Supported by:

Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

European
Climate Initiative
EUKI

based on a decision of the German Bundestag

THE CONGREGATE PROJECT

PILOT CASES FROM BULGARIA: BURGAS, DOBRICH, SOFIA MUNICIPALITY

Dragomir Tzanev

Center for Energy Efficiency EnEffect

EnEffect

10/3/2022

Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

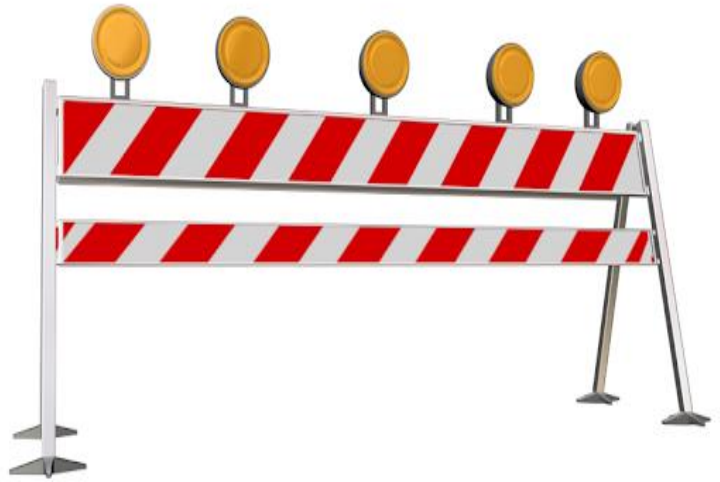
NATIONAL BARRIERS

So far, no any official draft of amended legislation

Political crisis underway, contradictory messages from the political parties represented in the Parliament

Major discussions related to:

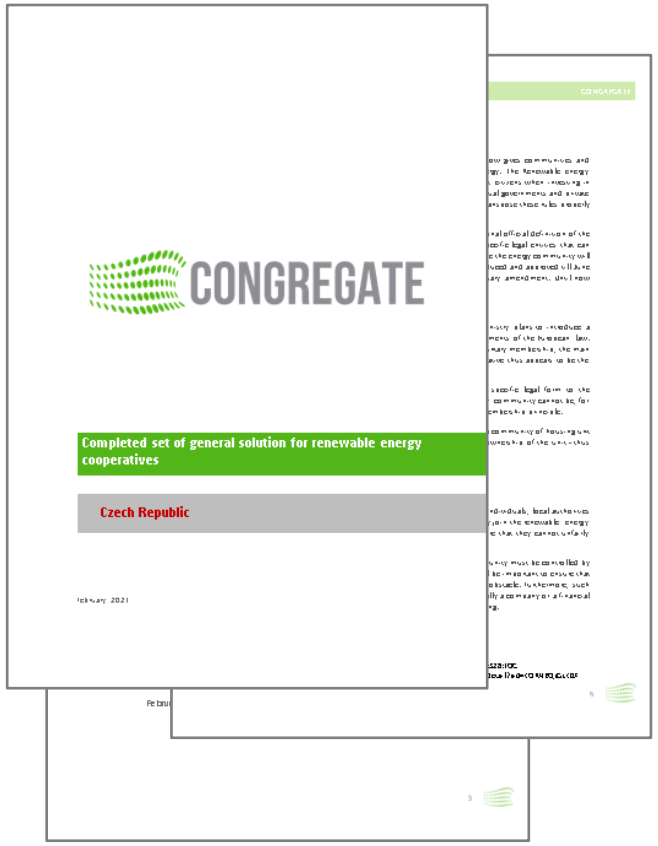
- Impact of electricity market liberalization on vulnerable households
- Future of coal-based power plants
- Delays in the adoption of the RES directive
- No discussion on key issues as smart metering and grid management



Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag

PROJECT ACHIEVEMENTS

Completed set of general solution for renewable energy cooperatives (Bulgaria)

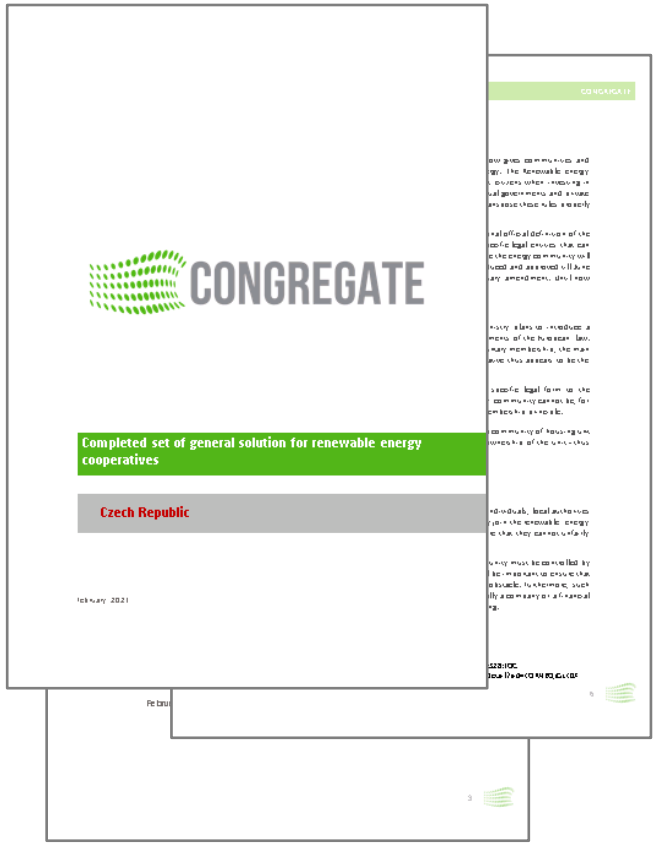


- National legal Framework & policies
- Legal structures for energy communities – cooperatives
- Current status
  - Statistical data on existing energy communities – cooperatives
  - RES technologies adopted
  - Energy sectors
  - Selected practices
- Other available reports: GreenPeace, E3 Analytics, Center for Study of Democracy

Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag

PROJECT ACHIEVEMENTS

Analyses of different applicable technologies and organizational structures (Bulgaria)



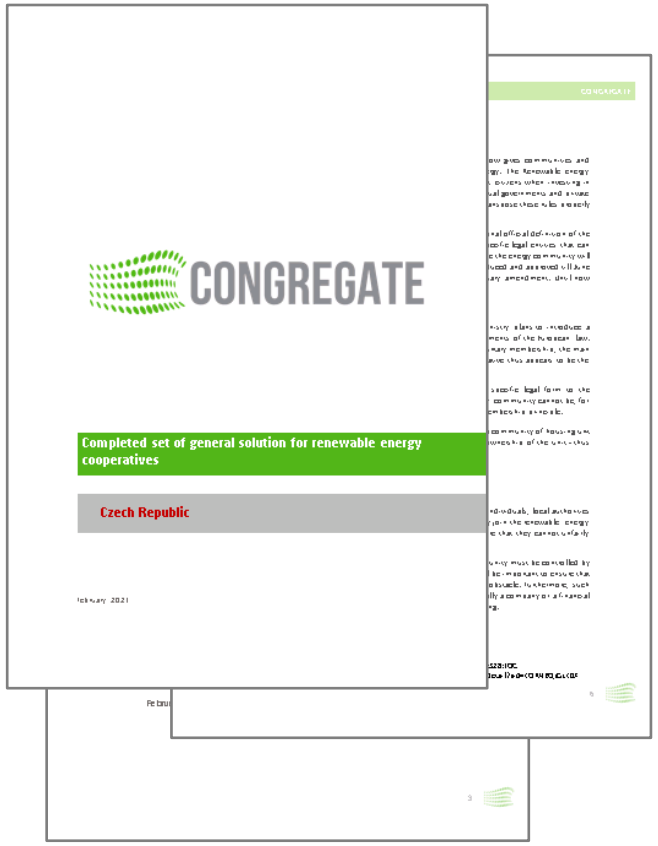
- Technologies:
  - PV (for own needs or for sale)
  - PV (green energy for electric vehicles charging stations)
  - Building renovation + PV
  - Biomass boiler/heat pump (heat/cold energy for own needs)
- Possible organizational structures:
  - Non-for profit
  - Association of homeowners
  - Ltd
  - JSC

Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag

PROJECT ACHIEVEMENTS

Selection of most viable models and consultations with local authorities (Bulgaria)

- Production of electricity with PV technologies for own needs of the cooperating parties
- Production of electricity with PV technologies for sale at preferential prices
- Building renovation, combined with the production of electricity with PV technologies

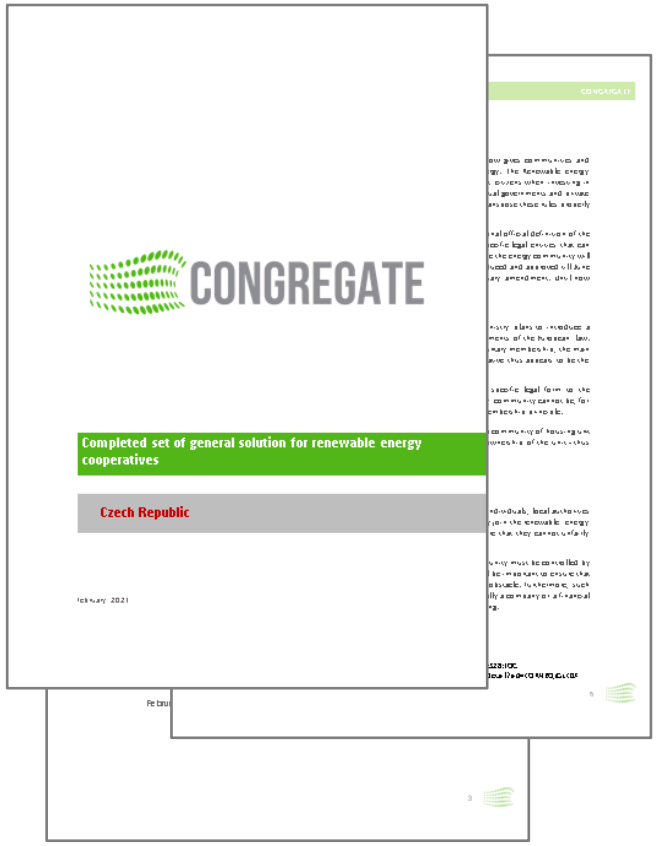


Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag

PROJECT ACHIEVEMENTS

Selection of most viable models and consultations with local authorities (Bulgaria)

- Production of heating energy for own needs by the cooperating countries (biomass boiler)
- Production of heating and cooling energy for own needs by the cooperating countries (heat pumps + PV)
- Out of the box: Production of electricity with PV technologies for "green energy" power supply at a charging station for electric vehicles



Supported by:
Federal Ministry for the Environme and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

BURGAS PILOT CASE: BASELINE

Already installed PV plants.

Use of geothermal energy.

Just a few companies provided detailed information for the installed capacity and the load profiles.

Wastewater treatment plant nearby

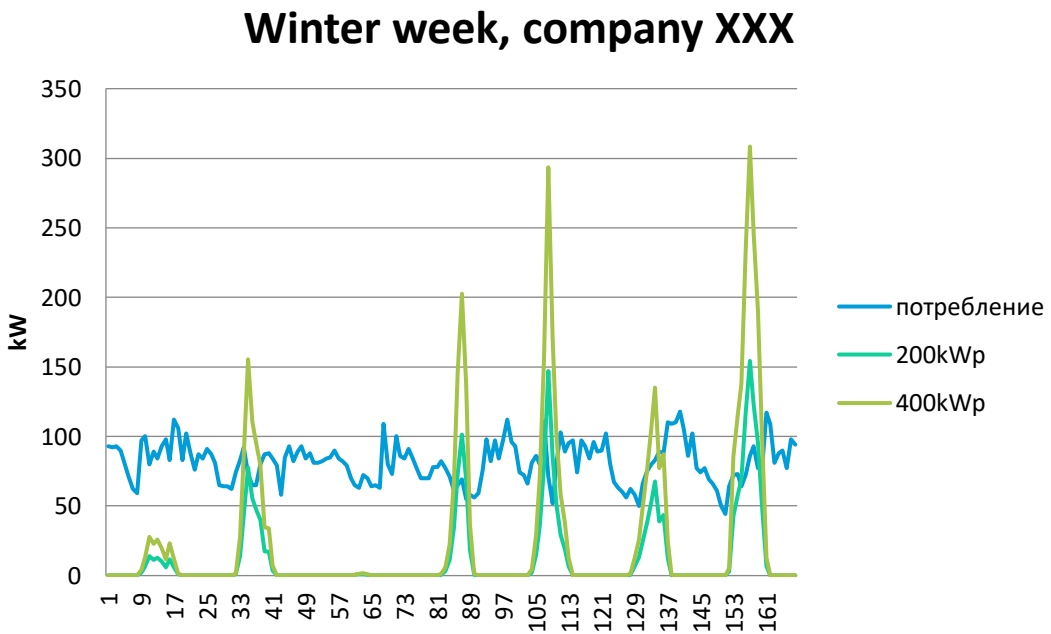
Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

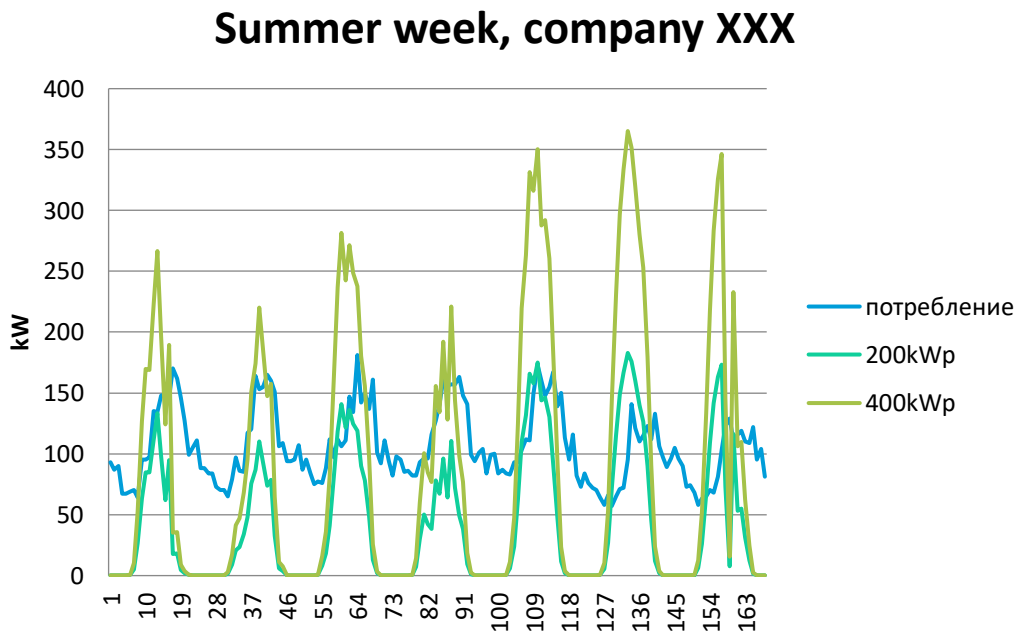
OPPORTUNITIES FOR COOPERATION

Scope of activities	Applicable technologies	Participants	Commercial aspects	Regulatory issues
Electricity for own use	PV/other, batteries, energy management	Owners in a common entity, entity group	Governed by a contract for participation	Need to coordinate a change in a project design (electrical part)
Electricity for own use and exchange with the grid	PV/other, batteries, energy management, commercial measurement	Owners in a common entity, entity group	Contracts with energy trader and electricity distribution company are required	Need for Legal entity, party to the contracts
Virtual power plants	RES generation Digital environment	Investors	Development of a trading platform	Licensed energy trader and business model
Energy efficiency services	Combination of technologies for consumption, production and management	Owners in a common entity, entity group, ESCO	Contract for energy management, contracts with energy trader and electricity distribution company	Complete energy project; Legal entity party to the contracts
Provision of utilities	Combination of technologies for consumption, production and management	Municipality, Industrial Zone, PPP	Own governance structure	Licensing of production, distribution, trading

Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

LOAD PROFILES





Supported by:
Federal Ministry for the Environme and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

SCENARIO 1

- Individual solutions – Business As Usual

  - Advantages
    - Established solution, everybody is doing exactly this

  - Disadvantages
    - Covers low percentage of the actual consumption
    - High share of energy to the grid
    - A lot of fees still exist
    - Not suitable for all (large consumer - small roof and vice versa)

Supported by:
Federal Ministry for the Environme and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

SCENARIO 2

- Cooperation within the Industrial zone

  - Advantages
    - Higher percentage of the produced energy is used on site
    - Reduction of additional fees
    - Constant electricity price over a long period of time

  - Disadvantages
    - Regulations still not supporting energy cooperatives
    - Leading partner is required
    - Additional expenses for design and construction
    - Need of load balancer

Supported by:
Federal Ministry for the Environme and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

SCENARIO 3

- Cooperation within the Industrial zone and connection to anaerobic plant

  - Advantages
    - Almost full use of the produced energy on site
    - Constant electricity price over a long period of time
    - Better balancing through the anaerobic plant
    - Even lower fees

  - Disadvantages
    - Regulations still not supporting energy cooperatives
    - Additional expenses for design and construction

Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

COMPARISON OF THE RESULTS

- Final price in scenario 3 - 287 BGN/MWh (annual appreciation of 1.4% for the first 10 years).
- Only in case of market energy price below 210 BGN/MWh (excluding fees), which is hardly possible, it is more profitable to keep the BaU scenario.
- Cooperative or individual solutions, comparison:

Company XXX, existing PV plant with 515 kWp	Standard contract (2021)	Standard contract (2022)	Contract with the cooperative	Members of the cooperative
Price of the energy from the PV, BGN/MWh	344	344	344	287
Price of the purchased energy, BGN/MWh	226	235	197	0
Price of sold energy, BGN/MWh	-183	-246	-188	0
Average annual price, BGN/MWh	**388**	**333**	**354**	**287**

Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

CONCLUSIONS AND RECOMMENDATIONS

- There is still a lack of ready-to-implement contractual and legal models for cooperation.
- At this stage, the leading role of the initiator of the cooperation, around which the different actors can unite, is crucial.
- The price levels achieved are competitive with the current electricity prices.
- The efficiency of investments can be significantly increased by the implementation of 'smart' solutions.
- The possibility of balancing the loads through the anaerobic plant allows maximum utilisation of the produced energy on site.

Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

DOBRICH (1)

The administrative building of Dobrich municipality

Repair of the roof is needed anyway.

Heating and cooling with air-conditioners.

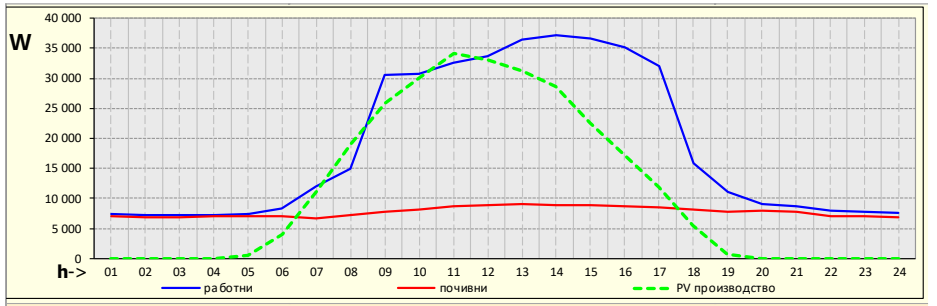
Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

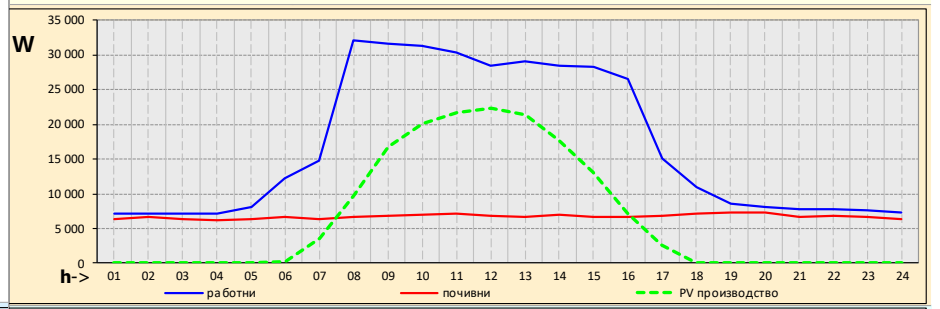
DOBRICH (2)

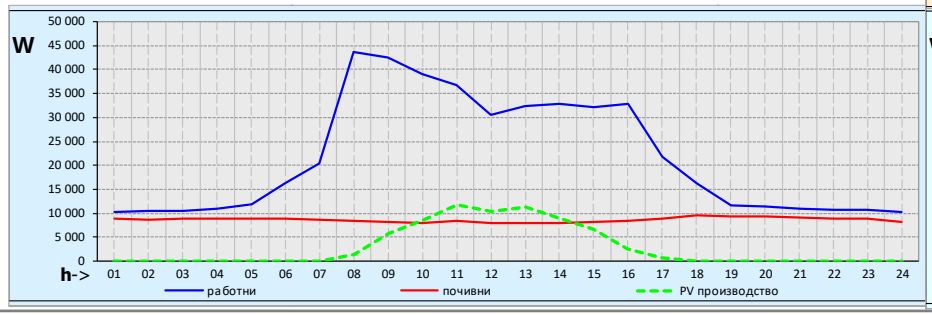
Energy to be used only for the building – simplified administrative procedure

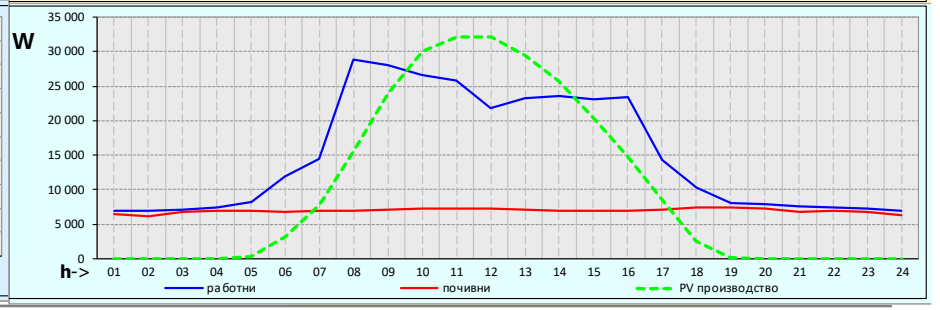
Provided power > 100 kW – hourly data available

Detailed analyses for the needed PV power









Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

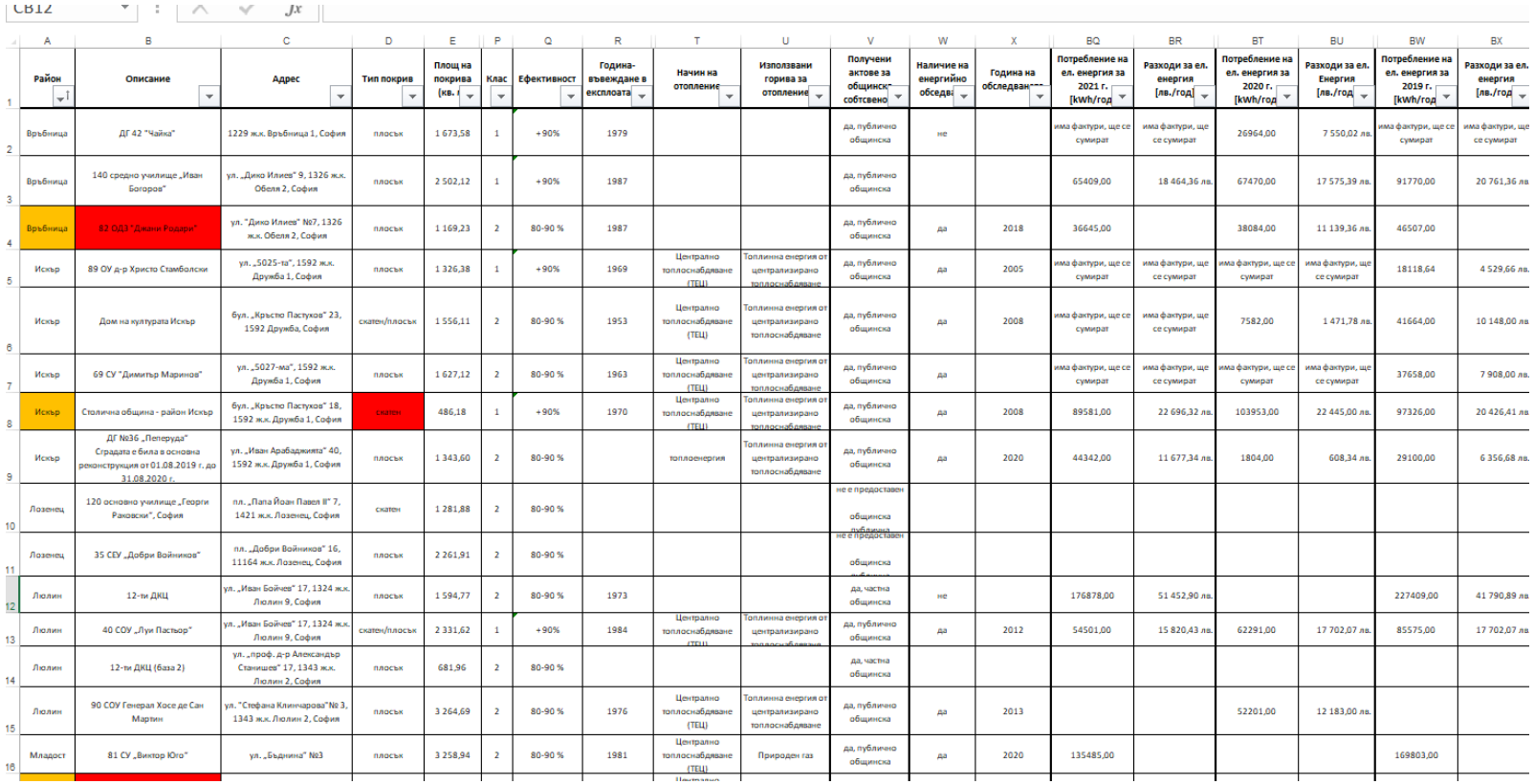
SOFIA (1)

Drone photography and potential assessment of over 860 municipal buildings

The municipality shortlisted 38 buildings.

EnEffect reduced to 12.

The municipality chose 1



	A	B	C	D	E	P	Q	R	T	U	V	W	X	BQ	BR	BT	BU	BW	BX
1	Район	Описание	Адрес	Тип покрив	Площ на покрива (кв.	Клас	Ефективност	Година-въвеждане в експлоата	Начин на отопление	Използвани горива за отопление	Получени актове за общинск собтсвено	Наличие на енергийно обсед	Година на обследван	Потребление на ел. енергия за 2021 г. [kWh/год	Разходи за ел. енергия [лв./год]	Потребление на ел. енергия за 2020 г. [kWh/год	Разходи за ел. Енергия [лв./год	Потребление на ел. енергия за 2019 г. [kWh/год	Разходи за ел. енергия [лв./год
2	Връбница	ДГ 42 "Чайка"	1229 ж.к. Връбница 1, София	плосък	1 673,58	1	+90%	1979			да, публично общинска	не		има фактури, ще се сумират	има фактури, ще се сумират	26964,00	7 550,02 лв.	има фактури, ще се сумират	има фактури, ще се сумират
3	Връбница	140 средно училище „Иван Богоров"	ул. „Дико Илиев" 9, 1326 ж.к. Обеля 2, София	плосък	2 502,12	1	+90%	1987			да, публично общинска			65409,00	18 464,36 лв.	67470,00	17 575,39 лв.	91770,00	20 761,36 лв
4	Връбница	82 ОДЗ "Джани Родари"	ул. "Дико Илиев" №7, 1326 ж.к. Обеля 2, София	плосък	1 169,23	2	80-90 %	1987			да, публично общинска	да	2018	36645,00		38084,00	11 139,36 лв.	46507,00	
5	Искър	89 ОУ д-р Христо Стамболски	ул. „5025-та", 1592 ж.к. Дружба 1, София	плосък	1 326,38	1	+90%	1969	Централно топлоснабдяване (ТЕЦ)	Топлинна енергия от централизирано топлоснабдяване	да, публично общинска	да	2005	има фактури, ще се сумират	има фактури, ще се сумират	има фактури, ще се сумират	има фактури, ще се сумират	18118,64	4 529,66 лв.
6	Искър	Дом на културата Искър	бул. „Кръстю Пастухов" 23, 1592 Дружба, София	скатен/плосък	1 556,11	2	80-90 %	1953	Централно топлоснабдяване (ТЕЦ)	Топлинна енергия от централизирано топлоснабдяване	да, публично общинска	да	2008	има фактури, ще се сумират	има фактури, ще се сумират	7582,00	1 471,78 лв.	41664,00	10 148,00 лв
7	Искър	69 СУ "Димитър Маринов"	ул. „5027-ма", 1592 ж.к. Дружба 1, София	плосък	1 627,12	2	80-90 %	1963	Централно топлоснабдяване (ТЕЦ)	Топлинна енергия от централизирано топлоснабдяване	да, публично общинска	да		има фактури, ще се сумират	има фактури, ще се сумират	има фактури, ще се сумират	има фактури, ще се сумират	37658,00	7 908,00 лв.
8	Искър	Столична община - район Искър	бул. „Кръстю Пастухов" 18, 1592 ж.к. Дружба 1, София	скатен	486,18	1	+90%	1970	Централно топлоснабдяване (ТЕЦ)	Топлинна енергия от централизирано топлоснабдяване	да, публично общинска	да	2008	89581,00	22 696,32 лв.	103953,00	22 445,00 лв.	97326,00	20 426,41 лв
9	Искър	ДГ №36 „Пеперуда" Сградата е била в основна реконструкция от 01.08.2019 г. до 31.08.2020 г.	ул. „Иван Арабаджията" 40, 1592 ж.к. Дружба 1, София	плосък	1 343,60	2	80-90 %		топлоенергия	Топлинна енергия от централизирано топлоснабдяване	да, публично общинска	да	2020	44342,00	11 677,34 лв.	1804,00	608,34 лв.	29100,00	6 356,68 лв.
10	Лозенец	120 основно училище „Георги Раковски", София	пл. „Папа Йоан Павел II" 7, 1421 ж.к. Лозенец, София	скатен	1 281,88	2	80-90 %				не е предоставен общинска публично								
11	Лозенец	35 СЕУ „Добри Войников"	пл. „Добри Войников" 16, 11164 ж.к. Лозенец, София	плосък	2 261,91	2	80-90 %				не е предоставен общинска публично								
12	Люлин	12-ти ДКЦ	ул. „Иван Бойчев" 17, 1324 ж.к. Люлин 9, София	плосък	1 594,77	2	80-90 %	1973			да, частна общинска	не		176878,00	51 452,90 лв.			227409,00	41 790,89 лв
13	Люлин	40 СОУ „Луи Пастьор"	ул. „Иван Бойчев" 17, 1324 ж.к. Люлин 9, София	скатен/плосък	2 331,62	1	+90%	1984	Централно топлоснабдяване (ТЕЦ)	Топлинна енергия от централизирано топлоснабдяване	да, публично общинска	да	2012	54501,00	15 820,43 лв.	62291,00	17 702,07 лв.	85575,00	17 702,07 лв
14	Люлин	12-ти ДКЦ (база 2)	ул. „проф. д-р Александър Станишев" 17, 1343 ж.к. Люлин 2, София	плосък	681,96	2	80-90 %				да, частна общинска								
15	Люлин	90 СОУ Генерал Хосе де Сан Мартин	ул. "Стефана Клинчарова"№ 3, 1343 ж.к. Люлин 2, София	плосък	3 264,69	2	80-90 %	1976	Централно топлоснабдяване (ТЕЦ)	Топлинна енергия от централизирано топлоснабдяване	да, публично общинска	да	2013			52201,00	12 183,00 лв.		
16	Младост	81 СУ „Виктор Юго"	ул. „Бъднина" №3	плосък	3 258,94	2	80-90 %	1981	Централно топлоснабдяване (ТЕЦ)	Природен газ	да, публично общинска	да	2020	135485,00				169803,00	

Supported by:
Federal Ministry for the Environment and Nuclear Safety
based on a decision of the German Bundestag
CONGREGATE

SOFIA (2)

Ivan Bogorov school

No summer consumption, the energy may be used in other municipal buildings, based on contract with energy trader

Supported by:

Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

European
Climate Initiative
EUKI

based on a decision of the German Bundestag

THANK YOU FOR YOUR ATTENTION!

Dragomir Tzanev
Executive Director, Center for Energy Efficiency EnEffect
dtzanev@eneffect.bg

Sídlo / Main Address:
Americká 17, 120 00 Praha 2, Czech Republic
phone: +420 224 252 115 / fax: +420 224 247 597

Pobočka / Regional branch:
Žižkova 12, 370 01 České Budějovice, Czech Republic
phone: +420 386 350 443 / fax: +420 386 350 370

E-mail: seven@svn.cz
Internet: www.svn.cz

EnEffect