

## PV Energy Community Case Study:

### Stavros Niarchos Foundation Cultural Center (SNFCC) Athens, Greece



**Stavros Niarchos Foundation Cultural Center (SNFCC) is located 4.5 km south of the centre of Athens, on the edge of Faliro Bay.**

SNFCC is a multifunctional arts, education and entertainment complex. It houses the facilities of the National Library of Greece and the Greek National Opera as well as a 210.000 m<sup>2</sup> of public garden park which constitutes a vital green space for Athens city.

The complex also includes a multistoried parking building, several outbuildings, dining and coffee halls. At the center of the park is the Great Lawn, an open space for larger gatherings, which also functions as a venue for concerts, festivals and films.

SNFCC Park ends on a hill 32m high, beneath which are the buildings that house the library and the opera house. The hill operates as a green roof for the structure, significantly reducing the air conditioning requirements.

At the Park's summit there is a 900m<sup>2</sup> glass-walled "Lighthouse", a space designed for people seeking a quiet area to read and reflect or appreciate the view but also an ideal space for events and exhibitions. Soaring 14 m above the summit there is a 100m x 100m photovoltaic canopy which services part of the electricity needs of SNFCC.

The total installed capacity of the PV canopy is 1584.6 kWp and it is estimated that it will produce over 2GWh per year, servicing a notable part of SNFCC's electricity needs. In certain monthly periods the coverage can reach up to 34%. Under normal operation all of the electricity produced by the PV canopy is consumed by the SNFCC premises.

SNFCC is bound by an auto-PV producer contract with the Distribution Network Operator which prohibits them from using the local distribution network as a backup system. Under normal operating conditions SNFCC's PV exports to the Local Distribution Network should be minimal and, where possible, zero. Being an auto-PV producer has turned SNFCC from a passive consumer to an active 'prosumer' as they produce and consume 100% of the renewable energy they produce.

SNFCC produces and uses all of its own electricity, carefully synchronising its utilisation in order to achieve 100% self-consumption. In the case of surplus produced PV energy, no payment measures (e.g. predefined Feed-in Tariff or according to the value of the System Margin Price) are available for compensation.

The European Directive 2010/31/EU on Energy Performance of Buildings suggests that, from 2018 onwards, all new public buildings (owned or rented) should be designed as Zero Energy Buildings.

In order to meet this objective, improvements must be made in the energy efficiency and smart operation of new buildings. Better matching of the on-site demand of buildings with Renewable Energy System (RES) production and the maximisation of their on-site generation should be a priority.

Recognising that PV costs decrease with time and energy costs increase, it is believed that Building-Integrated Photovoltaics will gain ground on newly built and refurbished buildings.

The outstanding technological methods and practices that SNFCC adopted during its construction phase together with their energy management has enabled efficient and economical operation of their building. Understanding the building's energy consumption and the level being exported to the grid will help to identify and mitigate the potential problems that this size of system can pose to the distribution networks.

It is thought that the SNFCC's system could be successfully replicated by more building communities and could help to develop a viable business model for the penetration of PV in building projects.



Aerial views of SNFCC (Credits: SNF - Yiorgis Yerolymbos)