

# REDUCTION OF ENERGY CONSUMPTION IN CENTRAL FINLAND MUNICIPALITIES THROUGH EFFECTIVE LONG TERM ACTIONS

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## Actions

- Energy savings contracts
- Energy consumption benchmarking among municipalities
- Energy auditing
- Energy advisory work
- ESCO service promotion
  
- The actions are not exclusive, some municipalities or housing companies are partners in Energy Savings Contracts, benchmark their energy consumptions against other municipal buildings and most of buildings included Energy Savings contract have performed Energy Audit as part of the contract tasks
- Actions are applied nationwide



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## Control of energy efficiency in new buildings

- Building stock is relatively young
- Minimum requirements for energy efficiency of building mantle have been in force for long
- Present minimum U-values W/m<sup>2</sup>K:
  - Wall 0,25
  - Ceiling 0,16
  - Floor 0,25 (0,20)
  - Windows, doors 1,4

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## Energy savings contracts

- Savings contracts are:
  - VOLUNTARY
  - MADE BETWEEN MINISTRY OF TRADE AND INDUSTRY AND CLIENTS
  - INCLUDES VOLUNTARY MEASURES WHERE CLIENT HAS TARGET FOR ENERGY CONSUMPTION REDUCTION
  - REPORT ON PRESENT ENERGY USE, TARGETS AND ACTIONS AND FOLLOW-UP PLAN
  - ENERGY AUDITS ARE INTEGRAL PART
  - CLIENT WILL REPORT THE DEVELOPMENT OF ENERGY CONSUMPTION ANNUALLY
  - SLIGHTLY DIFFERENT CONTRACTS FOR MUNICIPALITIES, HOUSING COMPANIES, INDUSTRIES ETC.
  - FEEDBACK REPORT ON ACTIONS IN THE SECTOR AND THE DEVELOPMENT OF ENERGY EFFICIENCY

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## Energy savings contracts

- 70 MUNICIPALITIES AND 15 MUNICIPAL CO-OPERATIVE BODIES HAVE ENERGY SAVINGS CONTRACTS IN FINLAND (2005)
- CONTRACTS COVER 68 MILLIOM M3 OF MUNICIPAL BUILDINGS OR 55 % OF THEIR BUILDING STOCK
- 52% OF BUILDINGS IN CONTRACT MUNICIPALITIES WERE AUDITED AND 43 % OF ALL MUNICIPAL SECTOR BUILDINGS ARE AUDITED (2005)
- 2700 ENERGY EFFICIENCY MEASURES REPORTED IN MUNICIPAL SECTOR BEFORE END OF YEAR 2005
- ESTIMATED SAVINGS OF THESE ACTIONS 63 GWh HEAT AND 11 GWh ELECTRICITY

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## Energy savings contracts

- NEXT CONTRACT MODEL IS MORE COMPREHENSIVE "ENERGY AND CLIMATE CONTRACT"
- MORE EMPHASIS ON ENERGY EFFICIENT INVESTMENTS AND MORE EMPHASIS ON ENERGY IN ALL PROCUREMENTS
- 9 GOVERNMENTAL FACILITY OWNERS HAVE MADE ENERGY SAVINGS CONTRACTS COVERING 95 % OF GOVENMENTAL BUILDING STOCK

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## Energy Benchmarking in Municipalities

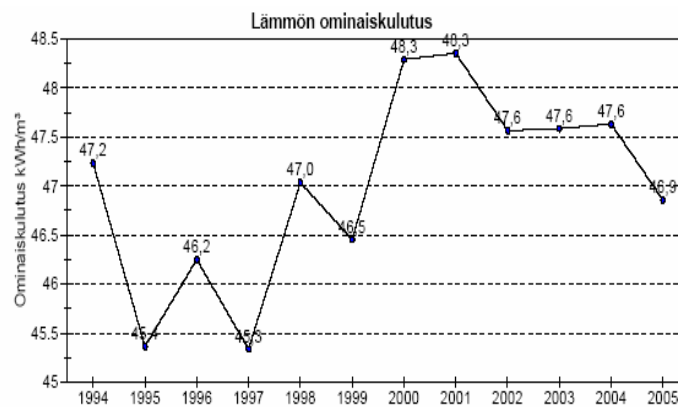
- ASSOCIATION OF MUNICIPALITIES HAVE COLLECTED THE ENERGY AND WATER CONSUMPTION DATA SINCE 1982
  - TO PAY ATTENTION TO ENERGY FOLLOW-UP
  - COMPARE THE DEVELOPMENT OF ENERGY CONSUMPTION WITHIN THE MUNICIPALITY
  - COMPARE THE ENERGY CONSUMPTION BETWEEN SAME TYPE OF BUILDINGS IN DIFFERENT MUNICIPALITIES
- The municipalities reporting their consumption cover 59 % of population (2005), better coverage in bigger municipalities (over 30 000, 90 %)

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## Energy Benchmarking, specific heat consumption in public buildings (5053 degree days)

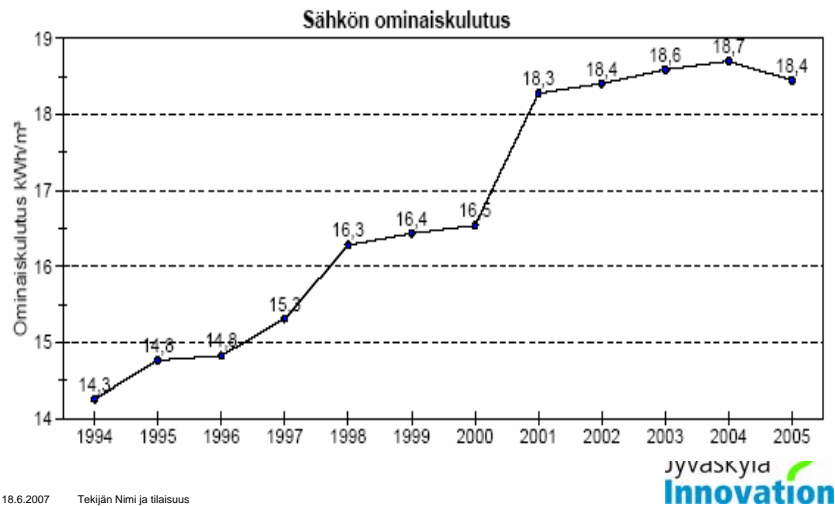


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## Specific electricity consumption in public buildings



## Energy bechmarking..

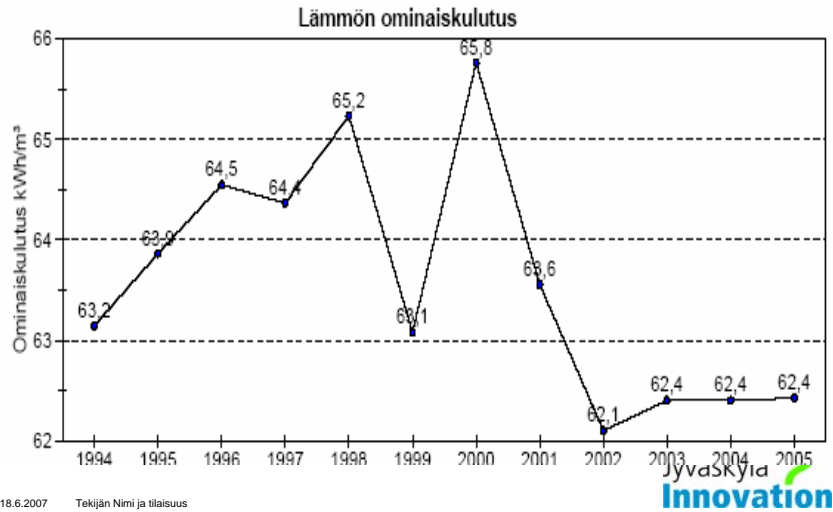
- Energy consumption and specially electricity consumption in public buildings have increased
- One reason is higer utilisation degree, e.g. schools are used for other activities during evenings etc.

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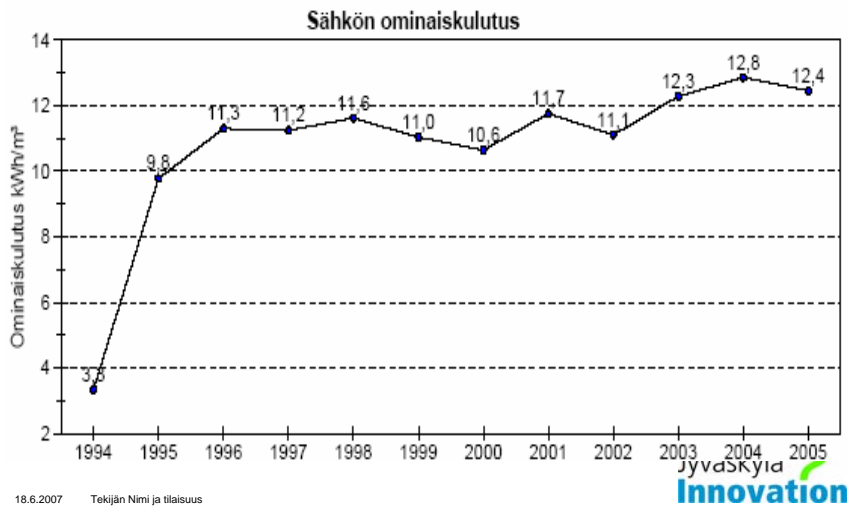
## Specific heat consumption in municipal housing, 5053 degree days



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## Specific electricity consumption



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## Energy auditing

- The methodology is developed by National energy agency Motiva
- Public buildings and housing: Audit is carried out by team of two trained and accredited persons (one electrician background, one HVAC background)
- Public support of 40 – 50 %
- Report with recommendations
  - Adjustments with not investment
  - Behavioral issues
  - Investments with short term payback 2-4 years
  - Long term investments, payback 4-8 year
  - Tasks to be done during next major refurbishment, but do not have payback if done separately

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## Energy auditing

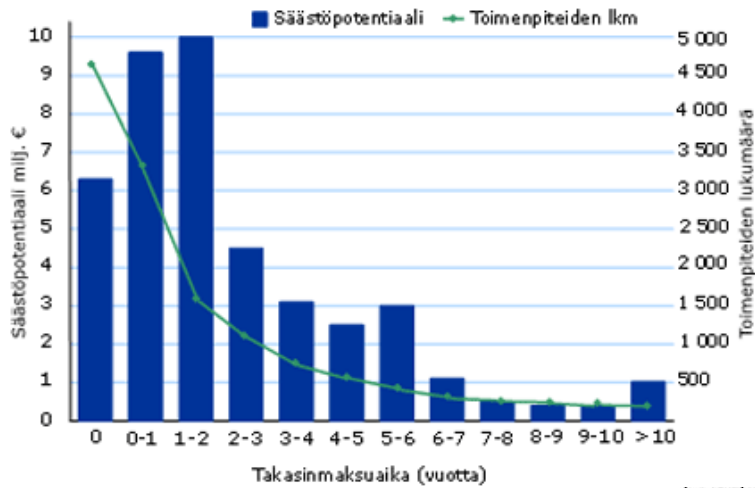
- Integral part of energy savings contract
- Widely applied in governmental buildings, 90 %
- Well covered in municipal buildings, 54 %
- Private sector coverage about 25 %
  
- About 70 % of the recommended savings

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## Energy auditing, distribution of savings potential found, investment vs. payback time



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## Energy audits

- Savings potential found during audits in municipal sector
  - Heat, electricity and Water

Nykyinen kulutus	KUNTASEKTORI		
	Säästöpotentiaali 2000-2005		
<b>842</b>			
Lämpöenergia			
675 732 MWh/a	85 685 MWh/a	12,7 %	
21 440 491 €/a	2 667 911 €/a	12,4 %	
Sähköenergia			
311 382 MWh/a	22 644 MWh/a	7,3 %	
17 455 353 €/a	1 520 439 €/a	8,7 %	
Vedenkulutus			
2 413 300 m <sup>3</sup> /a	165 656 m <sup>3</sup> /a	6,9 %	
5 277 398 €/a	369 054 €/a	7,0 %	
<b>Kulutukset yhteensä</b>	<b>Säästöt yhteensä</b>		<b>Investoinnit yhteensä</b>
44 173 242 €/a	4 557 404 €/a	10,3 %	7 752 602 €

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## Energy advisory work

- Energy advisory work, Nationwide MOTIVA
- Energy advisors in energy agencies
- Bioenergy advisors in regional forestry centres
- Energy advisory services for agricultural sector
- Bioenergy promotion projects
- Energy entrepreneurship advisory services
  - About 300 small energy supply companies established

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## ESCO services

- About 50 contracts in Finland
- About half in public sector
- One active municipality in Finland, Turku with 13 contracts
- Several feasibility studies in Central Finland
  - Fast payback cases typically invested by owner immediately when found
  - Savings potentials found typically with long payback times, part of the improvements can be done as ESCO service, but the timing must be together with other major renovation work in the building
  - Few fuel change projects made from oil to pellets, most cases done as energy supply contracts
- Slightly increased energy savings investment grant, if ESCO concept used

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## CONCLUSIONS

- BASIC ENERGY AWARENESS IS RELATIVELY ON A GOOD LEVEL
- VOLUNTARY MEASURES GIVE GOOD RESULTS WITH SMALL PUBLIC SPENDING
- COMPULSORY ENERGY EFFICIENCY CERTIFICATE CREATED STROM OPPOSITION, EVEN THE TARGET OF THE CERTIFICATE SYSTEM IS WELL ACCEPTED
- GOVERNMENTAL BUILDINGS ARE MANAGED BY PROFESSIONAL, SAME IN BIGGER MUNICIPALITIES
- ADVISORY WORK IS NEEDED IN SMALLER MUNICIPALITIES, SMALL HOUSING COMPANIES AND AMONG PRIVATE HOUSE OWNERS

## THANK YOU FOR YOUR ATTENTION