

Synopsis of results

Evaluating the potential and defining a policy framework for Demand Response (DR), Distributed Generation (DG), Renewable Energy Sources (RES) and Energy Storage (ES) in Cyprus

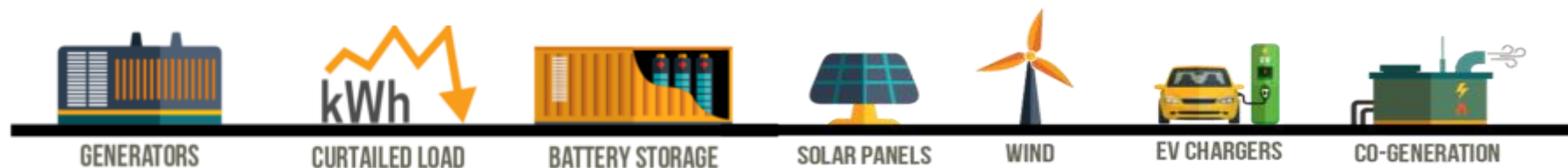
Dr Venizelos Efthymiou
Chairman

FOSS Research Centre for Sustainable Energy, University of Cyprus



Outline

- Task 1. Collecting information and statistics on potential for Demand Response
- Task 2. Review on Policy framework for utilizing Demand Response technologies
- Task 3. Review on Potential for pump hydro storage
- Task 4. Review on Policy framework for introducing Energy Storage technologies
- Task 5. Review of best practices to promote the penetration of Distributed Generation
- Task 6. Review on Policy framework for the provision of ancillary services



Current and future Demand Response potential in Cyprus

Summary

- The current flexibility potential for the whole island is estimated to be between 1.73 – 3.12%, while the total peak demand can be reduced up to 5.29%.
- The results highlight that for the Case Study A (25,000 EVs and total storage capacity of 180 MWh) the overall consumption and peak demand can be reduced up to 6.58 and 19.83%, respectively.
- As expected, both the overall consumption for Case Study B (50,000 EVs and total storage capacity of 360 MWh) is reduced by a percentage that ranges between 4.87 and 7.41%. Moreover, the peak demand can be reduced up to 29.58%.

Month	Baseline Scenario (2018)		Future Scenario (2030)			
			Case Study A		Case Study B	
	Consumption Reduction (%)	Peak Reduction (%)	Consumption Reduction (%)	Peak Reduction (%)	Consumption Reduction (%)	Peak Reduction (%)
September	3.12%	5.29%	6.58%	16.68%	7.22%	21.05%
October	1.86%	4.73%	4.03%	19.28%	4.90%	26.14%
November	1.87%	4.35%	4.27%	19.42%	5.26%	26.85%
December	2.25%	4.67%	4.68%	17.26%	5.56%	23.07%
January	2.08%	4.42%	4.49%	16.70%	5.33%	22.28%
February	2.06%	4.41%	4.48%	17.04%	5.36%	22.96%
March	2.03%	4.44%	4.60%	18.33%	5.62%	25.31%
April	1.82%	4.59%	4.13%	21.06%	5.19%	29.58%
May	1.73%	4.47%	3.93%	19.83%	4.87%	27.34%
June	2.85%	4.71%	6.58%	17.90%	7.41%	23.54%
July	2.97%	5.05%	6.23%	15.50%	6.77%	19.20%
August	3.05%	5.22%	6.40%	16.58%	7.03%	20.94%

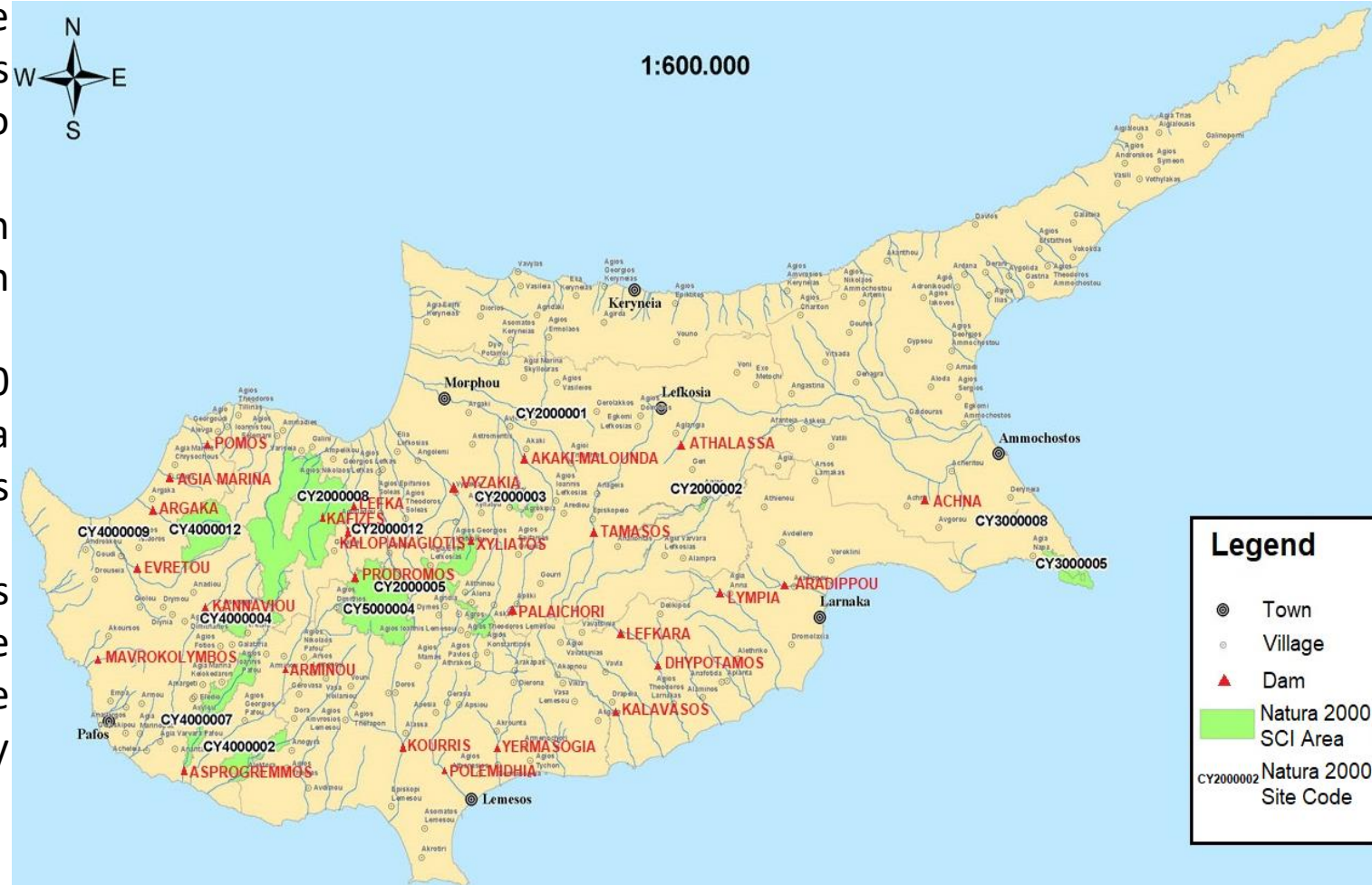
Promotion of Demand Response in Cyprus

The new electricity directive is introducing all aspects for providing the much-wanted flexibility through a responsive market and these need to be transformed into local legislation that will introduce as a minimum the following:

1. A functioning wholesale market
2. Functional market rules that allow freely to operate with all the market rights identified in the directive of the following as a minimum: suppliers, aggregators, empowered end users and energy communities.
3. Choice of appropriate smart meter capable of operating responsive ToU tariffs and / or dynamic pricing supply contracts.
4. Cost reflective tariffs that will allow storage systems to operate without any double charging of network charges and / or taxes and levies.
5. Reserve auctions and DR participation in contingency reserve

Environmental barriers for pumped Storage in Cyprus

- Reservoirs have a negative impact on the environment, and also, suitable sites in Cyprus are likely to face licensing problems due to environmental concerns.
- The potential for the development of PS plants in Cyprus is likely to face significant barriers, in relation to environmental concerns :
 - ✓ Specifically, these may include Natura 2000 protected areas, since almost the entire area within the Troodos region falls within this category.
 - ✓ This is unfortunate because the Troodos region seems ideal for pumped storage application, since it offers the desirable elevation (head) difference between nearby dams.



Economic Assessment of BESS installation in Cyprus

Net-Billing Scheme

- Investing in both PV and Storage facilities is the only viable option.
- Removal of network charges and levies on self-consumption reduces payback period from 10 years (CS-B2) to 9 years (CS-B6).
- Storage price reduction to €200/kWh can potentially reduce payback period to 7 years.

Regulatory Framework	Case Study	Total Capital Cost	Annual Savings	Payback Period
Current regulatory framework	CS-B1	€5,000.0	€1,220.5	6 years
	CS-B2	€9,500.0	€1,381.1	10 years
Without network charges but with taxes and levies on self-consumption	CS-B3	€5,000.0	€1,385.2	6 years
	CS-B4	€9,500.0	€1,545.7	9 years
Without nor network charges nor taxes and levies on self-consumption	CS-B5	€5,000.0	€1,414.6	6 years
	CS-B6	€9,500.0	€1,609.1	9 years
	CS-B7	€7,000.0	€1,609.1	7 years

Review of best practices to promote the penetration of Distributed Generation

- Lack of energy storage and of an open fully operational market are the main obstacles for the development of DG RES.
- End-users should be able to own DG assets and participate actively in all sectors of the electricity market singly or aggregated (i.e. capacity market, flexibility market, balancing market, etc).
- Participation in a fair transparent energy market which can lead to a cost reflective energy management of the assets by the market participants.
- Focus on suitable for Cyprus strategies and mechanisms:
 - Exploitation of local resources optimally using cooperative solutions where needed.
 - Cyprus is already on the pathway for some of the practices presented in this report. Enabling the participation of end-users to an open energy market along with practices mentioned above that can contribute to the promotion of DG penetration and this can further be reinforced through clear and transparent rules and regulations in line with the clean energy legislation for all Europeans.

Review on Policy framework for the provision of ancillary services by Renewable Energy Sources

- Generally, the technical capabilities of RES for the provision of AS are increasing through the advanced control features of inverters & the coupling with energy storage.
- The current level of participation of RES in the European Ancillary Service Markets is limited with the only exemption of Pumped Hydro.
- A similar situation is observed in Cyprus, where RES is not providing AS with the exception of the mandatory provision of Voltage Support.
- The operation of the ASM in Cyprus is expected to kick off after the operation in real terms of the energy market.
- The potential for the provision of AS services from the existing and future RES installations in Cyprus will follow similar promising trends as the rest of Europe.
- Initially, the existing and future RES installations may face some market barriers or difficulties to compete expecting corrective actions and revised policies to ensure the equal and fair participation in the ASM.
- Finally, as we have seen in the policy declarations of the Cyprus Government, significant developments in the energy sector are planned which are going to disrupt the current status of the energy sector in Cyprus, expected to improve and deliver.

Cyprus: Draft Integrated National Energy and Climate Plan for the period 2021-2030

The Governance Regulation and current policy situation of Cyprus in the fields of climate and energy:

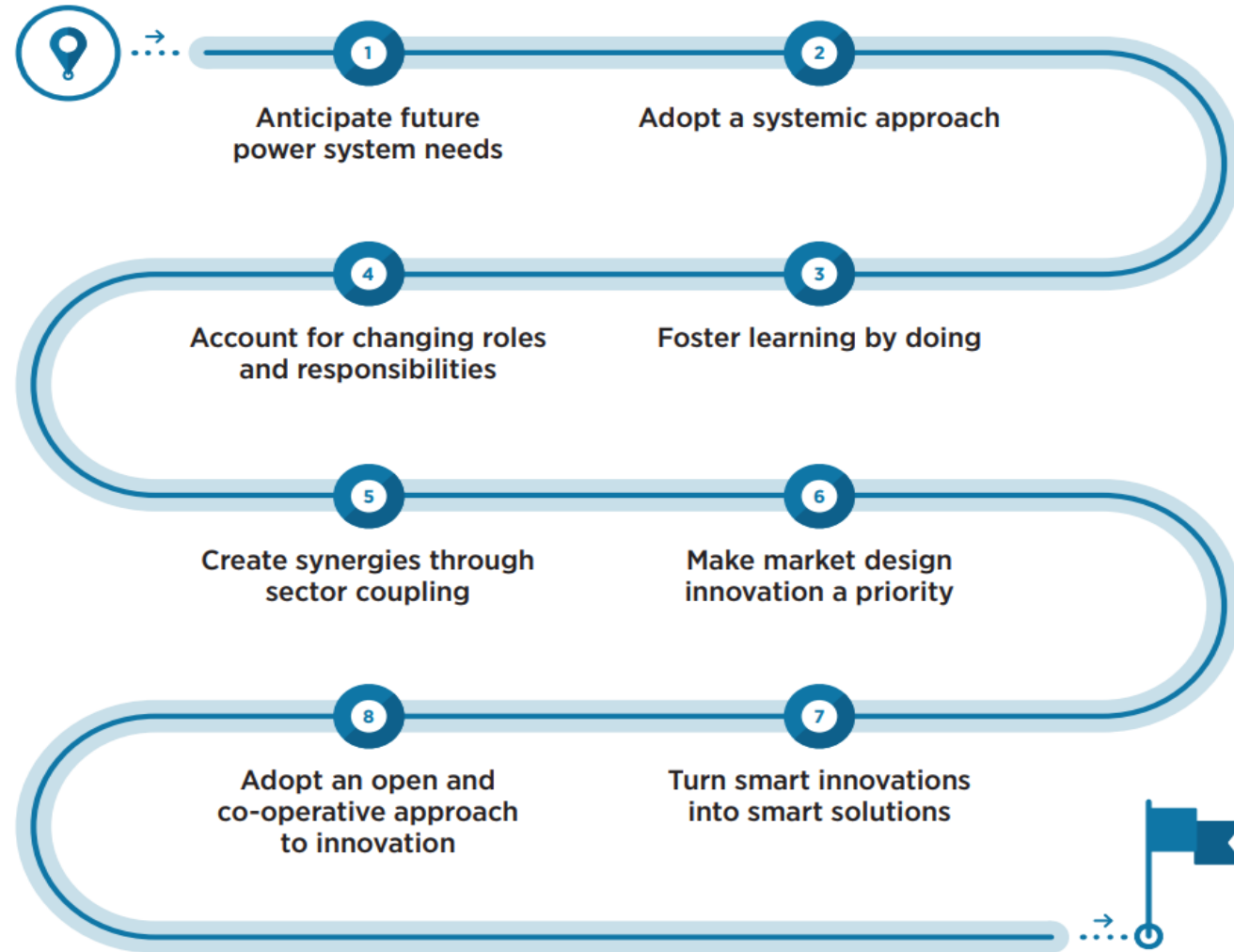
1. Promotion of competitively determined electricity prices - Increase system flexibility. Revise the regulatory framework to increase the use of flexibility in distribution networks and facilitate the market development of flexibility services with the objective of providing solutions alternative to system expansion
2. Remove market barriers in wholesale and retail markets to demand response and ensure that independent aggregators can compete on a level playing field. Revise the regulatory framework to define the technical modalities for the participation of Demand Response in the electricity market, including the provision of balancing energy and ancillary services.
3. Revise the regulatory framework to expand aggregation. Currently, Market Rules allow for the aggregation of RES-only generation and the size of the aggregated capacity is limited in the range of a minimum 1MW up to a maximum of 20 MW. Market Rules will be revised to allow the aggregation of sources of generation irrespective of the primary type of fuel or technology, of storage systems as well as of the supply side (demand response). Aggregators shall be able to participate at the wholesale energy market as well as the reserve and balancing markets. Preliminary timeframe for this Target is year 2022.

Cyprus: Draft Integrated National Energy and Climate Plan for the period 2021-2030

The Governance Regulation and current policy situation of Cyprus in the fields of climate and energy:

4. Revise the regulatory framework to enable the participation of storage in the electricity market. The provision of storage services should be market-based and competitive. Storage services shall be critical to the provision of flexibility services. Remove market barriers in wholesale and retail markets to demand response and ensure that independent aggregators can compete on a level playing field. Revise the regulatory framework to define the technical modalities for the participation of Demand Response in the electricity market, including the provision of balancing energy and ancillary services.
5. Introduction of dynamic-pricing retail contracts. Dynamic pricing retail contracts will be introduced gradually as the installation of smart meters is roll out and the competitive electricity market becomes operational. Cyprus shall provide the necessary regulatory framework to ensure that final customers who have a smart meter installed can request to conclude a dynamic electricity contract from a supplier that has more than 200 000 final customers.

Eight-step innovation plan for power sector transformation



Thank you for your attention

Dr Venizelos Efthymiou
Chairman of FOSS

University of Cyprus
1 University Avenue
New University Campus
P.O. 20537
1678, Nicosia

Tel: +357 22 893814
email: efthymiou.venizelos@ucy.ac.cy
www.foss.ucy.ac.cy
www.pvtechnology.ucy.ac.cy

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Contact: Stamatios Chondrogiannis

E-mail: Stamatios.CHONDROGIANNIS@ec.europa.eu

