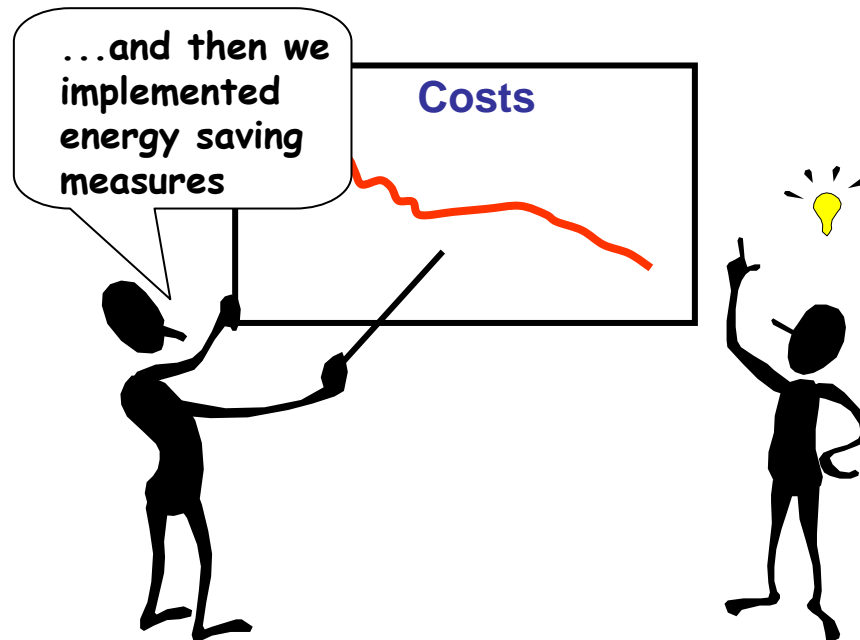


“Norwegian Capacity Building Programmes; results and further possibilities in Romania”

Trond Dahlsveen, ENSI – Energy Saving International



ENSI® - Energy Saving International AS

Capacity Building and Business Development Consultant

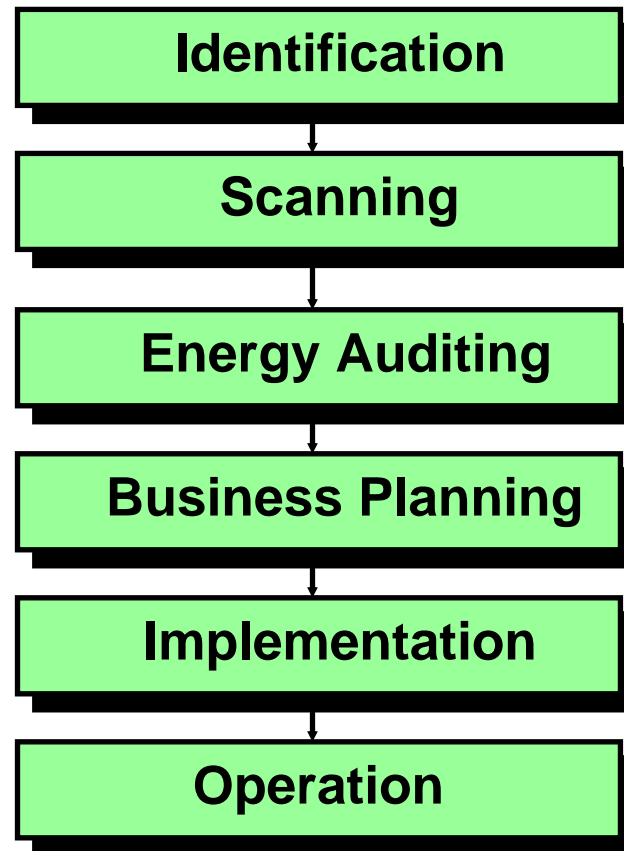
(energy, energy efficiency, renewables and the environment)

15 years of international experience in 24 Central and Eastern Europe and CIS countries:

- 
- Albania
 - Azerbaijan
 - Belarus
 - Bosnia & Herzegovina
 - Bulgaria
 - Croatia
 - Estonia
 - Georgia
 - Hungary
 - Kazakhstan
 - Kyrgyzstan
 - Latvia
 - Lithuania
 - Macedonia
 - Moldova
 - Montenegro
 - Poland
 - Republic of Slovakia
 - Romania
 - Serbia
 - The Czech Republic
 - The Russian Federation
 - Ukraine
 - Uzbekistan

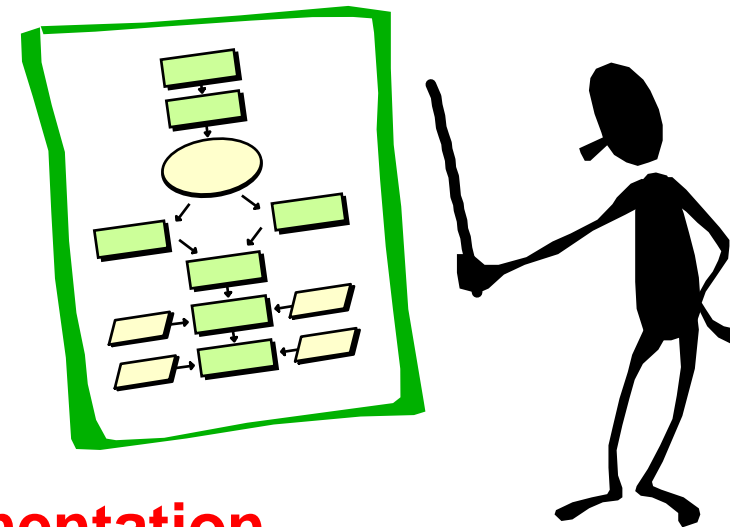
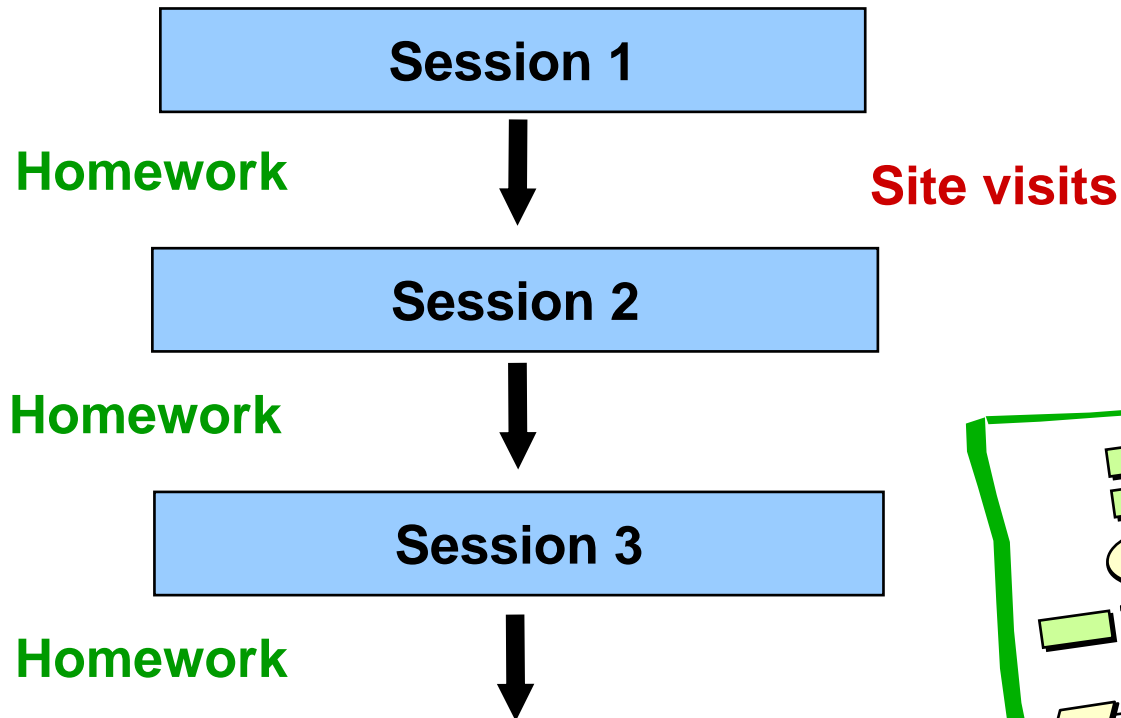
..... and Norway, Sweden and China

Capacity Building on Project Development, Financing, Implementation and Operation/monitoring



Train local consultants and experts to offer professional services and provide continued local training and education.

Efficient Capacity Building: Combined Training and Project Development

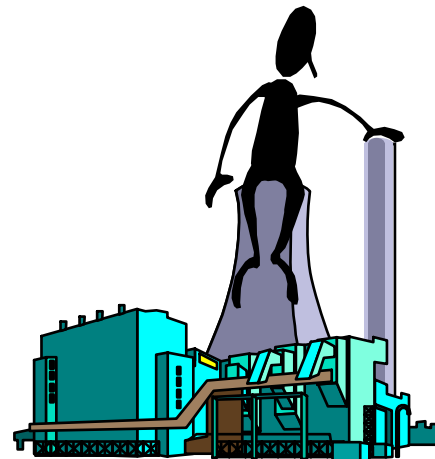


Projects developed, ready for implementation

Cleaner Production & Energy Efficiency in Industry

Identify and implement measures reducing or preventing waste and pollution at the source, giving:

- Lower costs and higher profit
- Less pollution
- Less waste
- Better working conditions
- Better product quality



Session 1

Session 2

Session 3

Bucharest 2003

24 participants from 10 companies:

1. Cesarom, Bucharest
2. Damen, Galati
3. Electrocentrale, Bucharest
3. Faur, Bucharest
5. Oltchim, Ramnicu Valcea
6. Romanceram, Roman
7. Sicomed, Bucharest
8. Termoficare, Pitesti
9. Upetrom "1Mai", Ploiesti
10. Vilmar, Ramnicu Valcea



Bucharest 2003 - results

120 CP&EE measures identified:

Savings	Identified potential Sep. 2003	Unit
Electric energy savings	6 721 950	kWh/year
Water savings	6 181 700	m ³ /year
Heat savings	94 600	Gcal/year
Gas savings	20 411 900	m ³ /year
Raw material savings (various)	61 900	t/year
Reduced emissions of GHG	7 331 400	t/year
Total economic savings	17 368 500	USD/year

Bucharest 2003 - results

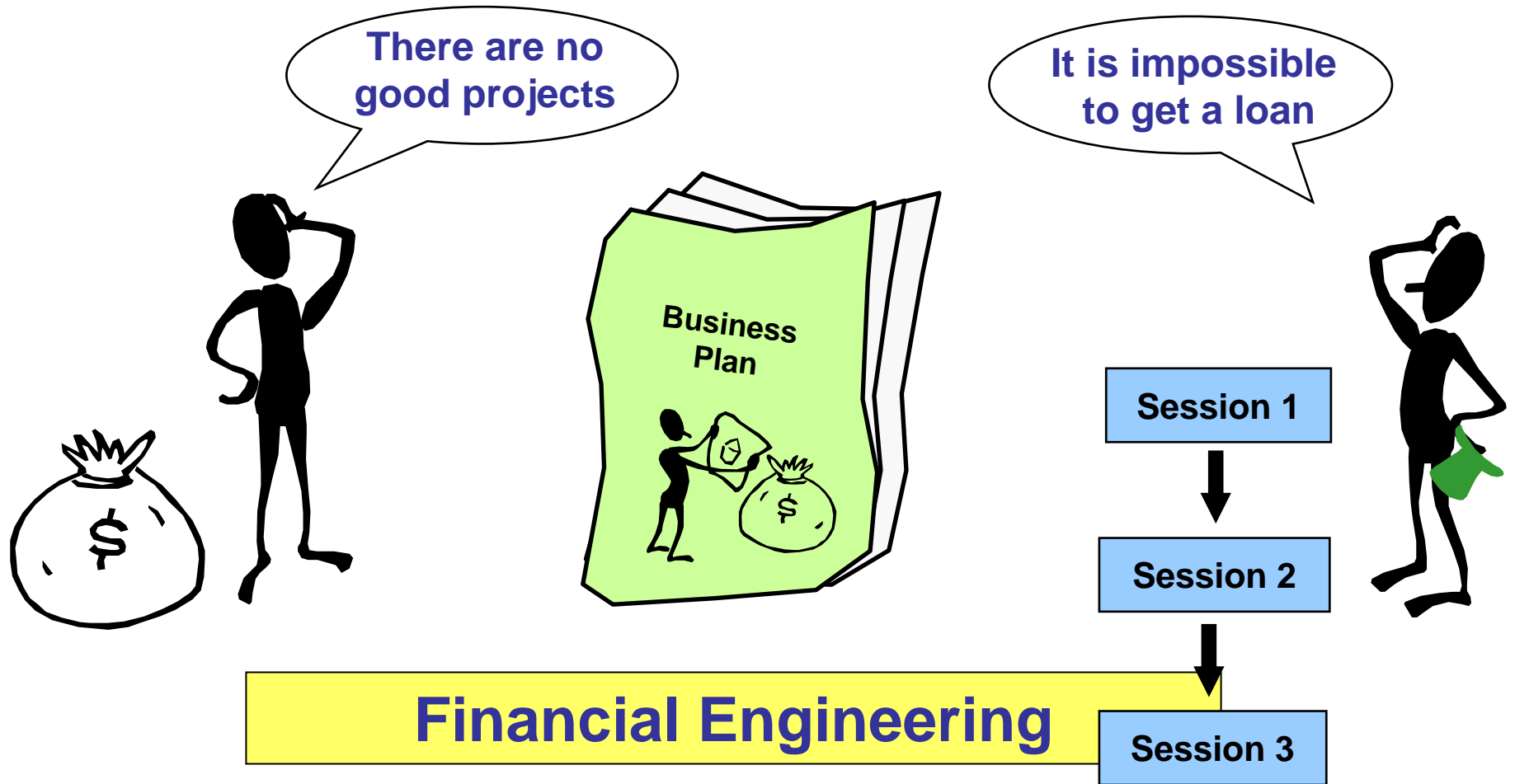
120 CP&EE measures identified, 64 of them implemented by the end of the programme:

Savings	Identified potential Sep. 2003	Achieved results Sep. 2003	Unit
Electric energy savings	6 721 950	2 153 000	kWh/year
Water savings	6 181 700	1 895 700	m ³ /year
Heat savings	94 600	53 400	Gcal/year
Gas savings	20 411 900	7 499 400	m ³ /year
Raw material savings (various)	61 900	43 800	t/year
Reduced emissions of GHG	7 331 400	62 200	t/year
Total economic savings	17 368 500	7 153 300	USD/year

Total Investment per September 2003 = approximately USD 1 000 000

Financing of projects

International Financial Institutions Owners of good projects



Bucharest 2004 - 05

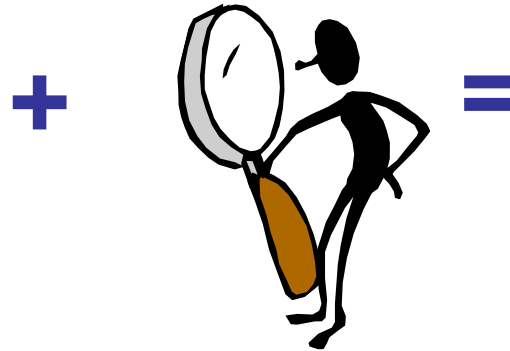
Company	Project Description	Investment (EUR)	PB (yrs)
1. Kvaerner – IMBG	Smoke extraction system and filters to reduce flue gas emissions	98 800	9,7
2. Turol	Replacement of the dust collecting system for steel processing machinery.	11 400	4,1
3. Romanceram	New fully automated kiln in the sanitary ware factory	1 100 000	5,0
4. Electrocentrale București	New burners for steam boilers at the Heat and Power Plant in Palas	3 500 000	35,0
5. Vilmar	Installation of new equipment	60 000	1,3
6. Laminate	Modernisation of heating furnace.	316 500	4,0
7. Argos	New 560 HP tug boat for Danube River transport services	450 000	3,6
8. Upetrom 1 Mai	New heating system in industrial halls	224 000	0,7
TOTAL		5 760 700	

Energy Efficiency Improvements in Buildings?

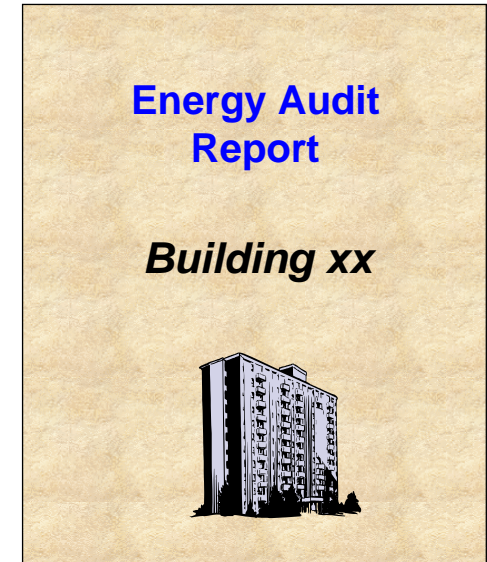
Energy Auditing



Existing building



**Inspection and
evaluation/analysis
by **energy auditor**
(**expert**)**



Energy Audit Report:

- Measures
- Investments
- Savings
- Profit









Energy Efficiency Improvement Potential - Energy Audit

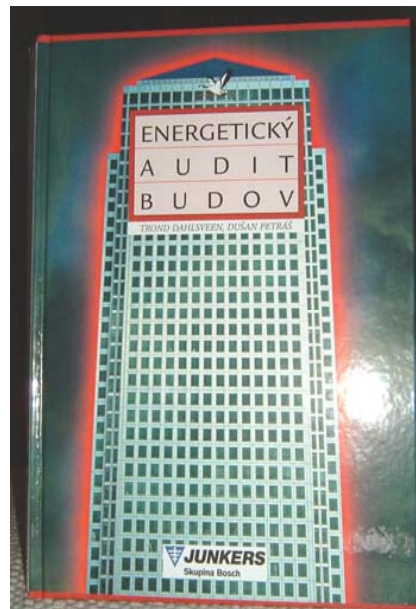
Measures	Investment [USD]	Net savings		Payback [year]	NPVQ*
		[kWh/yr]	[USD/yr]		
1. Energy efficient showers	400	3 495	450	0,9	6,90
2. Automatic control system	20 000	127 703	12 270	1,6	3,31
3. Operation and maintenance manuals / Energy monitoring system	15 000	31 365	2 140	7,0	0,51
4. Heat recovery, ventilation system	25 000	47 243	4 510	5,5	0,27
5. Balancing of heating system and thermostatic valves	22 500	30 484	3 050	7,4	0,23
6. Insulation of pipes, valves etc.	9 500	16 350	1 640	5,8	0,21
7. Insulation of attic floor	12 500	19 690	1 970	6,4	0,11
Profitable EE measures	104 900	276 330	26 030	4,0	
8. New windows	155 000	145 283	14 530	10,7	- 0,34
9. Insulation of external walls	185 000	103 159	10 320	17,9	- 0,61
Total all measures	444 900	524 772	50 880	8,7	

Typically 20-40% energy savings potential

Norwegian Capacity Building Programmes

- Training of Trainers
- Adjustment of Manuals and Tools
- Adjustment and adoption of Software
- Demonstration projects
- Information dissemination and awareness raising
- University education
-

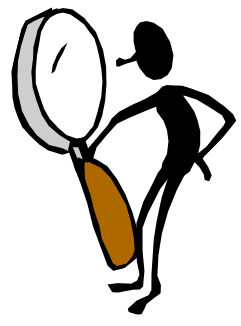
-  Energy Auditing
 - +  Exercise
 -  Manuals
 -  Ppoint
 -  Templates
 -  Tests
 -  Tools
 -  User Guides



EU Directive on the Energy Performance of Buildings

Norwegian Programme could support Romania in complying with the EU Directive

“Energy Auditing and Certification of Buildings”



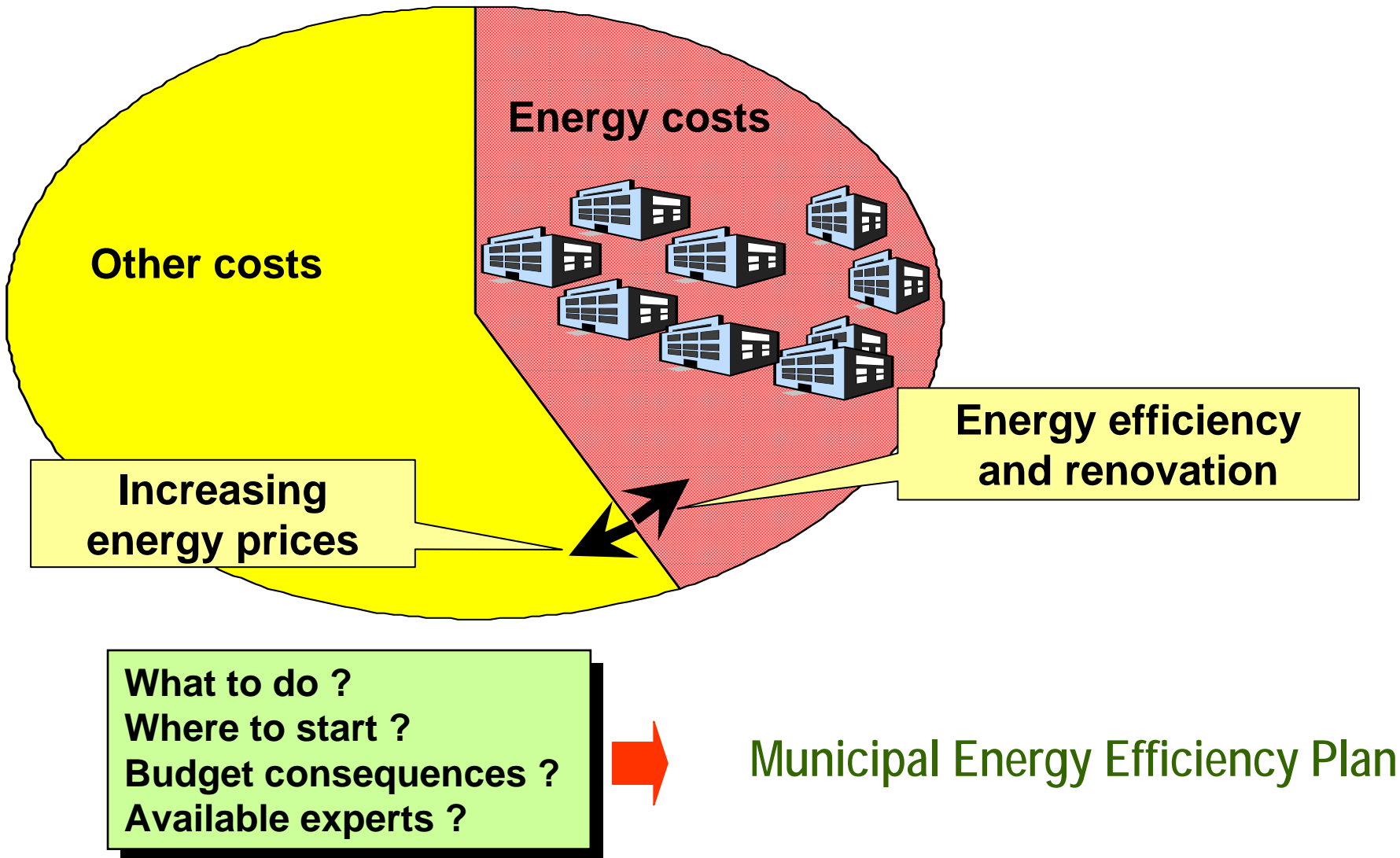
The ENSI Key Number Method and Software in Bulgaria



Parameter	Reference	Condition	Baseline	Sensitivity	kWh/m ² y	ENCON measure	After ENCON
1. Heating		46,4 kWh/m²y					
U - wall	0,30 W/m ² K	0,30	0,30	+ 0,1 W/m ² K = 9,03	0,30		
U - window	2,40 W/m ² K	3,00	3,00	+ 0,1 W/m ² K = 2,08	1,30		-22,96
U - roof	0,20 W/m ² K	0,60	0,60	+ 0,1 W/m ² K = 2,28	0,60		
U - floor	0,30 W/m ² K	0,30	0,30	+ 0,1 W/m ² K = 2,28	0,30		
Form - factor	0,31 -	0,31	0,31		0,31		
Window area	15,1 %	15,1	15,1		15,1		
Total solar gain	0,55 -	0,55	0,55		0,55		
Infiltration	0,25 1/h	0,25	0,25	+ 0,1 1/h = 15,02	0,25		
Indoor temperature	21,0 °C	23,0	23,0	+ 1 °C = 3,32	21,0		-4,57
Setback temperature	18,0 °C	23,0	23,0	+ 1 °C = 6,82	18,0		-23,15

The Minister of Energy announcing the Bulgarian version of the ENSI tools as approved for implementing the EU Directive on the Energy Performance of Buildings (March 2005)

Municipalities - substantial energy costs



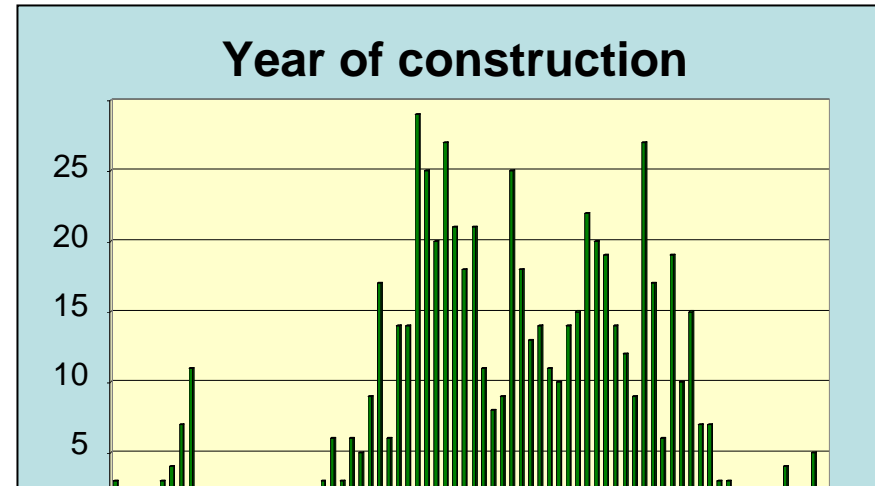
Results Kirovsk City – NW Russia

	Actual consumption		
	1999	2003	Reduction %
Heat energy (Gcal)	45 000	31 000	31
Electric energy (kWh)	5 700 000	4 200 000	26
Water & effluents (m ³)	237 000	167 000	30



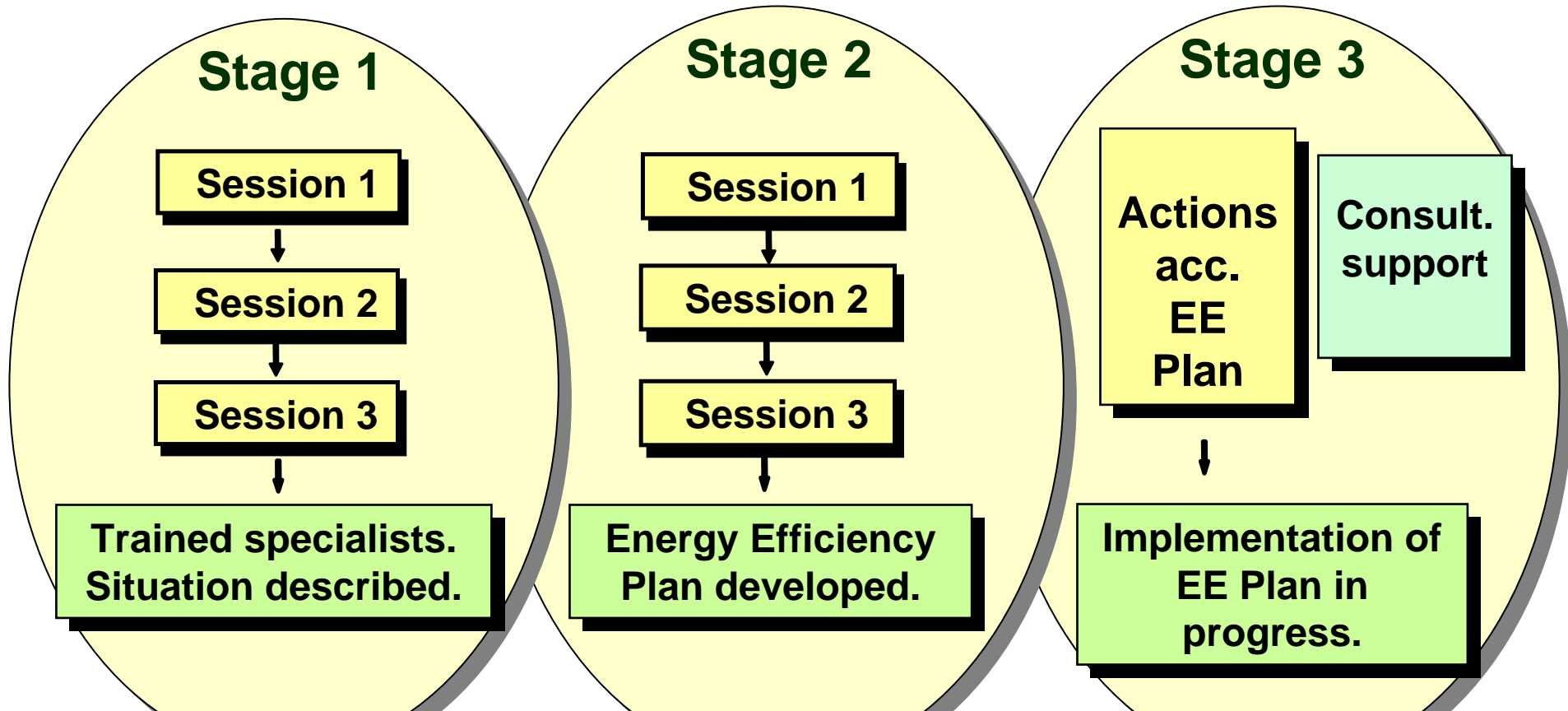
Almaty City, Kazakhstan

- Population: 1,5 million
- No of municipal buildings: 735 (Schools, kindergartens, hospitals, etc)
- Average age of the buildings: 30 years
- Yearly energy cost: 8,5 million USD
- Municipal Energy Efficiency Programme started 2005 (Capacity building and establishment of EE Team)



Plan 2007 - 2016 approved in the City Council June 2007
Expected results: Energy Costs in the city budget reduced by 25 %

Norwegian Programme in three stages



Could support Romanian Municipality to comply with the Energy Efficiency Law (EE Master Plans)

Energy Efficiency & Renewables;

Substantial potential for fruitful Romanian – Norwegian cooperation

