NECPs. The principle is expected to lead to identification and implementation of cost-effective energy-efficient solutions, while achieving the intended objectives. Member states are required to provide adequate incentives and information, guidance, and assistance at local level.[78]

The Finnish EEAs is an instrument that already combines many of these aspects. It has been developed in a way that enables the introduction of new sectors, actors, measures, and obligations in the system. So far, new obligations of the EED and to some extent the Energy Performance of Buildings Directive, have been relatively easily incorporated in the existing policy instrument. Long experience in the system and the flexibility of the existing system to adjust to increased energy saving target has limited the need to adopt more coercive measures.

It may not be meaningful to replicate the voluntary EEA system in every member state, but the interviews conducted for the case study reveal that certain aspects deserve attention. The strong role of the authorities in providing advice and communicating the benefits of energy efficiency are considered essential. This strengthens the understanding of energy efficiency potential for individual actors and their businesses, as well as municipalities. As described above, it is also the view of the EU.

[78] Commission Recommendation (EU) 2021/1749 of 28 September 2021 on Energy Efficiency First: from principles to practice – Guidelines and examples for its implementation in decision-making in the energy sector and beyond.

The experts held it also essential that member states should be allowed to implement obligations in a way that suits them. Member states may have good experiences in delivering energy savings and it is worth assessing the existing systems in member states and if they have proved potential. The national systems may differ significantly, but as long as they deliver the expected results, they may be worth using and developing. Having a stable environment that can be predicted can also be important for the companies to plan their operation and climate and energy commitments.

Especially in municipal sector climate and energy actions are closely linked and part of zero carbon -work and creating climate strategies. Different sectors have different roadmaps developed by the trade associations for climate neutrality and energy efficiency measures and EEA commitments are part of that. Whether participating in the EEAs triggers further climate and energy actions in a company or municipality, or joining an EEA is the consequence of adopting a climate strategy, is not relevant according to the experts. Some participants have joined the EEAs long before climate neutrality discussions arose, some have joined after having realised the potential contribution their companies can make towards net zero. EEAs can be used as part of the work towards climate neutrality, and as long as it delivers targeted energy savings and produce clear benefits for the companies, continuation and development of the system seems legitimate.

3.3 Validity of findings

While the EEAs have a strong reporting component in it, it may be difficult to assess which energy efficiency measures were adopted through the EEAs and what kind actions companies would have taken anyway. An unequivocal impact of the EEAs seems impossible to determine. In addition, the reporting of energy savings includes a certain level of interpretation and approximation. It is not always clear how much energy savings a certain measure produces. Estimations based on energy use before an action and after can be made to get an estimated value.

Investments on energy efficiency can be calculated and energy subsidies are easily quantifiable, but even if receiving energy aid for investments requires that the investment would not have been made without the energy aid, it is practically impossible to assess to what extent have the EEAs attracted energy efficiency investments.

This case study uses a variety of sources and used expert interviews to validate the initial results. Main source of information was national legal and policy documents on the implementation of EU energy efficiency requirements in Finland. Some previous studies of relevant authorities are available, and the results are considered here as well. After an initial study of the documents, expert interviews were conducted to fil in possible gaps in data and focus the research on relevant aspects and features of the system. Interviews focused on experts with substantial experience in the EEAs and energy efficiency policy in Finland. Therefore, results are presented based on the perceptions of our experts on what features are important in practice and what participants have considered essential previously. The interviews were semi-structured to allow the interviewees to express their views without the researcher leading them too much.

Literature in voluntary energy efficiency agreements in EU member states in the field of energy is relatively scarce and building a theoretical framework was challenging. Instead, this case study used literature in mapping the field and in building the interview instrument. Literature was used to some extent also in the analysis to see if it follows the previous experiences, but the nature of this case determined that more value was given on the key factors identified during the policy document review and interviews.

The national case studies in WP2 focused on the implementation of a specific policy in a member state, but a comparison between member states with similar policy instruments could have provided more insights of the context of voluntary agreements. However, this would have gone beyond the purpose of this task.

4. Conclusions and future work

4.1 Conclusions on the methodology

This case study discussed the national implementation of art. 7 EED in Finland. The main policy instrument examined was voluntary energy efficiency agreements. Voluntary EEAs exist in other member states, but the structure and characteristics vary significantly, and comparing these was not considered meaningful here. The uniqueness of the system posed some challenges for setting a theoretical framework as literature on voluntary EEAs in Europe is scattered. Literature on voluntary approach in general is available, but the specific scope of the case study did not support a wide general literature analysis. For a broader discussion on the characteristics of such a system, references to the literature could have been made. However, here the purpose of literature was more background research to draw attention to certain aspects.

Expert interviews were highly beneficial to deepen the understanding formed based on the review of legal and policy documents. Previous studies on the EEAs in Finland were also used for data. Interviews were not numerous, but key informants were chosen to focus especially on the implementation of the EED through the EEAs and to identify the most significant factors enabling the long-standing tradition and success of the EEAs. Further interviews on different levels and types of actors could have been conducted regarding the implications of EEAs on company-level, but previous studies have already examined this, and results were used partly in this case study.

4.2 Conclusions and recommendations for transformative climate policies

The EEA system in Finland has proved its capacity to deliver significant energy savings and to promote energy efficiency measures at different levels and sectors of the society. One of the key challenges of transformative climate policy is the need to involve actors across all sectors and different phases of the process. Achieving the long-run objective of climate neutrality calls for coordinated measures in different sectors to account for interdependencies. Integration across sectors means also that efforts are aligned across different government departments and units.

The EEAs have engaged a broad range of actors from public bodies and municipalities to private companies. The system involves different ministries and authorities, who negotiate with trade associations on the targets and measures for different sectors. Companies and municipalities are represented in the negotiation phase and the starting point for engaging many actors in a sector to energy efficiency work is demonstrating the multiple benefits of energy efficiency. This win-win starting point has proved successful in Finland, and companies and municipalities have widely committed to continuously improve the energy efficiency of their premises and operations.

There are various reasons for such a broad engagement. The long experience in voluntary energy efficiency agreements with strong participation of companies from the negotiation phase on has shaped the system to being relatively user-friendly. The EEAs are open for any organisation to join, and participants have recognised various benefits of implementing energy efficiency measures. Participants form with the responsible authorities a close network, which enables effective communication and wide exchange of information. This was regarded very useful among the participants, and potentially triggered new initiatives in other company when they were given first-hand experience on a particular energy efficiency measure.

Communicating the potential of energy efficiency is essential to attract more participants and energy efficiency measures. The responsible authorities provide extensive support for identifying and implementing the possible measures for participants, but they are also actively educating and training people, both in companies and the public, in energy efficiency and sustainable choices. This stimulates on its behalf education and training with the aim of ensuring the availability of skills and knowledge for the transition.

The structure of the system and its use is quite flexible, which enables new sectors, actors, and requirements to be integrated in the framework. As was demonstrated above, the EEAs are mainly implementing the obligations set in the EED, but also other policies or parts of them have been integrated in the system. The potential of such a flexible policy instrument in thus not limited to the implementation of a specific policy but allows a wider approach to incorporate policies with climate neutrality objective making their implementation more coherent.

While voluntary EEAs have proved successful in Finland and many of the key characteristics follow the findings of voluntary approach in general recognised in academic literature, EEAs may provide

some aspects to consider for further design of policies and policy instruments. Possible factors to be considered in designing policy instruments could be the creation of a low hierarchy network, where participants encourage each other to implement new measures based on their experiences, involving the stakeholders in designing the instrument and respecting their needs, and possibilities to integrate various policies and requirements in one flexible instrument to maximise the impact. Nevertheless, it is also important to understand that in some member states it has proved more successful to take obligations directly in law. These cultural differences should be cherished if they have proved effective to achieve the long-term goal of climate neutrality.

When designing and drafting climate policies, the national characteristics of member states should be recognised. By allowing member states to develop their existing policy instruments, policies may be better accepted. In Finland, an energy efficiency obligation scheme as enshrined in art. 7 EED, would have required a major change in the approach on energy efficiency, when more coercive measures would have been posed. Consequently, it seems safe to say that the existing national good practices should be acknowledged and utilised in the transition towards net zero.

4.3 Future work

Existing good practices can provide food for thought and inspiration to the design of transformative climate policies. To get a more comprehensive overview on the potential of voluntary measures, in energy efficiency or broader in energy and climate policies, a more profound analysis and comparison of the existing practices in the nine member states that have introduced some sort of voluntary energy efficiency agreements should be done. Few studies exist, but barely on the transformative potential of voluntary energy efficiency agreements. It might be useful to map the key characteristics in each of these systems and see which ones have generally proved significant.

References

Arimura, Toshi H, Hibiki, Akira and Katayama, Hajime. 2008. Is a voluntary approach an effective environmental policy instrument? A case for environmental management systems. *Journal of Environmental Economics and Management*.

Cornelis, Erwin. 2019. History and prospect of voluntary agreements on industrial energy efficiency in Europe. *Energy Policy.*

Görlach, Benjamin, Anuschka Hilke, Bettina Kampmann, Kati Kulovesi, Brendan Moore and Tomas Wyns. 2022. Transformative climate policies: a conceptual framing of the 4i's. 4i-TRACTION Deliverable D 1.1. Ecologic Institute; Berlin, available at https://www.4i-traction.eu/sites/default/files/2022-02/4iTraction_2022_Report_Concept%20transformative%20climate%20policies.pdf.

Knoop, Katharina and Lechtenböhmer, Stefan. 2017. The potential for energy efficiency in the EU Member States – A comparison of studies. *Renewable and Sustainable Energy Reviews*.

Meyer, Christine Benedichte. 2001. A Case in Case Study Methodology. *Field Methods.*

Rezessy, Silvia and Bertoldi, Paolo. 2011. Voluntary agreements in the field of energy efficiency and emission reduction: Review and analysis of experiences in the European Union. *Energy Policy*.

Rosenow, Jan and Kern, Florian. 2017. EU energy innovation policy: the curious case of energy efficiency, in Leal-Arcas, Rafael and Wouters, Jan (Eds.), *Research Handbook on EU Energy Law and Policy*, Chelyenham: Edward Elgar Publishing.

Scholmann, Barbara, Rohde, Clemens and Plötz, Patrick. 2015. Dimensions of energy efficiency in a political context. *Energy Efficiency*.

Schomerus, Thomas. 2020. Energy Efficiency and Energy Savings- The "First Fuel", in Peeters, Marjan and Eliantonio, Mariolina (Eds.). *Research Handbook on EU Environmental Law*. Northampton: Edward Elgar Publishing.

Sullivan, Roy. 2001. Voluntary approaches: an assessment and overview, Presentation at the Royal Institute of International Affairs Conference, Corporate Social Responsibility: From Words to Actions, Chatham House. London. 15-16 October 2001, available at https://pubs.iied.org/sites/default/files/pdfs/migrate/G00879.pdf.

Webley, Lisa. 2016. Stumbling Blocks in Empirical Legal Research. Case Study Research. *Law and Method*.

Yin, Robert K. 2018. *Case Study Research and Applications: Design and Methods*. London: Sage Publications Inc.

Zhang, Mingshun, Cui, Ying, ter Avest, Erik and van Dijk, Meine Pieter. 2018. Adoption of voluntary approach: Can voluntary approach generate collective impacts for China achieving ambitious energy efficiency targets?. *Energy & Environment.*

About the project

4i-TRACTION – innovation, investment, infrastructure and sector integration:
TRAnsformative policies for a ClimaTe-neutral European UnION

To achieve climate neutrality by 2050, EU policy will have to be reoriented – from incremental towards structural change. As expressed in the European Green Deal, the challenge is to initiate the necessary transformation to climate neutrality in the coming years, while enhancing competitiveness, productivity, employment.

To mobilise the creative, financial and political resources, the EU also needs a governance framework that facilitates cross-sectoral policy integration and that allows citizens, public and private stakeholders to participate in the process and to own the results. The 4i-TRACTION project analyses how this can be done.

Project partners

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement **No. 101003884**.