Technology Fact Sheet – PHOTOVOLTAICS (connected to the grid)

provided by ARENE Ile-de-France

Step by step to implement a feasibility study

1/ Stages of implementation of the project

a) Pre-feasibility study on technical, legal and economic issues

b) Draft:

Pre-sizing the PV system
Production simulation with specialized software
Stress Analysis of connecting to the network
Economic and Financial Analysis
Planning permissions

c) Choice of the company:

Writing specifications
Secure financing (equity, loans, and subsidies)
Choice of the company

d) Works:

Check sizing
Administrative procedures for connecting to the network
Control of installed products
Acceptance of the works

e) Operating

Monitoring the operation and production
Billing of supply energy to the buyer

2/ Design

a) Compliance with planning rules:

On new building: the panels are part of the application for a building permit
On existing building: must be declared to the local authority prior to building works

b) Power installation:

There is no correlation between the installed capacity and the needs of the building.
The choice is made according to criteria of budget and available space.

c) Orientation and inclination:

The optimal orientation is 30-35 °South.

d) Mask:

Avoid masks because the drop in efficiency is greater than the percentage of the PV panel surface.

e) Losses in the circuit:

The installation must be designed to minimize the distance between the PV plant and electric substation.

f) Inverter:

The design of the inverter is important.
The inverter must be located in an accessible, dry and ventilated area.

3/ Implementation

a) The main hotspots are:

Tightness
Wind resistance
Durability of the system components
Poor ventilation of the modules at the rear
Material compatibility between them

b) Installation options:

Roof integration
Superimposition
Roof terrace
Veranda
Sun Shading devices

4/ Maintenance and care tips

The installer must provide a maintenance contract:
Cleaning modules.
Cleaning the ventilation of the inverter.
Monitoring operation of the safety devices.
Visual examination of the status of the modules, sealing, good condition of the cables along the circuit.
Checking the operation of the inverter.

Technology Fact Sheet – SOLAR THERMAL

provided by ARENE Ile-de-France

Step by step to implement a feasibility study

1/ Stages of implementation of the project

Sizing the collective solar thermal plant:
1 / Needs Assessment in volume and time (day, week, season)
2 / Architectural conditions of the building for a good capture of solar energy
3 / Search surfaces for solar panels implantation: flat roof, pitched roof, floor.

Factors to be taken into account in the pre-dimensioning:

- Maximum available surface and constraints for the implementation of panels
- Typical performance and surface panels
- Annual rate of solar coverage
- Solar coverage in the warmer months
- Location available for storage tanks

2/ Sizing installation

a) Assessment of domestic hot water consumption

b) Assessment of energy consumption

c) Set limit values for temperature: 50 ° at the tap (faucet or shower)

d) Determine the energy requirements to produce the DHW (kWh / day) based on:

- Respective average temperature hot water (Tc) and cold water (Tf) of the network
- Average daily volume in m3 DHW
Q = 1.16 x Vecs x (Tc - Tf)
(1.16 is the specific heat of water, the amount of energy required to raise the temperature of 1 m3 of water by one degree is equal to 1.16 kWh)

e) Sizing the storage tank

f) Rate energy needs: share of annual energy needs provided by solar collectors

3/ Technical and economic assessment

- Amount of investments
- Estimated annual costs for maintenance and monitoring of equipment performance
- Solar Assessment (substituted energy, backup power and energy consumed by the auxiliary)
- Evaluation of the reference solution
- Gross payback time
- Updated overall cost of the life of the installation

4/ Recommendations

a) Solar collectors:

The flat plate collector:
Most flat plate collectors can gain temperature up to 70 ° over ambient temperature and are therefore ideally suited to the production of hot water.
The vacuum sensor.
You can get gains 100 ° and above. This type of sensor is particularly suitable for applications requiring high temperatures.
The simplified sensors (solar carpet)
They are particularly well suited for heating swimming pools where the temperature increase over the ambient temperature is low.

Vacuum tube collectors and flat plate collectors are suitable for solar hot water at 58 ° or higher and can be considered a return of at least 10 years in the Ile-de-France region, given the local solar resource and grants current. In comparison, solar carpets, less expensive, can find a faster return but are dedicated to the production of hot water at 30 °.

b) What technology for which kind of building

In general, office buildings or activities, consuming little hot water, do not undertake the development of solar thermal solutions, except in special cases.
Similarly, nurseries, schools closed in the summer when the solar radiation is the most important gyms, rarely justify the fact of conducting studies solar flares.
Solar thermal solutions are so much more sense in the pools, restaurants and housing consuming hot water throughout the year and in sufficient quantity. However, if the consumption patterns of these buildings lend themselves to the development of solar thermal solutions, state, structure, size, exposure and shading of the roof remain limiting factors that will be essential to understand from the beginning of the feasibility study. Thus, it is preferable to abstain if a ten-year restoration is underway or if works are planned.