



Strengthening Energy Efficiency in Macedonian Municipalities

ENSI - Energy Saving International AS, Norway



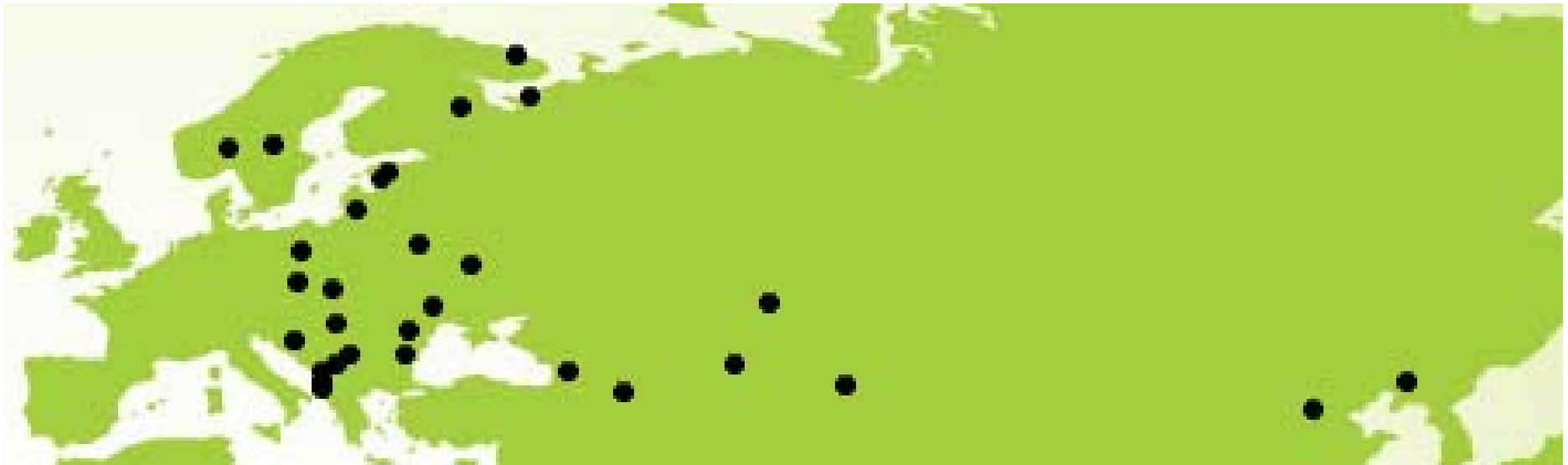
Presented by:

Dragan Blazevev, ENSI representative

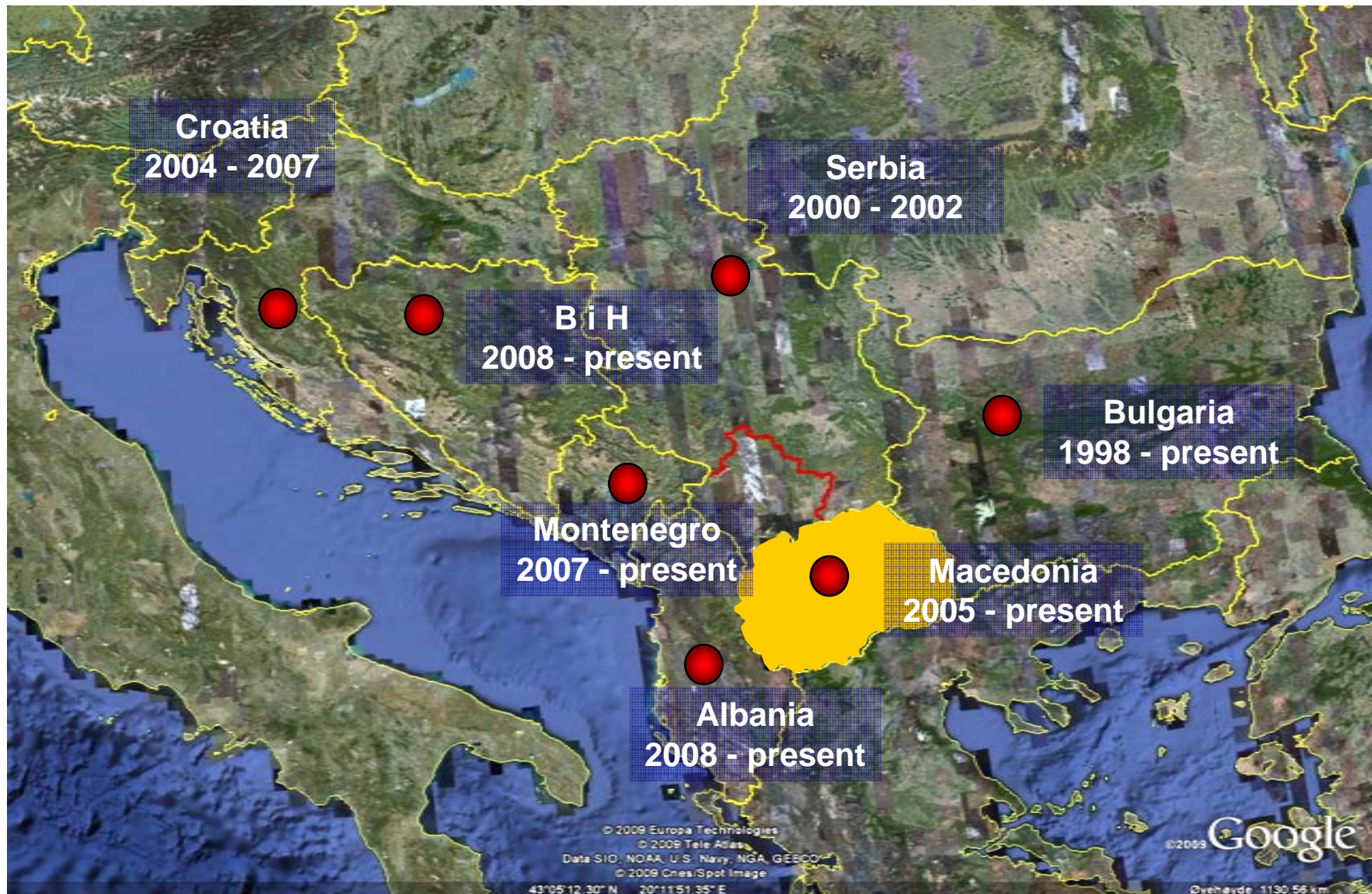
ENSI – Energy Saving International AS

- ✓ Located in Oslo, Norway
- ✓ Capacity Building/Technical Assistance within energy efficiency, renewables and the environment
- ✓ Specialised in energy efficiency in buildings
- ✓ 18 years of international experience
in 27 Central and Eastern Europe and CIS countries and China
- ✓ Clients: Public sector / Local governments, Private industry

Location of ENSI's EE programmes



ENSI activity in Balkan countries



Energy Efficiency in Macedonian Buildings

Start up: October 2005

Supported by:



Macedonian partners:



Faculty of Mechanical Engineering - Skopje
University of Ss. Cyril and Methodius

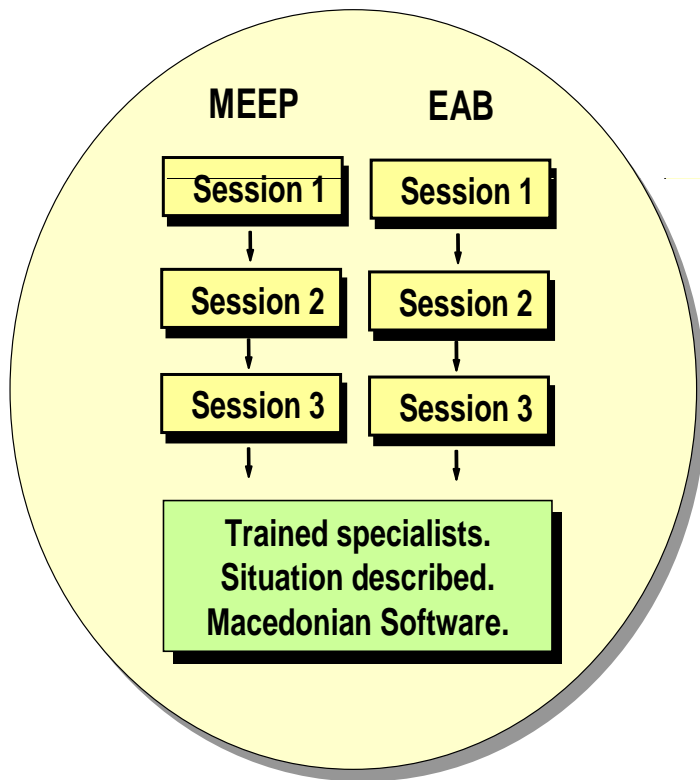


Two main components:

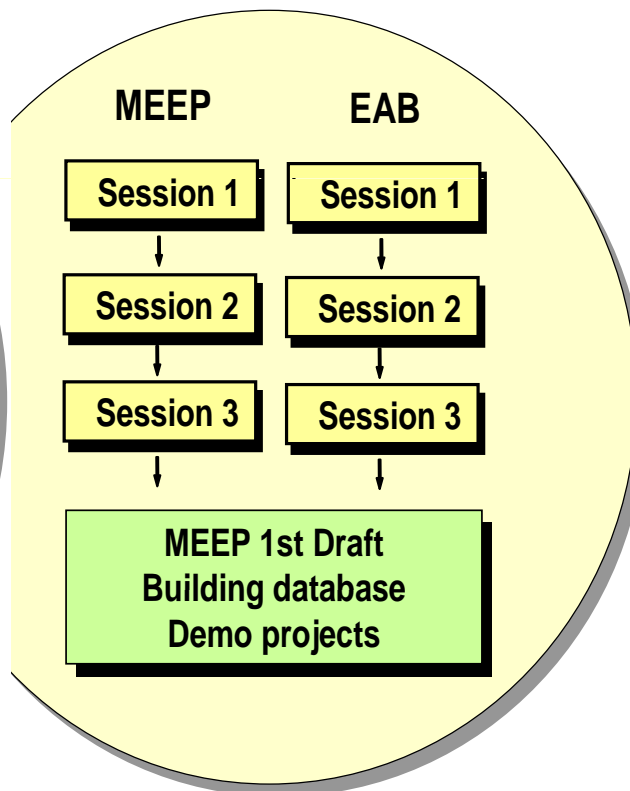
1. Energy Auditing in Buildings (EAB)
2. Municipal Energy Efficiency Programme (MEEP)

Combined training over 3 stages

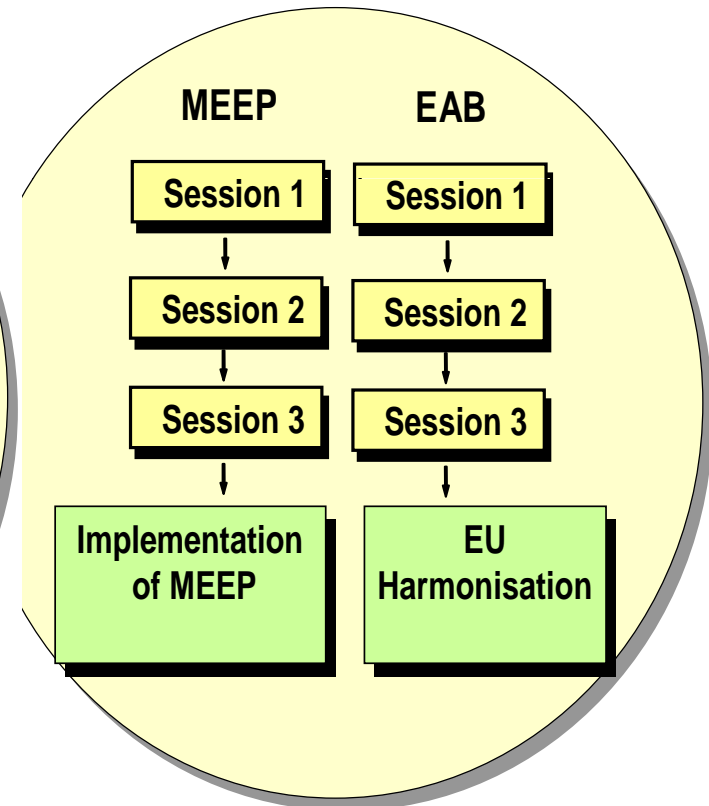
Stage 1



Stage 2



Stage 3



Energy Auditing of Buildings

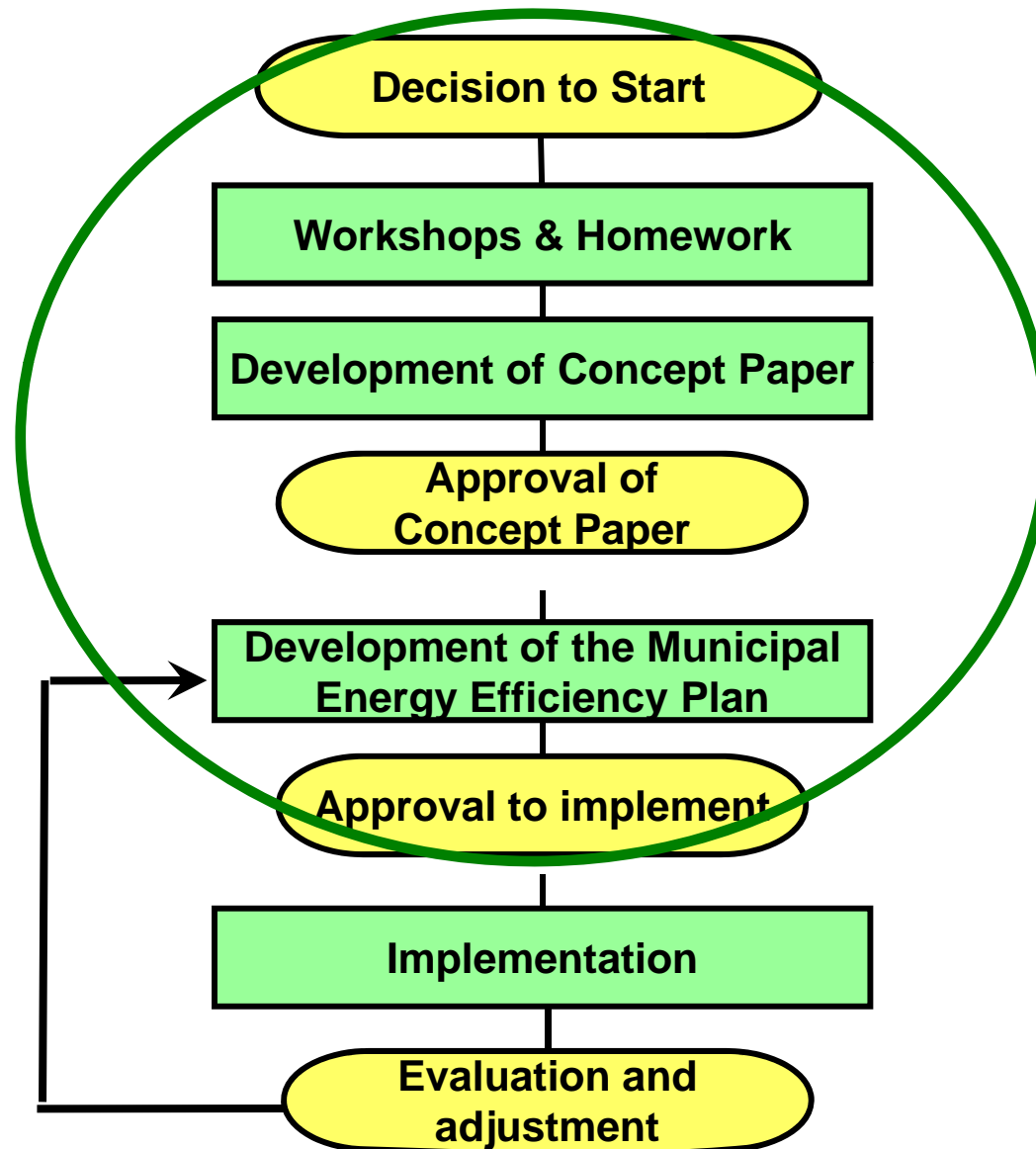
Outcome 1:

- ✓ Macedonian version of the ENSI Software and Energy Auditing Manuals

Parameter	Standard	Actual	Baseline	Sensitivity	kWh/m ² a	Measures	Savings
1. Heating :		24,3 kWh/m²a					
U - wall	0,80 W/m ² K	0,80	0,80	+ 0,1 W/m ² K = 2,07		0,80	
U - window	2,80 W/m ² K	2,80	2,80	+ 0,1 W/m ² K = 0,53		2,80	
U - roof	0,60 W/m ² K	0,60	0,60	+ 0,1 W/m ² K = 1,18		0,60	
U - floor	0,60 W/m ² K	0,60	0,60	+ 0,1 W/m ² K = 1,18		0,60	
Compactness ratio	0,65 -	0,65	0,65			0,65	
Window factor	18,0 %	18,0	18,0			18,0	
Total solar gain	0,56 -	0,56	0,56			0,56	
Infiltration	0,50 1/h	0,50	0,50	+ 0,1 1/h = 2,61		0,50	
Indoor temperature	20,0 °C	20,0	20,0	+ 1 °C = 2,29		20,0	
Setback temperature	17,0 °C	17,0	17,0	+ 1 °C = 4,17		17,0	

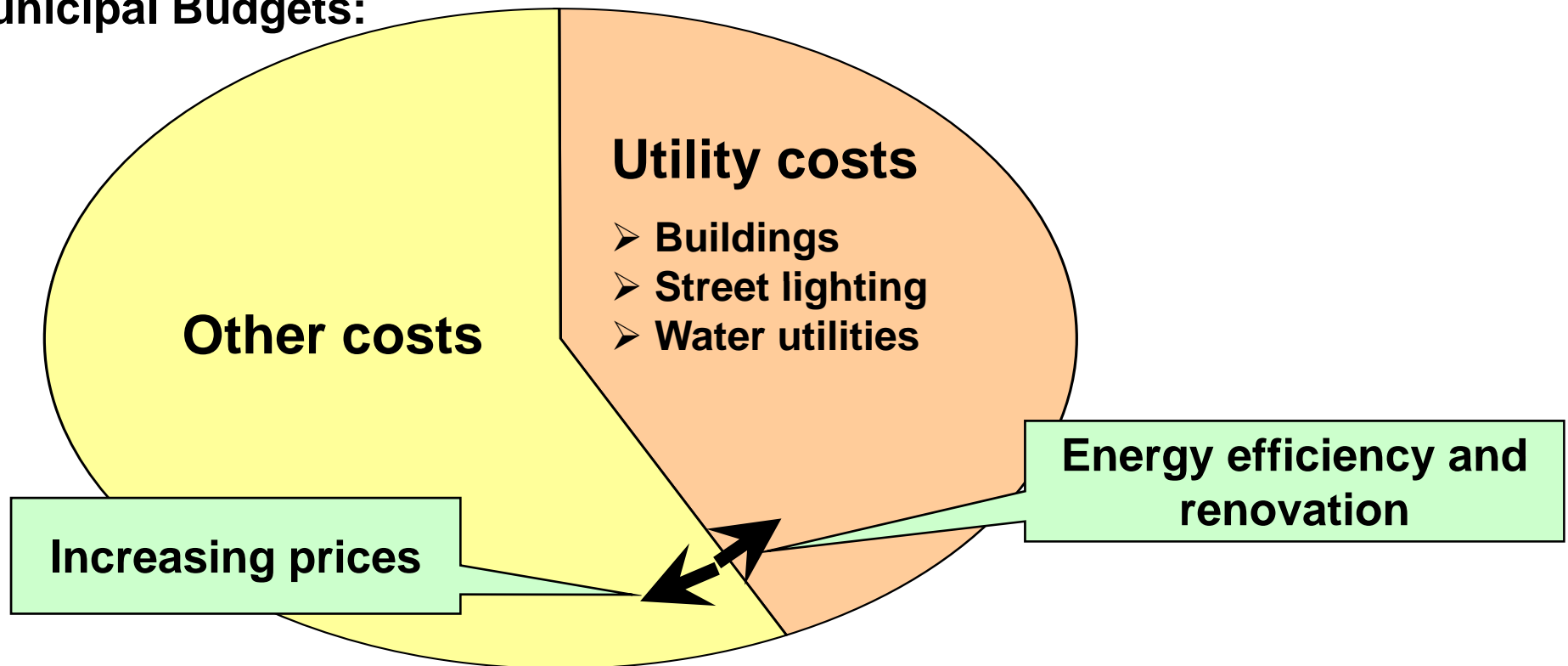


Municipal Energy Efficiency Planning



Municipalities: increasing utility costs

Municipal Budgets:



What to do ?
Where to start ?
Budget consequences ?
Available experts ?



Municipal Energy Efficiency Plan
(MEEP)

Municipalities: obligation to develop MEEP

Law on Energy (2006), articles 128 and 129

“The municipal energy efficiency policy is determined by the [Program for Energy Efficiency Promotion](#) and should correspond to the National Strategy for Energy Efficiency Promotion.

The Program passes the Municipal Council for period of 5 years.

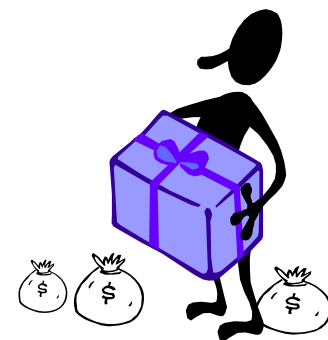
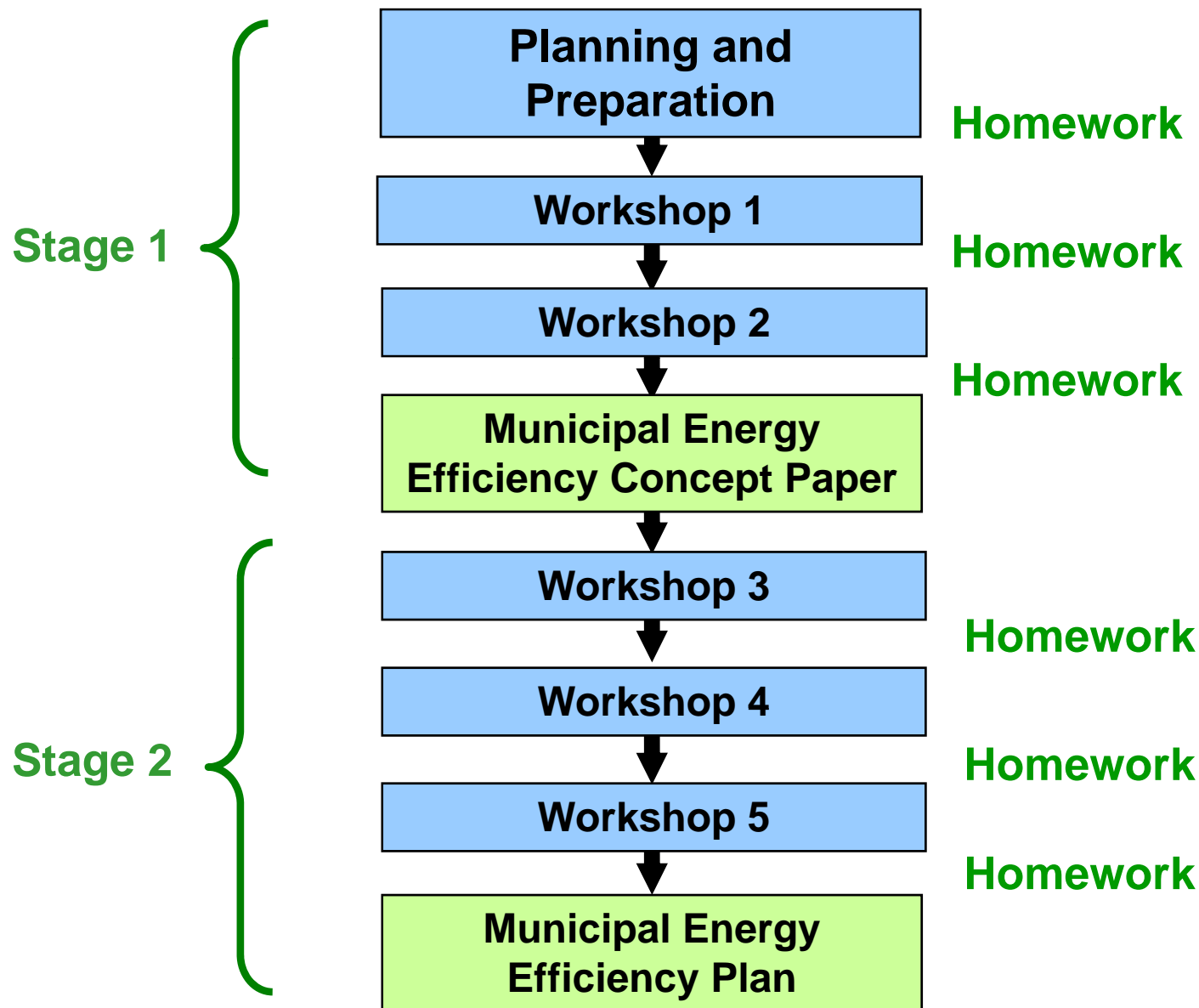
The Mayor prepares a Plan for realization of the program and reports on the past year’s achievements and submits it further to the Municipal Council for adoption.”

Energy Efficiency in Macedonian Municipalities; Capacity Building Programme

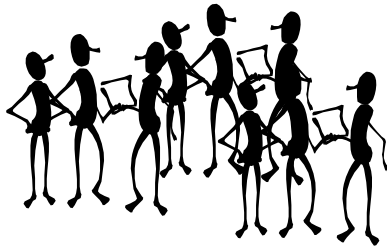
Increased awareness about energy efficiency possibilities in the municipal sector, and increased knowledge and skills on how to prepare Municipal Energy Efficiency Plans

- **Opportunities and barriers**
- **Energy efficiency measures**
- **Utilisation of renewables**
- **Operation, maintenance and management of municipal facilities**
- **Project financing and business planning**
- **Municipal energy efficiency planning**

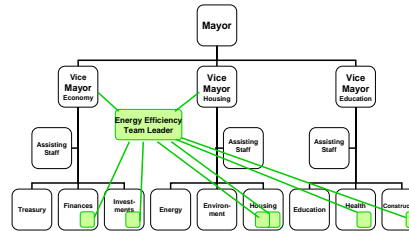
Interactive Capacity Building Programme



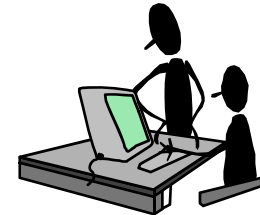
Outcomes from Stage 1



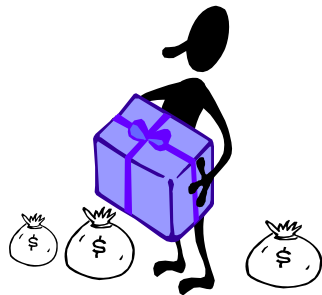
Consultants and Municipal specialists *trained*



Energy Efficiency Team *established*



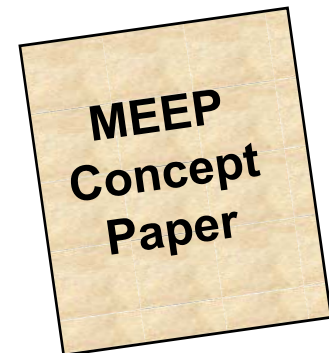
Building Database *established*



Financial Sources *identified*

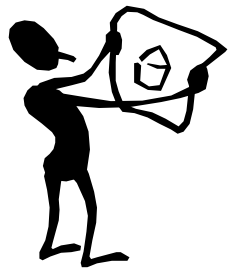


Barriers *identified*



Municipality Administration to approve the MEEP Concept Paper

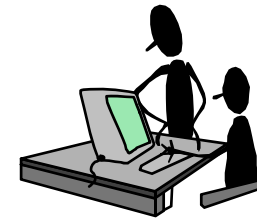
Outcomes from Stage 2



Proposals for removing identified barriers



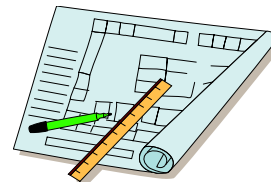
Energy Audits for projects developed



Building Database completed



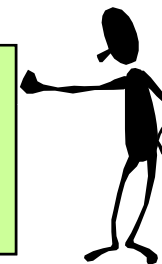
Financial schemes described



Routines for Operation and Maintenance introduced









Municipal Energy Efficiency Plan;
to be approved for implementation

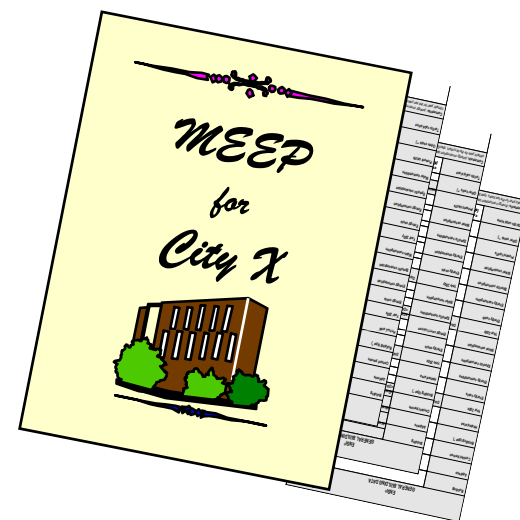


Municipal Energy Efficiency Plan

A tool for municipal decision makers and experts dealing with energy management in municipalities.

The plan describes:

-  **The municipality's policy on energy efficiency**
-  **Status and present situation**
-  **Objectives / targets for energy efficiency**
-  **Action plan and budget**
-  **Financial plan**
-  **Organizing the work**



Municipal Database

Графикони

Општина
Кисела Вода

Од тримесечје и година: 1 2009
До тримесечје и година: 4 2009

- По вид на гориво и сектори (во тое и ден)
- По сектори и по години (до 3 години)
- Потрош. и расходи за енергија по год.
- Енергија и буџетски расходи
- Релат. удел на расходи за енергија
- Енергија и расходи по целни групи
- Удел на енергија и расходи по целни групи

Извештај

Извештај на екран
 Извештај на печатар

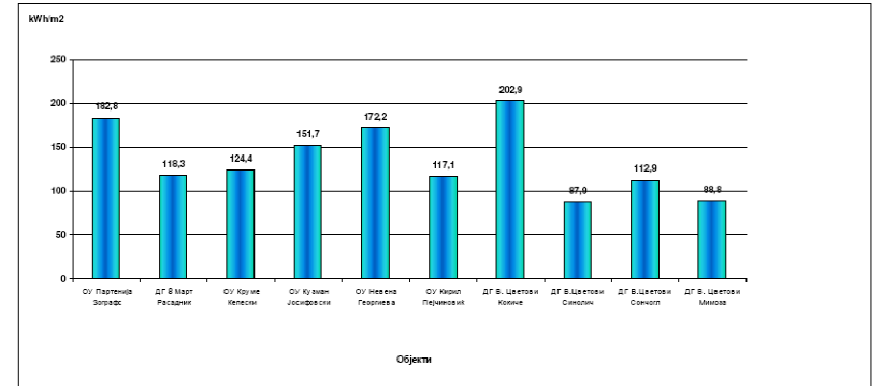
Целна група

Од тримесечје и година: 1 2009
До тримесечје и година: 4 2009

Излез

- Специфична потрошувачка по објекти во целна група (до 3 години)
- Вкупна потрошувачка по објекти во целна група (до 3 години) во MWh
- Специфична потрошувачка во целна група
- Специфична потрошувачка во целна група за избрани објекти

Специфична потрошувачка на објекти кои се греат со Централно греење во општина Кисела Вода за периодот 1' 2009 - 4' 2009 во сектор Образование



Continuously in use to identify inefficient buildings and to monitor results

Енергија и расходи Година: 2008 Тримесечја: 1 - 4

Сектор: Сите
Целна група: Сите
Општина: КОЧАНИ Населено место: Сите
Објект: Сите

	тое	MWh	Вредност (ден.)
Електрична енергија	195,317	2271,540	10695749,00
Лесно бродско гориво	224,087	2606,132	9031377,00
Топла вода за греење	0,000	0,000	1035574,00
Дрва	53,516	622,396	1449182,00
Вкупно	472,921	5500,068	22211882,00
Воа			1659543,00
Вкупно	472,921	5500,068	23871425,00

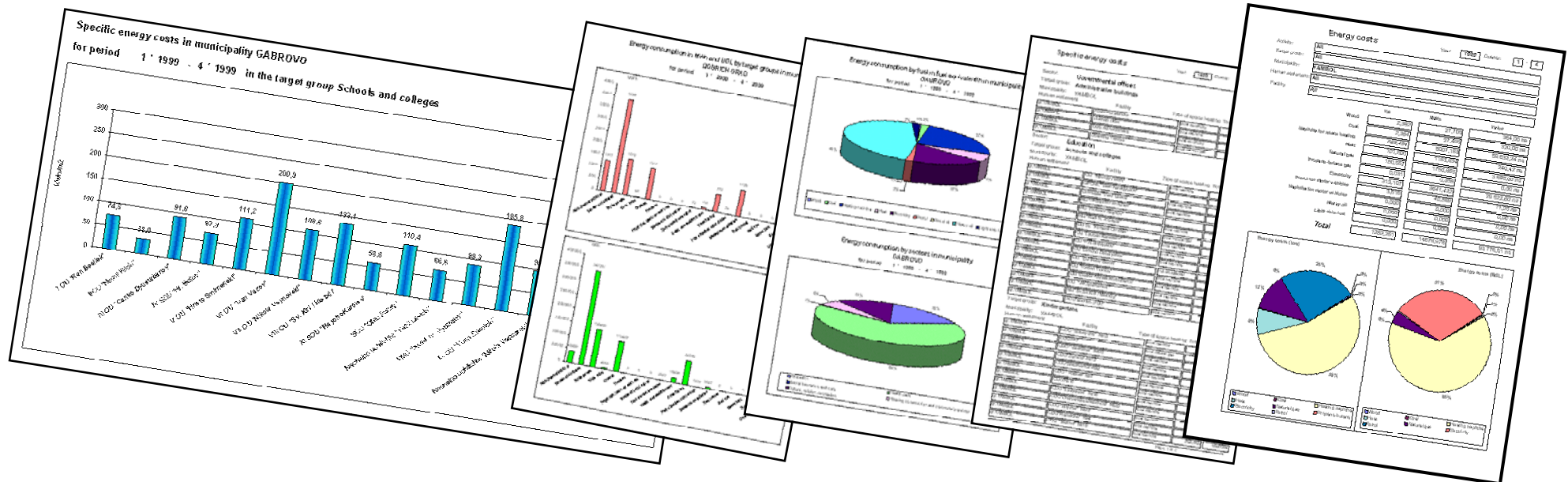
Расходи за енергија (тое)

Расходи за енергија (ден.)

Процентни расходи	во тое	во денари
Електрична енергија	41,30%	44,81%
Лесно бродско гориво	47,38%	37,85%
Топла вода за греење	0,00%	4,24%
Дрва	11,32%	6,07%
Воа	0,00%	6,85%

The main use of the database

- ✓ Overview of energy consumption/costs in municipal facilities
- ✓ Overall overview over the building stock
- ✓ Prioritizing / selecting inefficient buildings for Scanning / Energy Auditing
- ✓ Monitor and document results from implemented EE projects
- ✓ Status reporting



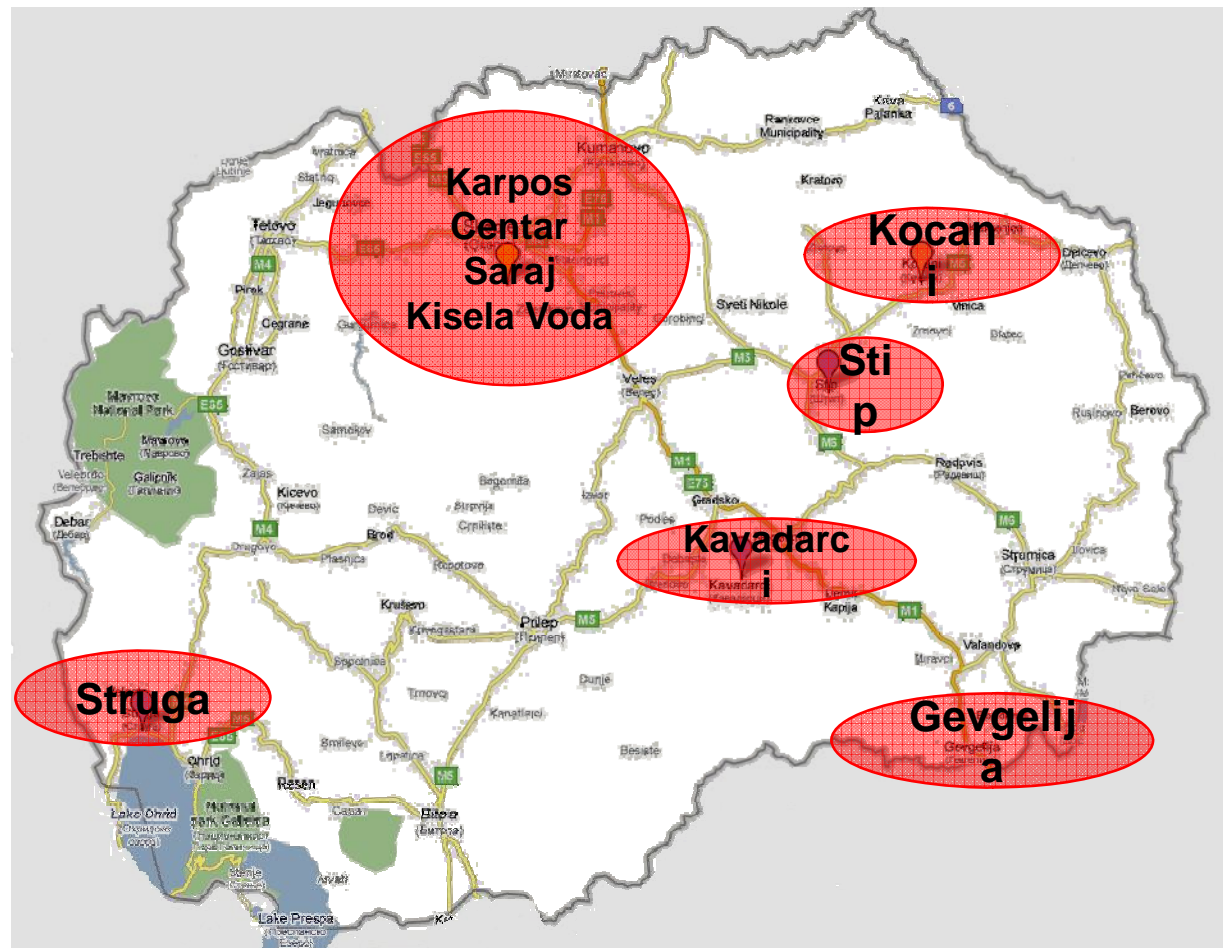
Local Government Energy Efficiency Programme in Macedonia

4 pilot municipalities:

- Centar
- Gevgelija
- Karpos
- Saraj

5 new municipalities:

- Struga
- Kavadarci
- Stip
- Kochani
- Kisela Voda



Aims and objectives of the MEEP programme

Overall aim: **To improve energy efficiency in buildings**

Objectives:

- Train municipal key personnel
- Collect and analyze data (technical + energy)
- Develop plan for Energy Efficiency activities in the municipality



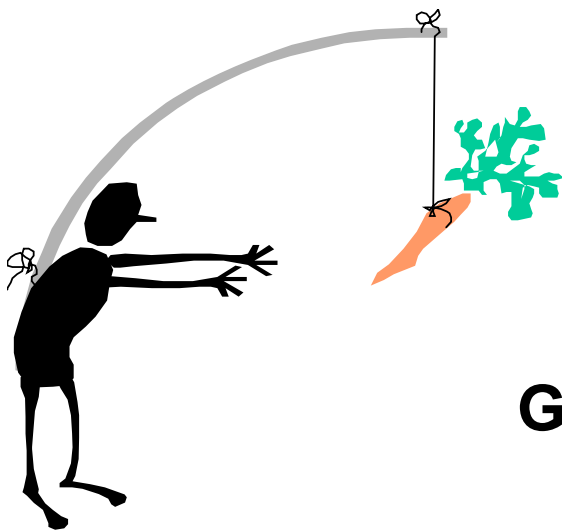
Impact

- Strengthening of local governments
- Reduced energy consumption => improved municipal economy
- Renovated municipal buildings => improved public services



Strengthening Energy Efficiency in Macedonian Municipalities

Local Government Energy Efficiency programme in Macedonia



Goal:

**Improved performance
of local governments in Macedonia
with focus on energy efficiency**

Thank you for your attention

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