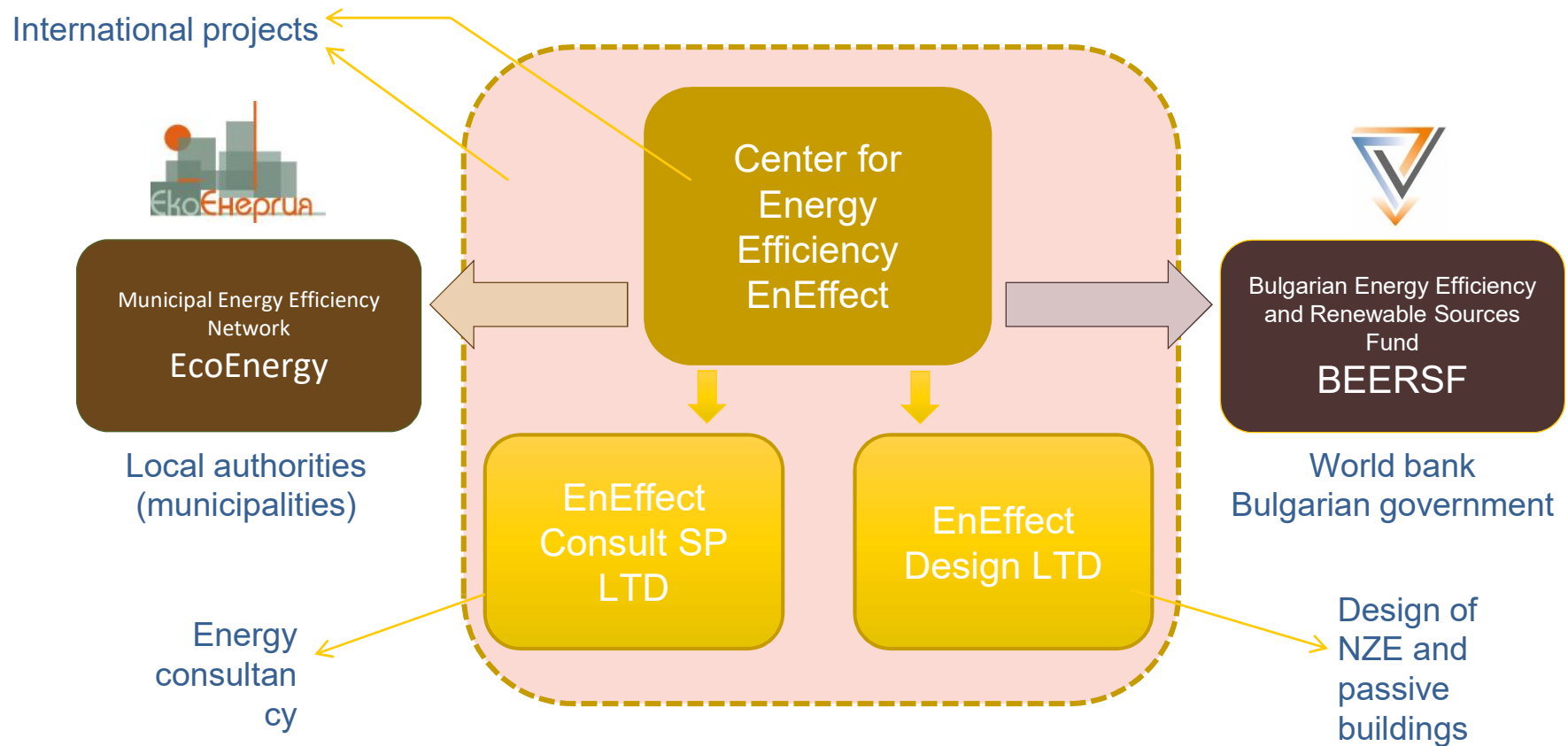


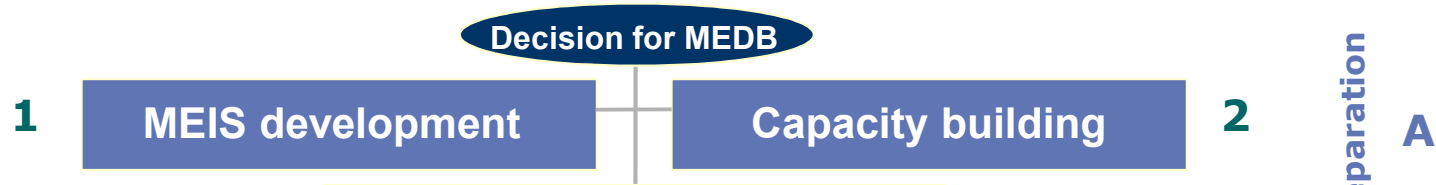
# DEEP ENERGY RENOVATION OF PUBLIC BUILDINGS IN BULGARIA: CHALLENGES AND OPPORTUNITIES

Dragomir Tzanev

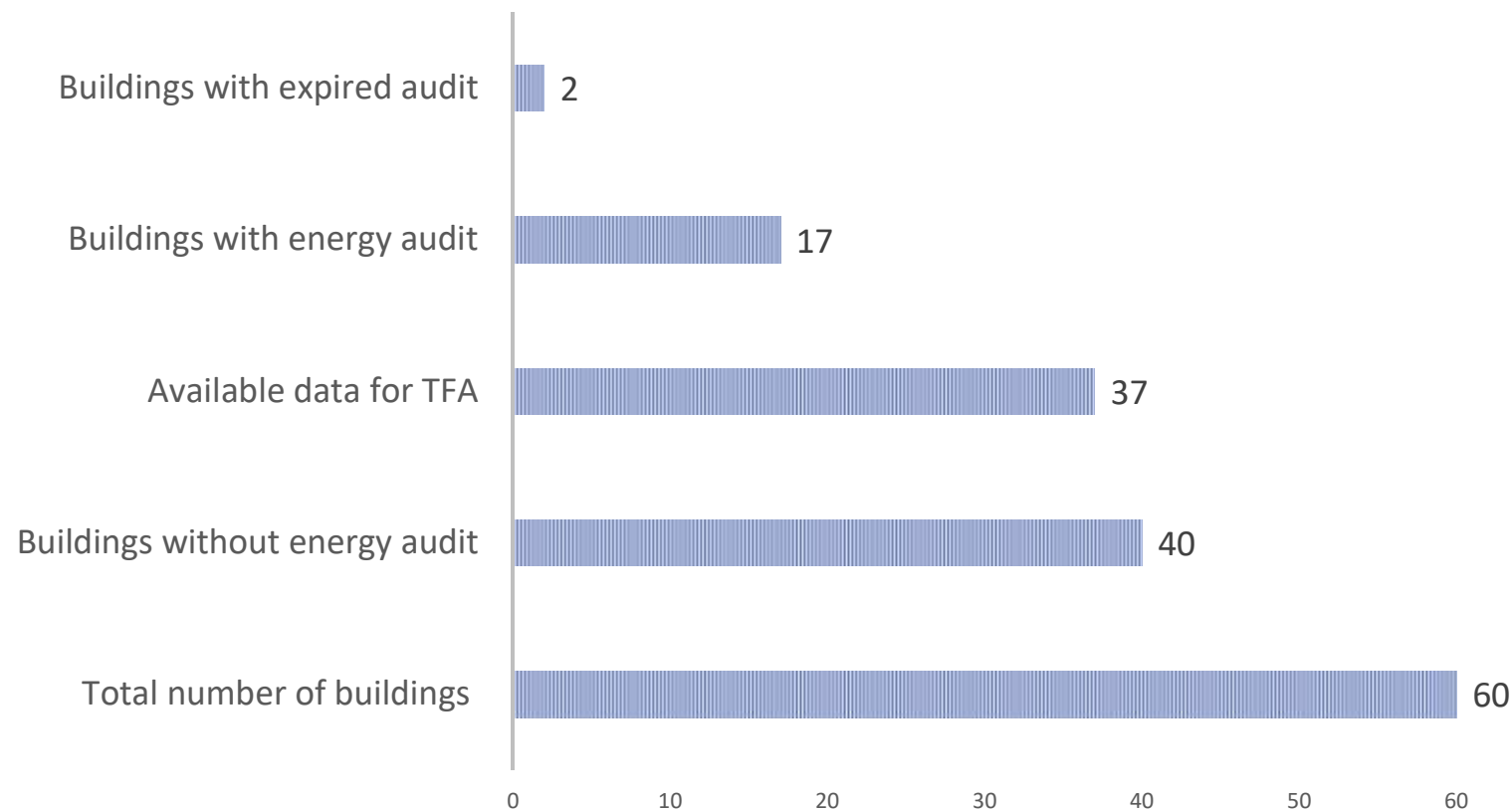
EnEffect. Center for Energy  
Efficiency  
1, Hristo Smirnenski Blvd, Sofia  
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[www.eneffect.bg](http://www.eneffect.bg)







## GABROVO: AVAILABLE DATA ABOUT BUILDINGS





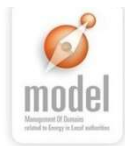
- Sustainable and innovative public procurement in Bulgarian municipalities



- Capacity building for local authorities for energy efficiency improvements and climate change mitigation



- Cooperation between local authorities to achieve the EU targets (3 x 20% by 2020) under the Covenant of Mayors



- Developing a common framework methodology for municipal energy planning



- Redirecting urban development towards sustainable energy use



- „Success models“ for sustainable implementation of passive and nearly zero-energy buildings in the construction practice at local level



- Deep energy building renovations using the step-by-step approach (Art. 4c/EED)



- Training for construction specialists, designers and municipal experts; opening of new training center and a master's program at the University of Architecture in Sofia



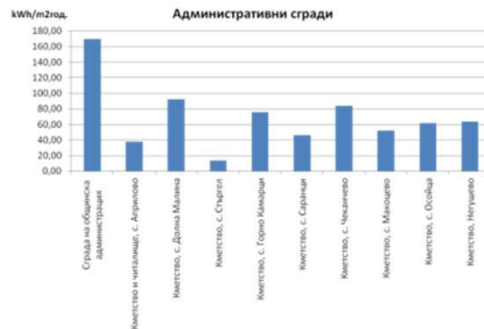
- Individual roadmaps for deep energy building renovations using the step-by-step approach; 20 audits for single-family houses and small public buildings



- Consumer modeling and end-user decision making

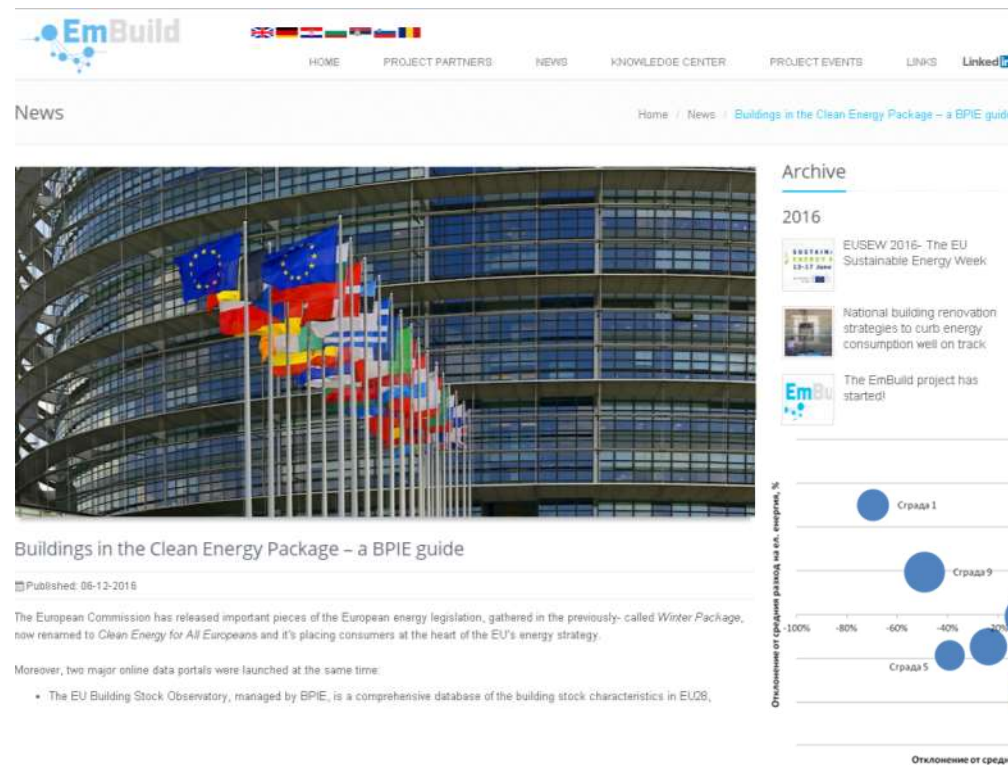


## Supporting the local authorities: the EmBuild project



Key actors: Gabrovo,  
Burgas, Dobrich, Gorna  
Malina

<http://www.embuild.eu>



EmBuild

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News

Home / News / Buildings in the Clean Energy Package – a BPIE guide

Buildings in the Clean Energy Package – a BPIE guide

Published: 06-12-2016

The European Commission has released important pieces of the European energy legislation, gathered in the previously- called Winter Package, now renamed to *Clean Energy for All Europeans* and it's placing consumers at the heart of the EU's energy strategy.

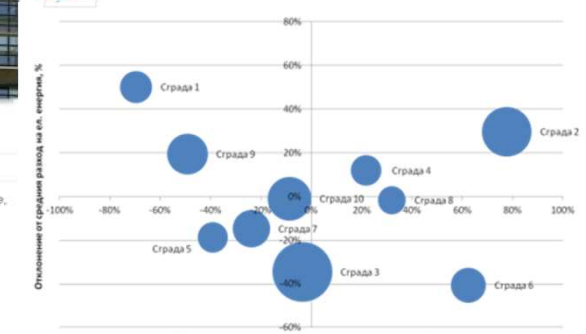
Moreover, two major online data portals were launched at the same time:

- The EU Building Stock Observatory, managed by BPIE, is a comprehensive database of the building stock characteristics in EU28.

Archive

2016

- EUSEW 2016- The EU Sustainable Energy Week
- National building renovation strategies to curb energy consumption well on track
- The EmBuild project has started!



# FIGTHING OFF MUNICIPAL ENERGY POVERTY

OR

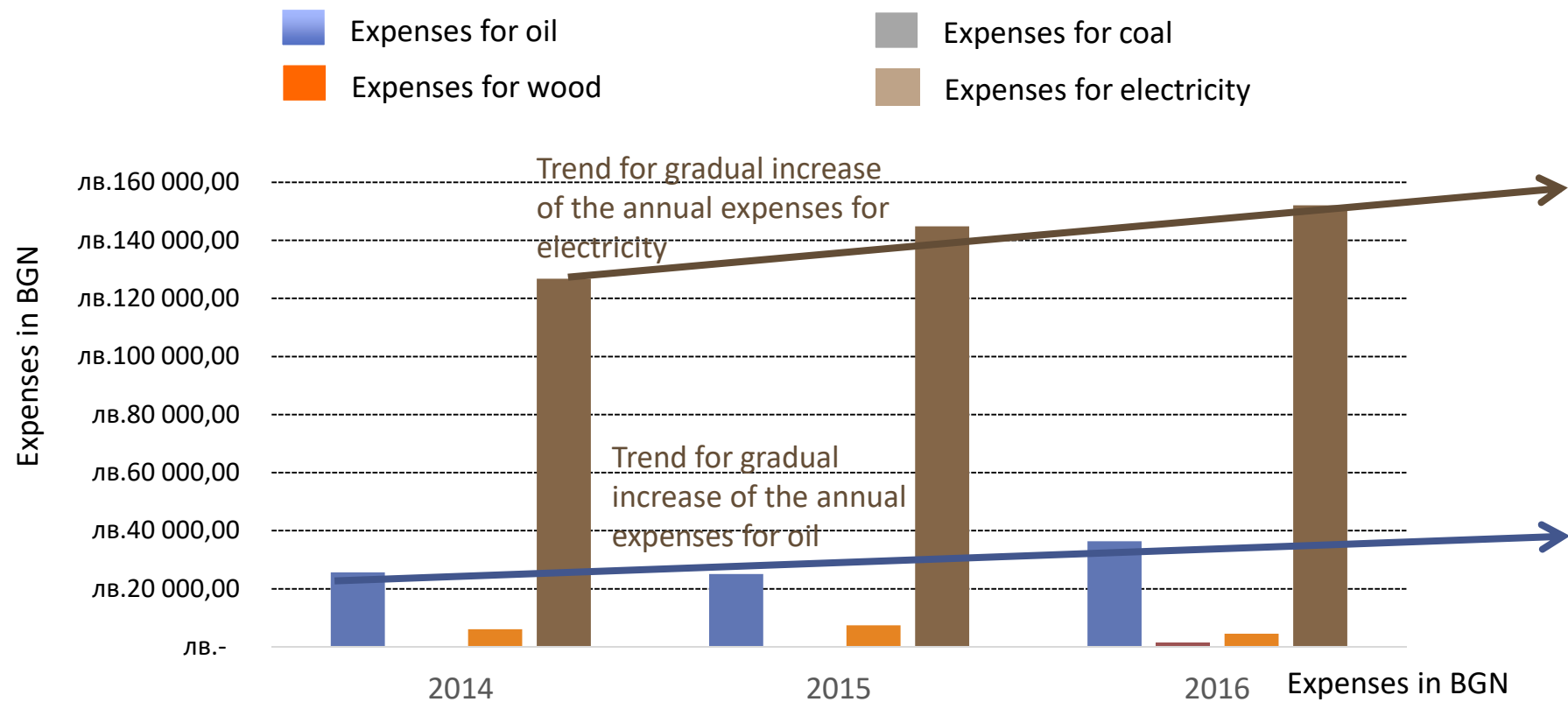
## STRATEGY AND ACTION PLAN

for deep energy renovation of the public  
buildings of Gorna Malina municipality  
for the period 2018 – 2025 г.

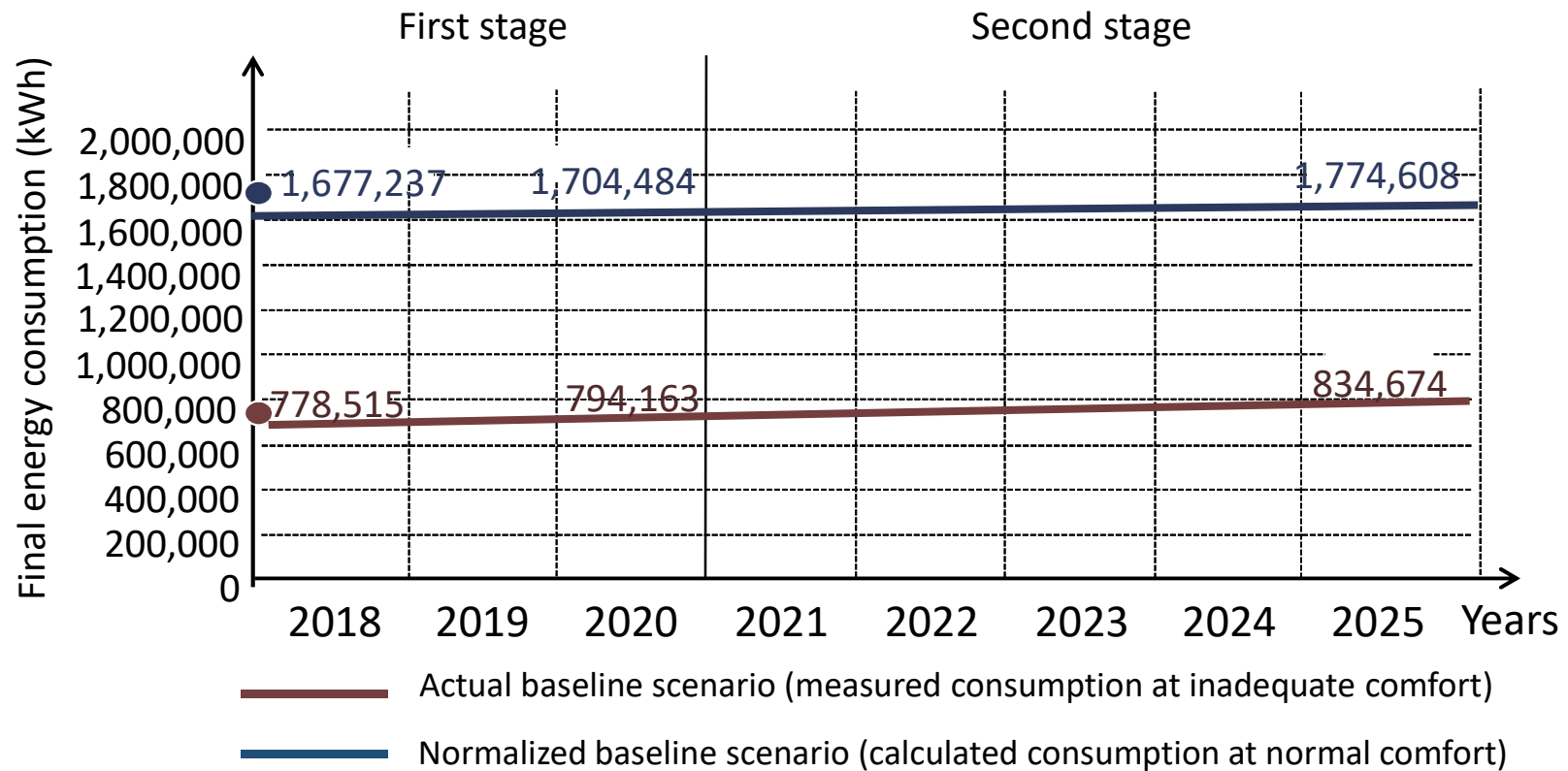




## Trend for annual expenditure growth (by energy sources) in all 41 municipal buildings



## Forecast for baseline scenario development in terms of total final energy consumption



## Example from Burgas

**Data from the National Programme for Energy Efficiency in the Multifamily Residential Buildings (source: SEDA database)**

Type of energy	Actual consumption, MWh/year	Calculated savings, MWh/year
Hard fuel	17,4	38,1
Gas	140,3	188,3
Mixture of fuels	8088,2	18068,4
District heat	40395,5	30971,5
Electricity	67973,1	54356,2
<b>TOTAL</b>	<b>116614,4</b>	<b>103622,4</b>

**Data for public buildings (source: Burgas municipality)**

Building	Actual consumption 2014 (MWh)	Actual consumption 2015 (MWh)	Actual consumption 2016 (MWh)	Calculated annual savings (report to SEDA - implemented measures in 2015/2016)
High School of Commerce	186,506	196,407	n/a	295,58
High School "K.Preslavski"	392,441	387,546	286,883	773,32
High School "Y. Yovkov"	269,476	308,515	n/a	569,45

## Preliminary financial framework of the plan (2018 - 2015)

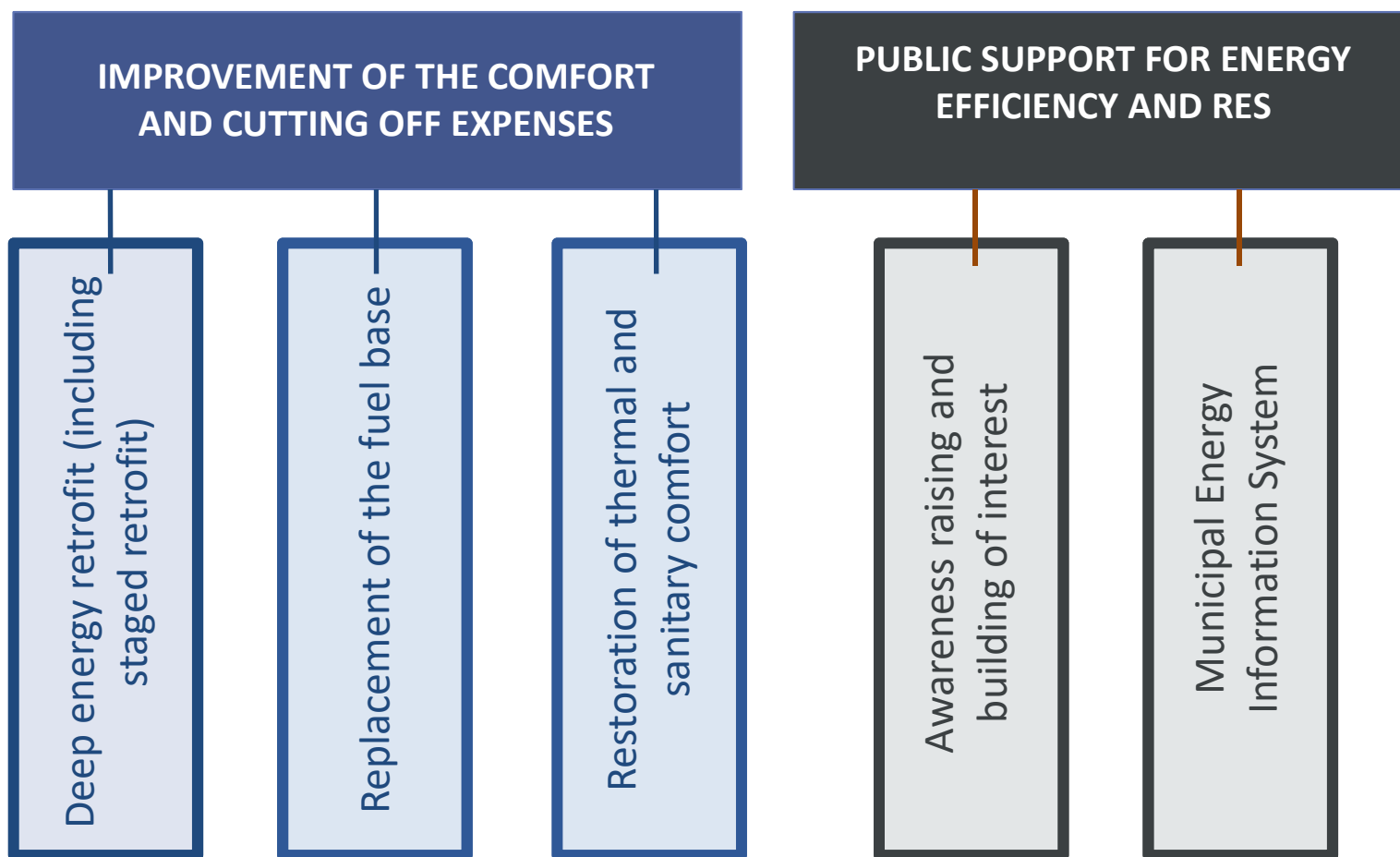
FINANCIAL SOURCES		YEARS								ОБЩО
		2018	2019	2020	2021	2022	2023	2024	2025	
OWN RESOURCES										
	Monetary resources	5000	10000	5000	5000	60000	55000	60000	100000	300000
	Guarantees	0	0	0	0	0	0	0	0	0
	In-kind contribution	2000	2000	2000	2000	3000	3000	3000	3000	20000
320000										
GRANT RESOURCES										
	Operational Programmes	0	0	0	60000	60000	60000	60000	60000	300000
	National Trust EcoFund	0		20000	20000	20000	20000	20000	20000	120000
	Financial Mechanism of EEA	20000	260000	120000	0	0	0	0	0	400000
	Horizon 2020	0	0	10000	10000	10000	10000	10000	10000	60000
	Other sources	0	0	0	60000	0	0	0	0	60000
940000										
SOFT AND BRIDGE FINANCING										
	Energy Efficiency and RE Fund	0	0	0	0	0	0	80000	160000	240000
	EE credit lines	0	0	0	0	0	0	0	0	0
	Other sources	0	0	0	0	0	0	0	0	0
240000										
Public-private partnerships										
	Partner 1	0	0	0	0	0	0	0	0	0
	Partner 2	0	0	0	0	0	0	0	0	0
0										
TOTAL:		27000	272000	157000	157000	153000	148000	233000	353000	1500000



## Comfort or financial savings?

In buildings where comfort is severely deteriorated (for example, in the administrative building of the municipality), improving comfort should be given priority over the reduction of financial costs

## Long-term strategic goals

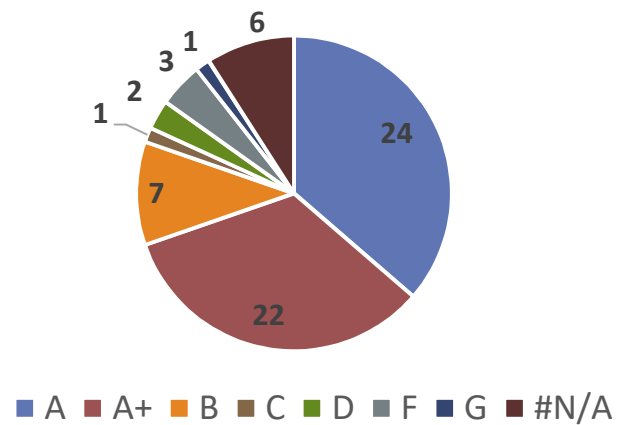


## Immediate goals of the action plan

PROJECT (BUILDING)	Score	Reduced emissions (%)	NPVQ	Financial savings	Investment
Municipal administration – Gorna Malina	116	79,56%	0,8915	38 006	345 000
“St. St. Cyril and Methodius” schools, Aprilovo village	98	77,96%	0,0778	19 849	320 000
Memorial house „Elin Pelin“, Bailovo village	118	80,58%	2,0095	24 681	140 000
“Vasil Levski” Community center, Gorna Malina	128	89,42%	4,0579	29 746	100 000
“Father Paisiy” school, Dolno Kamartsi village	93	86,15%	0,7603	9 728	95 000
Cultural center, Belopoltsi village	78	77,52%	-0,4831	2 452	85 000
“Hristo Botev” school, Gorna malina (all building units)	110	65,41%	2,1317	12 846	70 000
Health Center, Gorno Kamartsi village	103	85,36%	1,1635	8 206	65 000
Ritual center, Gorna Malina village	93	79,31%	0,1736	3 656	54 000
Daycare center “Faith, Hope and Love”, Gorna Malina village	148	83,83%	8,7767	25 946	45 000

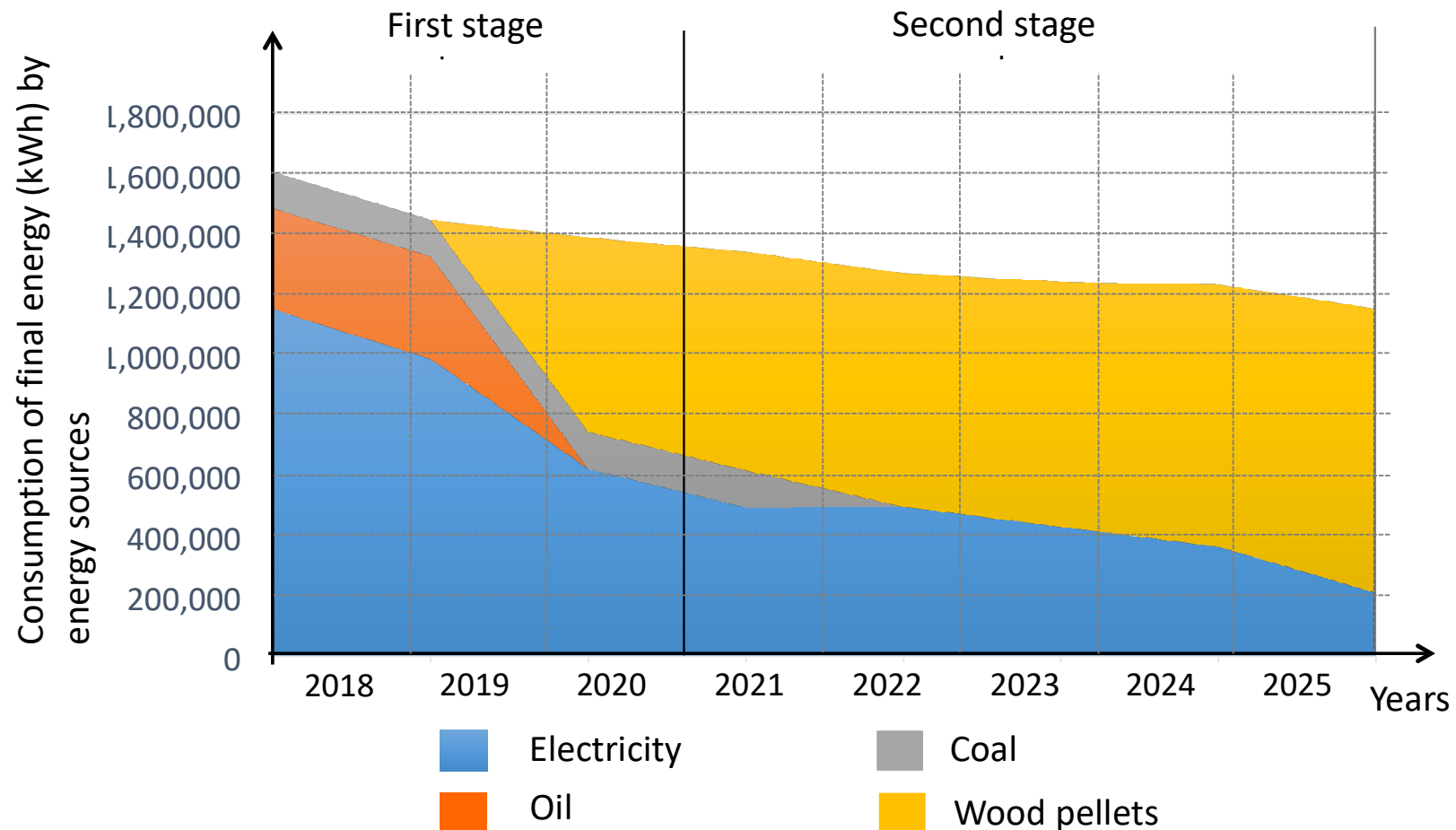
## Example from Dobrich

Number of buildings (n=66) distributed by energy classes (actual consumption)

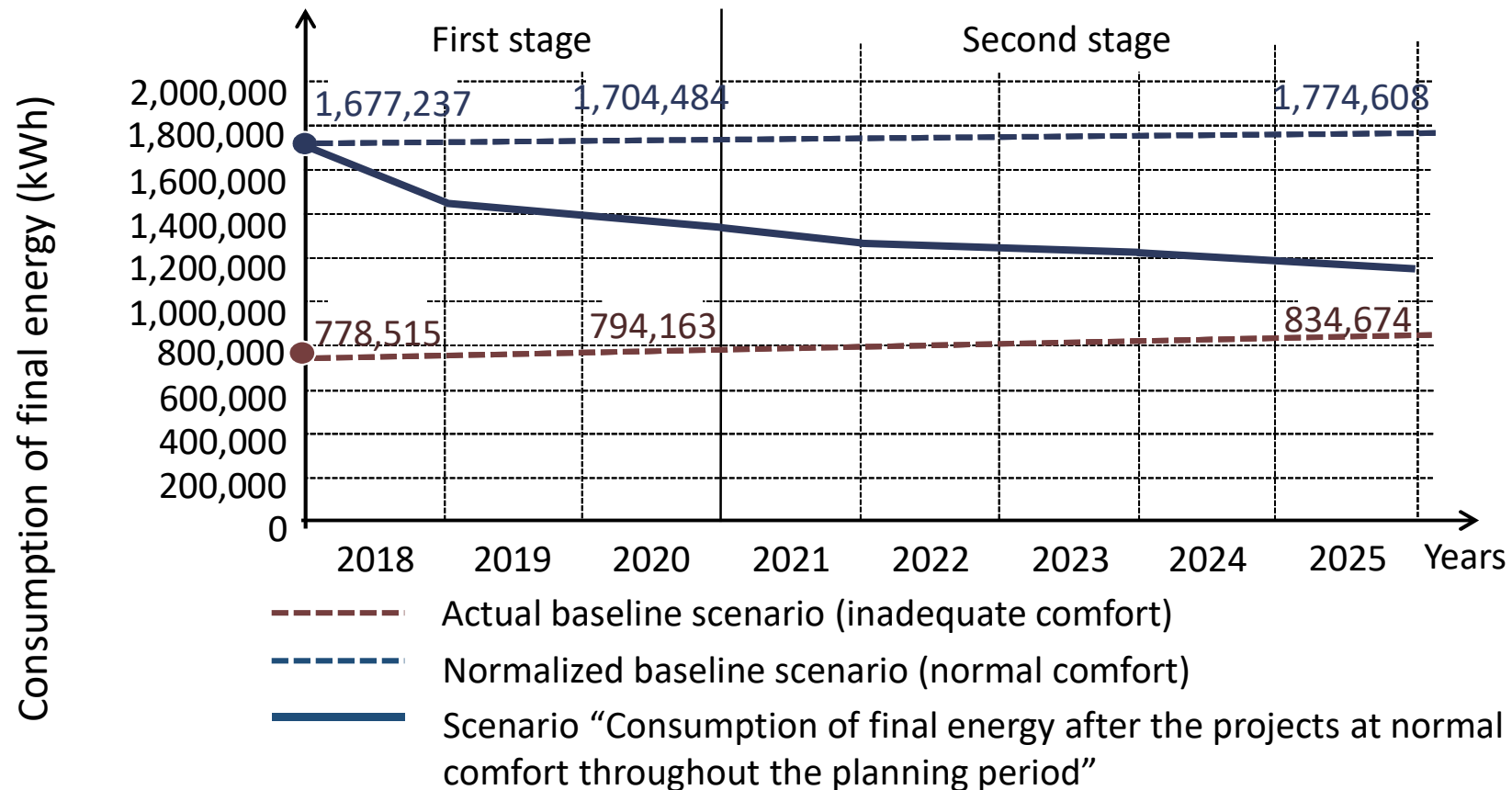




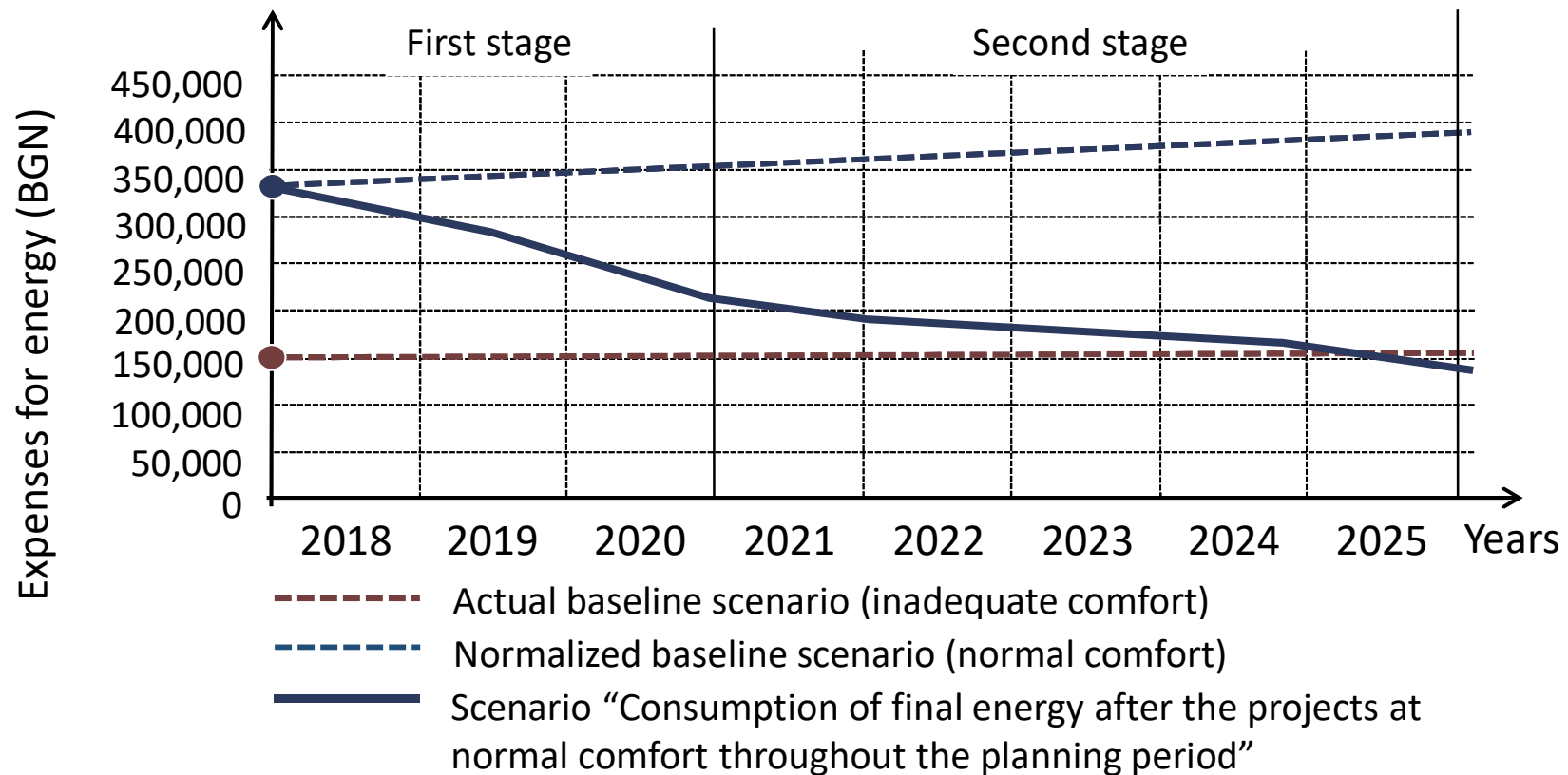
## “Normalized” energy consumption (by energy sources) after the completion of the projects



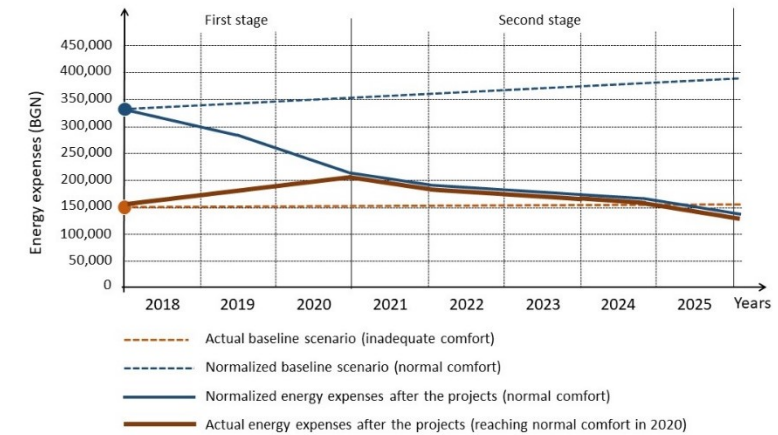
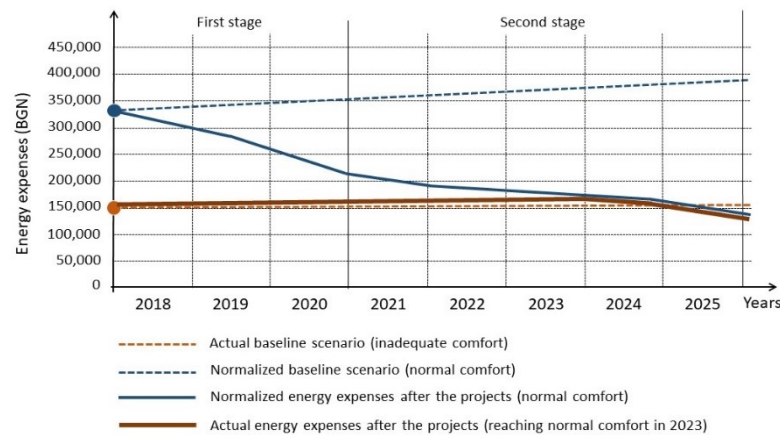
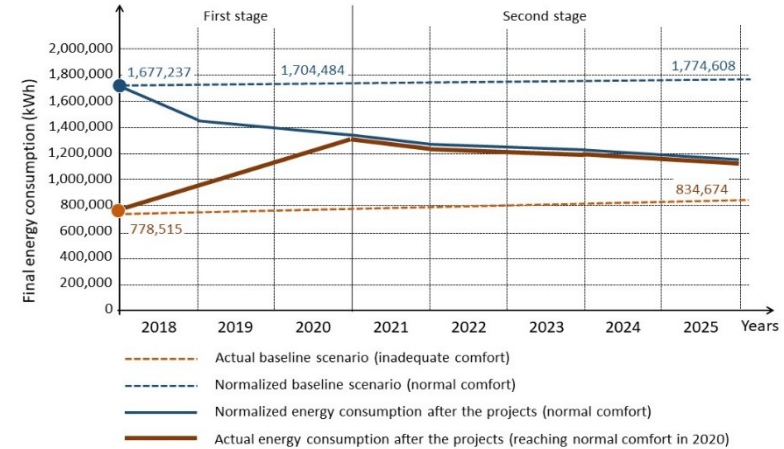
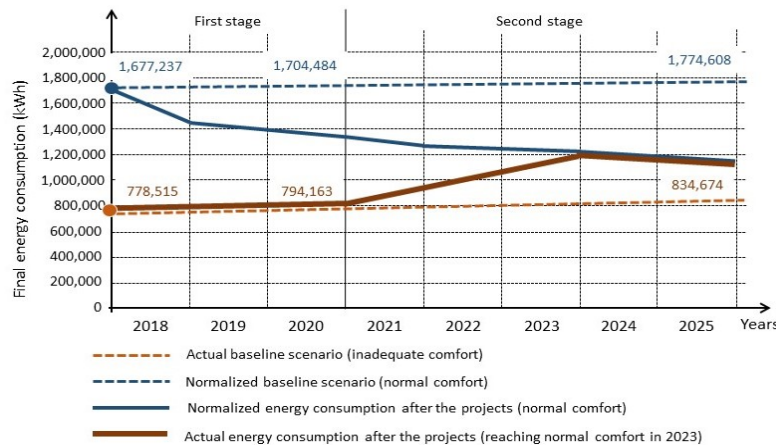
Scenario “Final energy consumption after projects’ completion at normalized comfort during the whole planning period”



Scenario “Expenditure after projects’ completion at normalized comfort during the whole planning period”

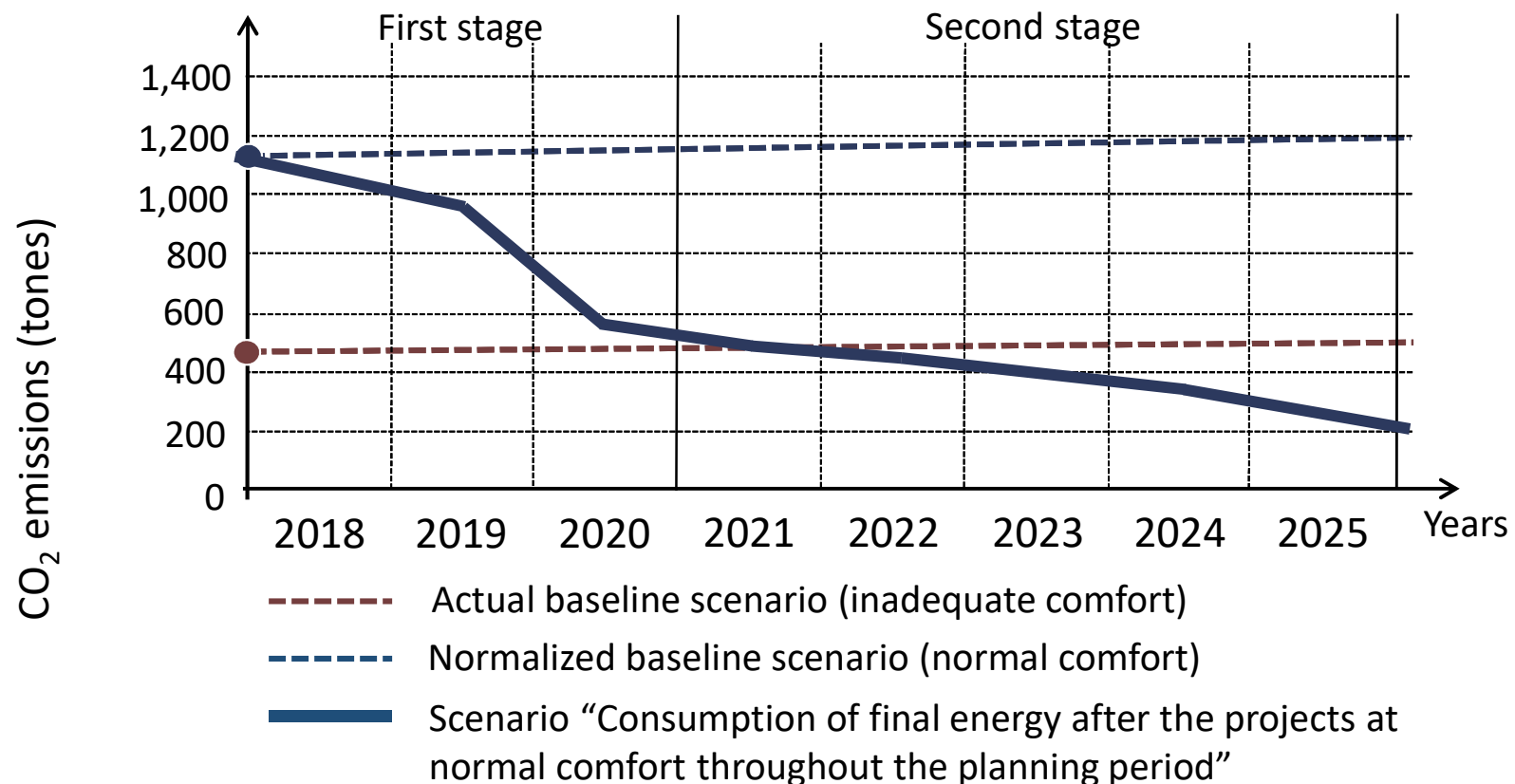


## Policy choices regarding comfort and expenditure





Scenario “CO<sub>2</sub> emissions after projects’ completion at normalized comfort during the whole planning period”

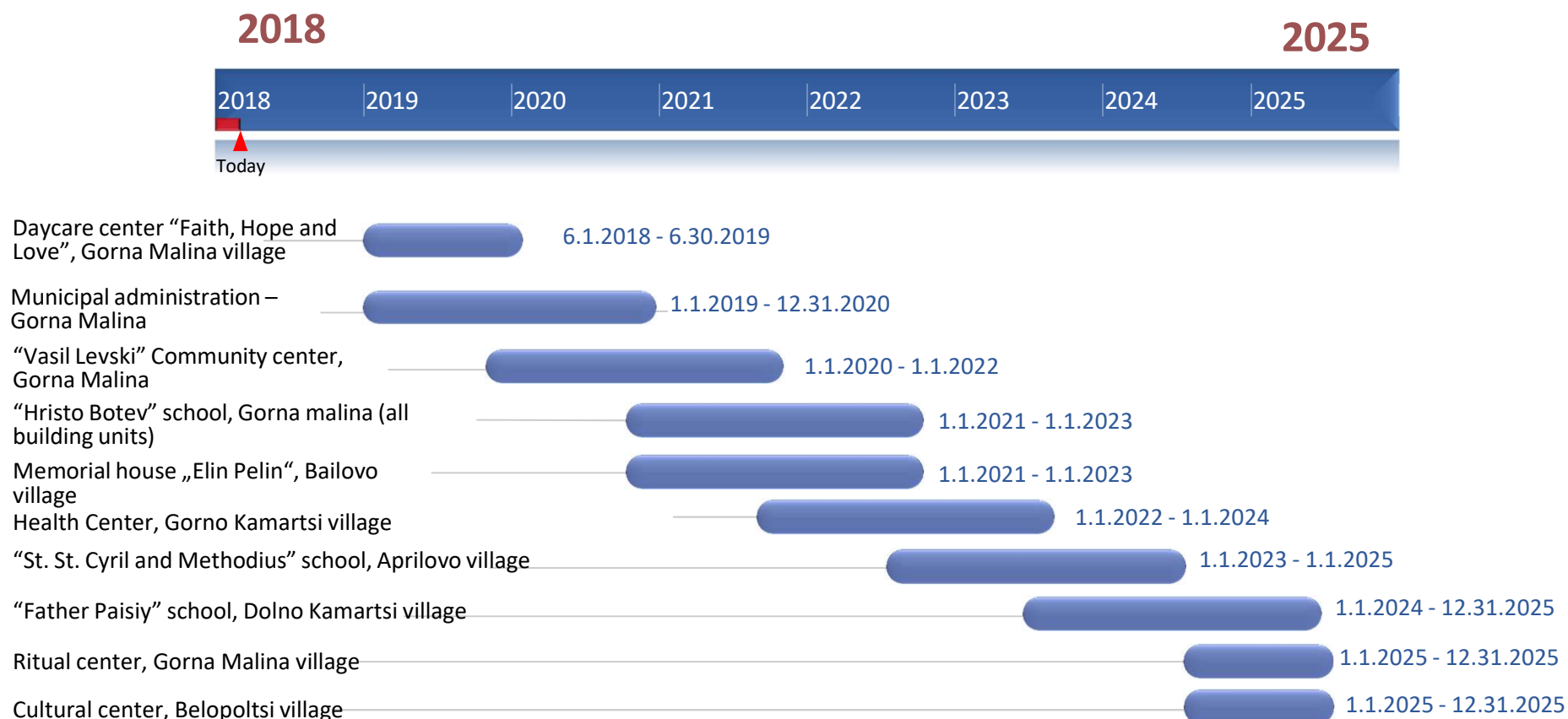


## **Improvement of the comfort to optimal levels is an achievable task**

Normalizing comfort in municipal buildings is a task that can be completed by the end of the first phase of the plan (2020)

The total energy consumption will gradually increase, but energy costs will grow insignificantly due to the introduction of cheaper RES (e.g. wood pellets) as substitutes for expensive electricity

## Sequence of implementation of the investment projects (time schedule)



## Deep energy renovation “step by step”

Through the staged (step by step) renovation approach, we keep the possibility that partially renovated buildings subsequently (when new financial resources become available) achieve higher energy classes and new investments are attracted.



## IMPROVEMENT OF THE COMFORT AND CUTTING OFF EXPENSES

Preparation of energy audits and  
development of design projects for  
renovation of the buildings



## PUBLIC SUPPORT FOR ENERGY EFFICIENCY AND RES

Information campaigns and energy  
efficiency and climate change days

Capacity building of the local  
administration

Municipal Energy Information  
and Management System

## Conclusions

- Secure long-term political commitment
- Establish and maintain an energy management system
  - Set realistic goals corresponding to the financial framework
  - Prioritize projects according to a coherent multi-criteria evaluation
- Define and target suitable sources of funding for each project according to the general strategy
  - Organize and monitor the implementation
    - Maintain high project readiness
    - Inform and communicate

**Thank you for your attention!**

**Dragomir Tzanev**  
**Center for Energy Efficiency EnEffect**

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