BEACON Bridging European & Local Climate Action

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THE SLOVAK SUSTAINABLE ENERGY FINANCING FACILITY (SlovSEFF)

Study

On behalf of:

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety

of the Federal Republic of Germany

European Climate Initiative EUKI

The Slovak Sustainable Energy Financing Facility (SlovSEFF)
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Abbreviations

BAFA	Federal Office for Economic Affairs and Export Control
BIDSF	Bohunice International Decommissioning Support Fund
BMU	Federal Ministry for Environment, Nature Conservation and Nuclear Safety
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EEA	European Environment Agency
EEW	Energy Efficiency Watch
EIB	European Investment Bank
EnEV	Energy Saving Ordinance
EPBD	Energy Performance of Buildings Directive
EPC	Energy Performance Certificates
ERDF	European Regional Development Fund
ESCO	Energy Service Company
ESD	Effort Sharing Decision
ETS	Emissions Trading System
EU	European Union
EUA	EU Allowance
GHG	Greenhouse Gas
IEA	International Energy Agency
IMF	International Monetary Fund
IRR	Internal Rate of Return
MCCF	Multilateral Carbon Credit Fund
MoE	Ministry of Environment
MoTC	Ministry of Transport and Construction
MunSEFF	Municipal Finance Facility – Energy Efficiency
NECP	National Energy and Climate Plans
RES	Renewable Energy Savings
REUPs	Rational Energy Utilisation Plans
SEAs	Simple Energy Audits
SEFF	Sustainable Energy Finance Facility
SFRB	State Housing Development Fund
SIEA	Slovak Innovation and Energy Agency
SME	Small and Medium-sized Enterprises
UNFCCC	United Nations Framework Convention on Climate Change

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1 Summary

Despite significant improvements in energy and greenhouse gas (GHG) emission intensity over the last decade, there remain large potentials to improve energy efficiency and further reduce carbon emissions in the Slovak Republic. At first glance, the GHG emission intensity in Slovakia is relatively low since nuclear energy is still the dominating electricity source and renewables make up 25% in the electricity mix. This provides a positive picture for the ETS sector. However, Slovakia is one of the most energy-intensive economies in the EU at levels almost twice the European Union (EU) average. The building sector consists to a large extent of very energy-inefficient and poorly insulated buildings from the Soviet era. In addition, non-electric energy in Slovakia is emission-intensive and electrification/sector coupling is rather limited. That is why Slovakia faces considerable challenges for mitigating emissions in the non-ETS housing and industrial sectors.

Partly addressing these challenges, the European Bank for Reconstruction and Development (EBRD) launched the Slovak Sustainable Energy Financing Facility (SlovSEFF) in 2007 with the objective of promoting sustainable energy investments in the Slovak Republic's private sector. It was one of the first in a series of SEFF facilities implemented by the EBRD over recent years to encourage energy efficiency and renewable energy projects with private industrial companies and housing associations. SlovSEFF intends to channel financing to sustainable energy projects reducing GHG emissions and also aims to transfer and build expertise among banks and companies related to sustainable energy investments. This is done by providing loans (EUR 20,000–2,500,000) and incentive payments in the case of successful completion and verification of a project. Integral to the project design is also supplemental grant funding for technical assistance, which is free to borrowers and assumed to be one of the success factors of the facility.

Projects have been financed in different sectors, with the largest uptake in the housing sector (accounting for 61% of the loan amounts) followed by industry-related projects (27%) and few investments in renewables (12%) (see Chapter **Error! Reference source not found.**.1). By 2015, SlovSEFF has supported more than 700 sustainable energy projects that are worth over EUR 200 million in total, resulting in yearly energy savings equivalent to the total household electricity consumption of a city the size of, for instance, Bratislava (EBRD, 2015). By 2014, measures have resulted in estimated annual primary energy savings plus additional renewable energy generated in the amount of 582 GWh (EBRD, 2014).

Sustainable energy projects financed under the third phase of the SlovSEFF scheme (starting in 2014) are expected to achieve annual GHG emission savings of 40,000 tonnes of CO_2 equivalent (EBRD, 2015). The two previous phases, SlovSEFF I and II, are expected to induce emission reductions of 115,000 tonnes CO_2 each year (EBRD, 2015). SlovSEFF III is complemented by funding that is sourced from the proceeds of a novel carbon credit transaction between the Slovak Republic and Spain. The third phase of SlovSEFF is also innovative in the way that it links the incentive payment amount to a project's emission reduction potential.

In terms of transferability, it is unclear whether an instrument similar to SlovSEFF would deliver significant additional incentives for emission reductions in Germany: a broad variety of similar and competing financing instruments is already in place and local banks already have the necessary capacities and liquidity for energy efficiency financing. However, for EU Member States with sectoral conditions similar to that of Slovakia, as well as a lack of sustainable investments and transition challenges, SlovSEFF could be a very useful instrument to scale up investments and to mitigate emissions in the housing and industrial sectors.

2 Introduction to SlovSEFF

SlovSEFF is short for Slovak Sustainable Energy Financing Facility. It was initiated by the EBRD in 2007. As such, SlovSEFF was one of the first in a series of financing facilities implemented with the objective to promote energy efficiency and renewable energy projects (EBRD, 2014). A major motivation underlying the programme and the source of financing for the technical assistance and incentive payments was the closure of the Bohunice nuclear power plant as part of the negotiations for the accession of the Slovak Republic to the EU.

Sustainable Energy Financing Facilities (SEFFs) such as SlovSEFF are a means by the EBRD to extend **credit lines** to local financial institutions that aim to develop energy financing as a field of their business. Acting as intermediaries, these financial institutions use the funds to on-lend to clients engaging in energy efficiency or small-scale renewable energy generation projects.

In addition to this financing component, SEFFs include a **technical assistance** component, implemented by external consultants, to both financial institutions and their clients. This includes, for instance, the training of bank staff in promoting the specific financial products and in recognising technically eligible projects as well as the provision of support to borrowers in identifying energy saving projects and in developing financing applications. A third component of EBRD's SEFFs is **incentive payments**. These can be provided to kick-start markets or to compensate financial institutions for "the restricted use of proceeds, costs incurred in training staff and fulfilling monitoring requirements" (EBRD, 2014, p.6).

Eligible projects for the SlovSEFF facility are divided into three different categories, with each of these groups having specific eligibility criteria that need to be satisfied:

- ***Renewable energy*****,** including projects related to the purchase and installation of equipment, systems and processes that use renewable energy resources (SlovSEFF, 2018a)
- ***Industrial energy efficiency***, including projects related to equipment, systems and processes that enable the reduction of primary energy consumption, final consumption of electricity, fuels and other forms of energy (SlovSEFF, 2018b)
- ***Housing energy efficiency***, including major thermal rehabilitation projects of blocks of flats (SlovSEFF, 2018c)

Its most recent extension, SlovSEFF III, provides a credit line of up to EUR 100 million to Slovak commercial banks (SlovSEFF, 2018e). It is co-funded by the Ministry of Environment of the Slovak Republic and the Ministry of Agriculture, Food and Environment of Spain. The incentive payments are funded through a market-based mechanism, namely from the proceeds of the sale of carbon credits from the Slovak Republic to Spain. This mechanism serves two purposes: It aims to help Spain meet its emission reduction target under the Kyoto Protocol, while the Slovak Republic can use the funds to reinvest them in the decarbonisation of its economy. The transaction of carbon credits was structured under the Green Carbon Fund of the Multilateral Carbon Credit Fund (MCCF), established and managed jointly by the EBRD and the European Investment Bank (EIB). It is the first time in Slovakia that a market-based mechanism has been used to generate grant financing (EBRD, 2015).

3 National context

3.1 National climate policy

Generally speaking, climate policies are not a priority on the Slovak political agenda. Since Slovakia became a member of the European Union in 2004, its climate policy is mainly guided by EU regulations. The three key targets of the **2020 Climate and Energy Package**, one of the most prominent climate frameworks of the Union, are related to GHG emission mitigation, the share of energy consumption from renewables, and improvements in energy efficiency (EC, 2018), respectively. In particular, Slovakia has committed to achieving the following **climate and energy goals until the year 2020** (**Nachmany et al., 2015)**:

- limit the increase in its non-ETS GHG emissions to 13% (compared to 2005)
- achieve a minimum share of 14% of gross final energy consumption from renewables
- reduce total final energy consumption by 11% (compared to 2005)

In addition, against the background of the Paris Agreement obligations and the need to develop long-term low emission strategies, Slovakia is currently developing a **low-carbon strategy until 2050** in cooperation with the World Bank (MoE et al., 2017). The strategy will identify both the potential for CO_2 reductions in several sectors of the economy and the most effective measures to tackle them (OECD, 2018). However, Slovakia has not yet officially established a comprehensive climate and energy strategy for the period beyond 2020 and in preparation of the obligatory National Energy and Climate Plans (NECP) on the European level.

In 2014, the Slovak government approved an **'**energy policy package' which outlines the objectives and priorities for the energy sector until 2035, with an outlook to 2050. The main objectives include: ensuring the **reliability and stability of energy supply**, including the **development of nuclear capacities**, **improving energy efficiency** and supporting the country in meeting its long-term targets. However, specific targets for the year 2030 have not yet been set (EC, 2015a).

Related energy policy topics such as securing a reliable energy supply have traditionally been of great concern for national policymakers (Esser et al., 2018). Slovakia is highly dependent on energy imports to satisfy its total primary energy supply needs (Figure 1). Only about one third of the energy supply is provided through domestic production. A large portion of the net imports are natural gas, oil and coal. In 2013, 98.7% of total gas imports to the Slovak Republic came from Russia (EC, 2015a), demonstrating a lack of diversification. These circumstances have contributed to the fact that energy security is a main policy objective. Figure 1 also shows that the industrial sector accounts for the major part of the total final energy consumption in Slovakia. The housing, transport and commercial sector together account approximately for the same share of the total final consumption.

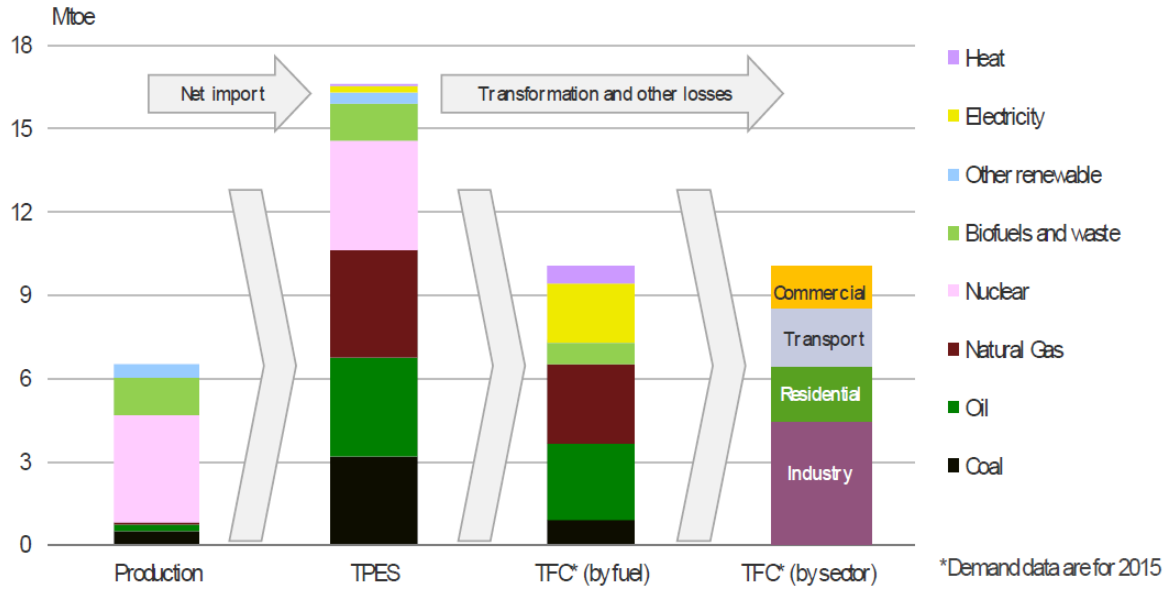

Figure 1: Energy supply and demand in Slovakia 2016 (IEA, 2017); TFC: Total Final Consumption; TPES: Total Primary Energy Supply.

Regarding **climate-related developments** in recent years, Slovakia has made considerable progress. Since 1990, the country has significantly decreased its CO_2 emissions as well as total final energy consumption and total primary energy supply. This development was possible even though the country's GDP sharply increased over the same period (see Figure 2). Based on approximated data for 2014, Slovakia has **decreased its non-ETS GHG emissions by 9%** since 2005. As the European Commission (2015) projects, Slovakia "is on track to overachieve its 2020 target, with a 17% margin between the projected emission and its target, as compared to 2005".

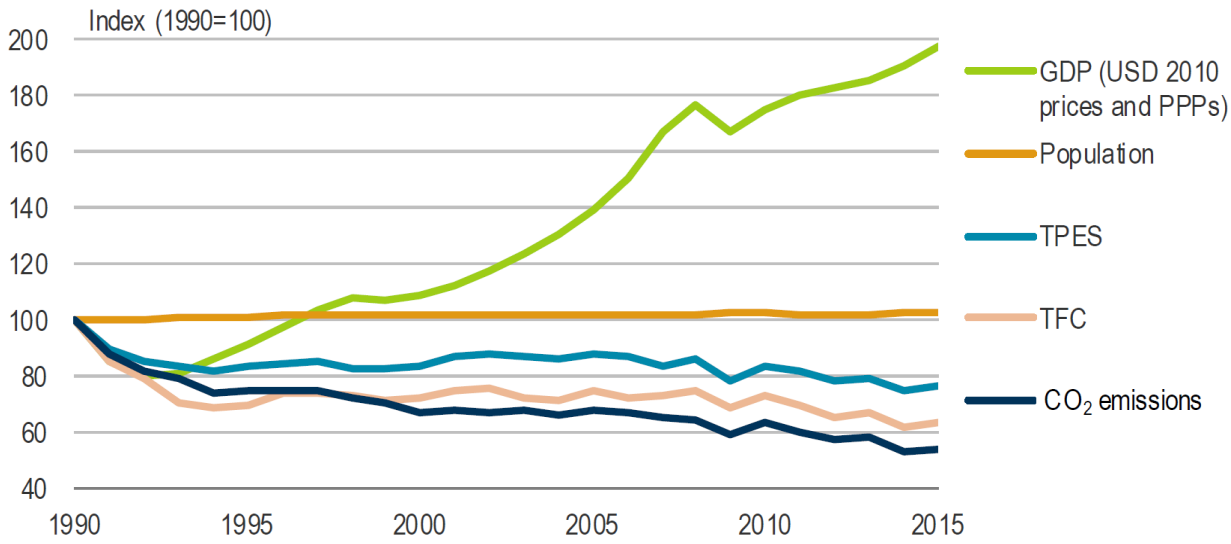

Figure 2: CO_2 emissions, energy consumption, energy supply, population and GDP in Slovakia, 1990-2015 (IEA, 2017); TFC: Total Final Energy Consumption; TPES: Total Primary Energy Supply.

The emission intensity in the Slovakian power sector is relatively low since nuclear energy is the dominant electricity source, with a 57% share in the electricity mix. Renewables make up 25%, including hydro, biofuels, waste and solar. Coal accounts for 12% of electricity generation in Slovakia (Figure 3). Regarding Slovakia's targets on **gross final energy consumption from renewables** (14% envisaged for 2020), the country had achieved a share **of 9.8%** by 2013 (EC, 2015a).

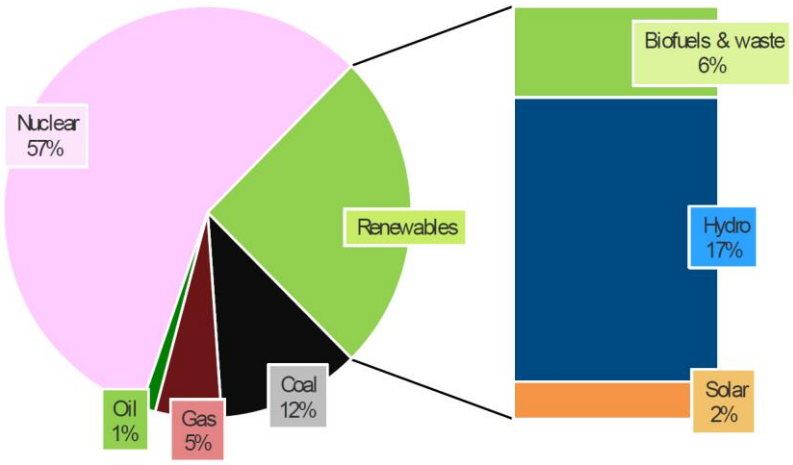

Figure 3: Electricity generation in Slovakia (IEA, 2017).

3.2 Sector context

As outlined in chapter 2, SlovSEFF does not only target a single sector, but includes three different thematic focuses: 1) industrial energy efficiency, 2) housing energy efficiency and 3) renewable energy. All three different contexts will shortly be addressed in the following. However, the focus of this study will be placed on the industrial and housing sector.

Slovakia is one of the **most energy-intensive economies in the EU**. As the Country Factsheet Slovakia reveals, "primary energy intensity in Slovakia has decreased at a fast pace (by 31.3% between 2005 and 2013), although in absolute terms it remains almost twice the EU average" (EC, 2015a). A similar picture can be drawn for the industrial sector: The level of final energy intensity remains very high compared to the EU average, even though a significant reduction in energy intensity has been recorded. One of the driving factors for Slovakia's high energy intensity is the manufacturing sector, where the car manufacturing industry plays a key role (EEA, 2015; Esser et al., 2018). As Table 1 reveals, the industrial sector in Slovakia accounts for the largest part of GHG emissions (36%) and thus ranges well beyond the sector's EU average emission figures (19%)[1]. Energy efficiency efforts as envisaged by SlovSEFF are therefore particularly relevant for the industrial sector.

Table 1: Largest sectors of GHG emissions in 2012, Slovakia and EU average (own illustration based on EC, 2015a).

Largest Sectors of GHG Emissions in 2012	Slovakia	EU average
Power industry	25%	33%
Transport	15%	20%
Industry	36%	19%
Agriculture (incl. forestry & fishery)	8%	12%
Housing & Commercial	9%	13%
Waste & others	7%	3%

The **housing sector**, including the commercial sector, accounts for 9% of GHG emissions in Slovakia (see Table 1). This share is smaller than the EU average with 13%. Recent figures reveal that the main part of the final energy consumption in the housing sector is covered by natural gas (52.8%), followed by derived heat (22.8%) and electricity (21.8%). With 1.5%, renewables account only for a fraction of the final energy consumption (MoE et al., 2017). The energy savings potential in buildings is estimated at up to 50% of the sector's current energy needs (CEE Bankwatch, 2015). The first two phases of SlovSEFF (2007-2014) were predominately effective for energy reduction in the housing sector.

Regarding the third sector of interest, **renewable energy** production accounts for one fourth of Slovakia's electricity generation. The main source is hydro (17%), while solar energy accounts for only 2% of national

[1] It must be underlined that emissions by sector have to be analysed with caution. The Slovak power sector has a relatively low emission intensity; hence, other sectors have higher *relative* shares. For a more in-depth analysis, absolute numbers should be taken into account.

electricity generation (IEA, 2017). The regulatory framework regarding renewables is deemed “very complex, unstable and not transparent” and thus is considered to “undermine investor confidence” (Esser et al., 2018). Until today, Slovakia’s electricity production has relied mainly on nuclear energy (see Figure 3). Nuclear energy, according to Esser et al. (2018), “is perceived as an attractive option to provide energy security while reducing emissions in the power sector”. Support for renewable energy production through incentive schemes such as SlovSEFF is thus highly important in order to scale up investments in this sector. However, as an evaluation for the first two phases of SlovSEFF has shown, this sector is only covered by a small share of the SlovSEFF facility. Furthermore, it affects primarily the ETS sector. In addition, in terms of energy profiles for buildings concerning the non-ETS sector targets, climate policies should address the fuel mix for heat; electricity only matters insofar as there are heat pumps or other forms of electric heat.

4 General description

4.1 History

With its approval in 2007, SlovSEFF was **one of the first Sustainable Energy Finance Facilities** launched by the EBRD in a series of SEFF facilities that had the objective of encouraging energy efficiency and renewable energy projects with private industrial companies and housing associations. Its initiation was motivated by the closure of the Bohunice V1 nuclear power plant as part of the accession negotiations of Slovakia to the EU, which materialised in 2004. At the time of SlovSEFF approval, 25% of Slovakia's energy needs were derived from nuclear energy. As the energy supply from nuclear sources was estimated to decrease by about one third due to the Bohunice V1 closure and taking into account economic growth and high energy intensity levels in Slovakia, SlovSEFF sought to mitigate the challenges of meeting the electricity demand in the years to follow (EBRD, 2014).

Until today, the financing facility has gone through **three phases**. The initial phase (**SlovSEFF I**) started in 2007 and involved sub-projects with four participating banks. EBRD extended credit lines of EUR 15 million to each of these banks (in total: EUR 60 million). Due to the success and quick uptake, the facility was extended by EUR 90 million in December 2009 (**SlovSEFF II**). As in the first phase, EUR 15 million were provided to each of the participating banks (including the four initial banks and two additional banks as of November 2010). Donor funding for incentive payments and technical assistance was provided by the Bohunice International Decommissioning Support Fund (BIDSF). The supplemental grant funding for technical assistance and performance fees amounted to EUR 30 million (EBRD, 2014). In total, about 700 projects were financed during the first two SlovSEFF phases (SlovSEFF, 2018d).

In its latest extension in 2014 (**SlovSEFF III**), the programme design has changed considerably. Firstly, in order to maximise the facility's impact on GHG emission reductions, the focus of the facility has been placed on renewable energy and industrial energy efficiency projects (SlovSEFF, 2018f). While in the previous years the programme was mainly focused on supporting projects with significant energy savings, the new SlovSEFF places more emphasis on reducing GHG emissions and installing new renewable energy sources (RES). This means that at least 45% of the credit line is for RES projects. Approximately 35% is allocated to industrial projects and 20% to the housing sector. Secondly, the incentive payments are now funded from the carbon credit sales from Slovakia to Spain, thus representing EBRD's first credit line funded through a market-based mechanism (SlovSEFF, 2018e). In addition, the programme's technical assistance component is also directly financed by the Spanish state. Further changes made to reflect and support this change in focus, e.g. linking the incentive payment level to a project's GHG emission reduction potential, will be outlined in more detail in chapter 4.3.

4.2 Legal basis

The **main actor** responsible for commissioning and funding SlovSEFF is the EBRD (EEW, 2015). Blending SlovSEFF III with EU structural funds or any other grant funding in general is not compatible (SlovSEFF, 2018f).

Relevant for the legal framework is also the **right of appeal** for applicants. That is, in case an applicant does not agree with the decision of the responsible project consultant, the following steps apply (SlovSEFF, 2018i):

- *First level of appeal*: Within 30 days of receiving the initial decision, an appeal may be submitted by letter stating the case for reconsideration.
- *Second level of appeal:* In case of a negative decision at the first level of appeal, the borrower may appeal for the second time by addressing the project manager in charge of SlovSEFF III.
- *Third level of appeal:* In case of a negative decision at the second level of appeal, an appeal may be raised with the financier of the facility, i.e. the EBRD. The decision of the EBRD Operation Leader will be final.

4.3 Functioning

By providing SEFFs, the EBRD extends credit lines to local financial institutions that seek to develop energy financing as a permanent field of business (EBRD, 2014). Local financial institutions on-lend the funds to their clients to undertake projects that achieve energy efficiency savings or invest in small-scale renewable energy generation.

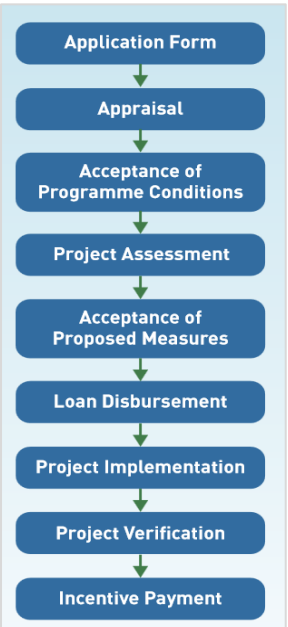

Figure 4: SlovSEFF procedure (SlovSEFF, 2018h).

As outlined in the introduction, **three categories of projects** are eligible under SlovSEFF: Renewable energy (max. project size: EUR 10 million), industrial energy efficiency (max. project size: EUR 5 million) and housing energy efficiency projects (max. project size: EUR 2.5 million) (**SlovSEFF, 2018f)**. In order to receive funding, a project must comply with specific eligibility criteria. Furthermore, only specific **private legal entities** may apply for SlovSEFF support, namely private enterprises, Energy Service Companies (ESCOs) and housing associations or cooperatives (**SlovSEFF, 2018g).**

The **procedure** from application to project implementation and incentive payments follows specific steps as depicted in Figure 4. First, an applicant / project applies for inclusion in SlovSEFF (*Application Form*). Then, a simple project analysis is conducted to assess whether basic eligibility criteria are fulfilled (*Appraisal*). Based on positive appraisal, the applicant accepts SlovSEFF conditions by signing a Letter of Engagement (*Acceptance of Programme Conditions*). Further, the consultant performs a technical assessment (e.g. Project Assessment Report, Energy Audit, Simplified Energy Audit or Energy Performance Certificate) to identify and/or confirm the best energy/carbon saving measures (*Project Assessment*). The project developer confirms that the investment recommendations are understood (*Acceptance of Proposed Measures*). Subsequently, the bank loan is disbursed (*Loan Disbursement*) and the project implemented (*Project Implementation*). Once the project is completed, the Verification Consultant assesses whether the project has been implemented in compliance with the Project Assessment Report (*Project Verification*). Upon successful verification, incentive payments are disbursed (*Incentive Payments*) (**SlovSEFF, 2018h; SlovSEFF, 2018i).**

The **incentive payments** (or carbon reduction compensation) are a crucial component of SlovSEFF III and are directly linked to a project's GHG emission reduction/energy savings potential. Incentive payments are provided to support markets by incentivizing financial institutions and borrowers to comply with higher standards for energy efficiency and renewable energy projects. In the case of financial institutions, they also occasionally compensate for costs of staff training and monitoring activities.

For **renewable energy and industrial energy efficiency projects**, the incentive payment is "equal to the project's estimated annual greenhouse gas emission reductions in tonnes of CO_2 equivalent (tCO_2e) multiplied by a crediting period of 3 years, a carbon price of EUR 20/tCO_2e and a discount rate of 3% applied over the crediting period" (**SlovSEFF, 2018h). In the case that a project's GHG emissions are directly covered by the EU Emissions Trading System (ETS), these projects are required to cancel an equivalent amount of EU allowances (EUAs) against a benchmark market price. This procedure, which is** a precondition to receive SlovSEFF incentive payments, **ensures that no double-counting of emission reductions is undertaken (SlovSEFF, 2018f). Minimum and maximum incentive payments exist, namely 5% and 20% of** the disbursed loan amount respectively.

For housing energy efficiency projects, the incentives payments are calculated as a percentage of the loan amount disbursed and depend on a project's total energy savings. The minimum level of energy savings that needs to be achieved is 30%. Between 30% and 40% of energy savings achieved, the incentive payment is equal to one tenth of the loan amount disbursed. For 40% and more energy savings, the incentive payment is 15% of the loan amount disbursed (SlovSEFF, 2018f).

As outlined above, the incentive payment is subject to successful project verification**. A further requirement for SlovSEFF borrowers is the reporting of annual** GHG emissions and energy savings to the Slovak Innovation and Energy Agency (SIEA) for a period of 5 years after project completion.

4.4 Interlinkages with other policy instruments

SlovSEFF cannot be combined with any other grant funding or the EU structural and cohesion funds. Furthermore, there are few interlinkages with other instruments for incentivising housing energy efficiency in Slovakia. For small-industry energy efficiency projects, no interlinkages with other instruments exist to date.

Since 2006, improvement of energy efficiency has been targeted by additional funding schemes. The revolving State Housing Development Fund (SFRB, partly funded by the European Regional Development Fund, ERDF) has been set up to provide loans for energy efficiency investments. Only residential buildings are eligible for loans and have to achieve at least a 35% reduction in heating energy consumption (in practice, the average for the accepted projects is ~50%) (MoTC, 2017). SlovSEFF pays out incentives to energy efficiency improvement projects financed from the SFRB that achieve energy savings higher than 30%. Thus, every energy efficiency measure or project qualifying for a SFRB loan also qualifies for a SlovSEFF payment, effectively becoming a soft loan.

Also in 2006, the Energy Performance of Buildings Directive (EPBD) was implemented in the Slovak national legislation. Energy Performance Certificates (EPC) have been issued since 2008. The ex-ante calculations of the energy savings to be achieved with a project (which are the criteria for ERDF loans) are based on the information provided in the energy certificate; in particular on the energy saving measures suggested therein that include the calculation of expected savings. Verification that the measure has been duly implemented and that energy savings have materialised is based on submitting the actual consumption data (via energy bills) after the implementation.

From 2007 to 2015, a programme similar to SlovSEFF existed with a focus on publicly-owned buildings: the Municipal Finance Facility – Energy Efficiency (MunSEFF). Like SlovSEFF, MunSEFF was initiated by the EBRD and the European Commission (EC). Targeting municipalities and their utilities, the key objective of MunSEFF was energy-efficient rehabilitation of municipal infrastructure, particularly the municipal and residential buildings

sectors due their high savings potential. MunSEFF was launched in 2007 and was initially envisioned to last until 2010 but was extended into a second phase due to its success. It ended in 2015 by full disbursement of the funds (MunSEFF, 2018a; MunSEFF, 2018b). The entities that had access to MunSEFF financing – those majorly owned or controlled by the state – are excluded from SlovSEFF support (SlovSEFF, 2018f).

5 Impacts of the policy instrument

5.1 Effectiveness

In the context of energy efficiency measures for industries and the housing sector, stakeholders face many barriers, one of them being imperfect information. As a result, only few companies and households undertake investments in energy efficiency measures – even though they might be profitable for many of them (Nauleau, 2014). To incentivise involved actors to undertake such investments, SlovSEFF was introduced by the EBRD.

SlovSEFF has supported investments in housing and industrial energy efficiency as well as renewable energy since its launch in 2007. In total, **688 projects** were funded in SlovSEFF I and II across Slovakia totalling about **EUR 200 million** (EBRD 2014; EBRD, 2015). An evaluation by the EBRD (2014) shows that the largest share of projects took place in the **housing sector (87%)**, followed by the industrial sector (11%) while renewable energy projects represented only 2% (EBRD 2014, p.24). Yet, when considering the **allocation of funds**, 61% went to housing, 27% to industrial projects and 12% to renewable projects, due to the larger financial size of renewable and industrial projects (ibid).

Figure 5 shows a map of projects currently financed by SlovSEFF, distinguished by sector. It illustrates that SlovSEFF III has recently made **a shift towards more projects in the industrial sector**, a development which is related to the amended eligibility criteria (see Chapter **Error! Reference source not found.**). In geographical terms, a majority of projects is located in western Slovakia and in the metropolitan area of Bratislava where most of the Slovakian industry is located.

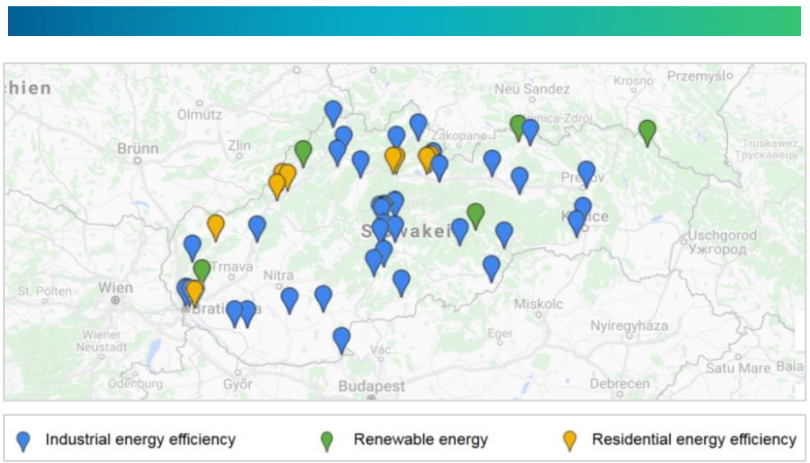

Figure 5: Overview of SlovSEFF projects across Slovakia (SlovSEFF, 2018e).

The different weight in distribution by number of projects and by loan amount as elaborated above reflects the different average **loan size** of projects by sectors. In the aggregated SlovSEFF I and II figures, renewable energy projects presented the largest size with an average of EUR 1.2 million per project. Industrial projects accounted for an average size of EUR 540,000 and housing sector projects an average size of EUR 154,000 (EBRD, 2014).

Taking a closer look at the results for energy savings, the 688 projects financed under SlovSEFF I and II resulted in primary energy savings of 580 GWh/year (EBRD, 2014) and result in total annual CO_2 emission savings of 114,000 tonnes (EBRD, 2014, p.26). The following table provides an overview of the results achieved.

Table 2: Summary of main quantitative results for SlovSEFF I & II (own illustration based on SlovSEFF, 2018d).

		SlovSEFF I	SlovSEFF II	TOTAL
Housing projects	*Number*	251	348	**599**
	Investment	EUR 32.6 million	EUR 58.9 million	**EUR 91.5 million**
Industrial projects	*Number*	34	42	**76**
	Investment	EUR 19.3 million	EUR 21.2 million	**EUR 40.5 million**
Renewable energy projects	*Number*	8	7	**15**
	Investment	EUR 8.1 million	EUR 9.8 million	**EUR 17.9 million**
Emission savings per year		63,564 tCO_{2e}	50,948 tCO_{2e}	**114,512 tCO_{2e}**
Primary energy savings per year		283 GWh	300 GWh	**583 GWh**
Average energy saving in housing projects		32%	35%	**33%**

Overall, about half of the total annual CO_2 emission reduction resulted from industry sector projects, although this fraction fell strongly from 61% in SlovSEFF I to only 37% in SlovSEFF II. At the same time, the fraction of total CO_2 savings resulting from housing projects rose from 15% up to 30%. These shifts reflect the more comprehensive housing projects undertaken under SlovSEFF II, as a result of the change in incentive payments.

Table 3: CO_2 savings by types of projects (own illustration based on EBRD, 2014, p.27).

CO_2(t/y)	Housing	Renewable	Industry	TOTAL
SlovSEFF I	9,570	15,216	38,779	**63,564**
SlovSEFF II	15,494	16,680	18,668	**50,842**
TOTAL	**25,063**	**31,896**	**57,447**	**114,406**

For the **third phase of SlovSEFF**, some projections exist on the amount of energy and GHG emissions that have been saved annually with the projects that were implemented until 2018 (Figure 6). Given the context of the relatively small industrial sector in Slovakia, the numbers demonstrate that the policy design of SlovSEFF III remains ambitious and that the instrument is still successful in terms of energy and emission savings achieved.

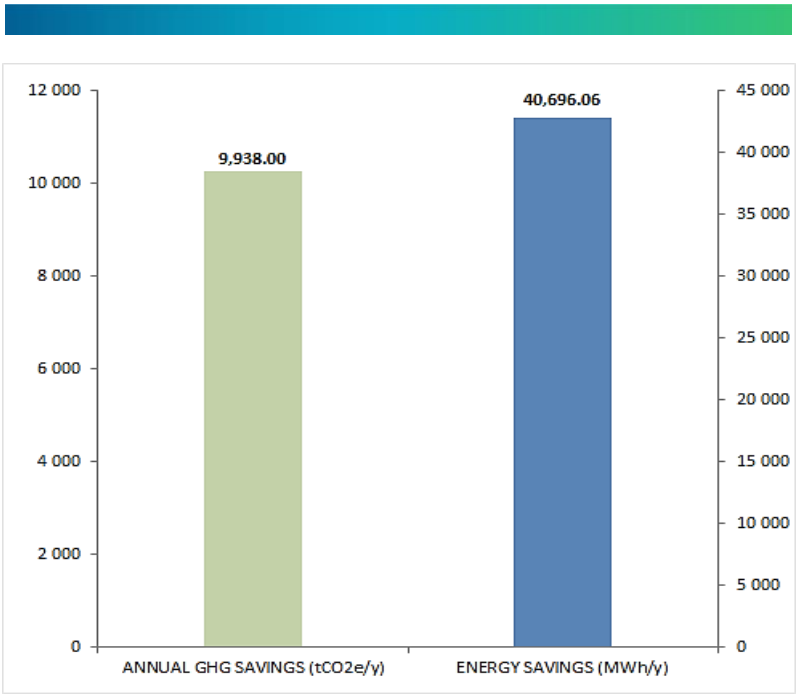

Figure 6: SlovSEFF III: Annual GHG and energy savings by projects implemented until 2018 (SlovSEFF, 2018e).

However, it must be noted that SlovSEFF shares challenges similar to other energy efficiency-related financing and incentive schemes. Two effects are of particular relevance to hamper the effectiveness of the instrument and should be considered in order to improve energy and emission savings (Bozonnat et al., 2016):

- When implementing energy efficiency measures, a **rebound effect** can occur. This is the case where a company or consumer tends to increase its consumption of the same good or service in reaction to the decrease of the price. In the case of energy renovations, i.e. when a dwelling becomes better insulated, the household's energy bill decreases, at equal indoor temperature. It is thus tempting for the consumer to increase the thermal comfort, which in turn harms the targeted energy savings.
- Energy efficiency-related incentive schemes can also support **free-ridership** (or **windfall gains**). Free-ridership describes a phenomenon where public money is provided to companies or households that would have undertaken the envisaged actions anyways, also in the absence of the financial incentive.

5.2 Cost efficiency

Besides the primary objective of an instrument to achieve the targets it is designed for, the related investment is an important criterion for assessment in a public policy context. As governments' budgets are constrained, the aim of successful energy efficiency policies in the industrial and building sectors should be to mitigate GHG emissions, to foster energy efficiency and to increase the share of low-carbon energies at the lowest costs

possible. Furthermore, renewable energy policies / schemes that shift the fuel mix towards technologies with lower carbon-intensity are especially helpful in order to reduce the emission intensity in the industrial and building sectors. When assessing incentive schemes such as SlovSEFF, it is also important to consider whether the instrument actually achieves *additionality* in energy demand reductions, compared to a scenario where the incentive scheme is not in place.

Before the implementation of SlovSEFF, "the extent to which local banks had been seen as a source of financing for energy efficiency and renewable energy was limited" (EBRD, 2014, p.10). SlovSEFF aimed to address this deficiency by targeting representative local banks, through which to provide a total of EUR 150 million in loans to energy efficiency/renewable energy projects over the first two phases of the facility (ibid.).

When analysing the cost effectiveness of SlovSEFF, two considerations should be considered that go beyond the mere discussion of public spending for the reduction of CO_2 emissions:

- Whether the money invested was spent on measures with the potential to induce significant GHG emission reductions (effectiveness);
- Whether the money spent was driving investments that otherwise would not have occurred (additionality).

To evaluate the first consideration, the EBRD benchmarks for energy savings per unit of investment are helpful. Figures 7 and 8 show the distribution of these parameters for housing and industrial sector projects respectively. In the case of **housing projects**, the distribution illustrates the impact of the changes to incentive payments that were made for SlovSEFF II. Due to the linking of incentive payments to energy savings under SlovSEFF II, projects tended to be more comprehensive. The average loan size for housing projects under SlovSEFF I was about EUR 130,000 and increased to about EUR 170,000 for SlovSEFF II (EEW, 2015, p.4).

Under SlovSEFF I, the **mean annual final energy saving** per unit of investment was 3.38 GJ/EUR but had fallen to 2.78 GJ/EUR under SlovSEFF II (EBRD, 2014, p.29). In terms of annual primary energy savings, the mean values were 3.77 GJ/EUR and 3.75 GJ/EUR respectively (ibid.).

In the case of **industrial energy efficiency** projects, the annual final energy saving per unit of investment also decreased between phases I and II. The EBRD sees this as a reflection of the lower internal rate of return under SlovSEFF II and the increase in small-scale projects. The mean annual final energy saving per unit of investment was 13.8 GJ/EUR under SlovSEFF I but had fallen to 8.78 GJ/EUR under SlovSEFF II (EBRD, 2014, p.29). In terms of primary energy saved, the mean values were 20.4 GJ/EUR and 16.7 GJ/EUR respectively (ibid.).

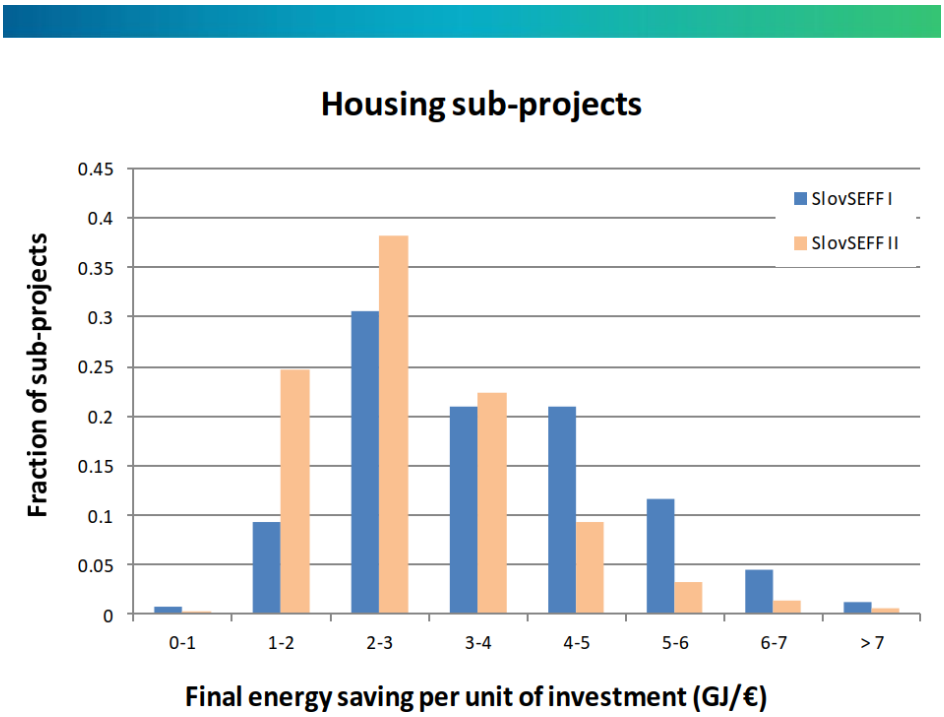

Figure 7: Distribution of annual final energy saving per unit of investment, housing sub-projects (EBRD, 2014, p. 29).

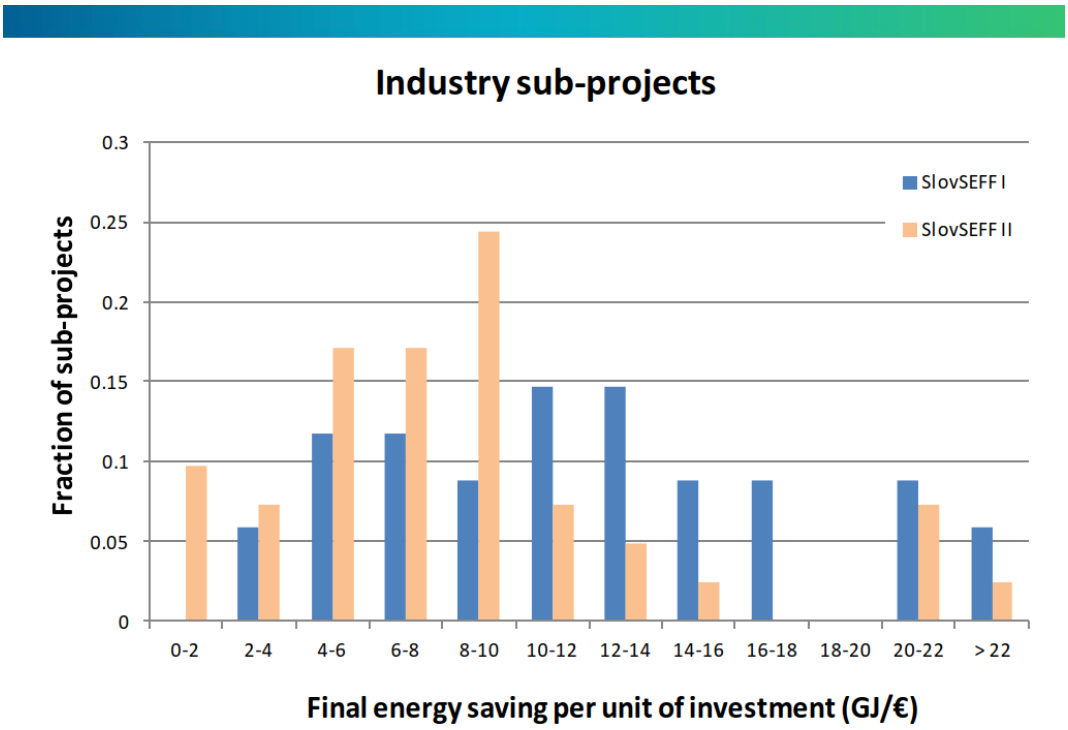

Figure 8: Distribution of annual final energy saving per unit of investment, industry sub-projects (EBRD, 2014, p. 30)

Regarding the second consideration, i.e. whether the public spending was driving *additional* investments (and hence additional energy savings), studies are in general rather pessimistic with regard to financial incentive schemes such as SlovSEFF. Nauleau (2014) puts forward the issue of "**free-ridership**", defined as behaviour occurring "when the agents targeted by the policy take the incentives but would have made the investment anyway" (Alberini et al., 2014).

Free-ridership **needs to be taken into consideration to not overstate a policy's efficiency**, for instance when assessing energy or GHG emission savings. Generally speaking for the SlovSEFF scheme, the additionality criterion has to be seen with caution since the instrument complements rather than displaces private sector finance.

Given the above considerations, it can be acknowledged that efforts should be undertaken by the EBRD to refocus the design of SlovSEFF to allow for greater cost efficiency, both by supporting cost-efficient measures and by avoiding free-ridership. Although the latter point is a very challenging endeavour (faced by many similar financing schemes), a first step could be to identify and target households and companies with no prior intention (or financial means and capacity) to conduct sustainable energy measures so as to ensure that actual *additional* energy saving activities are induced.

5.3 Co-benefits and side-effects

Several co-benefits were reported in the context of SlovSEFF. For instance, SlovSEFF supports the **development of technological and organisational innovations**, such as through a market shift towards the most efficient equipment (EC, 2015a). The EBRD evaluation report (2014) also finds a "significant improvement in the **living standard of residents** of the refurbished apartment blocks" (p.21). Even though no benchmarks were set, it is estimated that 31,184 households and therewith 86,376 residents benefited from the refurbishments (SlovSEFF, 2015d).

The project is also expected to have two sources of **transition impact** (EBRD, 2014):

- The policy instrument can generate a transition impact by demonstrating the benefits of energy conservation and promoting the expansion of energy efficiency and renewable energy lending in the Slovak Republic (p.15f.). In addition, the project demonstrates the **positive effects of rational energy utilisation** by reducing energy costs for private households and companies and the reduction of greenhouse gas (GHG) emissions.
- The instrument is also expected to **transfer and build expertise** related to sustainable energy investments, both among banks and borrowers. Participating financial institutions will build capacity in identifying sustainable energy opportunities as well as assessing the risk and credit-worthiness of clients for energy efficiency and renewable energy loans (p.16). Sub-borrowers are expected to become more familiar with banks' requirements for providing such loans (ibid.). Borrowers are provided assistance in identifying energy saving opportunities through energy audits and are advised on high performing technologies.

In addition, an **inflationary effect** is a potential side-effect of financing schemes that trigger investments. The effect describes the potential increase in the price of work related to (energy-related) renovations as a consequence of (the announcement of) a new financial instrument that leads to additional investments and building activities.

5.4 Success factors and challenges

SlovSEFF is considered to be an **innovative policy instrument** due to the technical assistance that is provided by the project consultant who helps clients of the local banks identify the most appropriate energy efficiency investments, through Rational Energy Utilisation Plans (REUPs), Simple Energy Audits (SEAs), and assistance to the formulation of loan applications (EEW, 2015, p.5; Build up, 2012). SlovSEFF illustrates that **free technical assistance** carried out by local consultants is crucial for the success of a policy instrument for financing energy efficiency. Local consultants contributed to the success by preparing technical assessment packages (REUPs and SEAs) and through monitoring activities.

Additionally, the SlovSEFF scheme has an integral **incentive payment system**: All successfully verified renewable energy and industrial energy efficiency projects are granted a one-off payment to compensate for carbon reduction, and housing projects receive a payment as a percentage of the provided loan depending on the total savings (EEW, 2015, p.5). The **combination of technical assistance and incentive payments** rather than the mere provisioning of funds is considered an additional success factor. To measure impact, a **monitoring system** is in place through several project assessment steps, including project verification and annual reporting to the SIEA (EEW, 2015, p.4). Compliance is ensured by the reporting of annual GHG emissions and energy savings by the borrowers to SIEA for a period of 5 years after project completion (EEW, 2015, p.3).

Despite these considerable success factors, SlovSEFF also faces **challenges**. As previously mentioned, **market barriers** can impede the implementation of energy efficiency projects. The main barriers of such projects are long payback periods and a large upfront investment burden. Incentive payments provided by SlovSEFF have helped overcome these market barriers. The incentive payments included in the SlovSEFF scheme are provided to push markets by incentivizing financial institutions and borrowers to comply with higher standards for energy efficiency and renewable energy projects (EBRD, 2014, p.6). Further, the EEW (2015, p.5) case study highlights that the **absence of initial targets** was an area of improvement in the initial phase of SlovSEFF. In addition, energy saving thresholds to receive incentive payments were found to be too low under SlovSEFF II, which is why they were doubled under SlovSEFF III (EEW, 2015, p.5). The minimum internal rate of return (IRR) threshold for renewable energy projects has been set to 10%, which may lead to superficial, rather than in-depth, energy refurbishment (ibid.).

Further barriers, particularly for the initial phase of SlovSEFF, include: a **low level of awareness** in many companies and **limited knowledge of available technologies** to reduce energy consumption (industrial sector); **difficulties in gaining consensus** in the case of a large number of owners within apartment buildings (housing sector); and lack of an adequate incentive system, fragmented regulation, non-guaranteed purchase tariffs, etc. (renewable energy sector) (EBRD, 2014).

6 Transferability

6.1 General comparability of the context

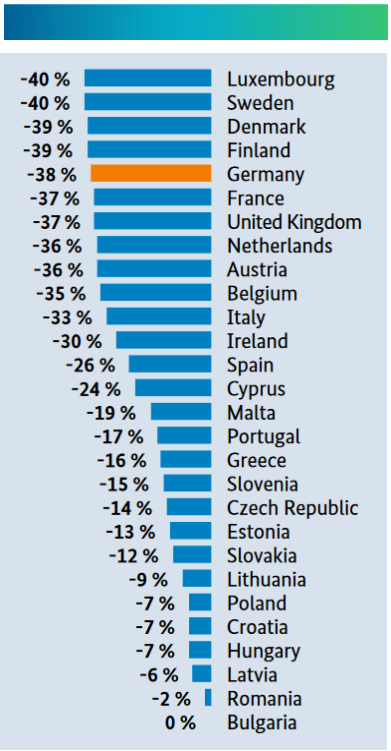

Figure 9: Breakdown of 2030 Effort sharing targets compared to 2005 (BMU, 2018).

The overall picture regarding **emission reduction targets** for non-ETS sectors of both Slovakia and Germany is diverse: While the Effort Sharing Decision defines an emission reductions target of 14% in 2020 for Germany, Slovakia needs to *limit the increase* in its non-ETS GHG emissions to 13% (both compared to 2005). When looking at the larger time horizon up to 2030, the **difference in level of engagement** for climate protection can again be observed: Germany is required to reduce its GHG emission by 38% while Slovakia targets a 12% reduction (Figure 9).

This **distribution** of targets is a result of the effort sharing among EU Member States based on GDP[2]. According to this mechanism, less wealthy countries have less ambitious targets because their relatively higher economic growth is likely to be a stronger emission driver and they have relatively lower investment capacities.

As current estimates for these targets predict, Germany will likely miss its 2020 target (BMU, 2018) while Slovakia "is on track to overachieve its 2020 target" (EC, 2015a).

When assessing more closely the building and industrial sectors, which are both particularly relevant for the potential impacts of SlovSEFF, the following can be observed: The largest sector in terms of GHG emissions (data from 2012) in Slovakia is the **industrial sector** with a share of 36%. In Germany, the industrial sector accounts for only 20% of GHG emissions. This is supported by the fact that the level of final energy intensity in the industrial sector is twice as high for Slovakia compared to EU average, while Germany's energy intensity level for the industrial sector is well below the EU average (EC, 2015a; EC, 2015b). However, it should be noted that the German energy mix is considerably more emission-intensive than the Slovakian (see Chapter **Error! Reference source not found.**). According to the MURE database, Germany applies several policy measures **specifically tailored for SMEs**, including i) a special fund for energy efficiency in SMEs, ii) KfW Energy consultations with SMEs and iii) promotion of energy-efficient cross-cutting technologies in SMEs. For Slovakia, no such SME policy measures were listed (Odyssee-MURE, 2015). The need to increase efficiency in the industrial sector, including the respective policy framework, appears to be particularly important in the Slovak Republic.

With regard to the **building sector**, the picture seems inverted. The share of the building sector (specifically, the housing and commercial sector) in terms of GHG emissions is 14% for Germany and 9% for Slovakia (see also

[2] The Effort Sharing legislation establishes binding annual greenhouse gas emission targets for Member States for the periods 2013–2020 and 2021–2030. These targets concern emissions from most sectors not included in the EU Emissions Trading System (EU ETS), such as transport, buildings, agriculture and waste.

Chapter **Error! Reference source not found.**). Furthermore, the final energy consumption per m^2 in the housing sector is considerably higher in Germany compared to Slovakia and even compared to EU average (data from 2013; EC, 2015a; EC2015b). According to 2011 Census figures, the Slovak housing stock counted 1,995,000 housing units. More than 90% of the housing was owner-occupied. In contrast, "Germany is the only country in the EU where renting is still more popular than home ownership" (Pittini et al., 2017, p.68). According to 2014 figures, only 45% of the German housing stock is owner-occupied (ibid.).

The situation in Germany creates a particular challenge when considering the **split-incentive dilemma** in the context of building renovations. Nevertheless, taking the high emission figures for the building sector into account, the need for Germany to increase **renovation activity** is of great importance. And the current funding schemes and regulations do not seem to have provided sufficient incentives for investments in the energy-efficient modernisation of residential buildings since the renovation rate continues to be on a low level. In this context, comprehensive financing facilities such as the SEFFs, which can trigger investments through (preferential) loans and incentive payments as well as technical assistance for borrowers, could provide a mechanism to scale up the desired modernisation activity.

6.2 Properties of the instrument

Generally speaking, the SlovSEFF scheme could be transferred to the German context relatively easily. In fact, many similar financing schemes for the energy-efficient renovation of dwellings and the financing of energy-related modernisations in SMEs are already in place in Germany.

A very relevant player for existing funding schemes in Germany is the state-owned bank KfW. With total assets of EUR 503 billion in 2015, KfW is one of the largest government-owned promotional banks in the world (KfW, 2018). Originally founded with the purpose of reconstructing post-war Germany in 1948, the KfW Group has been financing energy efficiency and emission reduction programmes for buildings since 1990. The majority of KfW's financial support activities for **energy efficiency in buildings** take place in Germany where, in 2016, a budget of approximately EUR 15.4 billion was provided for low-interest loans and grants for energy-efficient construction and refurbishment of buildings (KfW, 2018). KfW sets minimum requirements for energy efficiency in buildings and links them to the eligibility for funding. Furthermore, labels and tools are provided for the evaluation of measures. Table 4 provides an overview of the KfW energy efficiency programmes targeting buildings. The KfW loans for energy-efficient refurbishment (No. 151, 152, 430) possess a similar mechanism compared to SlovSEFF in that they progressively reward energy performance from a certain threshold upwards (with the difference that in Slovakia, the threshold is 30% compared to status quo, and in Germany, it refers to the regulatory minimum standard).

Table 4: KfW financing programmes related to energy efficiency for private households (KfW, 2016).

Programme	Focus	Volume	Number of beneficiaries
Energy-efficient Refurbishment (151, 152, 430)	Energy saving refurbishment projects are promoted by loans at favourable conditions or grants	EUR 4,166 mn	164,202

Energy-efficient Construction	Low interest, long-term loans and grants are provided for the construction of residential buildings	EUR 11,287 mn	74,046

In the **industry sector**, the KfW and the Federal Office for Economic Affairs and Export Control (BAFA) offer financing for energy efficiency measures, covering a wide range of energy efficiency and renewable energy promotion schemes such as cross-section technologies, energy-efficient production lines and processes, and special funds for cooling technologies, waste heat, etc. The conditions vary according to the technology, but a combination of a repayment bonus and a loan is usually applied.

6.3 Potential impacts

In general, the impact of a financing scheme such as SlovSEFF for the building and industrial sectors touches upon the ETS and non-ETS sectors. Two aspects are particularly relevant for the distinction of sector impacts:

- Fostering energy efficiency for district heat (mostly ETS) and decentralised heating systems (non-ETS)
- a shift among heating systems, e.g. from distributed heating based on fossil fuels to electricity-based heating, radiators and heat pumps, or to district heating (with both electricity generation and district heating being under the EU ETS)

In general, electrifying heating or moving to district heating expands the scope of what is under the EU ETS which results in lower Effort Sharing Decision (ESD) emissions. Electric heating is therefore desirable from an ESD-reduction perspective, and, additionally, in Slovakia electricity has a relatively low carbon-intensity. Likewise, the reduction of electricity consumption or district heating consumption from increased energy efficiency in electrically heated/district heated dwellings cannot reduce emissions in ESD sectors as they are already covered by the EU ETS umbrella.[3] Consequently, the aim of a financing scheme such as SlovSEFF should be to enable energy savings and, thus, to reduce GHG emissions in the non-ETS sectors, whereas other emission sources should be covered by the ETS. Certain policy design amendments should promote increased GHG savings in non-ETS sectors, such as buildings and SMEs within the industry sector.

Furthermore, a policy instrument similar to a SEFF would face the obstacle of creating an overlap (or even competition) with the existing financing schemes and energy efficiency policies in Germany. Market cannibalisation would be very likely if the scheme was introduced without adjusting it to the policy and financing scheme already in place.

In addition, SEFF facilities are initially designed for countries in transition (e.g. Slovakia, Turkey or Bulgaria). Therefore, the overall policy design is likely to be misaligned for the context of well-developed and highly-regulated countries such as Germany. Thus, in order to provide for the desired outcomes, a SEFF scheme in Germany would need to be designed with particular respect to the structure and nature of national stakeholders, the functioning of the market, and the technical savings potential in different sectors.

[3] For a more elaborated discussion on these conceptual aspects, please refer to Chapter 2.3 of the Übersichtspaper / Policy Paper.

6.4 Conclusion

A financing scheme such as **SlovSEFF** could be an **important component for a comprehensive decarbonisation strategy** of the housing and industrial sectors. This holds especially true in transition countries which lack adequate sustainable energy investment capacities from local banks.

Considering the ambitious sector-specific targets of the EU Member States, comprehensive investments are needed to achieve the desired renovation rate of existing buildings and higher energy efficiency standards in SMEs. This is particularly relevant for energy renovations, as the amortisation periods for such measures are often considered too long from an investor's perspective. In fact, the impact of a financing scheme such as SlovSEFF for the industrial and building sector would touch upon the ETS and non-ETS sectors by fostering energy efficiency. However, the carbon mitigation impact depends largely on emission intensity of the energy mix in the respective country.

Besides triggering emission reductions, a comprehensive financing scheme can also potentially have significant impacts regarding the **transfer of expertise among banks and companies** related to sustainable energy investments. Supplementary grant funding for technical assistance can further incentivise investments and foster this knowledge transfer.

If transferred to the **German context**, the instrument would be in addition to the **existing policy and financing landscape**. That is, investors would be free to select the type of support that is appropriate for their respective energy savings and/or emission reduction investment. However, as long-standing and similar financing instruments such as KfW loans are already in place and as financing capacities of (local) German banks seem sufficient, a supplementary financing instrument such as a SEFF is hardly necessary. The successful policy design of (Slov-)SEFF should therefore rather be applied to other EU countries in transition that face similar challenges with the energy intensity of the industry or the efficiency standards of their building stock (e.g. Poland, Czech Republic). This holds especially true in countries where local banks need additional capacities and technical knowledge regarding sustainable energy financing.

Lastly, for the policy design of such an instrument, it is also important to consider potential drawbacks for the effectiveness, namely windfall and rebound effects as well as cannibalisation with similar (financing) instruments. In light of the heterogeneity within the housing and industrial sector, a financing scheme should preferably be targeted towards those investor groups where the number of potential free-riders is expected to be relatively low, e.g. those which currently do not have access to sufficient funds and support schemes. In addition, low-income households and companies with liquidity constraints should receive particular attention in terms of eligibility.

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