





# Ministry of the Environment of the Czech Republic

# Energy efficiency financing in Central Europe

## Czech experiences with renovations of housing in the frame of the New Green Savings Programme

Kaiserstejnsky Palace, Lesser Town Square 23/37, Prague

April 27, 2017

Ministry of the Environment  
of the Czech Republic

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# New Green Savings Programme (NGS)

## Announcement of the NGS Programme - January 6, 2014

### □ Main objectives of the NGS Programme

Increasing the energy efficiency of buildings (energy saving, exchange of unsuitable heat sources and support for the use of renewable energy sources), reducing greenhouse gas emissions and air pollutants and improving of a quality of housing.

### □ Sources of the NGS Programme

The NGS Programme is covered by the share of auctioned emission allowances EUA and EUAA under the EU Emission Trading Scheme 2013-2020 pursuant to Act No. 383/2012 Coll., On the trading conditions of allowances for greenhouse gas emissions.

At present, the total revenues of the NGS Programme are estimated at **CZK 19,360.3 mil.** (from EUA/ EUAA auctions CZK 18,055.2 mil., another source in 2015 and 2016 was the State budget CZK 1,305.1 mil. in total)

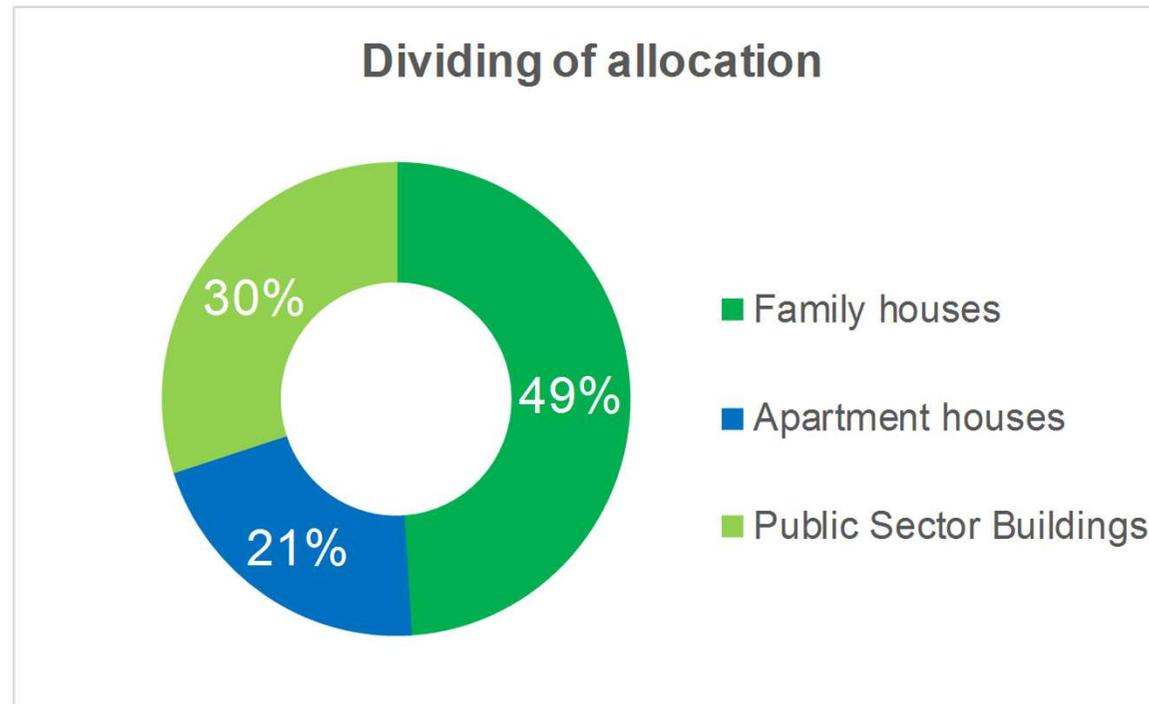


# Green Savings Programme

## □ Indicative allocation of NGS resources

### ▪ Segments:

- After subtraction the state administration costs (SAC) 4,3 % CZK 832,5 mil.*
- Family houses (FH) 49 % CZK 9 078,6 mil.
  - Apartment houses (AH) 21% CZK 3 890,8 mil.
  - Public Sector Buildings (PSB) 30% CZK 5 558,4 mil.



# Form and amount of subsidy per area of support

Support is provided in the form of a subsidy

## ▪ Family Houses – Areas of support

- **A** Reducing the energy performance of existing FH (thermal insulation)
  - the subsidy is set at a flat rate per m<sup>2</sup> of insulated area in 3 levels depending on the saved energy and ranging between 30% and 50% of the eligible costs
- **B** Building of family houses with very low energy performance
  - the subsidy amount is CZK 300 or CZK 450 thous. according to an achieved specific energy consumption in FH, ie. up to 20 kWh.m<sup>2</sup>/year or up to 15 kWh.m<sup>2</sup>/ year
- **C** Efficient use of energy sources
  - the amount of support depends on the type of exchanged or installed source of heat, and alternatively forced ventilation with heat recovery, ranging from CZK 15 to CZK 100 thous.
- Possibility of subsidy on green roofs - CZK 500/m<sup>2</sup> (A, B) and subsidies for use of heat from waste water - max. CZK 15 thous. (B, C)
- Support for the elaboration of expert opinion ranging between CZK 5 – CZK 35 thous. is provided for all areas of support



# Form and amount of subsidy per area of support

## ▪ Apartment houses (AH)

### *Supporting of the AH exclusively in the City of Prague*

#### ➤ **A** Reduce the energy performance of existing AH

- the subsidy is fixed at a flat rate per m<sup>2</sup> of insulated area at 2 levels depending on the energy saved and ranging between 25% and 30% of the eligible costs

#### ➤ **C** Efficient use of energy sources

- the amount of support depends on the type of exchanged or installed source of heat and alternatively forced ventilation with heat recovery, ranging from CZK 6 to CZK 25 thous. per dwelling unit

### *Supporting of the AH in the whole Czech Republic*

#### ➤ **B** Building of apartment houses with very low energy performance (or conversion of houses to apartment building in passive)

- the amount of support up to CZK 1,300/m<sup>2</sup> of energy-related area



## Apartment houses (AH)

- Possibility of subsidy on green roofs CZK 500 / m<sup>2</sup> (A, B) and subsidies for use of heat from waste water heat max. CZK 15 thous. (B, C)
- Support for the elaboration of expert opinion ranging between CZK 15 – CZK 70 thous. is provided for all areas of support.

### □ Public Sector Buildings (PSB)

- Support from the NGS is provided by strengthening the applicant's own resources within the announced calls for proposal from Specific objective 5.1 (To reduce the energy intensity of public buildings and increase the use of renewable energy sources (RES) of the Priority Axis 5 of the Operational Programme Environment (OPE)
- The maximum amount of support for approved applications calculated from eligible expenditure will consist: 40 % OPE + 45 % NGS



# Return on Investment of the Implementation of Measures Supported by the NGS Programme

- The return on investments in energy saving measures in family houses depends on the starting condition of the building, the extent of realized measures and the use of support for the most appropriate combination of measures incl. benefit - bonuses.
- Generally, on FH model examples (see in detail at the end of the presentation), it can be summarized that:
  - simple return on investment without State aid would be the most frequent 14 to 25 years
  - return on investment with support from NGS Programme for thermal insulation ranges most frequently from 7 to 13 years
  - return on investment with support from NGS Programme for the installation of solar thermal systems is usually around 10 years
  - return on investment with support from NGS Programme for the installation of photovoltaic systems ranges most frequently from 12 years



# The New Green Savings Programme

## □ Brief Overview of Calls for Proposal

- 1<sup>st</sup> Call for proposal FH Receipt of Applications: January 4 – December 31, 2014
- 2<sup>nd</sup> Call for proposal FH Receipt of Applications: May 5 – July 15, 2015
- 1<sup>st</sup> Call for proposal AH Receipt of applications: May 5 – October 31, 2015
- 3<sup>rd</sup> Call for proposal FH Receipt of Applications: October 22, 2015 - (Continuous)
- 2<sup>nd</sup> Call for proposal AH Receipt of Applications: March 15, 2016 - (Continuous)
- 3<sup>rd</sup> Call for proposal AH (Passive)  
Receipt of Applications: January 9, 2017 (Until the allocation of CZK 100 mil. has been reached)
- Within the framework of the 70<sup>th</sup> Call for proposal from OPE SC 5.1 (announced in April 3, 2017) for the buildings of central institutions it is possible to apply for strengthening of the applicant's own resources from the NGS Programme.



# Current changes in the NGS Programme

## □ Family houses segment - under preparation is:

- Creation of a new C.3.7 support sub-area for advanced photovoltaic systems with a high level of utilization of the produced electricity at the place of production
- Bonus for a combination of the boiler replacement within the OPE and the installation of the solar system within the NGS
- Bonus for replacing of a boiler from OPE and thermal insulation of a family house from the NGS within the NGS – sub - programme Family Houses, support area A - Reduction of the energy performance of existing family houses



# Implementation of NAPEE objectives within the Green Savings Programmes

- ❑ **Green Savings Programme (GS)** (2009 - 2014) – (initially Green Investment Scheme (GIS))
  - **74,050** applications FH and AH (**CZK 20.3 bil.**) and **PSB allocation CZK 400mil.** Final energy savings (FES) **8.9 PJ** – (The Energy Efficiency Center - SEVEN calculation) + **70 TJ** for PSB
- ❑ **New Green Savings Programme (NGS) 2013**
  - **Family houses segment (FH)**
    - 3,763 active applications (CZK - 544 mil.)
    - Final energy saving (FES) **449,3 TJ**
- ❑ **New Green Savings Programme (NGS) (2014 – 2023)**
  - **Family houses segment (FH)**
    - The average energy saving of FES **826 TJ** for CZK 1 bil. provided from the Programme
  - **Apartment houses segment (AH)**
    - The average savings of FES 793 TJ for CZK 1 bil. provided from the Programme
  - **Public sector building segment (PBS)**
    - The average saving of FES 187 TJ for CZK 1 bil. provided from the Programme  
(*Calculated for the central institutions buildings 85% rate of subsidy*)



# Implementation of NAPEE objectives within the Green Savings Programmes

## □ Final energy consumption savings total NGS (FH, AH and PSB) + NGS 2013

- **NGS 2013**                    **0.45 PJ /year**
- **NGS FH**                    **7.49 PJ /year**
- **NGS AH**                    **3.01 PJ /year**
- **NGS PSB**                    **1.04 PJ /year**
- **GS PSB**                    **0.07 PJ /year**
- **TOTAL**                    **12.06 PJ /year**

## □ Benefits of Green Savings (GS) Programmes

- At present, it is possible to predict a total final energy savings of **12.06 PJ /year** and a CO<sub>2</sub> reduction of app. **1 388 thous. T/year**. The resulting benefits of the New Green Savings Programme will mainly depend on the total proceeds of EUA/ EUAA auctioning.



# Overview of Programme administration - NGS applications till April 18, 2017

Call for proposal	Received applications		Active applications		Reimbursed applications	
	Number	Subsidy [CZK]	Number	Subsidy [CZK]	Number	Subsidy [CZK]
<b>1st Call NGS 2014 FH</b>	6 606	1 427 737 324	5 087	1 035 446 101	4 371	715 228 591
<b>2nd Call NGS 2015 FH</b>	4 722	1 050 324 679	3 719	805 541 329	2 898	484 280 664
<b>3rd Call NGS 2015 FH</b>	11 789	2 521 251 127	10 250	2 171 830 109	4 551	596 137 053
<b>Total NGS FH</b>	<b>23 117</b>	<b>4 999 313 130</b>	<b>19 056</b>	<b>4 012 817 539</b>	<b>11 820</b>	<b>1 795 646 308</b>
<b>1st Call NGS 2015 AB</b>	290	173 599 002	49	41 600 761	6	2 580 995
<b>2nd Call NGS 2016 AB</b>	340	289 933 703	294	247 309 615	71	46 319 542
<b>Total NGS AB</b>	<b>630</b>	<b>463 532 705</b>	<b>343</b>	<b>288 910 376</b>	<b>77</b>	<b>48 900 537</b>
<b>Total NGS</b>	<b>23 747</b>	<b>5 462 845 835</b>	<b>19 399</b>	<b>4 301 727 915</b>	<b>11 897</b>	<b>1 844 546 845</b>

**For a more detailed overview - see the following appendix**



# Overview of Administration - 3rd Call for Proposal of FH

## 3rd call for proposal NGS FH - Overview of applications by individual support areas till April 18, 2017

Data source: IS NGS 2015, 3rd Call for proposal NGS FH

AREA of SUPPORT	Received applications		Active applications*		Reimbursed applications	
	Number	Subsidy [CZK]	Number	Subsidy [CZK]	Number	Subsidy [CZK]
A.0 - Thermal insulation (implementation of partial measures)	2 178	305 021 961	1 874	257 638 753	774	94 574 279
A.1 - Thermal insulation (soft comprehensive renovations)	2 029	409 761 191	1 762	353 919 395	586	107 000 062
A.2 - Thermal insulation (medium comprehensive renovation)	2 852	925 999 954	2 478	801 184 165	631	180 433 889
A.3 - Thermal insulation (high comprehensive renovation)	304	168 592 257	230	126 710 594	22	10 178 135
A.5 - Support for the construction of green roofs	2	122 500	2	122 500	0	0
B.1 - Building of family houses	309	93 840 000	275	83 550 000	7	2 190 000
B.2 - Building of family houses with an emphasis on the use of RES	274	125 995 882	256	118 260 000	13	6 165 000
B.5 - Support for the construction of green roofs	5	306 370	4	242 460	0	0
B.6 - Support for the use of heat from waste water	1	5 000	1	5 000	0	0
C.1 - Replacement of resources (simultaneously with area A)	535	33 671 931	443	28 218 551	98	6 258 421
C.2 - Replacement of resources (without simultaneous administration with area A)	807	49 727 961	720	44 652 924	611	37 744 256
C.3.1 - Solar thermal systems for hot water preparation	1 467	52 157 435	1 272	45 235 332	898	31 803 467
C.3.2 - Solar thermal systems for hot water preparation and heating	1 118	56 412 370	986	49 775 184	683	34 364 885
C.3.3 - Photovoltaic systems for hot water preparation with direct heating	213	7 455 586	181	6 319 647	122	4 213 482
C.3.4 - Photovoltaic systems without electricity storage (total usable gain >= 1700 KWH / year)	384	21 507 932	335	18 737 332	197	10 976 009
C.3.5 - Photovoltaic systems with electricity storage (total usable gain >= 1700 KWH / year)	28	1 966 253	22	1 539 253	14	979 253
C.3.6 - Photovoltaic systems with electricity storage (total usable gain >= 3000 KWH / year)	250	25 448 646	214	21 778 646	97	9 778 646
C.4 - Forced ventilation systems with heat recovery	406	40 437 747	341	34 027 747	51	4 813 717
A.4 - Expert opinion and technical supervision	7 189	159 718 448	6 320	140 134 688	2 006	41 059 095
A.4.1- Benefit for using materials with a Type III declaration	0	0	0	0	0	0
B.3 - Expertise	568	19 815 724	530	18 485 724	20	693 600
B.4 - Benefit for Type III Processed Products	77	770 000	75	750 000	1	10 000
C.5 - Expertise	4 595	22 490 374	4 173	20 468 307	2 625	12 896 857
C.6 - Benefit for Type III Processed Products	51	101 907	37	73 907	2	4 000
<b>Total</b>	<b>25 642</b>	<b>2 521 327 429</b>	<b>22 531</b>	<b>2 171 830 109</b>	<b>9 458</b>	<b>596 137 053</b>

\* No canceled requests and closed-ended applications are included.

Note: The application may contain several measures.

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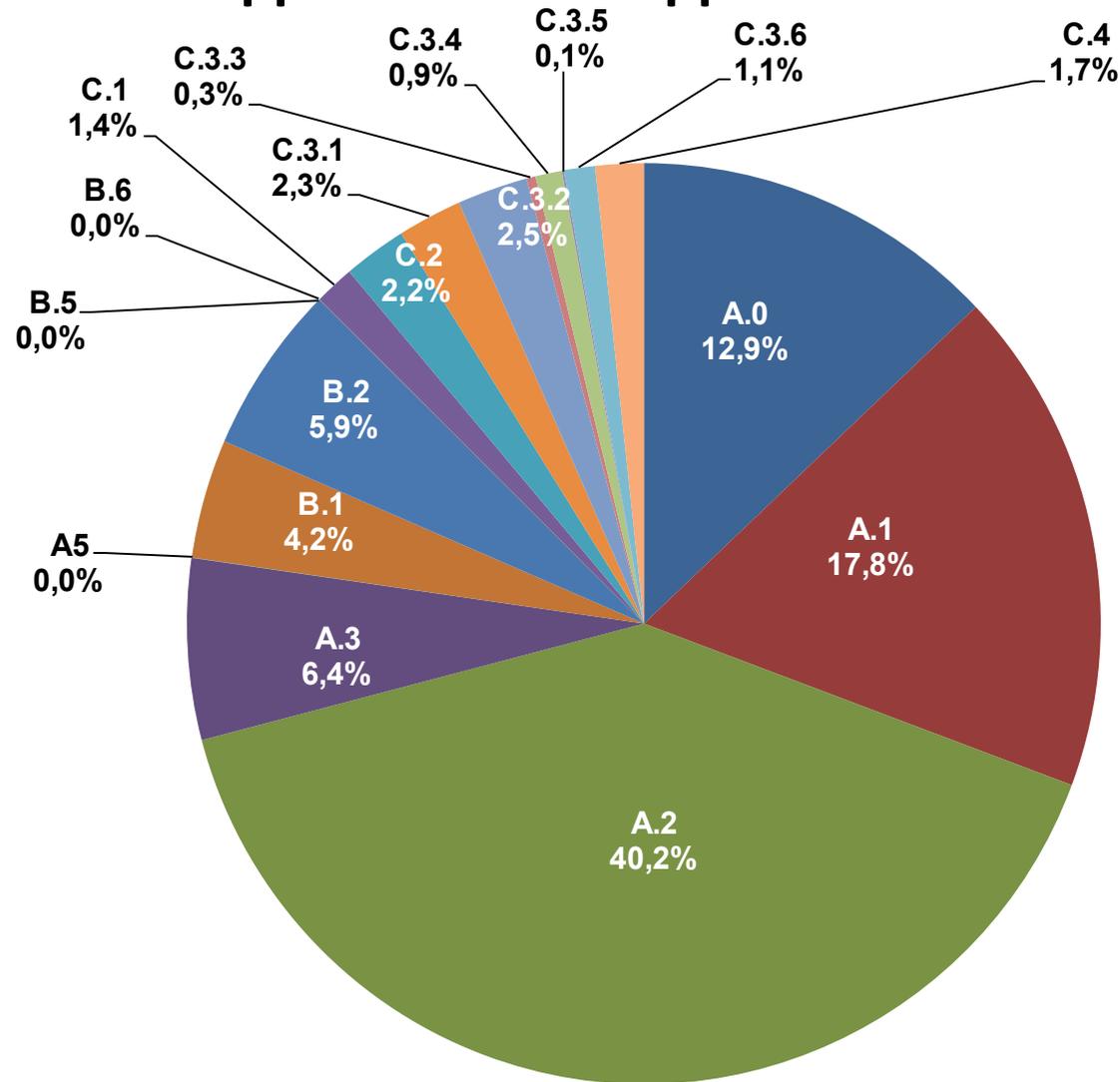
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# Support of Active Applications

## Support of active applications



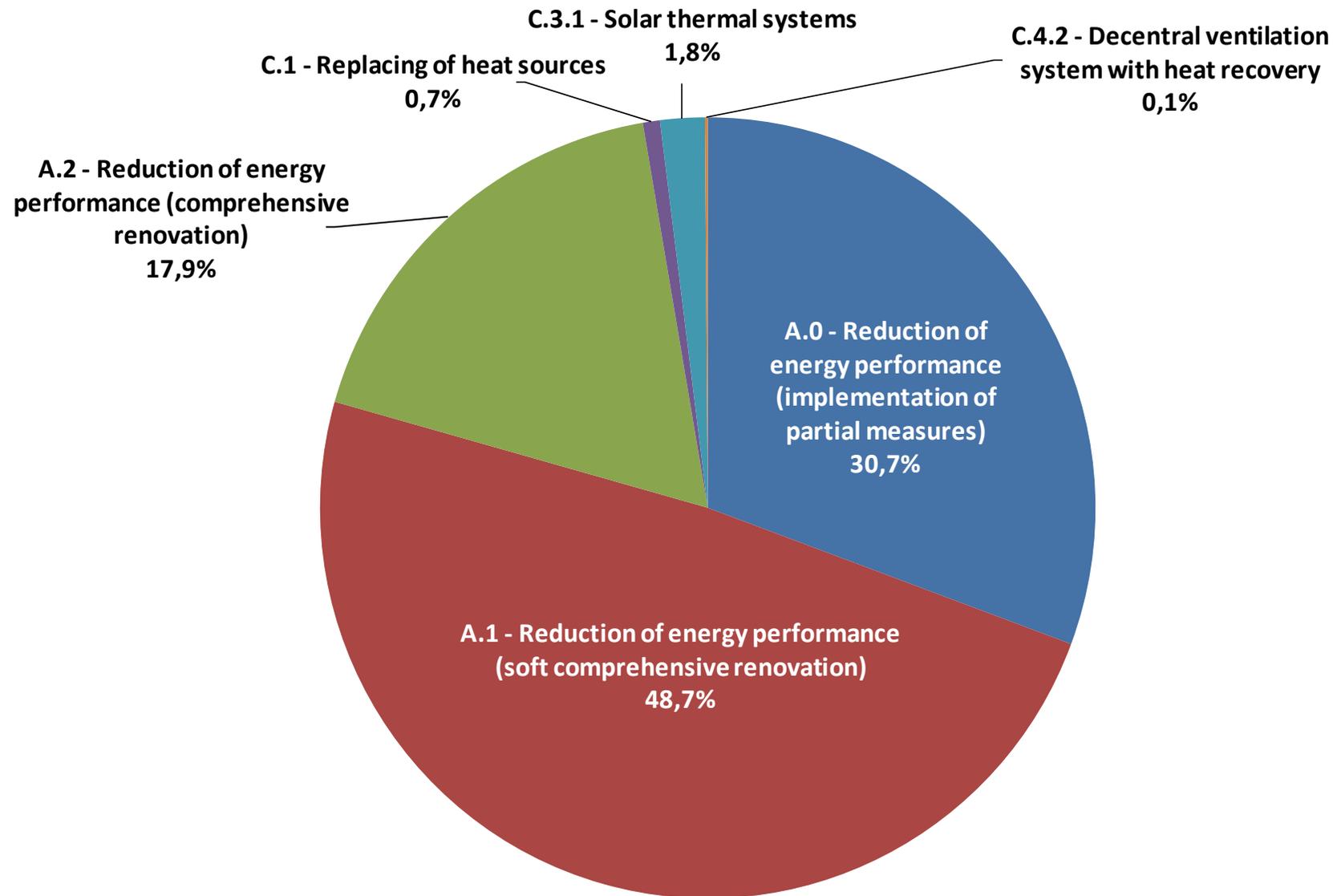
# Overview of Administration - 2nd Call for Proposal of AB

2nd call for proposal - NGS AB - Overview of applications by individual support areas till April 18, 2017						
<i>Data source: IS NGS 2015, 2nd call for proposal - NGS AB</i>						
AREA of SUPPORT	Received applications		Active applications*		Reimbursed applications	
	Number	Subsidy [CZK]	Number	Subsidy [CZK]	Number	Subsidy [CZK]
A.0 - Reduction of energy performance (implementation of partial measures)	131	91 486 848	109	72 747 100	27	12 657 298
A.1 - Reduction of energy performance (soft comprehensive renovation)	153	131 082 949	137	115 510 698	32	22 510 768
A.2 - Reduction of energy performance (comprehensive renovation)	50	48 561 289	44	42 539 584	8	7 408 592
C.1 - Replacing of heat sources	6	1 710 000	6	1 710 000	1	70 000
C.3.1 - Solar thermal systems	12	5 680 450	10	4 385 450	4	1 392 950
C.4.2 - Decentral ventilation system with heat recovery	2	280 000	2	280 000	0	0
A.3 - Expertise and technical supervision	308	10 893 976	280	9 957 810	66	2 233 461
C.5 - Expertise and technical supervision	17	198 973	15	178 973	5	46 473
<b>Total</b>	<b>679</b>	<b>289 894 485</b>	<b>603</b>	<b>247 309 615</b>	<b>143</b>	<b>46 319 542</b>
* No canceled requests and closed-ended applications are included.						
Note: The application may contain several measures.						



# Support of Active Applications

## Support of active applications



# Examples of return on investment in energy-saving measures

- FH - lateral terraced house
- FH with attic
- FH type "Šumperák,,
- FH type "OKAL,,
- FH Type "Bata's house,,
- FH - České Budějovice



<b>FH - lateral terraced house - Comparison of variants</b>		<b>Initial state</b>	<b>Boiler replacement only (OPE)</b>	<b>Thermal insulation only</b>	<b>Boiler replacement + thermal insulation</b>
Total delivered specific energy	kWh/(m <sup>2</sup> . year)	409	260	148	103
Total energy delivered	kWh/year	72 761	46 254	26 329	18 324
Saving of total energy delivered	kWh/year	---	26 507	46 432	54 437
Saving of total energy delivered	%	---	36,4%	63,8%	74,8%
Classification category of energy intensity	-	<b>G</b>	<b>E</b>	<b>C</b>	<b>B</b>
Cost on measures	CZK	0	125 000	670 740	795 740
Annual savings	CZK	0	17 700	33 000	38 400
Simple return without subsidies	years	-	7,1	20,3	20,7
Maximum amount of support (NGS + HBRP ( <i>Heat Boilers Replacement Programme</i> ) + bonus)	Kč	0	100 000	268 000	388 000
<b>Simple return with subsidy</b>	<b>years</b>	<b>0</b>	<b>1,4</b>	<b>12,2</b>	<b>10,6</b>



## FH with attic

FH with attic			Initial state	A.0	A.1	A.2	A.3
<b>Proposed measures</b>	Window, door replacement	[-]	-	-	<b>X</b>	<b>X</b>	<b>X</b>
	Roof insulation	[-]	-	-	-	<b>X</b>	<b>X</b>
	Ceiling insulation	[-]	-	-	-	<b>X</b>	<b>X</b>
	Facade insulation	[-]	-	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
	forced ventilation with heat recovery	[-]	-	-	-	-	<b>X</b>
<b>Achieved parameters</b>	Specific annual heat demand for heating	kWh/m <sup>2</sup>	170	92	75	52	32
	<b>Saving</b>	<b>%</b>	<b>0</b>	<b>45,9%</b>	<b>55,9%</b>	<b>69,4%</b>	<b>81,2%</b>
	Ratio Uem / Uem, R (average heat transfer coefficient of the building)	[-]	2,59	1,49	1,21	0,89	0,86
	Energy category according to Decree 78/2013 Col.: Total energy delivered			<b>E</b>	<b>D</b>	<b>C</b>	<b>B</b>
<b>Cost savings</b>	Saving annual heating costs	CZK thous.	-	29	35	44	51
	Estimated costs	CZK thous.	-	273	502	700	840
	<b>Subsidy</b>	<b>CZK thous.</b>	<b>-</b>	<b>91</b>	<b>161</b>	<b>280</b>	<b>420</b>
	Simple return without subsidies	years	-	9,6	14,4	16,0	16,4
	<b>Return with subsidy</b>	<b>years</b>	<b>-</b>	<b>6,4</b>	<b>9,8</b>	<b>9,6</b>	<b>8,2</b>



# FH “Šumperák”

			Initial state	A.0	A.1	A.3
<b>Proposed measures</b>	Window replacement	[-]	-	X	X	X
	Roof insulation		-	-	X	X
	Facade insulation	[-]	-	-	X	X
	Thermal insulation of the floor above the ceiling	[-]	-	-	X	X
	Insulation of the ceiling above the basement	[-]	-	X	-	X
	Forced ventilation with heat recovery	[-]	-	-	-	X
<b>Achieved parameters</b>	Specific annual heat demand for heating	kWh/m <sup>2</sup>	293	229	91	52
	<b>Saving</b>	<b>%</b>	<b>0</b>	<b>21,8%</b>	<b>68,9%</b>	<b>82,3%</b>
	Ratio Uem / Uem, R (average heat transfer coefficient of the building)	[-]	2,38	1,87	0,89	0,68
	Energy category according to Decree 78/2013 Col.: Total energy delivered			<b>E</b>	<b>D</b>	<b>B</b>
<b>Cost savings</b>	Saving annual heating costs	CZK thous.	-	9	30	36
	Estimated costs	CZK thous.	-	305	565	794
	<b>Subsidy</b>	<b>CZK thous.</b>	<b>-</b>	<b>95</b>	<b>182</b>	<b>397</b>
	Simple return without subsidies	years	-	33,2	19,1	21,9
	<b>Return with subsidy</b>	<b>years</b>	<b>-</b>	<b>22,9</b>	<b>13,0</b>	<b>10,9</b>



# FH – type „OKAL“

		Initial state	A.0	A.1	A.2	A.3	
<b>Proposed measures:</b>	Window, door replacement	[-]	-	X	X	X	X
	Ceiling	[-]	-	X	X	X	X
	Roof insulation	[-]	-	-	X	X	X
	Insulation of the ceiling above the basement	[-]	-	X	X	X	X
	Facade insulation	[-]	-	-	-	X	X
	Forced ventilation with heat recovery	[-]	-	-	-	-	X
<b>Achieved parameters:</b>	Specific annual heat demand for heating	kWh/m <sup>2</sup>	161	101	79	54	34
	<b>Saving</b>	<b>%</b>	<b>0</b>	<b>37,3%</b>	<b>50,9%</b>	<b>66,5%</b>	<b>78,9%</b>
	Ratio Uem / Uem, R (average heat transfer coefficient of the building)	[-]	2,16	1,37	1,09	0,79	0,67
	Energy category according to Decree 78/2013 Col.: Total energy delivered		<b>E</b>	<b>D</b>	<b>C</b>	<b>B</b>	<b>B</b>
<b>Cost savings:</b>	Saving of heating costs	CZK thous./year	-	18	25	33	40
	Estimated costs	CZK thous.	-	326	472	712	852
	<b>Subsidy</b>	<b>CZK Thous.</b>	<b>-</b>	<b>103</b>	<b>152</b>	<b>285</b>	<b>426</b>
	Simple return	years	-	17,8	18,7	21,5	21,5
	<b>Return with subsidy</b>	<b>years</b>	<b>-</b>	<b>12,2</b>	<b>12,7</b>	<b>12,9</b>	<b>10,8</b>



# FH type "Bata's house,,

		Initial state	A.0	A.1	A.2	A.3	
Proposed measures:	Window, door replacement	[-]	-	X	X	X	X
	Roof insulation	[-]	-	X	X	X	X
	Insulation of the ceiling above the basement	[-]	-	X	-	X	X
	Facade insulation	[-]	-	-	X	X	X
	Forced ventilation with heat recovery	[-]	-	-	-	-	X
Achieved parameters:	Specific annual heat demand for heating	kWh/m <sup>2</sup>	362	273	86	70	46
	<b>Saving,</b>	<b>%</b>	<b>0</b>	<b>24,6%</b>	<b>76,2%</b>	<b>80,7%</b>	<b>87,3%</b>
	Ratio Uem / Uem, R (average heat transfer coefficient of the building)	[-]	3,8	2,88	0,98	0,8	0,71
	Energy category according to Decree 78/2013 Col .: Total energy delivered		<b>F</b>	<b>E</b>	<b>B</b>	<b>B</b>	<b>B</b>
Cost savings:	Saving of heating costs	CZK thous./year	-	9	29	30	33
	Estimated costs	CZK thous.	-	167	275	314	424
	<b>Subsidy</b>	<b>CZK Thous.</b>	<b>-</b>	<b>54</b>	<b>90</b>	<b>125</b>	<b>212</b>
	Simple return	years	-	18,6	9,6	10,4	12,9
	<b>Return with subsidy</b>	<b>years</b>	<b>-</b>	<b>12,6</b>	<b>6,5</b>	<b>6,2</b>	<b>6,4</b>



# FH - České Budějovice



Area of support: **A.2, NZU2014**  
EA before: 246kWh / m<sup>2</sup>  
EA: 50kWh / m<sup>2</sup>  
AC: 251m<sup>2</sup>  
Saving: 79.5%  
Heating: gas. boiler  
Cost: CZK 864 thous.  
Subsidy: CZK 293 thous.  
Share of the subsidy: 33.9%  
Annual savings on heating costs: up to CZK 59 thous.  
Simple return: 14.6 years  
Return with NGS: 9.6 years  
Measures: insulated facade, interior design, new windows

Three-storeyed double-family house with cellar from the thirties of the last century underwent complete reconstruction and insulation. The doors and windows were replaced, the perimeter walls and the floor above the cellar and ceiling beneath the soil were insulated. As insulating material was used EPS (light-weight polystyrene), mineral wool and blown cellulose.



# Questions and answers...

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