

Smart Buildings with Integrated PV

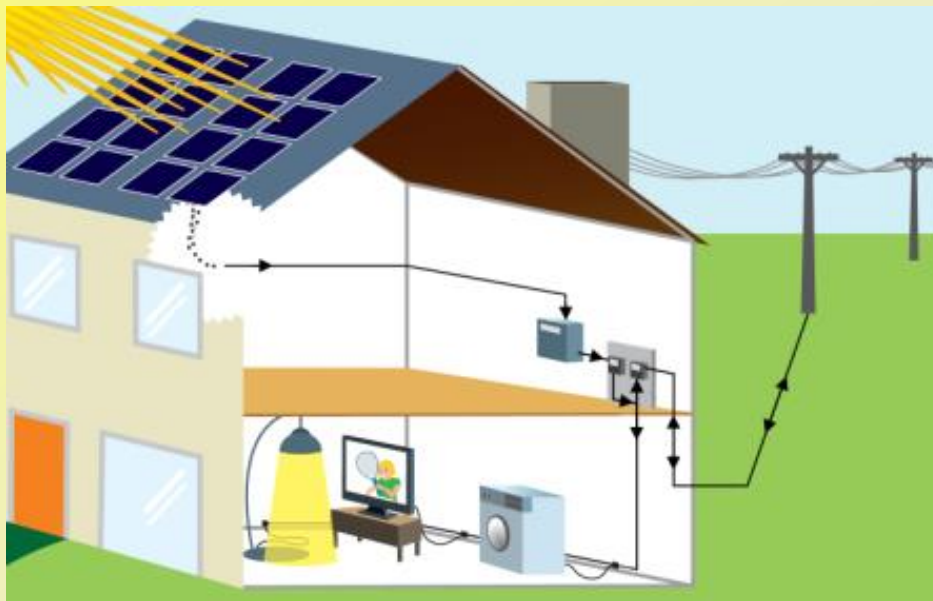
Ljubljana, 7.4.2016

Franko NEMAC, univ.dipl.ing.el.



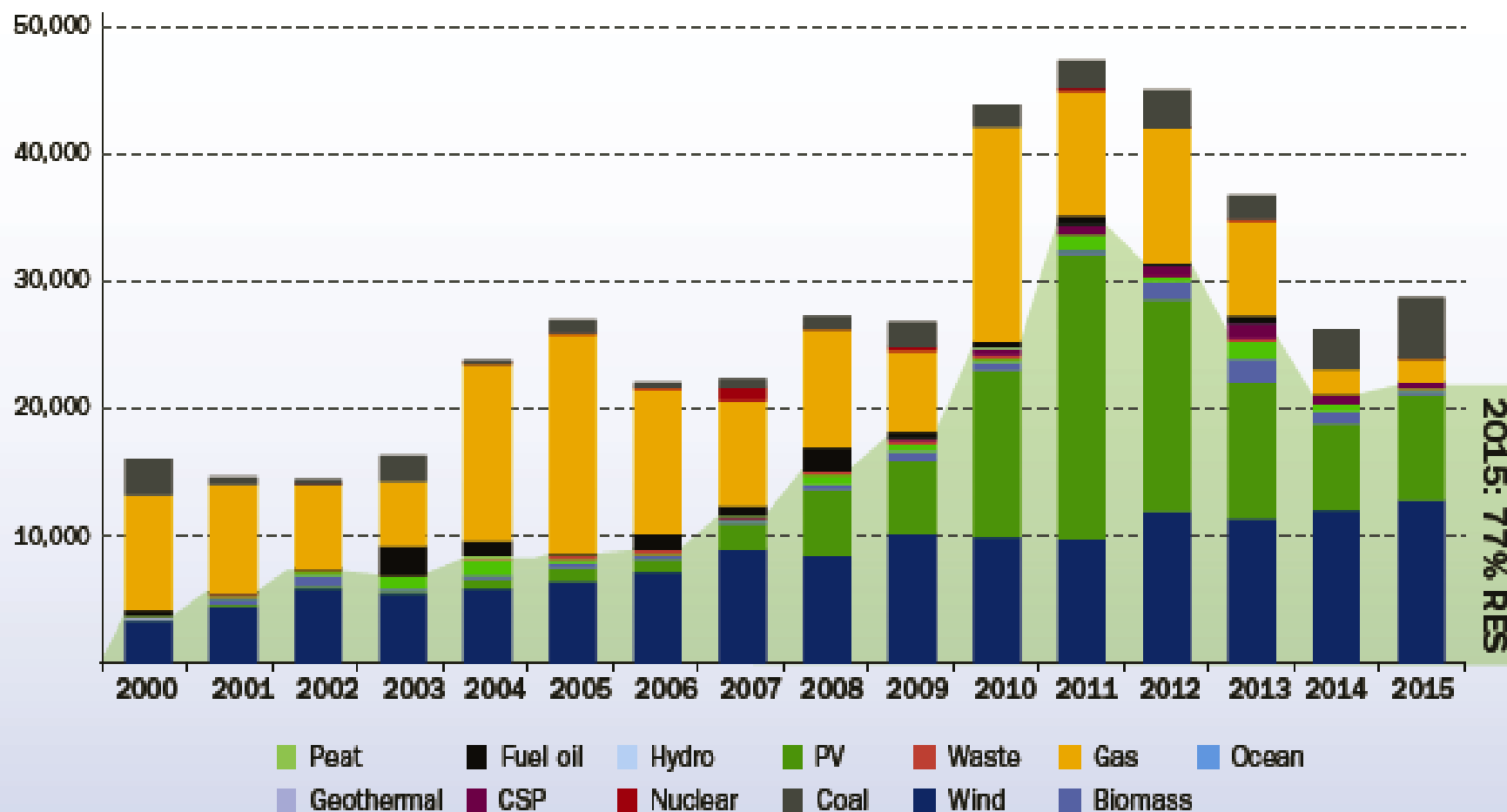
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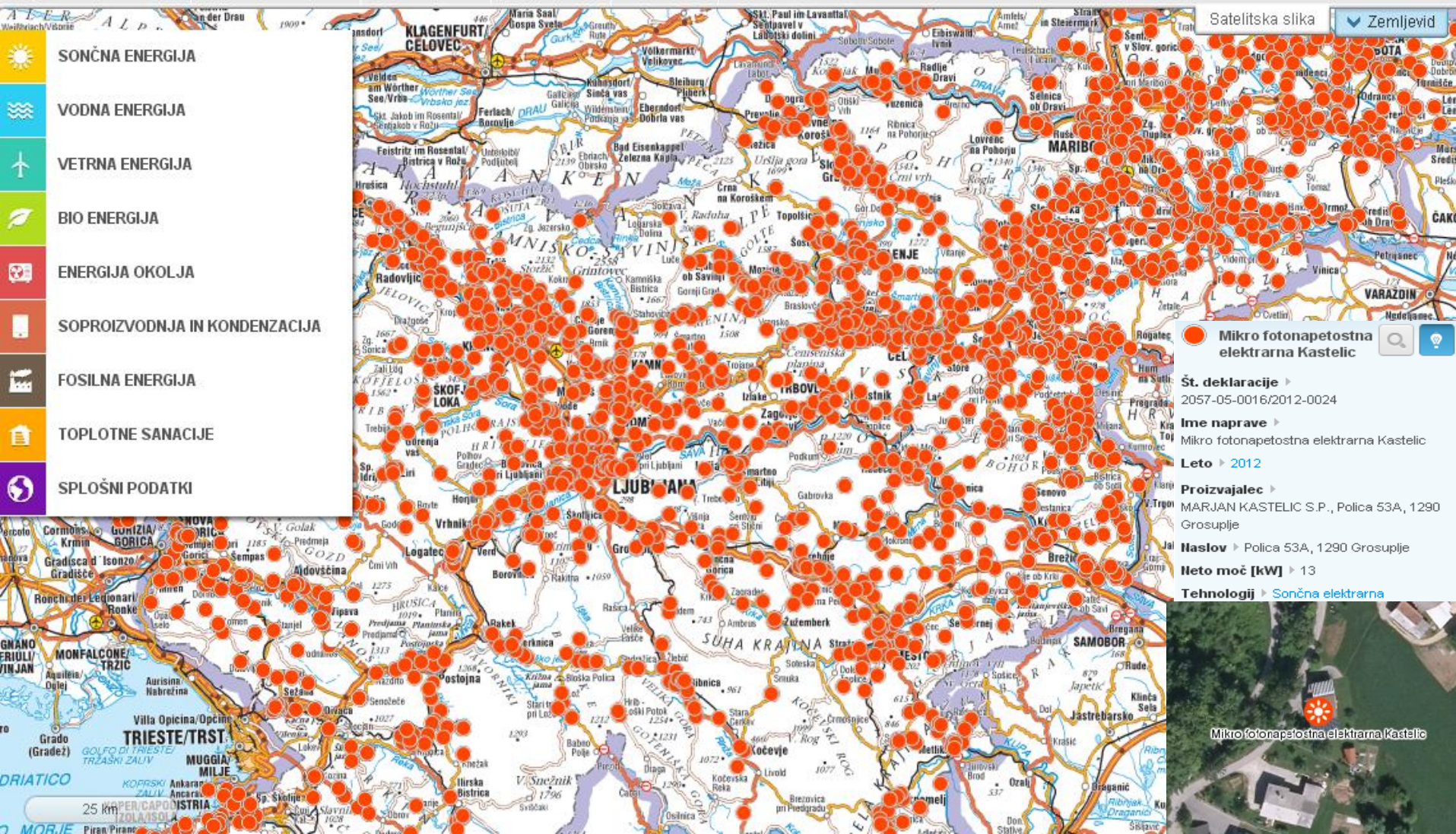



Installed power generating capacities per year and MW in Europe, 2000 - 2015

FIGURE 5: ANNUAL INSTALLED CAPACITY (MW) AND RENEWABLE SHARE (%)



-  SONČNA ENERGIJA
-  VODNA ENERGIJA
-  VETRNA ENERGIJA
-  BIO ENERGIJA
-  ENERGIJA OKOLJA
-  SOPROIZVODNJA IN KONDENZACIJA
-  FOSILNA ENERGIJA
-  TOPLLOTNE SANACIJE
-  SPLOŠNI PODATKI



 Mikro fotonapetostna elektrarna Kastelic

Št. deklaracije ▶
2057-05-0016/2012-0024

Ime naprave ▶
Mikro fotonapetostna elektrarna Kastelic

Leto ▶ 2012

Proizvajalec ▶
MARJAN KASTELIC S.P., Polica 53A, 1290 Grosuplje

Naslov ▶ Polica 53A, 1290 Grosuplje

Neto moč [kW] ▶ 13

Tehnologij ▶ Sončna elektrarna

Mikro fotonapetostna elektrarna Kastelic

Integration of PV on houses



PV 6 kW Janez Krč in Kokra



PV 8 kW Pitja Petkovšek in Ig

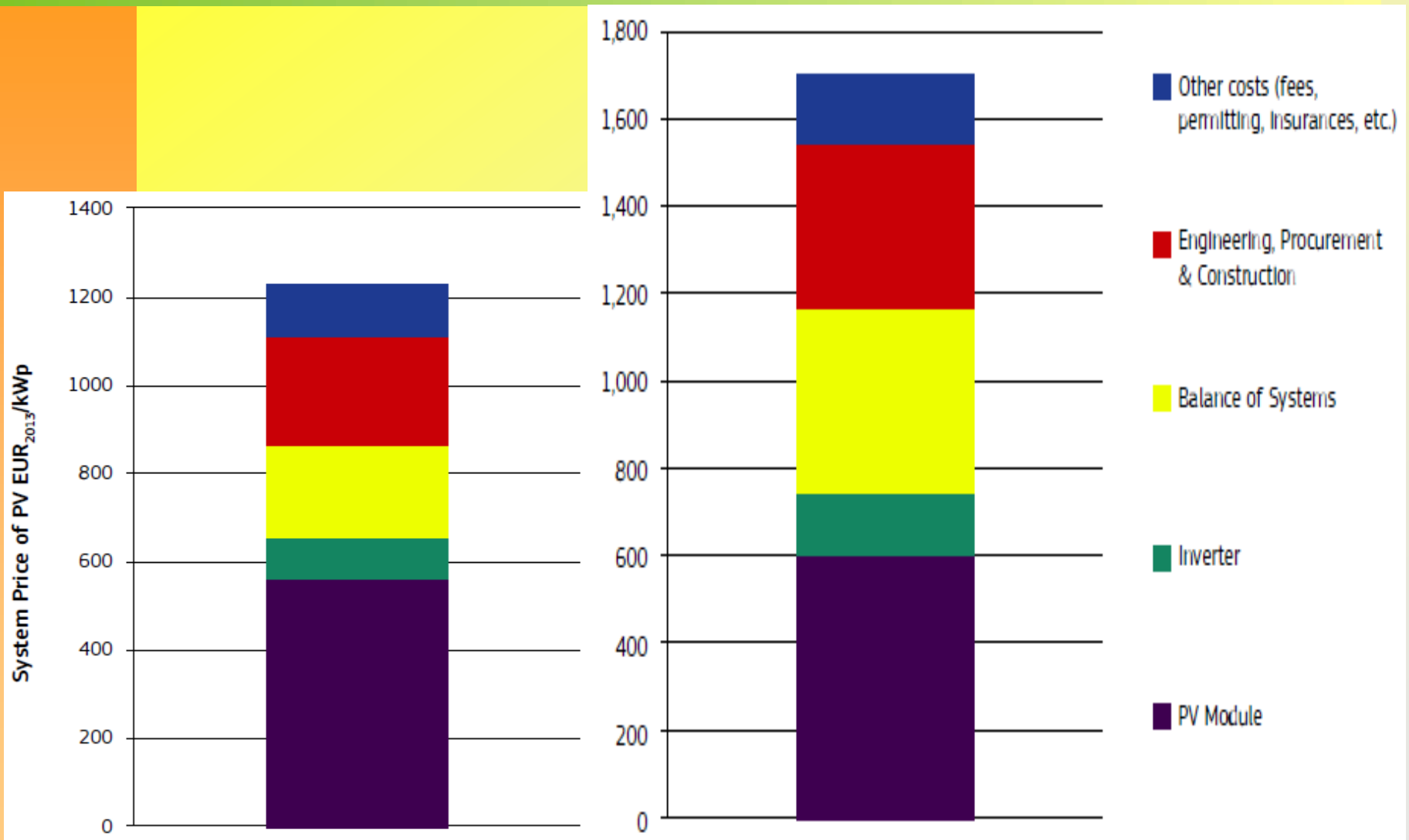
Sončne elektrarne so lahko lepe - del arhitekture



Sončna elektrarna Kristalna palača BTC- 100 kW



Price breakdown for a PV sistem utility and residential PV



Source: <http://iet.jrc.ec.europa.eu>

Key messages of SPE regarding Self-Consumption

- ★ **Self-consumption helps European consumers and businesses to control their energy bill.**
- ★ **Self-consumption increases retail competition and helps market transformation.**
- ★ **Self-consumption makes consumers active players of the energy transition, a key objective of the Energy Union.**
- ★ **Self-consumption is a key driver for demand-side flexibility.**

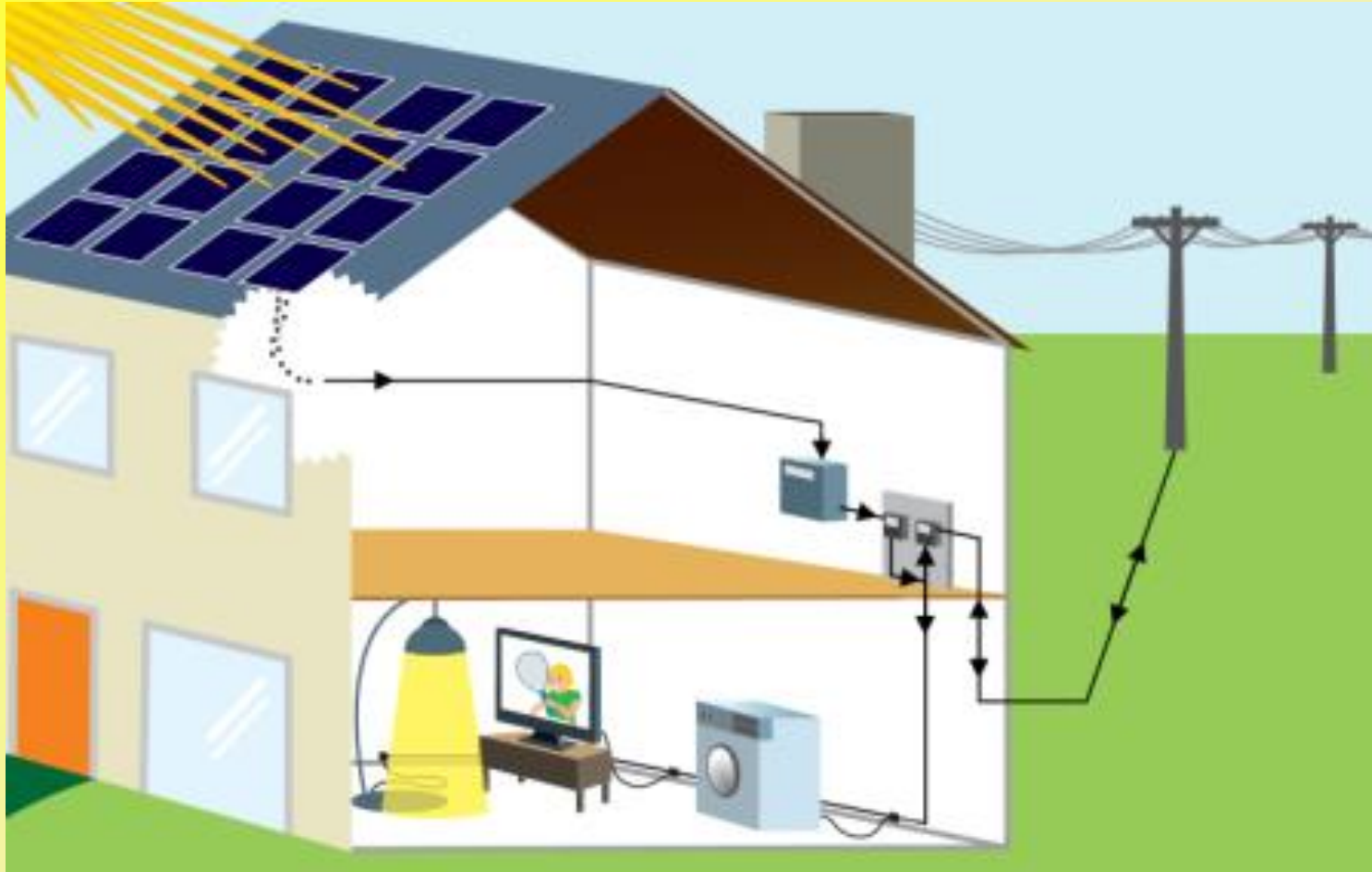


Proposals of SPE for better deployment of Self-Consumption

- ★ **Member States should ensure that consumers - residential and industrial - can freely use the energy they produce.**
- ★ **Self-consumption should be made easily accessible to a large number of consumers.**
- ★ **Prosumers policies should facilitate the reduction of peaks and unlock demand-side flexibility.**
- ★ **National regulators should design distribution grid tariffs fit for the energy transition.**
- ★ **Market rules should ensure that the excess power is injected into the grid and properly remunerated.**



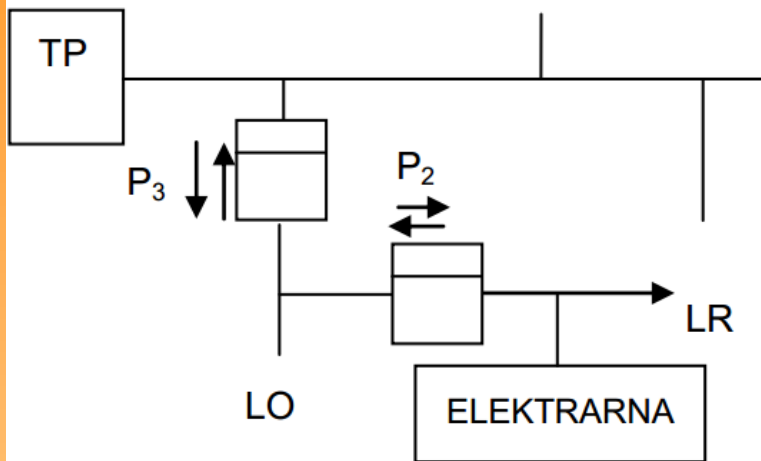
The future of smaller PV integrated on buildings for self-consumption



Source: www.epia.org

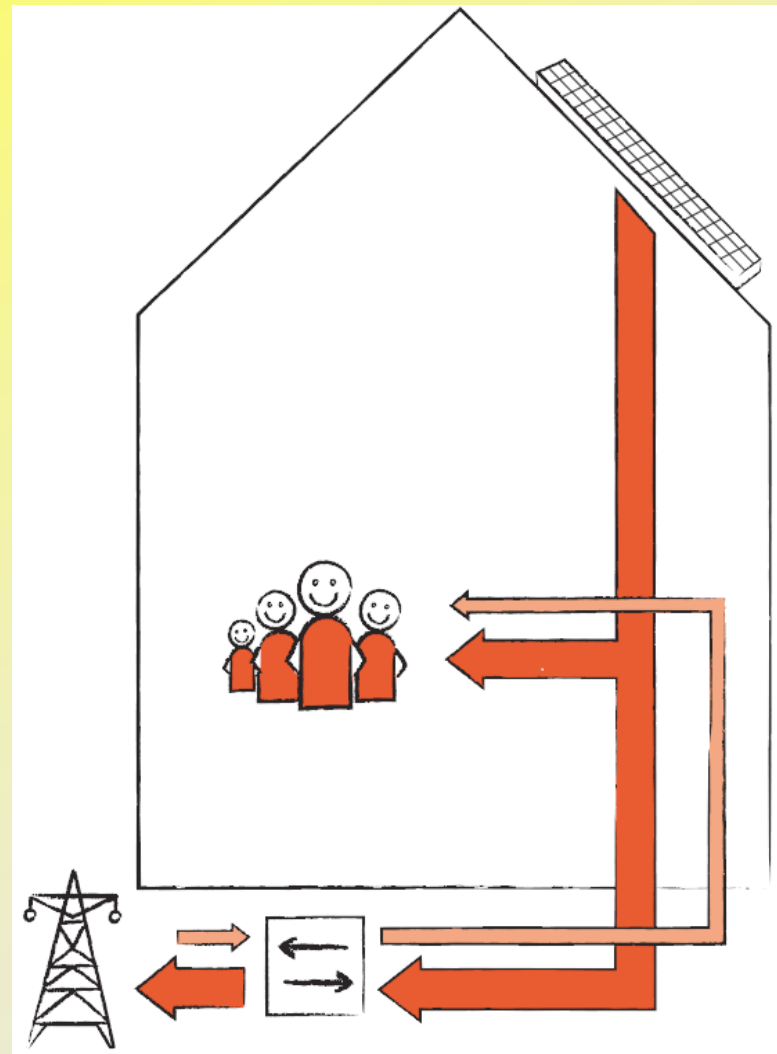
Shema P1.3

Pogoji: Odjemalec in $S_g \leq 0,8 \cdot S_{odj}$

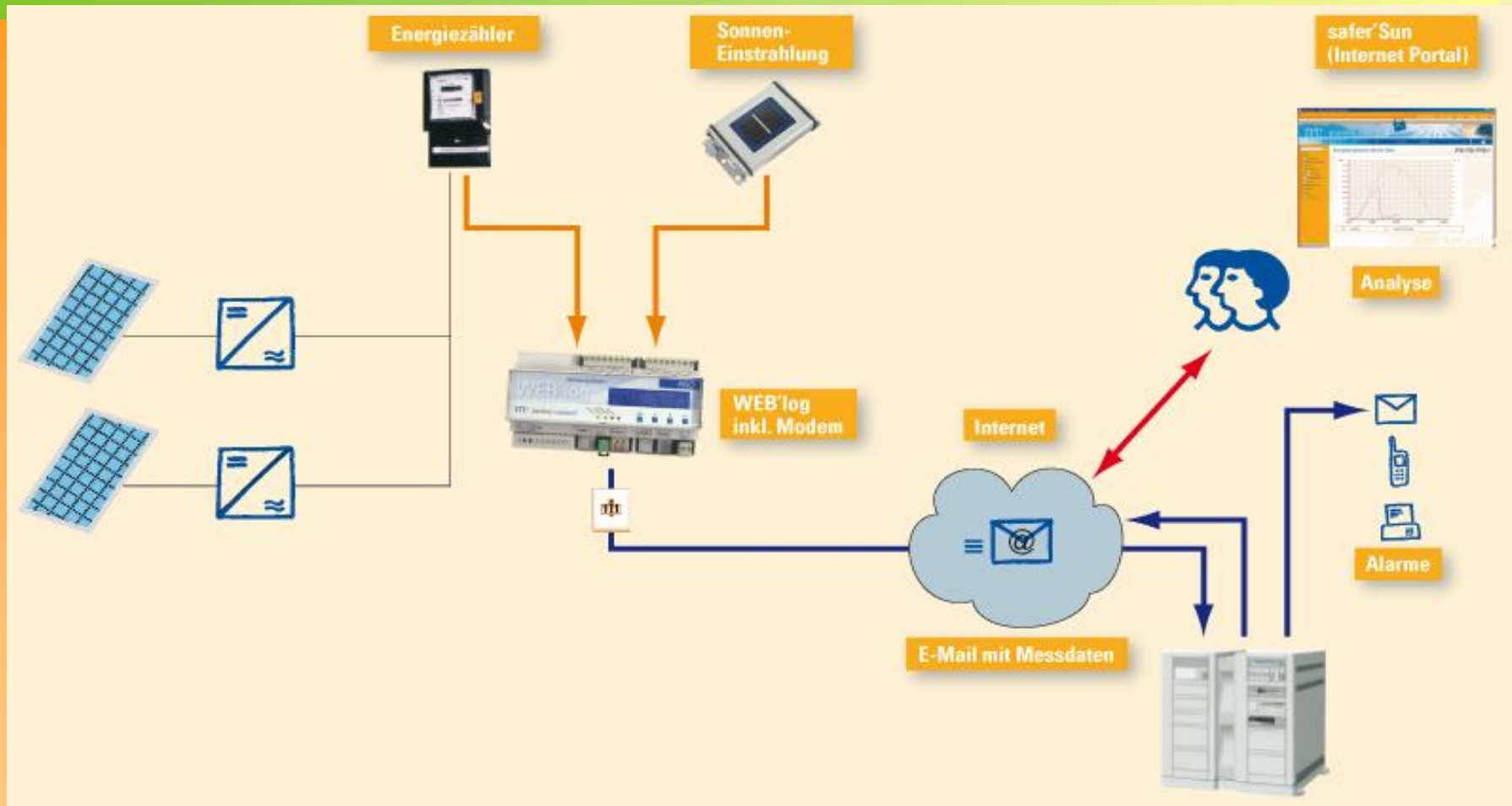


Legenda:

- P_1 – števec porabljene energije končnega odjemalca
- P_2 – števec neto proizvedene e.e. in LR proizvodne naprave
- P_3 – števec odvzete/oddane e.e. iz/v omrežje
- P_4 – poseben števec LR proizvodne naprave
- LR – lastna raba
- LO – lastni odjem
- P_g – delovna moč elektrarne pri $\cos\varphi = 0,8$
- S_g – navidezna inštalirana moč elektrarne
- P_{odj} – naročena delovna moč odjema



On-line control of consumption and production

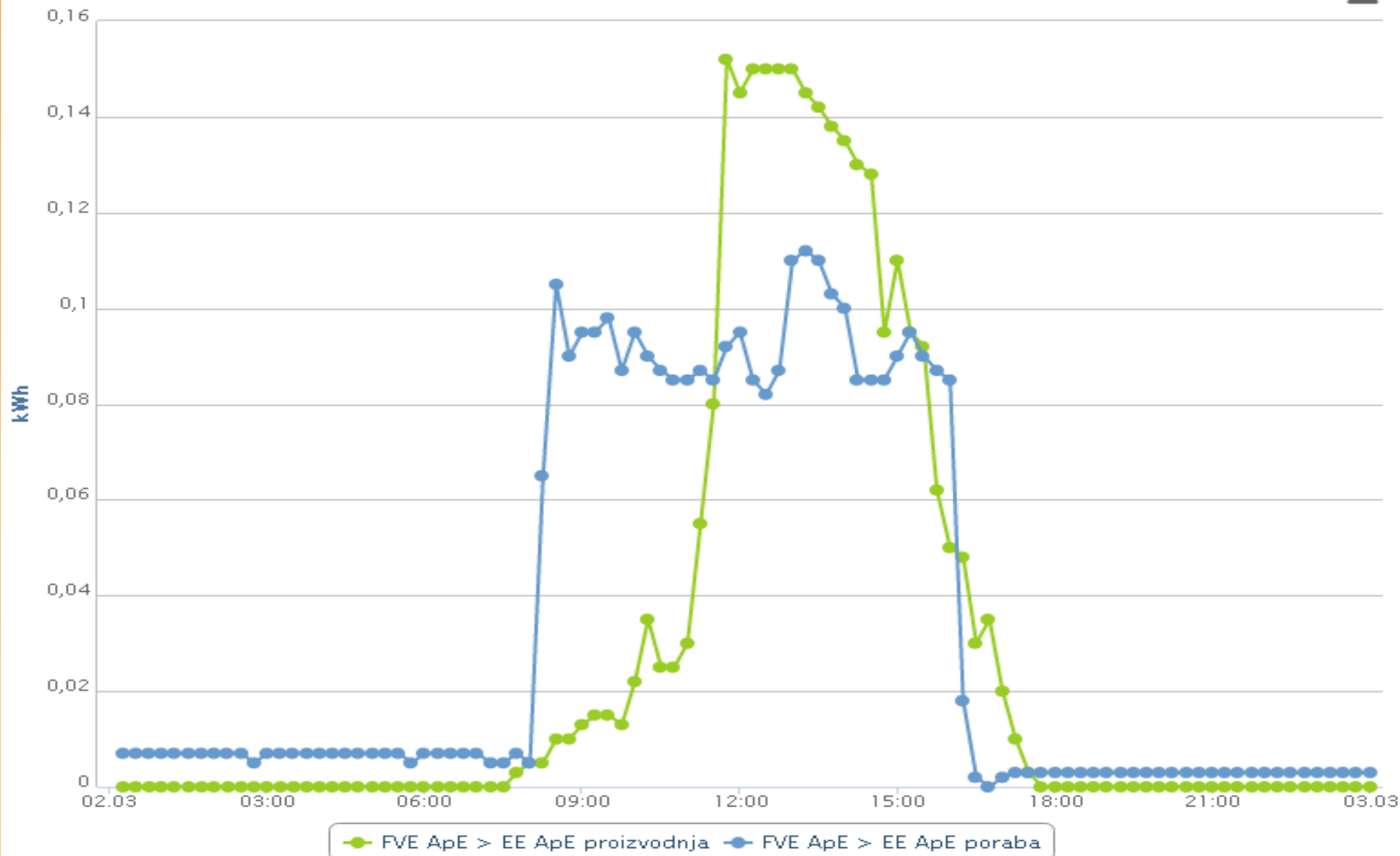


In the same system we have to integrate, process and control all measurements in a house (electricity, heating, gas, water, electro mobility etc.)



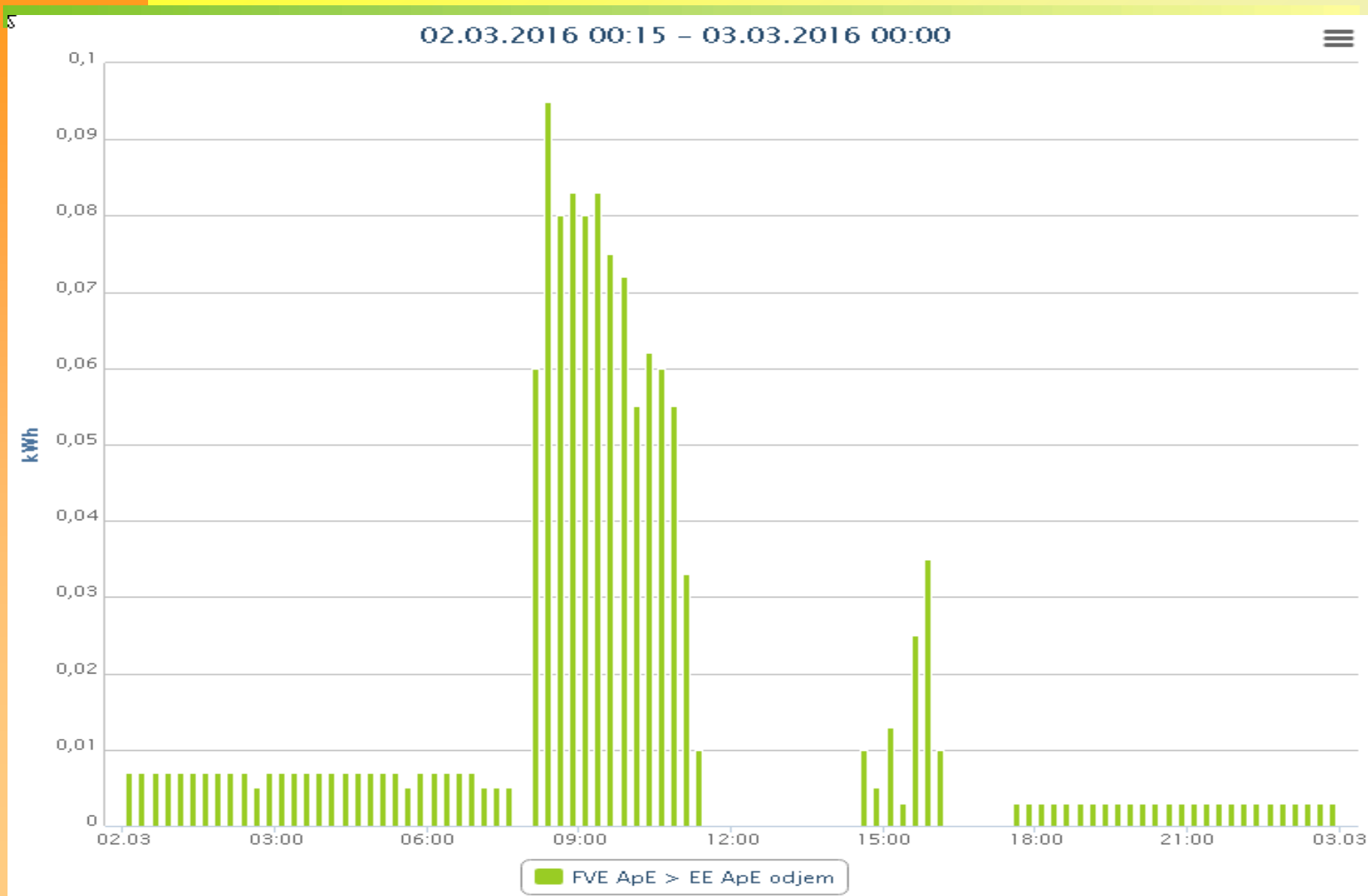
On-line registration of ApE consumption and production

02.03.2016 00:15 – 03.03.2016 00:00



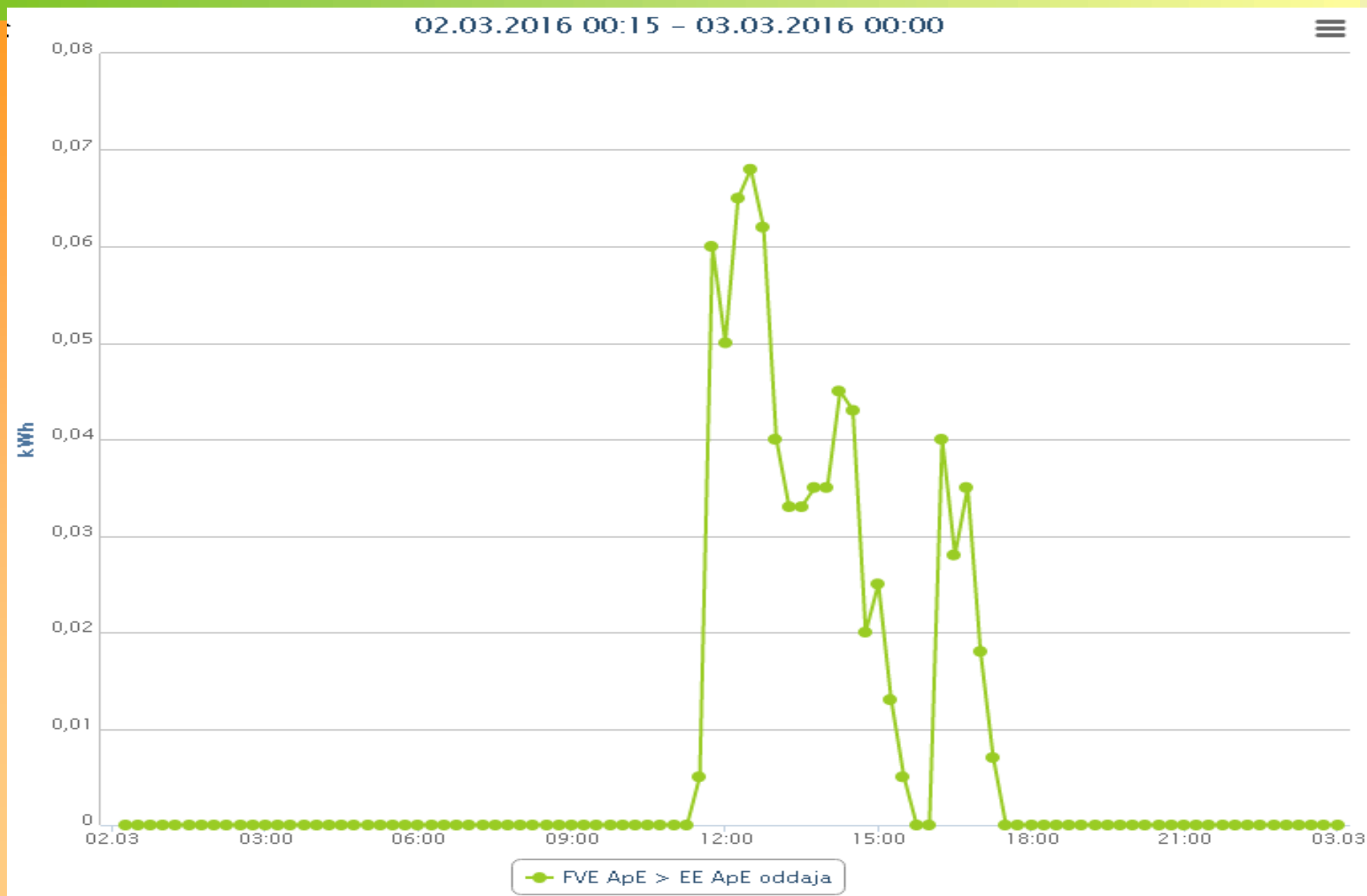


For the grid we are such type of consumer





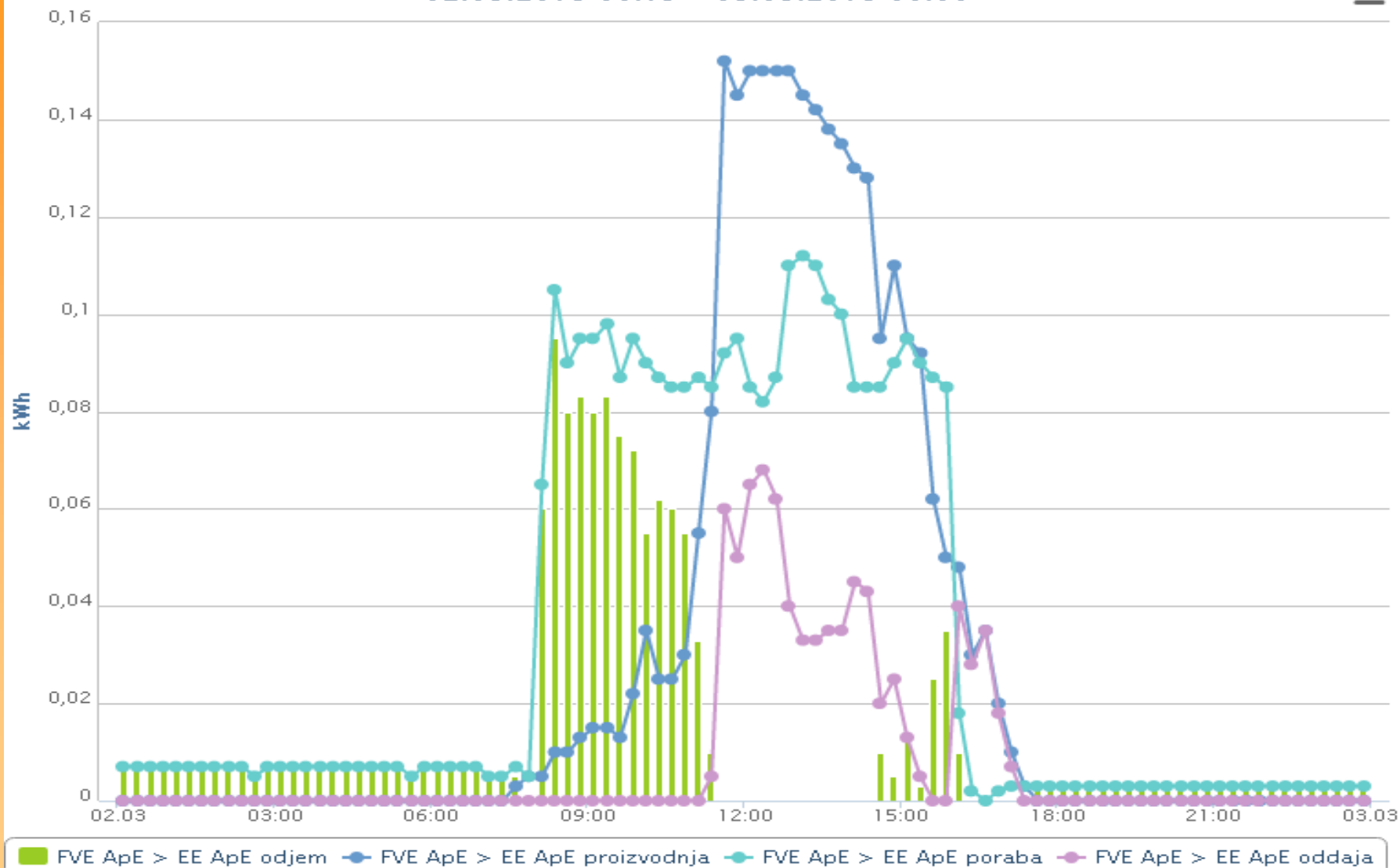
For the grid we are such type of producer





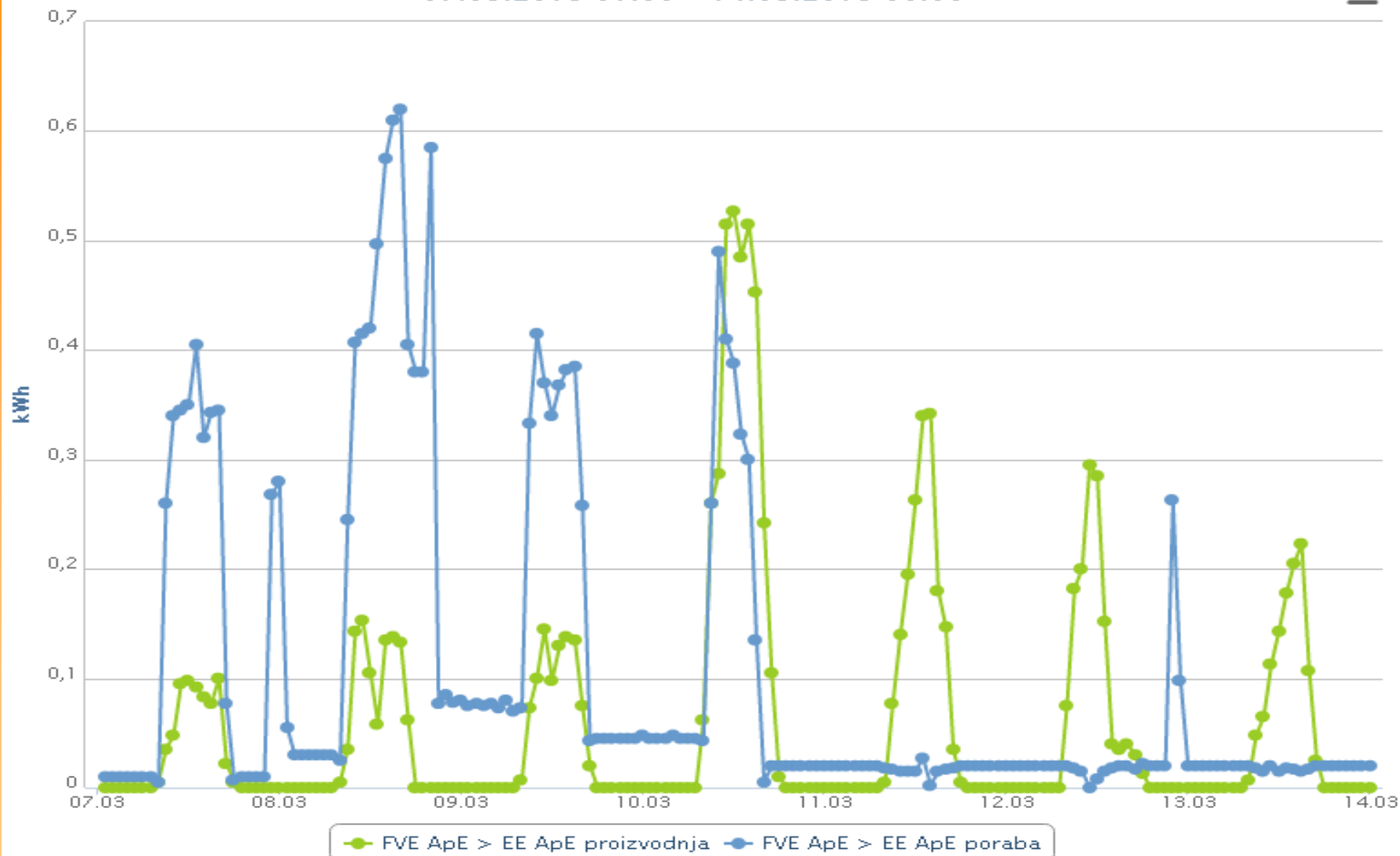
Complex inside in consumption and production of ApE

02.03.2016 00:15 – 03.03.2016 00:00



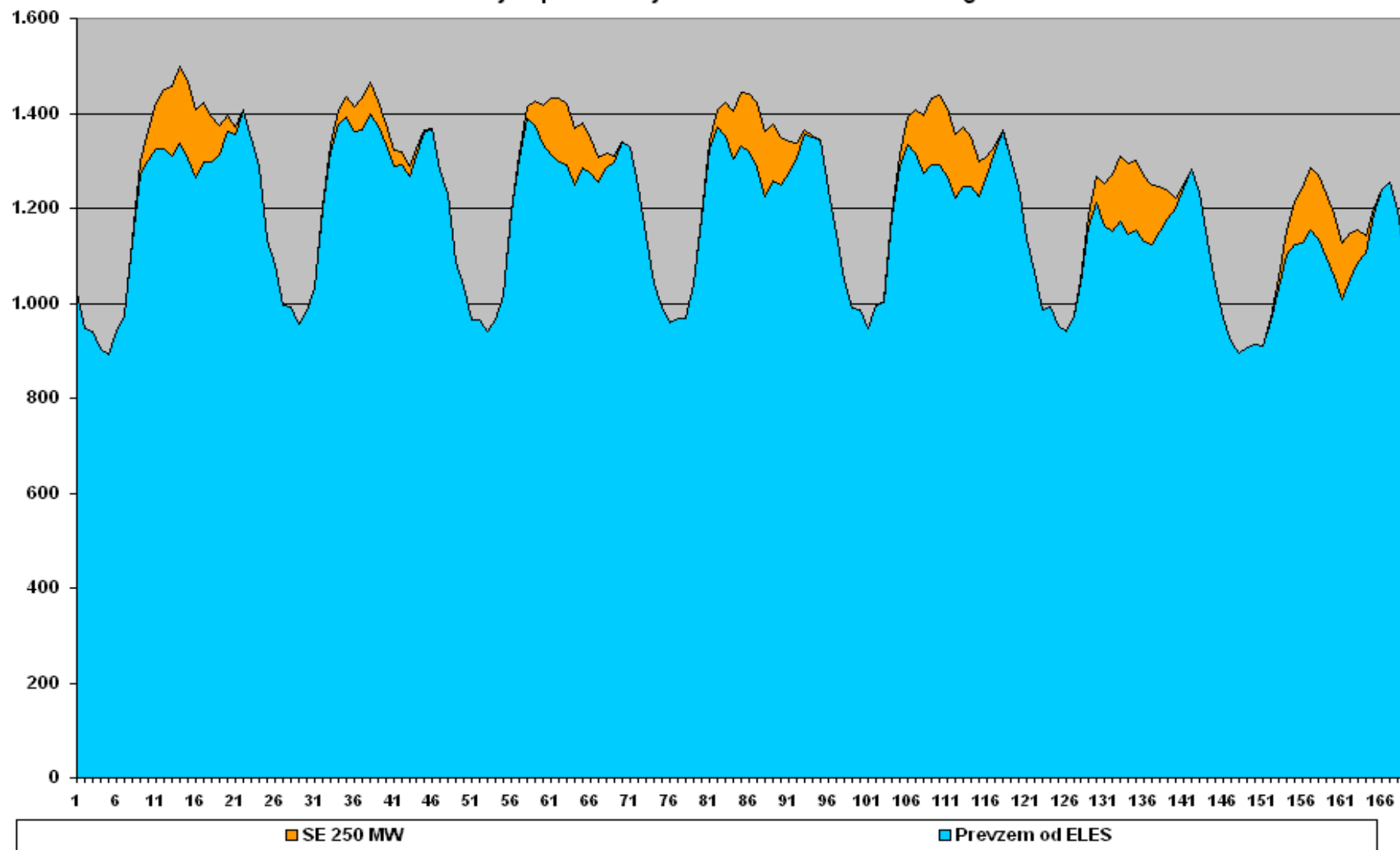
Weekly dynamics of consumption and production of ApE

07.03.2016 01:00 – 14.03.2016 00:00



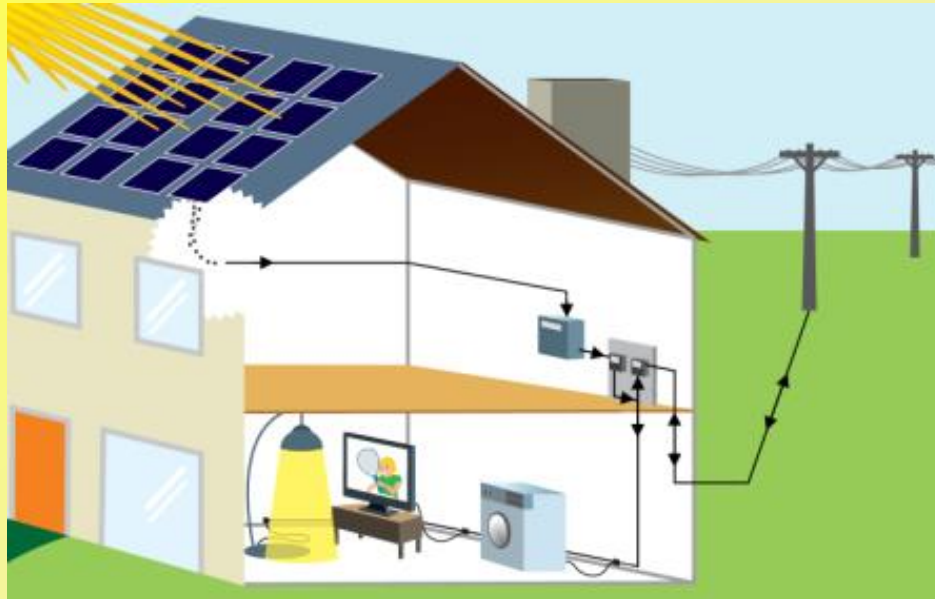
Weekly dynamics of total consumption and total production of PV - for Slovenia

Poraba Slovenije - proizvodnja sončnih elektrarn 4-10 Avgust 2014



MORE INFORMATION

www.ape.si



Thank you for your attention.

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