

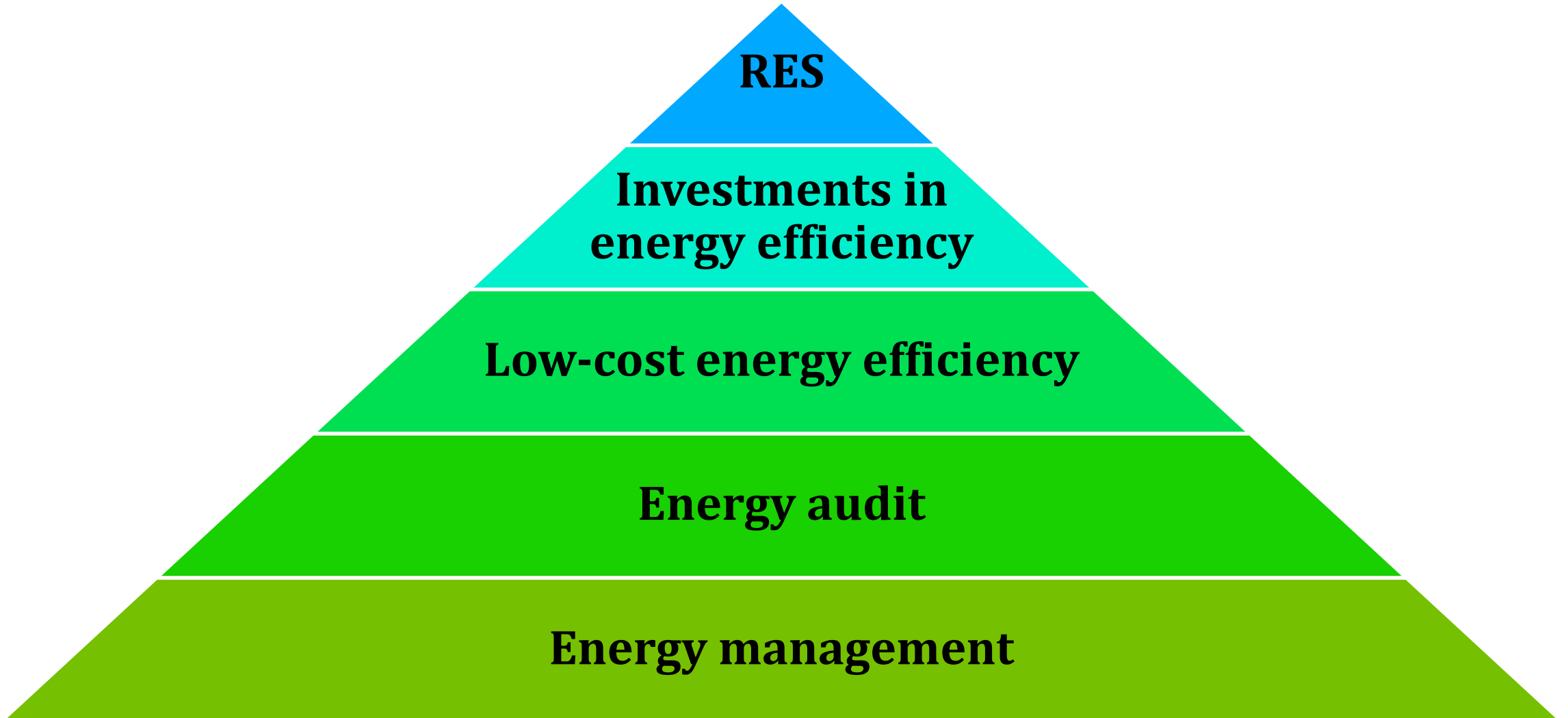
Round table

EE in public buildings – from inventory to implementation of measures
Bishkek, 16 July 2024

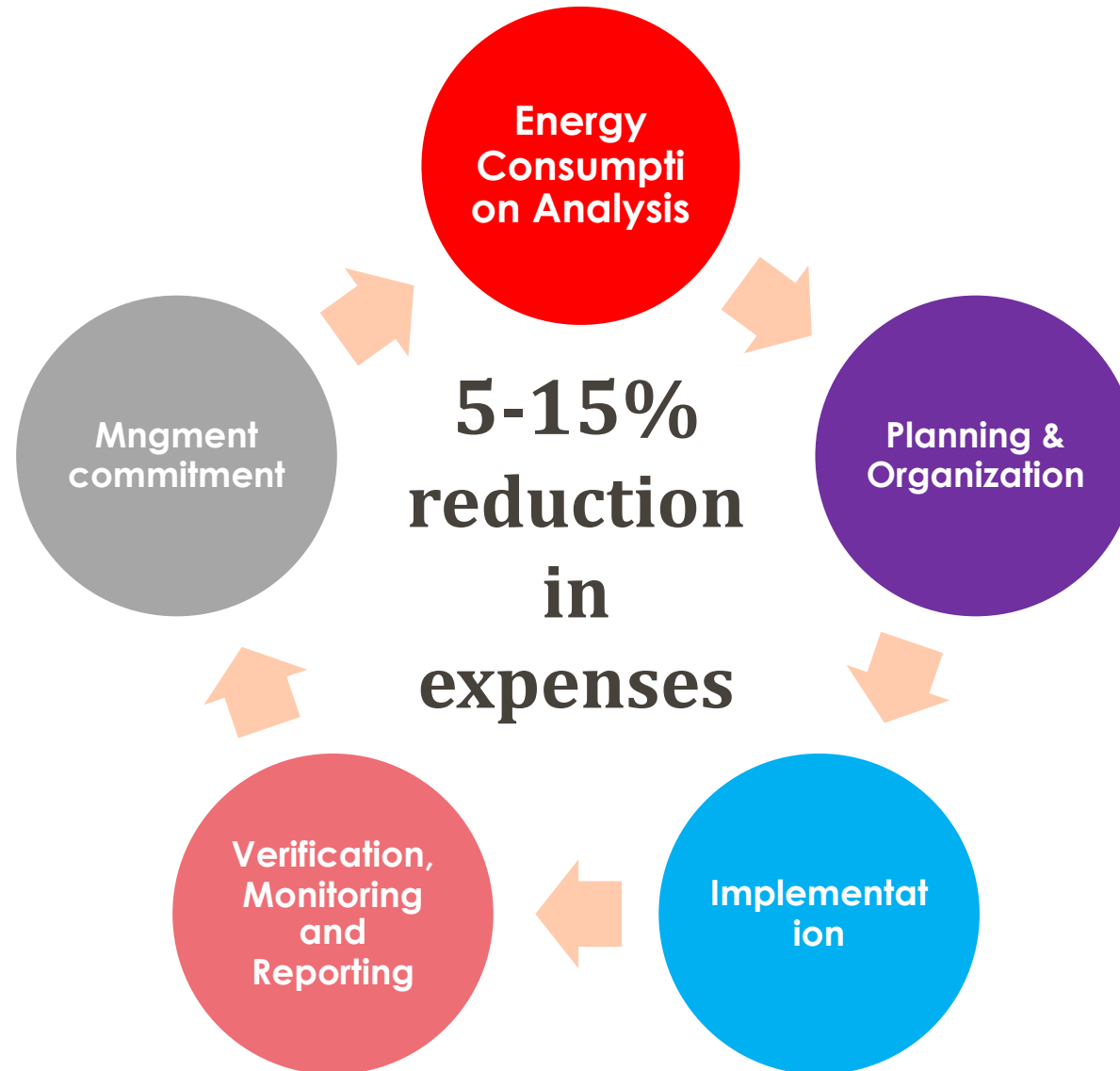
Implementation of EMIS in Chisinau city – lessons learnt and way forward

Nicolae Zaharia,
Expert in ESCO, SECCA

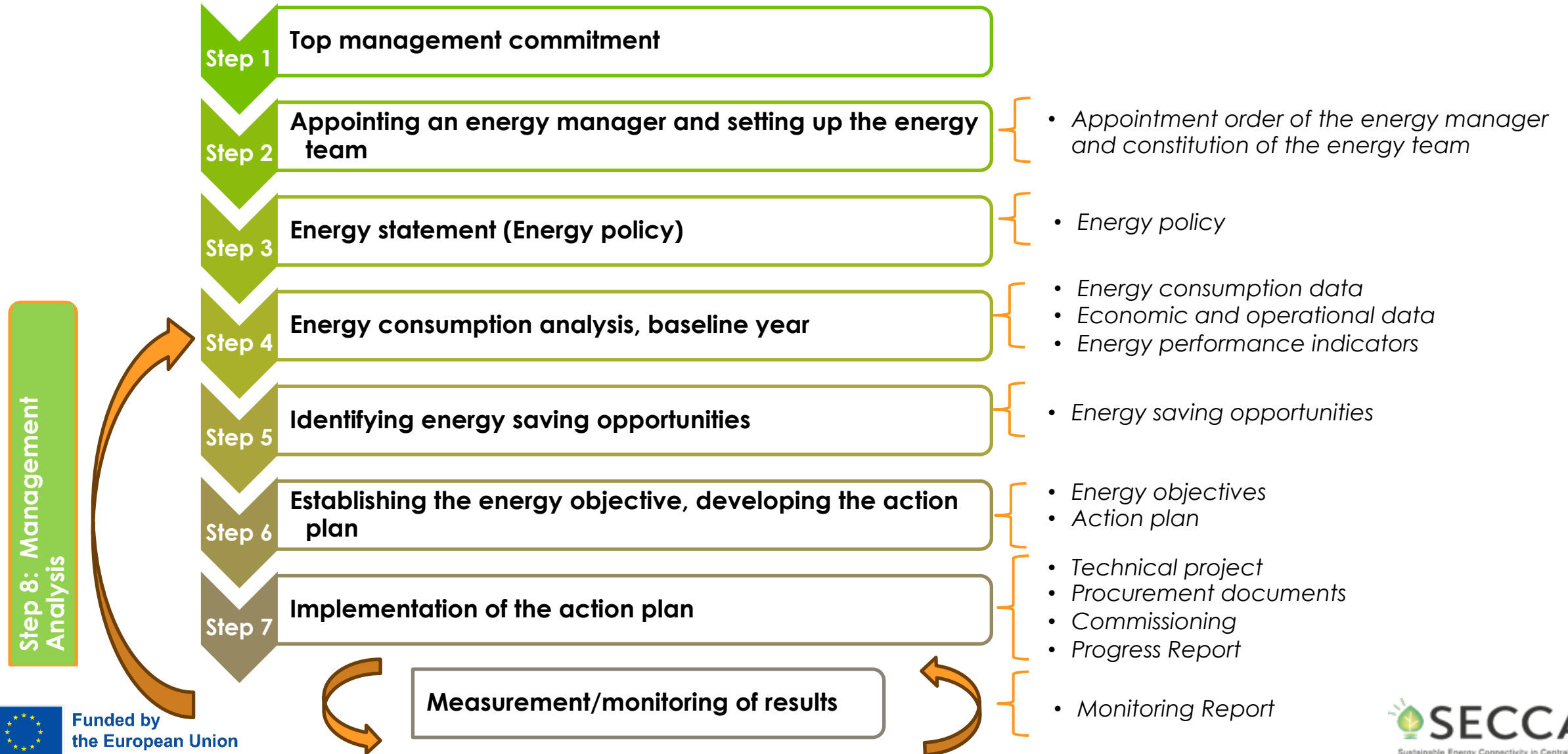
Recommended order of measures



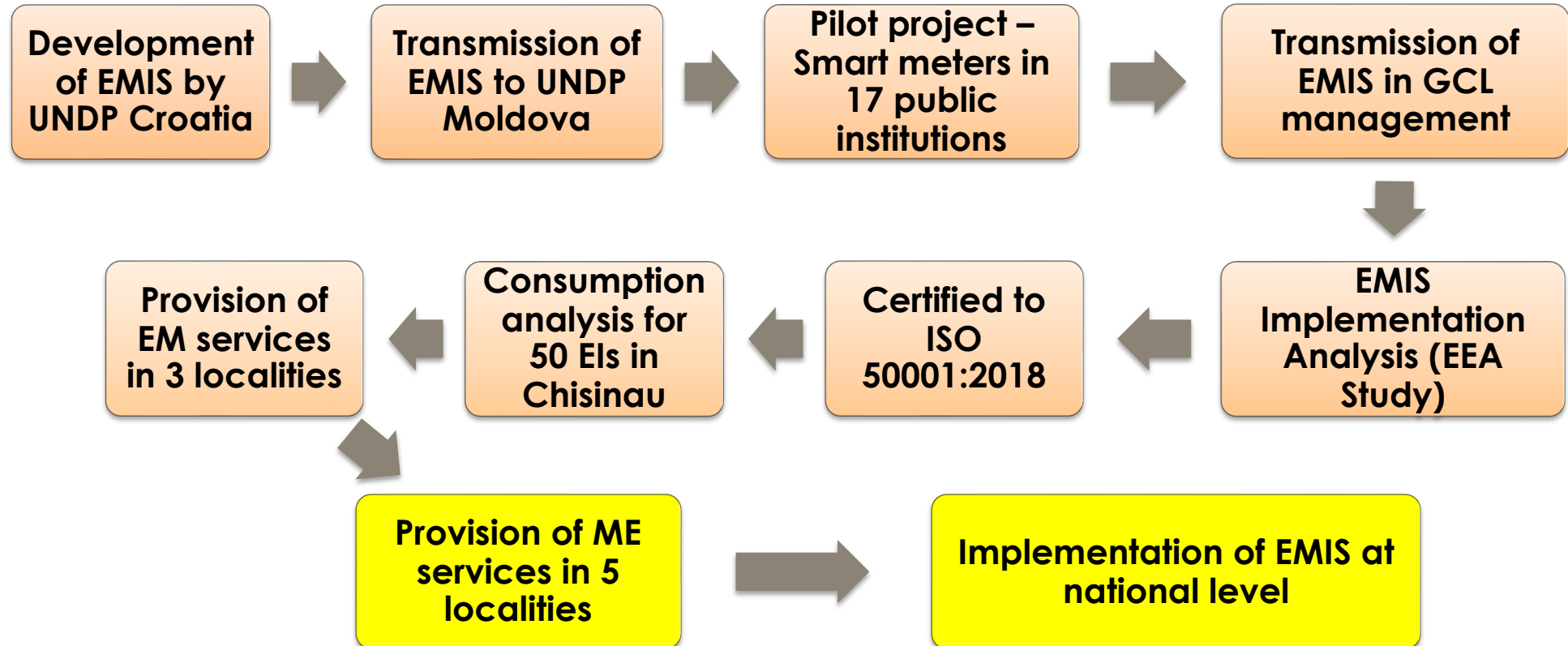
The lifecycle of the Energy Management System



The key elements of an Energy Management System



Implementation of the Energy Management Information System



Implementation of EMIS at national level (2023)

Collection and processing of statistic data for 3000 public buildings

5,348 buildings, 36,307 invoices and 396,000 automatic readings from smart meters

Over 200,000 invoices received semi-automatically from suppliers for 2022

Minimum 3000 public buildings with semi-automated invoicing in EMIS

Identifying the 300 most inefficient buildings and providing energy management services for them

ENERGY MANAGEMENT INFORMATION SYSTEM (EMIS.md)

Valori citite Apă (05013638) \$

Reimprospătare An 2023

Valori citite Energie electrică (50615051) \$

Reimprospătare An 2023 Luna 4

Valori citite Energie electrică (50613104) \$

Reimprospătare An 2022 Luna 3

Valori citite Energie termică (03024445) \$

Reimprospătare An 2022 Luna 3

Încălzire [Gcal]

Contoare:1 Încălzire [Gcal]

Valoare absoluta

Indicatori

- Energie [kWh]
- Emisii CO2 [t]
- verge primara [kWh]
- Cost [MDL]
- UFA CUPRILATIVA
- Energie [kWh]
- Emisii CO2 [t]
- verge primara [kWh]

Ora / Zi	1	2	3	4	5
0	0.01	0.0	0.02	0.01	0.0
1	0.01	0.0	0.02	0.02	0.0
2	0.02	0.0	0.02	0.03	0.04
3	0.02	0.0	0.02	0.03	0.04
4	0.02	0.0	0.02	0.03	0.04
5	0.01	0.0	0.15	0.12	0.14
6	0.01	0.01	0.3	0.23	0.26
7	0.01	0.01	0.3	0.23	0.26
8	0.01	0.01	0.3	0.23	0.26
9	0.01	0.01	0.26	0.24	0.26
10	0.01	0.01	0.21	0.26	0.25
11	0.01	0.01	0.21	0.26	0.25
12	0.01	0.01	0.21	0.26	0.25
13	0.01	0.01	0.19	0.19	0.21
14	0.01	0.01	0.17	0.11	0.15
15	0.01	0.01	0.17	0.11	0.15
16	0.01	0.01	0.17	0.11	0.15
17	0.0	0.01	0.09	0.06	0.08
18	0.0	0.0	0.01	0.0	0.0
19	0.0	0.0	0.01	0.0	0.0
20	0.0	0.0	0.01	0.0	0.0
21	0.0	0.01	0.01	0.0	0.01
22	0.0	0.02	0.01	0.0	0.01
23	0.0	0.02	0.01	0.0	0.01
Total	0.2	0.17	2.89	2.53	2.84

Ora / Zi	1	2	3	4	5	6	7
0	3.12	2.9	2.41	2.97	2.7	2.94	2.59
1	3.2	2.87	2.43	2.95	2.68	3.01	2.57
2	3.32	2.88	2.42	2.91	2.67	2.94	2.56
3	2.98	2.82	2.4	2.38	2.92	3.17	2.43
4	2.83	2.64	2.66	2.62	3.12	3.18	2.59
5	1.88	2.71	3.54	3.56	4.01	3.88	3.36
6	1.38	2.07	5.44	5.03	5.61	4.2	4.44
7	0.93	1.97	5.39	5.2	5.94	4.19	4.75
8	1.24	1.97	5.51	5.35	6.4	4.51	4.82
9	1.67	1.96	5.27	5.43	6.31	4.51	4.02
10	1.77	2.4	5.17	5.31	5.46	4.76	4.68
11	1.89	2.47	4.83	4.73	6.06	4.37	4.48
12	1.89	2.57	4.49	4.59	6.3	4.38	4.88
13	1.96	2.36	4.58	4.56	6.3	4.82	5.05
14	2.07	2.51	4.73	4.43	5.22	4.64	4.83
15	2.15	2.21	4.12	3.4	4.0	4.08	4.36
16	2.29	2.31	3.54	3.23	3.62	3.38	4.02
17	2.87	2.41	3.32	2.77	3.18	2.94	3.86
18	2.86	2.47	3.12	2.68	3.31	2.69	3.31
19	2.88	2.52	3.04	2.68	3.12	2.78	2.91
20	2.87	2.38	3.07	2.82	3.1	2.57	2.97
21	2.91	2.36	3.19	2.7	2.94	2.56	2.96
22	2.85	2.37	3.2	2.65	2.98	2.61	3.0
23	2.95	2.49	2.99	2.65	3.0	2.58	2.98
Total	56.76	58.62	90.86	87.6	100.95	85.69	88.42

Ora / Zi	1	2	3	4	5
0	0.02	0.03	0.03	0.03	0.0
1	0.02	0.03	0.02	0.03	0.0
2	0.04	0.04	0.02	0.03	0.0
3	0.05	0.04	0.02	0.03	0.0
4	0.42	0.41	0.12	0.41	0.0
5	0.5	0.5	0.5	0.5	0.0
6	0.55	0.5	0.7	0.5	0.0
7	0.6	0.66	0.7	0.71	0.0
8	0.7	0.75	0.75	0.85	0.0
9	0.65	0.85	0.76	0.75	0.0
10	0.65	0.6	0.6	0.6	0.0
11	0.59	0.48	0.4	0.47	0.0
12	0.42	0.53	0.47	0.5	0.0
13	0.42	0.51	0.43	0.42	0.0
14	0.27	0.34	0.24	0.25	0.0
15	0.18	0.47	0.18	0.22	0.0
16	0.28	0.33	0.37	0.24	0.0
17	0.3	0.3	0.34	0.22	0.0
18	0.07	0.07	0.09	0.04	0.0
19	0.06	0.06	0.04	0.04	0.0
20	0.05	0.05	0.04	0.04	0.0
21	0.04	0.04	0.03	0.03	0.0
22	0.03	0.03	0.03	0.03	0.0
23	0.03	0.03	0.03	0.03	0.0
Toti utilizatorii	6.94	7.65	6.91	6.97	0.7

Ora / Zi	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0	0.54	0.41	0.24	0.55	0.25	0.26	0.41	0.29	0.33	0.36	0.43	0.29	0.47	0.42	0.38	0.16	0.78	0.3	0.3	0.3	0.3	0.25	0.25	0.24	0.24	0.31	0.03	0.33	0.16	0.29	0.21
1	0.36	0.32	0.19	0.4	0.21	0.25	0.25	0.27	0.33	0.36	0.43	0.29	0.47	0.42	0.38	0.16	0.78	0.3	0.3	0.3	0.3	0.25	0.25	0.24	0.24	0.31	0.03	0.33	0.16	0.29	0.21
2	0.19	0.23	0.15	0.24	0.17	0.25	0.09	0.24	0.33	0.3	0.41	0.3	0.37	0.45	0.36	0.18	0.65	0.3	0.3	0.3	0.3	0.22	0.26	0.24	0.23	0.31	0.03	0.33	0.16	0.29	0.21
3	0.19	0.23	0.15	0.24	0.17	0.25	0.09	0.24	0.33	0.25	0.39	0.31	0.23	0.48	0.34	0.19	0.52	0.3	0.3	0.3	0.3	0.19	0.26	0.23	0.23	0.31	0.03	0.35	0.11	0.26	0.19
4	0.19	0.23	0.15	0.24	0.17	0.25	0.09	0.24	0.33	0.25	0.39	0.31	0.23	0.48	0.34	0.19	0.52	0.3	0.3	0.3	0.3	0.19	0.26	0.23	0.23	0.31	0.03	0.37	0.07	0.23	0.18
5	0.24	0.23	0.25	0.24	0.27	0.21	0.1	0.24	0.33	0.25	0.39	0.31	0.23	0.48	0.34	0.19	0.52	0.3	0.3	0.3	0.3	0.19	0.26	0.23	0.23	0.31	0.03	0.37	0.07	0.23	0.18
6	0.29	0.23	0.36	0.24	0.37	0.18	0.1	0.24	0.33	0.28	0.39	0.41	0.18	0.44	0.28	0.18	0.36	0.3	0.3	0.3	0.3	0.24	0.2	0.26	0.27	0.24	0.03	0.37	0.07	0.23	0.18
7	0.29	0.23	0.36	0.24	0.37	0.18	0.1	0.24	0.33	0.32	0.39	0.54	0.11	0.39	0.19	0.17	0.2	0.3	0.3	0.3	0.3	0.28	0.14	0.28	0.32	0.16	0.26	0.38	0.25	0.24	0.17
8	0.29	0.23	0.36	0.24	0.37	0.18	0.1	0.24	0.33	0.32	0.39	0.54	0.11	0.39	0.19	0.17	0.2	0.3	0.3	0.3	0.3	0.28	0.14	0.28	0.32	0.16	0.49	0.4	0.43	0.26	0.16
9	0.27	0.24	0.36	0.25	0.39	0.4	0.21	0.25	0.33	0.32	0.39	0.54	0.11	0.39	0.19	0.17	0.2	0.3	0.3	0.3	0.3	0.28	0.14	0.28	0.32	0.16	0.49	0.4	0.43	0.26	0.16
10	0.25	0.25	0.36	0.25	0.42	0.62	0.31	0.25	0.33	0.33	0.38	0.55	0.07	0.21	0.23	0.26	0.22	0.3	0.3	0.3	0.3	0.34	0.19	0.33	0.35	0.09	0.49	0.4	0.43	0.26	0.16
11	0.25	0.25	0.36	0.25	0.42	0.62	0.31	0.25	0.33	0.34	0.37	0.56	0.03	0.03	0.28	0.35	0.24	0.3	0.3	0.3	0.4	0.24	0.38	0.39	0.01	0.63	0.3	0.35	0.16	0.12	
12	0.25	0.25	0.36	0.25	0.42	0.62	0.31	0.25	0.33	0.34	0.37	0.56	0.03	0.03	0.28	0.35	0.24	0.3	0.3	0.3	0.4	0.24	0.38	0.39	0.01	0.77	0.2	0.28	0.07	0.08	
13	0.3	0.38	0.4	0.25	0.41	0.53	0.25	0.29	0.33	0.34	0.37	0.56	0.03	0.03	0.28	0.35	0.24	0.3	0.3	0.3	0.4	0.24	0.38	0.39	0.01	0.77	0.2	0.28	0.07	0.08	
14	0.36	0.52	0.45	0.25	0.4	0.44	0.18	0.33	0.33	0.43	0.38	0.49	0.08	0.11	0.28	0.38	0.27	0.3	0.3	0.3	0.34	0.34	0.3	0.28	0.42	0.01	0.77	0.2	0.28	0.07	0.08
15	0.36	0.52	0.45	0.25	0.4	0.44	0.18	0.33	0.33	0.52	0.38	0.42	0.15	0.22	0.29	0.42	0.3	0.3	0.3	0.3	0.37	0.27	0.35	0.18	0.45	0.01	0.59	0.25	0.15	0.04	0.09
16	0.36	0.52	0.45	0.25	0.4	0.44	0.18	0.33	0.33	0.52	0.38	0.42	0.15	0.22	0.29	0.42	0.3	0.3	0.3	0.3	0.37	0.27	0.35	0.18	0.45	0.01	0.41	0.31	0.02	0.01	0.09
17	0.36	0.52	0.45	0.33	0.37	0.39	0.3	0.33	0.33	0.52	0.38	0.42	0.15	0.22	0.29	0.42	0.3	0.3	0.3	0.3	0.37	0.27	0.35	0.18	0.45	0.01	0.41	0.31	0.02	0.01	0.09
18	0.36	0.51	0.45	0.41	0.35	0.33	0.42	0.33	0.49	0.42	0.47	0.48	0.42	0.38	0.47	0.43	0.3	0.3	0.3	0.3	0.56	0.28	0.38	0.52	0.32	0.14	0.39	0.39	0.28	0.41	0.25
19	0.36	0.51	0.45	0.41	0.35	0.33	0.42	0.33	0.49	0.42	0.47	0.48	0.42	0.38	0.47	0.43	0.3	0.3	0.3	0.3	0.56	0.28	0.38	0.52	0.32	0.14	0.39	0.39	0.28	0.41	0.25
20	0.36	0.51	0.45	0.41	0.35	0.33	0.42	0.33	0.49	0.42	0.47	0.48	0.42	0.38	0.47	0.43	0.3	0.3	0.3	0.3	0.56	0.28	0.38	0.52	0.32	0.14	0.39	0.39	0.28	0.41	0.25
21	0.38	0.37	0.5	0.33	0.3	0.37	0.36	0.33	0.49	0.42	0.47	0.48	0.42	0.38	0.47	0.43	0.3	0.3	0.3	0.3	0.56	0.28	0.38	0.52	0.32	0.14	0.39	0.39	0.28	0.41	0.25
22	0.41	0.24	0.55	0.25	0.26	0.41	0.29	0.33	0.42	0.43	0.38	0.48	0.42	0.38	0.32	0.6	0.3	0.3	0.3	0.3	0.41	0.26	0.31	0.38	0.32	0.09	0.39	0.39	0.28	0.41	0.25
23	0.41	0.24	0.55	0.25	0.26	0.41	0.29	0.33	0.36	0.43	0.29	0.47	0.42	0.38	0.16	0.78	0.3	0.3	0.3	0.3	0.25	0.25	0.2								

Benefits of using EMIS

- Setting up the energy management system and institutionalized processes in accordance with ISO-50001 principles
- Prioritization of Ef. En. and generating savings from no-investment and low-investment measures (5-15%)
- Simplified data collection and reduced costs for energy audits, feasibility studies, local/district action plans, action monitoring reports (SECAPs, RMPAEDCs)
- Reducing consumption data collection efforts by district/local energy managers and EEE
- Simplifying the process of selecting the beneficiary for the implementation of Ef measures. En. And SER
- Simplified monitoring/evaluation and reporting on the results of implemented measures

The Energy Management System staff

EMIS Core Team						
	Job title	Number of employees	Work norm	Months	Priority	Employment
1	Administrator IT	1	Part-time	12	1	AEE/ Government IT Services
2	Energy manager (EE specialist with middle class)	1	Full-time	12	1	EEA/Outsourced
3	Energy Efficiency Specialist (Mid-Rank Specialist/Junior EE)	2	Full-time	12	1	EEA/Outsourced
5	Assistant	1	Part-time	12	2	EEA/Outsourced
	TOTAL	5				
EMIS Support Team						
	Job title	Number of employees	Work norm	Months	Priority	Employment
1	Team Leader - Interns	2	Part-time	6	1	Internship
2	Trained interns	8	Part-time	6	1	Internship
3	Interns	10		1	1	Internship
	TOTAL	10				

Lessons learned

- Establishing EMIS as a national energy management system managed by the EEA, based on Law 139, has been instrumental in **standardizing energy data management across the country**.
- The development of a comprehensive regulatory framework was crucial in **supporting the effective implementation and operation of EMIS**
- Connecting EMIS to the State Hydrometeorological Service data provided **valuable insights into energy consumption** patterns influenced by weather conditions
- Testing indoor sensors offered **practical insights into their effectiveness and the potential for broader application in energy monitoring**
- Analysing changes in consumption curves post-implementation of energy efficiency measures highlighted **the impact and effectiveness of these initiatives**
- Ongoing collaboration with LPAs and the successful rollout of EMIS at the local level proved essential for **localized energy management**
- Continuous verification of data entered into EMIS ensured the **accuracy and reliability of energy management reports and analyses**



THANK YOU!



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