Work Package 5 Policy Brief Series: Austria

establishing Community Renewable Energy Webs

- Rolling out a business model and operational tool creating webs of households that jointly manage energy to improve efficiency and renewables uptake

Authors:
Katrin Burgstaller[1]
Rudolf Kapeller[1]
Johannes Reichl[1]
Mehmet Efe Biresselioglu[2]

[1] Energieinstitut an der Johannes Kepler Universität Linz
[2] Izmir University of Economics

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1 Introduction

This is one of the six eCREW Policy briefs. The policy briefs analyse the regulatory and administrative setups in Italy, Austria, Greece, Turkey, Spain and Germany. The focus of the policy briefs is on how well the existing regulatory and administrative infrastructures can be expected to enhance the implementation of the eCREW approach in the European Union and Turkey. This policy brief focuses specifically on the Austrian regulatory and administrative infrastructures that are of particular importance to the eCREW approach.

These policy briefs aim at specific topics relevant for member states in enabling an appropriate framework for energy communities in the sense of the Renewable Energy Directive (RED II) 2018/2001/EU[1] (Renewable Energy Community) and Internal Electricity Market Directive (ED 2019) 2019/944[2] (Citizen Energy Community) and the wider goals of the "Clean Energy for All Europeans Package".

This Policy Brief delivers the country profile from the eCREW perspective and identifies regulatory and administrative barriers as well as potentials for the development of eCREWs in Austria.

The research reported in this Policy Brief was undertaken as a part of eCREW's Work Package 5, coordinated by Izmir University of Economics, Turkey.

2 eCREW approach

The eCREW project aims at activating and fostering the inherent, and so far, underused forces of community-driven collective actions initiatives (CAI). Empowering citizens and giving them the tools needed to produce, store and consume energy for a) their own benefits, b) the prosperity of the (local) economy, and for c) tackling climate change is an important and indispensable step on our road to a stable, secure, energy-efficient and climate-neutral future energy system. Recent European legislation has paved the way for unleashing the potentials of such initiatives by granting them a certain degree of support and has set the scene for the establishment of Citizen Energy Communities (CECs) and Renewable Energy Communities (RECs). Unleashing the potentials of such CAIs requires new business models, financially viable solutions, reliable ICT tools and low, or no, entry barriers, in order to engage as many citizens as possible. We define a CREW (Community Renewable Energy Web) as a group of citizens jointly utilizing household level renewable electricity generation and storage capacities and establish CREWs as the third pillar of citizens' energy-related cooperation, complementing CECs and RECs. Joining requires simply signing a CREW contract, and no up-front investment or need to establish a legal entity, and minimal or no, opportunity costs. CREWs can come in sizes, from small neighbourhood groups to whole city districts. For this purpose, the project considers the legal, administrative and other relevant operational and infrastructural requirements for eCREW. The administration of the CREWs, including the billing of participants and provision of the smart phone app as the operational tool of the households' cooperation, is provided by local energy retailing companies (the Community Administering Entity – CAE), who implement the eCREW approach as a new business model. Hence, eCREW provides an impactful way of cooperation for those households that have no access to CECs and RECs. The core assumption of a CREW (most participants are households, but a CREW is generally open also to other entities, e.g. industrial companies with PV) is that some entities/households with PV have excess electricity generation. Usually, this excess is sold to a retailer/grid (depending on national legislation) for a fixed low feed-in tariff (e.g. 3 cent/kWh), while each kWh purchased from the grid costs at least double (e.g. 6 cent/kWh, energy only costs). The CREW approach is facilitated through a "CREW contract" that participants establish with their CAE. In this contract, participants (e.g. prosumers, households owning storage capacities, and households only consuming electricity) have some standard electricity tariff for consumption and production (e.g. a flat tariff; or a spot-market tariff). In addition, the CREW contract stipulates that whenever CREWs members, have excess

[1] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources, OJ 2018 L328/82.
[2] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, OJ 2019 L158/125.

electricity, others who need electricity at this time (i.e. households without PV) are first offered the excess electricity at lower than grid prices (e.g. 5 cents/kWh) and only when this supply is entirely absorbed by the community members, further quantities are purchased from the grid as required. The energy sharing in the eCREW is facilitated through the public grid. Thereby, customers' electricity costs in this tariff are lower than buying from the grid only. At the same time, those with excess electricity (i.e. households with PV) obtain a higher rate than they would by selling to the grid (e.g. 4 cent/kWh). The margin between these two prices are the revenue of the CAE (in this example 1 cent/kWh). The cooperation within a CREW is enabled through a software system that is hosted by GreenPocket, and a smartphone app serves as the easy-to-use interface for the CREW members. Data of the customers are transmitted from the pre-system of the CAEs and processed at GreenPocket, in order to finally display them in the eCREW app. The data records are stored on the database server of GreenPocket according to DSGVO guidelines. The CREW monitor is the central information hub within the smartphone app, which provides CREW members with different aggregated information, e.g., electricity flows from/to the CREW as total of all participants' individual flows, and monetary savings achieved by high community-level share of self-consumption. The CREW monitor requires the members' electricity load profiles as an input for the provision of these aggregations. The CAE serves as the regular electricity supplier for the CREW members, and as such, it either already has access to the members' electricity load profiles in the granularity (e.g., hourly figures from smart meters) required for billing of the electricity supply contract or, if not, guarantees to the collection of this data in the CREW contract. No additional data is required by the CAE for executing its special role of providing the CREW members with information regarding the members' individual electricity consumption, the CREW's performance in consuming shares of electricity produced within the CREW, or the members' individual monetary benefits through their participation.

3 Country profile

3.1 Demographic structure

Austria[3] is located in the southern part of Central Europe and is composed of nine federal states (in German: Bundesländer) including its capital and largest city, Vienna. With an area of around 83.883km², Austria is the 20th largest country in Europe and the 13th largest in the European Union (EU). In 2020, its population was approximately 8.9 million, resulting in a population density of 106 inhabitants per km².

Dividing the population by age groups reveals that roughly 23% are between 45 and 59 years old, and 20%, between 30 and 44. Up to 14-year-olds and 15- to 29-year-olds make up 14% and 17% of the population, respectively. While the dependency ratio in 2019 (age-population ratio of those typically not and typically (aged 15-64) in the labor force) is 50%, meaning the share of economically active is around twice the share of economically inactive, the given age structure might increase the future dependency ratio and thus impose serious implications on Austria's pension system. Also, the share of females (0.51) is slightly higher than the share of males (0.49).

Table 1 shows above statistics for Austria and its 9 federal states. Upper Austria, Salzburg, Tyrol and Vorarlberg belong to Western Austria, Carinthia and Styria to Southern Austria and Burgenland, Vienna and Lower Austria to Eastern Austria.

Table 1: Descriptive statistics by state, 2020. Data sources: Area and population: Statistik Austria (2021a). Age and gender: Statistik Austria (2020a). Own calculations.

2020	Austria	Burgenland	Carinthia	Lower Austria	Upper Austria	Salzburg	Styria	Tyrol	Vorarlberg	Vienna
Area (km²)	83882,86	3965,20	9536,47	19179,76	11982,64	7154,52	16399,40	12648,38	2601,66	414,83
Area (%)	100,00	4,73	11,37	22,86	14,28	8,53	19,55	15,08	3,10	0,49
Population	8 901 064	294 436	561 293	1 684 287	1 490 279	558 410	1 246 395	757 634	397 139	1 911 191

[3] The following explanations are based on the research results of Deliverable 5.1 "Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach".

Population (%)	100,00	3,31	6,31	18,92	16,74	6,27	14,00	8,51	4,46	21,47
Populaiton Density	106,11	74,26	58,86	87,82	124,37	78,05	76,00	59,90	152,65	4607,17
Dependency ratio	50,24	54,74	54,75	53,23	51,01	50,58	51,30	48,72	50,46	45,08
Female (%)	50,81	50,98	51,24	50,77	50,36	51,08	50,61	50,69	50,36	51,22
Male (%)	49,19	49,02	48,76	49,23	49,64	48,92	49,39	49,31	49,64	48,78
0-14 (%)	14,41	13,13	13,31	14,44	15,13	14,63	13,41	14,55	15,98	14,57
15-29 (%)	17,49	14,40	15,41	16,02	17,47	17,60	16,96	18,21	17,76	19,87
30-44 (%)	20,02	18,34	18,18	18,64	19,51	20,01	19,44	20,19	20,26	22,72
45-59 (%)	22,69	24,20	23,62	23,97	22,72	22,49	22,89	22,76	22,51	20,96
60-74 (%)	15,81	19,17	18,40	16,54	15,83	15,97	16,77	15,19	14,87	13,66
75+ (%)	9,57	10,75	11,08	10,39	9,33	9,31	10,53	9,11	8,61	8,23

Lower Austria is the largest state by area, making up 23% of Austria, followed by Styria (20%) and Upper Austria (14%). While Vienna, the capital, makes up only 0.5% of the total area, it has the largest population, with more than 1.9 million inhabitants, resulting in a population density of 4600 inhabitants per km². Burgenland has the lowest density, with 74. The dependency ratio varies by state, with Vienna reporting the lowest (45%) and Carinthia the highest (55%). This is due to the fact that, in general, states with more urban areas have a smaller older population and a larger prime working age population. Figure 1 shows Austria's population density for each of the 2095 municipalities. While the most densely populated area is Vienna and its surroundings, it is clear that the Austrian Alps, running in a west-east direction, play a major role in Austria's population distribution.

The Alps cover the west, south and the central area of Austria, 62,8% of the total area. In the north, the Alpine- and Carpathian foreland and parts of the Bohemian Forest, a granite mountain range, make up 21.5% of Austria. In the East, the Vienna- and parts of the Pannonian Basin cover 15.7% of Austria. Further, roughly 32% of Austria's area is used agriculturally (Statistik Austria, 2016) and 47.6% is forest area (BFW, 2012). 58.5% of Austria's population is urban, while 41.5% is rural (World Bank, 2019). In 2016, 6.7% of the total area consisted of residential and commercial areas, as well as infrastructures (Getzner and Kadi, 2019).

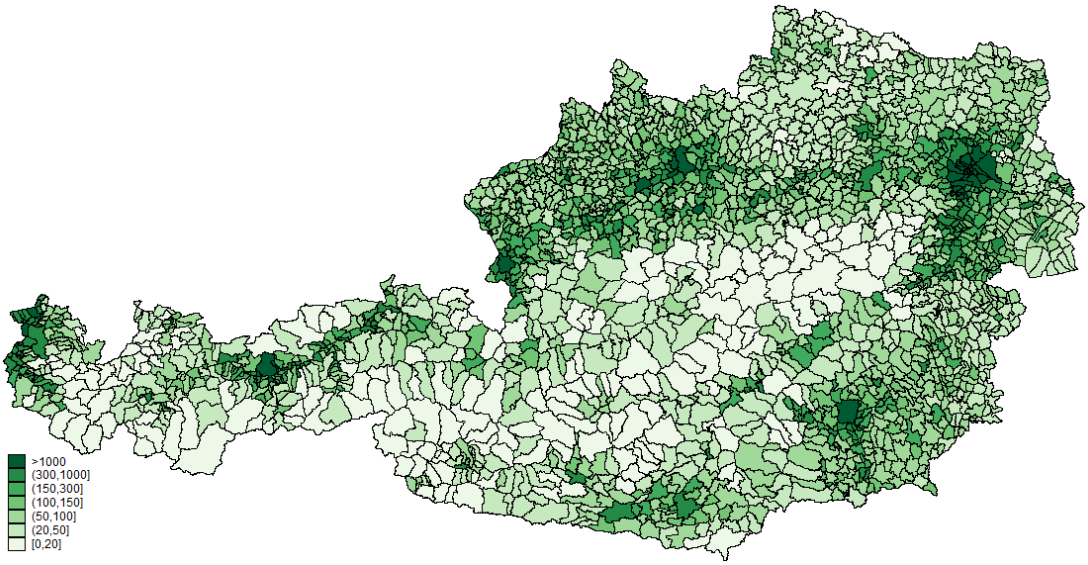

Figure 1: Population density by municipality, 2019. Data sources: Statistik Austria (2020b) and own calculations.

This landscape diversity does not necessarily translate to regional income diversity. In 2019, the average gross income employed per year was around 29.500€, as table 4 shows. This measure includes part-time employees, individuals who are not employed over the full year, and excludes apprentices. Females earned only 64% of male income. This is largely because a larger share of females is part-time employed. Regional heterogeneity exists on

a smaller scale, with a difference of the lowest earning state Vienna (27.600€) to the highest, Burgenland (32.300), of less than 5.000€ per year. Vienna also reports the highest ratio of female to male income (81.2%).

Looking at only full-time, full-year employed, the average gross income in Austria was 43.700€. It is apparent that not only regional heterogeneity decreases, but also the difference between female and male income. The gap between the most equal state Vienna (95.2%) and the most unequal state Vorarlberg is still substantial.

Table 2: Income and education by state. Data sources: Income: Statistik Austria (2019). Education: Statistik Austria (2018). Own calculations.

Gross income of employed per year in € (2019)	Austria	Burgenland	Carinthia	Lower Austria	Upper Austria	Salzburg	Styria	Tyrol	Vorarlberg	Vienna
Total	29 458	32 325	30 063	32 621	32 072	28 601	30 491	28 078	31 091	27 615
Female	22 808	24 571	22 611	25 023	22 916	22 169	22 602	20 870	21 719	24 714
Male	35 841	38 969	36 865	39 150	39 955	35 892	37 565	36 152	41 367	30 435
Female income in % of male	63,6	63,1	61,3	63,9	57,4	61,8	60,2	57,7	52,5	81,2
Gross income of full-time, full-year employed per year in € (2019)										
Total	43 719	43 926	43 335	45 159	44 310	43 177	43 265	42 896	46 790	43 902
Female	39 320	39 349	38 574	40 707	37 875	37 885	37 979	37 173	38 812	42 662
Male	45 900	46 429	45 508	47 346	47 030	45 728	45 872	45 652	50 610	44 828
Female income in % of male	85,7	84,8	84,8	86,0	80,5	82,8	82,8	81,4	76,7	95,2
% of 25- to 64-year-olds with college/university degree (2018)										
Total	18,10	13,6	15,5	15,4	14,6	17,3	16,6	16,6	14,5	27,1
Female	19,9	15,3	17,7	17,3	15,9	18,9	18,1	17,8	15	29,4
Male	16,3	11,7	13,2	13,4	13,1	15,7	15,1	15,3	14	24,7

In 2018, the percentage of 25 to 64-year-olds with college/university degrees was 18.1. While regional heterogeneity is rather low, Vienna marks an exception. While 13.6% of this age group attained tertiary education in Burgenland, this share is almost double in Vienna (27.1%). Also, without exception, the share of tertiary education is higher for females in all states. According to the OECD (2021), the percentage of 25-to 64-year-olds with tertiary education attainment (ISCED classification) in Austria in 2019 was 33.9%, while the OECD average was 38%.

While regional income heterogeneity is limited, the unemployment rates vary substantially by state. Table 5 depicts unemployment rates following a national definition for 2020. The national unemployment rate is defined as the ratio of unemployed registered at the Austrian Public Employment Service (in German: Arbeitsmarktservice, AMS) and the labour force potential (AMS registered plus employed).

The average unemployment rate in Austria was 9.9%. Upper Austria reported the lowest rate with 6.5%, and Vienna the highest rate with 15.1%, followed by Carinthia with 11.3%.

Table 3: Unemployment Rate (National Definition) By State, 2020. Data Source: Ams (2020)

National definition	Austria	Burgenland	Carinthia	Lower Austria	Upper Austria	Salzburg	Styria	Tyrol	Vorarlberg	Vienna
Unemployment rate (%)	9,9	9,4	11,3	9,4	6,5	7,3	8,4	8,1	7,7	15,1

Next, Table 3 depicts unemployment rates following the international ILO definition for different age groups in 2020. While the average unemployment rate for all ages (15 to 74) was 5.4%, youth unemployment was significantly higher (10.5%) compared to older age groups. Male and female unemployment rates are similar.

Table 4: Unemployment Rate (Ilo Definition), 2020. Data Source: Statistik Austria (2021b)

ILO definition	15-74	15-24	25-44	45-54	55-64	Male	Female
Unemployment rate (%)	**5.4**	**10,5**	**5,6**	**3,8**	**4,0**	**5,5**	**5,2**

As can be seen in Table 5 in 2020, 28.8% of all employees in Austria were employed in the crafts sector, followed by industry, commerce, information and consulting and tourism.

Table 5: Employees by Sector In %, 2020. Data Source: Wko (2021)

	Crafts	Industry	Commerce	Banking and insurance	Transport and traffic	Tourism	Information and consulting
Employees (%)	**28.8**	**18,9**	**21,3**	**4,1**	**8,3**	**9,2**	**9,4**

3.2 Energy profile

Table 6 provides Austria's energy balance in 2019, measured in Terajoule (TJ). National energy production consists largely of renewable energy, namely 83% of total energy production stems from renewable sources. Gas, oil and coal and combustible waste make up only approximately 5% each. However, Austria relies heavily on gas and oil imports. These account for roughly 78% of total gross available energy. Gross final energy consumption has increased by around 1% since 2018 to roughly 1139 Petajoule (PJ), a similar level to 2017. In the Renewable Energy Directive (2009/28/EC) Austria's goal is to achieve a 34% share of renewable energy in its gross final energy consumption in 2020. In 2019, this goal was almost reached with a share of 33,6% (Statistik Austria, 2020c). Austria's final energy consumption is comprised of the transport sector, accounting for 36% of the total, followed by industry with a share of 27%, private households with a share of 25%, public and private services with 10% and agriculture with a 2% share.

Table 6: Energy balance in TJ, 2019. Data source: Statistik Austria (2020c)

	Solid (coal and combustible waste)	Gas	Oil	Renewables	Electricity	Total (incl. district heating)
1. Production	**28 363**	**32 237**	**27 643**	**430 087**		**518 330**
2. Import	**115 234**	**492 484**	**637 502**	**37 578**	**93 769**	**1 376 566**
3. Stocks	**-3 669**	**105 675**	**4 103**	**794**		**106 903**
4. Export	**2**	**97 642**	**119 950**	**34 019**	**82 506**	**334 118**
5. Gross available energy (1+2-3-4)	**147 264**	**321 403**	**541 092**	**432 852**	**11 263**	**1 453 875**
6. Conversion loss	**130 487**	**98 202**	**418 525**	**270 531**	**33**	**917 776**
7. Conversion output	**77 796**		**405 829**	**10 085**	**255 083**	**833 675**
8. Consumption of energy sector	**63 672**	**10 460**	**15 661**	**0**	**25 771**	**115 564**
9. Transport loss	**611**	**111**			**11 896**	**25 264**
10. Nonenergy consumption	**1 544**	**14 866**	**73 603**	**174**		**90 188**
11. Gross final energy consumption (5+7-(6+8+9+10))	**28 747**	**197 765**	**439 132**	**172 233**	**228 644**	**1 138 758**
Agriculture	**17**	**1 080**	**9 274**	**6 873**	**4 393**	**22 095**
Private households	**805**	**59 050**	**39 575**	**82 728**	**66 175**	**280 644**
Industry	**27 921**	**112 013**	**12 236**	**47 985**	**100 855**	**311 577**
Transport	**4**	**10 510**	**370 125**	**20 231**	**11 804**	**412 675**
Public and private services	**0**	**15 111**	**7 921**	**14 415**	**45 418**	**111 767**

In 2018, road transport accounts for 86% of the transport sector's total consumption and demand has steadily and substantially increased in the past years. On the other hand, the final energy demand of the residential sector has increased at a significantly lower rate until 2018 and was approximately 15% above value of 1990 and only 1% above the 2015 value (Statistik Austria, 2020c). In 2019, the energy mix in the residential sector shows that renewable energy sources are in the lead with 29,5%, followed by natural gas (21%), electricity (24%), oil (14%), district heating (12%), and coal (<1%). Both the transport and the residential sector play an important role in Austria's current climate and energy strategy.

Figure 2 depicts Austria's energy mix from 2010 to 2019 in TJ. Gross final energy consumption has been relatively stable in the last decade and increased by around 22000 TJ since 2010. Moreover, no significant changes in the composition of the energy mix can be observed.

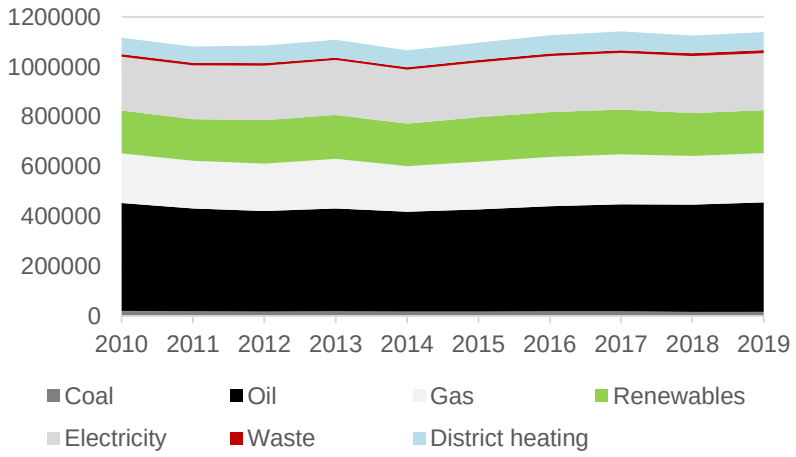

Figure 2: Energy mix in TJ, 2010-2019. Data source: Statistik Austria (2020c)

Austria's energy mix in 2019 reports that 39% of consumed energy is oil based, 20% is electric energy and 17% is gas based. Austria relies heavily on imports of oil and gas, and thus imports play also a significant role in overall energy consumption.

Austria's gross domestic electricity production equalled 255083 TJ in 2019. This is on a similar level to 2010. As shown in Figure 3, over the course of the decade, electricity production has fluctuated to some degree reaching its decade low in 2014 with 221805 TJ. The composition of sources has experienced several changes. Wind and solar energy, hydro and biogenic have all become increasingly important, while the share of coal, gas and oil has decreased since 2010.

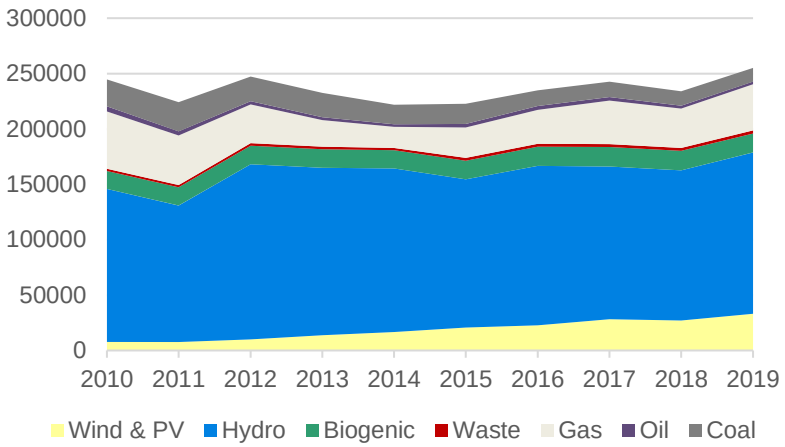

Figure 3: Gross domestic electricity production by source in TJ, 2010-2019. Data source: Statistik Austria (2020c)

In 2019, 57% of domestic electricity production stems from hydropower sources, 13% from wind and solar energy and 7% from biogenic sources. Summing up, Austria produced 77% from renewable sources. Looking at electricity consumption by sector, industry consumes 44% of gross final electricity consumption, followed by private households with 29%, public and private services with 20%, transport with 5% and agriculture with 2% (Statistik Austria, 2020c).

3.3 Energy infrastructure and infrastructure

Energy market

The Austrian energy market was liberalized by October 1, 2001, and since then all electricity customers have been free to choose their electricity supplier. The same has been done for gas customers since October 2002.[4] In Austria, E-Control is responsible for regulating the electricity and gas markets.[5]

On the Austrian market, there are several system charges, duties, taxes and support programs for green electricity. In addition to the pure energy price, customers have other cost components to pay. For a sample household with a yearly electricity consumption of 3500kWh, E-Control estimates the following electricity price composition. The energy price accounts for roughly 36% of the consumer electricity price, system charges for 25% and the rest (duties, taxes, etc.) for 39%. The energy price is composed of a monthly base price and the price per kilowatt hour consumed (E-Control, n.d.-b).

Customers have to pay the following three periodic system charges. The system utilization charge (in German: Netznutzungsentgelt) covers costs incurred by system operator for the construction, expansion and operation of their networks. The charge for system losses (in German: Netzverlustentgelt) covers costs induced by losses during the distribution of electricity from the generating facilities to the consumers. The metering charge (in German: Entgelt für Messleistungen) covers the costs of installation, maintenance and reading of metering points. The grid system charges are linked to the take-off and feed-in of electricity into the public grid. In total, there are seven

[4] Cf. *E-Control* (2011a). 10 Jahre Energiemarkt-Liberalisierung. p. 5 (available under: https://www.e-control.at/documents/1785851/1811255/bericht-10-jahre-energiemarktliberalisierung.pdf/418f0056-6db6-4b87-a835-091d1f512c9a?t=1413905309588).

[5] E-Control Website (n.d.-a): E-Control - Unsere Energie gehört der Zukunft - www.e-control.at.

components[6] from which the system charges are determined, which must be paid either by the withdrawing party[7] and/or the injecting party[8].[9] There are two exemptions from the system charges for injecting parties. On the one hand, injecting parties with a connected capacity of up to and including 5 megawatts (MW) are exempt from the charge for system losses. On the other hand, they are also exempt from the charge for system services, provided that they have a connected capacity of less than 5 MW.

There are two main types of wholesale electricity markets in Austria: the future market, and the spot market (E-Control, n.d.-d). Regarding the future market, a specified amount of power is bought and delivered at a certain price, over a predefined future period of time. The main reason is not physical fulfilment but hedging against uncertainty about future spot prices. Future market products can be further distinguished as baseload or peakload contracts. On the spot market, power is traded for delivery on the following day on an hourly basis (day-ahead market). Further, the intraday market operates on a quarter-hour basis, which sorts out the disparity between real demand realizations and the day-ahead forecasts.

In Austria, consumers and producers are bundled in balance groups. Each balance group is required to balance energy consumption and energy generation within the group on a quarter-hour basis. Electricity transaction schedules among balance groups within the control area have to be sent to the independent balance group coordinator APCS Power Clearing and Settlement AG on a daily basis for the following day. Schedules outside the control area have to be sent to the control area manager Austrian Power Grid AG (APG) (E-Control, n.d.-e). In the event of unanticipated fluctuations in generation (e.g., if power facilities fail or changing wind speeds) or discrepancies from the expected consumption level, the energy balance in the grid must be guaranteed by the control area manager APG through the connection or disconnection of power generating units (e.g., special backup power plants). The balance group that caused the respective fluctuation has to pay the costs for these balancing measures. Fluctuations are determined and billed through the independent balance group coordinator (APG, n.d.-b).

Infrastructure

According to E-Control (2021a), Austria's government regulator for electricity and natural gas markets, the Austrian electricity transmission grid totals about 7 000 km for long-distance transports. These are run by the operator Austrian Power Grid AG and comprised of roughly 2 600 km, 3 200 km and 1 200 km of 380 kilovolt (kV), 220 kV and 110 kV grid, respectively. Further, 122 electricity system operators handle approximately 260 000 km of grid at high, medium and low voltage levels that deliver electricity to consumers. Every gas or electricity distribution system operator (DSO) is responsible for delivering energy in a specified geographic area. Nearly every Austrian household is connected to the electricity grid, and roughly a third of them consume also gas.

In 2019, Austria counted almost 143 000 power facilities, as shown in Table 7. Over 97% of total facilities are solar power plants and each of them has a capacity under 10 megawatts (MW). While hydro power plants make up only 2% of the total count, they account for 56% of total capacity, followed by thermal power plants with 26% and wind power plants with 12%. Lastly, solar power plants account for 6% of total capacity, which was 26 156 MW in 2019. Moreover, while there are only 316 facilities with a capacity over 10 MW, they account for around 80% of total capacity.

[6] These are the following components: "system utilization charge" (in German: Netznutzungsentgelt), "charge for system losses" (in German: Netzverlustentgelt), "system admission charge" (in German: Netzzutrittsentgelt), "system provision charge" (in German: Netzbereitstellungsentgelt), "charge for system services" (in German: Systemdienstleistungsentgelt), "metering charge" (in German: Entgelt für Messleistungen), and "supplementary service charges" (in German: Entgelt für sonstige Leistungen).
[7] § 7 No. 14 EA 2010 defined "withdrawing party" as "a consumer or a system operator taking off electricity from a transmission or distribution system".
[8] § 7 No. 10 EA 2010 defined "injecting party" as "a producer or an electricity undertaking which feeds electrical energy into a system".
[9] All system charges can be read here as a summary: https://www.e-control.at/en/marktteilnehmer/strom/netzentgelte.

Table 7: Power facilities, 2019. Data source: E-Control (2021b)

Count	Hydro	Thermal	Wind	Solar	Geothermal	Total
<10 MW	2 913	499	516	138 715	2	142 645
>10 MW	163	64	89			316
Total	3 076	563	605	138 715	2	142 961
in %	2,15	0,39	0,42	97,03	0,00	100,00
Capacity (MW)						
<10 MW	1 433	421	1 459	1 619	1	4 933
>10 MW	13 165	6 310	1 749			21 224
Total	14 597	6 731	3 208	1 619	1	26 156
in %	55,81	25,73	12,27	6,19	0,00	100,00

Total capacity has increased by 50% from 1995 to 2019. Hydro- and thermal power facilities' total capacity has experienced slight but steady increases since 1995 and especially since 2005. Wind-, solar- and geothermal power facilities began to contribute noteworthy capacity starting in the early 2000's. While wind power facilities' uptake in count and capacity began around 2002, solar power plants' increase significantly since 2012 (E-Control, 2021).

Lastly, Figure 4 shows the number of PVs per 1000 inhabitants by municipality. PVs are especially densely distributed in parts of northern and eastern Austria, i.e., the states of Upper Austria, Lower Austria and Burgenland, but also in parts of Styria and Vorarlberg.

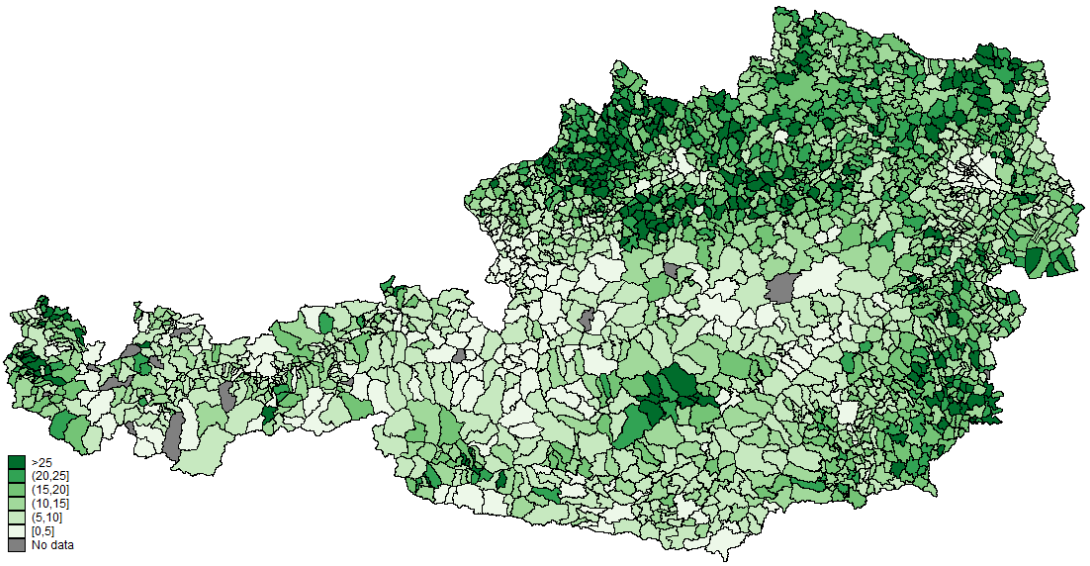

Figure 4: Number of PVs per 1000 inhabitants by municipality, 2019. Data source: Climate and Energy Fund (3/2020) and OeMAG (4/2020), as cited in Statistik Austria (2020d)

4 Analysis of the legislative and administrative framework

After[10] considering Austria's demographics, energy profile and energy infrastructure, we will now look at Austrian legislation with regard to energy communities and self-supply. In Austria, energy market regulations are issued both by federal laws covering the country as a whole and by provincial laws covering specific geographical areas. The main Austrian electricity law is the Federal Act Providing New Rules for the Organization of the Electricity Sector

[10] The following explanations are based on the research results of Deliverable 5.1 "Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach" as well as on the results of the jointly prepared article "*Biresselioglu* et al, Legal Provisions and Market Conditions for Energy Communities in Austria, Germany, Greece, Italy, Spain, and Turkey: A Comparative Assessment, Sustainability 2021, 13, 11212, 1-27" and the publication of "*Burgstaller/Holzleitner*, Energy Communities in Austria - Overview of the Specific Regulations for Joint Utilization of Electricity, ComForEn 2021, 14-24".

(Electricity Act 2010)[11]. The Electricity Act 2010 includes provisions for the generation, distribution, transmission, and supply of electricity. The organization of the electricity industry is also regulated there. This act also contains legal regulations on system charges and rules on billing, internal organization, unbundling, and transparency of accounting of electricity companies. Another important legal act in the field of renewable electricity is the Green Electricity Act 2012[12], with regulations and subsidies for electricity from renewable sources. Two further important laws are the Natural Gas Sector Act 2011[13] and the Federal Energy Efficiency Act[14]. The recent "Renewable Expansion Act"[15] also specifies central requirements for the energy sector. There are regulations on Renewable Energy Community (REC) and new funding regulations for renewable forms of energy. As a part of the amendment to the Electricity Act 2010, the legal requirements for the Citizen Energy Community (CEC) were supplemented. This act contains joint regulations for CEC and REC that use electricity. Therefore, both Electricity Act 2010 and the Renewable Expansion Act are the basis for the establishment and implementation of REC and CEC. The national regulations on REC and CEC run parallel with those of RED II and ED 2019. With the introduction of REC and CEC in Austria, all the legal requirements for establishing an energy community have been met.[16] The establishment of energy communities is therefore already being supported.[17]

4.1 A review of Renewable Energy Directive (RED II) 2018/2001/EU (defining "renewable energy communities")

4.1.1 Current progress in the implementation of REC

RED II stipulates objectives that the member states have to implement in national law. The requirements for REC can be found in Art 22 RED II and the definition of REC is provided in Art 2 No. 16 RED II. It defines REC as a "a legal entity:

(a) which, in accordance with the applicable national law, is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity;

(b) the shareholders or members of which are natural persons, SMEs[18] or local authorities, including municipalities;

(c) the primary purpose of which is to provide environmental, economic, or social community benefits for its shareholders or members or for the local areas where it operates, rather than financial profits".[19]

[11] Bundesgesetz, mit dem die Organisation auf dem Gebiet der Elektrizitätswirtschaft neu geregelt wird (Elektrizitätswirtschafts- und –organisationsgesetz 2010 – ElWOG 2010) F.L.G. I No. 110/2010 last amended by F.L.G. I No. 7/2022. Available online: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007045 (accessed on 09 May 2022).
[12] Bundesgesetz über die Förderung der Elektrizitätserzeugung aus erneuerbaren Energieträgern (Ökostromgesetz 2012 – ÖSG 2012) F.L.G. I No. 75/2011 last amended by F.L.G. I No. 150/2021. Available online: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007386 (accessed on 09 May 2022).
[13] Bundesgesetz, mit dem Neuregelungen auf dem Gebiet der Erdgaswirtschaft erlassen werden (Gaswirtschaftsgesetz 2011 – GWG 2011) F.L.G. I No. 107/2011 last amended by F.L.G. I No. 38/2022. Available online: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007523 (accessed on May 2022).
[14] Bundesgesetz über die Steigerung der Energieeffizienz bei Unternehmen und dem Bund (Bundes-Energieeffizienzgesetz – EEffG) F.L.G. I No. 72/2014 last amended by F.L.G. I No. BGBl. I Nr. 68/2020. Available online: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20008914 (accessed on May 2022).
[15] Bundesgesetz über den Ausbau von Energie aus erneuerbaren Quellen (Erneuerbaren-Ausbau-Gesetz – EAG) F.L.G. I 150/2021 last amanded by F.L.G. I 13/2022. Available online: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20011619 (accessed on May 2022).
[16] Cf. Website of österreichische Koordinationstelle für Energiegemeinschaften, Stand der Umsetzung von Erneuerbare-Energie-Gemeinschaften (EEG) – Registrierung, Energiedatenaustausch, Abrechnung, 13.12.2021 (available under: https://energiegemeinschaften.gv.at/stand-der-umsetzung-von-erneuerbare-energie-gemeinschaften-eeg-registrierung-energiedatenaustausch-abrechnung/ (accessed on 14. December 2021).
[17] Cf. Website of österreichische Koordinationstelle für Energiegemeinschaften, https://energiegemeinschaften.gv.at/programm-des-klima-und-energiefonds/ (14.12.2021).
[18] „SME" means small and medium-sized enterprises.
[19] Art 2 No. 16 RED II.

The Austrian legislator has implemented the requirements of Art 22 and Art 2 No. 16 RED II into national law. The national regulations regarding REC are contained in §§ 79 and 80 Renewable Expansion Act (hereinafter REA). Further regulations on RECs in connection with joint use of electricity are set out in § 16c, 16d and 16e Electricity Act 2010 (hereinafter EA 2010).

The current process for implementing RED II is well advanced. There has been already a comprehensive amendment of the Austrian energy law.

4.1.2 Evidence from implementations

As already shown, the central regulations to REC are defined in REA and EA 2010. The Renewable Expansion Act-package (REA-package[20]) adapted several laws and introduced one additional, namely the REA.

▪ Renewable Energy Community in Austria

In Austria, a REC can use any renewable energy source, but the focus of the legal regulations is on electricity from renewable sources. REC is defined in Art 7 (1) No. 15a EA 2010 as follows:

Renewable energy community means "a legal entity that enables energy generated within the community to be used jointly; its members or shareholders must be located in the proximity area as defined in § 16c (2)"[21] EA 2010. The reference to the proximity area is explained in more detail below.

A REC is permitted to generate energy from renewable sources, and to consume, store, or sell its self-generated energy. In addition, the community is allowed to be active in the field of aggregation and to provide other energy services. Participation in a REC does not affect consumers' rights and obligations, in particular, the right to the free choice of supplier. The REC may entrust a third party for operation and management of its generation plant. Contract and leasing models are also possible for REC.[22] Participation is voluntary and open. The following types of **members or shareholders** can participate in a REC[23]:

- natural persons;
- municipalities;
- legal entities of public authorities (local departments and other legal bodies under public law); or
- small and medium enterprises.

RECs must be **established as** "associations, cooperative societies, or partnerships ("Offene Gesellschaft (OG)", "Kommanditgesellschaft ("KG", "GmbH & Co KG", respectively); corporations ("Aktiengesellschaft (AG)" or "Gesellschaft mit beschränkter Haftung (GmbH)"); or similar associations with legal personality"[24].[25] "RECs must consist of at least two members/shareholders.[26] Private companies that do not meet the criteria for small and medium enterprises are excluded from participation in RECs. There is no restriction for legal entities of public authorities, as there is for private companies[27]. The REC regulation contains a restriction on private companies – their participation must not represent their main commercial or professional activity[28], thus excluding the

[20] Cf. F.L.G. I No. 150/2021. Available under: https://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2021_I_150/BGBLA_2021_I_150.html (15.11.2021).
[21] § 7 (1) No. 15a EA 2010.
[22] Government explanatory notes, pp 18, 18 (government explanatory notes of REA and the whole REA-package (in German: ErläutRV 733 BlgNR 27 GP) is available under: https://www.parlament.gv.at/PAKT/VHG/XXVII/I/I_00733/fname_933186.pdf (08.04.2021).
[23] Regardless of their used renewable energy source.
[24] *Biresselioglu* et al, Legal Provisions and Market Conditions for Energy Communities in Austria, Germany, Greece, Italy, Spain, and Turkey: A Comparative Assessment, Sustainability 2021, 13, 11212, 12.
[25] Comapre also *Hartlieb/Kitzmüller*, Erneuerbare-Energie. Gemeinschaften: Zivilrechtliche Stolpersteine und regulatorische Rahmenbedingungen, RdU-U&T 2021, p 57.
[26] Cf. § 79 (1) REA.
[27] Cf. Government explanatory notes, pp 18, 19.
[28] Cf. § 79 (2) REA.

participation of electricity and natural gas companies.[29] Their participation in a REC would be incompatible with the objective of the REC[30]."[31] The objective of the REC must not be financial benefit; this must be clear from the company's chosen legal form or at least stated in its articles. The REC should primarily provide environmental, economic, or social benefit to the members/shareholders or to the local areas where the REC operates.[32], [33]

Special aspects of RECs with the usage of electricity

In the definition of REC in RED II, it is defined that the members/shareholders of a REC are located in the proximity of the renewable energy project.[34] Austria has decided to divide the **proximity** to the project in the field of electricity into two areas based on the distribution grid structure. The two areas differ in their scope. On the one hand, there is the "local area", which extends from network level 7 to a part of the network level 6 (only to the lower-voltage part of this network level), and on the other hand, there is the "regional area", which extends from network level 7 to a part of the network level 4 (only to the medium-voltage part of this network level). In these two areas the electricity consumption facilities of the members/shareholders and the generation facilities of a REC must be connected. The consumption facilities of the members/shareholders must be connected to the generation facilities via a low-voltage distribution network[35] and the low-voltage part of the transformer station[36] (local area) or via the medium-voltage grid[37] and the medium-voltage busbar in the substation (regional area) in the concession area of one system operator. The transmission of energy from generation facilities or storage facilities to consumption facilities via grid levels 1 to 4, up to the medium-voltage busbar in the substation, is expressively not permitted. Transit through the networks of other system operators is also not permitted[38].[39]

Related to the proximity is the right to information according to § 16c (3) REA. The system users, i.e., the members/shareholders of a REC, have 14 days to obtain information on the part of the distribution network to which their consumption or generation facilities are connected. In the explanatory note, reference is made to the persons who wish to form a REC. On request, they shall be provided with information on the distribution network level to which their installations are connected or whether they are in the regional or local area of a specific community.[40] The distinction if a REC uses the local area or regional area has an impact on the system utilization charge (see below), because with the reduced use of the public grid a reduction of the charge is stipulated for RECs according to § 52 (2a) EA 2010.

In particular in the field of electricity, § 16c EA 2010 covers a **specification in the context of producer.** A producer that distributes electricity in the local or regional area may participate in a REC with one exception: Participating producers are not allowed to be controlled[41] by a supplier, provider or electricity retailer within the meaning of EA 2010. Based on the phrases "located in the proximity of the renewable energy projects" according to Art 2 (16) of RED II the government assumes that also wind farm, hydropower or larger PV projects can participate. Thus,

[29] § 79 (2) REA.
[30] Cf. Government explanatory notes, 19.
[31] Biresselioglu et al, Legal Provisions and Market Conditions for Energy Communities in Austria, Germany, Greece, Italy, Spain, and Turkey: A Comparative Assessment, Sustainability 2021, 13, 11212, 12.
[32] § 79 (2) REA.
[33] Cf. Deliverable 5.1 "Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach", pp 42.
[34] Art 2 No. 16 RED II.
[35] This low-voltage distribution network is the network level 7, with a voltage of 400 - 230 volts.
[36] The transformer station is network level 6.
[37] This is the medium voltage network on the network level 5, with a voltage of 1 - 36 kilovolts.
[38] Cf. § 16c (2) EA 2010.
[39] Cf. Deliverable 5.1 "Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach", pp 44 and 45.
[40] Cf. government explanatory notes, 28.
[41] Cf. § 7 (1) No. 34 EA 2010 this paragraph defines "control": This means rights, contracts or other means which, either separately or jointly and having regard to all the factual or legal circumstances, confer the possibility of exercising decisive influence over the activities of an undertaking, in particular by; a) rights of ownership or use over all or part of the assets of the undertaking; b) rights or contracts which confer a decisive influence on the composition, deliberations or decisions of the organs of the undertaking.

according to government explanation notes, it is possible that wind farm, hydropower or larger PV projects can also participate in REC, provided that these generation facilities are not controlled by energy companies.[42]

Austrian legislation has decided on **joint provisions of REC and CEC in the field of electricity**. Since both communities can use electricity, there are provisions in the EA 2010 on the metering and billing of electricity. Both communities have to provide information with the responsible system operator and make various agreements among each other.[43] In general, it should be noted that REC in Austria is not limited to electricity, but also includes all renewable energy (as well as heating and cooling), but the electricity regulations are in the main focus.[44]

4.1.3 Barriers & Motivators

With reference to "**motivators**", the Austrian regulations on REC are motivating as the determination of regional or local area has an effect on the system utilization charge. The system utilization charge is a component of the system charges, which system operators are allowed to invoice for their services (see section 3.3). For the use of the regional or local area there are reductions of the system utilization charge for REC according to § 52 (2a) EA 2010 in connection with system charges ordinance[45] (see section 4.1.6 "Practical issues with legislation and adaption"). Other benefits of participating in a REC include the following: RECs are eligible for two exemptions in charges. One is the electricity tax[46] and the other is the renewable support contribution[47] (see section 4.1.6 "Practical issues with legislation and adaption"). In addition to exemptions in charges, RECs can also benefit from other supports. Here, a REC can either receive a market premium[48] or benefit from an investment subsidy within the meaning of § 80 (1) and (2) REA (see also section 4.1.6 "Practical issues with legislation and adaption"). Market premiums are used to promote the generation of electricity from hydroelectric power, wind power, photovoltaic, biomass and biogas.[49] The market premium is only available for the amount of electricity generated but not consumed within the REC. Limited is the market premium with a maximum of 50% of the energy generated within REC. In addition, the legal requirements for the market premium must be met.[50] A REC can request an investment subsidy for its facility. This investment subsidy is available for new construction, revitalization and expansion of facilities[51]. In order to receive the subsidy, specific requirements must be met depending on the production technology of the facility.[52]

In general, one "**barrier**" for REC could be the establishment, since this requires a legal person. The members/shareholders can choose between a number of possible legal persons. Depending on the configuration of the members/shareholders, it will become clear which form of establishment is beneficial for the individual group. Thus, it cannot be clearly stated at this point in time whether the requirement for the establishment of a legal person is actually a barrier. Also, already the definition of REC in RED II provides that REC is a legal entity.[53] REA precisely defines the possible members/shareholders, which means that companies larger than small and medium-sized enterprises cannot participate in a REC. However, this barrier is also provided in RED II, which means that the legislator has followed the requirements of the directive.

[42] Cf. government explanatory notes, p 27.
[43] The common provisions are set out in § 16d and § 16e EA 2010.
[44] Cf. Deliverable 5.1 "Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach", pp 49.
[45] Verordnung der Regulierungskommission der E-Control, mit der die Entgelte für die Systemnutzung bestimmt werden (Systemnutzungsentgelte-Verordnung 2018 – SNE-V 2018) F.L.G. II No. 398/2017 last amended F.L.G. II No. 558/2021 (available under: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20010107, 08 May 2022).
[46] In German: Elektrizitätsabgabe.
[47] In German: Erneuerbaren-Förderbeitrag.
[48] Cf. § 55 (9) REA.
[49] Cf. § 2 (2) No. 1 REA; government explanatory notes, p 2.
[50] Cf. § 80 (1) in connection with §§ 9 – 54 REA.
[51] This includes, among other things, regulations on investment subsidies for photovoltaic system and electricity storage facility (§ 56 REA), hydroelectric power plant (§ 56a REA) and wind power plant (§ 57 REA); cf. § 2 (2) No. 2-3, §§ 55-63 REA.
[52] Cf. § 55 in connection with § 80 (1) REA.
[53] Cf. Art 2 No 16 lit a RED II.

It should be noted that the REC and CEC national regulations are new in Austria and the energy communities are just being formed, which gives rise to open questions on legal and technical issues. The actual barriers that arise will become apparent over time as the energy communities form and become operational.

4.1.4 Other national legislation related with RED II

With the REA-package, several energy laws were adjusted. These include, for example, the introduction of the REA and adjustment of EA 2010.

In the REA, provisions have been set for the promotion of various technologies for the production of renewable energy (investment subsidy). Provisions for a market premium for renewable electricity have also been set here. This is shown in section 4.1.6. The provisions on guarantees of origin were also amended.

At this point, it is necessary to address the possibility of sharing electricity. Even before RED II, people could generate their own electricity and sell their surplus electricity, see in the section 4.2.4. It should be emphasized that the implemented REA-package resulted in several amendments to laws and regulations of Austrian ordinances. This is another reason why it will only become clear in the future how the implementation of the directives will affect the existing legal framework.

4.1.5 Conformity to existing legislative framework

The introduction of REC and its proximity area links to the network topology. As such, it connects to an existing system and is therefore not an impediment to the legal framework already in place. Similarly, the reduction of the grid system utilization charge links to the use of the public distribution network and was further defined by the grid system charges ordinance[54]. This reflects the reduced use of the network in the regional and local area. With current status, no obstacles with the already existing legal framework can be identified, because the introduction of REC has also adapted the corresponding acts and regulations.

4.1.6 Practical issues with legislation and adaption

It should be noted that § 80 of the REA explicitly provides **that facilities of a RECs can be funded under the REA** promotion regulations, provided that the conditions in each case are fulfilled. The REC includes the use of renewable energy, which makes it possible to be funded under REA, because two subsidies are possible here[55]. On the one hand, the market premium[56] in the field of electricity or on the other hand, through the investment subsidy[57], whereby generation facilities (incl. storage) can be subsidized. That is, § 80 (2) REA stipulates that the amount of electricity from renewable sources that can be supported is limited to a maximum of 50% of the total amount of electricity generated within a REC. The market premium is calculated on the basis of the amount of electricity marketed by a REC and fed into the public electricity grid. No market premium will be granted for the production quantities consumed by or allocated to the members/shareholders.[58] Or else, § 80 (1) REA specifies that installations of REC can be supported by an investment subsidy as defined in the provisions of § 55 to 63 REA. This includes, among other things, regulations on investment subsidies for a photovoltaic system and electricity storage facility (§ 56 REA), or hydroelectric power plant (§ 56a REA) and wind power plant (§ 57 REA)[59]. It must be emphasized that only one of the two subsidy options can be used.[60]

The determination of the local and regional areas for REC affects the **system utilization charge**. § 52 (2a) EA 2010 provides for a reduction in this charge for REC. With this provision, the system utilization charge is taken into

[54] Verordnung der Regulierungskommission der E-Control, mit der die Entgelte für die Systemnutzung bestimmt werden (Systemnutzungsentgelte-Verordnung 2018 – SNE-V 2018) F.L.G. II No. 398/2017 last amended F.L.G. II No. 558/2021 (available under: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20010107, 09 May 2022).
[55] Cf. § 80 (1) and (2) REA.
[56] In German: Marktprämie.
[57] In German: Investitionszuschüsse.
[58] Cf. § 80 (2) REA.
[59] Cf. § 80 (1) in connection with §§ 55 with §§56, 56a, 57, or 57a REA or §§ 59 with 60, 61 or 62 REA.
[60] Cf. § 55 (9) REA.

account in relation to the consumption that is covered by the allocated energy from a REC generation facility, and thus the charge is reduced in accordance with the system usage. § 52 (2a) EA 2010 specifies how the system utilization charge is reduced. In this regard, it should be noted that the percentage discount on the energy part has already been defined in the system charges ordinance. In the local area, the reduction for grid levels 6 and 7 is 57%. In the regional area, the reduction for grid levels 6 and 7 is 28%, and 64% for grid levels 4 and 5.[61] Furthermore, the provision also contains a determination of the capacity part from the system utilization charge.[62]

Other reductions in charges for RECs are as follows: On the one hand, there is an exemption from the **electricity tax**[63] for electricity that is generated by photovoltaics of electricity producers (including producer groups such as REC) and is not fed into the grid[64], but consumed by the producers themselves.[65] On the other hand, there is also an exemption from the **renewable support contribution**[66]. Under this exemption, electricity generated and consumed within a renewable energy community is not taken into account when determining the renewable support contribution to be paid by the end consumer.[67]

The current legal situation does not allow **multiple memberships** until December 31, 2023. This means that a consumption facility or a generation facility may only participate in one joint generation facility (§ 16a EA 2010), CEC or REC. Only after January 1, 2024, it will be possible to participate in several energy communities with one facility.[68]

In Austria, it is possible to apply **for exemptions from the system charges for research and demonstration projects**. This exception is a regulatory sandbox and its requirements are regulated in § 58a EA 2010.

4.2 A review of Revised Energy Market Directive (ED 2019) 2019/944 (defining "citizen energy communities")

4.2.1 Current progress towards the implementation of CEC

The European regulations on CEC are set out in the ED 2019. The requirements for CEC are defined in Art 16 and Art 2 No. 11 ED 2019, and are to be implemented in national law by the member states. Art 2 No. 11 ED 2012 defines citizen energy community as "a legal entity that:

(a) is based on voluntary and open participation and is effectively controlled by members or shareholders that are natural persons, local authorities, including municipalities, or small enterprises;

(b) has for its primary purpose to provide environmental, economic or social community benefits to its members or shareholders or to the local areas where it operates rather than to generate financial profits; and

(c) may engage in generation, including from renewable sources, distribution, supply, consumption, aggregation, energy storage, energy efficiency services or charging services for electric vehicles or provide other energy services to its members or shareholders"

[61] § 52 (2a) sentence three and four EA 2010 in connection with § 5 (1a) system charges ordinance.
[62] § 52 (2a) last sentence EA 2010.
[63] In German: Elektrizitätsabgabe.
[64] Stipulated by law, is that the electricity generated and consumed within the REC is considered "not fed into the grid", according to § 2 (1) No. 4 Electricity Tax Implementation Ordinance (Verordnung des Bundesministers für Finanzen zur Umsetzung des Elektrizitätsabgabegesetzes im Bereich mittels Photovoltaik erzeugter elektrischer Energie F.L.G. II No. 82/2021 last amended F.L.G. II 464/2021 [available under: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20011479, 09 May 2022]).
[65] § 2 (1) No. 4 Electricity Tax Act (Bundesgesetz, mit dem eine Abgabe auf die Lieferung und den Verbrauch elektrischer Energie eingeführt wird (Elektrizitätsabgabegesetz) F.L.G. I No. 201/1996 last amended F.L.G. I No. 10/202 [avaliable under: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10005027 , 09 May 2022) in conjunction with § 2 Electricity Tax Implementation Ordinance.
[66] In German: Erneuerbaren-Förderbeitrag.
[67] Cf. § 75 (5) REA.
[68] Cf. 111 (8) EA 2010.

In Austria, the energy legislation framework has been adjusted (this includes e.g., amendments in EA 2010). In this act, the requirements of the ED 2019 regarding the citizen energy community (CEC) were implemented. As already described above, Austria is currently in the process of implementing the directives (see section 4). In the context of the REA-package, it was referred that this legislative package implements a part of the ED 2019, thereby showing that Austria will make further amendments and modifications.[69]

4.2.2 Evidence from implementations

Legal regulations on CEC are located in the EA 2010, because CEC can only use electricity. The central scope of CEC is regulated in § 16b EA 2010. It specifies the possible members as well as the control over the CEC, the establishment and operation.

▪ Citizen Energy Community in Austria

In its definition, § 7 no. 6a **EA 2010 set the CEC** as a legal entity that generates, consumes, stores, or sells electrical energy, is active in the field of aggregation, or provides energy services to their members and is controlled by members or shareholders. The definition already provides the framework for CEC, such as limitations on electricity, members, and control over the CEC. By participating in a CEC, the rights and obligations of the individual members/shareholders remain unaffected, in particular, the free choice of suppliers.[70] The collective use of a different form of energy is reserved for REC, as already stipulated by RED II and ED 2019. However, **CEC can use electricity from any source** (renewable or fossil).

The following **members or shareholders** can be part of a CEC:

- natural persons,
- legal entities, and
- local authorities.

CECs are open to all forms of legal entities (e.g., large and small companies, natural persons, etc., see above) in terms of membership. However, the "power of decision" for these entities is limited. To this end, in § 16b (3) EA 2010 regulates the types of members with the right to assert control over the CEC.[71]

Control is restricted to **natural persons, local authorities, and small enterprises**. This limitation of control applies automatically if the chosen corporate form includes a statutory majority held by stated members/shareholders. According to the bill's explanatory notes, the necessity of limiting the power of control in CECs (as outlined above) is derived from the open participation for all types of legal entities. The main decision-making powers were limited to members who are not engaged in largescale commercial activities and whose actual area of business activity is not the energy industry.[72] Thus, medium and large companies, as well as companies that have electricity undertakings[73], are excluded from control[74].[75]

A community must consist of two or more members/shareholders. CECs must be **established as** associations, cooperative societies, partnerships, corporations, or similar associations with legal personality, as in the case of REC (compare above section 4.1.2). Financial benefit must not be the main purpose of a CEC. This must be clear from the chosen legal form of the company, or at least be stated in the company's statutes. The primary purpose

[69] Cf. government explanatory notes, p 1.
[70] Cf. § 16d (1) EA 2010.
[71] Cf. Deliverable 5.1 "Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach", pp 48.
[72] Cf. § 16b (3) EA 2010.
[73] According to the definition of § 7 (1) No. 11 EA 2010.
[74] Cf. government explanatory notes, p 27
[75] Cf. Deliverable 5.1 "Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach", pp 49.

of CEC is to provide members/shareholders or the locality with environmental, economic, and social community benefits. The participation is voluntary and open, as is leaving the CEC.[76]

There are no regulatory local or regional restrictions for CEC. A **CEC can extend across the whole Austrian market area**.[77] The community can use the entire Austrian market and thus concession areas of different distribution system operators may be involved. There are also no special regulations in the form of a beneficial system utilization charge that would be based on a regional restriction. Therefore, a CEC has to pay the corresponding system utilization charges according to §§ 52 to 58 EA 2010 and the system charges ordinance for the Austria-wide use of the public grid. This also results from the fact that these relevant provisions do not stipulate any reductions as standardized in comparison with CEC on the system utilization charges pursuant to § 52 (2a) EA 2010.

In addition to specific REC and CEC regulations, there are **joint regulations** that are applicable to both communities (§§ 16d and 16e EA 2010). These regulations refer to the definition of how electricity is to be divided and which obligations the system operator and the members/shareholders of REC and CEC have to fulfil.[78] In addition, there are further regulations concerning the metering and billing of the shared electricity.[79] Among other things, both energy communities are obliged to use a concessionary grid operator.[80]

4.2.3 Barriers & Motivators

ED 2019 has already specified what kind of members/shareholders are allowed to have control in a CEC. The implementation of Austria allows the participation of all legal persons and natural persons, but the control is limited, as ED 2019 specifies. With the implementation of CEC in Austria, there are seeming barriers for larger companies, which are allowed to participate, but are not allowed to participate in decision-making. From another perspective, the Austrian CEC offers an opportunity for all interested parties to participate in an energy community. This means that all other interested parties who cannot participate in a REC are still offered the opportunity to participate in a CEC. Thus, the regulation on CEC is **not a pure obstacle**, it **rather provides an opportunity** for all companies (small to large scaled) to join an energy community.

Under the system utilization charge legislation, there is no exception for CEC, because these communities are allowed to be interconnected across the electricity market, i.e., across multiple distribution system operators.

The regulations on subsidies according to REA can be seen as a **motivator** for participation in a CEC (more information in section 4.2.6). CECs can not only use electricity from fossil sources, but also generate and share electricity from renewable sources, thereby also eligible for support under REA in conjunction with § 16b (4) and (5) EA 2010 (see section 4.2.6).

4.2.4 Other national legislations related with ED 2019

Further national implementations of the requirements of ED 2019 are, among others, the implementation of unbundling requirements for energy storage facilities according to Art 36 and Art 54 ED 2019. In principle, the directive states that transmission system operators and distribution system operators shall not own, develop, manage or operate energy storage facilities.[81] By derogation from this general exclusion of network operators, Member States may allow distribution system operators (DSOs) and transmission system operators (TSOs) to own, develop, manage or operate energy storage facilities. This permission is subject to the fulfilment of the requirements set out in Art 36 and Art 54 ED 2019. Austria has made use of this possibility. According to § 22a EA 2010,

[76] Compare *Cejka, S.* Energiegemeinschaften im Clean Energy Package der EU. 2020. Available online: https://www.researchgate.net/publication/340548396_Energiegemeinschaften_im_Clean_Energy_Package_der_EU (accessed on 22 August 2021).
[77] Cf. Deliverable 5.1 "Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach", pp 49.
[78] Cf. § 16d EA 2010.
[79] Cf. § 16e EA 2010.
[80] Cf. § 16d (6) EA 2010.
[81] Cf. § 36 (1) and § 54 (1) ED 2019.

distribution and transmission system operators are allowed to own, construct, manage or operate facilities for the conversion of electricity into hydrogen or synthetic gas, if the conditions required by § 22a EA 2010 are met.

4.2.5 Conformity to existing legislative framework

As mentioned above, the implementation of REC and CEC has resulted in further changes to energy legislation in Austria. Therefore, it is not yet possible to conclude how CEC will fit into the existing legal system.

Nevertheless, it can be stated that Austria has not chosen its own new legal form for CEC and REC. In Austria, already existing legal structures are to be used for establishing energy communities. This means that the corresponding legal basis for the establishment of the respective legal form must be observed. These are the following possible legal forms: association, cooperative society, partnership[82], corporation[83] or similar association with legal personality.

As mentioned in the previous section, even before RED II and ED 2019, it was possible to produce electricity jointly in a multi-party building. It is possible to sell the self-produced electricity through the public grid, provided that the relevant regulations are complied with. Both possibilities are shown below.

▪ Energy exchange in Austria before RED II

Jointly using electricity in a building

In Austria, the possibility to share self-generated electricity in a building with several apartments or business premises was implemented in 2017. The self-produced electricity (that is not consumed from the participants in the building) can be sold to an electricity supplier and fed into the public grid.[84] This possibility of electricity sharing is regulated in § 16a EA 2010.[85] This is called a joint generation facility.[86] This construct of shared electricity generation and use is limited to the building (main building line) and the metering points connected to it, but electricity not consumed can be sold as surplus. This requires a contract with an electricity supplier.[87]

Sell self-generated electricity to the neighbours

Even before REC and CEC, it was possible to share surplus electricity in Austria. Citizens are allowed to generate electricity for their own consumption and even sell the excess, e.g., to neighbours. However, citizens that generate electricity themselves and wish to sell surplus electricity to a neighbour through the public grid, shift from the legal status as “consumers” to “providers” or “suppliers” [88].[89] The change in legal status means that the person must comply with the corresponding rights and obligations[90] (such as joining a balancing group[91], fulfilling electricity labelling and other obligations) of a provider/supplier with electricity rules of the EA 2010. Although, electricity can be exchanged through the public grid, e.g., with a neighbour, this is not the best solution to exchange electricity, because it is related to many obligations under electricity law. Moreover, if the sale activity does not meet the neighbour’s whole electricity need, the neighbour might be forced to buy additional electricity from another provider/supplier. In order not to have to fulfil obligations under electricity law, the citizen can sell their surplus electricity to a professional electricity supplier that, in turn, sells the electricity to the neighbour. Therefore, it is more efficient and easier for a citizen to sell the electricity to an electricity trader in order not to be obliged to fulfil any obligations as an electricity supplier. This is exactly the approach that eCREW follows with the support of suppliers.

[82] Possible partnerships with legal personality in Austria are: “Offene Gesellschaft (OG)”, “Kommanditgesellschaft (KG)“, „GmbH & Co KG“.
[83] Possible corporation in Austria are: “Aktiengesellschaft (AG)” or “Gesellschaft mit beschränkter Haftung (GmbH)“.
[84] Cf. § 16a EA 2010; *Stöger*, Die (nicht so) "Kleine Ökostromnovelle" 2017, ÖZW 2018, p 8 (12, 13).
[85] Cf. § 16a EA 2010.
[86] In German: „gemeinschaftliche Erzeugungsanlage“.
[87] Cf. Deliverable 5.1 “Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach", p 39.
[88] § 7 (1) No. 74 EA 2010.
[89] Cf. *Ennser B.*, Energierecht für (inter)aktive Kunden: Gemeinschaftliche Erzeugungsanlagen im ElWOG 2010 und andere Modelle der kollektiven Marktteilnahme, in Paulus (Ed.) Jahrbuch Regulierungsrecht (2017) 167 (174).
[90] Cf. *Ennser B.*, Energierecht für (inter)aktive Kunden: Gemeinschaftliche Erzeugungsanlagen im ElWOG 2010 und andere Modelle der kollektiven Marktteilnahme, in Paulus (Ed.) Jahrbuch Regulierungsrecht (2017) 167 (174).
[91] Cf. § 66 (1) Z 1 in connection with § 85 (1) ElWOG 2010.

By participating in eCREW, a supplier becomes responsible for arranging the surplus electricity and can help citizens effectively share and benefit from their electricity through the tools offered (in the form of an app and a digital platform).[92]

4.2.6 Practical issues with legislation

The legal provision on **CEC** stipulates that such a community can also benefit from this support through the market premium or the investment subsidy regulated in REA. The precondition is that the CEC does not use electricity from fossil fuels. Therefore, CECs are eligible for the subsidies, if they use renewable electricity. In connection with the provisions of the investment subsidy[93], § 16b (4) EA 2010 specifies that generation facilities can be subsidized if they meet the relevant conditions of the investment subsidy. Thus, only facilities that are in the renewable energy category are covered. § 16b (5) EA 2010 provides for a subsidy through the market premium, but only for those electricity quantities that originate from renewable sources. The market premium supports renewable electricity quantities generated but not consumed within the CEC. The amount of electricity from renewable sources that can be supported is limited to a maximum of 50% of the total amount of electricity generated within a CEC. The market premium is calculated on the basis of the quantity of electricity marketed by a CEC and fed into the public electricity grid. No market premium will be granted for the production quantities consumed by or allocated to the members/shareholders.[94] In addition, both subsidies must fulfil the further requirements of § 16b (1) or (2) EA 2010 and the respective requirements of the REA. It must be emphasized that only one of the two subsidy options can be used.[95]

For complete coverage, it is to be noted that the regulations to CEC do not have a territorial restriction. The explanatory notes to the government bill already state that CEC can extend over the entire Austrian market area. The energy of CEC can flow through several concession areas of distribution system operators. It was also pointed out that there are no special regulations for CECs with regard to electricity network charges. CECs have to pay all system charges according to EA 2010 and the system charges ordinance.[96] This is due to the fact that the law does not provide for any reductions in system charges for CECs.

As noted for RECs, a generating facility or consuming facility can only have a **membership** with one CEC, REC, or joint generation facility until December 31, 2023. Only after that date (January 1, 2024), a facility can participate in **multiple** communities.[97]

4.3 General overview of how the legislative and administrative framework conforms with the eCREW approach

In the current Austrian legal system, it is possible to share energy (especially electricity) under REC and CEC (see section 4.1.1 and 4.2.1). For this purpose, the legal requirements for a REC or CEC (e.g., the specified members/stakeholders, etc., see above for CEC and REC) must be met and the communities must be established as a legal person. It is also possible to exchange electricity via the public grid without REC or CEC, but the consequences listed above have to be considered (see section “Energy exchange in Austria before RED II”). Within the eCREW approach, the sharing of electricity is made possible by involving a professional energy retailer, who offer their customers, who want to sell and buy electricity via a non-bureaucratic way, to join together in a community (here so-called CREWs). To be a member of a CREW according to the eCREW approach, one needs only an agreement (eCREW contract), through which the electricity retailer takes over the administrative tasks for the allocation of producers and consumers in a CREW. In doing so, the member also assumes the legal obligations of

[92] Cf. Deliverable 5.1 “Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach”, pp 38.
[93] Cf. § 55 REA in connection with § 56, § 56a, § 57 or § 57a REA.
[94] Cf. § 16b (5) REA.
[95] Cf. § 55 (9) REA.
[96] Cf. government explanatory notes, p 26.
[97] Cf. Deliverable 5.1 “Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach”, pp 44 and 49.

a supplier and administrative obligations related to the function of the CREW. As already described above (see section ”Energy exchange in Austria before RED II”), electricity can be exchanged via the public grid, but since this includes many additional legal obligations and challenges (such as joining a balancing group[98], fulfilling electricity labelling and other obligations as well[99]), it is recommended to use an electricity supplier in order not to be obliged to fulfil these legal obligations of a supplier according to Austrian energy law. In this context, the eCREW approach is an opportunity for citizens, but also for larger companies, to engage in collaborative electricity exchange without having to fulfil the obligations of a retailer.[100]

The existing regulations for smart meters in Austria are essential for the eCREW approach. Energy data is collected by smart meters, which are also subject to data protection regulations. The system operator is responsible for installing the smart meter and reading the data. In order for quarter-hour values to be measured, the consumer's consent is required or the consumer's contract makes this necessary. The data is read out once a day and then made available to consumers on a website of the system operator. The responsible electricity suppliers receive the energy data of its customers monthly from the system operator. It is also possible that the consumer authorizes a third party to use data from the smart meter. In this case, the system operator must provide the data and information in a storable and printable form for further processing. In Austria, it is also possible to use a unidirectional communication interface. Accordingly, there are several possibilities how the energy consumption data for the eCREW approach could be obtained. The relevant options for obtaining smart meter data must be considered when applying the eCREW approach.

In general, the eCREW approach fits well into the Austrian energy system. The regular system charges, which are paid for the purchase of electricity and the feed-in of electricity (see section 3.3). Reductions of system charges are only foreseen for REC. In Austria, in addition to the system charges for the use of the public electricity grid, tax levies and contributions are also to be paid. For example, no electricity tax has to be paid for self-generated electricity from a PV system which is consumed by the participants themselves. Participants in eCREW can also benefit from this.[101]

With the introduction of investment subsidies and the market premium, these funding programs are also possible, provided that all requirements of REA are met. These subsidies are interesting for the individual participants depending on the individual case, since the production of renewable electricity is promoted. In addition to the grants provided in REA, there are other grant programs that may be of interest to eCREW participants. There are also different funding programs provided by the Austrian Federal Ministries (e.g., by the Climate and Energy Fund[102]) or by the individual federal states. Depending on the current funding program, eCREW participants can also benefit from funding.

In connection with REC and CEC, the „österreichische Koordinierungsstelle für Energiegemeinschaften“ (in English: Austrian coordination office for energy communities) is to mention. This information center can be consulted via https://energiegemeinschaften.gv.at/. It is an information office that informs about the establishment and operation of energy communities. Based on this, the office cooperates with the local information offices of the individual federal states (see https://energiegemeinschaften.gv.at/bundeslaender/).

Regarding energy communities, e.g., there is a funding program that promotes the implementation of energy communities in Austria (see https://www.klimafonds.gv.at/call/energiegemeinschaften-2021/). There were three phases of tendering (with submission period), which attracts the following target groups:

[98] Cf. § 66 (1) Z 1 in connection with § 85 (1) ElWOG 2010.
[99] Cf. *Ennser, B.*, Energierecht für (inter)aktive Kunden: Gemeinschaftliche Erzeugungsanlagen im ElWOG 2010 und andere Modelle der kollektiven Marktteilnahme, in Paulus (Ed.) Jahrbuch Regulierungsrecht (2017) 167 (174).
[100] Cf. Deliverable 5.1 “Draft report on the legal and administrative framework regarding the adaptability of the eCREW approach”, pp 52.
[101] Cf. § 2 No. 4 Electricity Tax Act.
[102] In German: Klima- und Energiefond; cf. Website: https://www.klimafonds.gv.at/ (14 December 2021).

1. Phase 1: Energy communities that are close to implementation and are considered pioneer projects (from 20.09.2021 until 31.10.2021).
2. Phase 2: Energy communities that are increasingly in the planning phase (from 01.11.2021 until 31.12.2021).
3. Phase 3: Energy communities that intend to start operations at a later date (beginning 2022) (from 01.01.2022 until 28.02.2022).

Several support programs exist within the federal states, e.g., in Upper Austria. They can be found via https://www.energiesparverband.at/energie-gemeinschaften#c24347 and https://www.land-oberoesterreich.gv.at/253029.htm.

5 Practical framework

5.1 Energy behaviours of citizens and how they would associate with the eCREW approach, barriers, and motivators

This section firstly describes the attitudes of Austrian citizens towards energy related matters and secondly their energy behaviour. This assessment is based on a survey carried out during the H2020 project ECHOES. The survey aimed at providing insights into individuals' energy choices within the context of an energy transition process. The survey covered 31 countries (EU 28 including the United Kingdom, plus Norway, Switzerland and Turkey). From a total of 18,037 participants in the 31 countries, 604 were from Austria. This online survey contained 114 questions.

Regarding attitudes towards renewable energy, the survey results reveal that 84.6% of the respondents in Austria are positive about the environmental benefit of renewables. Also, 66.6% state that they intend to use renewable energy in such a way as to support energy transition. Regarding economic benefits, 58.1% believe that the use of renewables will create employment. More general, 79.6% of the respondents believe that global warming is in progress, underscoring the urgency of adopting green behaviour. This perception is connected to actual behaviour as 62.9% state that acting pro-environmentally is an important part of their lives. 72.5% feel obliged to be energy efficient, and 65.3 % feel obliged to adopt energy savings behaviour regarding household heating and cooling. Lastly, 52.2% of the respondents from Austria are in favour of pro-environmental policies, even if they result in higher costs. These results indicate attitudes towards energy related matters that would encourage a success of the eCREW approach. The majority is aware of the importance of and need for renewable energy and is willing to adapt their behaviour towards an energy transition.

Regarding actual energy behaviour, the ECHOES survey also provides insights into respondents' lifestyles and choices in Austria. Most respondents, 58.12%, live in apartment blocks. Another 30.3% live in single-family homes. Regarding the floor areas of the dwellings, 34.1% are smaller than 70 m², and 22.7% are between 71 to 90 m². 12.3% live in larger dwellings of 91 to 110 m², and 9.6% between 111 and 130 m². 20.3% live in households of 131 m² or larger. In Austria, 51.7% of the respondents use central heating for domestic heating, 27.7% use district heating, 8.6% use one or more standalone stoves and 7% use one or more standalone electric heaters. Accordingly, 29% of the households use gas for heating, 21.4% oil, 14.1% wood, 7% a heat pump (geothermally) and 6.8% use electricity for heating. Statistik Austria (2021) reports that electricity-based heating systems in Austria increased from 9.7% in 2008 to 11.3% in 2016.

The energy used for heating and cooling depends on individuals' comfort temperature preferences. 41.4% of the respondents of the ECHOES survey state that their comfort temperatures are close to the average, 37.4% prefer cooler temperatures, and 18.5% warmer temperatures. 82.5% of respondents in Austria do not own an air conditioner. 9.5% use them almost never or rarely and 8.1% stated that they sometimes, regularly or often use air conditioners during hotter periods.

41% of respondents stated that they always or often disconnect electric appliances when not in use, 40.4% never or rarely and 18.7% occasionally. 84.6% use energy-saving light bulbs at home, and 65.6% have at least a share of 75% of energy-saving light bulbs. This indicates that a large share of households already implemented basic energy saving measures and are willing to adapt their lifestyles towards greener behaviour which is a necessary base for CREWs.

A considerable share of respondents, namely 45.2%, give no definite answer on whether their electricity provider has a particularly high share of renewable energy production. 47% confirm that their provider has a particularly high share of renewable energy production, while the remaining 7.8% confirm that theirs do not. It might be the case that households that are aware of such information are more likely to join an energy community such as the eCREW approach offers.

5.2 Current status of communities in terms of energy-related endeavours

According to Caramizaru and Uihlein (2020), energy communities are very heterogeneous in terms of both organisational and legal forms. Broughel and Hampl (2018) argue that in Austria, there are traditional concerns about the unspotted Alpine scenery and tourism, which impact socio-political acceptance of large-scale renewable energy installations. Further, direct citizen involvement might reduce the tension between renewable energy development and the willingness to protect natural environments. However, since Austria has a long tradition of citizen participation in different types of community-based initiatives (from banking services to dairy farms), there would be many reasons to believe that community renewable energy projects might have a large potential in Austria. In fact, in 2014, Austria hosted approximately 400 community renewable energy projects (Bauwens et al., 2016). This is a relatively high number compared to 1750 in Germany, 700 in Denmark, 500 in the Netherlands, 430 in the United Kingdome, 200 in Sweden or only 33 in Spain (Caramizaru and Uihlein, 2020).

Since 2017, joint generation facilities in apartment buildings are allowed (see § 16a EA 2010). Electricity produced by generating facilities within apartment buildings can be consumed by the residents via an internal grid. Prior to this law, renewable electricity generated mostly by PV panels on the roof of houses was often not used directly in the building but fed into the electricity grid. In 09/2020, 291 joint generation facilities were in operation and additional 460 were being planned (TP Smart Grids Austria, 2020).

Moreover, three ongoing community energy initiatives operating in Austria are described. One of the most promising community initiatives is happening in a residential area within Leopoldstadt, a district of Austria's capital Vienna. The largest energy supplier of Austria, Wien Energie, is working on a 5-year project together with local residents to create new products and services in the fields of energy, mobility and smart living. The area includes more than 300 new apartments, local production and consumption of PV electricity and several mobility services, such as car-sharing. Also, peer-to-peer trading via blockchain technology as well as a shared electricity storage with 70kWh are being tested. In the nearer future, heating and cooling supply will be improved with additional solar energy facilities, heat pumps, a local district heating network as well as a local district cooling opportunity. This project is the foundation for future services that could be offered in energy communities (Wien Energie, n.d.).

In 2020, the OurPower Energy Cooperative established an online energy marketplace. Consumers can buy green electricity directly from regional energy producers, ranging from single households with PV panels to small scale businesses owning their own hydro power plant. Consumers, who participate in the marketplace and buy electricity thus directly contribute to the continuity of existing facilities and the expansion of new renewable energy plants. Also, in this way consumption and production of electricity both happen locally. Producers have to join the cooperative (minimum of 100€) to become sellers on the marketplace (OurPower, n.d.).

A smaller scaled but interesting initiative is handled by the network operator Energienetze Steiermark in Heimschuh, a 2000-inhabitants municipality in southern Styria. In 2017, a 100kWh electricity storage system was implemented, shared by a small number of households that all produce electricity with solar energy. As a result, the self-consumption rate of these PVs increased from 30% to more than 70%. Since 2019, peer-to-peer trading via

blockchain technology was enabled. Households can sell their excess electricity directly to their neighbours (Energienetze Steiermark, n.d.).

As described above (section 4.3), there are three tender phases, and the first energy communities are forming. These energy communities become pioneers and are to gather knowledge for subsequent energy communities.

5.3 Role of central government and local administrations in the energy transition – with special emphasis on their positions with respect to the eCREW approach

The Austrian state has electricity regulations that are applicable throughout the whole country. Austria consists of nine federal states, which also have regulations in connection with electricity within their legal scope of authority. The eCREW approach works throughout Austria due to federal legislation regarding regulations, e.g., electricity supply and electricity generation (cf. EA 2010 and REA). The individual federal states also have electrical and building regulations that must be complied with in the respective region (of the nine federal states). It can be noted that the eCREW approach is in line with the Austria-wide and state-wide regulations. With the eCREW approach, all interested citizens and companies that are not subject to legal restrictions, such as unbundling regulations[103], can participate. This includes participants with a generation facility, such as PV system, and also participants who only want to consume electricity from a CREW. Participants must comply with the legal requirements of their own generation facility. There are no obstacles for the eCREW approach, because the eCREW concept is based on the simple and unbureaucratic connection of participants. For the implementation of the approach, professional electricity suppliers are necessary, who take over the legal requirements for the electricity exchange in a CREW. The approach perfectly fits in the legal framework of Austria.[104] For the eCREW approach to work well, it is necessary that the installation of smart meters continues to be pushed forward.

6 Conclusion

6.1 A quick SWOT analysis of the legislative and administrative framework with respect to the eCREW approach

SWOT	**Legislative und administrative framework with respect to the eCREW approach**	
	Strengths	Weakness
Internal perspective	• eCREW uses existing legal framework • Participants with PV systems benefit from reduced electricity tax for self-produced electricity that is consumed by themselves • Unbureaucratic combination of participants into a CREW (no establishment of legal entities)	• No reduction in system charges for eCREW
	Opportunities	Threats
External perspective	• Focus of eCREW is on renewable electricity, thereby subsidies for	• Amendment of the legal and administrative framework

[103] Cf. unbundling requirements for transmission grid operators (§ 24 to 33 EA 2010) and distribution grid operator (§ 42 (3) EA 2010).
[104] The implementation of ED 2019 has not yet been completed, which may result in further changes to the energy law framework. This will be done at a later stage in Deliverable 5.2.

	generation and storage facilities of participants possible • The split-approach of eCREW can be adapted to the Austrian market • eCREW can be offered by professional energy retailers that have an existing customer base	

6.2 A quick SWOT analysis for the practical framework with respect to the eCREW approach

SWOT	**Practical framework with respect to the eCREW approach**	
	Strengths	Weakness
Internal perspective	• Energy-sharing associations/cooperatives already exist • Hundreds of joint generation facilities in apartment buildings are in operation • Strong acceptance of benefits of renewable energy among Austrians • Regions with densely distributed private PVs	• Lack of knowledge/interest in one's electricity providers share of renewable energy
	Opportunities	Threats
External perspective	• Governmental strategies to increase the expansion of PV systems	• Energy retailers not adopting eCREW approach, instead focusing on REC and CEC accompaniment • Smart-meter contingency

6.3 Suggestions for the wider uptake and further development of the eCREW approach

The development of smart meters also allows third parties to open a service in terms of shared use of electricity. In order to offer such a service, generation and consumption data are necessary, which is possible through smart meters and the current legal situation in Austria. As shown above, the eCREW approach is feasible in Austria. Further, subsidies for renewable energy in Austria support the eCREW approach, because participants in a CREW have an incentive to generate their own electricity. The eCREW approach opens up a non-bureaucratic, easy way to share one's electricity with other participants through an electricity supplier. The adaptability and the need for further development of the eCREW approach will be further examined in the light of future developments in Austrian energy law.

6.3.1 Acknowledgments

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6.3.2 References

1. APG (n.d.). Strommarkt. Austrian Power Grid AG. Retrieved from https://www.apg.at/en/markt/strommarkt (accessed: 19.05.2021)
2. BFW (2012). Österreichs Wald. *Bundesforschungszentrum für Wald*. Available at http://bfw.ac.at/050/pdf/Oesterreichs-Wald-BFW-120416.pdf (Accessed: 21.04.2021)
3. Caramizaru, E. & Uihlein, A. (2020). Energy communities: an overview of energy and social innovation, EUR 30083 EN, Publications Office of the European Union, Luxembourg. Retrieved from https://publications.jrc.ec.europa.eu/repository/handle/JRC119433 (18.05.2021)
4. *Cejka, S*. Energiegemeinschaften im Clean Energy Package der EU. 2020. Available online: https://www.researchgate.net/publication/340548396_Energiegemeinschaften_im_Clean_Energy_Package_der_EU (accessed on 22 August 2021)
5. E-Control (2011a). 10 Jahre Energiemarkt-Liberalisierung. p.5. Retrieved from https://www.e-control.at/documents/1785851/1811255/bericht-10-jahre-energiemarktliberalisierung.pdf/418f0056-6db6-4b87-a835-091d1f512c9a?t=1413905309588
6. E-Control (2011b). 10 Jahre Energiemarkt-Liberalisierung. p. 22. Retrieved from https://www.e-control.at/documents/1785851/1811255/bericht-10-jahre-energiemarktliberalisierung.pdf/418f0056-6db6-4b87-a835-091d1f512c9a?t=1413905309588
7. E-Control (2021a). Strom- & Gasnetze in Österreich. Retrieved from https://www.e-control.at/rund-ums-netz-bei-strom-und-gas (accessed: 28.04.2021)
8. E-Control (n.d.-a). Website. Available under https://www.e-control.at/en/home_de
9. E-Control (n.d.-b). Strom- & Gaspreise. Retrieved from https://www.e-control.at/konsumenten/strom-gas-preise (accessed: 18.05.2021)
10. E-Control (n.d.-c). Netzentgelte. Retrieved from https://www.e-control.at/en/marktteilnehmer/strom/netzentgelte (accessed: 19.05.2021)
11. E-Control (n.d.-d). Großhandelspreise. Retrieved from https://www.e-control.at/marktteilnehmer/strom/strommarkt/preise/grosshandelspreise (accessed: 18.05.2021)
12. E-Control (nd.d-e). Sonstige Marktregeln. Retrieved from https://www.e-control.at/de/marktteilnehmer/strom/marktregeln/sonstige_marktregeln (accessed: 19.05.2021)
13. Energienetze Steiermark GmbH (n.d.). Projekt Leafs. Retrieved from https://www.e-netze.at/Strom/Projekte/Leafs/Default.aspx (accessed: 18.05.2021)
14. Ennser, B. Jahrbuch Regulierungsrecht (2017). Energierecht für (inter)aktive Kunden: Gemeinschaftliche Erzeugungsanlagen im ElWOG 2010 und andere Modelle der kollektiven Marktteilnahme, in Paulus (Ed.) 167-183.
15. Getzner, M. & Kadi, J. (2019). Determinants of land consumption in Austria and the effects of spatial planning regulations. European Planning, 28(6), 1095-1117
16. Government explanatory notes to REA-package. available under: https://www.parlament.gv.at/PAKT/VHG/XXVII/I/I_00733/fname_933186.pdf (05-11-2021)
17. *Hartlieb/Kitzmüller*, Erneuerbare-Energie. Gemeinschaften: Zivilrechtliche Stolpersteine und regulatorische Rahmenbedingungen, RdU-U&T 2021, 56-61.
18. Klima- und Energiefond. Website: https://www.e-control.at/en/home_dwww.klimafonds.gv.at/ (14.12.2021).
19. OurPower (n.d.). OurPower Energiegenossenschaft SCE mbH, Wien. Retrieved from https://www.ourpower.coop/?gclid=CjwKCAjwy42FBhB2EiwAJY0yQkeEG3dfq7ZBJBMBogVEnAmkGAgUNF2onvOiQ8dSc4INWdR__8o5RBoCD_gQAvD_BwE (accessed: 18.05.2021)

20. Statistik Austria (2021). Energieeinsatz der Haushalte. Retrieved from: https://www.statistik.at/web_de/statistiken/energie_umwelt_innovation_mobilitaet/energie_und_umwelt/energie/energieeinsatz_der_haushalte/index.html (accessed: 12.11.2021)
21. *Stöger, K.*, Die (nicht so) "Kleine Ökostromnovelle" 2017, ÖZW 2018, 8-15
22. TP Smart Grids Austria (2020). Positionspapier 03/2020, Erfahrungen mit Gemeinschaftlichen Erzeugungsanlagen. Retrieved from https://www.smartgrids.at/files/smartgrids/Dateien/Dokumente/Dokumente/Positionspapier_%C2%A716a_Erfahrungen.pdf (accessed: 19.05.2021)
23. Website of österreichische Koordinationstelle für Energiegemeinschaften, https://energiegemeinschaften.gv.at/programm-des-klima-und-energiefonds/ (14.12.2021).
24. Website of österreichische Koordinationstelle für Energiegemeinschaften. Stand der Umsetzung von Erneuerbare-Energie-Gemeinschaften (EEG) – Registrierung, Energiedatenaustausch, Abrechnung, 13.12.2021 (https://energiegemeinschaften.gv.at/stand-der-umsetzung-von-erneuerbare-energie-gemeinschaften-eeg-registrierung-energiedatenaustausch-abrechnung/ (14.12.2021).
25. Wien Energie GmbH (n.d.). Viertel Zwei. Retrieved from https://positionen.wienenergie.at/beitraege/viertel-zwei/ (accessed: 18.05.2021)

6.3.3 Data sources

1 AMS (2020). *Arbeitsmarktdaten* [Online]. Arbeitsmarktservice Österreich. Available at: http://iambweb.ams.or.at/ambweb/ (Accessed: 22.04.2021)
2 E-Control (2021b). Bestandsstatistik. Retrieved from https://www.econtrol.at/statistik/strom/bestandsstatistik (accessed: 28.04.2021)
3 OECD (2021). Adult education level (indicator). doi: 10.1787/36bce3fe-en (accessed: 04.05.2021)
4 Statistik Austria (2016). *Land- und Forstwirtschaft*. Available at: http://pic.statistik.at/web_de/statistiken/wirtschaft/land_und_forstwirtschaft/index.html (Accessed: 21.04.2021)
5 Statistik Austria (2018). Bildungsstand der Bevölkerung. Retrieved from http://pic.statistik.at/web_de/statistiken/menschen_und_gesellschaft/bildung/bildungsstand_der_bevoelkerung/index.html (accessed: 21.04.2021)
6 Statistik Austria (2019). Jährliche Personeneinkommen. Retrieved from https://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/soziales/personen-einkommen/jaehrliche_personen_einkommen/index.html (accessed: 21.04.2021)
7 Statistik Austria (2020a). Bevölkerung nach Alter und Geschlecht. Retrieved from http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/bevoelkerung/bevoelkerungsstruktur/bevoelkerung_nach_alter_geschlecht/index.html (accessed: 21.04.2021)
8 Statistik Austria (2020b). NUTS-Einheiten. Retrieved from http://www.statistik.at/web_de/klassifikationen/regionale_gliederungen/nuts_einheiten/index.html (accessed: 20.04.2021)
9 Statistik Austria (2020c). Energiebilanzen. Retrieved from http://www.statistik.at/web_de/statistiken/energie_umwelt_innovation_mobilitaet/energie_und_umwelt/energie/energiebilanzen/index.html (accessed: 22.04.2021)
10 Statistik Austria (2020d). STATatlas. Retrieved from https://www.statistik.at/atlas/ (accessed: 28.04.2021)
11 Statistik Austria (2021a). Übersicht der Bundesländer. Retrieved from http://www.statistik.at/web_de/klassifikationen/regionale_gliederungen/bundeslaender/index.html (accessed: 20.04.2021)
12 Statistik Austria (2021b) Arbeitslose und Arbeitslosenquoten nach ILO-Konzept nach Alter und Geschlecht. Retrieved from http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/arbeitsmarkt/arbeitslose_arbeitssuchende/arbeitslose_internationale_definition/063260.html (accessed: 22.04.2021)
13 WKO (2021). *Unternehmen und unselbständig Beschäftigte nach Sparten.* Wirtschaftskammern Österreichs. Available at: https://wko.at/statistik/jahrbuch/unternehmen-sparten.pdf?_gl=1*of82t3*_ga*MTAzMjU2NzI0OC4xNjE3NzgxNTgz*_ga_4YHGVSN5S4*MTYxOTA4MjU4

My4xLjEuMTYxOTA4MjU4Ny41Ng..&_ga=2.32363644.377829572.1619082583-1032567248.1617781583
(Accessed: 22.04.2021)

13.1.1 Legislation

1 Bundesgesetz über die Förderung der Elektrizitätserzeugung aus erneuerbaren Energieträgern (Ökostromgesetz 2012 – ÖSG 2012) F.L.G. I No. 75/2011 last amended by F.L.G. I No. 150/2021. Available online: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007386 (accessed on 09 May 2022).

2 Bundesgesetz über die Steigerung der Energieeffizienz bei Unternehmen und dem Bund (Bundes-Energieeffizienzgesetz – EEffG) F.L.G. I No. 72/2014 last amended by F.L.G. I No. BGBl. I Nr. 68/2020. Available online: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20008914 (accessed on 09 May 2022).

3 Bundesgesetz, mit dem die Organisation auf dem Gebiet der Elektrizitätswirtschaft neu geregelt wird (Elektrizitätswirtschafts- und –organisationsgesetz 2010 – ElWOG 2010) F.L.G. I No. 110/2010 last amended by F.L.G. I No. 7/2022. Available online: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007045 (accessed on 09 May 2022).

4 Bundesgesetz, mit dem eine Abgabe auf die Lieferung und den Verbrauch elektrischer Energie eingeführt wird (Elektrizitätsabgabegesetz) F.L.G. I No. 201/1996 last amended F.L.G. I No. 10/2022. Avaliable under: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10005027 (acceced on 09 May 2022)

5 Bundesgesetz, mit dem Neuregelungen auf dem Gebiet der Erdgaswirtschaft erlassen werden (Gaswirtschaftsgesetz 2011 – GWG 2011) F.L.G. I No. 107/2011 last amended by F.L.G. I No. 38/2022. Available online: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20007523 (accessed on 09 May 2022).

6 Verordnung der Regulierungskommission der E-Control, mit der die Entgelte für die Systemnutzung bestimmt werden (Systemnutzungsentgelte-Verordnung 2018 – SNE-V 2018) F.L.G. II No. 398/2017 last amended F.L.G. II No. 558/2022. Available under: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20010107 (accessed on 09 May 2022).

7 Verordnung des Bundesministers für Finanzen zur Umsetzung des Elektrizitätsabgabegesetzes im Bereich mittels Photovoltaik erzeugter elektrischer Energie F.L.G. II No. 82/2021 last amended F.L.G. II 464/2021. Available under: https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20011479 (accessed on 09 May 2022).