Barriers to marketability of PV in Austria

An analysis of constraining parameters to marketability and deduced aspects of improvements

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Co-operating Universities

Financial support by

Prague and Vienna, 2018

ABSTRACT

Photovoltaics in Austria is currently not marketable, as the market share is too small due to the low annual installed capacity. The following paper examines which barriers photovoltaics face and how these can be overcome in order to achieve marketability. For this purpose, an interview with the general secretary of Photovoltaic Austria was conducted in addition to a literature search. Barriers in the funding system, in bureaucracy and in the legal framework are examined and suggestions for improvements are made. The barriers identified can be eliminated by changing the legal regulations and introducing standard legislation. It is shown what effects the change in the support system can have without additional funds. In summary, the paper demonstrate that Austria can achieve marketability through new initiatives and the will to change its organisational structures.

1. INTRODUCTION

1.1 Motivation

Photovoltaic (PV) as a technology of power generation is no longer in its infancy in Austria. In the year 2016 the record of one Gigawatt (precisely 1.096 MWpeak) installed capacity in Austria was reached (Biermayr, 2017). The expansion of photovoltaics in Austria happened much faster than predicted: In 2009, the share of photovoltaics in Austria's electricity generation was forecast at 0.1% for 2020 (Kaltschmitt 2009). In 2016, however, the share was already 1,88 % (Biermayr et al., 2017, p.112). The positive development of photovoltaics is also reflected in falling investment prices for consumers. Just in the four years between 2011 and 2015 a reduction of 44 % has be examined (Biermayr, 2017).

Despite these positive developments, photovoltaics in Austria is still dependent on government subsidies and therefore not competitive on its own. Photovoltaics has already overcome a first barrier to marketability: Grid parity was reached in the year 2014 (PVA 2017). Grid parity is the situation when the electricity generation costs for photovoltaic electricity (levelised costs) are equal to the electricity costs of the suppliers (Voith 2016). However, grid parity is not an indicator for the capability of competition on the electricity market, so called marketability, as the electricity generation costs also include subsidies. For the following paper, the term “marketability” shall therefore be defined as achieving grid parity without subsidies.

The following paper will examine the barriers that photovoltaic faces in Austria to reach marketability and tries to state ways to overcome those barriers. Only by demolishing this barriers Austria can reach its goal of 15 GWp of photovoltaics by 2030, which was defined in the new climate and energy strategy in 2018 (BMNT 2018). Once photovoltaic is a competitive technology, it has the potential to become one of the most important renewable energy sources not only in Austria but also around the globe.

1.2 Problem statement

The problem with photovoltaics in Austria at present is that a photovoltaic system does not amortise without subsidies within the lifetime of the modules (approximately 25 years). The main reason for the dependence on subsidies is the low market penetration. The following graph shows the newly installed capacity per year as well as the development of the total capacity. After a peak in the year 2013, the newly installed capacity was just about under 160 MWpeak per year in the last three years due to the reduction of subsidies. However a healthy growth market growth in Austria would be around 300 to 350 MWpeak per year explains energy consultant Cornelia Daniel-Gruber in the Austrian newspaper “Der Standard” (Zoidl 2015). As shown in the following analysis it is due to various barriers, that PV cannot reach its healthy market share and therefore marketability.

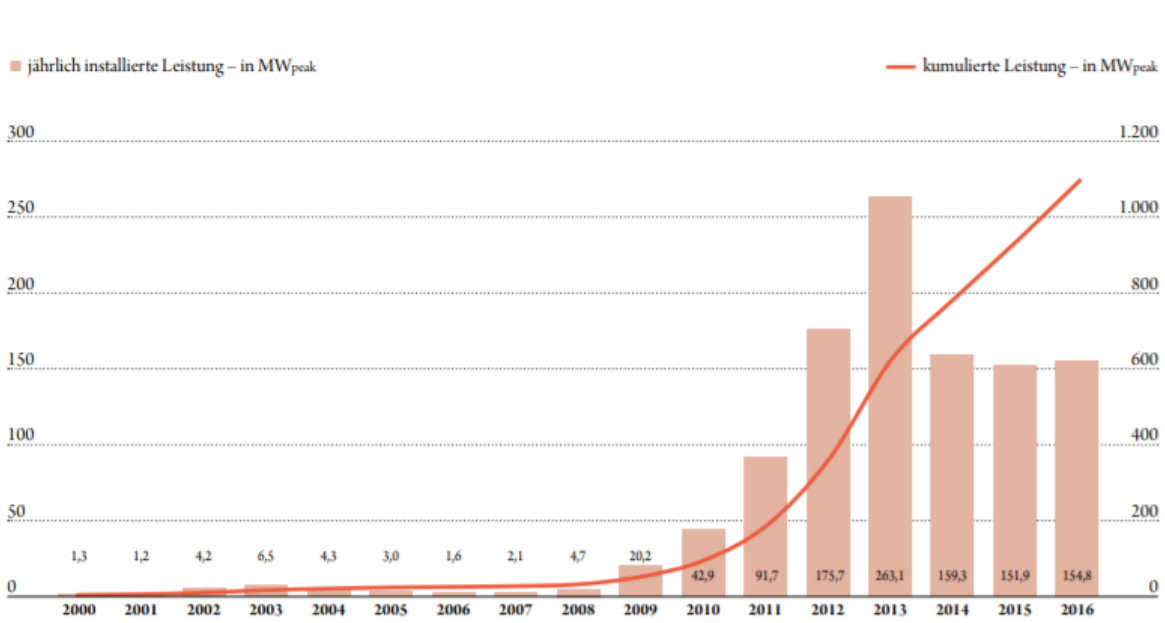

Figure 1 Yearly and total installed capacity of PV in Austria (Biermayr 2017)

According to a study by the Vienna University of Economics and Business Administration, however, there is great untapped potential on the Austrian market. Results of this study show that 85% of the interviewees would support the installation of a photovoltaic system in their home town, but it is not possible for various reasons (Hampl et al. 2015). The legal framework must be adapted in such a way that photovoltaic systems can be installed quickly, bureaucratically and with economic self-interest. It is therefore up to politicians to remove the barriers examined in the following and create new incentives for further constructions.

1.3 Approach

Starting from the problem that the marketability of the Austrian photovoltaic industry is not yet given, this paper will examine in the following which main barriers exist to achieve this. The research for this analysis is based on an extensive literature research using electronic publications as well as statistics. Furthermore an interview with the general secretary of Photovoltaic Austria (PV Austria), DI Vera Immitzer (former Liebl), was conducted and used as a source. Furthermore, measures to overcome the inhibiting factors are to be derived from the research results.

2. SUPPORT SYSTEM

Although the goal of marketability presupposes independence from subsidies, subsidies are still needed at present to increase market penetration. Therefore an effective support system is of importance as an ineffective on acts as a barrier for the expansion of PV. The following chapter describes the recent developments in the subsidy system, which been the result especially from the "small" amendment of the Green Electricity Act in 2017. Difficulties of the current support system, particular in the promotion of feed-in tariffs, as well as further potential for improvements are shown.

2.1 Development and state of the current system

2.1.1 Tariff promotion until 2017

The tariff promotion until 2017 was defined in the amendment of the Green Electricity Act in 2012: PV systems over 5 kWp up to 200 kWp can apply for a subsidised feed-in tariff guaranteed for 13 years. An annual budget of eight million euros is available, which is financed by the annual green electricity charge, which must be paid per metering point depending on the network level (ÖSG 2012; § 23). When the new Green Electricity Act came into force in 2012, tariff subsidies were at 27.6 cents/kWh (ÖSVO 2011). The feed-in tariff was significantly higher than the usual electricity costs and it therefore made economic sense to sell the self-generated electricity and purchase the required electricity at a lower price. Due to the falling costs for photovoltaic electricity, tariff subsidies were lowered year by year. The following figure shows the development of the feed-in tariffs. In some years there were additional investment promotions ("+Zuschuss" in the figure) but these are discussed in the following chapters.

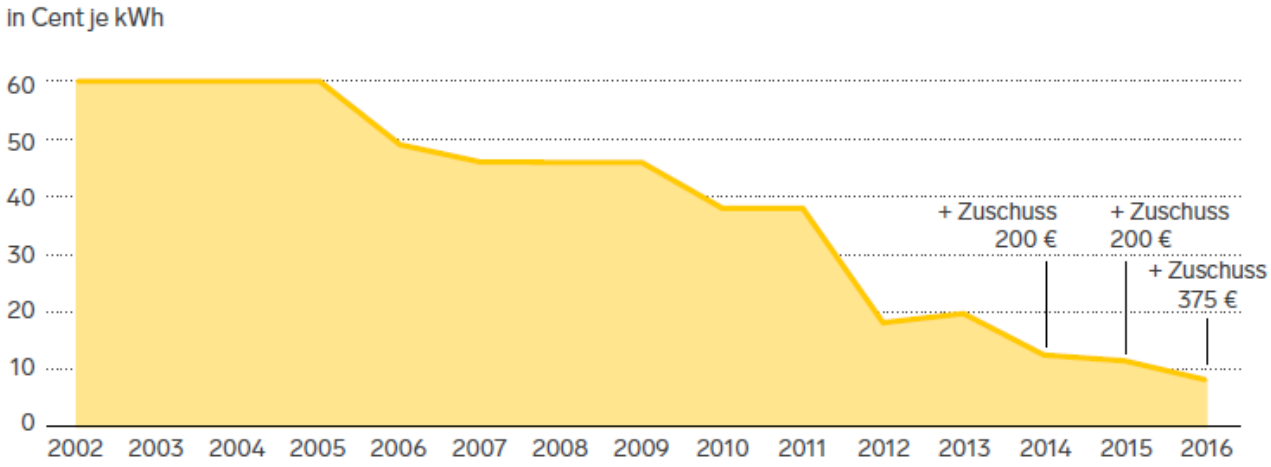

Figure 2 Development of the feed-in tariffs (Bmwfw 2017)

In 2016 the subsidies were only at 8.24 cents/kWh (ÖSVO 2015). As a result the feed-in tariffs were well below the average electricity prices for private customers, which were at 18 to 22.9 cents/kWh (Selectra Österreich GmbH 2016). Under these conditions, full feed-in was no longer an economic option, which led to a tendency towards an increase of self-consumption. This development was not foreseeable in the emergence of the law and made the Green Electricity Act ineffective in its current form. The submitted applications were still calculated as if they were "full-feeder", even if a high

proportion of the electricity generated was used for self-consumption. With an average self-consumption of 30%, almost a third of the subsidies were lost.

Furthermore, the structure of the online application for the funding was inconvenient. On the first working day of the year at 5 p.m. the application opened up and the funding was given away within three minutes each year. Therefore the funding commitment often depended on the processing power of the computer used to submit the application (Immitzer 2018).

2.1.2 Tariff promotion with self-consumption ranking since 2018

Due to three years of battle of the federal association PVA a new, so called “small”, amendment to the Green Electricity Act had been achieved in 2017. There are three major innovations in the amendment (Bmwfw 2017).

- The adjustment of feed-in tariff subsidies taking into account the share of self-consumption.
- New investment subsidies for photovoltaic and electricity storage systems (chapter 2.1.3).
- A new legal regulation that makes it possible that roof surfaces of multi-party houses can be used for communal generating plants (chapter 4).

The consideration of self-consumption was a first step in the renewal of the subsidy system. For the first time, it is not the time but the declaration of the self-consumption is the basis for the ranking, with a higher share of self-supply leading to a higher ranking. In the case of the same share, the time of application is decisive (ÖSET-VO 2018, §4). The other parameters, the subsidised feed-in tariff guaranteed for 13 years and an annual budget of eight million euro, stayed the same in the amendment. According to the general secretary of PV Austria, DI Vera Immitzer, Only through the self-consumption ranking 70 MWp more capacity, 160 instead of 90 MWp, could be supported (Immitzer 2018). This corresponds to an increase of 77 % with the same funding amount.

Even though the industry is very pleased with result there were two main problems in the new system. Firstly, there was resentment in the installer industry because although PVA had informed them in advance that this regulation will come, it was decided at the last minute. As a result the installer had no time to adapt to the new regulation.

The second problem was that many people (mostly installer aswell) didn’t know what self-consumption to declare. If one gambled and declared a high self-consumption of e.g. 90 %, one was sure to receive the support but would only get it for 10 % of his production. On the other side people feared to not get the support at all if they declare a lower, more realistic consumption. PVA had a lot of inquiries about this (Immitzer 2018).

In the end, however, the result was an average self-consumption of 40%. There was so much money that even full feeders received a subsidy. “But of course we didn't know that in advance, we'll know next year. And you should simply declare the realistic self-consumption, this is the best way to do it.”, says the general secretary of PVA (Immitzer 2018).

In 2018 the feed-in tariff was 7,91 c/kWh (ÖSET-VO 2018, §6). So despite the achievement of the amendment the question arises whether tariff promotion, which is to be reduced by 8 percent annually (ÖSG 2012), will still make sense at all in the coming years. PVA has the goal to change

the support system to an investment instead of tariff promotion for small and medium size plants (see Chapter 2.2).

2.1.3 Investment promotion of energy storages and plants

The amendment also included an investment subsidy for the construction and expansion of photovoltaic and storage systems. It did not matter whether existing plants were supplemented with the storage tank or newly constructed in combination with the plant. The funding like the tariff promotion comes from the “OeMAG", the processing agency of Ökostrom AG. For 2018 and 2019, 15 million euro per year are available for the fund. Of this amount, at least 9 million per year are used for the construction or expansion of PV systems. The subsidy for the PV systems amounts to a maximum of 30% of the direct investment required for the installation and a maximum of 250 €/kWp (up to 100 kWp) and a maximum of EUR €/kWp (100-500kWp). If a PV system has a storage capacity of at least 0.5 kWh per kWp or if an existing storage capacity is being expanded, an additional investment subsidy of 500 €/kWh can be granted. Funding is provided up to a maximum of 10 kWh per kWp (§ 27a ÖSG 2012).

The funding was over within 1,5 minutes on 12 March 2018 as the procedure was similar to the former (until 2017) system of the tariff promotion. In addition to the time problem in the application process, there were also other problems with the new funding. On problem was, that the size of storage systems was not limited, so large storage system were taking away the funding quickly.

> “*Surprisingly, the average storage capacity subsidised was 15 kWh - so relatively small. However, we also know that very large storage systems were subsidised, i.e. some 100 MWh of capacity. That means, on the other hand, there were also many little ones, including many private ones. Nevertheless, this size requirement is insane. We tried in advance, when the directive was drawn up, to point out that this is simply not possible*.”, states the general secretary of PVA (Immitzer 2018).

Another problem was that some federal states, for example Salzburg, stopped their own storage subsidies because of the nationwide funding (Immitzer 2018). Furthermore, the nationwide climate and energy subsidy (KLIEN) for PV systems smaller than 5 kWp was reduced from 8 to 4.5 million. Within the first 4 days (starting on 29.5. 2018), 1 million were already gone, last year this was only the case after one month (PVA 2018).

The constant stop and go of subsidies not only makes it difficult for installers to adapt to them, but also inhibits customers' purchasing decisions. In order to push the expansion forward, there must be clarity in the subsidies.

2.2 Possible improvements in the support system

2.2.1 Investment instead of tariff promotion

With regard to the tariff promotion, there is a clear appeal by PV Austria to switch it to one-time investment promotion for small and medium-sized plants (Immitzer 2018). With the annual funding sum of 8 million the tariff promotion promoted the establishment of plants with a capacity of around 90 megawatt peak every year, prior to the amendment (bmvit 2015). If the feed-in tariffs, which are paid for 13 years, are shifted to a one-time subsidy, this results in an annual subsidy budget of 104 million (eight million times 13 years). With a one-time investment subsidy of 400 €/kWp and a budget of 104 million annually, 260 megawatt peak could be installed. This increase is more than three times the value prior to the amendment and still about 60 % more than the 180 MWp with the self-consumption ranking. The increase is being made possible just by changing the support scheme and without the need to increase the subsidies. Assuming the system is changed photovoltaics will, according to estimates of the PV Austria, not require subsidies any longer and reach marketability by the end of the Green Electricity Act in 2022 (Kronberger 2016).

However, for reaching the15 GWp of PV by 2030, Austria will certainly require plants for which tariff promotion will still be needful. There are several options to realise these tariff promotions, e.g. through auctions where you can bid for funding (Immitzer 2018).

2.2.2 Optimization of existing investment promotions

There is still room for improvement with regard to the investment subsidy for storage systems. Firstly, according to PV Austria, an upper limit of 50 kWh should be established in order to promote a higher number of smaller, private storage systems. Furthermore, the subsidy of 500 euros per kWh should be reduced, so that the subsidy is not gone again after 1.5 seconds and so that again more installers can benefit. In addition, it would of course be desirable for the states to restart their support programmes.

Furthermore, PV Austria has demanded that investment subsidies for systems below 5 kWp (KLIEN) shall be raised again to 8 million. This support is particularly important for private homeowners, as they often install systems with a size of 5 kWp. The 100,000 Roofs Programme contained in the new climate and energy strategy cannot be realised without the increase in the funding budget (Immitzer 2018).

2.2.3 „Left-over-Budget"

The Green Electricity Act also includes the use of "Left-over-Budget" (german Resttopf), which is divided between wind, hydropower and photovoltaics. The sum was 19 million euros in 2012 and is reduced by one million euros per year. In 2018 the budget was 12 Million. However, this "Left-over-Budget" is almost inaccessible for photovoltaics, as the applications for subsidies for PV systems expire after one year, while applications for wind and hydro power remain in the waiting list for three years. (§23 ÖSG 2012)

From the point of view of photovoltaics, it would also be desirable to divide the "Left-over-Budget" by one third each between photovoltaics, wind and hydropower.

3. BUREAUCRACY AS A BARRIER

Bureaucracy is one of the major barriers for PV in Austria. There are no standardised, Austria-wide regulations for the approval and construction of PV-systems. In the nine of federal states of Austria there are nine different building codes as well as nine different regulations in the Electricity Industry and Organisation Act (Elektrizitätswirtschafts- und –organisationsgesetz EIWOG) (ElWOG 2010). Common in all states is the application for a feed-in confirmation including a metering point from the network operator. Depending on the federal state, different sorts if building permits ("Baugenehmigung" or "Baubewilligung"), a permit exemption or only a construction notification is required. Furthermore, an electricity permit or just a notification is required, which also varies depending on the federal state and the size of the system (Haslinger 2016).

Until last year's amendment of the Green Electricity Act an additional application for an "eco-electricity confirmation" (Ökostromanlagenbescheid) from the respective state government was necessary. Even though this confirmation is no longer officially required, it is still demanded by some energy suppliers (Immitzer 2018). Hans Kronberger, president of Photovoltaic Austria expresses the absurdity of this confirmation as follows: "*What other than an eco-electricity system is a photovoltaic system supposed to be?*" (Kronberger 2016).

In Austria, the necessary notifications are subject to a fee and are also time-consuming. Here there is potential to save money and time which can be invested in the construction of new plants.

2.1 Possible improvements - Reduction of bureaucracy

Potential for improvement in terms of bureaucratic effort can be identified by looking at Germany. In Germany, the approval process is regulated uniformly throughout Germany. Neither a green electricity confirmation, a building permit/notification nor a law permit or a notification are required. Furthermore, the feed-in confirmation, which also includes a check of the network capacity, is free of charge. This simplified construction process has the consequence that in Germany a PV system in the size of 30 kWp can be approved and installed within three to six weeks. The approval process for a plant of a comparable size in Austria is expected to take six months (Haslinger 2016).

In order to increase the market penetration of photovoltaics, the respective state laws in Austria, in particular EIWOG and building regulations need to be replaced by a complete federal law. The reduction of these bureaucratic obstacles results in financial and time savings which can be used for the expansion of photovoltaics.

Furthermore, large information campaigns would be beneficial for mayors and municipal officials, as many do not know which notifications are necessary, and demand for more to insure themselves.

4. LEGAL BARRIERS

In addition, legal barriers inhibit the expansion of photovoltaics. One example is the use of photovoltaics in multi-party buildings. For a long time it was impossible to distribute the electricity generated on the roof of a house to several parties in the house. The reason for this was, on the one hand, that under the Residential Property Act, a unanimous agreement of the owners is required for the house's internal power generation. On the other hand, according to the Electricity Industry and Organization Act (EIWOG), such plants had to feed all the electricity generated into the grid (ElWOG 2010). Under these conditions, i.e. without the use of own consumption, such systems were not economical and were therefore not being installed. Due to these legal framework conditions, which were created under different circumstances, a large roof potential remained unused, especially in the urban area. The newspaper "Salzburger Nachrichten" announced at the end of 2014 that the construction of PV systems could generate 360 gigawatt hours of electricity per year on only ten percent of Viennese residential buildings (Graf 2016).

The legal basis for the distribution of electricity to tenants or owners has been created by the 2017 amendment described in Chapter 212. As already practised in Germany, the electricity is charged proportionally to the residents. Although the law is now in place, only a few facilities have been built so far and the expansion is only in its initial phase. There are two reasons for this slow start.

On the one hand, the law is phrased quite openly; therefore, the exact terms of the contract have to be newly developed. The first projects to emerge are therefore primarily from energy suppliers, who take this as a showcase project and also have the financial, time and human resources such as legal advice etc.. Project developers and investors are now also increasingly interested in the topic. PV Austria has created an information platform on which model contracts are made available. However, these standard contracts must of course be adapted on a case-by-case basis (Immitzer 2018).

The second inhibitor, residential building researcher Wolfgang Amann explained to the newspaper derStandard, is the slow rollout of the smart meter. Only if the energy suppliers set up the technical infrastructure including smart meter technology as quickly as possible, the green electricity generated on the roof can also be billed directly to the tenants' apartments. According to the Viennese networks, the first 30,000 new meters will be installed from the summer [2018] onwards and are on schedule. Nevertheless, Wolfgang Amann believes that it is only a small step to PV becoming the standard in new construction, because the willingness of Austria's non-profit building association for it is very high (Andenberger 2018).

3.1 Possible improvement especially for large plants

In order to promote the expansion of community systems, it should also be possible to shared plants on open land. This is particularly important for the construction of large plants (larger than 30 kWp). For example, PV Austria had a request from a municipality that would like to build a community plant on its former sports fields. Such cases are not yet possible due to the legal situation.

4 FURTHER SUGGESTIONS

4.1 Abolition of self-consumption tax

To reach the target of 15 GWp photovoltaics by 2030 in Austria, it will be necessary to install large systems (larger than 30 kWp). However, the main obstacle to this is the self-consumption tax. The first 25,000 kWh of electricity generated is tax-free. With an average generation of 1000kWh/kWp in Austria, all plants from 25 kWp are affected. There is a clear demand to abolish the own consumption tax for photovoltaic systems in order to increase incentives for the construction of large systems (Immitzer 2018).

4.2 New financial incentives

Furthermore, other financial incentives are necessary to increase the construction rate. Participation models are innovative approaches, which are enjoying increasing popularity according to a study by the Vienna University of Economics and Business Administration (Hampl et al. 2015). There are different approaches such as:

- Sale and lease back
- Voucher Models
- Loan models

These models enable the access to renewable energy for interested parties, which cannot build their own photovoltaic system due to ownership structures or financial reasons (Brandstetter and Haslinger 2013).

4.3 Participation in the balancing power market

Furthermore, there is the idea of letting photovoltaics increasingly participate in the balancing power market. In Germany, for example, there are still barrier, such as a minimum bid size of 5 MW and weekly bidding periods, which require a detailed forecast of availability. This is a particular problem for fluctuating renewable energy technologies such as photovoltaics. A shortening of the bidding periods for the controlled power per second and per minute and the reduction of the minimum bid size to one MW would make it possible for photovoltaics to open up an additional market which to date (2018) is almost inaccessible (Seidel et al. 2016).

5. CONCLUSIONS

The paper has highlighted the barriers for photovoltaics in Austria and showed ways to overcome them.

On the one hand, there are legal barriers caused by the fact that legislation was being passed under different circumstances. Here the way for photovoltaics can be paved in the form of further amendments. On the other hand, a reduction in bureaucracy could largely unify and accelerate the application processes. The paper showed how particularly large plants suffer from these restrictions and how the number can be increased through tax exemption, simplified approval procedures and the use of open spaces for community plants.

The greatest influence on marketability, however, can be the conversion of the support system from tariffs to investment promotion. The calculation described showed how the increase can be tripled without increasing the financial resources. In addition, new financing models and a share of the balancing power market can further increase the marketability of photovoltaics.

None of the barriers mentioned is unassailable and the marketability of photovoltaics will be reality in the near future.

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