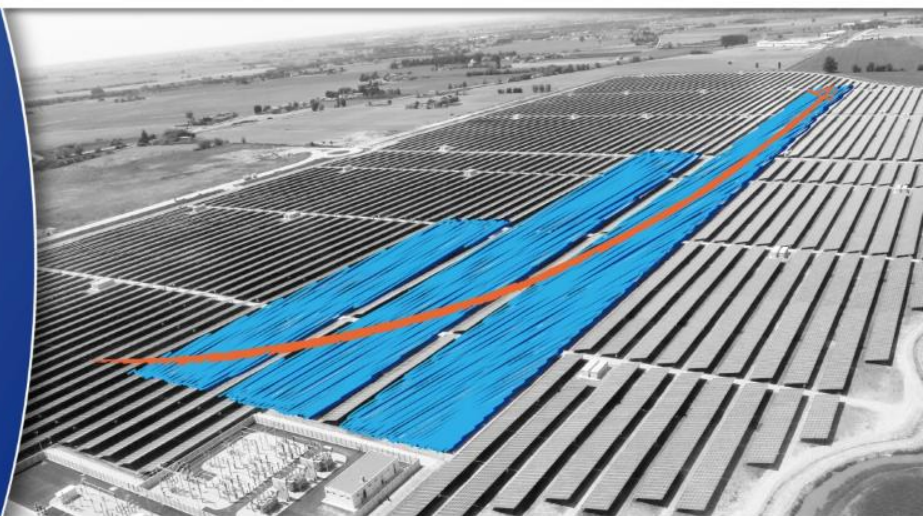


# Solar PV business models for the social housing sector



Sonia Dunlop, Policy Adviser, SolarPower Europe

Housing Europe conference “Getting our homes future ready: essential skills and innovative solutions needed for a fair energy transition”, Brussels, 8 March 2017



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PVFINANCING 



 **Frankfurt School**  
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AMBIENTEITALIA





An aerial photograph of a dense residential neighborhood. The houses are mostly two-story brick buildings with red-tiled roofs. Many of the roofs have blue solar panels installed. The houses are arranged in rows, with some green spaces and trees interspersed. A road runs through the middle of the neighborhood, and a few cars are visible. The overall scene depicts a typical suburban or urban housing estate.

# Why is social housing different for solar?

- Low costs of capital and increased returns
- Long time horizons
- Economies of scale and major renovation projects
- Energy performance requirements - public authorities two years earlier



# Rented sector: the landlord-tenant dilemma





# Multi-family housing

- Less roof space so higher self-consumption (80-90%)
- Barriers to selling to multiple consumers e.g. Austria and Italy
- Wires within building: grid or not grid?
- Self-consumption for communal areas (lifts, lighting, air conditioning, CCTV, saunas)

# Business model options

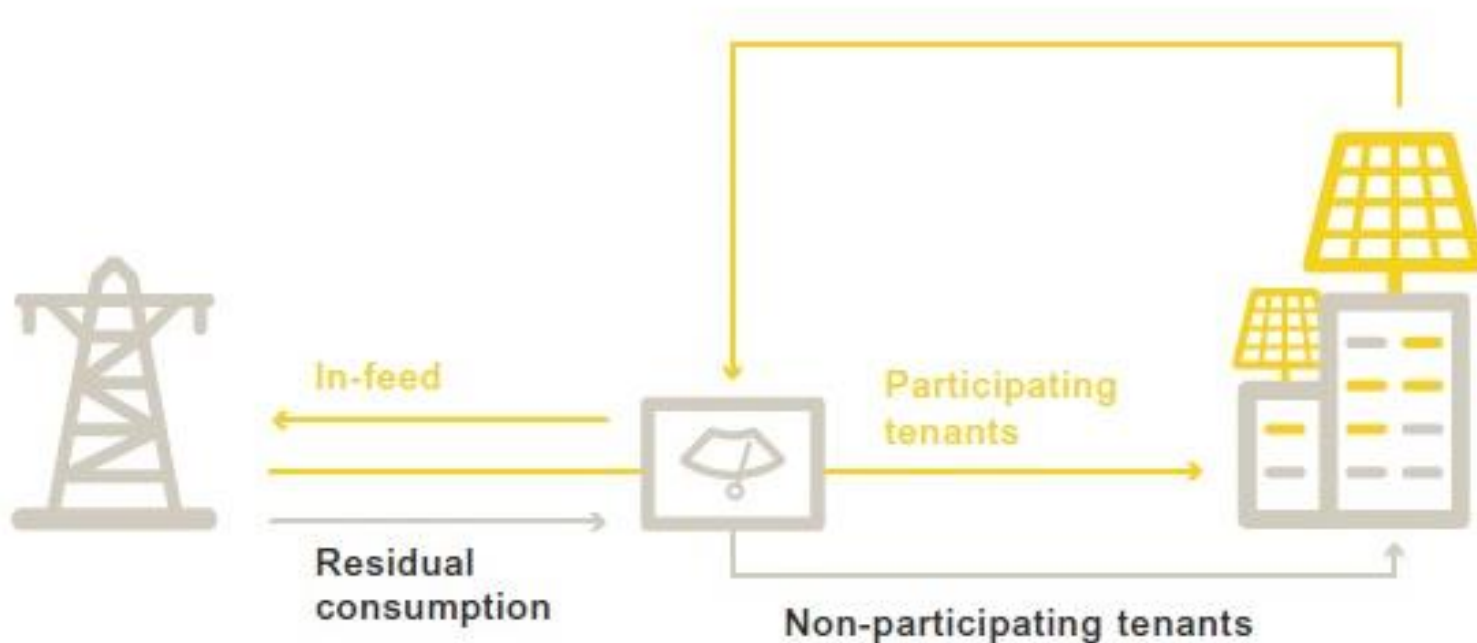
1. Leasing – and this could be the building owner
2. Onsite direct wire mini PPAs
3. Collective self consumption
4. Crowdfunding



# Leasing model

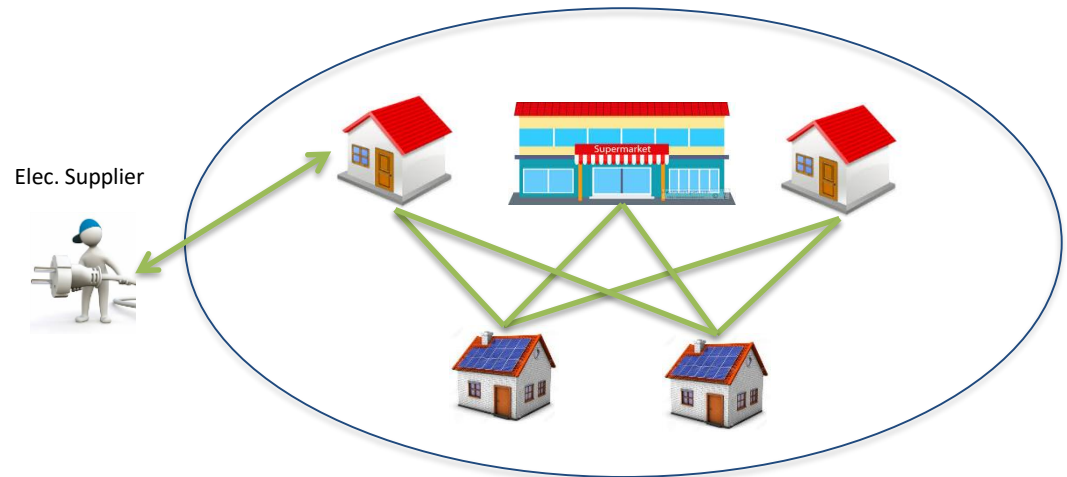
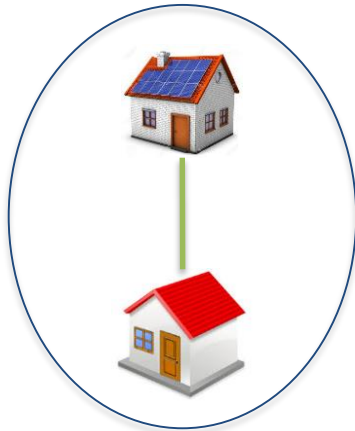
- Solar leasing company designs, invests and installs PV system on consumer's roof.
- Consumer pays monthly leasing fee over 10-20 years
- System automatically gets passed to consumer after period OR option to buy at end of leasing contract.
- Consumer responsible for O&M of system.
- Three contracts: rooftop access, leasing and maintenance.
- Solar leasing company can lease to tenant, housing association can lease to tenant.
- No up-front cost, savings from day one. But what happens when tenant moves on?

# *“Mieterstrom”* in Germany



...onsite mini direct wire PPAs



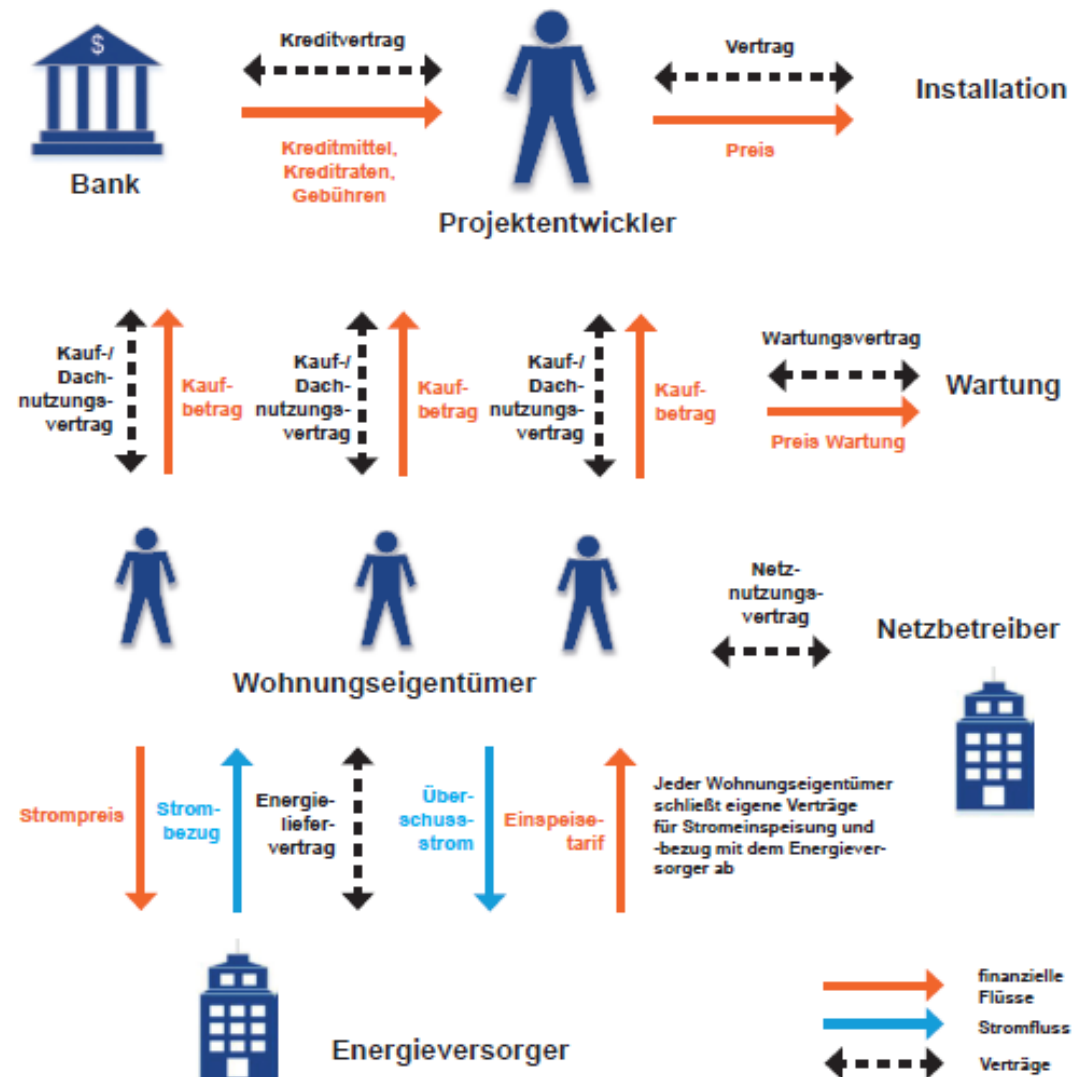


*« Self-consumption is collective when the electricity supply is taking place between one or more electricity producers and one or more end consumers, linked together by a legal entity ... » ( beginning of Art. L 315-2, Energy Code).*

## Collective self-consumption in France

# Shared generation facility in Austria

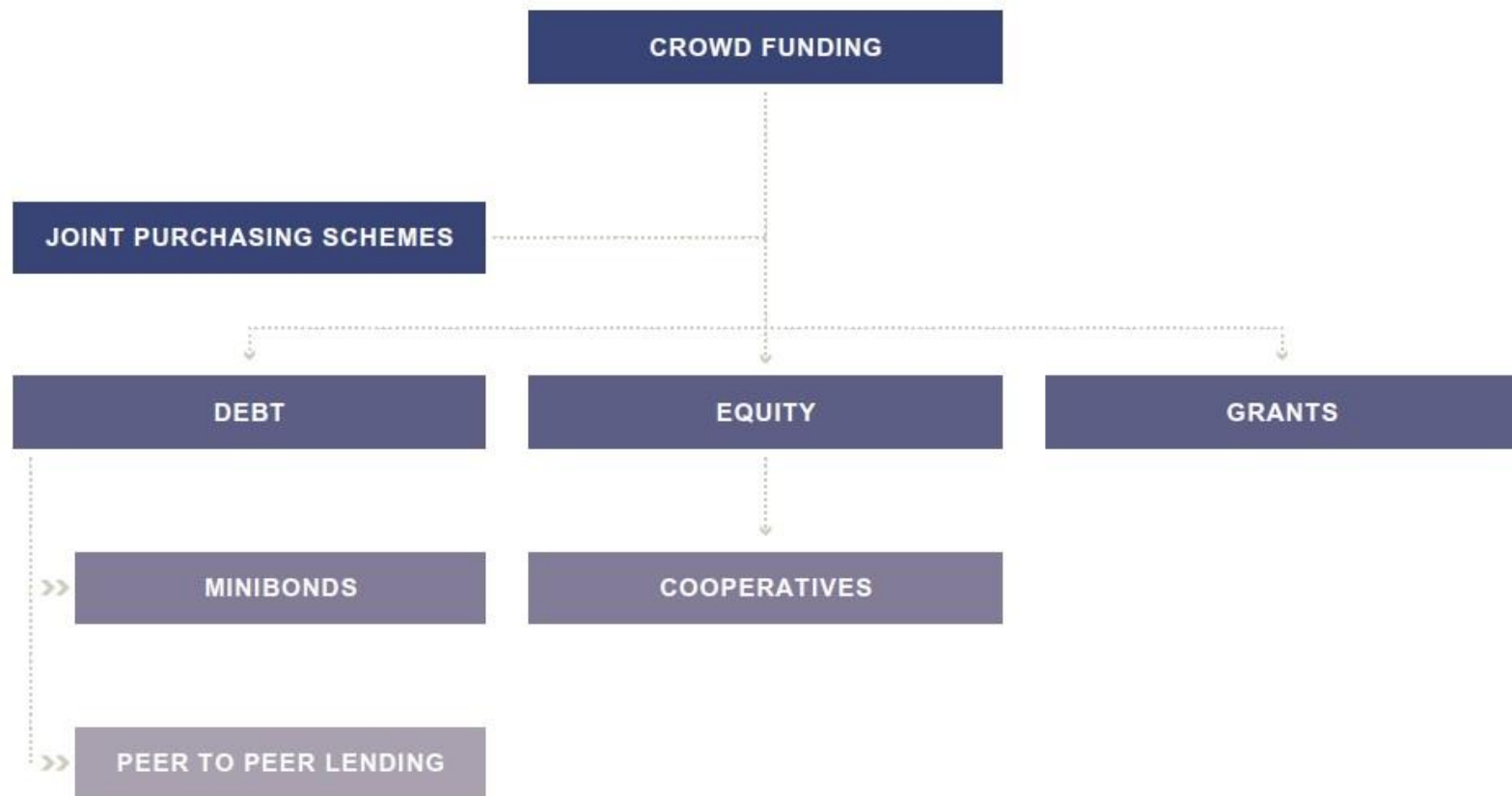
Abbildung 9: PV-Einzelanlagen pro Wohn-/Büro-/Geschäftseinheit – Struktur des Geschäftsmodells (symbolisch)





# Crowdfunding

*Figure 14. Types of crowdfunding for solar PV*



# Other options...

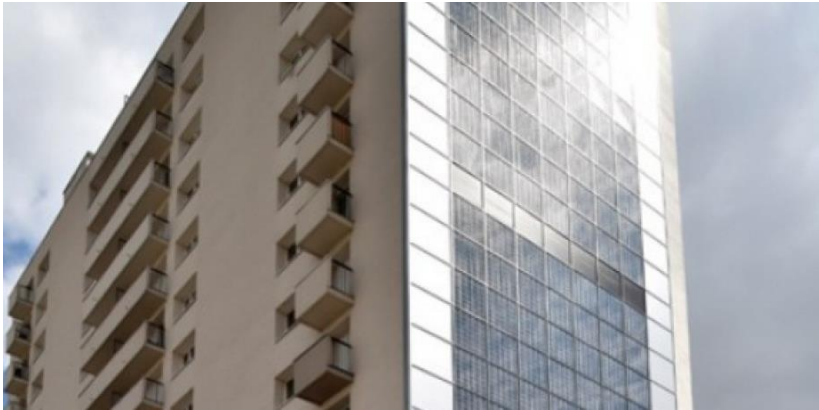
1. Multiple technically separate PV systems
2. District power (uniting consumption)





# Case studies

# Ile-Saint-Denis, Paris, France



- BIPV
- Meets power demand of communal areas (lighting, lifts)
- 80 flats
- ~23kW
- Installed in ~2015
- €260k, of which €100k regional government and €100k public money
- Social housing provider Immobiliere 3F and Ateliers David/ACIEO Group



# Heidelberger Cooperative, Heidelberg, Germany



- 445kWp
- 525,000 EUR
- All tenants offered shares
- Package 800 EUR loan + 2 x 100 EUR shares
- Loans repaid over 20 years at 3% interest
- East-West system
- Tenants buy electricity from solar system at 0.25 EUR/kWh, guaranteed for 20 years

# Hirst Estate, Ashington, UK



- 400 solar homes, 1MW in total
- Micro inverters
- No high voltage DC cables within homes
- Free solar electricity for tenants
- Installed in 2014-2015
- Enphase, Saving Energy Renewables North East and Arch Northumberland



# Brixton Energy Solar, London, UK



- Community share offer
- Return on investment 3% (with tax relief)
- 2012-2016
- Latest offer raised £65k from 71 investors
- 37kW, 45kW, 52kW
- 20% revenue to a Community Energy Efficiency Fund
- RePowering London, Southern Solar, Lambeth Council, Transition Town Brixton and Roupell Park Tenants Management Coop



# Broxtowe Estate, Nottingham, UK



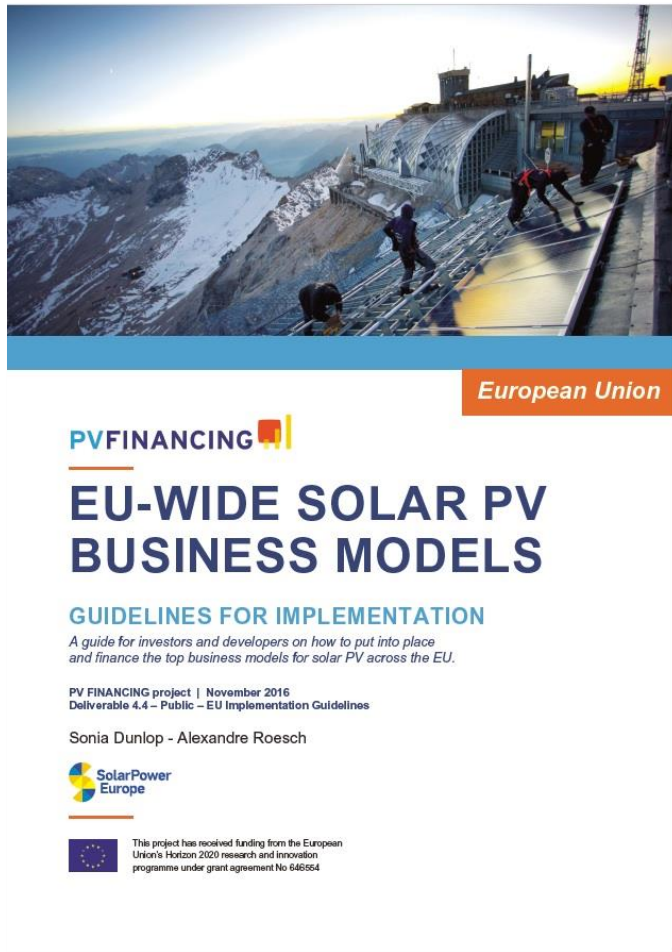
- Broxtowe Estate
- Nottingham City Council
- £9million cost
- £350k/year profit for 20 years
- ~2015

- Draft revision of EU Renewable Energy Directive (Art 15 and 21)
  - PPAs for multiple power consumers
  - Multiple electricity suppliers
  - Use of wires and cables without grid charges or supply license
  - Third party ownership of self-consumption systems (leasing)

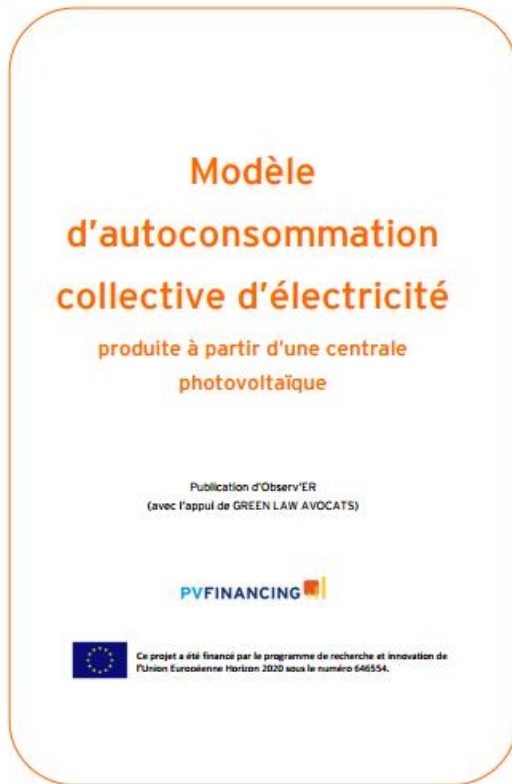
# Want to know more?



# EU-level PV Financing reports



# National contract templates and business model guidelines

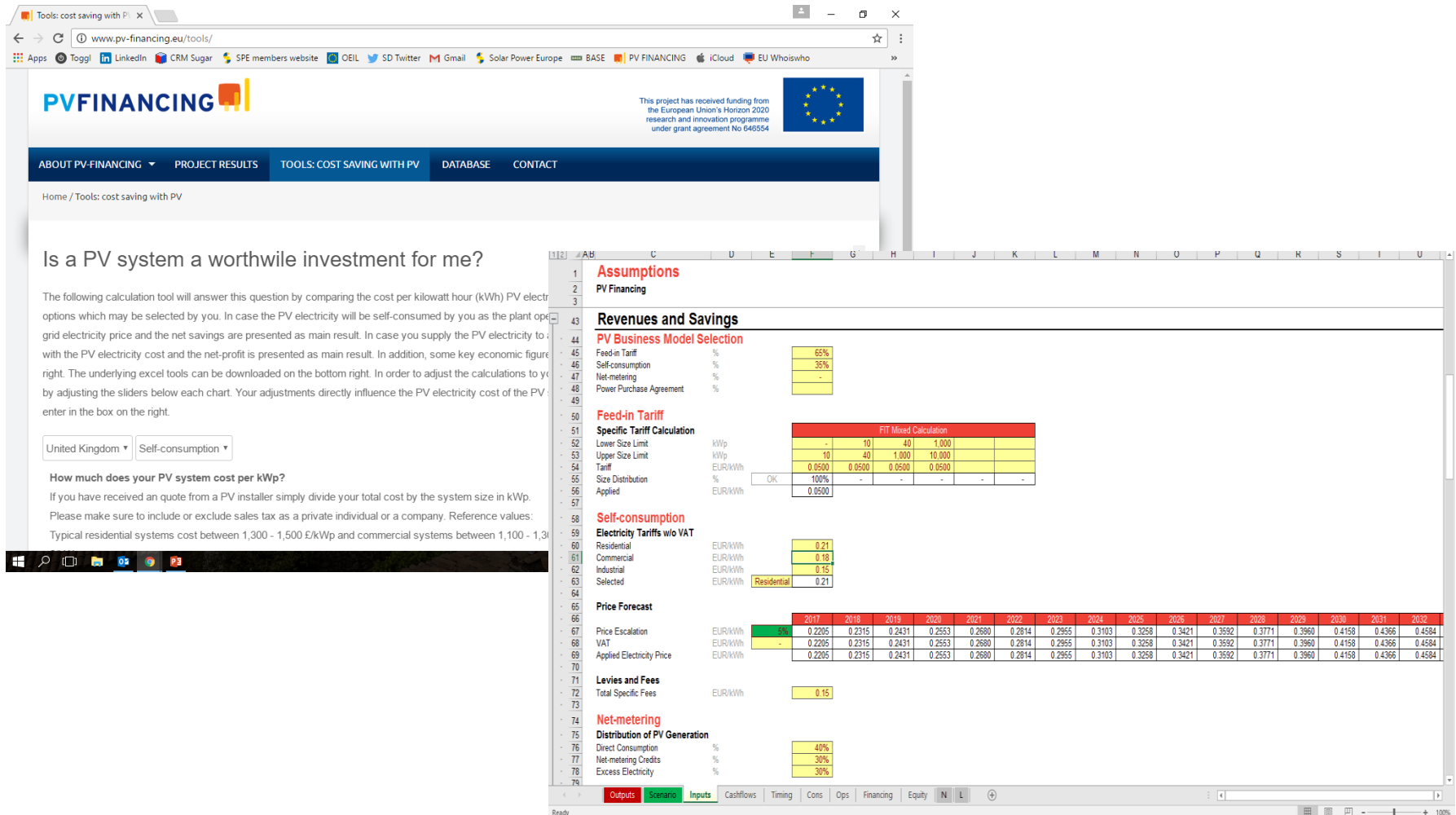


Örnek Elektrik  
Sözleşmesi  
topluluğu, Türkiye

Bird & Bird LLP  
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# Cash flow models



The screenshot displays the PVFINANCING website interface and the underlying Excel spreadsheet used for calculations. The website, titled "Tools: cost saving with PV", features a navigation menu with links to "ABOUT PV-FINANCING", "PROJECT RESULTS", "TOOLS: COST SAVING WITH PV", "DATABASE", and "CONTACT". The main content area asks, "Is a PV system a worthwhile investment for me?" and provides a detailed explanation of the calculation tool. It includes a dropdown menu for "United Kingdom" and a radio button for "Self-consumption". Below this, it states: "How much does your PV system cost per kWp? If you have received an quote from a PV installer simply divide your total cost by the system size in kWp. Please make sure to include or exclude sales tax as a private individual or a company. Reference values: Typical residential systems cost between 1,300 - 1,500 €/kWp and commercial systems between 1,100 - 1,300 €/kWp".

The Excel spreadsheet, titled "Assumptions", contains the following data:

| Assumptions                          |   |
|--------------------------------------|---|
| <b>Revenues and Savings</b>          |   |
| <b>PV Business Model Selection</b>   |   |
| Feed-in Tariff                       | 65%   |
| Self-consumption                     | 35%   |
| Net-metering                         | -   |
| Power Purchase Agreement             | -   |
| <b>Feed-in Tariff</b>                |   |
| <b>Specific Tariff Calculation</b>   |   |
| Lower Size Limit                     | 10  |
| Upper Size Limit                     | 40  |
| Tariff                               | 0.0500  |
| Size Distribution                    | 100%  |
| Applied                              | 0.0500  |
| <b>Self-consumption</b>              |   |
| <b>Electricity Tariffs w/o VAT</b>   |   |
| Residential                          | 0.21  |
| Commercial                           | 0.18  |
| Industrial                           | 0.15  |
| Selected                             | Residential 0.21  |
| <b>Price Forecast</b>                |   |
| Price Escalation                     | 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032                                 |
| VAT                                  | 0.2205 0.2315 0.2431 0.2553 0.2680 0.2814 0.2955 0.3103 0.3258 0.3421 0.3592 0.3771 0.3960 0.4158 0.4366 0.4584 |
| Applied Electricity Price            | 0.2205 0.2315 0.2431 0.2553 0.2680 0.2814 0.2955 0.3103 0.3258 0.3421 0.3592 0.3771 0.3960 0.4158 0.4366 0.4584 |
| <b>Levies and Fees</b>               |   |
| Total Specific Fees                  | 0.15  |
| <b>Net-metering</b>                  |   |
| <b>Distribution of PV Generation</b> |   |
| Direct Consumption                   | 40%   |
| Net-metering Credits                 | 30%   |
| Excess Electricity                   | 30%   |



# Index of national documents (1/2) **PVFINANCING**

## **AUSTRIA**

Roof rental contract [Dachvermietung \(Österreich\)](#)

Leasing contract [Pachtvertrag \(Österreich\)](#)

Solar cooperative association by-laws [Vereinstatuten \(Österreich\)](#)

Self-consumption model guidelines [Leitfaden zu PV-Eigenverbrauchsmodellen](#)

Policy advisory paper Austria [Nationales Positionspapier](#)

## **FRANCE**

Collective self-consumption contract [Modèle d'autoconsommation collective d'électricité \(France\)](#)

Surplus electricity in collective self consumption electricity contract [Modèle de contrat de vente du surplus d'électricité dans le cadre d'une autoconsommation collective \(France\)](#)

Solar business model implementation guidelines [Guide de Mise en Oeuvre de Projets PV en France](#)

Policy advisory paper France [Recommandations pour un deployment accru du photovoltaïque en France](#)

## **GERMANY**

Neighbour electricity model implementation guidelines ["Geschäftsmodelle Mit Pv-Mieterstrom"](#)

Policy advisory paper Germany [Nationales Positionspapier](#)

## **ITALY**

Operational leasing contract for a PV plant [Contratto di locazione operativa di impianto fotovoltaico \(italia\)](#)

Power Purchase Agreement contract for electricity supply through a PV plant [Accordo per la costruzione di impianto dedicato e somministrazione di energia elettrica secondo lo schema del sistema efficiente di utenza \(italia\)](#)

Solar business model implementation guidelines [Impianti fotovoltaici: linee guida per l'implementazione](#)

Policy advisory paper Italy [Fotovoltaico in Italia, quale politiche di supporto?](#)

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## SPAIN

Contract template for the participation in the crowdfunding of a PV installation [Contrato de cuentas en participación para la explotación de una instalación fotovoltaica ubicada en \(España\)](#)

Contract template for representation in the electricity trading market for a prosumer with self-consumption 2 [Contrato de representación de mercado para la venta de excedentes de una instalación del autoconsumo \(España\)](#)

Cooperative by-laws template [Plantilla de estatutos corporativa \(España\)](#)

Solar business model implementation guidelines [Pautas de Implementación Nacional](#)

National report on regulatory framework Spain [Informe nacional de asesoramiento regulatorio](#)

## TURKEY

Contract for lease of PV system [FV sistemlerin kiralanması için Örnek Kontrat](#)

[Electricity utility, investor and solar supplier contract Kontrat tipi 1: Kamu Hizmetleri\(Elektrik\), yatırımcı ve solar tedarikçi model I \(Türkiye\)](#)

[Electricity supply contract for solar PV electricity supply and example electricity bill Fotovoltaik Elektrik Arzı ve Örnek Elektrik faturası için Örnek Elektrik Arzı Sözleşmesi \(Türkiye\)](#)

Solar business model implementation guidelines [Ulusal uygulama rehberi](#)

Policy advisory paper Turkey [Ulusal Politika Tavsiye Belgesi](#)

## UNITED KINGDOM

[Power Purchase Agreement \(United Kingdom\)](#)

[Making Solar Pay: the future of the solar PPA market in the UK](#)

[UK National Policy Advisory Paper](#)

# Webinars and events

National webinars (in national languages) for seven countries: Austria, Germany, France, Italy, Spain, Turkey and United Kingdom

- Germany webinar on “crowdinvesting” on [Tues 4 April](#)
- Contact the [national partners](#) for more information

Event in Brussels to present results to policymakers in April/May 2017

- Contact [SolarPower Europe](#) for more information

Possible national webinars in other EU Member States to disseminate project results

- Check [@PVFinancing on Twitter](#) for more information.





# Questions?

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