Online monitoring system for companies in the Finnish Energy Efficiency Agreement scheme and the Energy Audit monitoring system – lessons learned (extended version)

Ulla Suomi, Motiva, Finland

IEA - IIP Policy Pathway on Energy Management Programmes Workshop, 30th September, Paris
Well planned is almost half done

• The monitoring system should be planned at the same time as the programme
  • include obligations for reporting to the agreements with companies/communities and granted subsidy schemes
• Different target groups for the collected data should be taken into account
  • ministries, feedback for the companies/communities, energy auditors, media etc.
• Level of ambition should be decided upon as early as possible
• Monitoring system should cope with an expansion of the programme
Different levels of monitoring

E.g. Energy Audit programme → levels I–IV

- **Level I**: Just to follow the total granted subsidies (€)
- **Level II**: Knowledge for which sectors and volumes the granted money is spent
- **Level III**: Understanding how much could be saved (based on energy auditors calculations)
- **Level IV**: Calculated estimate of the realized savings (based on engineering estimates and follow up data on implemented measures)
- **Level V**: Knowledge how much is saved (measurement errors)
- **Level VI**: Confirmed savings by a third party (a legal commitment fulfilled e.g. ESCO)

Picture modified from SAVE/Audit II-project (2001–2003) report

Be realistic

- How to get reliable data with reasonable costs
  - the end-users seldom interested to spend money on monitoring and verification (M&V) above their own needs
  - who will pay the additional M&V costs?
- On-site field conditions are far away from laboratory conditions
  - be realistic what can be with reasonable costs and accuracy measured and verified and what not
  - be careful what and how much data can be gathered in annual reporting from the companies/communities
- Small savings cannot be identified from the total consumption
  - consider what is worth to monitor and follow up
- Prepare to develop the system
- Keep it as simple as possible – how true also here!
Energy Efficiency Agreements 2008–2016 in Finland

www.energyefficiencyagreements.fi
Energy Audit programme since 1992 covers sectors widely

- **Buildings**
  - 2 auditing models (energy inspection, energy audit)

- **Industry**
  - 3 auditing models (energy audit, energy analysis, 2 phased process energy analysis)

- **Energy sector**
  - 2 auditing models (power plants energy analysis, district heating energy audit)

- **Other models**
  - Post-acceptance audit (buildings)
  - Follow up energy audit (buildings and industry)
  - Energy audit for logistics chain (service and industry)
  - Renewable energy municipal audit (municipals)

- On top of the previous some supplementary guidelines related to the process services like
  - Compressed air systems
  - Refrigeration an cooling systems
  - Steam and condensate systems (under preparation)
New monitoring and reporting database

- New internet based monitoring system for the new agreement period 2008–2016 since spring 2009 (related to the agreements on the responsibility of the Ministry of Employment and the Economy)
  - more flexible and easier to use – number of reporters increased
  - target to save resources both on administration and on organisational level
  - enables the generation of feedback and summary data for joined companies/communities, associations and ministry
  - allows more flexible modifications and sector specific features
- At the same time Energy Audit monitoring system was connected to the same database
- Development project for the new monitoring system started in 2007
  - target to serve at the same time Energy Services Directive (ESD) bottom up monitoring requirements
  - now including 17 reporting areas, about 1900 users
  - development costs to build up the system 2007–2010 about 0,5 million euros – development continues also in year 2011 and 2012
Annual reporting in Energy Efficiency Agreements

Data collection has quite similar main categories in all agreement areas on site/community level:

• General issues
  • Name of the organisation, contact information, name and contact information for the appointed person responsible of the energy efficiency agreement etc.
  • Energy savings target in 2016

• Energy consumption data
  • Electricity, purchased heat, fuels, water consumption (transferred electronically in some areas from the statistics gathered from other organisations)

• Energy efficiency improvement measures
  • The follow-up of the implementation of the implemented measures proposed in the energy audits
  • Other EEI-measures reported with analogues data than energy audit measures

• Continuous improvement
  • Divided in subcategories: management systems, energy consumption monitoring, training and communication, design and procurement, logistics)

• Innovation ideas
Energy Efficiency Agreements
Data collection – online monitoring

Companies and municipalities
(~ 550 companies/communities, including about 1900 reporting sites/communities)

Accession data

Annual reporting (~ 1900/a)

Supplementary data if needed

Branch Associations or Motiva

Energy Efficiency Agreement Database
Data since 1999
(previous agreement period 1997–2007)
Annually 100…200 separate data items per one joined site/community

Energy Audit Database

Motiva
Annual online reporting for companies and communities – an example of a reporting window

<table>
<thead>
<tr>
<th>General</th>
<th>Energy consumption</th>
<th>Continuous improvement</th>
<th>Innovation ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yeinen</td>
<td>Energiaiedot</td>
<td>Energiaakatselmukset ja toimenpiteet</td>
<td>Jatkuva parantaminen</td>
</tr>
</tbody>
</table>

Energy efficiency improvement measures

<table>
<thead>
<tr>
<th>Management systems and the action plan</th>
<th>Energy consumption monitoring</th>
<th>Training and communication</th>
<th>Design and procurement</th>
<th>Logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management system</td>
<td>Status</td>
<td>Certified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ ISO14001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ EMAS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ ISO9001</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Not in use</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Other, what?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The site’s action plan to improve the energy efficiency

<table>
<thead>
<tr>
<th>The action plan is completed (month+year)</th>
<th>The plan is updated within the follow up year</th>
<th>The responsibilities for the energy efficiency issues are appointed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Company level</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Site level</td>
</tr>
</tbody>
</table>

Is energy efficiency integrated to the management system?

Is Energy Efficiency System (EES) in use in the company?

Is the promotion of the renewables included in the management system?
Energy Audits

Data collection in three phases

Energy Audit Client

Subsidy Applications
~ 100–150/a

Energy Audit reports
~ 150–350/a

Follow-up questionnaires

Regional Centres for Economic Development, Transport and the Environment

Motiva

Since 2000 follow up data collected via voluntary agreements

Energy Audit Database 1994 →

Including:
- about 7500 reported buildings/sites
- almost 40 000 EEI-measures

Phase I
Phase II
Phase III

30.9.2011 Ulla Suomi
IEA - IIP Policy Pathway on Energy Management Programmes Workshop, Paris
Energy Audit Programme
Three phase data collection

Phase I  **Subsidy application – data filled in manually**
- General data: (e.g., volume, year of construction, type of building, involvement in energy efficiency agreements etc.)
- Energy audit model, granted subsidies, auditing costs, energy auditor

Phase II  **Energy audit report – most data transferred to the database via Excel-file**
- Reviewing/updating general data
- “Table 1: Energy and water consumption” and “Table 2: Proposed EEI-measures and their impacts”

Phase III  **Follow up – data via online energy efficiency agreement’s annual reporting**
- Follow up data related to the implementation of the proposed measures in energy audits, Table 2, see below (most of the energy audits are made in the companies/communities who has joined to EE agreements)

### TABLE 2
**SUMMARY OF THE PROPOSED MEASURES**

<table>
<thead>
<tr>
<th>MEASURE</th>
<th>TOTAL SAVING</th>
<th>ROI</th>
<th>INVESTMENT</th>
<th>CO2 reduction</th>
<th>ENERGY SAVING</th>
<th>ELECTRICITY</th>
<th>WATER SAVING</th>
<th>STATUS OF IMPLEMENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>€/a</td>
<td>a</td>
<td>€</td>
<td>t/a</td>
<td>HEAT</td>
<td>ENERGY</td>
<td>POWER</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MWh/a</td>
<td>€/a</td>
<td>€/a</td>
<td>m³/a</td>
</tr>
<tr>
<td>1</td>
<td>Description of measure</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Description of measure</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Description of measure</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
<td>.</td>
</tr>
<tr>
<td>TOTAL</td>
<td>0</td>
<td>0,0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- Normally approx. 4...10 measures/audit
To avoid double-counting within three instrument package is essential

- Monitoring boundaries
  - Voluntary agreements 1997  \(\rightarrow\) 9 TWh/a
  - Energy Audits 1992  \(\rightarrow\) 1.1 TWh/a
  - Subsidies 1992  \(\rightarrow\) EAs 1998  \(\rightarrow\) EEIs 0.5 TWh/a

- E.g. total savings approx. 9.5 TWh/a (not 10.6 TWh/a)

EA = Energy Audit
EEI = Energy efficiency investment
Monitoring has a crucial role to reveal the results and create trust and commitment

- Well functioning monitoring systems has been crucial to reveal the results and for credibility and commitment potential both for agreement scheme as well as for energy audit scheme connected closely to the agreements
- Long term top-level commitment achieved
  - Energy Efficiency Agreements (Voluntary Agreements) have been part of all national energy policy and strategy papers since they were launched 1997 and Energy Audits already before, since 1992
  - Energy Audit subsidies available since 1992
  - Investment subsidies for EEI measures available since 1998
  - Adequate recourses for programme administration
Thank you!

www.motiva.fi/en
www.energyefficiencyagreements.fi
Motiva

An expert company promoting efficient and sustainable use of energy and materials.
Motiva Group

**Motiva Oy**
- Owned by the Finnish State (100%)
- Number of personnel 44
- Expert services
  - Mainly for Finnish governmental authorities (ministries, agencies, institutes)

**Motiva Services Oy**
- Owned by Motiva Oy (100%)
- Number of personnel 13
- Expert services
  - For companies, associations, municipalities, international projects

**Annual Turnover (Million €)**

- 2007: 4.0
- 2008: 5.1
- 2009: 5.9
- 2010: 6.1

Motiva Group
Motiva’s Milestones

1993
- Energy Information Centre MOTIVA was set up as a 3-year project within Finntech Finnish Technology Ltd Oy

1996
- Personnel 27, Turnover 4,4 M€

1998
- Personnel 43, Turnover 6,1 M€
- Motiva’s operations were made permanent as an independent business unit in the Finntech-company
- Promotion of renewable energy sources was added into Motiva’s operations

2000
- Motiva Oy, 100% state-owned, was established

2005
- Personnel 57, Turnover 8,6 M€ (estimated)
- Material efficiency was added to the scope of Motiva’s activities

2006
- Subsidiary company Motiva Services Oy was established

2008
- Coordination of Consumer Energy Advice activities

2010
- Personnel 43, Turnover 6,1 M€
- Ecolabel Finland to Motiva Services Oy

2011
- Personnel 57, Turnover 8,6 M€ (estimated)
Method of Operation

to bind methods technologies communication into an efficient entity.

Motiva produces, refines and disseminates information, develops methods and boosts the introduction of advanced technology.
Motiva’s Market Position

Public administration

Motiva

Co-operation networks

Industry and Suppliers

The end-users of energy and materials

Public sector

Companies

Consumers
Areas of Operation 1/2

Energy Efficiency Agreements
• development, promotion of implementation, monitoring, advisory services

Energy Audits and Analyses
• development, training and qualification, promotion, quality control, advisory services

Energy-efficient Technology
• speeding up introduction of new technologies

Energy Management
• energy management systems, continuous improvement of energy efficiency

Renewable Energy
• increasing sustainable use of energy, speeding up introduction of different technologies
Areas of Operation 2/2

Material Efficiency
• efficient use of materials

Monitoring and Impact Assessment
• effectiveness of programmes and activities

Advisory Services and Communications
• influencing in attitudes and consumption behaviour, communication campaigns

Training Services
• competence development, training programmes and events

Ecolabelling
• administration of the Nordic ecolabel and European ecolabel
More information

www.motiva.fi/en