

Self-consumption and decentralized (PV) generation in Portugal

Cycle of Round Tables – “APREN and the Universities” | Day of the Sun

Solar PV Production in Portugal

IST | 3rd of May of 2018

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AGENDA

1- PV IN PORTUGAL

2 - DL 153/2014 - DECENTRALIZED GENERATION

3 - SELFCONSUMPTION UNITS (UPAC)

4 - “SMALL PRODUCTION” UNITS (UPP)

5 - GENERATED POTENTIAL

6 - CONCLUSION

We have the opportunity to “co-create” the future

**More
ELECTRICAL**

2X The demand for electricity in comparison to the energy demand in 2014)

Source : IEA WEO 2014

**More
DIGITAL**

10X connected devices than people in 2020.

Source : Cisco, Internet World Statistics

**More
DESCARBONIZED**

82% potential of economic reductions by means of energy efficiency in buildings and more than a half in industry.

Source : World Energy Outlook 2012, Internal Analysis

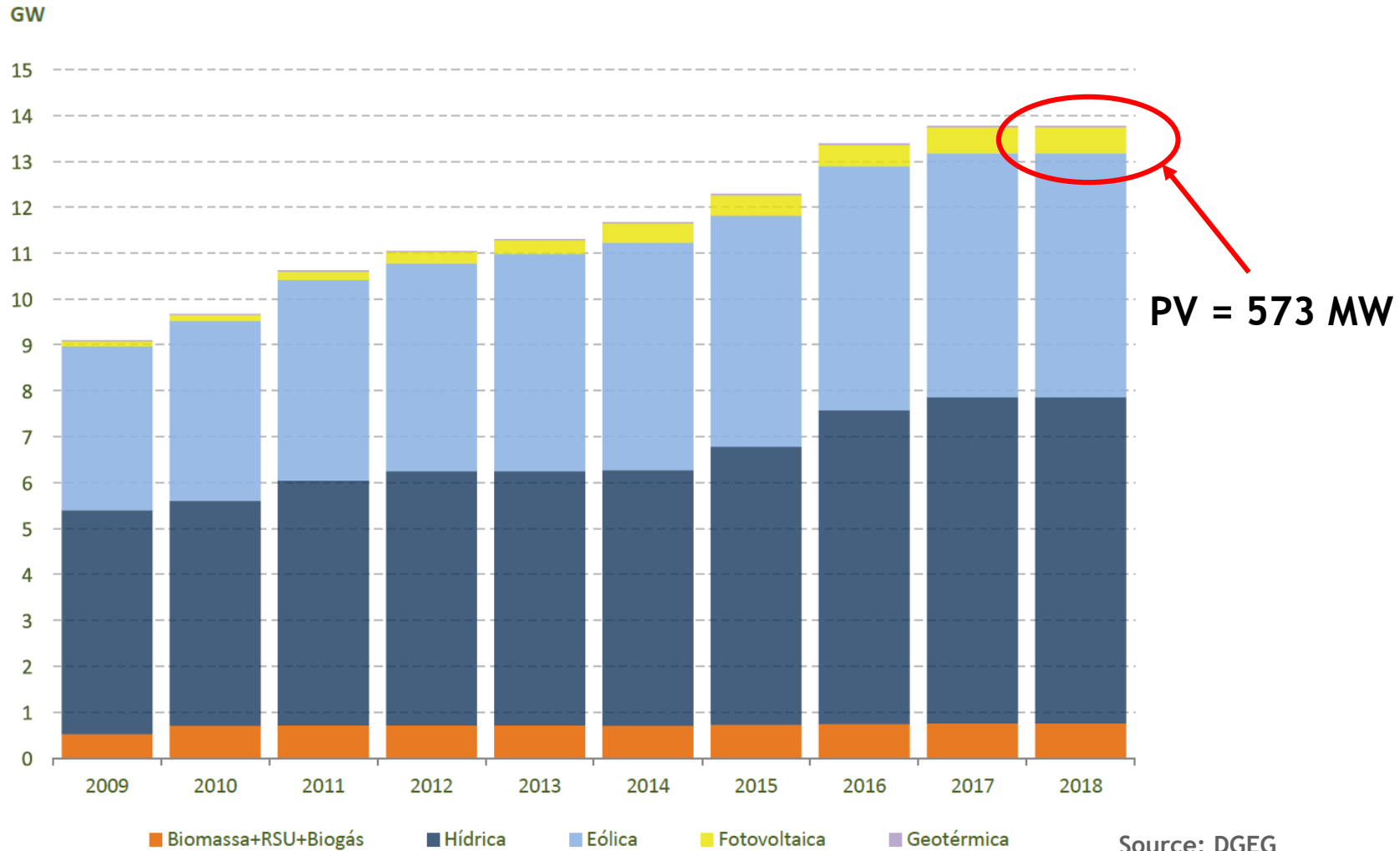
**More
DECENTRALISED**

70% of the new installed capacity in 2040 will be of a renewable source.

Source : BNEF

1- PV IN PORTUGAL

TOTAL INSTALLED RENEWABLE POWER (GW)



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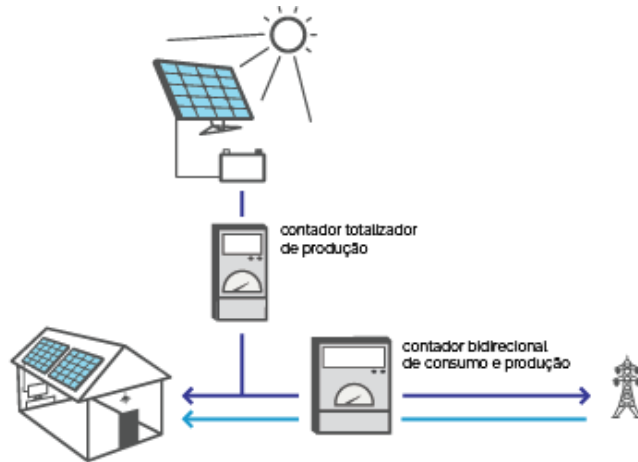
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1. It promotes the production close to the consumption point, reducing grid loss;
2. It promotes the capacity of renewable production (usually from solar origin) and from **endogenous resources**;
3. **It makes the energy production possible to everyone**, allowing new “small sized” players and increasing competition amongst producers;
4. It reduces the concentration of production units (web scheme), improving supply safety;
5. **It reduces electrical need in rush hours** (in the solar PV case);
6. In a medium-to-long term, it **limits the need to invest in RESP** (though it may challenge the grid operation in medium and low voltage);
7. **It boosts the PV sector**, which comprehends a remarkable number of professionals (i.e. installers, maintenance, components production);
8. It generates employment and contributes to **training, qualification and development of technological resources**, namely at the level of local economies.

TYPES OF DECENTRALIZED GENERATION

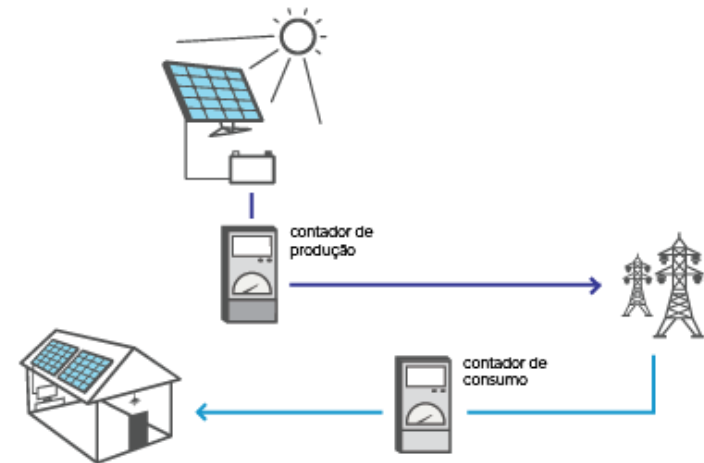
SELFCONSUMPTION UNITS (UPAC)



The produced energy is consumed ideally in the consumption facility. The production excess can be sold to the grid.

- Power connection \leq Contracted power
- Installed power $\leq 2x$ Power connection

SMALL PRODUCTION UNITS (UPP)



All the produced energy is injected in the grid.

- Power connection \leq Contracted power
- Power connection $\leq 250kW$
- Produced energy $\leq 2x$ Consumed Energy Installation/facility

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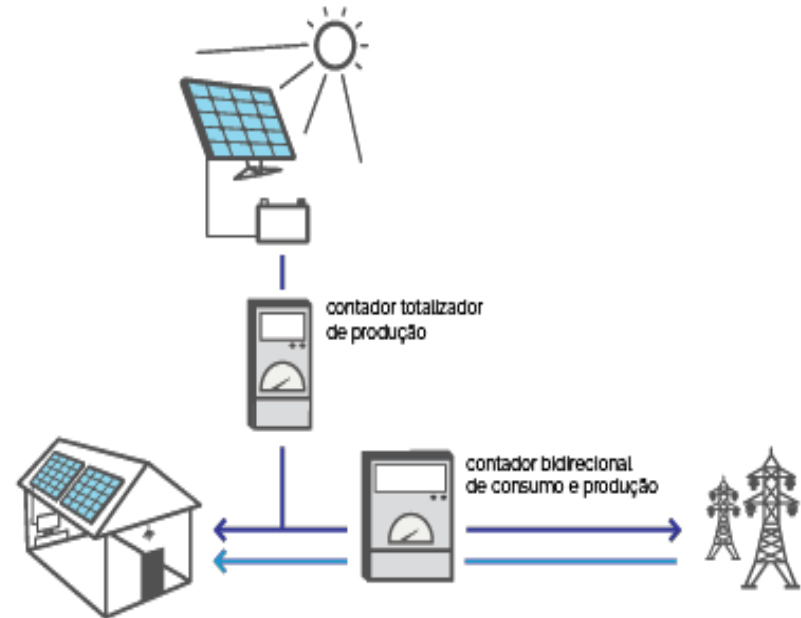
3 - SELFCONSUMPTION UNITS (UPAC)

MAIN CHARACTERISTICS

A Selfconsumption unit (UPAC) is meant to satisfy the energy demand locally.

The electrical energy that is produced, is immediatly injected in the consumption unit.

Any exceeding production is injected into the grid, to avoid any losses.



Sizing criteria:

1. Power connection $UPAC \leq$ Contracted power
2. Installed power $UPAC \leq 2 \times$ Power connection

3 - SELFCONSUMPTION UNITS (UPAC)

MAIN CHARACTERISTICS

The installation owner has to register his facility online, in SERUP (managed by DGEG).

Type	UPAC POWER	Procedure:
A	< 200 W	No need to register
B	200 W - 1,5 kW	Only a prior notification is required
C	1,5 kW - 1 MW	Register and inspection (see Figure 1)
D	> 1 MW	Requires Production Licence DL 115B/2012

UPACs Type B, when meant to be paid for the energy injected in RESP or when meant to use Guaranties of Origin, are subject to the conditions applicable to Type C UPACs.

LICENSE PROCEDURES TYPE C - UPAC

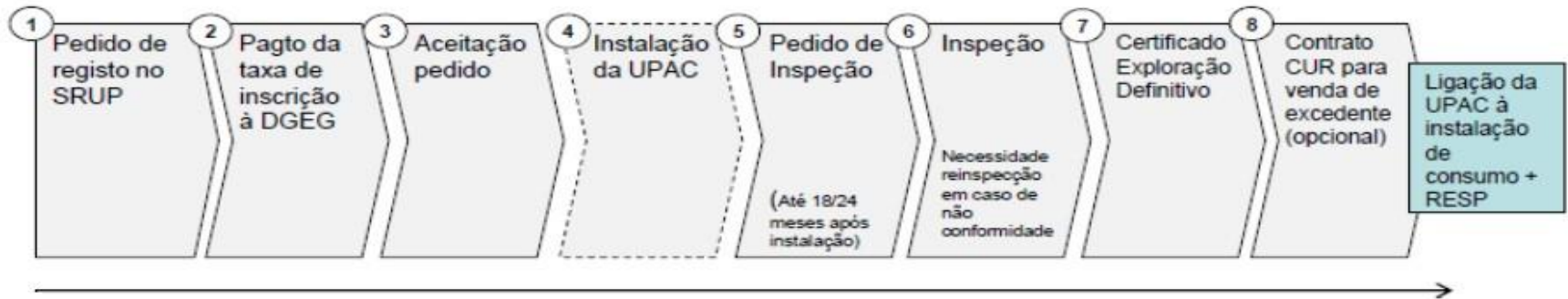


Figure 1 - Example of a register for UPAC, higher to 1,5 kW and lower than 1 MW

3 - SELFCONSUMPTION UNITS (UPAC)

MAIN CHARACTERISTICS

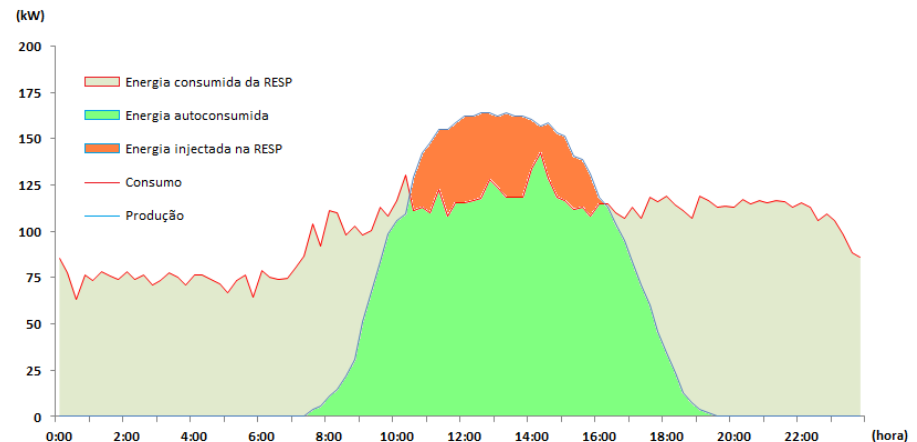
1. The energy produced by the UPAC is compensated through the **avoided cost**, in the selfconsumed share.

2. The non selfconsumed energy is injected in RESP, and is paid at **90% of the monthly average rate OMIE** (see adjacent graphic).

$$R_{UPAC,m} = E_{fornecida, m} \times OMIE_m \times 0,9$$

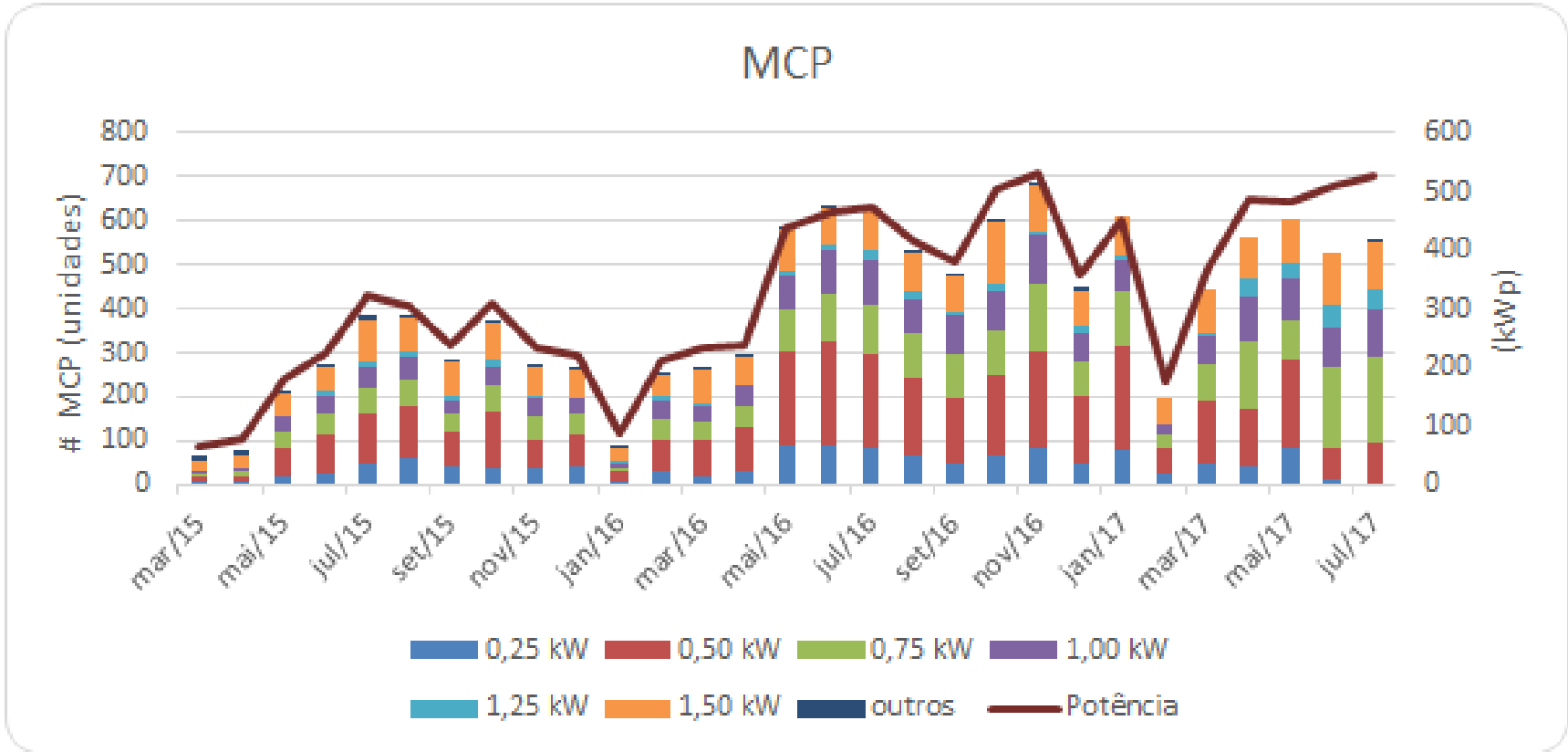
3. Selfconsumed energy can benefit from a future transaction of Guaranties of Origin (GO).
The energy inject into the grid does not allow the use of GO.

Production and consumption diagram



3 - SELFCONSUMPTION UNITS (UPAC)

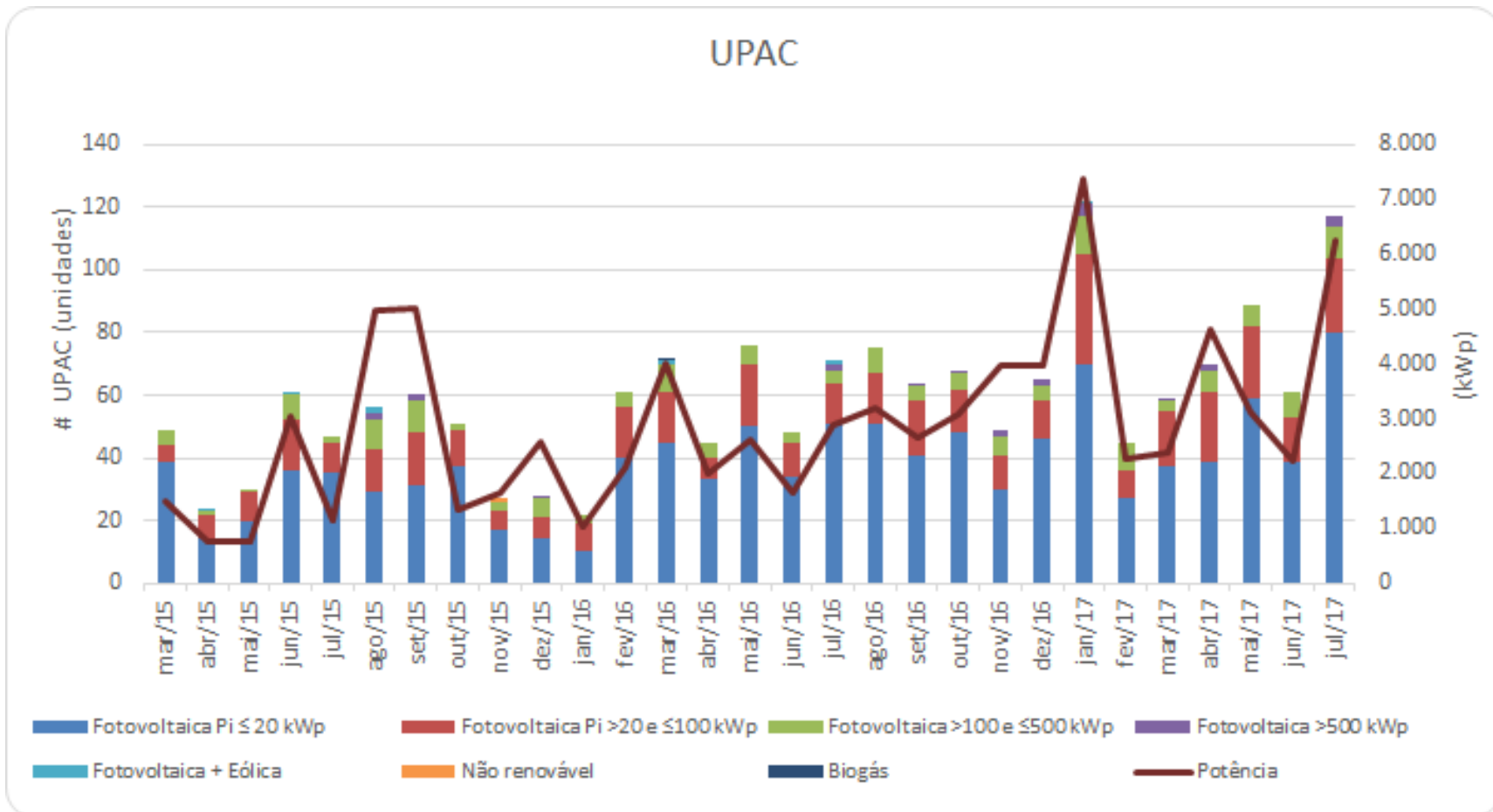
PRIOR NOTIFICATION (MCP)



SOURCE: DGEG

The average number of prior notifications in the last months was about 550/month.

3 - SELFCONSUMPTION UNITS (UPAC)



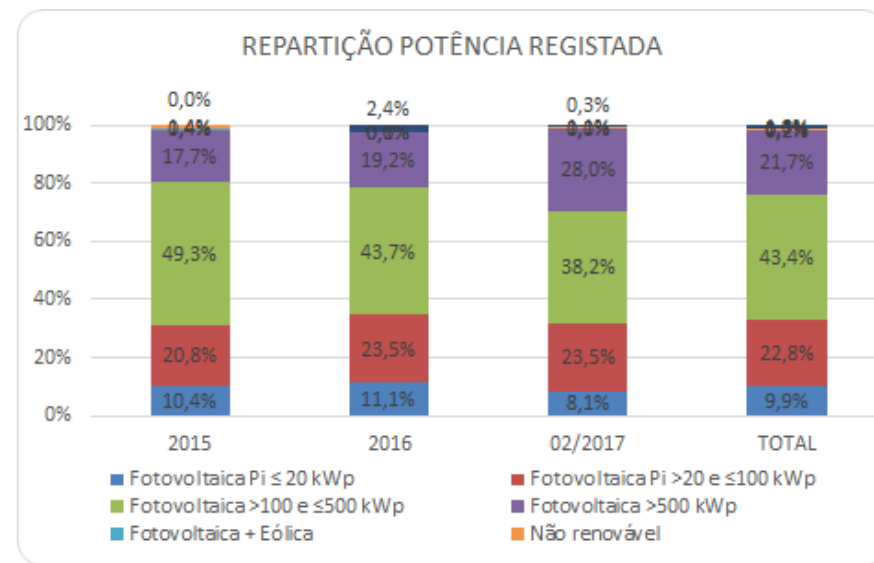
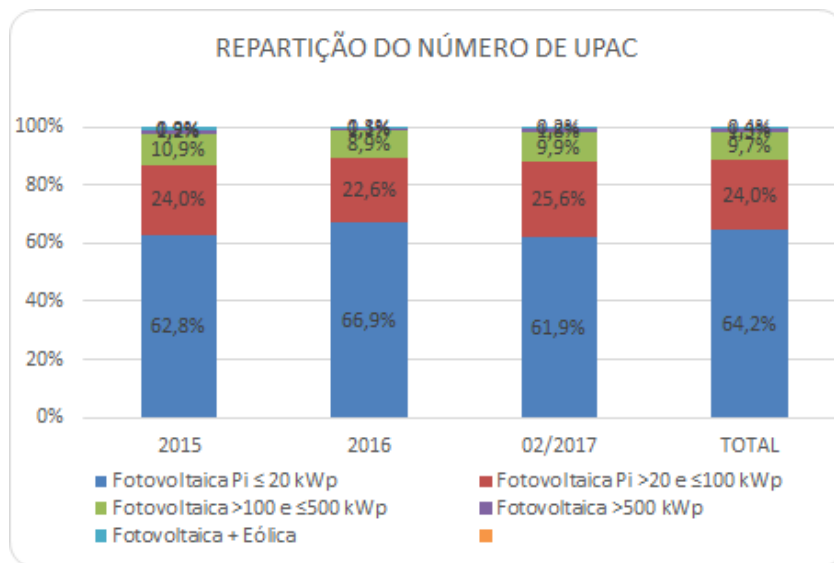
Fonte: DGEG

3 - UNIDADES DE AUTOCONSUMO (UPAC)

UNIDADES DE PRODUÇÃO DE AUTO CONSUMO (UPAC)

(nº)	2015	2016	07/2017	TOTAL
Fotovoltaica Pi ≤ 20 kWp	272	479	351	1.102
Fotovoltaica Pi >20 e ≤100 kWp	104	162	145	411
Fotovoltaica >100 e ≤500 kWp	47	64	56	167
Fotovoltaica >500 kWp	5	8	10	23
Fotovoltaica + Eólica	4	2	1	7
Eólica	0	0	2	2
Biogás	0	1	1	2
Não renovável	1	0	1	2
	433	716	567	1.716

(kWp)	2015	2016	07/2017	TOTAL
Fotovoltaica Pi ≤ 20 kWp	2.367	3.684	2.281	8.333
Fotovoltaica Pi >20 e ≤100 kWp	4.720	7.795	6.649	19.164
Fotovoltaica >100 e ≤500 kWp	11.213	14.464	10.824	36.501
Fotovoltaica >500 kWp	4.016	6.351	7.930	18.297
Fotovoltaica + Eólica	97	36	4	137
Eólica	0	0	239	239
Biogás	0	786	75	861
Não renovável	315	0	315	630
	22.728	33.116	28.316	84.160



Fonte: DGEG

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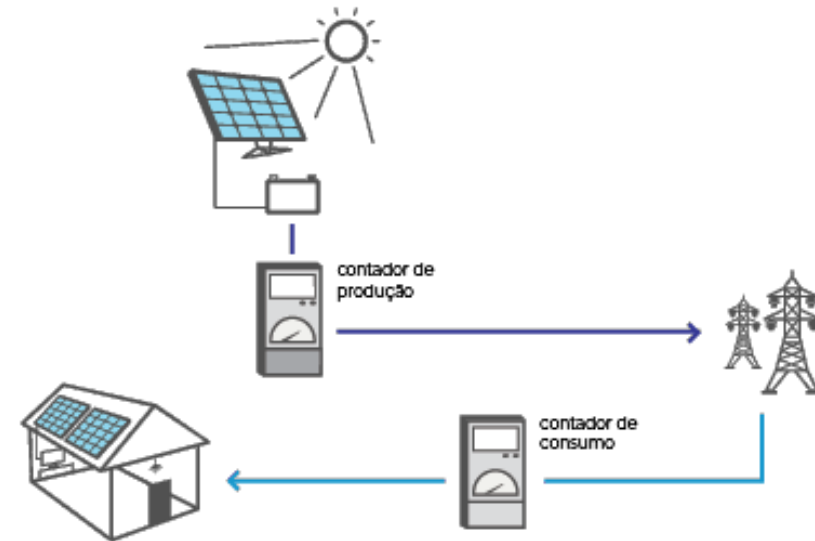
4 - “SMALL PRODUCTION” UNITS (UPP)

MAIN CHARACTERISTICS

The small production unit (UPP)
injects all the produced energy in RESP;

The consumption facility gets all its energy
from the energy supplier

The model is similar to the previous
minigeneration model.



Sizing criteria:

1. Power connection $UPP \leq$ Contracted power
2. Power connection $UPP \leq$ 250 kW
3. Produced energy $UPP \leq 2 \times$ Consumed energy

4 - "SMALL PRODUCTION" UNITS (UPP)

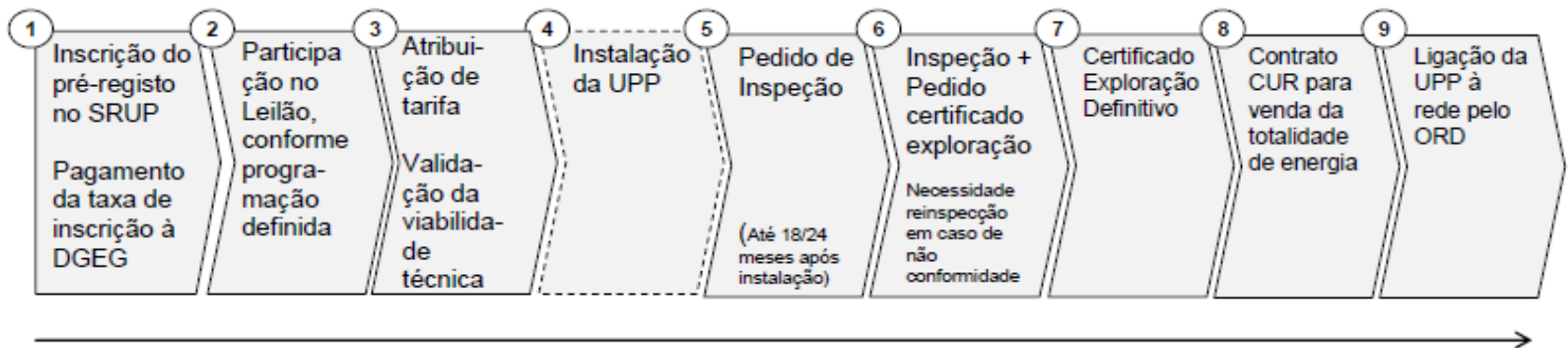
MAIN CHARACTERISTICS

The installation owner has to register his facility online, in SERUP (managed by DGEG);

It is not allowed to sum up UPP registers associated to the same facility for the use of electric energy;

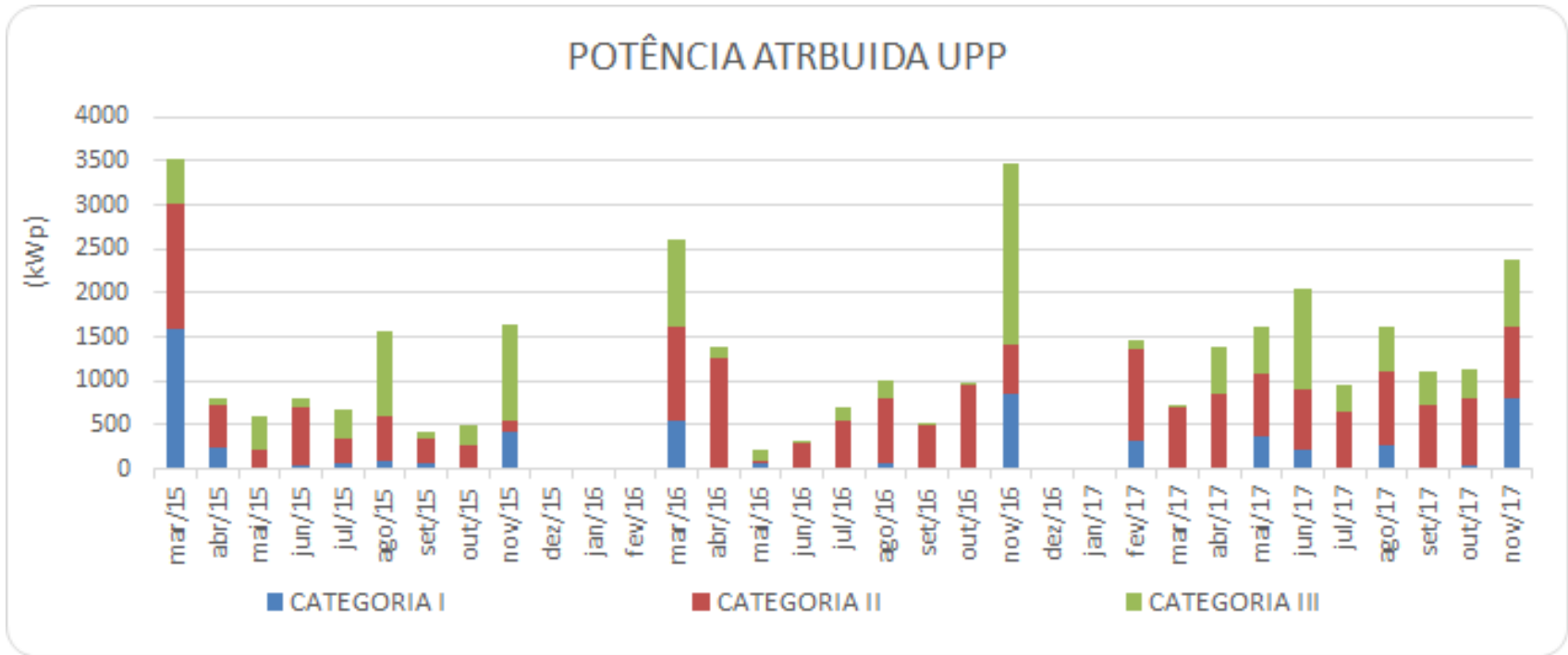
A third party can access the register of an UPP when the owner of the contract has authorized that third party to do so.

The request for the permit is subject to the following steps:



4 - "SMALL PRODUCTION" UNITS (UPP)

UPPS Registration - SERUP



Source: DGEG

- Category II to exhaust the available power every month;
- Average 1,5 MW/month.

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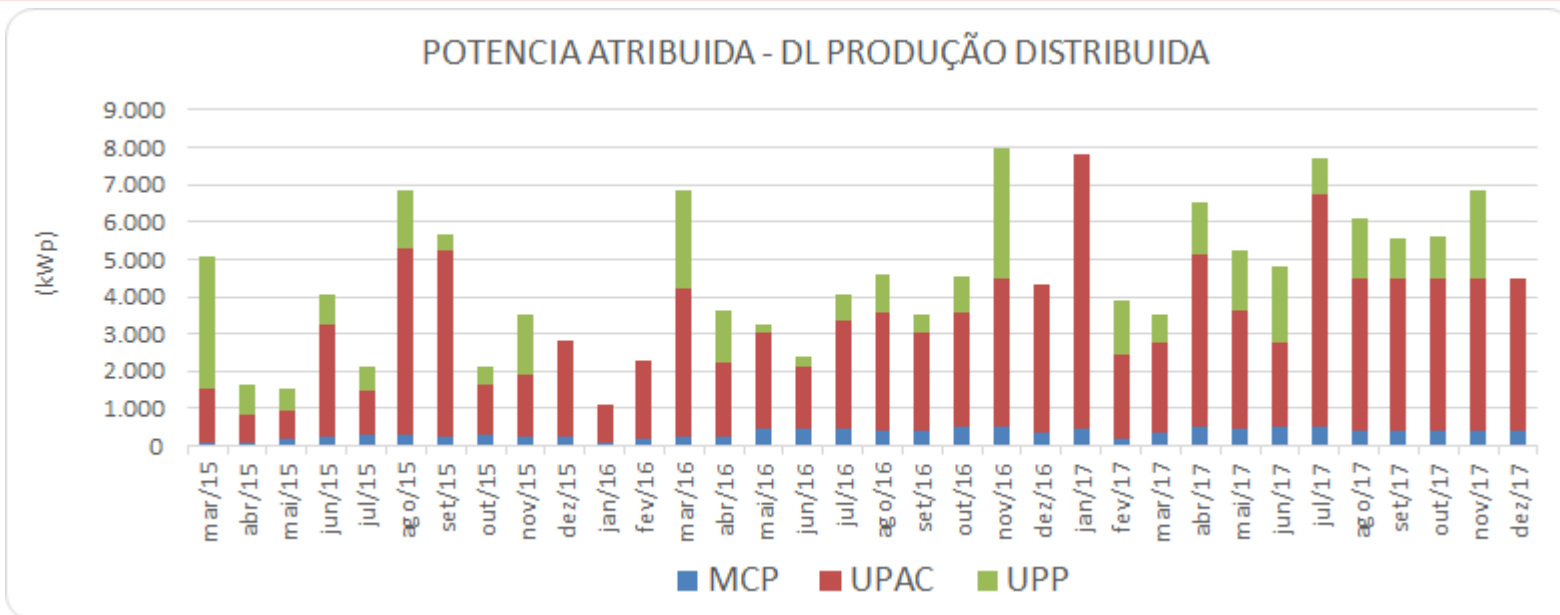
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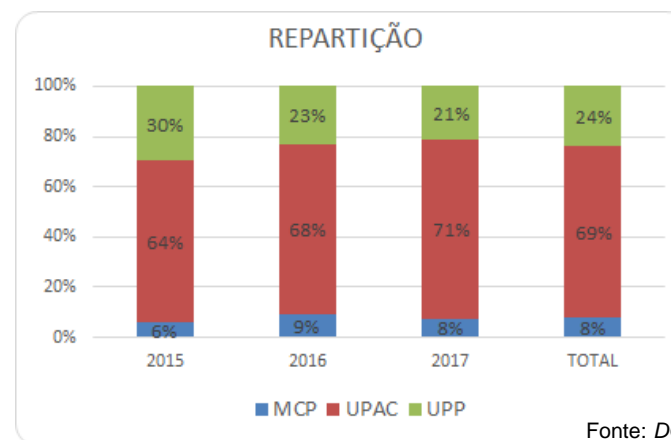
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REGISTRATION DL153/2014 - SERUP



(KWp)	2015	2016	2017	TOTAL
MCP	2.181	4.343	5.136	11.659
UPAC	22.728	33.116	48.541	104.386
UPP	10.495	11.157	14.398	36.050
Total	35.404	48.616	68.075	152.095



Fonte: DGE

5 - GENERATED POTENTIAL

INSTALLED POWER - DECENTRALIZED GENERATION

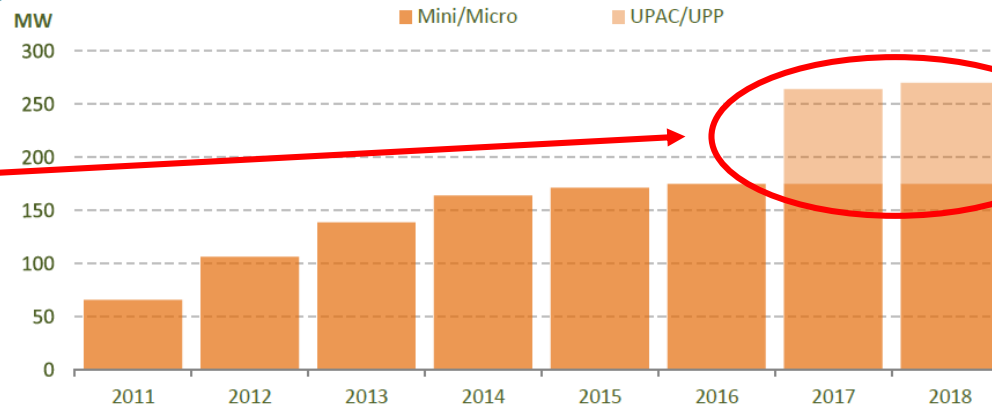
	Potência Instalada (kW)							
	2011	2012	2013	2014	2015	2016	2017	2018 fev
Total Potência	65 146	105 709	138 098	163 436	170 876	174 366	263 418	269 312
UPAC/UPP ¹							88 998	95 005
Biogás							544	544
Eólica							36	36
Fotovoltaica							88 418	94 425
Mini/Micro	65 146	105 709	138 098	163 436	170 876	174 366	174 420	174 307
Hídrica	32	24	69	123	123	237	237	237
Eólica	627	631	683	478	480	480	483	483
Fotovoltaica	64 487	105 054	137 345	162 834	170 272	173 649	173 698	173 585
Biogás			0.7	0.7	0.7	0.7	0.7	0.7

47% of total PV Installed Power

¹Potências certificadas pela DSEE/DGEG

Previous UPAC and UPP statistical data aggregated in 2017

Average 30MWp/Year of new capacity



Source: DGEG

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- The PV installed capacity tends to increase under decentralized generation, bearing also in mind the national and European context.
- DL 153/2014 was a very important step for the decentralized generation promotion, increasing greatly the efficiency of consumers and the electrical system itself;
- The next step will be the development of storage, along with greater participation and decision-making, of the final consumer in their choices of energy consumption
- Electric Vehicle and decentralized generation will be the perfect match between two complementary sectors
- This type of systems favor access to information and increase the interaction capacity of energy consumers, which in conjunction with the present digital age allow the creation of disruptive energy management solutions
- The success of this policy depends greatly on the clarification of some practical issues and on the publication of regulation, which is still pending on approval, mainly related with grid interconnection

Muito Obrigado
Thank you very much

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APESF

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