FINLAND Energy Efficiency Agreement for Industries

Elinkeinoelämän energiatehokkuussopimus

About the measure

Policy instrument	Sector	Starting date and status
Cooperative/voluntary agreements	**Industry and the tertiary (private services) sector**	**10 November 1997 – 31 December 2007** **1 January 2008 – 31 December 2016** **1 January 2017 – 31 December 2025**

The Energy Efficiency Agreements has been a long-running important national initiative to improve energy efficiency already before EU directives. It also plays a leading role in achieving the binding national energy efficiency target set out in Article 7 of the EED as well as the indicative national energy efficiency target set out in Article 3. Targets are set for the coverage of the agreement and indicative targets are established for the expected energy savings within the agreement scheme.

The parties committed to this agreement are the Ministry of Economic Affairs and Employment (MEAE), the Energy Authority and the Confederation of Finnish Industries (EK) and its member associations. The Energy Authority is in charge of most administrative matters. Motiva assists authorities in implementation.

The agreement between the government and businesses is a framework contract supplemented by sub-sectoral Action Plans e.g. defining more precise targets and obligations for the stakeholders and participants. Companies join the agreement by signing an Accession Document to the Action Plan for their own sub-sector with their industry association. Agreements are open for all companies which are members to the aforementioned industry associations. Non-members can also participate but must pay an administrative fee.

Taking action in a voluntary manner is more flexible and economical to the industry than regulation. The agreement is a way to start or continue energy management systematically with a view to continuous improvement. The scheme facilitates communicating the activities and results in a reliable way to the authorities. Many participants use the agreements as a way to demonstrate environmental responsibility which is increasingly important to clients. By joining the agreement, the participants can also be eligible for specific technical support and/or financial incentives.

The agreement is also an alternative to mandatory energy audits in accordance with the EED for large companies if they also implement the national energy efficiency system (ETJ+) which resembles energy efficiency standards.

Participants implement energy efficiency actions and annually report on their progress to a database through web access. All types of energy saving actions are eligible with a view to the saving lifetimes.

The EPATEE project has received funding from the European Union's Horizon 2020 Research and innovation programme under grant agreement No 746265.

Expected energy savings in 2020	Benchmark
Annual final energy savings expected in 2020 from actions implemented by participants in the 1997–2007, 2008-2016 and 2017-2025 agreement periods (source: NEEAP 2017): 200 GWh/a in the private services sector 770 GWh/a in mid-sized industry 11 691 GWh/a in energy-intensive industry	EED Art. 7 cumulative savings estimated for actions implemented and reported by participants starting in 2014 are expected to cover about two thirds of the EED art. 7 cumulative savings target (49 TWh_{cum}) in 2020 . Savings estimated for 2016 (from projects implemented from 2008) in industry account for 8.0% of the sectoral total final consumption in 2016 (136 TWh according to provisional data).

Means and outputs

Public budgets are used for the administration of the Agreement. The Ministry for Economic Affairs and Employment, and since 2014 the Energy Authority, have annually contracted Motiva for assignments in administration, supporting participants in implementation, communication and marketing as well as monitoring and evaluation of the energy efficiency agreements since 1997. The budget for the assignment, covering most of the operational costs of the agreement scheme's administration, is roughly one million euros in 2017. The level has been approximately similar in previous years.

A one-off large budget item was the construction of a new web-based monitoring database in 2007-2008. The resources needed for setting it up were about 200 person-days used by Motiva (specification, testing, introduction) and 300 000 euros for subcontracting. The annual resources for operation and maintenance of the database have been about 50 000 euros for maintenance activities and additional development by a third party and about one person-year of Motiva's own work in 2009–2016. Annual resources needed for data checking, analyses for branch specific reports and reporting in Motiva are about two person-years. Reporting is partly financed by all involved industry associations. In addition, some industry branch associations finance partly the energy advice given by Motiva to mid-sized enterprises signed up to the agreements.

The coverage of the agreement of the industry is very high. The proportion of energy consumption of all industrial companies participating in energy efficiency agreements was 85% of industrial energy consumption at the end of 2016. The coverage is calculated annually by Motiva as a proportion of the energy consumption of the participants compared to statistical data in the sector. At the end of 2016 the number of participating energy intensive industry enterprises (defined as all enterprises having at least one site where annual energy use is over 100 GWh/a) was 41 and they were operating at 131 sites; the coverage of the segment was in practice 100%. In mid-sized industry there were about 290 participants operating at 650 sites and in the private services sector 125 enterprises operating at almost 3000 sites.

Figure 1 shows the number of energy saving actions taken and reported in industry and the private services sector in 2008-2016. In addition to the number of actions, also the type of actions is being monitored allowing classification to technical (investments) and operational actions (e.g. changes in operation hours or settings). Furthermore, a lot of qualitative information is gathered annually on actions to follow up agreement obligations supporting continuous energy efficiency improvement (see section "Other indicators monitored and/or evaluated"). This data is published in annual summary reports by sub-sector.

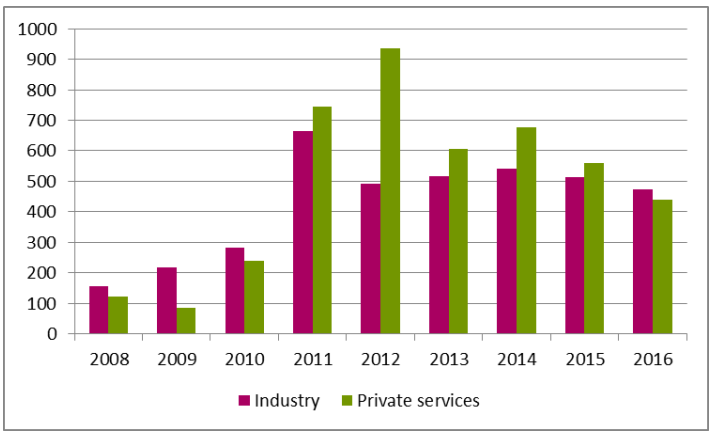

Figure 1. Number of energy saving actions implemented by year in 2008-2016

Figure 2 shows the total investments made by the participants in industry and the private services sector in 2008-2016. The scope of investment costs is not specified in the reporting. Reported total investments include both private investment as well as possible public subsidy. The additional incentive given to participants is that while non-participants can receive investment subsidies only for energy efficiency actions using new technology and investments in renewable energy, participants can get subsidy also for energy efficiency investments using traditional technology. Information is collected also on the pay-back time of investments and whether the investment was made using third-party financing by energy services companies, i.e., the ESCO concept. The participants report the investment pay-back times.

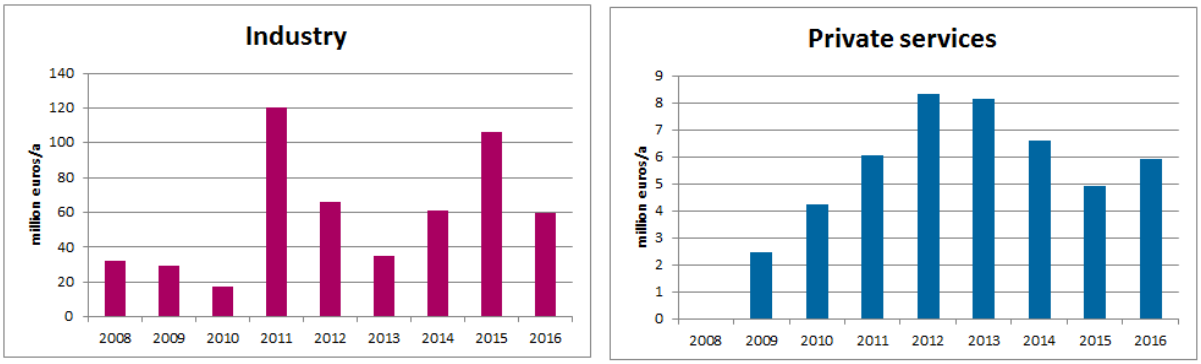

Figure 2. Investments by year in 2008-2016, million euros/a

Data about energy savings

Unit	Main source of data
Final energy savings, GWh	Monitoring database operated by Motiva

Figures 3, 4 and 5 show achieved energy savings in the energy intensive industries (as defined in the agreements), mid-sized industries and the private services sector, respectively. The indicative target trend for participants shown in the mid-sized industries and the private services sector graphs illustrates linear pace of savings needed to reach the ESD indicative target of 9% for 2016. The indicative target setting for energy intensive industries action plan, where most participants are under Emission Trading Scheme and thus not in the scope of ESD, was not set in a similar way and thus not presented in Figure 3. Cumulative valid savings show the accumulation of final energy savings from annual savings, i.e., all savings valid in a given year from actions implemented from the start of the

energy efficiency agreements in 1997 up to this given year. The bars show the new annual final energy savings (annual valid savings) which are savings remaining after extracting "expired" savings from annual new savings in a given year by taking into account the saving lifetimes. The expired savings in 2008-2010 refer to the expired savings from the actions implemented during the agreement period 1997-2007.

According to the monitoring results, good progress is being made in all areas although savings in the mid-sized industries and the private services sector are slightly falling behind the indicative 9% ESD target to which the target for the agreements has been aligned.

Among energy intensive industry, the cumulative valid savings in 2016 are excellent and are representing 8.3% of participants' energy use in 2016. In the mid-sized industries, the achieved total savings in 2016 represent 9.6% of participants' energy use in 2016. In the services sector, cumulative valid savings in 2015 represent 7.6% of participants' energy use in 2015. All 2016 data is still preliminary and final data will be released at the end of September 2017.

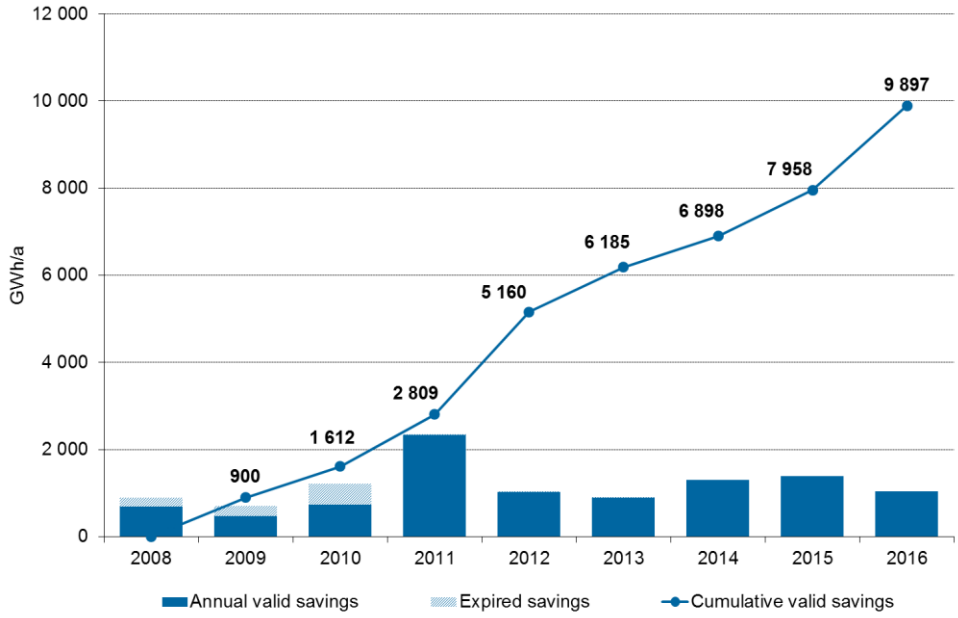

Figure 3. Energy savings in the energy intensive industry in 2008–2016

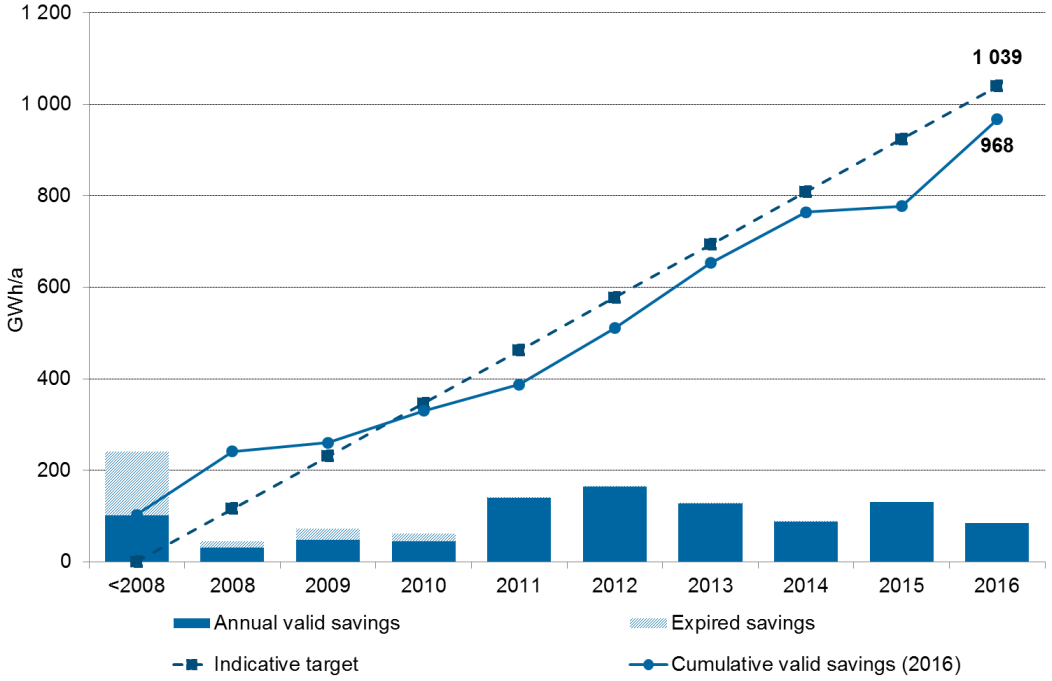

Figure 4. Energy savings in the mid-sized industry in 2008-2016

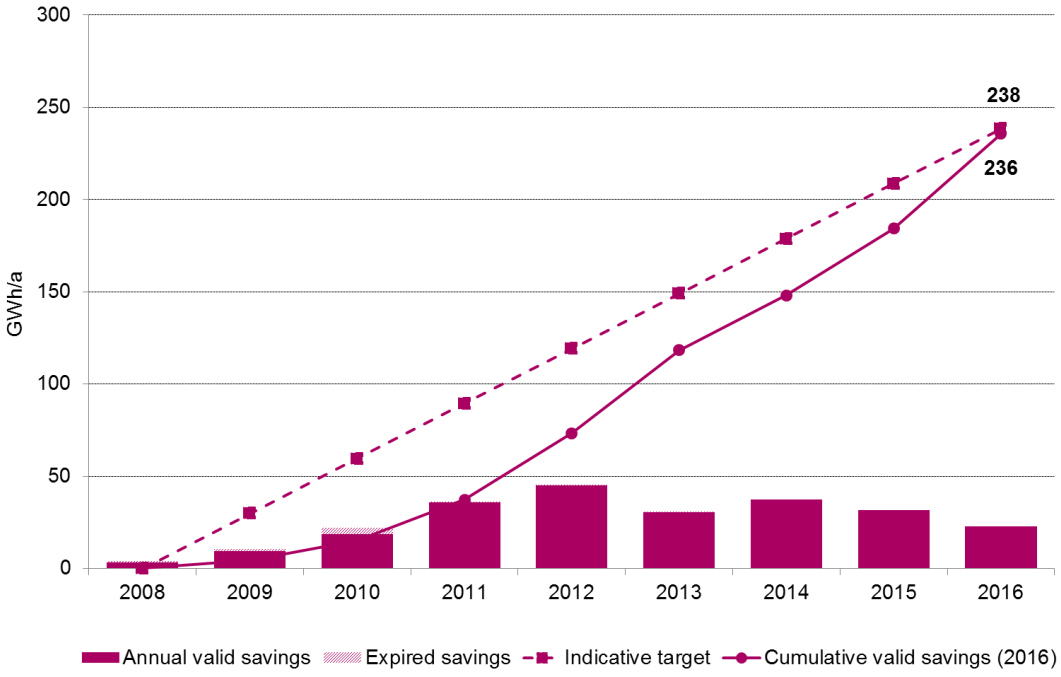

Figure 5. Energy savings in the services sector in 2008-2016

Sources of uncertainties about energy savings

- The accuracy of the savings calculation for reported individual actions corresponds to the accuracy that may be achieved in normal field work and the calculations are typically carried out by an external consultant on behalf of the participating party (e.g. energy auditor).
- Some of the initial data are design data of technical systems or estimates, since measurements are often not possible or at least too costly. Savings calculations of individual actions dependent on outside temperatures are made using normalized energy consumption data.
- Measures have been taken to reduce uncertainty by providing guidelines, training and support:
    - A guideline has been issued for agreement participants and their service providers for estimating the energy savings impact of reported energy efficiency actions, available on the website of the energy efficiency agreements.
    - At the beginning of annual reporting, briefing sessions have been organised for the participants and their service providers. Since 2014 this has been implemented mainly as webinars.
    - Companies are supported via a designated email service.

Evaluation of the energy savings

Calculation method(s) and key methodological choices

- Impact evaluations of the same policy measures are often made using different calculation rules depending on the reporting at hand. The savings calculations described in this case study represent the evaluation of all real savings valid in a given reporting year as the result of energy efficiency projects implemented during the agreements periods.
- The evaluation method and savings are given for industry and the services sectors, i.e., excluding the energy sector, which is also part of the same agreement.
- Calculation method used is detailed engineering estimates (**scaled savings, Method 5**).
- Type of baselines:
    - In most cases “before” energy consumption; “actual before” energy consumption in the cases when consumption has been metered
    - In EED article 7 cumulative energy savings calculations, the baseline is based on the minimum energy performance standards for actions for which eco-design requirements are taken into account in electricity savings calculations, i.e., only savings exceeding standards are accounted for
- Interaction between end-use actions and double counting of policies (with the Energy Audit Programme concerning voluntary energy audits) have been taken into account and removed from the results based on data collected to the monitoring database of the two schemes.
- Only actions actually implemented in each year are taken into account, i.e., actions with just an implementing decision or planned actions are excluded.
- Lifetimes of technical and operational actions are different. An average lifetime of 12 years is used for implemented technical actions. This is conservative in comparison to the guidelines given by the European Commission which set 15 year lifetimes for most technical actions. Lifetime of 5 years is used for operational actions taking into account good level of consumption monitoring and prompt reaction to deviations which is one of the obligations in the agreement.

Ex-post verifications and evaluations

- The savings achieved by the energy saving actions are not usually verified by subsequent measurements, since it is most often difficult to make measurements in practice and it generates significant additional costs.
- Other important policies which have been running in parallel with the energy efficiency agreements are the energy audit programme and energy investment subsidy scheme. The

impact evaluations given here exclude, with the exception of energy analyses for process industry, impact of actions identified in voluntary energy audits. The impact of the investment subsidy scheme overlaps with impact of the energy agreement scheme and the voluntary energy audits and, therefore, there is no separate impact estimate for the investment subsidies. There is also no separate impact estimate for the mandatory energy audits.

Other indicators monitored and/or evaluated

Indicator	Explanations
CO_2 emissions avoided	Data used in calculation: energy savings by energy carrier (electricity, heat, fuels) and emission factors
Direct pay-back times	Data reported by the participants
Annual cost savings	Calculated by using average energy prices and data reported by the participants on implemented actions
Investment cost	Data reported by the participants (scope of investment costs not specified in reporting)
Public budgets used for participants' voluntary energy audits and investments	Data collected from voluntary energy audits and approved investment subsidy applications
Energy efficiency actions implemented using third-party financing by energy service companies (ESCOs)	Data reported by the participants
Use of renewables	Data reported by the participants
Participants who - have organised and defined responsibilities in energy efficiency - have prepared an energy efficiency improvement plan - have implemented the national Energy Efficiency System, ISO 50001, ISO140001, Eco-Management and Audit Scheme (EMAS) or some other environment system	Percentage of participants calculated by sub-sector. Based on data reported by the participants.
Participants who - have issued guidelines for taking energy efficiency into account in planning - have updated the planning guidelines during the reporting year - have issued guidelines for taking energy efficiency into account in procurement - have updated the procurement guidelines regarding energy efficiency during the reporting year	Percentage of participants calculated by sub-sector. Based on data reported by the participants.
Participants who - have organised training of personnel in energy efficiency - use energy efficiency as a criterion in their performance bonus system of the personnel - have organised eco-driving education of personnel - have joined the Energy Efficiency Week	Percentage of participants calculated by sub-sector. Based on data reported by the participants.
Participants who - make us of the energy efficiency agreement in their communications	Percentage of participants calculated by sub-sector. Based on data reported by the participants.

Indicator	Explanations
- mention participation on their web page - use energy efficiency agreement logo in their communications	
Participants who - use undertaking an Energy Audit of Transport Chains as a criterion in their procurement of transport services - demand their transport service providers to report their fuel use	Percentage of participants calculated by sub-sector. Based on data reported by the participants.

The above data is reported in the annual monitoring reports of the branches and the annual summary report prepared by Motiva (In Finnish only).

A very important indicator for the participants themselves is the cost savings achieved through participation. It is also a matter of public interest and getting attention in major media. In mid-sized industry, the cost savings were 51 million euros in 2016 and cumulative savings totalled 245 million euros over the 2008-2016 period. In energy intensive industry, cost savings were 315 million euros in 2016 and cumulative savings were 1310 million euros from 2008 to 2016. In 2015, cost savings in the services sector were 14 million euros and the cumulative savings from 2008 to 2015 were 57 million euros.

Other aspects evaluated

The participants have a possibility to report on their overall satisfaction to the agreement scheme in their annual reporting. Additional feedback is collected in various events organized around the agreement scheme. Feedback was also the topic of the formal third-party evaluation carried out in 2005.

Focus on early planning and significance of monitoring

Reporting obligations and the monitoring system were planned at the same time as the policies. This has helped the common problem that momentum is lost at least partly if a decision on monitoring is only done when the policies are already in the implementation phase.

A well-functioning monitoring system for the agreement scheme has had a central role in revealing the results, create trust and credibility among all parties (not just the government) and in achieving long-term top-level commitment.

Focus on the third-party evaluation in 2005

The evaluation concerned the energy conservation agreement commencing in 1997 and which was planned to run until the end of 2005. Later the agreements were extended by two years until the end of 2007.

The evaluation started in 2004 and was completed in January 2005. The reason for carrying out the evaluation before end-term was that results and ideas for further improvement could be used in the planning of future activities.

The coordinator of the evaluation was Granlund Oy. Other evaluators came from Advansis Oy and Tampere University.

The evaluation work included the preparation of a number of background reports, internal evaluations carried out by the agreement parties, an on-line survey and about 80 interviews. The project group carrying out the evaluation was supported by a background group consisting of participants representing agreement parties.

The sectors covered in the evaluation were industry, municipalities and joint municipalities, real estates, energy industry and bus transport.

The coverage of participants of each branch was evaluated to be quite good. It was concluded that the objectives were well achieved because, although the agreement was voluntary, yet the participants perceived them as binding. The savings obtained were considered to be significant. Total savings of electricity and heat were estimated at about 4.7 TWh/a at the end of 2003. However, there were differences in coverage, commitment and functioning of the agreement between the branches within the agreement scheme. The interviews indicated strongest commitment in industry and in energy production. Coverage and impact was lower in the real estate sector and in electricity transmission/distribution. In the municipal sector, the lack of resources limited commitment and the sector was forced to concentrate on other more compelling objectives. In the real estate business, it was typical that principally the strategically most important buildings were included into the monitoring and audit scheme related to the agreement.

Based on interviews of the participants, it is the energy audit which usually kicks off the process for improving energy efficiency and the external view given by the auditor was perceived useful. The size and profitability of energy audit business had significantly developed during the agreement period. On the other hand, several reasons slowing down the investments in energy efficiency were identified. A fundamental reason is that saving energy is not a major driver in decision making on investments which are principally made driven by reasons related to production, safety, health or environment.

The participants mentioned recognizing energy saving opportunities, developing own operation, having clearer energy efficiency targets and energy audit and investment subsidies as the most significant benefits from the participation. Image benefits were clearly mentioned too. The agreement facilitated the development of co-operation networks and exchange of information between participants. General understanding of energy saving had increased as well as using a systematic approach to improve energy efficiency.

While the evaluators concluded that there is a strong consensus on the continuation and further development of the agreement scheme among the participants, they also noted that expectations of future agreements are different and, therefore, proposed a number of ideas for improvement. A recommendation was that the consultations at the planning phase should be more extensive. The online survey revealed that the goals of the new agreement should be defined in more concrete terms. One of the areas mentioned by interviewees was the need for more personal contacts in implementation of actions, reporting and communications. Securing of resources and commitment at all organisational levels immediately at signing the agreement are crucial factors.

In the 2008-2016 period, the indicative energy saving target was set in a coherent manner with the indicative national target for the Energy Saving Directive. Following the discovery that small organisations and SMEs in particular need a support person who would provide them with both general information on the energy efficiency agreement scheme and specialist advice on their own sector, energy advice to SMEs was implemented in the 2008-2016 period. Companies were supported in their communications by providing more communication services from coordination and the web-pages were developed to include, e.g., case studies on good practices. A large new effort was the shift in reporting from Excel to an on-line system.

See ”To go further” for the results of the evaluation (in English).

Experience feedback from stakeholders

Feedback: Mr Heikki Väisänen; Deputy Director General, Energy Efficiency; Energy Authority, Finland

1. **What is the role of evaluation in the management of the scheme?**

Monitoring and evaluation have an absolutely critical role in the scheme. This agreement is the source of a significant part of Finland's EED Art. 7 savings. We need to be constantly aware of the progress made.

Good results ensure that actions are sustained. Without robust monitoring data produced by our monitoring systems, the long-running scheme (since 1997) would not have continued this long, probably for just a few years.

2. **What were the main lessons learnt from the evaluations (about the impacts of the scheme and what could be improved)?**

Data coming from the participating companies is the 'raw material' of evaluation. There is no possibility to make compromises in the quantity, quality or submission deadlines of this data. Ensuring timely submission of good quality data requires a lot of administrative work. This has involved a lot of discussions with the contact persons of participating companies and looking after.

When the new contract for the period 2017-2025 was being negotiated with the sector, annual reporting was one of the few topics which were not open for negotiation – it was a must.

The system works well and it appears that there is not much need for improvement anymore. There is experience already since 2000 and improvements have been made constantly in small steps in the spirit of continuous learning.

3. **What were the lessons learnt in terms of evaluation practices?**

The absolutely critical starting points are reliability and coverage of data used in evaluation and the skills and technical know-how of the evaluators.

In reality, if two persons carry out impact evaluation of the same policy measure, they get different results. Even if I make the same calculation in successive years without proper documentation of the calculation method and definitions, the calculation can be different. This highlights the needs for good logic and documentation.

Despite the need for good logic and documentation at the national level, based on personal experience on practicalities of evaluation I would not open the discussion for far reaching harmonization at the European level.

4. **In parallel of the ex-post evaluations, are there other evaluations or studies that provided insights about the impacts of the scheme and/or possible interactions with other policies or drivers (or barriers) for energy efficiency?**

No.

5. **What would you like to highlight about your experience related to the evaluations of the scheme?**

The success factors of this well-working policy measure have been good monitoring and evaluation, strong results and communication of results. This has led to increasing motivation and further improving results, i.e., a circle of positive development has been created. There is a wide positive consensus, all the way up to the ministries and ministers.

To go further

About the measure

- Website of Energy Efficiency Agreements 2017-2025 (in English): http://www.energiatehokkuussopimukset2017-2025.fi/en/
- Website of Energy Efficiency Agreements 2008-2016 (in English): http://www.energiatehokkuussopimukset.fi/en/
- 2015 annual summary report of the Energy Efficiency Agreement for Industries (in Finnish): https://www.motiva.fi/files/11859/Energiatehokkuussopimukset_Elinkeinoelaman_eri_alojen_yhteenvetoraportti_2015.pdf
- Unofficial translation of the new agreement (period 2017-2025) (in English): http://www.energiatehokkuussopimukset2017-2025.fi/wp-content/uploads/EK-2017-EN.pdf
- Descriptions in the MURE Database: IND-FIN14 for industry and TER-FIN15 for private services: http://www.measures-odyssee-mure.eu/public/mure_pdf/industry/FIN14.PDF http://www.measures-odyssee-mure.eu/public/mure_pdf/tertiary/FIN15.PDF

References of the evaluation(s)

- Finnish National Energy Efficiency Action Plans (NEEAPs): https://ec.europa.eu/energy/en/topics/energy-efficiency/energy-efficiency-directive/national-energy-efficiency-action-plans (in Finnish; NEEAP-2 and NEEAP-4 also in English)
- Third-party evaluation of the 1997-2007 period (in English): https://www.motiva.fi/ajankohtaista/julkaisut/energiansaastosopimukset_1997-2005/in_english/energy_efficiency_agreements_in_finland_1997-2005.12315.shtml
- Annual summary and sub-sector reports of the Energy Efficiency Agreement (in Finnish): http://www.energiatehokkuussopimukset.fi/fi/toimintaa_ja_tuloksia/sopimustoiminnan_tuloksia/vuosiraportit/
- Annual sub-sector reports on types of actions implemented within the Energy Efficiency Agreement (in Finnish): http://www.energiatehokkuussopimukset.fi/fi/toimintaa_ja_tuloksia/sopimustoiminnan_tuloksia/toteutetuiksi_raportoidut_toimenpiteet/

Other useful references

- Suomi, U., Puhakka, P. and Väisänen, H. (2007). Comprehensive monitoring system – essential tool to show the results of the energy audit and voluntary agreement programmes. Proceedings of the 2007 ECEEE Summer Study 2007. https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2007/Panel_4/4.166/
- Suomi, U., Puhakka, P., and Väisänen, H. (2009). New board energy efficiency agreement. Proceedings of the ECEEE 2009 Summer Study 2009. https://www.eceee.org/library/conference_proceedings/eceee_Summer_Studies/2009/Panel_3/3.266/

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