SOLAR HEATING & COOLING PROGRAMME
INTERNATIONAL ENERGY AGENCY

2020 Subsidies for PVT collectors in selected countries

IEA SHC TASK 60 | PVT SYSTEMS

TASK60
PVT SYSTEMS

2020 Subsidies for PVT collectors in selected countries

SHC Task 60/Report D6

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Preface

PVT collectors can be still considered as young technology, but with significant growing tendency in terms of market development and number of manufacturers on a worldwide point of view. Nevertheless, PVT is definitely in an early stage of its product life cycle, where economic competitiveness among other renewable technologies providing heat and electricity is challenging.

Supporting the market penetration of young technologies and new products by granting public subsidies is a well established instrument in many economies around the world. The PVT technology is also in the position of generally being grant-worthy by public funding, although the availability and the dimensions of subsidies for PVT are strongly country-specific.

The aim of this report is to give an overview of currently obtainable PVT subsidies in selected member countries of Task 60. In particular, the countries Austria, France, Germany, Italy, the Netherlands, Switzerland and the UK were considered for this analysis. The data basis of this subsidy overview was gained from a survey asking for funding schemes available for the three solar technologies “Photovoltaics”, “Solar Thermal Systems” and “PVT Systems”. The evaluation of this survey points out, how PVT systems are supported by public funding in the selected countries and gives recommendations for possible improvements of this subsidy situation.

Contents

1 Survey procedure

1.1 Description of the subsidy survey

The subsidy survey was initiated in December 2019 among the selected Task 60 member countries Austria, France, Germany, Italy, the Netherlands, Switzerland and the UK. The survey asked for available subsidies for the three solar technologies “Photovoltaics” (PV), “Solar Thermal Systems” (ST) and “PVT”.

Funding guidelines usually comprise various criteria, limitations and premises. As it would not make sense to include every detail in this subsidy overview, only the most important funding criteria were required to be included in the survey. Furthermore, this subsidy survey was limited to funding available on national level of each country and did not ask for other funding options on regional level or on the level of municipalities. The 30th of June 2020 was chosen as the reference day, meaning that only subsidies should be reported available by then.

The following Figure 1 displays an extract from the survey, showing an example of a subsidy scheme for solar thermal systems in Austria. Some eligibility criteria have been asked as well as the particular specification of the considered subsidy scheme. A hyperlink to the detailed funding guideline was provided in order to have access to all of the details. Each subsidy scheme had to be checked, if PVT systems are eligible as well, if they are definitely excluded or if they are not mentioned at all.

The main expected outcome of this survey is the information, if the PVT technology is being supported equally in terms of public funding, compared to ST and PV.

SUBSIDY #1	
Who can apply?	Private individuals
Which premises have to be fulfilled to get the subsidiy granted?	For DHW and SH
	Gross area > 4 m²
	Building permit before 2006
How is this subsidy specified?	EUR 700,- blanket
Is this subsidy also applicable to PVT-systems?	Nothing mentioned.
Link to subsidy guideline	https://www.klimafonds.gv.at/wp-content/uploads/sites/6/Leitfaden_Solaranlagen_2020.pdf

Figure 1: Extract from the survey; example from Austria for a solar thermal subsidy scheme

1.2 Survey evaluation approach

The evaluation of the received survey data was done in the following way:

- The subsidy information for each country was summarized on one “Subsidy fact sheet” with the intention to have all the basic funding data condensed on one single page. Further details for each subsidy can be looked up by following the weblinks that are also included on the subsidy fact sheets.
- The main quantification parameter to evaluate the subsidy situation in each country is the number of funding schemes.
- Each subsidy scheme on the fact sheet is colored as follows. This color code makes it possible to gather the overall subsidy situation by just one view.
  - Green → PVT systems are fully eligible for funding scheme
  - Yellow → PVT systems are eligible but funding criteria are unfavorable to PVT
  - White → Eligibility of PVT for funding not clear or not mentioned or currently not available → further investigation necessary
  - Red → PVT is definitely excluded from funding scheme
- Absolute numbers (€ or $ of subsidies, % of tax deduction…) are hardly comparable between countries. Therefore, this information is given briefly in the fact sheets, but it is not taken into account as comparison parameter.
- The summary of the survey results includes a country-specific view on the subsidy situation as well as a conclusion among all the selected countries.

1.3 List of abbreviations

The following abbreviations listed in Table 1 were used for describing the funding schemes.

Table 1: List of abbreviations

ADC	Air-driven collector
BAPV	Building-applied PV system
BIPV	Building-integrated PV system
CSTS	Concentrated solar thermal system
DHW	Domestic hot water
ETC	Evacuated tube collector
FPC	Flat plate collector
OGHT	On-greenhouse solar thermal system
PH	Pool heating
SC	Solar cooling
SDC	Solar district cooling
SDH	Solar district heating
SH	Space heating
SHIP	Solar heat in industrial processes
TEB-NZEB	Transformation of existing buildings in "nearly zero energy buildings" (nZEB)
UWC	Unglazed water collector

2 Survey results

2.1 Subsidy situation in Austria

The subsidy fact sheet in Figure 2 reflects the current situation in Austria.

Subsidy Fact Sheet 2020 for Austria

Solar Thermal Systems	PV	PVT
• Private individuals • For DHW and SH • Gross area > 4 m² • Building permit before 2006 • € 700,- blanket Link	• Private individuals, industrial applications and municipalities • Grid connected systems only • Funding for max. 5 kWp • € 250,-/kWp for BAPV • € 350,-/kWp for BIPV Link	No particular subsidy scheme.
• Industrial applications • Gross area < 100 m² • For DHW, SH and SHIP • € 150,-/m² (FPC) | € 195,-/m² (ETC) | € 125,-/m² (ADC) Link		
• Industrial applications • Gross area >= 100 m² for DHW, SH and SHIP • Every collector area for SC • 20% of investment costs Link		
• Industrial applications • Gross area between 100 m² and 10,000 m² • For DHW, SH, SC, SDH • Up to 50% of investment costs • Subsidy closed for 2019, but announced for 2020 similarly Link		
• Municipalities • Gross area < 100 m² • DHW, SH and SHIP • € 90,-/m² (FPC) | € 117,-/m² (ETC) | € 75,-/m² (ADC) Link		
• Municipalities • Gross area >= 100 m² for DHW, SH and SHIP • Every collector area for SC • 12% of investment costs Link		
• Municipalities • Gross area between 100 m² and 10,000 m² • For DHW, SH, SC, SDH • Up to 40% of investment costs • Subsidy closed for 2019, but announced for 2020 similarly Link		

Figure 2: Subsidy fact sheet 2020 for Austria

The subsidy situation in Austria can be summarized as follows:

- Two of seven subsidy schemes for ST also include PVT.
- One subsidy scheme for PV is available, but it does not clearly mention PVT eligibility.
- No additional PVT funding scheme is available.

Remarkable for the Austrian funding situation is that only subsidy schemes supporting “innovative projects” can be applied to PVT collectors.

2.2 Subsidy situation in France

The subsidy fact sheet in Figure 3 illustrates the overview of available funding schemes in France, which can be summarized in the following way:

- None of the three ST subsidy schemes does include PVT without any inequalities.
- All of the three PV subsidy schemes accept PVT collectors equally.
- One specific PVT subsidy scheme was available for “innovative” projects, but it is suspended for 2020.

Remarkable issues:

- ST subsidy schemes distinguish between air-driven and water-driven PVT systems. The air-driven ones are excluded from funding.
- A comparison of absolute numbers of one of the ST subsidy schemes shows potential inequalities, because higher one-time payments are granted to ST system than to PVT systems at the same boundary conditions.

Subsidy Fact Sheet 2020 for France

Solar Thermal Systems	PV	PVT
• Private individuals • For DHW and SH • For renovation projects: building older than 2 years • Increase in system performance required • Solar Keymark or CSTBat • Applicants with modest incomes: SHS: € 6500,- to € 8000,- | DHW: € 750,- to € 4000,- | PVT-systems: only water-driven; € 2000,- to € 2500,- • Applicants with intermediary incomes: SH: € 3000,- | DHW: € 350,- to € 2000,- | PVT-systems: only water-driven; € 0,- to € 1000,- • Special conditions for double flux ventilation Link Link	• Grid connected systems • Primary self-consumption • BIPV and BAPV • < 100 kWp • Subsidies (can change quarterly): <=3 kWp: 390 €/kWp + 10 c/kWh <=9 kWp: 290 €/kWp + 10 c/kWh <=36 kWp: 180 €/kWp + 6 c/kWh <=100 kWp: 90 €/kWp + 6 c/kWh Link	• Collective housing • Innovative projects: collective space heating, ST + HP, PVT… • 1 or 2 installations can be granted • Subsidy depends on the specific project • Suspended in 2020 Link
• Collective housing, tertiary, industry and agriculture • Gross area > 25 m² • Renovation and new buildings • Solar Keymark or CSTBat • Feasibility study • Fsav > 30% (measured) • Solar yield > 350…450 kWh/m²a (simulated) • Project costs < € 800,-/m² • Subsidy depends on region, e.g. in the North: € 55,-/MWh annual yield over 20 years	• Grid connected systems • Infeed only • BIPV and BAPV • < 100 kWp • Subsidies (can change quarterly): <= 3 kWp: 18.53 c/kWh <= 9 kWp: 15.75 c/kWh <= 36 kWp: 12.07 c/kWh <= 100 kWp: 10.51 c/kWh Link	
• Collective housing, tertiary, industry and agriculture • Gross area > 500 m² or annual yield > 200 MWh • Renovation and new buildings • Solar Keymark or CSTBat • Feasibility study • Monitoring required, data must be shared • Subsidy individually for each project; minimum e.g. € 25,-/MWh annual yield over 20 years for industry Link	• Industry, Agriculture... • Grid connected systems • Infeed only • BIPV, BAPV and ground installation • 100 kWp to 10 MWp • Feed-in tariff changes by tender and period: 59.5 €/MWh up to 117.8 €/MWh Link Link Link Link	

Figure 3: Subsidy fact sheet 2020 for France

2.3 Subsidy situation in Germany

Figure 4 presents the subsidy fact sheet for Germany.

Subsidy Fact Sheet 2020 for Germany

Solar Thermal Systems	PV	PVT
• All applicants • For DHW, SH, SC, SDH, SDC • Solar Keymark • min. yield 525 kWh/m²a • UWC not eligible • Min. gross areas: 9 m² (FPC) | 7 m² (ETC) | no min. area for ADC • Min. buffer storage: 40 l/m² (FPC) | 50 l/m² (ETC) • Stronger requirements for new buildings • Subsidy: 30% of overall costs Link	• All applicants • Grid connected systems only • Metering required • Feed-in tariff: 11.47 ct / kWh Link	• All applicants • Used like a ST system or as source for HP (and self consumption of electrical energy) • Solar Keymark • Subsidy: 30% of overall costs (if used as ST) | 35% in combination with more renewables Link

Figure 4: Subsidy fact sheet 2020 for Germany

This information can be summarized as follows:

- One ST subsidy scheme is available that only includes covered PVT collectors.
- One PV subsidy scheme includes also PVT systems.
- One specific PVT subsidy scheme is available.

Remarkable in the German subsidy situation is the fact that uncovered collectors (including PVT) are not eligible for funding.

2.4 Subsidy situation in Italy

The subsidy fact sheet for Italy is displayed in Figure 5.

The summary for the Italian subsidy situation is the following:

- Two of four ST subsidy schemes are fully applicable to PVT systems.
- Two of two PV subsidy schemes are fully applicable to PVT systems.
- No additional PVT funding scheme is available.

Subsidy Fact Sheet 2020 for Italy

Solar Thermal Systems	PV	PVT
• Private individuals, industrial applications, public administration • For DHW, SH, SHIP, PH • Compliance with EN12975 or EN12976 • Minimum warranty periods • Income tax deduction: 65% of investment costs; max. € 60.000,- Link	• Private Individuals • Building renovation • Income tax deduction: 50% of investment costs; max. € 96.000,- Link	No particular subsidy scheme.
• Private individuals, industrial applications, public administration • For DHW, SHIP, SC, SH, CSTS, OGHT • Solar Keymark • Minimum warranty periods • Annual incentives: 0.08 - 0.43 €/kWh$_{th}$ Link	• Public Administration • BAPV, TEB-NZEB • Existing buildings --> nZEB • Annual incentives to be calculated individually	
• Private Individuals • For DHW, SC, SH • Building renovation • Income tax deduction: 50% of investment costs; max. € 96.000,- Link		
• Public Administration • DHW, SC, SH, TEB-NZEB • Existing buildings --> nZEB • Annual incentives to be calculated individually Link		

Figure 5: Subsidy fact sheet 2020 for Italy

2.5 Subsidy situation in the Netherlands

The subsidy fact sheet for the Netherlands can be found in Figure 6.

The situation of subsidies in the Netherlands can be summarized as follows:

- None of the two ST subsidy schemes is fully applicable to PVT. Although, both schemes do not explicitly exclude PVT from funding, some criteria appear to be unfavorable for PVT.
- Three of three PV subsidy schemes are applicable to PVT.
- No additional PVT funding scheme is available.

Remarkable issues:

- The ST subsidy schemes basically include PVT. Uncovered collectors (including PVT) are subsidized at lower rates than covered collectors (including PVT) or excluded (under certain conditions).
- The electrical and the thermal part of the PVT collector are funded separately by the corresponding ST resp. PV subsidy scheme.

Subsidy Fact Sheet 2020 for the Netherlands

Solar Thermal Systems	PV	PVT
• Subsidy "SDE++" • Gross area > 200 m² • Annual subsidy for 15 years: 3.5 to 6 ct/kWh • For covered collectors only • PVT included (until 02/04/2020) Link	• Subsidy "SDE++" • >= 15 kWp < 1 MWp • Feed-in tariff for 15 years: 0.1 to 3.5 ct/kWh Link	No particular subsidy scheme.
• Subsidy "ISDE" • Gross area <= 200 m² • Subsidy: one-time payment based on annual energy yield; 0.68 €/kWh for <= 10 m²; 0.30 €/kWh for 10 m² to 200 m² • Energy yield is calculated at ΔT=40K • Subsidy ends in 2020 for newly built houses Link	• Subsidy "VAT refund" • Subsidy: One-time fixed amount by VAT refund (21%) • Electrical part of PVT can be subsidized with 1/3 of VAT.	
	• Subsidy "Net metering" • For "small consumers"	

Figure 6: Subsidy fact sheet 2020 for the Netherlands

2.6 Subsidy situation in Switzerland

The Swiss subsidy situation is condensed on the fact sheet in Figure 7 and can be summarized as follows:

- One ST subsidy scheme is available, but its applicability to PVT collectors depend on the specific canton and on the specific collector used.
- Two of two PV subsidy schemes also include PVT collectors.
- No additional PVT funding scheme is available.

Remarkable issues:

- Subsidy schemes on national level are not available at all, but subsidies are granted on canton level with varying funding criteria.
- PVT (and also ST) collectors are only eligible for funding, if they are included in a central list of collectors.
- Thermal subsidies for PVT are usually low as they depend on the thermal output, which is computed for a traditional domestic hot water system, requiring higher temperatures.

Subsidy Fact Sheet 2020 for Switzerland

Solar Thermal Systems	PV	PVT
• Private individuals • Only on cantonal and communal level • New systems or extensions of existing ones on existing buildings • Solar Keymark and listed in kollektorliste.ch • Validated performance guarantee • min. 2 kW nominal thermal power (TKN) • Min. subsidy: 1200 CHF + 500 CHF/kW_{TKN} (depending on canton) • Investment costs are tax deductible. • PVT systems excluded in some cantons, but usually subsidised like ST; several PVT collectors are included in kollektorliste.ch. Link Link Link	• Private individuals, industrial applications • BIPV, BAPV and ground installation • > 100 kWp • Subsidy: 1100 CHF + 340 CHF/kWp (0…30 kWp) + 300 CHF/kWp (> 30 kWp) • Feed-in tariffs very variable: 4 CHF-cts to > 20 CHF-cts • Investment costs are tax deductible. Link Link Link	Count both as solar thermal systems and as PV systems. The same subsidy schemes apply (except for some cantons, in which PVT collectors are excluded from the solar thermal subsidy scheme). Thermal subsidies are usually low as the thermal output (TKN) is computed for a traditional domestic hot water system, requiring higher temperatures.
	• Private individuals, industrial applications • BIPV only • < 100 kWp • Subsidy: 1100 CHF + 380 CHF/kWp (0…30 kWp) + 330 CHF/kWp (> 30 kWp) • Feed-in tariffs very variable: 4 CHF-cts to > 20 CHF-cts • Investment costs are tax deductible. Link Link Link	

Figure 7: Subsidy fact sheet 2020 for Switzerland

2.7 Subsidy situation in Switzerland – Canton Vaud

Due to the situation in Switzerland, where no subsidies are available on national level but on regional level only, the subsidy situation of the Swiss Canton Vaud is included in this report. It will not be taken into account for the final comparison of the available subsidy schemes on national level in the selected countries.

The subsidy fact sheet for the Swiss Canton Vaud is shown in Figure 8.

Subsidy Fact Sheet 2020 for Switzerland - Canton Vaud

Solar Thermal Systems	PV	PVT
• All applicants • New systems or extensions of existing ones on existing buildings • Solar Keymark and listed in kollektorliste.ch • Water collectors • Subsidy: P_{th} < 3 kW: 4000 CHF P_{th} > 3 kW: 2500 CHF + 500 CHF/kW • PVT systems eligible if the collector is included in kollektorliste.ch. Link	• All applicants • > 2 kWp • New installation of extension • Subsidy: About 30% of investment costs of standard solution with same power Link	No particular subsidy scheme.

Figure 8: Subsidy fact sheet 2020 for Switzerland – Canton Vaud

The following summary can be given for the situation in the Canton Vaud:

- One ST subsidy scheme is available and it is only applicable for PVT, if the collector is included in the central list of eligible collectors.
- One PV subsidy scheme includes also PVT systems.
- No additional PVT subsidy scheme is available.

2.8 Subsidy situation in the UK

The subsidy fact sheet for the UK is shown in Figure 9 and can be summarized in the following way:

- One of two ST subsidy schemes is applicable to PVT as well.
- No information about PV subsidy schemes available.
- No additional PVT subsidy scheme is reported.

Remarkable for the subsidy situation in the UK is the issue that one of the two ST subsidy schemes is not applicable for PVT because the funding depends on the thermal output. This specific subsidy guideline was written some years ago, at a time when PVT was considered not to have significant thermal output at all, and therefore it was excluded from funding.

Subsidy Fact Sheet 2020 for the UK

Solar Thermal Systems	PV	PVT
• Private individuals • DHW only, other applications are not eligible • FPC or ETC only • Energy Performance Certificate for the building • Quarterly payments over 7 years: 21.09 p/kWh (annual estimated yield) Link	No information.	No particular subsidy scheme.
• Industrial, commercial, public sector • DHW, SH, SHIP • FPC or ETC only • PVT is eligible if thermal output is metered separately • Energy Performance Certificate for the building • Subsidy based on measured thermal contribution: 10.98 p/kWh Link		

Figure 9: Subsidy fact sheet 2020 for the UK

2.9 Overview of subsidy situation in the selected countries

The main aim of this performed survey was to find out, if the technology of PVT is supported equally by public funding compared to ST and PV. The number of subsidy schemes that fully include PVT systems was chosen as quantification parameter among the participating countries.

The following Table 2 summarizes the numbers of available subsidy schemes, separated for ST and PV, for each country contributing to this survey. It also provides the numbers of subsidy schemes that fully include PVT systems without any restrictions or limitations (green category in the subsidy fact sheets) as well as the corresponding relation. Furthermore, the number of specific PVT subsidy schemes is given for each country.

Table 2: Overview of number of subsidy schemes applicable for PVT

	PV subsidy schemes			ST subsidy schemes			Number of specific PVT subsidy schemes
	Total number	PVT fully included	Rate	Total number	PVT fully included	Rate	
Austria	1	0	0%	7	2	29%	0
France	3	3	100%	3	0	0%	0
Germany	1	1	100%	1	0	0%	1
Italy	2	2	100%	4	2	50%	0
Netherlands	3	3	100%	2	0	0%	0
Switzerland	2	2	100%	1	0	0%	0
UK	-	-	-	2	1	50%	0

Results of this overview:

- PV subsidy schemes include PVT systems with a rate of 100% in five of six countries. The situation in Austria is not completely clear in this case, and from the UK there was no information available concerning PV subsidies.
- ST subsidy schemes show rather low percentages in terms of accepting PVT systems. Four of seven countries cannot provide any subsidy scheme for PVT with equal support as for ST. Austria, Italy and the UK have at least one ST subsidy that fully includes PVT.
- Germany is the only country providing a specific PVT subsidy scheme in 2020.

3. Conclusions of the survey

The topic of public funding for solar energy technologies is on the one hand very complex within each country, because there are normally different levels of funding authorities (national, regional, municipal…), and various criteria have to be fulfilled. On the other hand, the subsidy situation can be hardly compared in absolute numbers between different countries, because economic and social premises are different.

Nevertheless, the performed subsidy survey among seven selected member countries of Task 60 can provide a tendency about the current subsidy situation for PVT systems. The following findings and conclusions can be stated:

- Only one of the participating countries provides a specific PVT subsidy scheme in 2020.
- Many subsidy guidelines do not clearly point out, if PVT systems are eligible at all. Additional clarification is necessary that results in additional effort for the user.
- PV subsidy schemes show high acceptance of PVT with equal funding criteria.
- ST subsidy schemes are mostly not prepared well to include PVT. Subsidy criteria are designed for ST and are therefore sometimes unfavorable for PVT.
- Some ST subsidy schemes base on the conventional application of hot water generation. This operation mode requires temperatures that are not in the optimum range of PVT collectors. Therefore, such subsidy criteria are disadvantaging for PVT.
- ST subsidy schemes partly exclude uncovered collectors (ST and PVT) from funding.
- Some ST subsidy schemes exclude air-driven collectors from funding.
- Different consideration of the PVT-types (covered, uncovered, air-driven, water-driven) raises the complexity of the subsidy situation.
- Separate funding of the thermal and electrical part of the PVT raises the complexity of the subsidy situation.
- The thermal performance of PVT is still under-estimated in some subsidy guidelines.
- Simplification of the PVT subsidy situation is necessary!

4. Recommendations for future PVT subsidies

The conclusions of the survey reveal that the current subsidy situation for PVT applications in the considered countries is not satisfying. Therefore, the following recommendations for future PVT subsidies can be provided:

(1) **Development of separate PVT subsidy schemes** rather than integrating PVT in existing ST and PV schemes

(2) If existing PV and ST subsidy schemes shall include PVT: **Clear statement that PVT collectors are eligible** for funding

(3) Clear statement that **all specific types of PVT** (covered, uncovered, evacuated, air-driven, water-driven) are equally subsidized

(4) **Electrical part** of the PVT collector shall be supported **equally to PV**: same funding criteria (e.g. quality requirements), same form and amount of subsidy

(5) **Thermal part** of the PVT collector shall be **supported based on an adequate operation point**, which can be defined by an average collector temperature of e.g. 35°C. Other funding criteria (e.g. quality requirements), form and amount of subsidy can be identical to ST.

(6) Subsidies shall be available on **national level in order to simplify the subsidy situation** if this in favor of reducing unequal funding situation between certain regions of a country.