Technology Collaboration Programme
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International Energy Agency
Photovoltaic Power Systems Programme

Task 1 Strategic PV Analysis and Outreach

PVPS

National Survey Report of PV Power Applications in Austria

2020

What is IEA PVPS TCP?

The International Energy Agency (IEA), founded in 1974, is an autonomous body within the framework of the Organization for Economic Cooperation and Development (OECD). The Technology Collaboration Programme (TCP) was created with a belief that the future of energy security and sustainability starts with global collaboration. The programme is made up of 6.000 experts across government, academia, and industry dedicated to advancing common research and the application of specific energy technologies.

The IEA Photovoltaic Power Systems Programme (IEA PVPS) is one of the TCP's within the IEA and was established in 1993. The mission of the programme is to "enhance the international collaborative efforts which facilitate the role of photovoltaic solar energy as a cornerstone in the transition to sustainable energy systems." In order to achieve this, the Programme's participants have undertaken a variety of joint research projects in PV power systems applications. The overall programme is headed by an Executive Committee, comprised of one delegate from each country or organisation member, which designates distinct 'Tasks,' that may be research projects or activity areas.

The IEA PVPS participating countries are Australia, Austria, Belgium, Canada, Chile, China, Denmark, Finland, France, Germany, Israel, Italy, Japan, Korea, Malaysia, Mexico, Morocco, the Netherlands, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, and the United States of America. The European Commission, Solar Power Europe, the Smart Electric Power Alliance (SEPA), the Solar Energy Industries Association and the Cop- per Alliance are also members.

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What is IEA PVPS Task 1?

The objective of Task 1 of the IEA Photovoltaic Power Systems Programme is to promote and facilitate the exchange and dissemination of information on the technical, economic, environmental and social aspects of PV power systems. Task 1 activities support the broader PVPS objectives: to contribute to cost reduction of PV power applications, to increase awareness of the potential and value of PV power systems, to foster the removal of both technical and non-technical barriers and to enhance technology co-operation. An important deliverable of Task 1 is the annual "Trends in photovoltaic applications" report. In parallel, National Survey Reports are produced annually by each Task 1 participant. This document is the country National Survey Report for the year 2019. Information from this document will be used as input to the annual Trends in photovoltaic applications report.

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COVER PICTURE

Wien Energie/Johannes Zinner, 11,45 MW Agricultural-PV System on a 125.000 m² former gravel landfill

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1 INSTALLATION DATA

The PV power systems market is defined as the market of all nationally installed (terrestrial) PV applications with a PV capacity of 40 W or more. A PV system consists of modules, inverters, batteries and all installation and control components for modules, inverters and batteries. Other applications such as small mobile devices are not considered in this report.

For the purposes of this report, PV installations are included in the 2020 statistics if the PV modules were installed and connected to the grid between 1 January and 31 December 2020, although commissioning may have taken place at a later date.

1.1 Applications for Photovoltaics

The Austrian PV market is highly dominated by roof top installations. More than 90% are roof top, a few percentages are building integrated (BIPV facade and roof) and only some percent are ground mounted PV systems. Only in the last year (2020) the first larger ground mounted PV-systems larger than 10 MW were installed, mainly by utilities. Other applications are in an infant state, a first Agri-PV installation - vertical with bifacial modules and some larger carport solutions are demonstrated so far. However, the federal ministry and local governments are more and more promoting alternative applications, always with the feature of being integrated into the- already existing or planned - built environment. Currently, mainly due to the new national target to increase the PV installations by 11 GW until 2030, there is a high dynamic on all pv markets visible, dominated by a wide public discussion about the acceptance of large ground mounted PV systems.

1.2 Total photovoltaic power installed

Data acquisition is done by a project of a group of academic stakeholders on behalf of the Austrian ministry of climate action, environment, energy, mobility, innovation and technology. This national survey is dedicated to the technologies of PV, wind, solarthermal, heat pumps and bioenergy and is done on an annual basis since the year 1992.

The survey is based on data from the various national and regional funding agencies and the green electricity processing agency (ÖMAG) as well as on surveys among planners, producers and installers. The market figures are also coordinated with the surveys of the regulatory authority.

Centralized PV: any PV installation which only injects electricity and is not associated with a consumer (no self-consumption)

Decentralized PV: any PV installation which is embedded into a customer's premises (self-consumption)

Table 1: Annual PV power installed during calendar year 2020

		Installed PV capacity in 2020 [MW]	AC or DC
PV capacity	Off-grid	0,5	DC
	Decentralized	336	DC
	Centralized	4,3	DC
	Total	340,8	DC

Table 2: PV power installed during calendar year 2020

			Installed PV capacity [MW]	Installed PV capacity [MW]	AC or DC
Grid-connected	BAPV	Residential	326,7	n.a.	DC
		Commercial		n.a.	DC
		Industrial		n.a.	DC
	BIPV	Residential	9,2	n.a.	DC
		Commercial		n.a.	DC
		Industrial		n.a.	DC
	Utility-scale	Ground-mounted	4,4	4,4	DC
		Floating		0	DC
		Agricultural		0	DC
Off-grid		Residential	0,5	n.a.	DC
		Other		n.a.	DC
		Hybrid systems		n.a.	DC
Total			340,8		DC

Table 3: Data collection process

Is the collection process done by an official body or a private company/Association?	University AS Technikum Vienna, TU Vienna
Link to official statistics (if this exists)	https://nachhaltigwirtschaften.at/resources/iea_pdf/marktentwicklung-2020_web.pdf
	The survey was carried out by evaluating all national and regional funding agencies via a survey of planners and installers; Furthermore, a comparison was made with the figures from the regulator (E-Control), which determines these from the annual statutory reports from the network operators.

Table 4: The cumulative installed PV power in 4 sub-markets

Year	Off-grid [MW]	Grid-connected distributed [MW] (BAPV, BIPV)	Grid-connected centralized [MW] (Ground, floating, agricultural…)	Total [MW]
1992	0,338	0,187	0	**0,525**
1993	0,423	0,346	0	**0,769**
1994	0,59	0,453	0	**1,043**
1995	0,755	0,586	0	**1,341**
1996	0,888	0,831	0	**1,719**
1997	0,992	1,196	0	**2,188**
1998	1,193	1,648	0	**2,841**
1999	1,393	2,189	0	**3,582**
2000	1,649	3,219	0	**4,868**
2001	1,835	4,263	0	**6,098**
2002	1,962	8,357	0	**10,319**
2003	2,131	14,66	0	**16,791**
2004	2,645	18,415	0	**21,06**
2005	2,895	21,126	0	**24,021**
2006	3,169	22,416	0	**25,585**
2007	3,224	24,477	0	**27,701**
2008	3,357	29,03	0	**32,387**
2009	3,605	48,991	0	**52,596**
2010	3,812	91,686	0	**95,498**
2011	4,502	182,67	0	**187,172**
2012	4,722	358,163	0	**362,885**
2013	5,19	620,784	0	**625,974**
2014	5,489	779,757	0	**785,246**
2015	5,535	931,563	0	**937,098**
2016	6,487	1089,529	0	**1096,016**
2017	6,963	1262,008	0	**1268,971**
2018	7,197	1439,935	8	**1455,132**
2019	7,697	1676,296	18,1	**1702,093**
2020	8,197	2030,337	4,4	**2042,934**

Table 5: Other PV market information

	2020
Number of PV systems in operation in your country	"138.715 (end of 2019, official data from regulator) - 160.000 by end of 2020 (est.)"
Decommissioned PV systems during the year [MW]	n.a.
Repowered PV systems during the year [MW]	-
Total capacity connected to the low voltage distribution grid [MW]	-
Total capacity connected to the medium voltage distribution grid [MW]	-
Total capacity connected to the high voltage transmission grid [MW]	-

Table 6: PV power and the broader national energy market

	2019	2020
Total power generation capacities [MW]	26.166	26.153
Out of that Hydro	14.599	14.640
Thermal power	6.743	6.372
Total electricity demand [TWh]	74.318	72.866
Total energy demand (PJ]	1.139	1.052
New power generation capacities installed [GW]	-	0,35
New renewable power generation capacities (including hydropower) [GW]	-	0,35
Estimated total PV electricity production (including self-consumed PV electricity) in [GWh]	1.785	2.100
Total PV electricity production as a % of total electricity consumption	2,4	2,8

1.3 Key enablers of PV development

Table 7: Information on key enablers

	Description	Annual Volume	Total Volume	Source
Decentralized storage systems		> 5.000 systems	n.a.	expert guess
Residential Heat Pumps [#]		31.721	350.000	Survey by Enfoss-comapny on behalf of the ministry of climate protection
Electric cars [#]		14.984	44.507	Statistic Austria
Electric buses and trucks [#]		n.a.	n.a.	

2 COMPETITIVENESS OF PV ELECTRICITY

2.1 Module prices

Table 8: Typical module prices for a number of years

Year	Lowest price of a standard module crystalline silicon [€/W]	Highest price of a standard module crystalline silicon	Typical price of a standard module crystalline silicon [€/W]
2011	1350		1446
2012	810		943
2013	650		746
2014	600		671
2015	570		600
2016	510		610
2017	480		508
2018	440		466
2019	420		447
2020	378		378

Prices for modules produced in Austria - for modules from abroad the typical price was 269€/kWp (range: 100-400)

2.2 System prices

Table 9: Turnkey PV system prices of different typical PV systems

Category/Size	Typical applications and brief details	Current prices [€/W]
Off-grid 1-5 kW	A stand-alone PV system is a system that is installed to generate electricity to a device or a household that is not connected to the public grid.	n.a.
Residential BAPV 5-10 kW	Grid-connected, roof-mounted, distributed PV systems installed to produce electricity to grid-connected households. Typically roof-mounted systems on villas and single-family homes.	1,506 (for a 5kWp system)
Residential BIPV 5-10 kW	Grid-connected, building integrated, distributed PV systems installed to produce electricity to grid-connected households. Typically, on villas and single-family homes.	n.a.
Small commercial BAPV 10-100 kW	Grid-connected, roof-mounted, distributed PV systems installed to produce electricity to grid-connected commercial buildings, such as public buildings, multi-family houses, agriculture barns, grocery stores etc.	1,192 (for a 10kWp System)
Small commercial BIPV 10-100 kW	Grid-connected, building integrated, distributed PV systems installed to produce electricity to grid-connected commercial buildings, such as public buildings, multi-family houses, agriculture barns, grocery stores etc.	n.a.
Large commercial BAPV 100-250 kW	Grid-connected, roof-mounted, distributed PV systems installed to produce electricity to grid-connected large commercial buildings, such as public buildings, multi-family houses, agriculture barns, grocery stores etc.	0,9 (est.)
Large commercial BIPV 100-250 kW	Grid-connected, building integrated, distributed PV systems installed to produce electricity to grid-connected commercial buildings, such as public buildings, multi-family houses, agriculture barns, grocery stores etc.	n.a.
Industrial BAPV >250 kW	Grid-connected, roof-mounted, distributed PV systems installed to produce electricity to grid-connected industrial buildings, warehouses, etc.	0,8 (est.)
Small centralized PV 1-20 MW	Grid-connected, ground-mounted, centralized PV systems that work as central power station. The electricity	0,7 (est.)

	generated in this type of facility is not tied to a specific customer and the purpose is to produce electricity for sale.	
Large centralized PV >20 MW	Grid-connected, ground-mounted, centralized PV systems that work as central power station. The electricity generated in this type of facility is not tied to a specific customer and the purpose is to produce electricity for sale.	n.a.

Table 10: National trends in system prices for different applications

Year	Residential BAPV Grid-connected, roof-mounted, distributed PV system 5-10 kW **[€/W]**	Small commercial BAPV Grid-connected, roof-mounted, distributed PV systems 10-100 kW **[€/W]**	Large commercial BAPV Grid-connected, roof-mounted, distributed PV systems 100-250 kW **[€/W]**	Small centralized PV Grid-connected, ground-mounted, centralized PV systems 10-20 MW **[€/W]**
2010	3680	n.a.	n.a.	n.a.
2011	2970	n.a.	n.a.	n.a.
2012	2216	n.a.	n.a.	n.a.
2013	1943	n.a.	n.a.	n.a.
2014	1752	n.a.	n.a.	n.a.
2015	1658	n.a.	n.a.	n.a.
2016	1645	n.a.	n.a.	n.a.
2017	1621	n.a.	n.a.	n.a.
2018	1567	1,27 (for 10 kWp)	0,9 (est.)	n.a.
2019	1560	1,19 (for 10kWp)	0,8 (est.)	n.a.
2020	1506	1,19 (for 10kWp)	0,7-1 (est.)	n.a.

In the national PV market data there are analysis for 5 and 10kWp systems included. Therefore, in this table, first row represents prices for 5 kWp System, second for 10kWp. There is a significant difference between 10 and 100kWp Systems, which might be better correspond to the data in row 4.(large commercial) the larger they are.

2.3 Cost breakdown of PV installations

The cost breakdown of a typical 5-10 kW roof-mounted, grid-connect, distributed PV system on a residential single-family house and a typical >10 MW Grid-connected, ground-mounted, centralized PV systems at the end of 2019 is presented in Table 11 and **Fehler! Verweisquelle konnte nicht gefunden werden.**, respectively.

The cost structure presented is from the customer's point of view. I.e. it does not reflect the installer companies' overall costs and revenues. The “average” category in Table 11 and **Fehler! Verweisquelle konnte nicht gefunden werden.** represents the average cost for each cost category and is the average of the typical cost structure. The average cost is taking the whole system into account and summarizes the average end price to customer. The “low” and “high” categories are the lowest and highest cost that has been reported within each segment. These costs are individual posts, i.e. summarizing these costs do not give an accurate system price.

Table 11: Cost breakdown for a grid-connected roof-mounted, distributed residential PV system of 5-10 kW

Cost category	Average [€/W]	Low [€/W]	High [€/W]
Hardware			
Module	0,483	n.a.	n.a.
Inverter	0,343	n.a.	n.a.
Mounting material	0,3	n.a.	n.a.
Other electronics (cables, etc.)	0,1	n.a.	n.a.
Subtotal Hardware	**1,226**		
Soft costs			
Planning	0,08	n.a.	n.a.
Installation work	0,1	n.a.	n.a.
Shipping and travel expenses to customer	0	n.a.	n.a.
Permits and commissioning (i.e. cost for electrician, etc.)	0,05	n.a.	n.a.
Project margin	0,05	n.a.	n.a.
Subtotal Soft costs	0,28		
Total (excluding VAT)	1,506		
Average VAT	0,2		

Total (including VAT)	1,8072	

2.4 Additional Country information

Table 12: Country information

Retail electricity prices for a household	18-24 €Cent/kWh
Retail electricity prices for a commercial company	10-19 €Cent/kWh
Retail electricity prices for an industrial company	10-13 €Cent/kWh
Population at the end of 2020	8,9 Mio.
Country size [km^2]	84.000
Average PV yield in [kWh/kW]	1050

3 POLICY FRAMEWORK

This chapter describes the support policies aiming directly or indirectly to drive the development of PV. Direct support policies have a direct influence on PV development by incentivizing or simplifying or defining adequate policies. Indirect support policies change the regulatory environment in a way that can push PV development.

Table 13: Summary of PV support measures

Category	Residential		Commercial + Industrial		Centralized	
Measures in 2019	**On-going**	**New**	**On-going**	**New**	**On-going**	**New**
Feed-in tariffs	yes	yes	yes	-	yes	-
Feed-in premium (above market price)	-	-	-	-	-	-
Capital subsidies	yes	-	yes	-	yes	-
Green certificates	-	-				
Renewable portfolio standards with/without PV requirements	-					
Income tax credits	-					

Self-consumption	-					
Net-metering	-					
Net-billing	-					
Collective self-consumption and virtual net-metering	yes		yes			
Commercial bank activities e.g. green mortgages promoting PV	-					
Activities of electricity utility businesses	yes		yes		yes	
Sustainable building requirements	yes		yes	-	-	
BIPV incentives	yes		-		-	

3.1 National targets for PV

In 2020 a new law was designed, which enters into force finally in July 2021. It sees a PV target of additional 11 TWh coming from PV until 2030.

3.2 Direct support policies for PV installations

3.2.1 Feed-In Tariffs

The feed-in-tariff system is designed only for systems between 5 and 200 kWp; Feed-in Tariff is provided via the national green-electricity act; the “new RES” are supported by this act mainly via up to 13 years guaranteed feed-in tariffs; The feed-in-tariffs are stated by the federal Ministry for Economics and financed by a supplementary charge on the net-price and a fixed price purchase obligation for electricity traders. For 2020 the tariff was set with 7,67 €Cent/kWh for PV at buildings and no incentive for PV on open landscape; an additional 250 € subsidy per kWp (max. 30% of total invest cost) was offered.

Beside that, a federal investment support for systems up to 500 kWp, introduced in 2019 was available. The PV system is supported with up to € 250 per kWp, electricity storage with € 200 per kWh. There is also a new restriction on the maximum storage capacity that can be funded: Both PV and storage systems can be built larger, but a maximum of 500 kW for PV systems or 50 kWh for electricity storage are funded. Within this scheme, 24 million euros for the funding of PV systems (2019: 9 million euros) and a further 12 million euros for electricity storage (2019: 6 million euros) were available.

3.2.2 Capital Subsidies

About 6,2 MEUR were dedicated to PV investment support for small systems up to 5 kWp in 2020 by the Austrian “Climate and Energy Fund”. This additional support scheme has existed since 2008 and is well co-ordinated with the feed-in scheme. With 250 EUR per kWp for roof-top systems and 350 EUR per kWp for building integrated systems, the support per kWp was slightly lower than in 2019. This support has led to about 5370 new PV systems with a total capacity of 31,4 MWp in 2020.

“For the sixth time, there was an additional offer for the agricultural sector – systems from 5 kWp to 50 kWp, owned by farmers, obtained a comparable incentive per kWp (275/375 EUR) as other private owners, which has led to approx. 22.7 MWp installed in 2020. Regions that participate in the Programme “Climate and Energy Pilot Regions” are eligible to receive funding for PV installations that are in special “public interest”. In 2020, 265 PV installations were funded with 4.0 MEUR. In total, 8.7 MWp were submitted.”

3.2.3 BIPV development measures

There is just a 100€ bonus for BIPV in the investment support scheme of the climate and energyfund scheme. Other measures to support BIPV can be found in the research sector with some projects on BIPV as well as some activities of the Austrian PV technology plattform (www.tppv.at) to support the development of BIPV.

3.2.4 PV and Storage

The concept of “Investment subsidies for photovoltaic systems and electricity storage 2020” supports the construction, expansion and combination of new or existing PV systems with electricity storage. f a storage capacity of at least 0.5 kWh per kW peak is installed in a PV system or an existing storage capacity is expanded, an additional investment grant of EUR 200 per kWh can be granted. Electricity storage is funded up to a maximum of 50 kWh per kW peak.

3.3 Indirect support policies for PV installations

3.3.1 Building codes

Building codes are mainly regional in Austria; Many countries have regulations and/or incentives for building a PV system. Upt o now only in Vienna it is obligatory to install a PV system. In detail: A PV system with a minimum output of "1 kWp (kilowatt peak) per characteristic length of the building and for every 300 m² of conditioned gross floor area" is mandatory (for commercial buildings, at least 1 kWp is required for every 100 m² of gross floor area). One- and two-family houses as well as allotment garden houses are exempt from the obligation.

3.3.2 Electric vehicles and Renewable Electricity

The Austrian government supports electric vehicles and charging stations via the Austrian energy and climate fonds. In addition, heavy e-commercial vehicles, e-buses, e-fleets, e-special vehicles and multimodal mobility nodes can be funded. The support ranges from 2000€ for plugged in hybrid vehicles and 5.000 for battery only driven cars up to more than 100.000€ for larger electric busses. Moreover, the costs of an e-car are pre-tax deductible. Up to € 40,000.00 gross acquisition costs there is a full input tax deduction, between € 40,000.00 and € 80,000.00 aliquot and above € 80,000.00 no input tax deduction. Electricity costs and costs for the electricity distribution points are also deductible. Currently (mid 2021) about 50.000 battery electric driven vehicles (BEV) are operated in Austria and about 12% of the new sales are BEV.

3.4 Self-consumption measures

Collective self consumption was introduced in 2017 and mainly dedicated to PV on multifamily buildings. Up to the end of 2020 about of only 400 self collective projects were recorded in Austria; there are various effects why this model is not yet successful; smart meter installations and their data acquisition is mentioned frequently as well as the bureaucracy of the implementation. Moreover, it is frequently not seen as a sufficient financial benefit by the users.

Table 14: Summary of self-consumption regulations for small private PV systems in 2019

PV self-consumption	1	Right to self-consume	yes
	2	Revenues from self-consumed PV	no taxes etc… for self consumed energy
	3	Charges to finance Transmission, Distribution grids & Renewable Levies	no
Excess PV electricity	4	Revenues from excess PV electricity injected into the grid	typically 4-6 €Cent per kWh, depending on the offer of the utility
	5	Maximum timeframe for compensation of fluxes	n.a.
	6	Geographical compensation (virtual self-consumption or metering)	enter description here
Other characteristics	7	Regulatory scheme duration	not limited
	8	Third party ownership accepted	continuous
	9	Grid codes and/or additional taxes/fees impacting the revenues of the prosumer	yes
	10	Regulations on enablers of self-consumption (storage, DSM…)	not for self consumed energy

	11	PV system size limitations	There exists a support scheme for PV-Storage-systems: In 2020, one-time investment funding was used to support the construction of the PV system and the construction of an electricity storage facility.
	12	Electricity system limitations	no
	13	Additional features	each project checked individually, depending on the grid structure

The measures for the feed in tariff are financied by the electricty bill of all consumers ("renewable energy support contribution"), all other support schemes are financed by the general budget of the regional and federal government.

3.5 Curtailment policies

Up to a network-effective rated output of a maximum of 30 kVA per network connection point of a network user in the low-voltage network, automatic disconnection points can be used

according to ÖVE guideline R 25. Details can be found at the guideline "Tor-Erzeuger", newly published by the Austrian regulatory office "E-control" in 2019.

4 INDUSTRY

Module manufacturing is defined as the industry where the process of the production of PV modules (the encapsulation) is done. A company may also be involved in the production of ingots, wafers or the processing of cells, in addition to fabricating the modules with frames, junction boxes etc. The manufacturing of modules may only be counted to a country if the encapsulation takes place in that country.

. In Austria, in 2020 there was no production site for ingots, wafer and/or cells.

Compared to the previous year, the Austrian module producers saw in 2020 an increase in produced Module output by 6.3% to 134,350 MWpeak.

The inverter production grew from 3.499 to 3.657 MW.

5 PV IN THE ECONOMY

This chapter aims to provide information on the benefits of PV for the economy.

5.1 Labour places

Table15: Estimated PV-related full-time labour places in 2020 in Austria

Market category		Number of full-time labour places [FTE]
Upstream	Research and development (not including companies)	403
	Manufacturing of products throughout the PV value chain from feedstock to systems, including company R&D	920
Downstream	Distributors of PV products	n.a.
	System and installation companies	1432
	Operation and maintenance companies	n.a.
	Electricity utility businesses and governement	n.a.

5.2 Business value

The data from the national survey shows that 14.7% of the modules installed are domestically origin and 50.8% of the deployed Inverters in 2020 were also produced domestically, but among them it is highly probable that inverters and modules produced abroad also come from Austrian dealers were resold to local planners and installers. Based on this data, the national added value from the installation of complete PV systems in Austria is EUR 259.6 million, which corresponds to 50.6% of sales.

In 2020, Austrian module producers produced PV modules with a Total output of 134,350 kWpeak. Of this, a total of 76,450 kWpeak was exported and 50,006 kWpeak resold in Austria. related sales in 2020 is EUR 45.5 million.

5.3 Labour places

The number of jobs was determined in the course of the annual data collection. Included is the determination of the number of jobs of Austrian PV planners and installer as extremely complex, since in many companies there is no clear demarcation of the different areas of the company. Based on the survey of 30 Austrian system planners and installers, 43.7% of the 2020 in Austria newly installed power, the average jobs per installed MWpeak and based on the newly installed PV power in 2020 extrapolated. Only system planners and installers were taken into account who in the year 2020 have installed PV systems with a capacity of at least 200 kWp (n=12). The The previous year's figure of 5.0 jobs per installed MWpeak fell to 4.2 this year Jobs per installed MWpeak. This is due to the recent market growth years quite realistic, especially in view of the sharp decline in recent years Number of workstations per installed MWpeak. In general, however, it should be noted that these numbers need to be interpreted with caution and will continue to do so for one more meaningful comparison should be observed over several years. Based on this key figure and the installed capacity of 340.3 MWpeak in 2020 1,432 jobs, which means an increase of about 16.7% compared to the previous year. This means that PV planners and installers account for 52.0% of all jobs in the PV industry responsible. With 748 jobs (27.2%), the manufacturers of inverters and PV auxiliary components in second place. The number of employees in this area should be significantly higher, however, since many producers do not sell their products exclusively produce for the PV division and therefore no or no reliable figures regarding the employees in the PV area could deliver. Finally, another 403 jobs in the research and development (14.6%). With 172 jobs, the Number of jobs at Austrian module producers in 2020 will increase significantly 27.41% (2019: 135 jobs). The total amount in 2020 can therefore be 2,755 jobs are estimated. This corresponds to an increase of 0.2% in comparison to 2019.

6 INTEREST FROM ELECTRICITY STAKEHOLDERS

6.1 Structure of the electricity system

Austria has one Transmission system operator (Austrian power grid) and more than 120 Distribution network operators. The balancing energy market in Austria is mainly determined by pumped storage power plants and gas-fired power plants. There are currently 16 natural gas power plants in Austria and 3,4 GW power made by pump hydro storages powerplants. Energie-Control Austria for the regulation of the electricity and natural gas industry - or E-Control for short - is the regulatory authority in Austria responsible for the electricity and gas industry. The TSO and the larger DSO's are mainly owned by the federal od regional governments. Many smaller are private companies owned by industry or private persons. Unbundling is by law foreseen, however, several interdependencies between network operator and their former joint energy provider and generator-company still exist; this situation is strictly controlled by the regulatory authority in order not to influence the market competition.

6.2 Interest from electricity utility businesses

There are a lot of activities by utilities in the PV sector. Many of them have founded own daughter companies for their renewable energy projects and services. From planning and installing of private and commercial PV systems up to citizens participation in PV powerplant projects. Many larger utilities own and operate larger PV power plants, the currently largest PV power plant (14 MW, ground mounted) is jointly operated by the largest electricity utility and the large federal oil and gas company. Many others, slightly smaller are already in operation or in the planning phase. (e.g. a 50 MW system in the east of the country) For energy communities some utilities are already very active, one larger utility has recently founded a new company exclusively dealing with services for the foundation and operation of energy communities. Others are active in the planning and service process as well, some are in an infant stadium, since the law for energy communities was just introduced (July 2021). A few non utility companies offer peer to peer electricity trading. Amongst them the "E-Friends" who are a community that shares regionally generated green electricity with one another. E-Friends are either electricity producers (for example because they operate a PV system on their roof) or electricity consumers. A specific E-Friends technology is in the meter boxes of your houses and apartments. Ourpower (ourpower.coop) is a platform which brings together private energy producers and consumers who have to choose out of an energy portfolio of different renewable technologies. After entering the postcode and the expected annual consumption, they make an offer of 40% solar, 30% wind, 20% small hydropower and 10% biomass power (if available) from the power plants closest to the postcode on the OurPower marketplace. Up to mid 2021, 450 private participants are active on the ourpower market place.

7 HIGHLIGHTS AND PROSPECTS

7.1 Highlights

The highlight in the national development in 2020 was the announcement and the political goals towards 100% renewable electricity by 2020 and climate neutrality by 2040.

7.2 Prospects

The year 2021 will bring the new electricity act on the enlargement of renewables (Erneuerbaren Ausbaugesetz) together with a new support mechanism and clear targets. Innovative PV technologies will get specific support in order to broaden the fields of application and to push the integration of PV into existing structures and domains.

It will be seen how far research and development will be supported in order for the Austrian manufacturers and the research community to successfully compete on the significantly growing international PV-market.