

# NEW GREEN IN SAVINGS PROGRAMME (NGiS) IN THE CZECH REPUBLIC

## Study

On behalf of:



Federal Ministry  
for the Environment, Nature Conservation  
and Nuclear Safety



European  
Climate Initiative  
EUKI

of the Federal Republic of Germany

## New Green in Savings Programme (NGiS) in the Czech Republic

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## Abbreviations

CZK	Czech Koruna
EE	Energy Efficiency
EED	Energy Efficiency Directive
EEW	Energy Efficiency Watch
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificate
ESD	Effort Sharing Decision
EU	European Union
EUA	European Union Allowance
EUA	European Union Aviation Allowance
EUR	Euro
GHG	Greenhouse Gas Emissions
IROP	Integrated Regional Operational Programme
MEPS	Minimum Energy Performance Standards
MMR	Monitoring Mechanism Regulation
MOE	Ministry of Environment
MtCO <sub>2</sub> e	Million tonnes of carbon dioxide equivalent
NEEAP	National Energy Efficiency Action Plan
NGiS	New Green in Savings Programme
NO <sub>x</sub>	Nitrogen Oxides
nZEB	nearly Zero Energy Buildings
OPE	Operational Programme Environment
PM <sub>2.5</sub>	Particulate Matter less than 2.5 microns in diameter
PJ	Petajoule
RES	Renewable Energy Sources
SEP	State Energy Policy
SEF	State Environmental Fund
TJ	Terajoule
TWh	Terawatt hour
VOC	Volatile Organic Content

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# 1 Summary

Financial schemes to support renovation, efficient heating systems and nearly zero energy buildings are a policy tool used throughout the European Union to achieve energy demand and emission reductions. In the Czech Republic the main instrument for this type of support is the New Green in Savings Programme (NGiS, 2014-2021) in the area of residential buildings. This study explores the transferability thereof to Germany and other EU Member States.

Since 2009, the different phases of the country-wide Green in Savings programmes have significantly contributed to the Czech achievements in the buildings sector in the fields of energy efficiency and emission reductions. Recently, a considerable total GHG emission reduction for 2020 (1 MtCO<sub>2e</sub>/year, >1% of the total emissions in the energy sector) and the instrument's cost efficiency (150 EUR/tCO<sub>2e</sub>) was forecasted. Thus, it is the programme with the highest potential to reduce GHG emissions in the building sector in the Czech Republic.

The programme obtains most of its financial resources through EU ETS auction revenues. It supports three energy efficiency areas (A: Improving energy performance; B: Construction of very high energy-performance buildings; C: Efficient use of energy sources) aiming especially at the existing 1.6 million single-family houses (as well as multi-family buildings and since 2016, public buildings). In the Czech Republic about 70% of these structures have not been renovated. Owners of single-family houses are also the most frequent applicants to the programme and most funds are requested and accepted for renovation ( $\approx$  70%, area A) and nearly zero energy buildings ( $\approx$  10%, area B).

**In Germany, there are various, similar policy instruments to the NGiS Programme supporting comparable areas (renovation, efficient heating systems, nearly zero energy buildings). Still, lessons learned from the Czech programme are transferable to the German context such as, for example, an increase of electronic communication and documentation and reduction of administrative barriers by simplification.**

After consultation with Czech experts and the corresponding literature, it can be concluded that the Czech NGiS Programme can serve as a role model for Member States with comparable energy mixes and renovation structures of their building stocks. A short analysis showed that there is still significant potential in the EU's building stock to replace fossil fuels and increase renovation activities in more than one third of Member States.

The Czech Republic's experiences offer valuable insight into the benefits of a well-designed financial support scheme that is able to contribute to achieving the buildings sector's energy efficiency and emission reduction targets. The significant emission reductions that can be achieved show that other Member States should consider establishing comparable programmes in the case that no similar policy instruments in the building sector have been implemented and sufficient funds can be raised.

## 2 Introduction to the instrument

In 2014 the “New Green in Savings Programme” (NGiS) of the Czech Ministry of the Environment (MOE) was established. The programme is administered by the State Environmental Fund (SEF) and obtains most of its financial resources by revenues from the sale of EUA (European Union Allowance) and EUAA (European Union Aviation Allowance) units<sup>1</sup> (SFZP, 2018).

The programme’s main aim is to reduce greenhouse gas emissions (GHG) by achieving energy savings in final consumption and introducing emission-friendly heat generation technologies. Further objectives are to stimulate the Czech economy with other social benefits: improving the quality of housing of citizens, improving the image of towns and villages and initiating long-term progressive trends (SFZP, 2018).

The programme supports the reduction of the energy intensity of residential buildings by, e.g. deep or shallow thermal insulation, the construction of nearly zero energy buildings (nZEB) and efficient use of energy sources, e.g. through renewable energy sources (SFZP, 2018).

Owners or builders of single- and multi-family buildings (both individuals and legal entities, and since 2016, public buildings) can apply for support. They can apply via an online form on the website [www.novazelenausporam.cz](http://www.novazelenausporam.cz). Applications to the programme are considered by the SEF either until the end of the programme (31 December 2021) or until the allocation is depleted (SFZP, 2018).

The amount of funding depends on calculated energy savings before and after implementation. Up to 50% (single-family houses) or 30% (multi-family houses) of the total eligible expenses are covered by the programme. The subsidy is paid out after the implementation (ex-post financing). Most of the funds are requested by and granted to owners of single-family houses (SEF, 2018).

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<sup>1</sup> For more information on the EU ETS auctioning process please refer to: [https://ec.europa.eu/clima/policies/ets/auctioning\\_en](https://ec.europa.eu/clima/policies/ets/auctioning_en).

## 3 National context

### 3.1 National climate policy

The Czech Republic has made progress in the development and implementation of energy policy. Some key policy recommendations, most notably the need to develop coherent long-term energy and climate strategies, have been implemented (IEA, 2016). The State Energy Policy (SEP), which replaced the previous 2004 policy, was approved by the Czech government in 2015. The SEP established key targets for energy security, emissions, energy savings, electricity generation and affordability and set out the strategic goals for the proportions of primary energy sources and electricity production. The SEP formulates the following **emission** reduction targets for ETS and non-ETS sectors as:

*“Reducing greenhouse gas emissions within the EU ETS by 21% and limiting the increase in emissions outside the EU ETS to 9% by 2020 compared with the 2005 level.” (SEP, 2016)*

The 9% increase allowed **by 2020** in emissions of the non-ETS sectors matches the Czech Republic target set by the Effort Sharing Decision (ESD). According to the latest national forecasts, the Czech Republic will exceed its 2020 effort sharing target by around 17% as GHG emissions are projected to decrease by 8% between 2005 and 2020 (EC, 2018b).

The SEP does not specify **2030** targets yet. According to the Effort Sharing Regulation targets **for 2030** for the non-ETS sectors, GHG emissions of the Czech Republic are to be reduced by 14% compared to 2005 (EC, 2018a).

In addition, the SEP states that, amongst other instruments, the New Green Savings Programme will ensure the implementation and financing of measures to reduce emission and that the measures and instruments “*are further developed and implemented in the draft Climate Protection Policy of the Czech Republic*” (SEP, 2016). The Czech Climate Protection Policy was adopted in 2017 and sets specific primary<sup>2</sup> (2020, 2030) and indicative<sup>3</sup> (2040, 2050) **emission** reduction targets reflecting the EU commitments. Figure 1 shows the trends of emissions of GHG in the Czech Republic from 1990 to 2014 (MOE, 2018).

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<sup>2</sup> 2020: -32 MtCO<sub>2</sub>e; 2030: -44 MtCO<sub>2</sub>e

<sup>3</sup> 2040: level of 70 MtCO<sub>2</sub>e; 2050: level of 39 MtCO<sub>2</sub>e



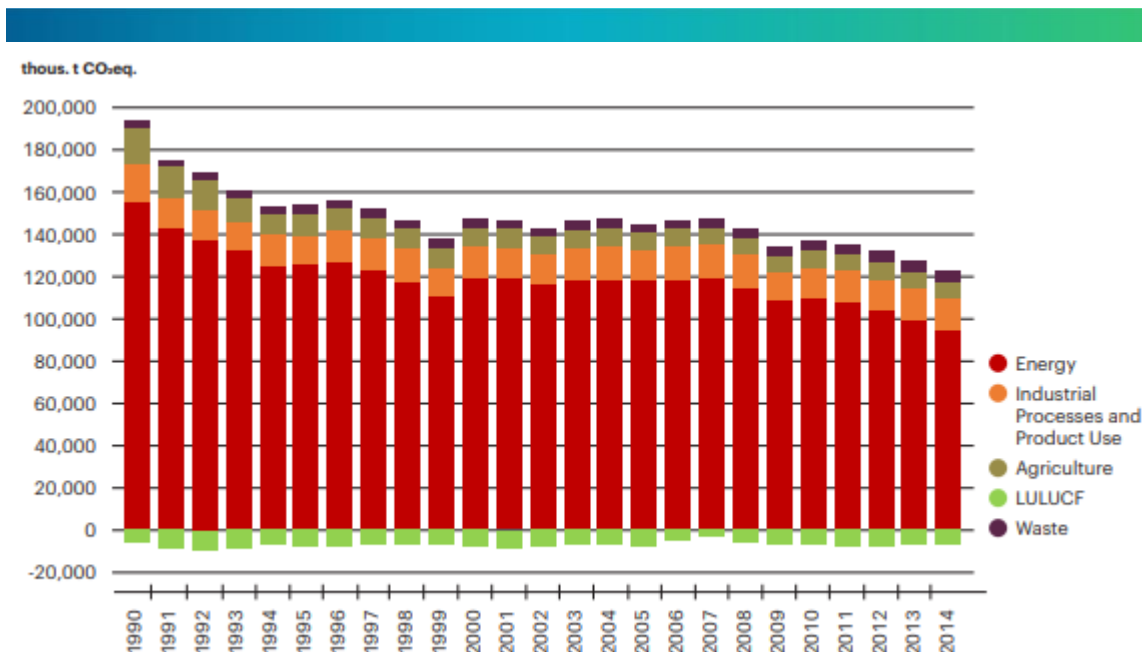


Figure 1: Trends of emissions and sinks of greenhouse gases in the Czech Republic in the period 1990–2014 according to specific sectors (MOE, 2018), (Note: LULUCF – Land Use, Land Use Change and Forestry)

Concerning **renewable energy** shares and higher energy efficiency, the SEP sets three objectives (SEP, 2016):

- Ensuring 13% share of energy from renewable sources in gross final energy consumption by 2020
- Ensuring 10% share of energy from renewable sources in transport by 2020, and concurrently reducing emissions of NO<sub>x</sub>, VOCs and PM<sub>2.5</sub> from transport
- Implementing the commitment to increase energy efficiency by 2020<sup>4</sup>

The Czech Republic is on track to meet the first objective to increase its 2020 renewable energy share to 13% (status 2015: 13.6%) (EC, 2018b).

In the Czech Republic the CO<sub>2</sub> emissions per capita from fuel combustion are higher than the EU average (SEP, 2016). Despite the increasing energy efficiency, the Czech Republic has the third most energy intensive economy among the EU Member States (twice the EU average). Broken down by sector, industry accounts for the largest share of the economy's energy intensity. This is followed by the transport and housing sectors (NEEAP, 2017).

Figure 2 shows the final energy consumption of the Czech Republic by sector. The residential and the industry sector are the largest consuming sectors with approximately 30% in 2015 (ODYSSEE, 2018).

<sup>4</sup> "The Czech Republic established its indicative national target at 50.67 PJ (14.08 TWh) of new savings in the final energy consumption by 2020. The specific way of achieving that goal is contained in the updated 3rd National Action Plan for Energy Efficiency of the Czech Republic."

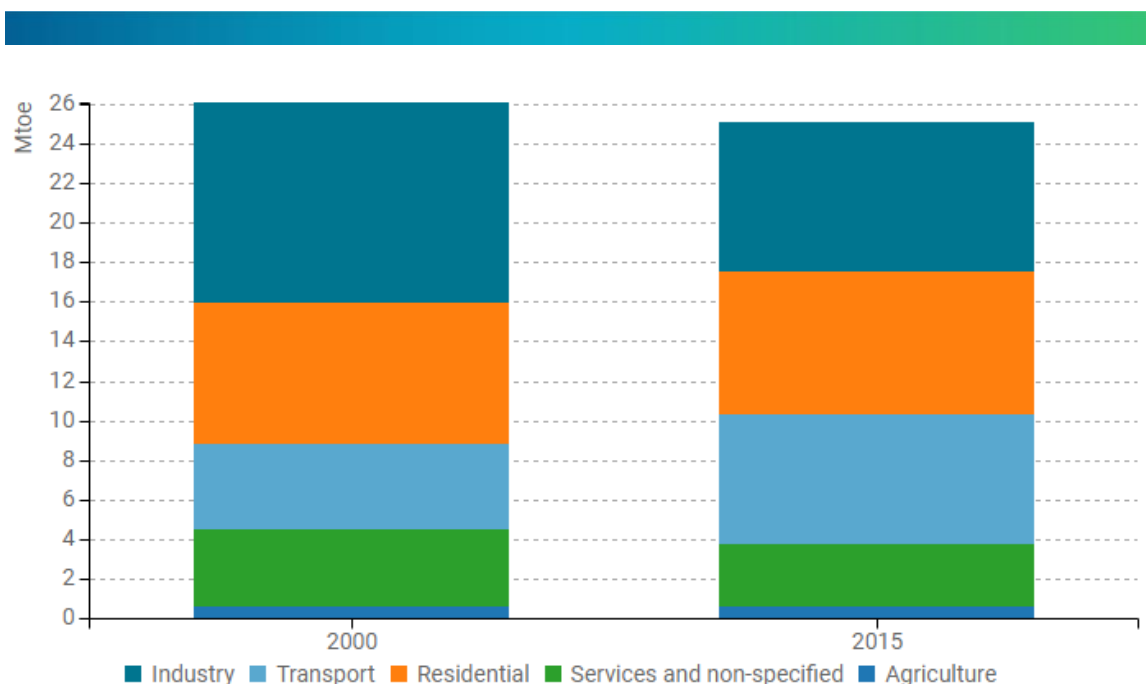


Figure 2: Final energy consumption of the Czech Republic by sector (normal climate), (ODYSSEE, 2018)

Figure 3 shows the fuel shares in 2016 for Total Primary Energy Supply (TPES) and for the electricity generation compared to IEA averages (IEA, 2017).

Fuel shares compared to IEA average						
Fuel	TPES (%)	IEA average* (%)	IEA range (%)	Electricity (%)	IEA average (%)	IEA range (%)
Coal	40	17	0-69	55	28	0-84
Oil	19	36	7-58	0	2	0-10
Gas	17	27	2-40	4	27	1-51
Hydro	0	2	0-43	2	13	0-96
Nuclear	15	10	0-44	29	19	0-73
Biofuels	10	6	2-27	6	3	0-26
Wind	0	1	0-7	1	6	0-42
Geothermal	0	1	0-23	0	0	0-18
Solar	0	1	0-3	3	2	0-13

\* IEA Average - total supply per fuel / TPES for 29 IEA countries

Figure 3: Fuel shares for TPES and for the electricity generation compared to IEA averages, 2016 (IEA, 2017)

## 3.2 Sector context

To achieve the above-mentioned climate targets of the Czech Republic, significant reductions in the energy consumption of buildings represents one of two levers, the other being decarbonising energy. As mentioned above, the residential sector is (together with industry) the largest consuming sector with approximately 30% in 2015 (ODYSSEE, 2018).

The Czech Republic's heating and cooling demand is mainly comprised of space heating (52%) and process heating (36%)<sup>5</sup>. Figure 4 shows that in the residential sector space heating is particularly dominant (~ 75%). The main energy carriers used to provide space heating in the residential sector are natural gas (~ 33%), biomass (~ 23%) and district heating (~ 19%). Approximately 20% of the final energy for heating and cooling is provided by renewable sources (31/157 TWh) (Heat Roadmap Europe, 2017).

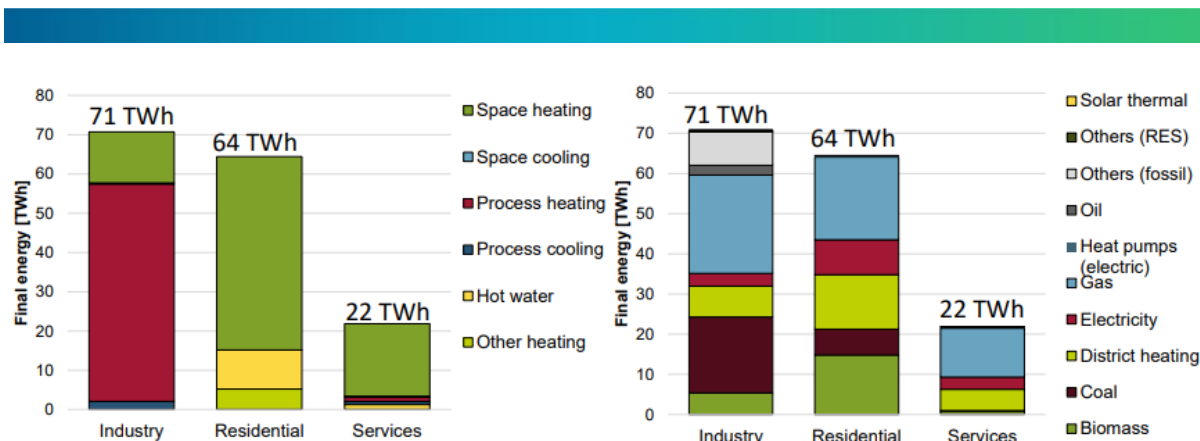


Figure 4: Sectors by purposes and energy carriers (Heat Roadmap Europe, 2017)

The total building stock in the Czech Republic comprises almost 400 million square metres. The distribution between residential and non-residential buildings is about 75/25%. Within residential buildings there are approximately 4 million dwellings, about 60% are multi-family houses, and 40% single-family houses (ENTRANZE, 2012). Significant shares of the buildings require refurbishments (e.g. approximately 70% of all single-family houses) (SEF, 2018).

<sup>5</sup> Other shares: 7% Hot water, 3% Other heating, 2% Process cooling, 0% Space cooling (Heat Roadmap Europe, 2017)

## 4 General description of the policy instrument

### 4.1 History

The GREEN IN SAVINGS programme was established by the MOE in April 2009. Since then it has been administered by the State Environmental Fund (SEF). The programme has been adapted twice since 2009 with the following phases and funding volumes:

- GREEN IN SAVINGS programme, (IEA Green in Savings Programme, 2014a):
  - Period: 2009-2013
  - Funding volume: ≈ EUR 1,000 million (CZK 25,000 million)
- NEW GREEN IN SAVINGS 2013 programme, (IEA Green in Savings Programme, 2014b):
  - Period: 2013
  - Funding volume: ≈ EUR 40 million (CZK 1,000 million)
- NEW GREEN IN SAVINGS 2014+ programme, (IEA Green in Savings Programme, 2017):
  - Period: 2014-2021
  - Funding volume: ≈ EUR 700 million (CZK 18,000 million) (SEF, 2018)

Despite the above-mentioned adaptations of the programme over the years the main objectives have not changed and include (IEA Green in Savings Programme, 2017):

- Reduce GHG emissions
- Reduce final energy consumption
- Promote nearly zero energy buildings (nZEB)
- Replace inefficient and not environmentally friendly heating sources
- Stimulate Czech economy by social benefits

The main changes for single-family houses in the programme structure include accelerated administration and a simpler subsidy calculation (SEF, 2017).

### 4.2 Legal basis

The legal basis for the NGiS Programme is formed by:

- Act No. 388/1991 Coll., on the State Environmental Fund of the Czech Republic and
- ME Directive No. 1/2014 on the Provision of Funding within the New Green in Savings Programme (IEA Green in Savings Programme, 2017)

## 4.3 Functioning

Because of the economic transition since the early 1990s, the Czech Republic has been able to stay below its Kyoto Protocol assigned amount of GHGs. This surplus can be traded as EUA and EUAA units with other industrialised countries (EUR 700 million for NGiS from phase 3 EU ETS: auctions 2013-2020) (SEF, 2018). Revenues from credits must be utilised exclusively for financing special projects that contribute to the reduction of greenhouse gases. In the case of the Czech Republic, the Green in Savings Programme was established for this purpose (SFZP, 2018).

The NGiS Programme includes three objects of aid (A-C) comprising mainly the following subcategories for single- and multi-family and public buildings also indicating the funding limits<sup>6</sup> (SEF, 2018):

- Improving energy performance
  - Shallow comprehensive measures on building envelopes
  - Funding limits: wall/roof  $\approx$  20 EUR/m<sup>2</sup> component; windows  $\approx$  80 EUR/ m<sup>2</sup> component
  - Comprehensive measures on building envelopes
  - Funding limits: wall/roof  $\approx$  20-30 EUR/m<sup>2</sup> component; windows  $\approx$  80-150 EUR/ m<sup>2</sup> component
  - Deep comprehensive measures on building envelopes
  - Funding limits: wall/roof  $\approx$  30 EUR/m<sup>2</sup> component; windows  $\approx$  150 EUR/ m<sup>2</sup> component
- Construction of very high energy-performance buildings
  - Construction of low energy consumption houses
  - Funding limit:  $\approx$  EUR 6,000
  - Construction of buildings in the so-called passive house standard
  - Funding limit:  $\approx$  EUR 17,500
- Efficient use of energy sources
  - Replacement of heat sources using solid and listed liquid fossil fuels by efficient, environmentally friendly sources
  - Funding limits:
  - Gas boiler:  $\leq$  EUR 1,400
  - Heat pumps and automatic biomass boiler:  $\leq$  EUR 4,000
  - Installation of solar thermal and photovoltaic systems
  - Funding limit:  $\leq$  EUR 6,000
  - Controlled ventilation systems with heat recovery (only multi-family houses)
  - Funding limit:  $\leq$  EUR 4,000

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<sup>6</sup> The limits are set up based on a survey on average prices available in the market. The prices were multiplied with the desired subsidy ratio and then used to limit the maximum subsidy for the measure. The aim was to reduce the risk of overpriced projects (SEF, 2018).

- Green roofs and heat from wastewater (since 2016)

Given the above-mentioned funding limits per measures the NGiS cover up to 50% (single-family houses) or 30% (multi-family houses) of the total eligible expenses depending on the calculated energy savings before and after implementation of the measure. Eligible for support are owners or builders of single-family and multi-family buildings (both individuals and legal entities, and since 2016: public buildings) (MURE, 2018).

The typical process for an application is:

- Application: Online electronic evidence, [www.novazelenausporam.cz](http://www.novazelenausporam.cz)
- Evaluation: Every application that meets the criteria (and is covered by funds) is subsidised
- Installation of measures: 18 months to complete the project (for renovations)
- Final check and money transfer: Check of invoices and money transfer (SEF, 2018)

The SEF considers applications to the programme either until the end of the project (31 December 2021) or until the allocation is depleted (SFZP, 2018). The most frequent applicants are individuals (not entrepreneurs) (SEF, 2017).

Further characteristics of the programme are:

- Staffing: 80 Full time employees (from which 50 are project managers)
- Application capacity: ≈ 10,000 applications per year
- Cash-flow capacity: ≈ EUR 80 million per year
- Average subsidy: ≈ EUR 10,000 per measure
- High further potential: only ≈ 25-30% of the single-family houses are renovated (SEF, 2018)

Projects for single-family buildings may be supported across the entire Czech Republic whereas multi-family buildings are only supported in the City of Prague (MURE, 2018).

## 4.4 Interlinkages with other policy instruments

To meet the Czech climate targets, several energy efficiency programmes in the building sector have been implemented. As mentioned above the New Green in Savings Programme (NGiS, 2014-2021) was created to realise energy savings and emission reductions in single and multi-family buildings (and since 2016: public buildings) with an available total funding volume of about EUR 700 million (SEF, 2018).

Further policy instruments in the Czech building sector to support similar objectives as the NGiS Programme are:

- Integrated Regional Operational Programme (IROP, 2014-2020)
- Target group: multi-family and public buildings
- Operational Programme Environment (OPE, 2014-2020)
- Target group: public buildings

- PANEL Programme (2013-2020)
- Target group: multi-family buildings
- Implementation of EPBD requirements (e.g. Minimum Energy Performance Standards (MEPS), nZEB standard, Mandatory inspections of boilers and air-conditioning systems, Energy Performance Certificates (EPCs))
- Target group: all building types

The IROP programme includes energy efficiency and smart energy management measures for public and multi-family buildings by improving thermal performance of buildings, replacing heating and hot water equipment and triggering the transition to low-carbon energy sources. The available budget of EUR 660 million is comparable to the Green in Savings Programme (IEA, 2016). As the IROP programme funds similar building types and objects of aid as the NGiS (e.g. insulation, replacement of heat generators) a clear interlinkage exists.

The OPE programme aims to improve the energy performance of public buildings with measures like insulation, building renovation, recovery of waste heat and boiler replacements by covering up to 90% of the expenses. The available budget is 30% higher than the Green in Savings Programme (EUR 910 million) (IEA, 2016). Again, a clear interlinkage concerning the financially supported building types and objects of aid to the NGiS exist although public buildings are not the main focus area of the NGiS and the OPE Programme also funds efficiency improvements in the energy and transformation sector and in the industrial end-use sector.

The PANEL programme offers financial assistance for reconstruction and modernisation of multi-family buildings, e.g. by appliances and equipment upgrades and elevator replacement. The available budget is much lower than for the Green in Savings Programme (EUR 40 million) (IEA, 2016). As the PANEL programme focuses less on the overall energy performance of the buildings and more on appliances and modernisations (elevator), only minor interlinkages with the NGiS exist.

The implementation of the EPBD requirements is not a financial support scheme and therefore not directly comparable to the NGiS Programme. Nevertheless, the implementation of the EPBD has impact on all building types and is therefore indirectly interlinked with the NGiS.



## 5 Impacts of the policy instrument

### 5.1 Effectiveness

The NGiS Programme is a country-wide programme for single-family buildings whereas multi-family buildings are only supported in the City of Prague (since 2016, public buildings are included) (MURE, 2018). Figure 5 shows the widespread distribution of the applications.

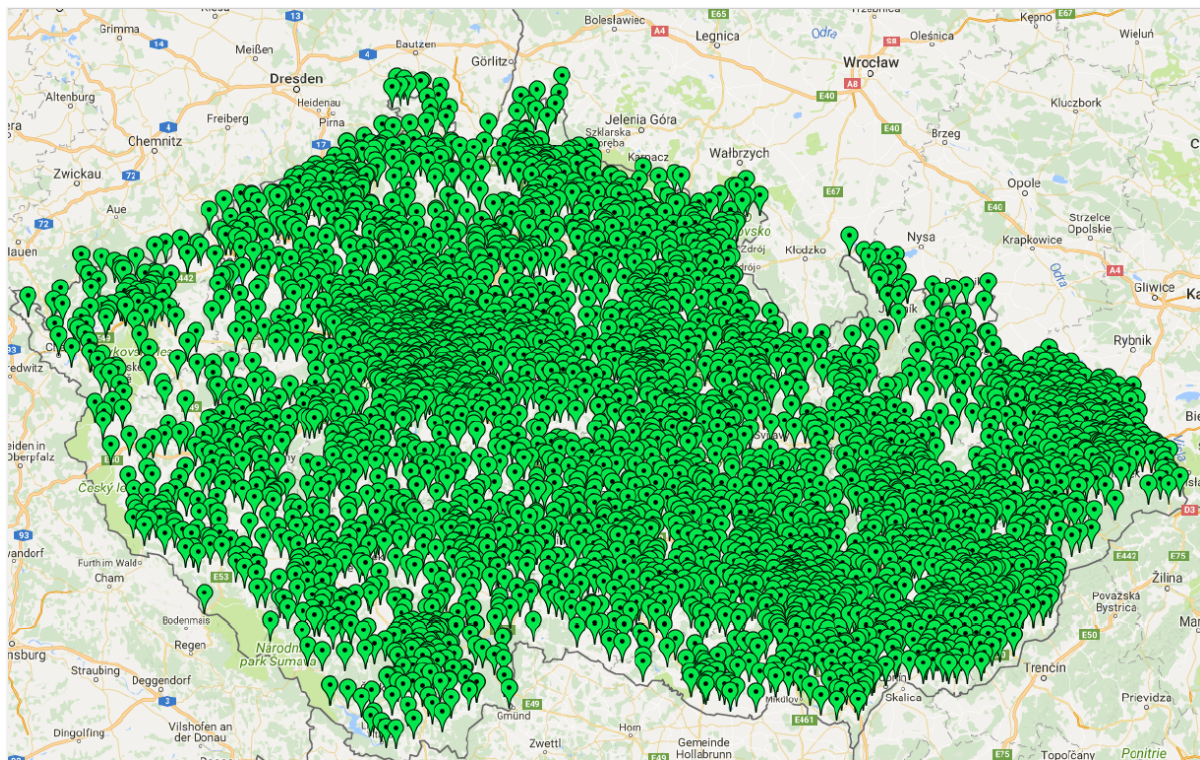


Figure 5: Regional distribution of applications for the Green in Savings Programme (SEF, 2018)

The most recent data<sup>7</sup> received from the State Environmental Fund for **single-family houses** show that in the 14 Czech regions 75% of the applications have been accepted (21,633 of 28,489) and 65% of the requested aid have been paid out (EUR 150 of 230 million) (SEF, 2018).

Figure 6 shows the major requested funding areas of single-family houses (subsidy-weighted). Most of the funds for single-family houses are requested for measures to reduce the energy demand (63%, aid area A), followed by new passive houses (14%, aid area B).

<sup>7</sup> Status: 10.09.2018



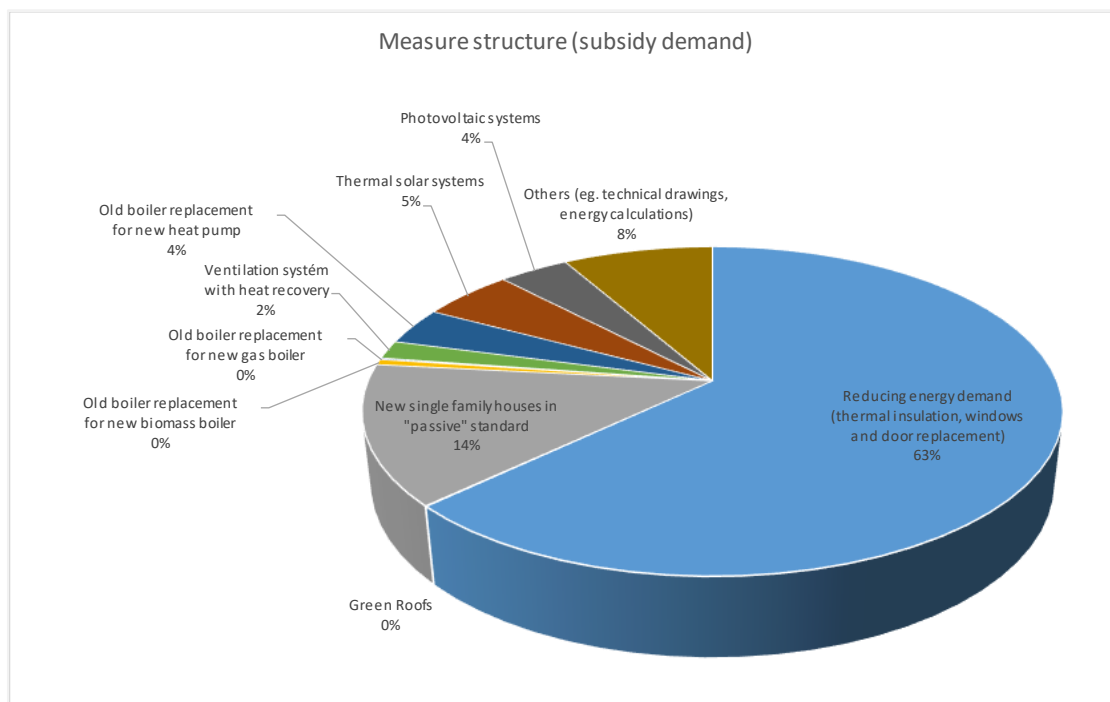


Figure 6: Green in Savings Programme, subsidy demand structure, single-family houses (SEF, 2018)

**Renovations of multi-family houses** are only subsidised in the region of Prague<sup>8</sup> where 67% of the applications have been accepted so far (303 of 449) and 60% of the requested aid has been paid out (EUR 9 of 15 million).

The **passive house** standard is planned to be subsidised in **new multi-family houses** in 5 Czech regions where none of the nine applications have been accepted thus far. Therefore, also no aid has been paid out so far but EUR 1.6 million has been requested).

Figure 7 shows the major requested funding areas of multi-family houses (subsidy-weighted). Most of the funding for multi-family houses is requested for measures to reduce the energy demand (85%, aid area A), followed by new passive houses (10%, aid area B).

<sup>8</sup> Other regions can be financed by the Integrated Regional Operational Programme (IROP, run by Ministry of Regional Development).

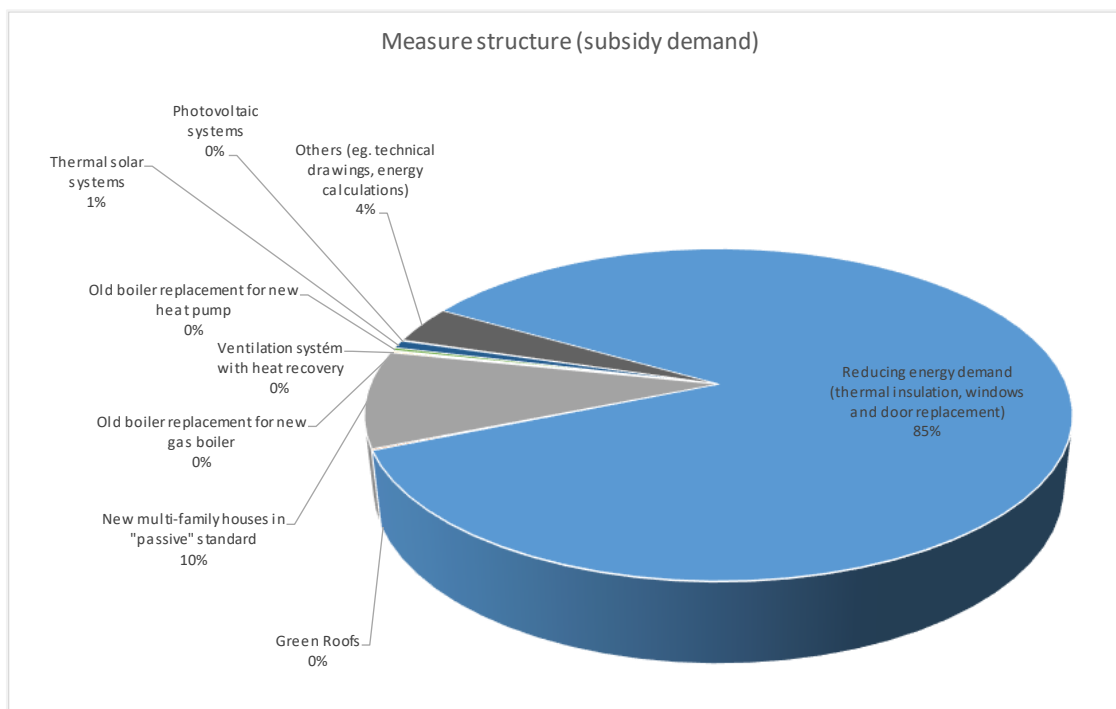


Figure 7: Green in Savings Programme, subsidy demand structure, multi-family houses (SEF, 2018)

The NGiS Programme (2014-21) is one of the most efficient programmes in the Czech Republic. Based on the experiences of the programme, approximately 1 Terajoule (TJ) can be saved with EUR 0.06 million in funding<sup>9</sup> (SEF, 2018).

The energy savings are evaluated within a separate evaluation of individual implemented projects. To calculate the energy savings, the implementing public authority uses the method of forecast savings. With this method the **forecasted** overall energy savings are (MURE, 2018) 2,710 Terajoule for 2014 to 2016 and 7,855 Terajoule for 2017 to 2020.

The emission reductions of the NGiS Programme (2014-21) are **forecasted** to be around 1 million tCO<sub>2</sub>e/year in the year 2020 (EEA, 2018b).

## 5.2 Cost efficiency

The "EEA database on climate change mitigation policies and measures in Europe" (EEA, 2018a) shows emission forecasts that are calculated from energy savings and energy replaced by RES using average emission coefficients of the final consumption in households. These policies and measures have been reported by Member States

<sup>9</sup> Note: The total investment will be higher. Only up to 50% of the eligible costs are funded.

under the European Union Monitoring Mechanism Regulation (MMR) in 2017. Table 1 shows forecasted GHG emission reductions for the four building-related instruments.

Table 1: Forecast of total GHG emissions reduction in 2020/2030, (EEA, 2018b)

Policy Instrument. Buildings	Total GHG emission reductions in 2020 [ktCO <sub>2</sub> e/year]	Projected absolute costs [EUR/year]
<b>New Green in Savings Programme 2014 - 2021</b>		166,000,000
<i>target group: single- and multi-family and public buildings (since 2016)</i>	1,069	(total budget: EUR 982,000,000 <sup>10</sup> )
<b>Integrated Regional Operating Programme (IROP)</b>		89,000,000
<i>target group: multi-family and public buildings</i>	672	(total budget: EUR 614,000,000)
<b>Operational Programme Environment (OPE)<sup>11</sup></b>		98,000,000
<i>target group: public buildings</i>	2,320	
<b>PANEL Programme<sup>12</sup></b>		13,300,000
<i>target group: multi-family buildings</i>	189	

The table shows that when comparing the NGiS Programme with the only comparable programme IROP<sup>10,11</sup>, it is the programme with the highest potential to reduce GHG emissions in the building sector of the Czech Republic in 2020. Concerning the cost efficiency, the New Green in Savings Programme is slightly less efficient<sup>13</sup> than the Integrated Regional Operating Programme (155 vs. 132 EUR/tCO<sub>2</sub>e)<sup>14</sup> (EEA, 2018b).

<sup>10</sup> Note: The EEA forecast figures deviate from the (SEF, 2018) expectations (EUR 982 vs. 700 million). In order to maintain consistency, the cost efficiency is calculated with the forecasted costs and emissions from EEA. In the rest of the report the figure from (SEF, 2018) is used.

<sup>11</sup> The figures of the OPE Programme are not directly comparable to NGiS and IROP as it also funds efficiency improvements in the energy and transformation sector and in the industrial end-use sector.

<sup>12</sup> The figures of the PANEL Programme are not directly comparable to NGiS and IROP as the focus is on appliances and modernisations (e.g. elevator) and not on efficiency improvements of the buildings.

<sup>13</sup> The mentioned difference in efficiency between New Green in Savings Programme (NGiS) and IROP is likely caused by max. subsidy ratio (50% NGiS and 30 - 40% IROP) and the type of buildings being supported (single-family houses (NGiS) are not as compact as the multi-family houses (IROP)) (SEF, 2018).

<sup>14</sup> Note: Meant are the total reductions in CO<sub>2</sub> emissions achieved by the subsidy i.e. only up to 50% of the eligible costs. The total investment will be higher.

## 5.3 Co-benefits and side-effects

Further positive effects of the programme are expected for the Czech economy due to social benefits. These include an improved quality of housing for citizens, an improved image of towns and villages (tourism), reduced running energy costs for the inhabitants and the start of long-term progressive trends (SFZP, 2018).

Nonetheless, the subsidies for shallow renovations within the programme area A (improve energy performance) will lead to unwanted lock-in effects ( $\approx 25\%$  of all funded renovations) (SEF, 2018). Lock-in effects arise when a renovation measure is carried out with energetic ambition that are too low (e.g. 5 cm of insulation instead of 20 cm). Most likely this shallow renovation status will last for a long period without being renovated with a higher ambition (lock-in).

## 5.4 Success factors and challenges

In general, for the Czech Republic the Energy Efficiency Watch project identified barriers of energy efficiency instruments in the building sector as e.g. low public awareness of energy efficiency in buildings and lack of financial means of investors to realise renovation activities (EEW, 2014).

The NGiS, however, is an exception, e.g. as to its high visibility in the Czech Republic which could be realised, among other things, by working with the target groups of house owners either directly or in close cooperation with municipalities, NGOs or associations. Also, the lack of financial means can be partly solved by funding up to 50% (single-family houses) or 30% (multi-family houses) of the total eligible expenses of the efficiency measures (SEF, 2018).

Another success factor is the simplification of the application and communication process in the NGiS by using e.g. electronic online evidence and communication. In addition, the State Environmental Fund, which administers the NGiS, identified the following administrative success factors (SEF, 2018):

- Choose a long-term continuous call for application instead of start/stop calls
- Trust other authorities
- Reduce paperwork

A challenge for the NGiS Programme evolves from its future funding perspective. As already mentioned, the programme obtains most of its financial resources from revenues of the sale of EU ETS emission allowances. A prolongation after 2021 is dependent on whether enough funds can be raised by sales of EU ETS emission allowances to other EU Member States. But for the near future (2021-2030) the Climate Protection Policy of the Czech Republic indicates that the revenues of the Czech Republic from the emission allowances auctions are likely to increase which would secure future financing of the NGiS Program for the next period (2021-2030: 3.2-5.8 billion) (MOE, 2018).

## 6 Transferability

### 6.1 General comparability of the context

The comparability chapter aims to illustrate which boundary conditions a Member State would need to fulfil in order to introduce a comparable policy instrument like the Czech Green in Savings Programme. For this purpose, three pillars could be identified:

- Funding of the instrument/comparable instruments in place
- Energy carrier mix
- Renovation status

As mentioned above the NGiS Programme of the Czech Republic is **funded** by the sale of EUA and EUAA units (phase 3 EU ETS auctions 2013-2020). Therefore, Member States that would like to introduce a comparable instrument could use, if available, the same source of funding or provide financing from differing sources.

In Germany, various policy instruments like the NGiS are in place and funded by ETS revenues and the state budget such as the KfW programmes (support schemes for ambitious energy standards for new construction and renovation) and the BAFA programme (support scheme for efficient heating systems). For example, the KfW programme for new buildings is widely used. The evaluation report of 2016 shows that 50% of all new buildings have been supported by this programme (IWU, 2018).

Also, replacements of inefficient and/or fossil heat generators are part of the Czech NGiS Programme (e.g. by heat pumps or biomass boilers) as the Czech **energy mix** still consists of considerable shares of fossil energy carriers (e.g. 8% coal for heating in the residential sector) (Heat Roadmap Europe, 2017).

In Germany, hardly any building is still heated with coal (< 1%) but still a considerable share of building stock is heated with heating oil (≈ 25%) (Heat Roadmap Europe, 2017).

In addition, still significant shares of the Czech buildings require **refurbishments** (≈ 70% of all single-family houses) (SEF, 2018).

In Germany, the average refurbishment status of all building elements (wall, roof, floor) can be estimated at approximately 36%. Main refurbishment areas are the roofs/top ceilings (≈ 50-60% of the component's area), followed by the exterior walls (≈ 25-35%) and the floors/cellar ceilings (≈ 10-20%) (Dena, 2018)<sup>15</sup>.

Overall, the above-mentioned facts for Germany show that refurbishments and energy mix developments are still needed but that similar policy instruments to the NGiS are already in place.

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<sup>15</sup> Estimation based on primary source „Datenerhebung Wohngebäudebestand 2016“, Darmstadt: Institut Wohnen und Umwelt GmbH.  
[http://www.iwu.de/fileadmin/user\\_upload/dateien/energie/Endbericht\\_Datenerhebung\\_Wohngeb%C3%A4udebestand\\_2016.pdf](http://www.iwu.de/fileadmin/user_upload/dateien/energie/Endbericht_Datenerhebung_Wohngeb%C3%A4udebestand_2016.pdf)

For other Member States that have comparable needs to change their energy mix<sup>16</sup> ( $\approx 45\%$ ) and trigger renovations<sup>17</sup> ( $\approx 55\%$ ) and do not have similar policy instruments in place, the introduction of an instrument like the Czech NGiS Programme should be considered.

## 6.2 Properties of the instrument

Since 2009, the Green in Savings programmes focuses on the financial support of renewable heat generators (e.g. heat pumps, biomass boiler) and renovations as well as new highly efficient buildings. In detail, the areas A (improving energy performance), B (construction of very high energy performance buildings) and C (efficient use of energy sources) are subsidised.

In general, it can be stated that if Member States have no comparable policy instruments in place the introduction of a similar support scheme shall be taken into consideration. A brief evaluation of the policy database of Odyssee-Mure revealed that at least three Member States<sup>18</sup> potentially lack a comparable policy instrument for supporting renovation in buildings (MURE, 2018).

## 6.3 Potential impacts

As addressed in chapter 5, the impacts of a well-designed support scheme for residential buildings like the NGiS Programme are significant. Considering the high forecasted total GHG emission reduction for 2020 (1 MtCO<sub>2</sub>e/year) for a comparably small country like the Czech Republic, many Member States may benefit from setting up a comparable programme.

Also, considering the energy carrier structures and renovation statuses of the EU Member States (see chapter **Error! Reference source not found.** and **Error! Reference source not found.**), there are considerable potentials in many Member States to replace fossil fuels and increase renovation activities.

## 6.4 Conclusion

This study explores the Czech NGiS Programme and the transferability thereof to Germany and other EU Member States. The experiences of the Czech Republic offer valuable insight into the value of a well-designed financial support scheme that can contribute to the achievement of the buildings sector's energy efficiency and emission reduction targets.

**In Germany, various similar policy instruments are in place supporting comparable areas like the Green in Savings Programme (renovation, nearly zero energy buildings, efficient heating systems). Still, some lessons learned from the Czech programme may be transferable to the German programmes like e.g. reduction of paperwork and reduction of administrative barriers by simplification.**

<sup>16</sup> According to EPBD impact assessment data 13 of 28 MS (46%) still have a significant share of oil and coal consumption within residential buildings (>20%), 7 of 28 MS (25%) even above 40%.

<sup>17</sup> According to EPBD impact assessment data 16 of 28 MS (57%) have a renovation status in the residential building stock that is worse or comparable to the status in the Czech Republic.

<sup>18</sup> Denmark, Poland, Portugal

After consultation of Czech experts and the corresponding literature, it can be stated that the Czech NGIS Programme can serve as a role model for Member States with an energy carrier mix and renovation structures comparable to the Czech Republic. A short analysis showed that there is still significant potential in the EU's building stock to replace fossil fuels and increase renovation activities in more than one third of the Member States.

**The Green in Savings Programme is funded by the sale of EU ETS emission allowance units. Other Member States that would like to introduce a comparable instrument could use, if available, the same source of funding. Otherwise the funds for the programme would need to be acquired via other means.**

The forecast for the total GHG emission reduction for 2020 (1 MtCO<sub>2</sub>e/year, > 1% of the total emissions in the energy sector) and the high cost efficiency of the programme (150 EUR/tCO<sub>2</sub>e) show that many Member States may benefit from setting up a comparable programme.

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