SHIFT-WP 4 Working Paper

Task 4.3: Identify standards and other instruments currently in use in Austria

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1 Introduction

To achieve the national targets stipulated by the EU Effort Sharing Decision, Austria needs to cut its non EU ETS greenhouse gas emissions by 9 million tonnes CO_2 compared to 2005. If those targets are not met, additional emission allocations need to be purchased or additional emissions must be compensated and a penalty payment must be paid (Anderl et al. 2018).

The buildings sector is one of the sectors not regulated by the EU ETS and plays an important role for Austria's compliance with its climate goals. Environmental policy instruments are designed to enforce climate goals and support Austria's transition to a low-carbon society. This report aims to establish an inventory of environmental policy instruments currently applied in Austria's buildings sector to enable further analysis and policy advice.

The policy framework in Austria's buildings sector is very diverse and subject to division of responsibilities, including law acts of the federal states as well as national law acts. The fact that construction law and buildings codes are duty of the federal states established a very complex structure of regulations which will be discussed in the following chapters.

In chapter 2 of this report general data on greenhouse gas emissions and the structure of Austria's buildings sector will be provided while chapter 3 provides a categorization of policy instruments. Chapter 4 introduces an inventory of policy instruments currently applied in Austria's buildings sector and chapters 5, 6 and 7 discuss regulatory and economic instruments identified as standards, subsidies and taxes in more detail.

2 General data on greenhouse gas emissions and the structure of Austria's buildings sector

While greenhouse gas emissions from Austria's buildings sector have declined by 37,2 % since 1990 they still amount to 8,1 million tonnes carbon dioxide equivalent (MT CO_2 eq.) or 10,1 % of national greenhouse gas emissions in 2016. Excluding emissions from sectors regulated by the Emissions Trading System of the European Union (EU ETS), buildings account for 16,0 % of residual emissions (Anderl et al. 2018).

Figure 1 shows the development of greenhouse gas emissions from Austria's buildings sector since 1990. Emissions from buildings are subject to big annual variations and are highly dependent on weather conditions (Anderl et al. 2018). Thus, emissions have been adjusted for temperature in an additional data series. The figure also includes the emissions trajectory stipulated by the Climate Protection Act (BGBl. I Nr. 106/2011) from 2013 to 2020. The Climate Protection Act as a policy instrument will be discussed more comprehensively in chapter 5.6.

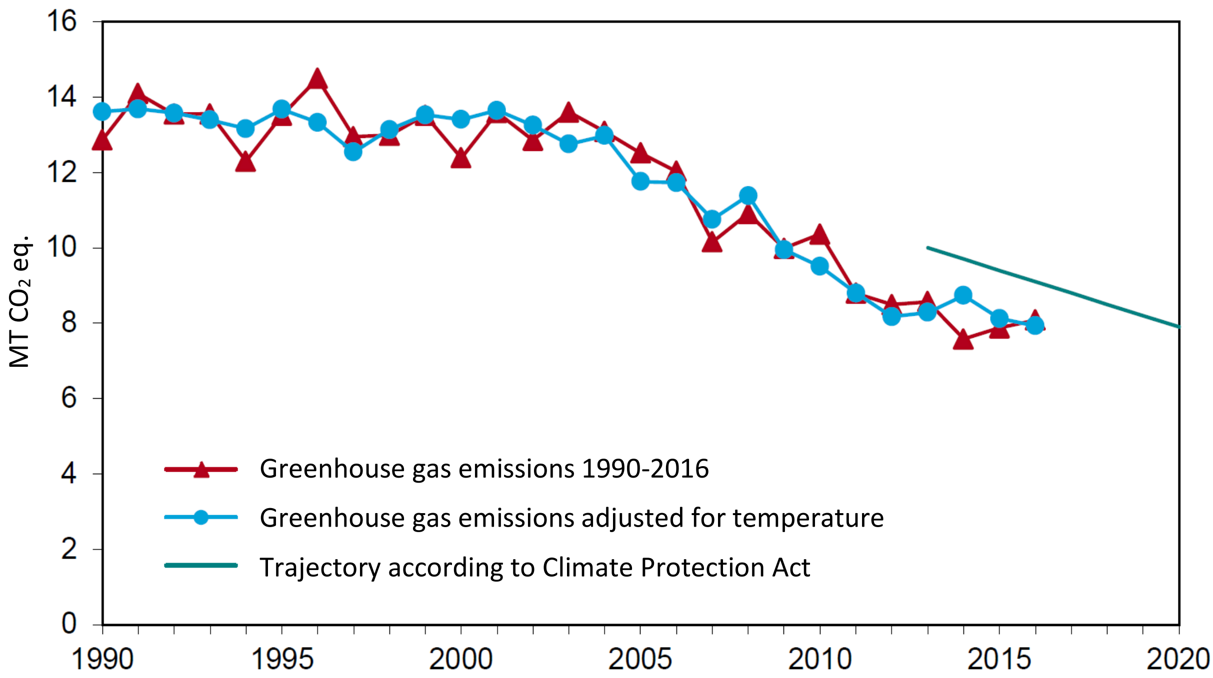

Figure 1: Greenhouse gas emissions (1990 - 2016) and Climate Protection Act trajectory (2013 - 2020) from Austria's buildings sector. Source: (Anderl et al. 2018, p. 125)

As depicted in figure 1, the strongest decline in greenhouse gas emissions from buildings took place after 2005. Increased use of district heating and renewable energy sources combined with a decline in the use of natural gas and mineral oil are mainly responsible for reduction of emissions. Additionally, increased thermal quality of buildings allowed for a more efficient use of energy in general (Anderl et al. 2018). The sectoral targets defined in the Climate Protection Act have been met in all years since 2013.

While increased use of district heating is responsible for a decline in greenhouse gas emissions in the buildings sector it is important to notice that this constitutes a shift of emissions to the industry sector. The same is true for emissions induced by generation of electricity which are shifted to the energy sector (Anderl et al. 2018).

Buildings emissions include CO2, methane and nitrous oxide and are mainly caused by combustion of fossil fuel for generation of heating and hot water. The main polluters are private households but public and private services (public buildings, office buildings, hotel industry, hospitals, etc.) contribute to sectoral emissions as well. Emissions of private households include stationary and movable devices like lawn mowers (Anderl et al. 2018).

Table 1 demonstrates how greenhouse gas emissions of the main polluters (private households and public and private services) have evolved in the past decades.

Main Polluters	1990	2016	Change 1990 – 2016	Share of national greenhouse gas emissions 2016
Private Households (stationary and movable sources)	10.508	6.580	- 37,4 %	8,3 %
Public and Private Services	2.358	1.505	- 36,2 %	1,9 %

Table 1: Main polluters of greenhouse gas emissions in Austria's buildings sector (in 1.000 T CO_2 eq.). Source: Anderl et al. 2018

As depicted in table 1, greenhouse gas emissions of private households and public and private services have declined in the past decades and private households are responsible for the major proportion of total emissions.

Private households involve all residential buildings. In 2016, 87,4 % of all residential buildings in Austria were single and two-family homes and 12,5 % multi-family homes (e.g. apartment buildings). 45,5 % of all dwellings were placed in single and two-family homes and 51,5 % in multi-family homes. The remaining 3 % were placed in non-residential buildings (Anderl et al. 2018).

The number of primary residences in Austria increased by 31,8 % between 1990 and 2016 and living space of all primary residences increased by 44,8 % (Anderl et al. 2018). This development has emission increasing effects that have been counterbalanced by other factors described above.

45 % of total living space is located in buildings constructed before 1970. Those buildings have a significantly higher final energy demand per unit of area (gross floor area – including walls) than newer buildings. Therefore, the potential greenhouse gas emission reductions due to energy-efficient buildings renovation measures are highest for buildings built prior to 1970 (Anderl et al. 2018).

Greenhouse gas emissions in Austria's buildings sector differ among federal states. Those federal states with a more urban structure (e.g. Vienna) show lower per capita emissions, mainly due to a denser structure (less living space, lower per capita building rate), despite a relatively high share of fossil fuels. In more rural areas the increase in living space per capita since 1990 is higher. Per capita emissions from public and private services are highest in federal states with a higher share of tourism businesses (e.g. Tyrol and Vorarlberg) (Anderl et al. 2018).

2.1 Final energy use in Austria's buildings sector

In 2016, Biomass (18,8 %), Natural Gas (17,7 %) and Mineral Oil (13,4 %) constitute the most important fuel types among final energy use within the buildings sector. Solid fuels (coal) (0,2 %) play only a minor role (Anderl et al. 2018). Table 2 provides an overview of the evolution of final energy use in the sector since 1990.

Year	Mineral Oil	Solid Fuels	Natural Gas	Biomass	Electricity	District Heating	Solar Heat/Ambient Heat	Total
1990	93.120	27.578	46.092	60.457	73.952	22.179	2.099	326.588
2005	92.712	4.367	86.018	66.651	103.545	46.217	6.698	406.729
2016	51.643	958	68.272	72.259	114.653	61.287	16.305	385.471
1990-2016	**- 45 %**	**- 97 %**	**+ 48 %**	**+ 20 %**	**+ 55 %**	**+ 176 %**	**+ 677 %**	**+ 18 %**

Table 2 Final energy use per energy source in Austria's buildings sector - excluding movable sources (in terajoule - TJ). Source: (Anderl et al. 2018)

Total final energy use from 1990 to 2016 increased by 18%. While the use of Natural Gas, Biomass, Electricity, District Heating and Solar/Ambient Heat increased since 1990, the use of Mineral Oil and Solid Fuels diminished. Figure 2 shows the supply of final energy from different energy sources applied in the buildings sector.

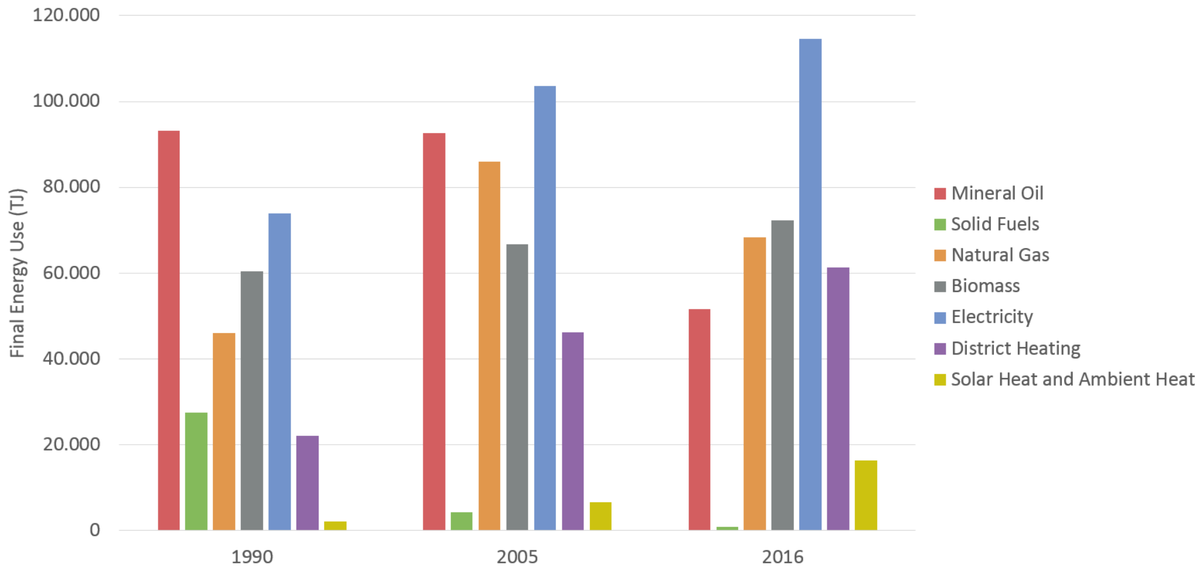

Figure 2: Final energy use in Austria's buildings sector (in terajoule - TJ). Source: (Anderl et al. 2018)

In 2016, electricity is the most important energy source in the sector. Use of electricity within the sector includes heating, warm water and additional uses like operation of biomass and solar heating systems. Note that emissions from generation of electricity are allocated to the energy sector rather than the buildings sector. Similarly, emissions from district heat generation are attributed to the industry sector (Anderl et al. 2018). This effect becomes more important as the use of electricity and district heating increased over time.

3 Categorization of policy instruments in Austria's buildings sector

A categorization of policy instruments will be done following the structure applied by Neyer and Williges 2018. Policies are divided into four categories: strategy and planning measures, regulatory instruments, economic instruments and information and awareness raising tools. Regulatory instruments and economic instruments will be further divided into standards, subsidies and taxes. Identified standards, subsidies and taxes will be discussed in more detail. In a further step identified standards, subsidies and taxes will be assigned according to the framework introduced by van der Werf and Vollebergh 2018.

Strategy and planning:

No measures have been identified.

Regulatory instruments:

- OIB-guideline 6
- Housing support scheme
- Energy efficiency obligation scheme
- Joint agreement on energy savings
- Federal building codes
- Climate protection act

Economic instruments:

- Tax on natural gas
- Mineral oil tax
- Tax on solid fuels
- Tax on electricity
- Housing support scheme
- Domestic environmental support
- Renovation drive
- Green electricity subsidy
- Austrian climate and energy fund
- District heating and cooling act

Information and awareness raising tools:

- Energy performance certificates
- Energy audits
- Klimaaktiv

4 Inventory of policy instruments currently applied in Austria's buildings sector

This section provides an overview of environmental policy instruments currently applied in Austria's buildings sector. Policy instruments are categorized according to the structure introduced in chapter 3. This inventory includes national policy instruments and the main policy instruments of the federal states designed to reduce greenhouse gas emissions in various ways. Policy instruments on EU level are not introduced as the main EU directives have been adopted into national legislation. Figure 3 summarizes policy instruments identified and their implementation periods.

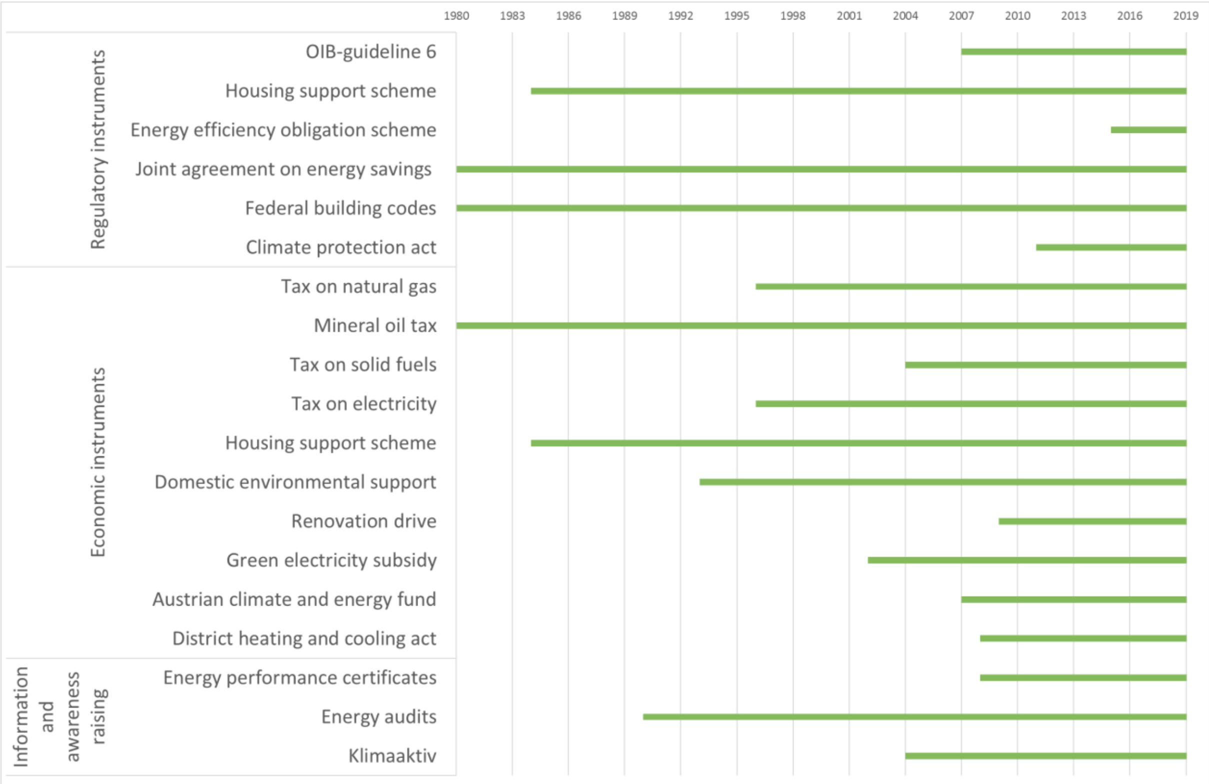

Figure 3: Overview of most relevant policy instruments for greenhouse gas emissions reduction in the Austrian buildings sector. Implementation period and categorization as a policy instrument. Source: own representation, data from: (Österreichisches Institut für Bautechnik 2007), BGBl. Nr. 482/1984, (Österreichische Energieagentur 2017), BGBl. Nr. 351/1980, (Österreichisches Institut für Bautechnik 2015a), BGBl. I Nr. 106/2011, BGBl. Nr. 201/1996, BGBl. Nr. 598/1981, BGBl. I Nr. 71/2003, BGBl. Nr. 201/1996, BGBl. Nr. 482/1984, (Husz et al. 1996), (Windsperger et al. 2011), BGBl. I Nr. 149/2002, (Klima- und Energiefonds 2018), BGBl. I Nr. 113/2008, BGBl. I Nr. 137/2006, (Österreichische Energieagentur 2017), (Bundesministerium für Nachhaltigkeit und Tourismus 2019)

5 Standards

This section aims to discuss regulatory instruments defined as standards identified in Austria's buildings sector in more detail.

5.1 Federal Building Codes

Building codes in Austria are the legislative responsibility of the federal states. Therefore, there exist nine different federal systems to define energy requirements for new buildings as well as building renovations. The federal building codes are quite diverse in their implementation. In 2007 the OIB-guideline was introduced which is a national guideline that aims to standardize federal building codes. It will be discussed in detail in chapter 5.5. The following section provides an overview of regulatory standards applied by federal building codes.

Noailly 2011 describes two different kinds of regulatory standards that can be found in building codes. Thermal insulation standards that define minimum requirements for the level of insulation of various building components and energy performance standards that define maximum values for energy demand of a whole building.

In federal building codes in Austria both kinds of regulatory standards are applied. As building codes were introduced in the federal states of Austria, in the late 70s to early 80s, thermal insulation standards, in the form of minimum requirements to (maximum) U-values were the dominant form of regulatory standards. Noailly 2011, pp. 796–797 provides a precise definition for U-values which will be utilized in this report: *"The 'U-value' is the amount of heat that flows through a squaremeter of building component with a temperature difference of 1 °C (kWh/m2)."*

Figure 4 depicts minimum requirements for thermal insulation standards, defined by federal building codes, for three different building components (external walls, top-floor ceiling and windows). Additionally, the OIB-guideline 6 (national guideline) is added to the figure. Individual regulatory standards depicted in the figure are shown in color theme. Higher U-values (red) indicate less stringent standards than lower U-values (green). The years colored in white indicate no minimum requirements were defined by federal building codes. For the years after 2007 this means that the national OIB-guideline 6 was implemented in the federal building codes and replaced federal requirements.

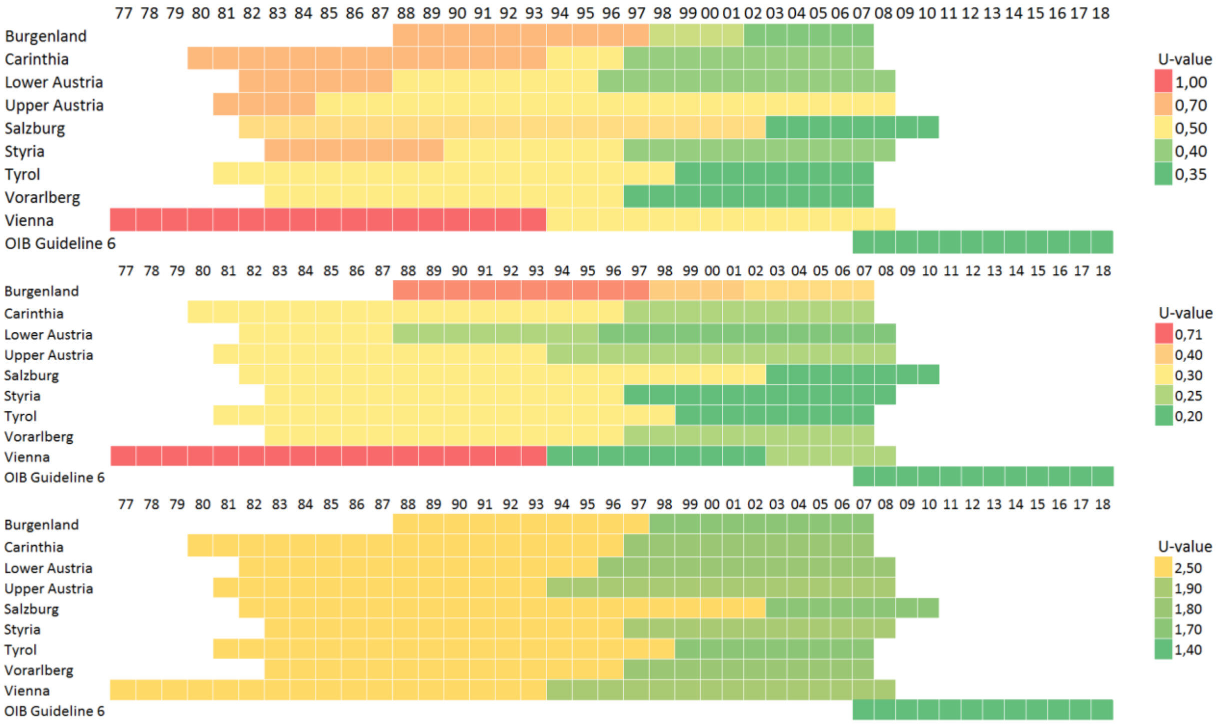

Figure 4: Minimum requirements, stipulated by federal building codes, for (maximum) U-values of various building components - external walls (top), top-floor ceiling (middle) and windows (bottom). Source: own representation, data from: (Österreichisches Institut für Bautechnik 2015a)

Most federal states adopted thermal insulation standards in the early 80s and show similar development in tightening the standards in the following decades. In the 90s and 2000s federal states moved beyond this and developed more complex regulatory standards adopting energy performance standards to regulate the energy demand of buildings as a whole. Note that while after the introduction of the national OIB-guideline 6, federal building codes did not introduce any further thermal insulation standards but instead focused more on energy performance standards which are better suitable to regulate energy consumption and greenhouse gas emissions.

Federal systems for energy performance standards are very diverse and utilize different energy performance indicators. The unified requirements implemented in the national OIB-guideline 6 will be discussed in chapter 5.5.

In the policy framework provided by van der Werf and Vollebergh 2018 thermal insulation standards stipulated by the federal building codes and the national OIB-guideline 6 can be described as standards of technical design and minimum quality and safety standards. Those thermal insulation standards constitute product quality and environmental technology standards.

5.2 Joint Agreement on Energy Savings

The Joint Agreement on Energy Savings was introduced in 1980 by the national council and the federal states in a national law act BGBl. Nr. 351/1980. It is an early joint agreement between the national council and the federal states that defines standards for energy savings. Like federal building codes at that time it defines thermal insulation standards that define minimum requirements. In that sense it acts as a standard of technical design and a minimum quality and safety standard.

5.3 Energy Efficiency Obligation Scheme

The Energy Efficiency Obligation Scheme was introduced in 2014 by the Energy Efficiency Act (BGBl. I Nr. 72/2014). It obligates energy suppliers to perform energy efficiency measures to the extent of 0,6% of their sales in the past year. The savings can either be achieved from the supplier itself or from its customers. The measures must be reported to a monitoring institution yearly. If the company fails to achieve certain energy savings it has to pay a fine of 0,20 € / kWh of missed savings (Österreichische Energieagentur 2017). The Energy Efficiency Obligation Scheme can be defined as a standard of behavioral performance.

5.4 Housing Support Scheme

The Housing Support Scheme as a subsidy will be discussed in chapter 6.1. As a standard it appears since the amendment of the Housing Support Scheme Act in 1984 (chapter 6.1). In 2006 a joint agreement between the national council and the federal states was signed (BGBl. II Nr. 19/2006). In 2009 an additional joint agreement was signed, BGBl. II Nr. 251/2009. Both agreements define quality standards for the Housing Support Scheme, setting minimum requirements for heating demand (HD) that must be met by houses constructed utilizing funds of the Housing Support Scheme. Like the national OIB-guideline 6 these requirements are defined as minimum (national) requirements, while the Housing Support Scheme acts of the federal states can imply much stricter standards. Note that the minimum requirements of the Housing Support Scheme are stricter than the requirements defined by the OIB-guideline 6 since they only affect housing funded by the Housing Support Scheme. As the standards of the federal states for the Housing Support Scheme are very diverse, they won't be discussed in more detail. An example of requirements implied by the federal states (Vorarlberg) can be found in the Appendix. Similarly to the OIB-guidelines the Housing Support Scheme standards can be categorized in various ways. The Housing Support Scheme standards discussed above are best described as standards of minimum quality and safety in the sense of standards of technical design.

5.5 OIB-guideline

The most important collection of standards in the Austrian buildings sector are the OIB-guidelines. Those are published by the Austrian institute of construction technology (OIB) and aim to generalize federal building codes. These national standards were enacted in domestic law in all nine federal states after several years. To avoid impediment of innovation the standards issued in the federal states can deviate slightly from the national standards, if the level of protection resulting from these standards is not falling below the national level (the national standards can be seen as minimum standards). The OIB guidelines set standards for mechanical resistance and structural stability (OIB-guideline 1), fire protection (OIB-guideline 2), sanitation, health and environmental protection (OIB-guideline 3), accessibility and safety in use (OIB-guideline 4), sound insulation (OIB-guideline 5) and energy savings and thermal insulation (OIB-guideline 6). The standards are updated every four years (2007, 2011, 2015, 2019 …). The current version was published in 2015. The draft of an updated version (OIB-guideline 6:2019) is currently developed (Österreichisches Institut für Bautechnik 2018b).

5.5.1 OIB-guideline 6

Among the OIB-guidelines, the OIB-guideline 6 on energy savings and thermal insulation is the main environmental policy standard targeting energy efficiency and CO2 emissions of buildings at the national level. The guideline defines requirements for thermal and energetic quality of buildings. The primary purpose of this guideline is to implement the requirements formulated in European directives on the energy performance of buildings. The first European directive implemented in Austria this way was the directive 93/76/EWG to decrease CO2 emissions through energy efficiency (SAVE) published in 1993. This directive was followed by the Austrian national guideline of 1999, which formulated and standardized calculation methods for heating demand (HD[1]). These methods were then employed in the federal states guidelines for the Housing Support Schemes. Energy performance certificates for buildings that were issued using these calculation methods ultimately implemented the requirements of the SAVE directive. The publication of the European directive on the energy performance of buildings, EPBD[2] 2002/91/EC, required an update of the national guideline which resulted in the OIB-guideline 6:2007. In the national guideline, the calculation methods for heating demand (HD) were revised and a new category of buildings covered by the guideline was introduced – non-residential buildings. This new categorization required the implementation of new energy indicators for lighting and cooling (Österreichisches Institut für Bautechnik 2014).

In 2010 a new European directive on the energy performance of buildings, EPBD 2010/31/EU, was published and required a revision of the national guideline. Therefore, the OIB-guideline 6:2011 was published which revised some of the calculation methods in use and added energy indicators for domestic electricity use (further differentiating residential and non-residential buildings). In addition, the overall energy efficiency factor (f_{OEE}[3]), an additional energy indicator was introduced. This indicator allows to account for renewable energy that is produced at the dwelling and decreases the amount of energy that needs to be delivered to the site. It is calculated as the ratio of the amount of energy that needs to be delivered and the default total energy demand with default household equipment (the smaller the ratio gets, the less energy needs to be supplied) (Österreichisches Institut für Bautechnik 2014).

In May 2018 the current European directive on the energy performance of buildings was published, (EU) 2018/844. This directive aims to amend the EPBD 2010/31/EU. The main changes that it brings is

[1] In the national guidelines the expression that is used for heating demand is 'Heizwärmebedarf (HWB)'
[2] Energy Performance of Buildings Directive
[3] In the national guidelines the expression that is used for overall energy efficiency factor is 'Gesamtenergieeffizienz-Faktor (f_{GEE})'

that it requires a long-term renovation strategy (until 2050) for the national stock of residential and non-residential (private and public) buildings from all member states (The European Parliament and the Council of the European Union 2018). This directive was not implemented in a national guideline yet. The new national guideline is expected to be published in 2019.

5.5.2 OIB-guideline 6, National Plan

The 'OIB-guideline 6, National Plan' is a supporting document for the OIB-guideline 6 that implements additional requirements defined in the EPBD 2010/31/EU. It was first published in 2013/2014 and revised in 2018. The main content is the determination of interim goals for a national strategy to increase energy efficiency in buildings as well as the implementation of a standard for minimum-energy buildings[4]. In the current document of 2018 different minimum requirements for overall energy efficiency are defined for residential and non-residential buildings, further distinguishing requirements for new construction and comprehensive renovation of existing buildings. The requirements target either heating demand (HD) or the overall energy efficiency factor (f_{OEE}) demanding the gradual decrease of at least one of these two energy indicators (thus, increasing energy efficiency). Targets (interim goals) are set for the current period, the period after the OIB-guideline 6:2019 is published and a third period, starting on the 1st of January 2021. The requirements defined for new construction in the third period are equal to the requirements defined for minimum-energy buildings (Österreichisches Institut für Bautechnik 2018a). New buildings used by public authorities need to fulfill the requirements for minimum-energy buildings by the 31st of December 2018 (Österreichisches Institut für Bautechnik 2014).

5.5.3 OIB-guideline 6:2015

The current version of the OIB-guideline 6 was published in 2015. As the European directive was not updated before, the foundation of the national guideline is still the EPBD 2010/31/EU. It sets the same requirements as the OIB-guideline 6, National Plan for the current period regarding HD and f_{OEE} for residential and non-residential buildings (new construction and comprehensive renovation of existing buildings). Additional to that, requirements are defined for the share of renewable energy used in new buildings or after a comprehensive renovation of existing buildings has been carried out. For new individual components of buildings (walls, windows, doors, ceilings and floors), minimum requirements for (maximum) U-values are defined (Österreichisches Institut für Bautechnik 2015b). Energy performance certificates[5] are issued according to the OIB-guideline 6:2015 where an example (for residential and non-residential buildings), how energy performance certificates should be designed is included. These examples cite the minimum requirements for HD and f_{OEE} stated above. The requirements are set according to a reference climate from the location of the building. (Österreichisches Institut für Bautechnik 2015b) Energy performance certificates will be further discussed in the according section.

[4] Niedrigstenergiegebäude (nstEH)

[5] Energieausweise

5.5.4 Energy performance standards in the OIB-guideline 6

Unified requirements of the federal building codes are expressed in the OIB-guideline 6 in the form of energy performance standards. Heating Demand (HD) is one of the energy performance indicators used in the guideline. Figure 5 provides an overview of the evolution of requirements of HD for new buildings and buildings which are subject to comprehensive renovation. Note that the national OIB-guideline defines minimum requirements and federal building codes can apply much stricter requirements. Heating demand is expressed in kWh per square meter and year dependent on a reference climate. Heating demand has been calculated for a reference building (single family house) with a standardized surface-to-volume-ratio provided by Töglhofer et al. 2009.

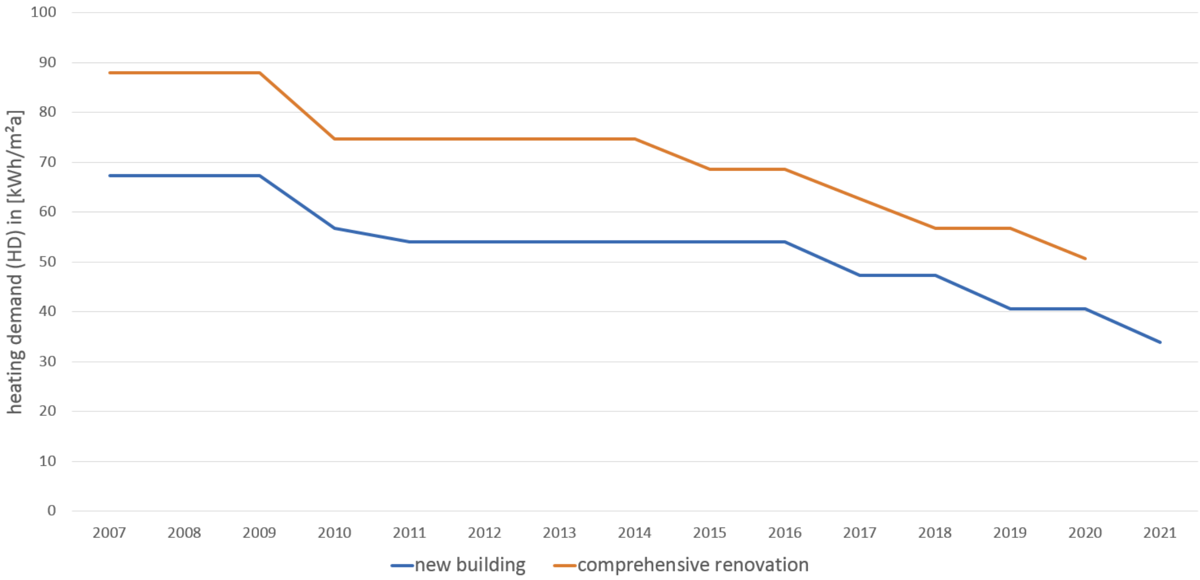

Figure 5: Evolution of requirements of HD, stipulated in the national OIB-guideline, for new buildings and comprehensive renovation of existing buildings, 2007 - 2021. Source: own representation, data from: ((Österreichisches Institut für Bautechnik 2007, 2011, 2015b, 2018a)

The requirements of HD for new buildings in 2021 are equal to the requirements defined by the standard for minimum-energy buildings (Österreichisches Institut für Bautechnik 2018a).

A categorization of the OIB guidelines in the policy framework provided by van der Werf and Vollebergh 2018 is a difficult task. Primarly, the OIB-guideline acts as a standard of minimum quality and safety in the sense of a standard of technical design. At the same time, it defines new standards for measurement and reference as it introduces new energy indicators. It also plays a role as a standard of behavioral performance (certification process of energy performance certificates) and as a standard for interface compatibility.

5.6 Climate Protection Act

The Climate Protection Act was passed in 2011 and is a national law that sets limits for greenhouse gas emissions for all Austrian sectors outside the EU ETS, including the buildings sector. This is act embeds the targets defined by the EU Effort Sharing Decision (ESD) into national law (Anderl et al. 2018). The first commitment period started in 2008 and ended in 2012. The second period started in 2013 and ends in 2020. Besides greenhouse gas quotas for Austrian sectors the law act is designed to enable coordinated implementation of effective measures for climate protection. The main goal is to decrease greenhouse gas emissions or enhance carbon sinks (BGBl. I Nr. 106/2011).

The Climate Protection Act is a standard of behavioral performance and constitutes emission limits for sectors.

6 Subsidies

This section includes a more detailed discussion of the most important subsidies in Austria's buildings sector.

6.1 Housing Support Scheme

The Housing Support Scheme in Austria in the current form was introduced in 1954 in the Housing Support Scheme Law Act. It is a policy instrument primarily designed to fund construction of housing, utilizing national funds as well as funds of the federal states. The allocation of national funds to the federal states is done according to the population share of each federal state. Subsidies can either be granted to municipalities, charitable construction associations, individuals or companies. Companies are only granted a subsidy if the building constructed becomes legal property of an individual afterwards. Subsidies are granted in the form of loans, granting of guarantees, annuity subsidies or grants on construction costs (BGBl. Nr. 153/1954).

In 1984, the Housing Support Scheme Law Act was amended, defining requirements on energy savings – and thus, reduction of greenhouse gas emissions - measures for the first time. As mentioned in chapter 5.2 the Joint Agreement on Energy Savings was introduced in 1980. The amendment of the Housing Support Scheme Law Act 1984 required improved thermal insulation standards compared to those stated in the Joint Agreement on Energy Savings. Thus, 1984 is treated as the starting point for the Housing Support Scheme acting as an environmental policy instrument in Austria's buildings sector. Additionally, funding of renovation measures was introduced in the amendment. Renovation measures mentioned in the law act and relevant for reduction of greenhouse gas emissions involve: establishing district heat connection, increasing thermal insulation and measures to decrease energy loss (BGBl. Nr. 482/1984).

Until 1988 legislation of the Housing Support Scheme was duty of the federal government while the federal states were responsible for execution of the law. In 1988 a new law was signed transferring the duty of legislation to the federal states. This replicates the tendency of delegating responsibilities within the Housing Support Scheme to the federal states (Kerschner et al. 2016). This transfer of legislation responsibilities required individual Housing Support Scheme Law Acts for every federal state. Thus, in the following years the federal states issued individual Law Acts as well as guidelines defining requirements for granting a subsidy. Those requirements are very versatile and involve ecological as well as social and economic aspects. Ecological requirements include minimum energy performance requirements for new buildings as well as renovation measures. In that sense the Housing Support Scheme acts as a standard in addition to its primary role as a subsidy. The Housing Support Scheme defined as a standard was discussed in chapter 5.4.

In general, the Housing Support Scheme in Austria focuses on direct supply-side subsidies (funding properties) to establish sufficient and affordable housing supply. In the early 2000's approximately 75% of housing permitted for construction was co-funded by the Housing Support Scheme (Streimelweger 2010). This fact stresses the importance of the Housing Support Scheme in the whole sector and its significance as an environmental policy instrument, making it one of the key instruments for regulation potential.

Figure 6 compares total expenditure of the Housing Support Scheme and resulting CO_2 emissions reduction in the past decade. Expenditures have been adjusted to $€_{2018}$ values (left axis) and emissions reduction is given in thousand tons CO_2 (right axis).

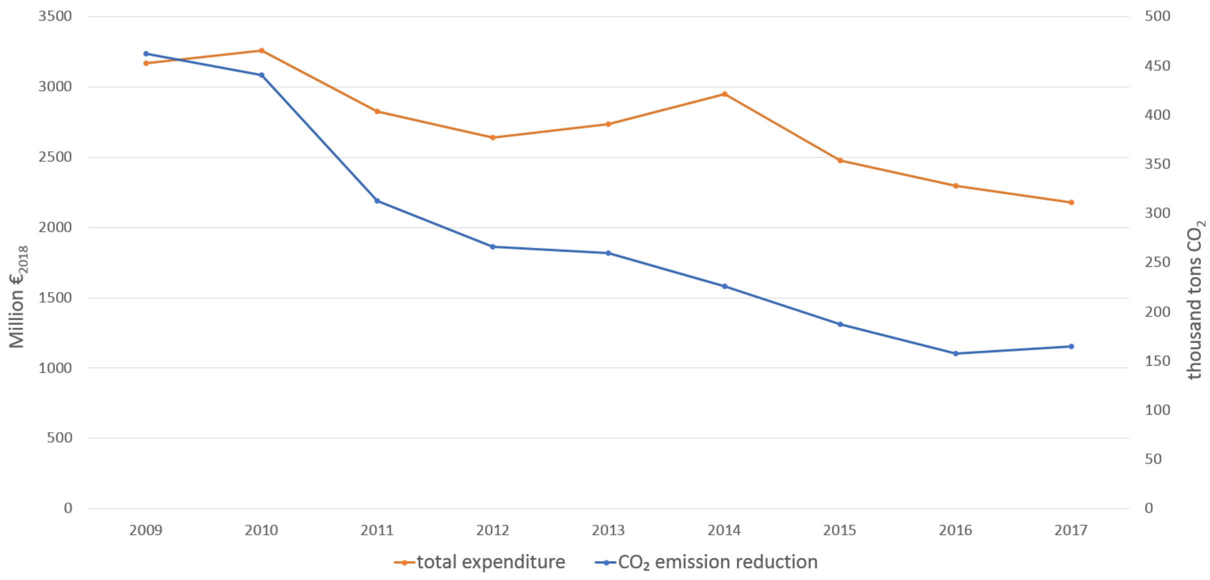

Figure 6: total expenditure and CO2 emissions reduction resulting from the Housing Support Scheme. Source: own representation, data from: (Schieder and Lamport 2019; BMF 2019)

Emissions reduction data base on approved subsidy applications and are comprised of various individual measures. An overview of individual measures and resulting emissions reduction effects within the Housing Support Scheme is presented in table 3. Emissions reduction data are given in thousand tons CO_2.

Housing Support Scheme measures	2009	2010	2011	2012	2013	2014	2015	2016	2017	Sum
New buildings	25	13	13	12	12	10	8,1	8,2	5,9	**108**
Energy systems in new buildings	7,1	9,2	5,5	5,5	4,4	4,9	3,5	4,7	8,8	**54**
Comprehensive energy refurbishment	162	168	110	88	80	74	60	55	47	**845**
Refurbishment of individual components	61	58	57	38	32	31	28	25	23	**35**
Energy systems and comprehensive energy refurbishment	17	19	11	9,5	8,0	6,0	5,8	4,3	7,7	**88**
Energy systems without comprehensive energy refurbishment	165	150	102	101	114	85	70	52	61	**900**
Thermal solar systems	26	23	15	11	8,3	6,2	4,9	3,8	3,2	**102**
Photovoltaics (data from 2014 onwards)	:	:	:	:	:	9,4	6,1	6,0	7,3	**29**
All measures	**462**	**441**	**313**	**266**	**260**	**226**	**187**	**158**	**165**	**2.478**

Table 3: Individual measures and resulting emissions reduction effects (thousand tons CO2) within the Housing Support Scheme, 2009 - 2017. Source: own representation, data from: (Schieder and Lamport 2019)

Emissions reduction effects resulting from measures funded by the Housing Support Scheme in the past decade have declined. Reasons for that are diverse, including the fact that standards for measures not funded by the Housing Support Scheme have become more stringent (reference value for thermal quality of buildings). Simultaneously, subsidized gross floor space has declined. The individual measure "Energy systems without comprehensive energy refurbishment" contributed the largest share of total emissions reduction effects. As buildings without comprehensive energy refurbishment have a higher energy demand, improvements of energy systems result in higher emissions reduction effects (Schieder and Lamport 2019).

The data further emphasizes the importance of refurbishment measures in general, as measures of new buildings play a secondary role in total emissions reduction effects.

The Housing Support Scheme acts as a diffusion subsidy.

6.2 DES (Domestic Environmental Support)

The DES is part of the Austrian Environmental State Aid which was introduced in 1993 by the Federal Ministry for Sustainability and Tourism (MST). The Ministry was renamed several times during the observation period – Ministry for Sustainability and Tourism (MST) was the current name when this report was issued. While the Environmental State Aid covers a much broader range of (environmental) topics, including water resources management, environmental remediation and international climate funds, the DES covers all subsidies that can be attributed to the Austrian buildings sector – in addition to other subsidies targeting different sectors e.g. transportation. Thus, only the DES will be incorporated in this report.

The general aim of the Environmental State Aid is defined in the Environmental State Aid Act, BGBl. Nr. 185/1993. It seeks to provide investment aid for projects and measures that are designed to protect the environment in various ways. The DES is particularly designed to increase efficiency in resource and energy use and decrease (air) pollution, especially decreasing emissions of green-house gases like CO2 and thus contributing to achieving national emissions reduction targets (BGBl. Nr. 185/1993).

The allocation of the subsidy budget is done via an application process managed by the KPC, a public consulting company that acts as the administrator for all subsidies within the Environmental State Aid. Companies, municipalities and private households can apply for investment aid to realize measures which are attributable to subsidies offered by the Environmental State Aid. On behalf of the MST every three years an evaluation report is issued, covering subsidy data and analyzing ecological and economic effects of the respective subsidies. These data have been used to identify subsidy volumes inside the DES that promote greenhouse gas emissions reduction in Austria's buildings sector. Figure 7 presents all the attributable subsidy volumes in three-year evaluation periods since the introduction of the DES in 1993.

Note, that while some projects receive additional investment aid from EU funds and budgets from the federal provinces of Austria, the subsidy volumes in the figure display national funds only. The reason for the exclusion of non-national funds is the fact that national funds provide a large proportion of total funds and non-national funds are less relevant for national policy analysis. To give an example of the ratios: in the last evaluation period displayed in the figure (2014-2016), EU funds provided 7.4% and the aid of the federal provinces amounted to 6.8% of the total budget (Gigler et al. 2017a).

For a better comparison of the different evaluation periods, subsidy volumes in figure 7 have been adjusted for inflation using the index calculator provided by "Statistik Austria"[6]. Subsidy volumes of all periods have been adjusted to EUR_{2018} values (consumer price index – comparison of annual averages).

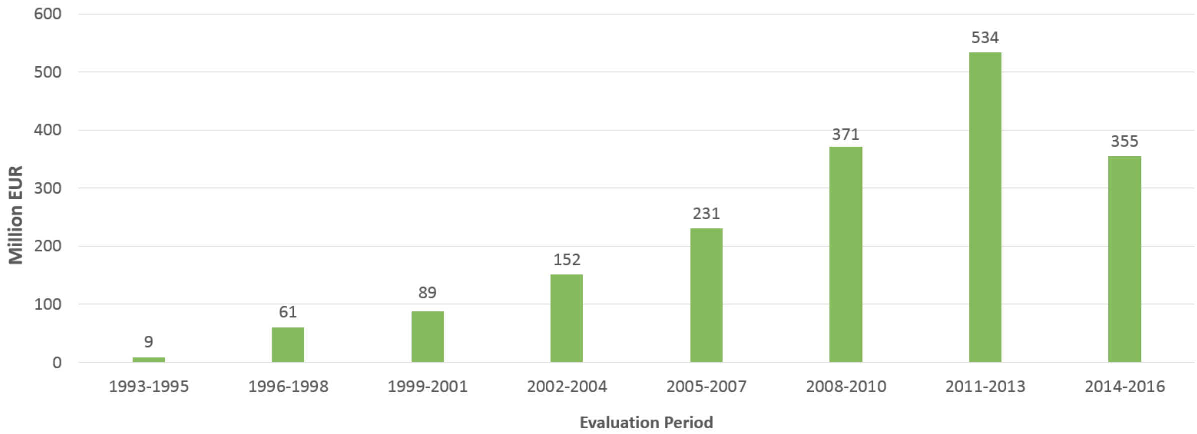

Figure 7: Total volumes of all subsidies attributed to the buildings sector per evaluation period (values in Million Euros – adjusted to EUR2018 values). Source: own representation, data from: (Husz et al. 1996; Knoflacher et al. 2000; Karner et al. 2002; Karner et al. 2005; Karner et al. 2008; Windsperger et al. 2011; Karner et al. 2014; Gigler et al. 2017b)

Adjusted subsidy volumes of the DES attributed to the buildings sector increase over time with a peak in the 2011-2013 period, followed by a sharp decline in the last period observed. Both, peak and decline partly reflect the associated expansion and reduction of the subsidy budget of the *"Renovation Campaign"* program (introduced in 2009) which is part of the DES and will be further discussed in chapter 6.3. Low subsidy volumes in the first evaluation period can be explained by a small number of subsidies being available and a low recognition rate for the program in general.

Figure 8 shows the adjusted subsidy volumes per subsidy type - for all evaluation periods combined. Only subsidies exceeding a total subsidy volume of 5 Million Euros (sum over all evaluation periods) are included in the figure. Note that the volume of the "*Biomass Heating*" subsidy program is comprised of different subsidy volumes, funding various biomass projects like individual facilities, grids, CHP plants and local/district heating.

[6] https://www.statistik.at/Indexrechner/Controller

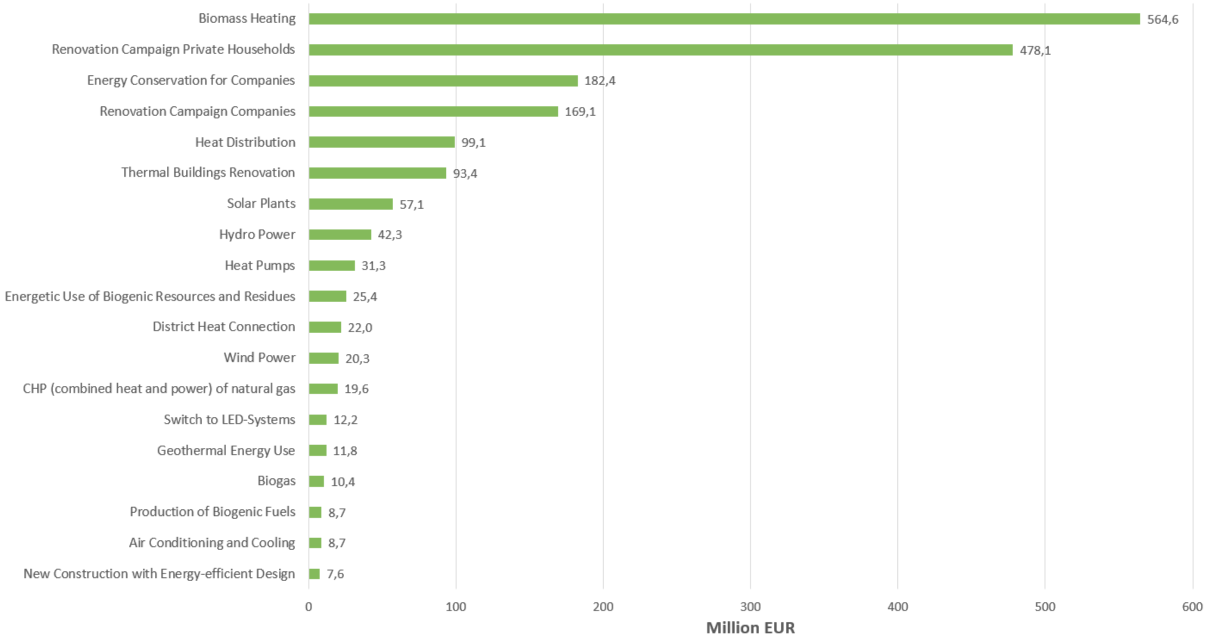

Figure 8: Total volumes (> 5 Million EUR) of different subsidy types attributed to the buildings sector (values in Million EUR – adjusted to EUR2018 values). Source: own representation, data from: (Husz et al. 1996; Knoflacher et al. 2000; Karner et al. 2002; Karner et al. 2005; Karner et al. 2008; Windsperger et al. 2011; Karner et al. 2014; Gigler et al. 2017b; Kommunalkredit Public Consulting GmbH 2018)

"Biomass Heating" and *"Renovation Campaign Private Households"* dominate in total subsidy volumes. The subsidy volume of *"Energy Conservation for Companies"* should be treated with caution as it might contain funding for measures outside the buildings sector.

Figure 9 provides an overview of the years in which subsidy money was used to fund projects. The subsidies are sorted (descending) by subsidy volumes for all evaluation periods combined – as depicted in figure 9. Some subsidy programs did not fund any projects in certain observation periods, e.g. *"Geothermal Energy Use"* in the period 2014-2016. While the subsidy was still available, no projects were handed in for application in that particular period (Gigler et al. 2017b).

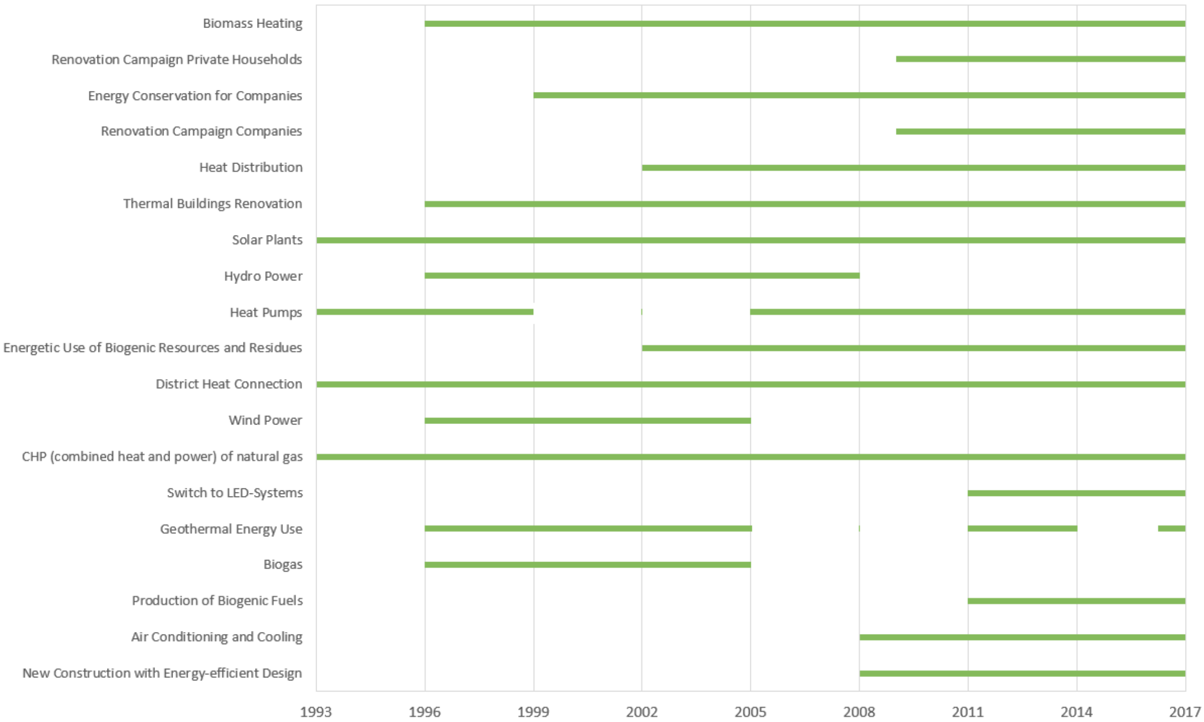

Figure 9: Overview of years in which DES subsidy money was provided for funding projects. Source: own representation, data from: (Husz et al. 1996; Knoflacher et al. 2000; Karner et al. 2002; Karner et al. 2005; Karner et al. 2008; Windsperger et al. 2011; Karner et al. 2014; Gigler et al. 2017b; Kommunalkredit Public Consulting GmbH 2018)

After the first period (1993-1996) the number of available subsidies increased steadily. Starting in the 1996-1998 period, subsidies funding production of electricity emerged as a substantial part of the DES program. Those are reflected by subsidies like (small scale) "*Hydro Power*" and "*Wind Power*". In the later stages of the program, production of electricity became less relevant, shifting the focus further towards energy efficiency and heat production measures. An additional subsidy outside the Environmental State Aid, focusing on production of electricity, was introduced in 2002, the Green Electricity Subsidy (see chapter 6.4). Throughout the whole period (excluding 1993-1996) funding of *"Biomass Heating"* measures was a significant part of the DES.

The DES is a diffusion subsidy.

6.3 Renovation Campaign

The Renovation Campaign was introduced in 2009 under the second economic stimulus package[7] and was designed to promote thermal buildings renovation for private households and companies (focusing on SME's – small and medium-sized enterprises). In the first period 100 Million Euros were provided. The application process was managed by the KPC as part of the Environmental State Aid (Windsperger et al. 2011). Due to high demand for the subsidy in 2009 the subsidy volume was increased to 100 Million Euros per year in 2011. In 2014 the volume was reduced again (Gigler et al. 2017b). Criteria for application and the actual amount provided to the applicant were amended several times during the observation period and depend on construction standards and subsidy volumes (Kommunalkredit Public Consulting GmbH 2018).

6.4 Green Electricity Subsidy

The Green Electricity Subsidy was implemented in 2002 and aims to increase the share of electricity, produced by renewable sources (green electricity), in total electricity generation in Austria. Legislation is covered in the Green Electricity Act (BGBl. I Nr. 149/2002) which was amended several times (2006, 2012, 2018). Specific targets are defined in the law act and involve increasing the share of green electricity to achieve the targets set by the European directive 2001/77/EG (directive on promotion of electricity produced from renewable energy sources in the internal electricity market). In addition, the Green Electricity Act aims to promote new technologies in the field of green electricity and to subsidize existing CHP plants (BGBl. I Nr. 149/2002).

The subsidy is designed as feed-in tariffs accompanied by a purchase obligation to ensure acceptance and compensation of the green electricity produced. Exemptions from the subsidy include electricity produced using waste lye, carcass meal and sewage sludge. Larger hydro power plants (>10 MW) are also excluded from the subsidy. Compensation is paid per kWh produced and differs across types of renewable energy sources. The exact amounts of compensation paid are defined in an additional green electricity directive which is updated regularly and adapted to the current market situation. The Green Electricity Act declares that compensation amounts (feed-in tariffs) should be determined according to average costs of production of cost-efficient plants. Additionally, the feed-in tariffs should provide incentive to increase generation of green electricity continuously. Feed-in tariffs should be designed to provide security of investment, ensuring fixed tariffs up to ten years after putting the plant into service (BGBl. I Nr. 149/2002).

Another part of the subsidy involves promotion of electricity produced in CHP plants. This type of electricity is accepted to be subsidized if the plant supplies public district heating and ensures savings of primary energy input and greenhouse gas emission reductions (compared to separated production of electricity and heat) (BGBl. I Nr. 149/2002). The 2006 amendment of the Green Electricity Act introduced additional investment subsidies for green electricity plants.

To analyze the effects of the Green Electricity subsidy on domestic electricity production, the following section outlines important data for the electricity sector. Figure 10 provides an overview on the evolution of gross electricity production in Austria since 1990. The figure includes production of electricity from energy providers, electricity produced by companies for their own supply and electricity produced by CHP plants for the main energy sources applied.

[7] Konjunkturpaket II

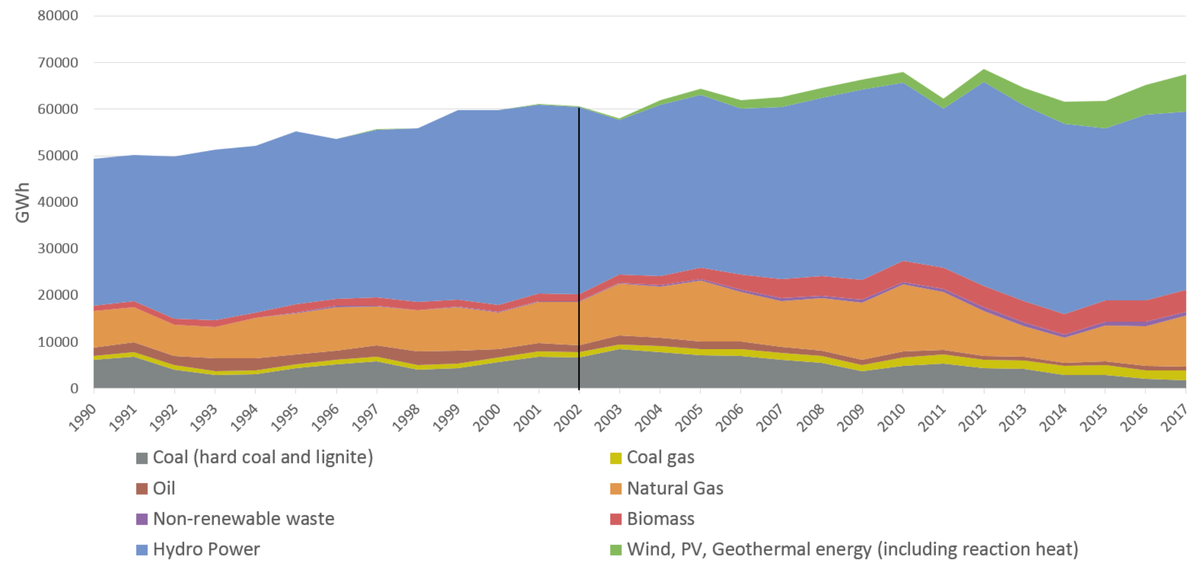

Figure 10: gross domestic electricity production in Austria, 1990 – 2017. Source: own representation, data from: (Statistik Austria 2019a)

As depicted in figure 10 a large portion of gross domestic electricity production in Austria is provided by hydro power. The share of fossil fuels in the electricity mix has declined as total production increased during the period observed. Increased production mostly origins from renewable sources (hydro power and other renewables). 2002 marks the year of introduction of the Green Electricity Subsidy. In the following years, production from renewable sources (wind, PV, geothermal, biomass) steadily increased. Small scale power plants which are also affected by the subsidy are part of the hydro power production and not indicated separately.

Figure 11 summarizes total net compensation paid in the course of the subsidy program (adjusted to $€_{2018}$ values, using the index calculator of "Statistik Austria") and the electricity feeding volume initiated by the subsidy. The feeding volume is indicated in the left axis and net compensation in the right axis.

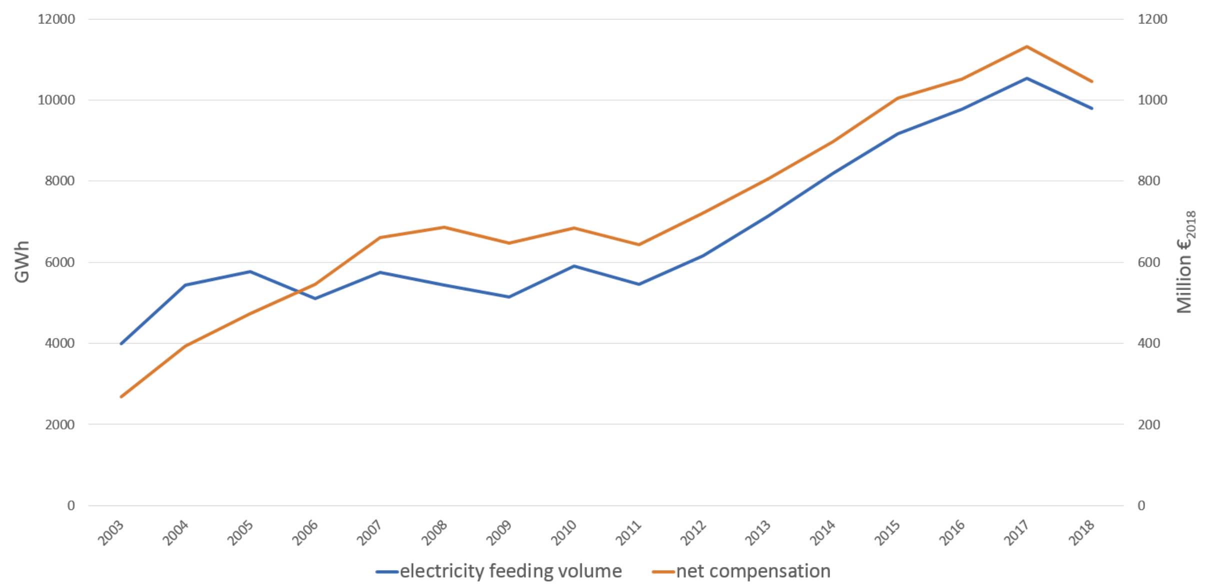

Figure 11: total electricity feeding volume and net compensation. Source: own representation, data from: (E-Control 2019) (OeMAG 2019)

Electricity feeding volume (in GWh) and net compensation (in Million $€_{2018}$) show similar development since the introduction of the subsidy in 2002. Both gradually increase, peaking in 2017. This acts as a diffusion subsidy.

6.5 Austrian Climate and Energy Fund

The Austrian Climate and Energy Fund is an extensive subsidy program founded in 2007, introduced by the Climate and Energy Fund Act 2007 (BGBl. I Nr. 40/2007). Since its foundation the Austrian Climate and Energy Fund was able to subsidize approximately 120.000 projects with a budget of more than 1 Billion €. The program pursues several program lines and offers a diverse set of subsidies including topics of several sectors. Some of the projects are designed to reduce greenhouse gas emissions within the Austrian buildings sector. While a few of the applicable subsidy programs are managed by the KPC and included in the DES, other subsidy programs will be additionally mentioned in this section.

Main parts of the Austrian Climate and Energy Fund are "Research", "Transport" and "Market Penetration". The program line "Research" involves several subsidy programs funding innovative projects on different subjects. Relevant programs for the buildings sector include "Energy Research", "Energy Transition 2050" and the "Smart Cities Initiative".

The program line "Market Penetration" aims to support innovative technologies in their market launch. Important projects for the buildings sector within "Market Penetration" involve "Climate and Energy Model regions" (KEM), "Building as Power Station" and "Promotion of Renewable Energy" (Klima- und Energiefonds 2018). These subsidy programs fund several projects aiming to increase energy efficiency in the buildings sector and thus decreasing greenhouse gas emissions.

The Austrian Climate and Energy Fund acts as a R&D subsidy and as a diffusion subsidy.

6.6 District Heating and Cooling Act

The District Heating and Cooling Act was introduced in 2008 and provides a subsidy fund of 60 Million Euros per year for construction of grids for transport of district heating and cooling. The funds are emitted as investment grants for projects that achieve cost-effective emissions reductions and increase energy efficiency and enable utilization of waste heat potentials from industries. Special focus lies on expansion of district heat in conurbations (BGBl. I Nr. 113/2008).

7 Taxes

In this section relevant taxes that affect greenhouse gas emissions in Austria's buildings sector will be analyzed. Environmental taxation is an important policy instrument aiming to reduce environmental impacts of industries and consumers. OECD and Eurostat provide a categorization of environmental taxes into four different groups: energy taxes, transport taxes, resource taxes and (environmental) pollution taxes. In 2017 the revenue of environmental taxes in Austria amounted to 9.5 Billion Euros, 58% of it stemming from energy taxes, 34% from transport taxes, 7% from resource taxes and up to 1% from pollution taxes. (Statistik Austria 2019b).

7.1 Energy Taxes

In addition to generating the highest share of total tax revenue among environmental taxes, energy taxes is the most relevant tax group aiming to reduce greenhouse gas emissions in Austria's buildings sector. Österreichische Energieagentur 2017 provide an overview of energy taxes applied in Austria as key measures to increase energy efficiency in various sectors, including the buildings sector. Applicable tax rates are imposed by energy source and per measuring unit. National tax law acts and the various tax rates are summarized in table 4. The years indicate when the tax (or change in tax rate) was introduced, the time period prior to 1981[8] is not included. The Mineral Oil Tax Act has been in place for several decades. To facilitate comparison, changes in currency and measuring units have been converted accordingly. The conversion rate for kilograms to liters is provided by Umweltbundesamt 2019.

Tax Law Act	Energy Source	Unit	1981	1984	1992	1995	1996	2000	2003	Source
Electricity Tax Act	Electricity	€/kWh	-	-	-	-	0.007	0.015		BGBl. Nr. 201/1996, BGBl. I Nr. 26/2000
Natural Gas Tax Act	Natural Gas	€/m³	-	-	-	-	0.044		0.066	BGBl. Nr. 201/1996, BGBl. I Nr. 71/2003
Solid Fuels Tax Act	Hard Coal	€/kg	-	-	-	-	-	-	0.05	BGBl. I Nr. 71/2003
Mineral Oil Tax Act	Marked Fuel Oil	€/l	0.035		0.047	0.069			0.098	BGBl. Nr. 597/1981, BGBl. Nr. 695/1991, BGBl. Nr. 297/1995, BGBl. I Nr. 71/2003
Mineral Oil Tax Act	Liquefied Petroleum Gas	€/kg	0.218	0.189		0.043				BGBl. Nr. 597/1981, BGBl. Nr. 587/1983, BGBl. Nr. 297/1995

Table 4: Tax rates on various energy sources per measuring unit in Austria, 1981 – 2018, own representation based on Österreichische Energieagentur 2017

8 In 1981 a major reform of the Mineral Oil Tax Act took place

7.1.1 Electricity Tax Act

The Electricity Tax Act is part of the 1996 Structural Adjustment Act. The tax is imposed on the delivery of electricity to all customers except to suppliers of electricity. The tax is further imposed on consumption of self-generated electricity. Exemption from the tax is granted if electricity is solely produced for own consumption and less than 5,000 kWh per year are produced and consumed. Exemption from the tax is further granted for electricity used to produce and transmit electricity. (BGBl. Nr. 201/1996).

7.1.2 Natural Gas Tax Act

Like the Electricity Tax Act the Natural Gas Tax Act is part of the 1996 Structural Adjustment Act. The tax is imposed on the delivery of natural gas to all customers except to suppliers of natural gas. The tax is further imposed on consumption of self-generated natural gas. Exemption from the tax is granted if natural gas is used for delivery, production and storage of natural gas, for natural gas used for processing and transport of mineral oil and for natural gas used to generate electricity (BGBl. Nr. 201/1996).

7.1.3 Solid Fuels Tax Act

The Solid Fuels Tax Act is part of the 2003 Ancillary Budget Act. The tax is imposed on the delivery of various types of coal (including coke), excluding the delivery to coal traders. The tax is further imposed on consumption of coal by coal producers or coal traders. Exemption from the tax is granted if the coal is used to generate electricity (BGBl. I Nr. 71/2003).

7.1.4 Mineral Oil Tax Act

The Mineral Oil Tax Act regulates taxation of various types of mineral oil, including fuel oil for heating purposes. The tax is imposed as an excise duty on mineral oil that is produced, delivered or consumed (BGBl. Nr. 630/1994). The Mineral Oil Tax Act is a very comprehensive and complex legislation act including various exemptions and regulations which exceed the scope of this report. Therefore, only mineral oil types which are largely used in the buildings sector are covered in this report. Those include marked fuel oil and liquefied petroleum gas. The tax rates on these mineral oil types generally used for heating purposes are significantly lower than those on transport fuels. Therefore, gasoil used for heating purposes needs to be marked using a color-additive to facilitate distinction from transport fuels. While the tax reduction for marked fuel oil was active during the whole observation period, the tax reduction for liquefied petroleum gas was introduced in 1995. This explains higher tax rates on liquefied petroleum gas in the years prior to 1995.

Figure 12 depicts the evolution of tax rates on the different energy sources stated in table 4. For better comparison, tax rates are calculated for direct greenhouse gas emissions (kg CO_2 equivalent) of the respective energy source. Note that the greenhouse gas emission factor for electricity reflects domestic production as well as imports and decreased over time as the share of renewables in domestic production increased. The current emission factor is used in the calculation. To account for the fact that the inherent energy content of the different energy sources varies, tax rates per kWh have been calculated in an intermediate step. Conversion and emission factors can be found in the Appendix.

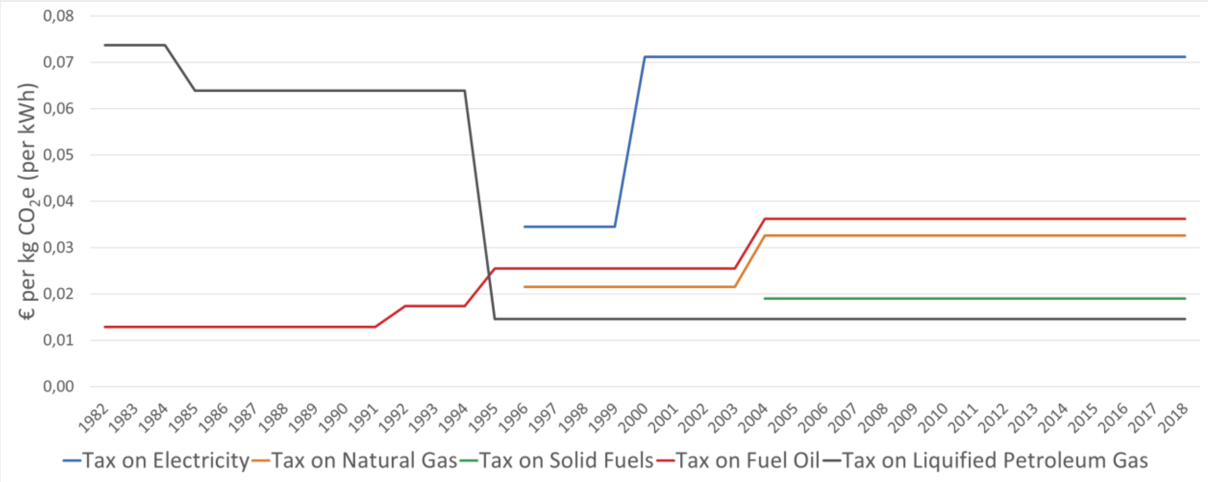

Figure 12: Evolution of tax rates on direct greenhouse gas emissions of the different energy sources applied in the Austrian buildings sector. Source: own representation, data from: Umweltbundesamt 2019, Tax Law Acts in table 4

In the current energy tax system in Austria greenhouse gas emissions from electricity incur the highest tax rates among energy taxes. As mentioned in chapter 2, greenhouse gas emissions from generation of electricity are allocated to the energy sector rather than the buildings sector. Regardless, those emissions persist and should be taken into consideration as they are not abated but rather shifted to another sector. The initially higher tax rates on liquefied petroleum gas indicate the lack of tax exemptions (for mineral oil used for heating purposes) for this type of mineral oil until 1995.

According to chapter 2.1, biomass, natural gas and mineral oil constitute the most important fuel types among final energy use for the buildings sector in 2016, while solid fuels (coal) play only a minor role. Electricity provides the highest share in final energy use across all energy sources. This emphasizes the relevance of the related tax rates for shares of total emissions. The data suggest that the introduction or increase (decrease) of energy taxes did not have the expected effect on the share of the related energy source in final energy use in the buildings sector. For electricity, the share in final energy use increased from 1990 to 2016 while the tax rate was introduced (1996) and doubled (2000) in this period. The same is true for natural gas. A major reduction of the use of solid fuels took place prior to the introduction of the tax in 2004, indicating different reasons for the reduction. Usage of mineral oil draws a similar picture. While from 1990 to 2005, the tax on fuel oil (primary used) increased and the tax on liquefied petroleum gas decreased, the share in final energy use remained almost stable. From 2005 to 2016, when the share of mineral oil in final energy use diminished, the tax rates remained unchanged.

Note that energy taxes applied in Austria are not considered carbon taxes, the representation in figure 12 is for comparison purposes only. A limitation of the representation is the fact that while emission factors for fossil fuels (natural gas, solid fuels, mineral oil) remain rather constant the emission factor for electricity varies with time.

7.2 Property Tax

Another tax affecting the Austrian buildings sector is the property tax. While it does not have a direct effect on greenhouse gas emissions caused by the sector it indirectly affects the settlement structure influencing transport emissions. At the same time the property tax is a negative incentive for vacancy.

8 Appendix

Wohnbauförderung Vorarlberg				
	Neubau			Gesamtsanierung
	Heizwärmebedarf bei A/V 0,8			Heizwärmebedarf
Jahr	Eigenheim	Reihenhaus	Mehrwohnungshaus	alle Objektarten
1989	1989 und früher keine Grenzwerte und keine Zusatzförderung			kein Grenzwert
1990	für Regelförderung kein Grenzwert; Zusatzförderung ab < 60			kein Grenzwert
1991	für Regelförderung kein Grenzwert; Zusatzförderung ab < 60			kein Grenzwert
1992	für Regelförderung kein Grenzwert; Zusatzförderung ab < 57			kein Grenzwert
1993	für Regelförderung kein Grenzwert; Zusatzförderung ab < 60			kein Grenzwert
1994	für Regelförderung kein Grenzwert; Zusatzförderung ab < 70			kein Grenzwert
1995	für Regelförderung kein Grenzwert; Zusatzförderung ab < 70			kein Grenzwert
1996	für Regelförderung kein Grenzwert; Zusatzförderung ab < 70			kein Grenzwert
1997	für Regelförderung kein Grenzwert; Zusatzförderung ab < 55			kein Grenzwert
1998	für Regelförderung kein Grenzwert; Zusatzförderung ab < 55			kein Grenzwert
1999	für Regelförderung kein Grenzwert; Zusatzförderung ab < 55			kein Grenzwert
2000	für Regelförderung kein Grenzwert; Zusatzförderung ab < 55			kein Grenzwert
2001	für Regelförderung kein Grenzwert; Zusatzförderung ab < 55			kein Grenzwert
2002	<60	<60	<55	kein Grenzwert
2003	<60	<60	<55	kein Grenzwert
2004	<65	<60	<55	kein Grenzwert
2005	<65	<60	<55	kein Grenzwert
2006	A/V kleiner 0,8: 60			kein Grenzwert
2007	55 (nicht erneuerbare)			
	57 mit Wärmepumpe			
	59 mit Biomasse			kein Grenzwert
2008	47 (nicht erneuerbare)			
	50,5 mit Wärmepumpe			
	54,0 mit Biomasse			70
2009	45			70
2010	45			70
2011	45			65
2012	36			60
2013	36			60
	HWB	**PEB**	**CO2**	
2014 privat	44,2	150	24	
2014 öffentlic	25	110	19	60
2015 privat	44,2	150	24	
2015 öffentlic	25	110	19	60
2016 privat	44,2	150	24	
2016 öffentlic	25	110	19	60
2017 privat	44,2	150	24	
2017 öffentlic	25	110	19	60
2018 privat	kein Grenzwert nur Bonus ab HWB 34, PEB 90 und CO2 14			kein Grenzwert, Bonus
2018 öffentlic	40,8	110; 120 bei Fernwä	15	wenn
2019 privat	kein Grenzwert nur Bonus ab HWB 34, PEB 90 und CO2 14			kein Grenzwert, Bonus
2019 öffentlic	40,8	110; 120 bei Fernwä	15	wenn
Details siehe jeweilige Förderungsrichtlinie!				
Erstellt am 14.2.2019 durch Mag. Karl Ladenhauf				

Source: (Ladenhauf-Kleindienst 2/14/2019)

8.1 Emission and conversion factors for figure 12.

Energy source	Emission factor	Conversion factor	Source
-	kg CO_2e/kWh	kWh/measuring unit	-
Electricity	0,211*	-	(Umweltbundesamt 4/29/2019)
Natural Gas	0,200	10,14**	(Umweltbundesamt 2019)
Hard Coal	0,332	7,94	(Umweltbundesamt 4/29/2019)
Marked Gasoil	0,271	9,985**	(Umweltbundesamt 2019)
Liquefied Petroleum Gas	0,231	12,81	(Umweltbundesamt 2019)

*... Emission factor for Electricity (domestic production and imports): direct emissions account for 85% of total emissions (total emissions stated by (Umweltbundesamt 2019))
**... Conversion factors for Natural Gas and Marked Gasoil are calculated according to their density (as stated by (Umweltbundesamt 2019))

8.2 Law Act translations

Tax Law Act	Gesetzestitel
Ancillary Budget Act	Budgetbegleitgesetz
Climate and Energy Fund Act	Klima- und Energiefondsgesetz (KLI.EN-FondsG)
Climate Protection Act	Klimaschutzgesetz (KSG)
District Heating and Cooling Act	Wärme- und Kälteleitungsausbaugesetz (WKLG)
Energy Efficiency Act	Energieeffizienzpaket des Bundes
Energy Performance Certificate Act	Energieausweis-Vorlage-Gesetz (EAVG)
Environmental State Aid Act	Umweltförderungsgesetz (UFG)
Electricity Tax Act	Elektrizitätsabgabegesetz
Green Electricity Act	Ökostromgesetz (ÖSG)
Mineral Oil Tax Act	Mineralölsteuergesetz (MinStG)
Natural Gas Tax Act	Erdgasabgabegesetz
Housing Support Scheme Law Act	Wohnbauförderungsgesetz
Solid Fuels Tax Act	Kohleabgabegesetz
Structural Adjustment Act	Strukturanpassungsgesetz

9 National law references

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BGBl. Nr. 351/1980, last amended by BGBl. Nr. 388/1995. Österreichischer Nationalrat. Vereinbarung gemäß Art. 15 a B-VG über die Einsparung von Energie

BGBl. Nr. 598/1981. Österreichischer Nationalrat. Bundesgesetz vom 9. Dezember 1981 über die Neuregelung der Mineralölbesteuerung (Mineralölsteuergesetz 1981 – MinStG 1981)

BGBl. Nr. 587/1983. Österreichischer Nationalrat. Änderung des Mineralölsteuergesetzes 1981

BGBl. Nr. 482/1984. Österreichischer Nationalrat. Wohnbauförderungsgesetz 1984 — WFG 1984

BGBl. Nr. 695/1991. Österreichischer Nationalrat. Abgabenänderungsgesetz 1991

BGBl. Nr. 185/1993, last amended by BGBl. I Nr. 39/2018. Österreichischer Nationalrat. Bundesgesetz über die Förderung von Maßnahmen in den Bereichen der Wasserwirtschaft, der Umwelt, der Altlastensanierung, zum Schutz der Umwelt im Ausland und über das österreichische JI/CDM-Programm für den Klimaschutz. Umweltförderungsgesetz – UFG

BGBl. Nr. 630/1994, last amended by BGBl. I Nr. 117/2016. Österreichischer Nationalrat. Bundesgesetz, mit dem die Mineralölsteuer an das Gemeinschaftsrecht angepaßt wird (Mineralölsteuergesetz 1995)

BGBl. Nr. 297/1995. Österreichischer Nationalrat. Strukturanpassungsgesetz

BGBl. Nr. 201/1996. Österreichischer Nationalrat. Strukturanpassungsgesetz 1996

BGBl. I Nr. 26/2000. Österreichischer Nationalrat. Budgetbegleitgesetz 2000

BGBl. I Nr. 149/2002, last amended by BGBl. I Nr. 114/2008. Österreichischer Nationalrat. Bundesgesetz, mit dem Neuregelungen auf dem Gebiet der Elektrizitätserzeugung aus erneuerbaren Energieträgern und auf dem Gebiet der Kraft-Wärme-Kopplung erlassen werden (Ökostromgesetz - ÖSG)

BGBl. I Nr. 71/2003. Österreichischer Nationalrat. Budgetbegleitgesetz 2003

BGBl. II Nr. 19/2006. Österreichischer Nationalrat. Vereinbarung gemäß Art. 15a B-VG zwischen dem Bund und den Ländern über gemeinsame Qualitätsstandards für die Förderung der Errichtung und Sanierung von Wohngebäuden zum Zweck der Reduktion des Ausstoßes an Treibhausgasen

BGBl. I Nr. 137/2006. Österreichischer Nationalrat. Bundesgesetz über die Pflicht zur Vorlage eines Energieausweises beim Verkauf und bei der In-Bestand-Gabe von Gebäuden und Nutzungsobjekten (Energieausweis-Vorlage-Gesetz - EAVG)

BGBl. I Nr. 40/2007. Österreichischer Nationalrat. Bundesgesetz über die Errichtung des Klima- und Energiefonds - Klima- und Energiefondsgesetz (KLI.EN-FondsG)

BGBl. I Nr. 113/2008, last amended by BGBl. I Nr. 72/2014. Österreichischer Nationalrat. Bundesgesetz, mit dem die Errichtung von Leitungen zum Transport von Nah- und Fernwärme sowie Nah- und Fernkälte gefördert wird (Wärme- und Kälteleitungsausbaugesetz – WKLG)

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