



Recent Developments in Empowering
Consumers within the Markets of South-
East Europe: from End-user to Prosumer
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**AFRODITI SEMKOU
ATTORNEY-AT-LAW
PHD CANDIDATE, ARISTOTLE UNIVERSITY OF
THESSALONIKI
INTERNATIONALL HELLENIC UNIVERSITY
ASSOCIATE**

RECENT DEVELOPMENTS IN EMPOWERING CONSUMERS WITHIN THE MARKETS OF SOUTH-EAST EUROPE: FROM END- USER TO PROSUMER

The ultimate goal of continuous supply of energy to consumers did not occur overnight. It is the outcome of a systematic regulatory framework that sets out the energy generation, transmission, distribution and storage standards, while simultaneously safeguarding the cross-border nature of the energy infrastructures.

After a vast variety of developments and many rounds of EU energy market legislation the –emerged out of the Edison age - energy industry's business model has remained fundamentally unaltered. The utility was responsible for generating power and selling it to the customer. Customers were simply energy consumers, **power flow was one way** from generation to load, and demand was fairly predictable. However the system still appears unbalanced, calling for the resolution of any inconsistencies.

Today we are witnessing the **utilities model undergoing a paradigm shift!**

The emergence of advanced, **smarter technology** has enabled consumers to make more informed choices about energy usage and **become energy producers and storers themselves.**

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THE NOTION OF PROSUMER

- ✓ Active energy consumers, are often called 'prosumers' because they both consume and produce energy
- ✓ We are observing a diametrical deviation from the passive perception of consumer to the new concept of 'prosumer'
- ✓ Various types of prosumers : residential prosumers who produce energy at home, commercial prosumers whose main business activity is **not** electricity production, public institutions e.g. schools, hospitals as self-generating producers
- ✓ private citizens and especially farmers own half of Germany's renewable energy installed capacity
- ✓ wind turbines in Denmark are owned in percentage of 85% by private individuals

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Except for the emergence of the prosumer notion, the whole strategy behind Europe's Energy Union recognizes the need for Europe's entire energy system and related value chains to be changing.

Since energy innovation cannot become a success story by focusing on a single actor, it will be the result of a vast variety of contributions of several stakeholders from different horizons, inspired and pushed by smart city projects, end-users, the new and the traditional energy players, academic institutions and generally by the whole "rearrangement" atmosphere.

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In the aforementioned context of consumer empowerment, the structuring of an open market with **the adoption of smart grids and smart grid technologies**, has attracted considerable interest in the fields of economics, sociology and electrical engineering.

What are smart grids?

“Electricity networks that can intelligently integrate the behavior and actions of all users connected to it – generators, consumers and those that do both – in order to efficiently deliver sustainable, economic and secure electricity supplies”

The term applies to both upstream (generator) and downstream (consumer) markets and it measures actual output or consumption in real time, broadcasting data and providing market actors with the option of remote control of these data.

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What is the increased value of the smart metering system?

- ✓ Consumers are integrated as empowered players in the electricity system
- ✓ Through the reduction of peaks in demand and the enhancement of efficiency energy savings are achieved
- ✓ Integration and optimization of RES and energy storage in electricity networks
- ✓ Innovation in load handling
- ✓ Quality enhancement of the energy supply to end- users, by anticipating the outages with the necessary improvement and by maintaining self-adapting networks
- ✓ Establishment of information networks with data storage and management forecasts

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The Distributed Generation model (DG)

Opposite to the large central station model that has been dominant for electricity production and use for many decades, the distributed generation model encloses any means of generating and feeding energy into the grid. The design involves a variety of aspects, such as a range of smaller-scale devices designed for provision of electricity or thermal energy in locations close to consumers, fossil and renewable energy technologies, photovoltaic arrays, wind turbines, reciprocating engines, fuel cells, combustion turbines, steam turbines, along with energy storage devices and cogenerating systems that combine both heat and power systems.

Electricity flows both ways, meaning that if the customer demands more electricity than the generator produces, the meter runs forward, whereas when the customer generates more electricity than the one demanded, the meter runs backwards. Excess of generated electricity is either stored, or flows freely into the grid and may be used by third parties.

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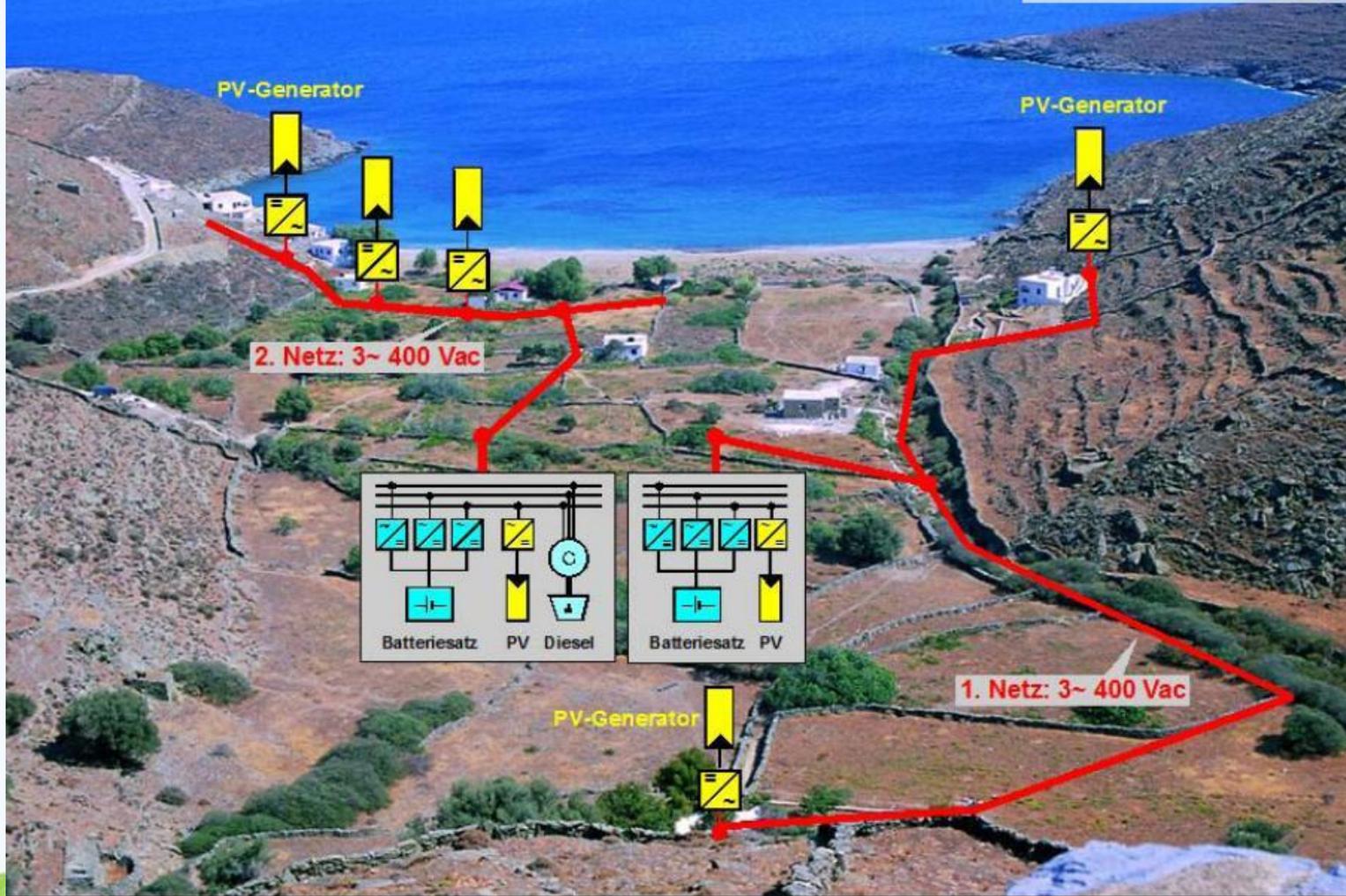
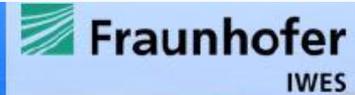
Establishment of Distributed Generation and RES penetration in the power mix of European island grids

Autonomous island grids, mainly electrified by diesel generators, are dramatically enhancing the energy cost and pollution of the environment, despite the excellent wind and solar potential in these areas.

Technical issues pose barriers and many case studies have been carried out in order to investigate the restraints at the penetration level of distributed generation and of renewable energy.

The Kythnos Island Project

SELFsync Microgrids on Kythnos, Greece



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- **The Way Forward: Market Liberalization** as wholesale price caps will be removed, making prices reflect the real value of electricity in time and location (scarcity pricing) to drive investments towards the flexible assets most needed to the system, including demand-response and storage in the Greek islands.
- **Sustainability:** is also about moving towards the decarbonization of the energy mix of the European Union and, thus, the Energy Community Member – States.
- **Security of Supply:** electricity and gas transmission grids should be reviewed from a regional perspective in order to increase competition in the energy internal market and provide system stability.



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