



# Energy Audit, Minimum Criteria in EED

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# Content

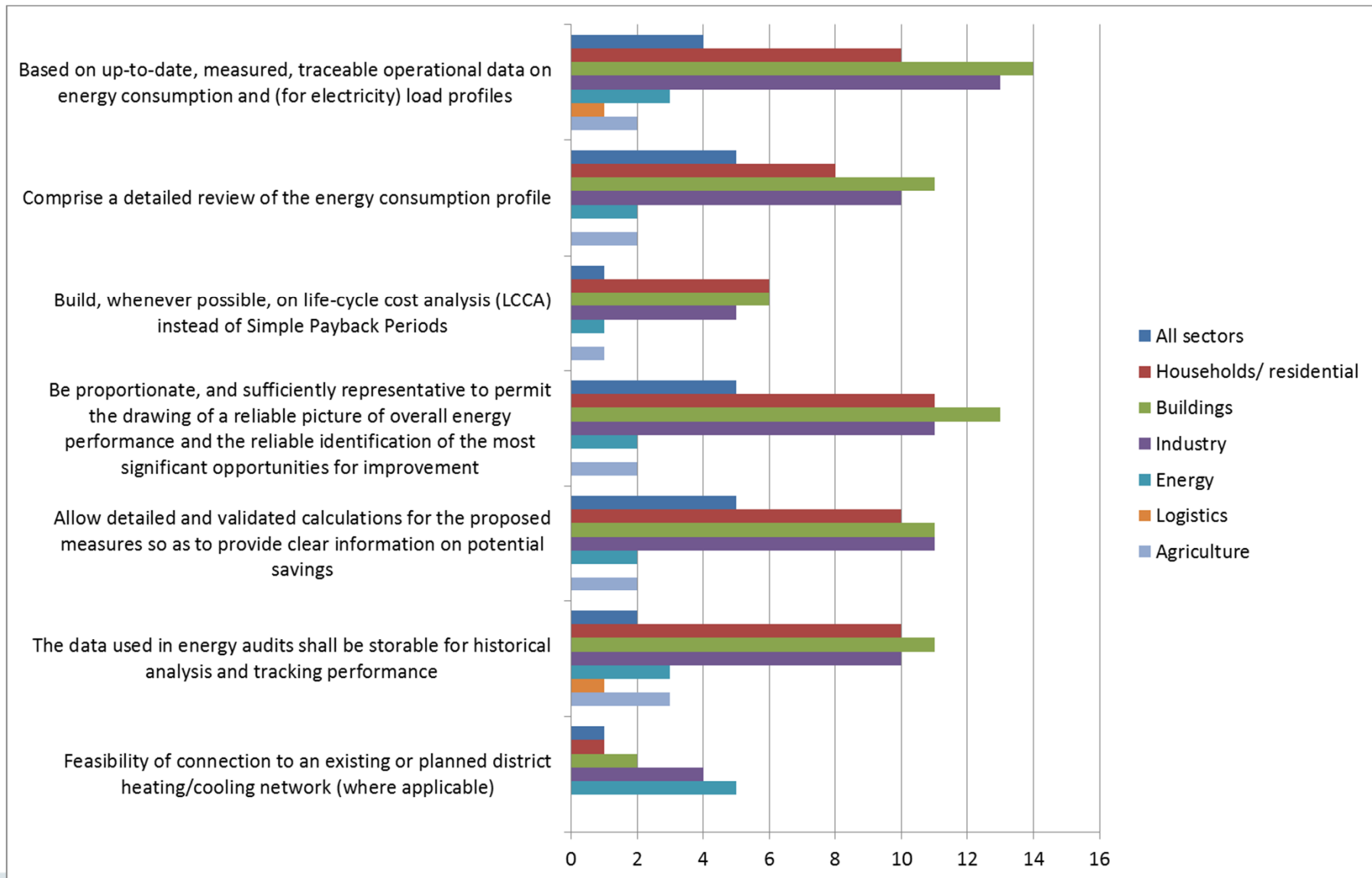
- Energy Audit minimum criteria, EED Annex VI
- Finnish experiences

# EED minimum criteria for energy audits, in short

- Based on up-to date, measured data on energy consumption and load profiles
- Detailed review of the energy consumption profile
- Build, whenever possible, a LCC analyses on saving measures
- Give reliable picture of energy performance and identification of opportunities to save energy
- Shall allow detailed calculations for proposed measures
- Data used in audits shall be storable for historical analyses and tracking performance

# Minimum criteria for energy audits

Q8 With reference to the requirement of the Annex VI and art. 8.7, please indicate which criteria for energy audit are already present in guidelines/standards for different sectors (select if applicable).



The minimum criteria gives requirements for the auditing scope, aim and thoroughness – not able to fulfill with "walk through audits"

How these minimum criteria fit in the existing Finnish auditing programs and environment?

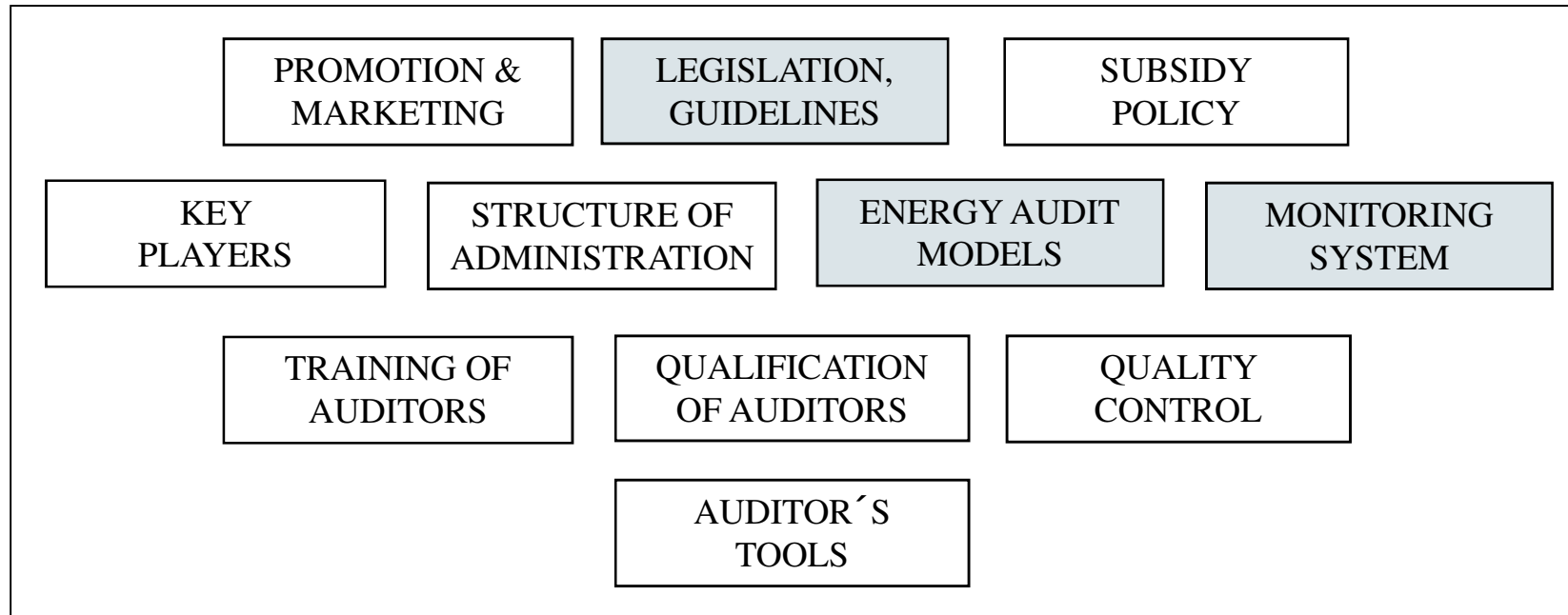
# Energy audit responsibilities in FI

- Buildings,
  - Industry,
  - Energy and
  - Transport sector
- } Ministry of Employment and the Economy
- Apartment buildings, housing
  - Agriculture, farming
- Ministry of Environment  
Ministry of Agriculture

Every audit client categories have it's special environment for auditing and also solutions in the programme

- qualification
- auditor training
- audit scope and thoroughness and report models
- etc.

# Energy Audit Program Elements



- The program runs in Finland on a voluntary basis
  - Audits have to be attractive to the clients (the aim is big volumes, nationally remarkable saving results)
  - Audits and the whole program have to be cost effective to the clients and the government

# Programme elements

Closely linked together .. have to be in balance

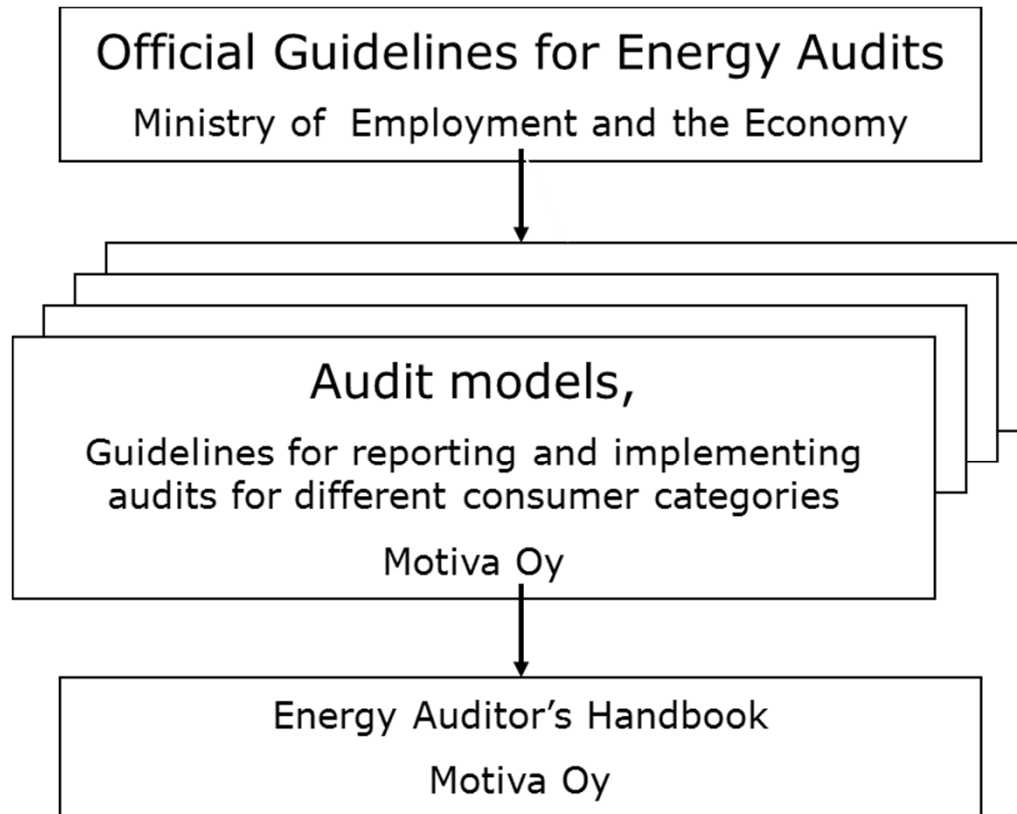
- The scope and thoroughness of audits, average expected savings, auditing costs, subsidies..
- Audit models
  - Support monitoring
  - Help the quality control (the same structure in reporting)
  - Support cost effectiveness and are one of the auditor tools
- Monitoring
  - For marketing (gives info about average saving potential, saving measures..)
  - Convince the government about the profits of the programme costs and guarantee a continuous funding and subsidy scheme
  - Consumer advise and information
- Auditor training
  - Trains the methodology, ministeries rules and guidance, audit models..
  - Aim to make qualified auditors, that can act as responsible leaders of the audit



# Energy Audit Requirements in EED

- High quality
- Cost effectiveness
- Annex VI minimum criteria
  - => requirements for audit guidelines and models, monitoring

# The three guidance levels



# Key Players



# Audit model guides and rules

Every audit model comprise three parts:

1. General description of the scope and model specific features
2. Reporting rules and requirements (table of contents with explanations)
3. Model report

Flexibility in rules and guides support cost-effectiveness,

- an example: measurements in audits



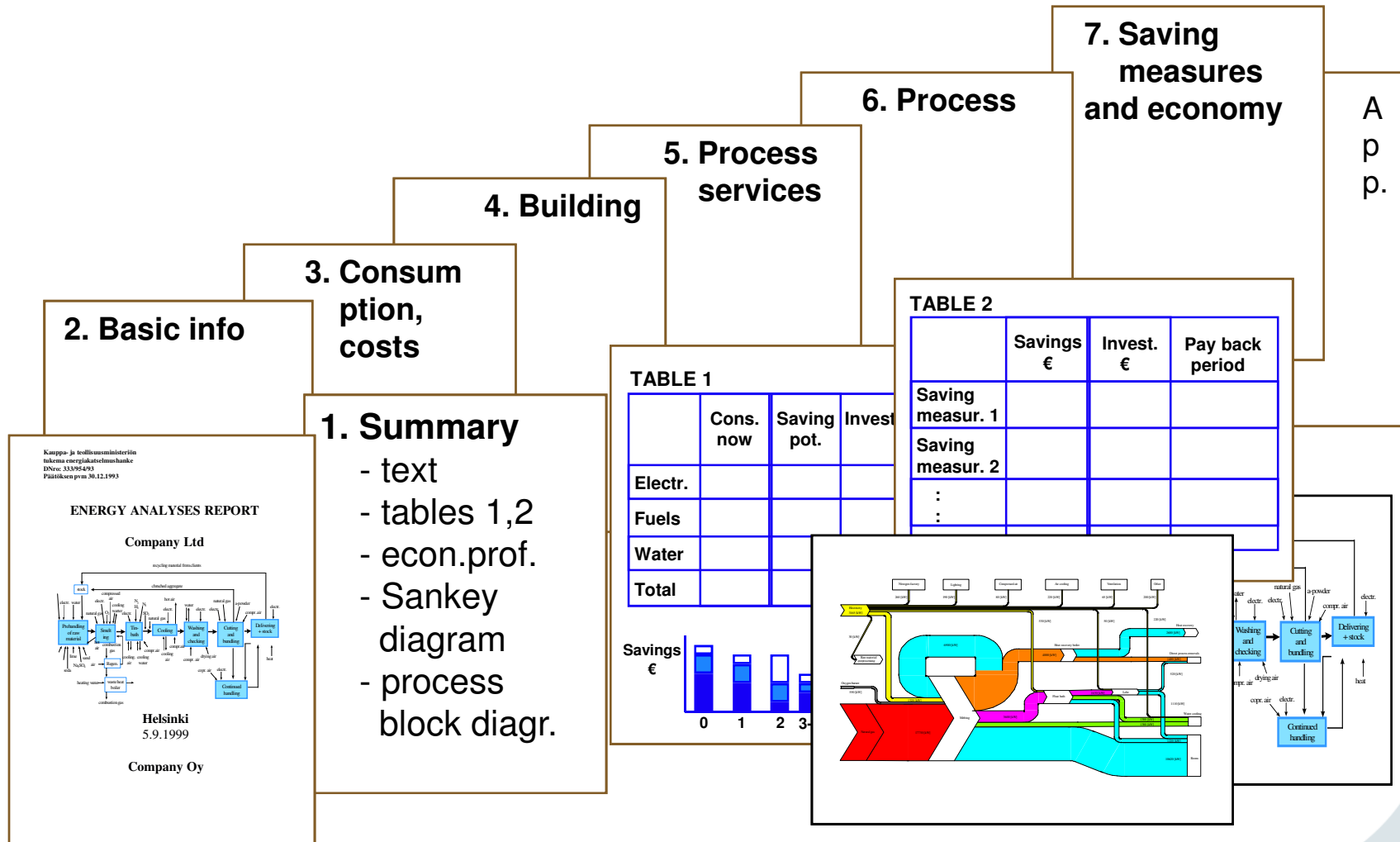
# Requirements of measurements in Motiva Audits

- Measurements have to be implemented but less resources for measurement should be allocated in small buildings (kindergartens etc) than in big commercial buildings or industrial plants
- The basic principle: auditors and clients have wide rights to make decisions what will be measured or not in audits.
- Minimum measuring requirements in the ministries audit guidance:
  - inside temperatures (samples)
  - water flows in taps etc. (samples)
  - efficiency of a heat recovery installation in HVAC units
  - inlet air temperature in ventilation
  - burning efficiency in boilers
  - illuminances in typical rooms in buildings in order to evaluate lighting quality and energy efficiency in all audit projects
  - power demand changes and load curves during day and night time and week ends

# The same requirements in every audit model

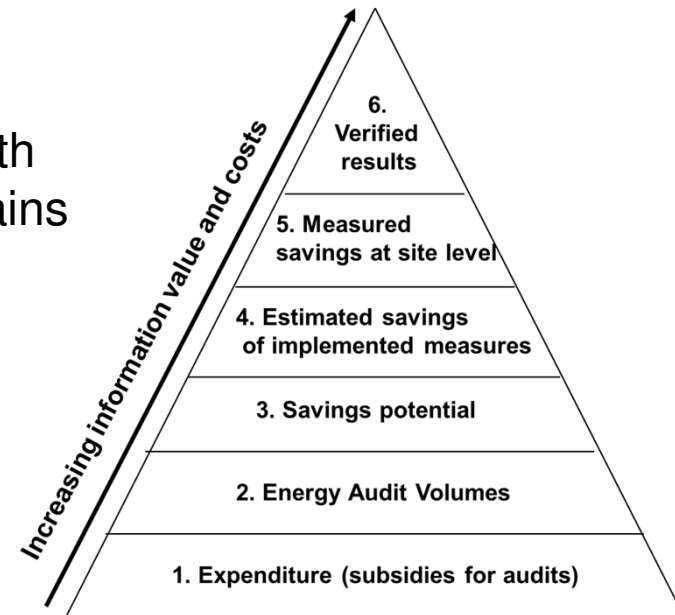
- Comprehensive study
  - Energy efficiency and saving: heating/ electricity/ fuels/ water
  - Possibilities to substitute conventional energy sources by renewables
- Results:
  - Break down of consumption, load and consumption profiles
  - Good understanding about energy costs, energy consumption and changes, historical values, etc.
  - Proposals for saving measures and renewable energy sources
    - Justification
    - Economy (savings, investments, simple payback periods...
    - Other effects and impacts of the proposals

# Energy Analyses in Industry Report Model



# Monitoring

- requirement in all models:
  - paataulu.xls will be delivered to Motiva with the report, strictly in the right format (contains to tables)
- will be loaded electronically to the monitoring database
- online database filing all relevant audit data (volumes, individual saving measures etc.
- To be used:
  - For marketing (gives info about average saving potential, saving measures..
  - Convince the government about the profits of the programme costs and guarantee a continuous funding
  - Consumer advise and information
  - Etc.



# Table 1

	Consumption	Saving potential		Investments
	Nykyinen kulutus	Säästöpotentiaali		Kokonaisinvestointi
	2007			
Heat and Fuels	Lämpö + polttoaineet			
	959 MWh/a 36 600 EUR/a	40 MWh/a 1 200 EUR/a 9 t CO <sub>2</sub> /a	4 % 3 %	0 EUR
Electricity	Sähkö			
	425 MWh/a 25 600 EUR/a	47 MWh/a 3 320 EUR/a 33 t CO <sub>2</sub> /a	11 % 13 %	0 EUR
Water	Vedenkulutus			
	1 426 m <sup>3</sup> /a 3 400 EUR/a	90 m <sup>3</sup> /a 260 EUR/a	6 % 8 %	0 EUR
Total	Kulutukset yhteensä	Säästöt yhteensä		Investoinnit yhteensä
	65 600 EUR/a	4 780 EUR/a 42 t CO <sub>2</sub> /a	7 %	7 220 EUR

Heat and fuel by source		Electric heat				
	MWh	€/a	MWh	€/a		
Heat	<b>Lämpö</b>	959	36600	<b>Lämmityssähkö</b>	6	400
Fuels	<b>Polttoaineet</b>					
-fossil	Fossiiliset polttoaineet	0	0			
-renew.	Uusiutuvat polttoaineet	0	0			
-peat	Turve	0	0			
other	<b>Muu</b>	0	0			
Normituksen vertailupaikkakunta						
Kuopio						



# Table 2

**TABLE 2**  
SUMMARY OF THE PROPOSED MEASURES

	MEASURE	TOTAL SAVING €/a	ROI a	INVEST- MENT €	CO2 reduction t/a	ENERGY SAVING						WATER SAVING		STATUS OF IMPLEMEN- TATION	
						HEAT			ELECTRICITY			water m <sup>3</sup> /a	costs €/a		
						energy MWh/a	costs €/a	power €/a	energy MWh/a	costs €/a	power €/a				
1	Description of measure	0	0,0	0	0	0	0	0	0	0	0	0	0	0	
2	Description of measure	0	0,0	0	0	0	0	0	0	0	0	0	0	0	
3	Description of measure	0	0,0	0	0	0	0	0	0	0	0	0	0	0	
.															
.	Normally approx. 4...10 measures/audit														
.	<b>TOTAL</b>	<b>0</b>	<b>0,0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	

**EXAMPLE:** Total consumptions, energy costs, saving potentials and investments of 402 energy audits in the municipal sector (7,9 million m<sup>3</sup>) reported during the period 2006–2011

<b>Present consumption</b>	<b>MUNICIPAL SECTOR</b>			
<b>402</b>	<b>Saving potential 2006-2011</b>			
Heat				
427 880 MWh/a	67 273 MWh/a	15,7 %		
18 196 648 €/a	2 900 823 €/a	15,9 %		
Electricity				
213 350 MWh/a	18 103 MWh/a	8,5 %		
16 497 419 €/a	1 527 540 €/a	9,3 %		
Water				
1 290 436 m <sup>3</sup> /a	100 046 m <sup>3</sup> /a	7,8 %		
3 347 659 €/a	258 282 €/a	7,7 %		
<b>Total consumptions</b>	<b>Total savings</b>			<b>Investments</b>
38 041 726 €/a	4 686 645 €/a	12,3 %		15 743 142 €

# EED requirements

- Discussions with stakeholders (ministeries etc..) in 2013 about audit programs for different client categories
  - Modifications needed ?
  - Supplementary work needed in any programs or program elements?
  - .....

Thank you!

Kiitos!