NiceGrid results

Strasbourg, November 22nd, 2016

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BUILD & CONNECT

NICE ? COTE d'AZUR ?
French Riviera ?

But it's also

But it's also
Electric vehicles,

But it's also
Electric vehicles, engaged authorities,

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But it's also
Electric vehicles, engaged authorities, industries,

But it's also

Electric vehicles, engaged authorities, industries, PV generation…

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It's a "nice" area to test new solutions for the energy transition

NICE GRID
A SMART SOLAR DISTRICT

PV integration

Peak shaving

Islanding

Customer engagement

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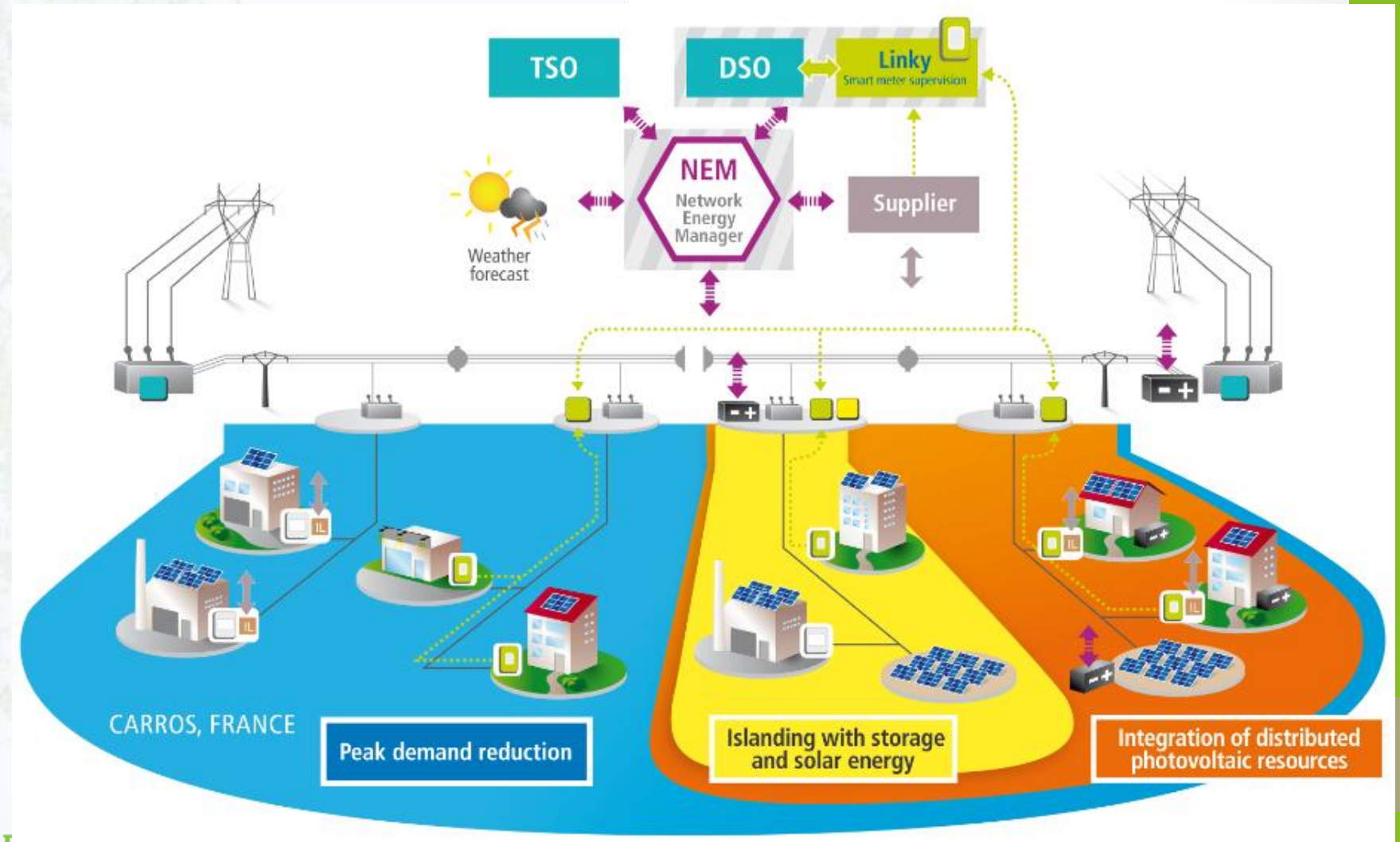
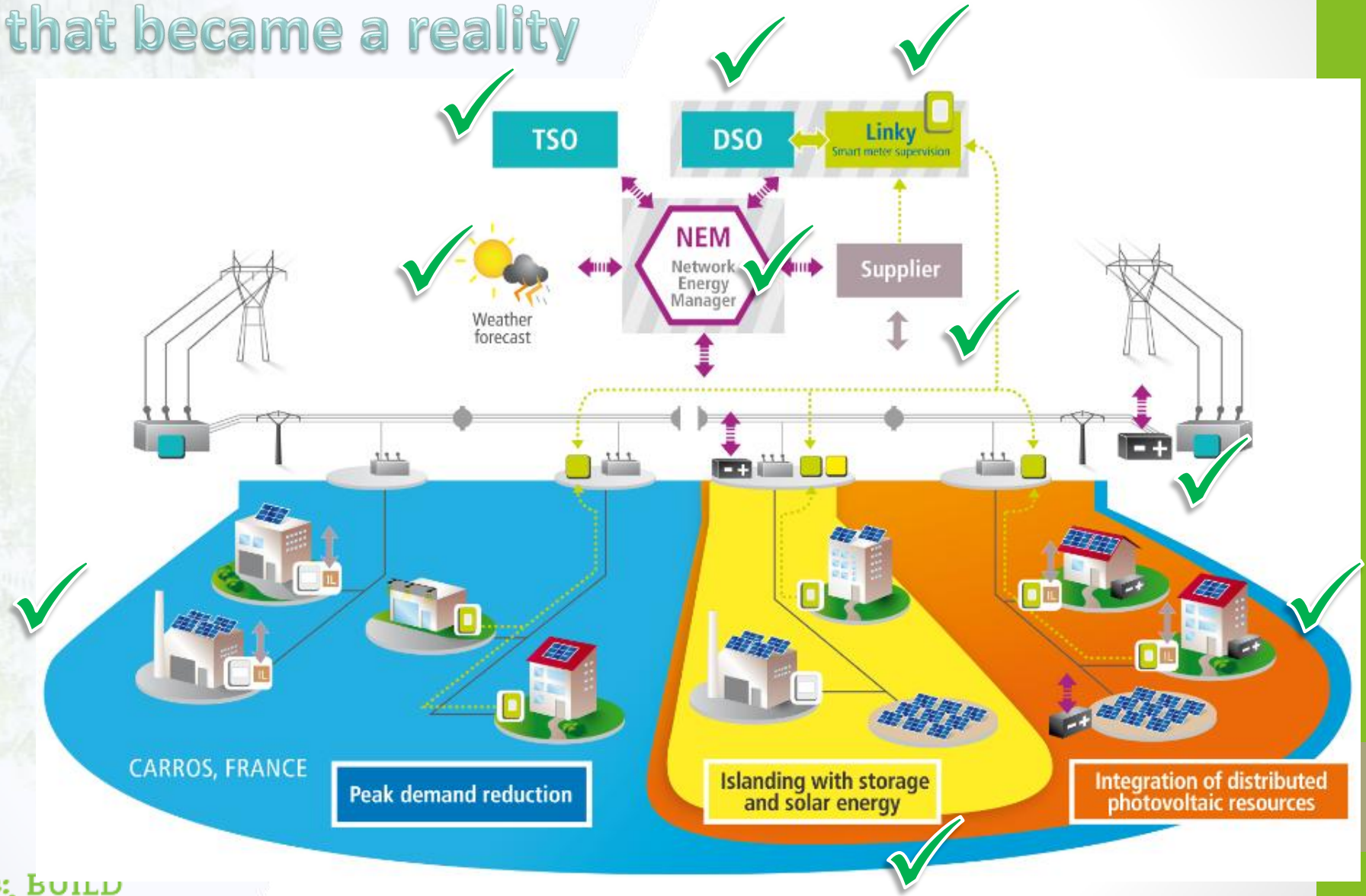
A historical diagram



A historical diagram that became a reality



How does it work for a customer in summer?

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Today off-peak rate from 12:00 am to 4:00 pm

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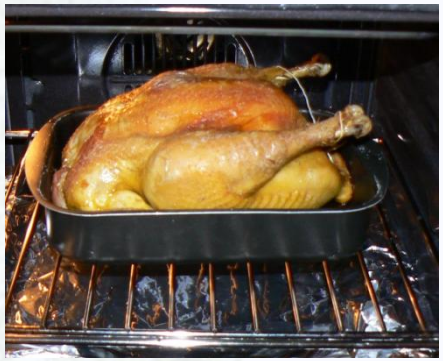

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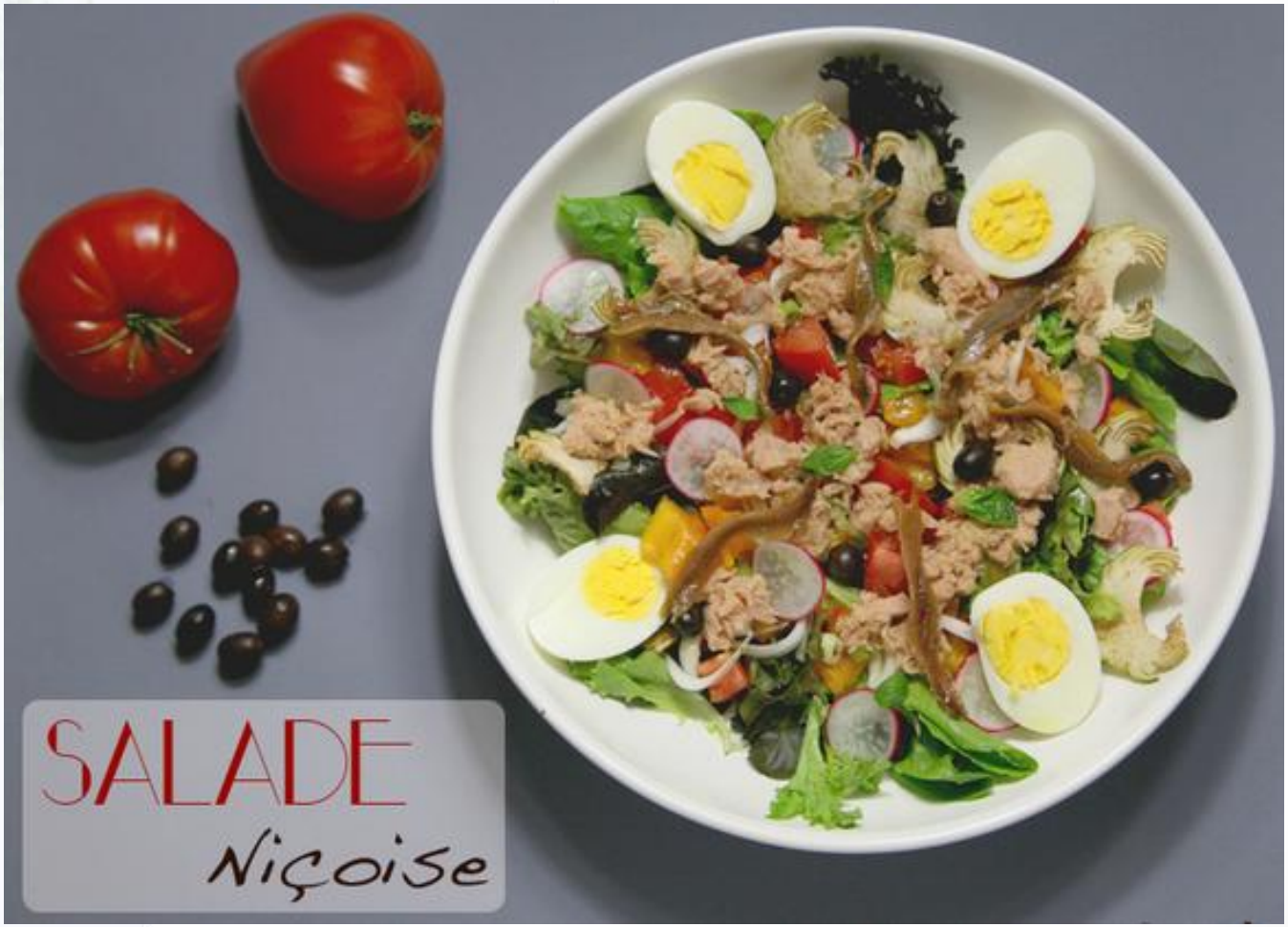

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EDF summer offers for households and individual results

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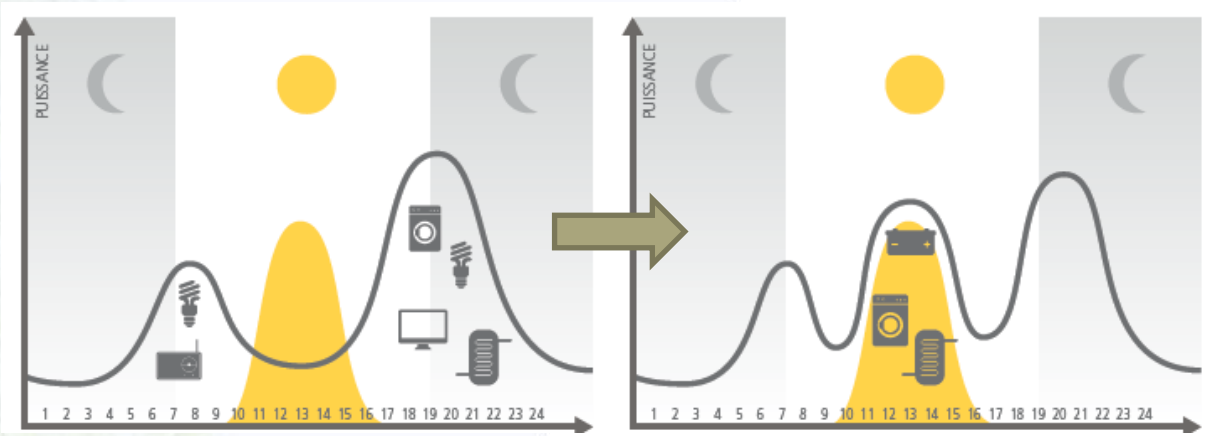
Summer offers for households

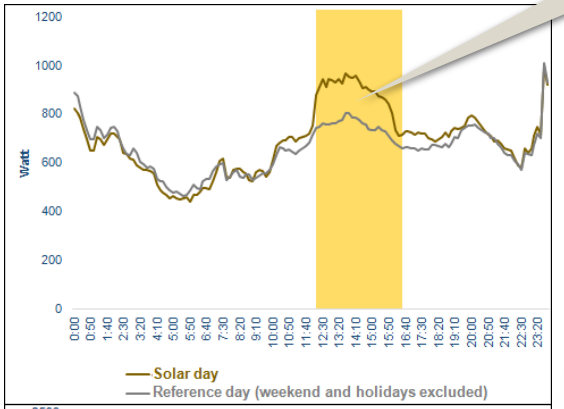


- Solar bonus (additional off-peak hours) from 12:00 am to 4:00 pm on « solar days »

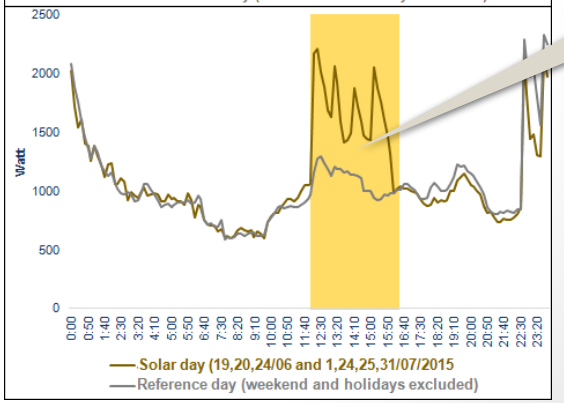
+

Recruitment : 15%

- Electric Hot Water Tank operated by Linky smart meter



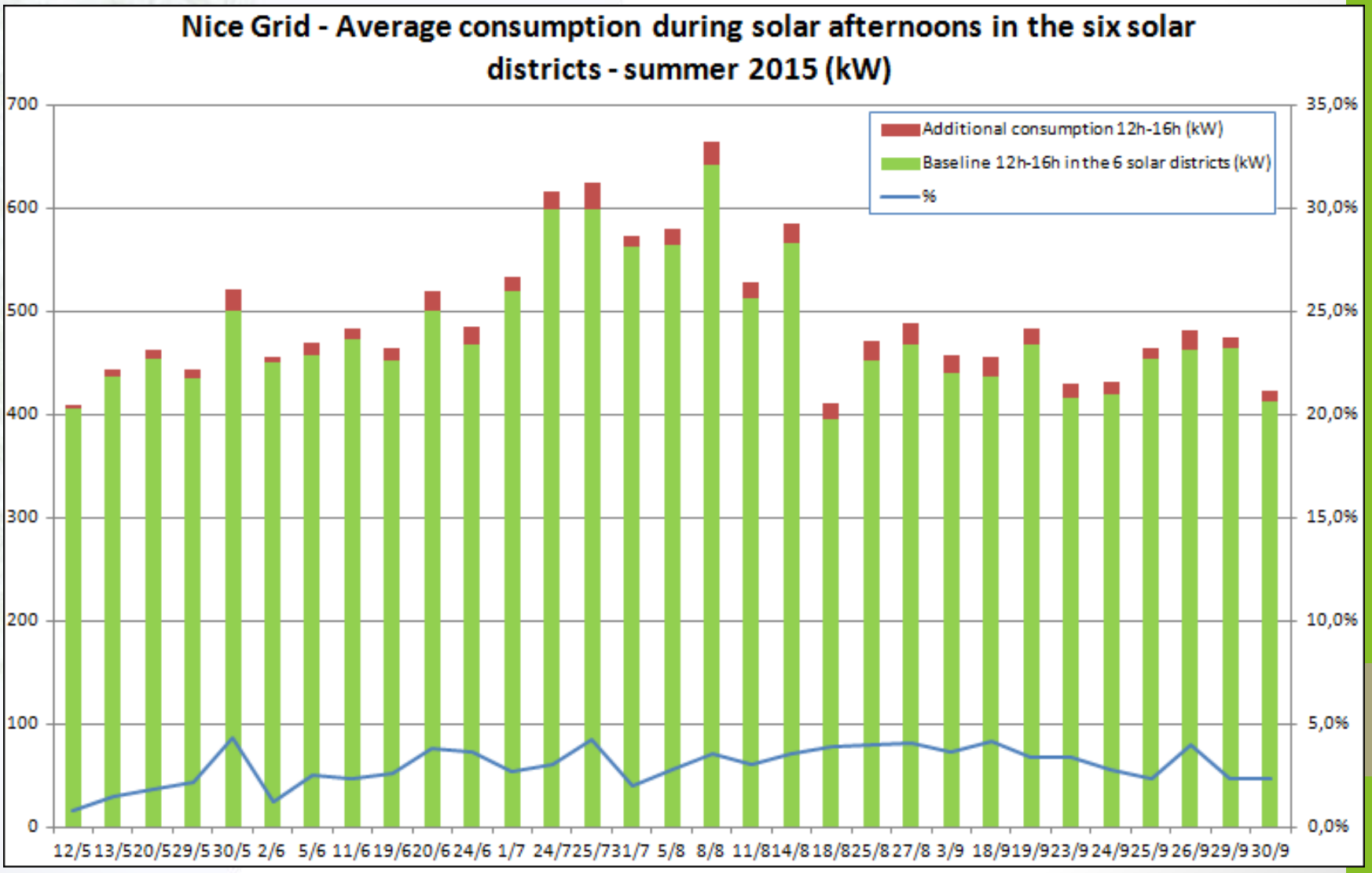
+20%

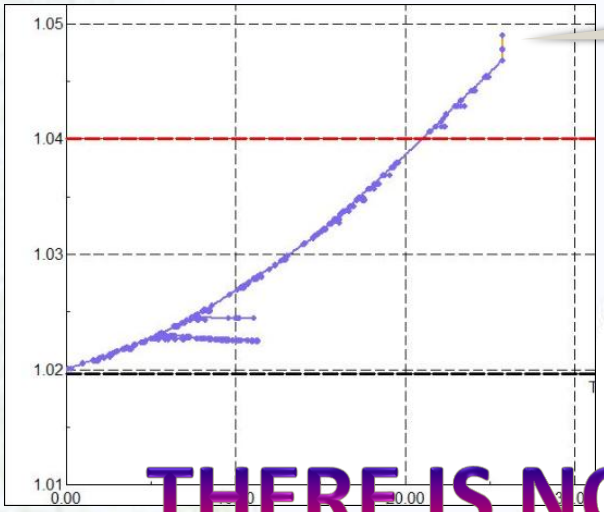


+56%

What about the effect on the network?

Agregated shifted power during solar afternoon

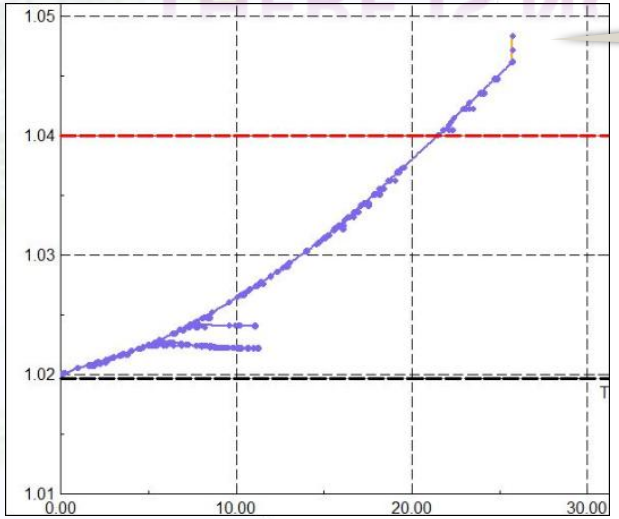




dU/U = +4,9%

Network voltage profile **without** NiceGrid residential flexibilities

THERE IS NO VISIBLE DIFFERENCE



dU/U = +4,8%

Network voltage profile **with** NiceGrid residential flexibilities

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Key factors of success for a visible impact of residential flexibilities on network 1/2

- **Recruit a lot of customers (>> 15%)** in the grid area where DSO needs additional consumptions to reduce the constraints
- Expect large scale deployment of connected appliances
- **Identify new controllable loads**, with higher storage capacity

+40 kWh ?

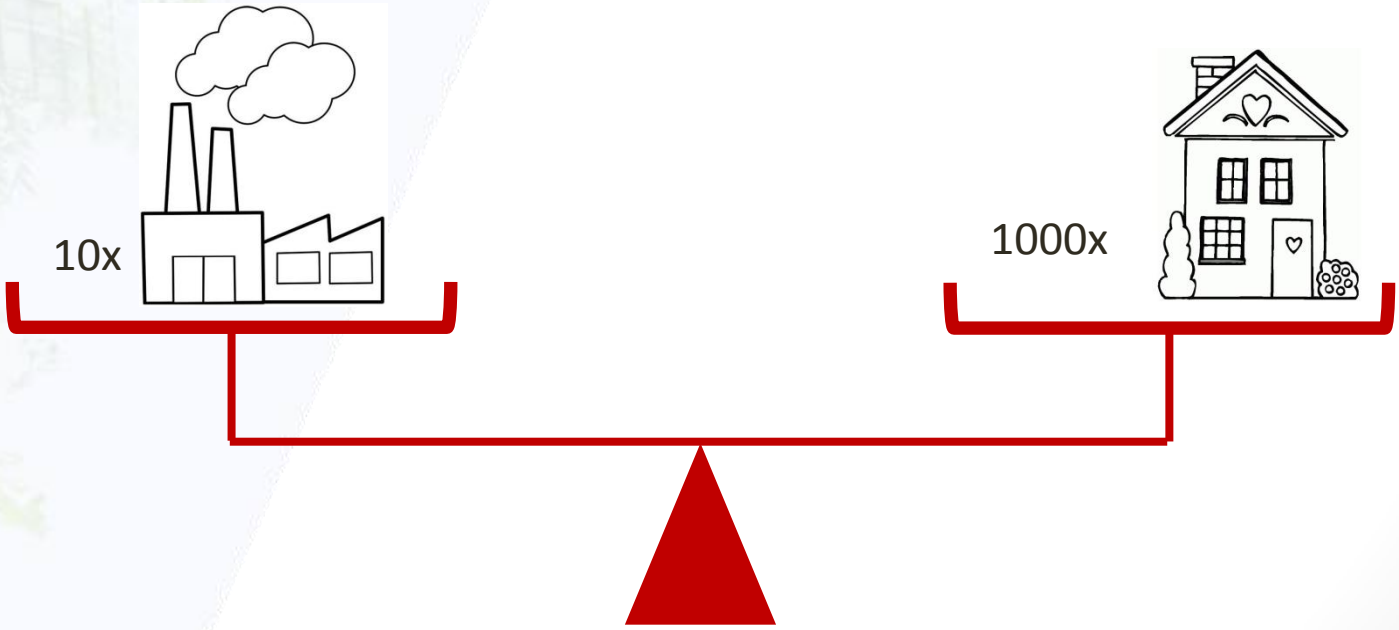
+0,6 kWh

+2 - 3 kWh

Key factors of success for a visible impact of residential flexibilities on network 2/2

- Enlarge the grid area (Primary Substation minimum), to reduce the dispersion of the forecasts and variability of the customers response
- Control the individual PV generation, **even when the prosumer is absent**

- A larger potential of flexibilities within industrials sites *(tested only in Winter for load reduction but what about sundays?)*



Storage is a key factor

What about Nice Grid feedback?

4 levels of electric storage tested

1 MW / 560 kWh at primary substation

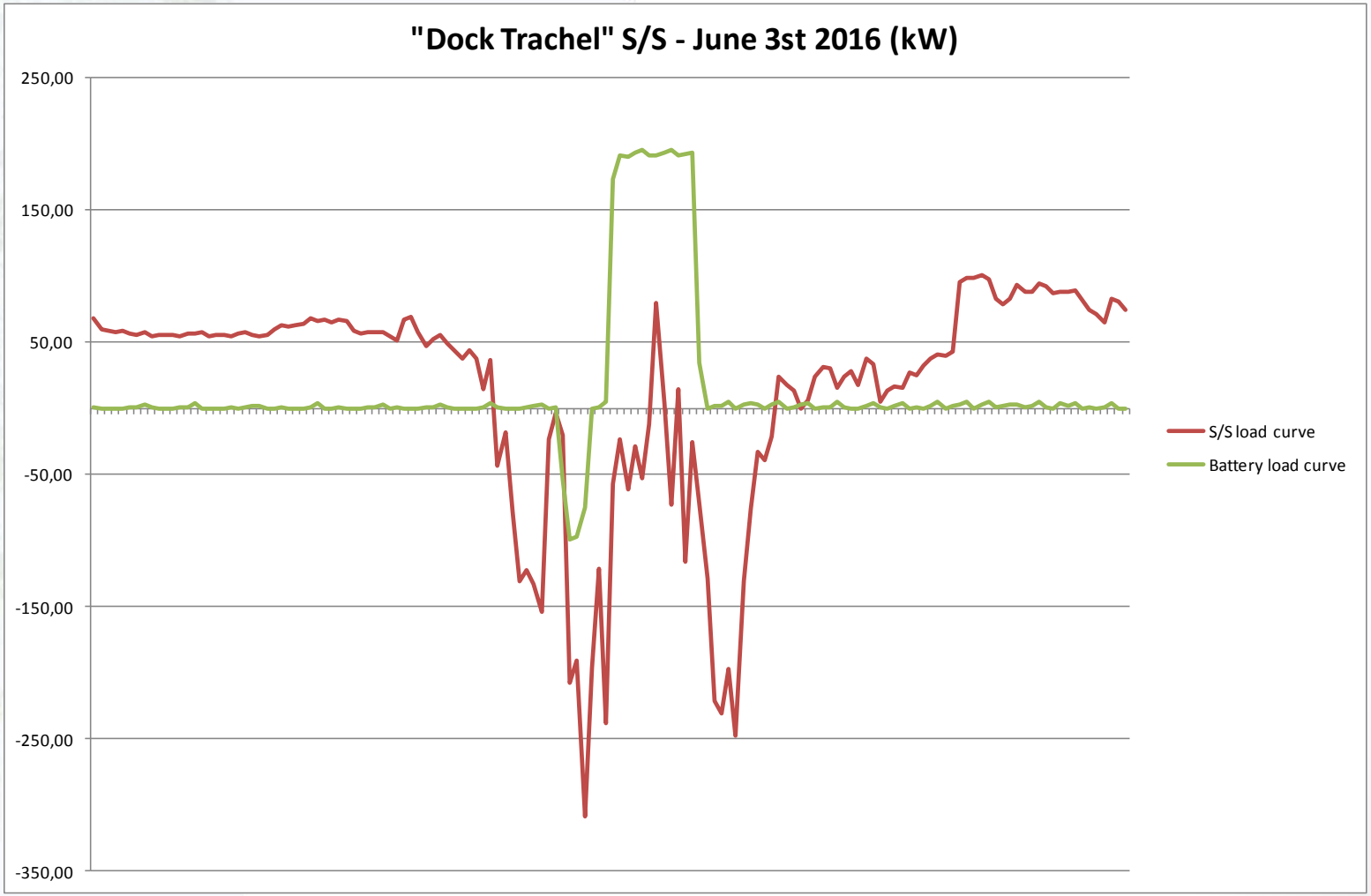
250 kW / 620 kWh at secondary substation

2 x 33 kW / 106 kWh at LV level

18 x 4 kW / 4 kWh at customer level

It’s very efficient on the network if it’s correctly sized

Here a 250kW battery downstream a 400 kVA transformer



Nice Grid feedback on network batteries

Programmable

Complex but easy to operate

Availability around 95%

Efficient when correctly sized (P & E)

No standard for installation

Flexible and reactive

No long term feedback on safety

Now, Costs >> benefits for only seasonal energy storage

~ 80% efficiency

Large ground footprint for urbanized area

www.grid4eu.eu

Key factors for industrial deployment of electric storage on the grid

- Reduce the price
- Develop other services for storage
- Use it more often

- Define standards for their installation
- Improve even more the availability
- Improve the efficiency by reducing the consumption of auxiliaries
- Integrate the storage device during the design phase of a building project

Participants point of view

Household participants feedback : summer offers

15% participants in summer (70/460)

Motivations :
- Savings
- Participate to sustainable development

86% of satisfaction

40 solar days each summer

Savings (*):
15 to 30 € / summer

(*) with Nice Grid conditions

The summer offers are easy to understand and don't reduce my comfort

I'm proud to belong to Nice Grid community

Household participants feedback : winter offers

13% participants in winter (220/1700)
- 80% self behavior
- 20% controlled heating

Motivations :
- Savings
- Participate to sustainable development

94% of satisfaction

Incentive (*):
20 to 40 € / winter

(*) with Nice Grid conditions

20 requests to reduce consumption each winter

I'm proud to belong to Nice Grid community

Industrial participants feedback : winter offers

12 companies

(100% of eligible industries > 250 kW)

Motivations :
- **Participate to the improvement of regional network reliability**

100% of satisfaction

10 requests to reduce consumption each winter

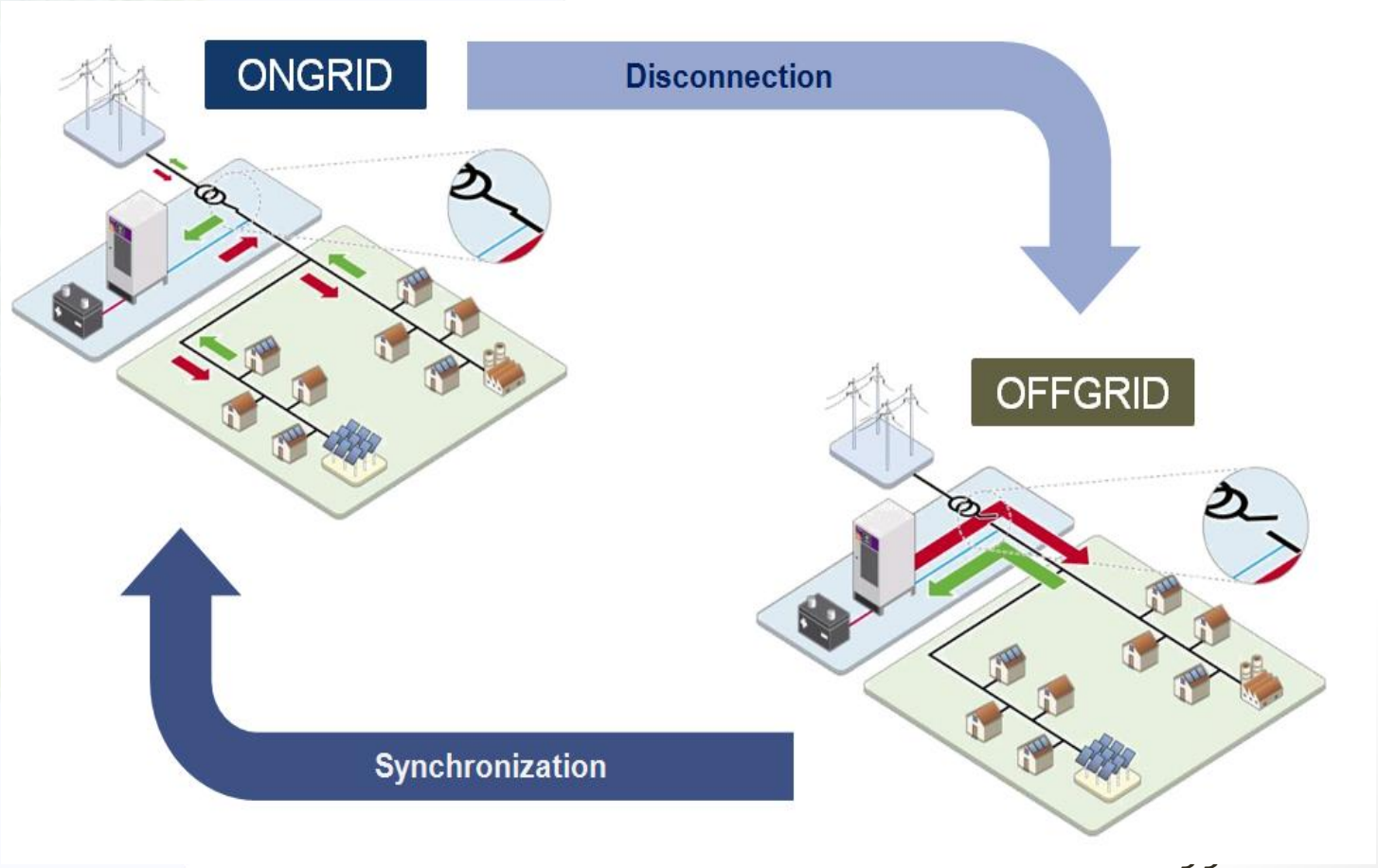
No incentive

The period of peak reduction does not match with my organization

Islanding

Two types of islanding successfully tested

1) Scheduled islanding (without blackout)
2) Unforeseen islanding (after 3’ of blackout in the islanding area)



Islanding conclusions

No modification of PV inverters required

No rotating generator

8 hours of scheduled islanding realized (2016/09/19)

Can be added on top of existing storage asset

Expensive and complex solution

Keep the state of charge in a certain range to face unforeseen islanding

And also in Nice Grid…

- Fast BPL communication system on MV and LV feeders (5 Mbits/s)
- Efficient softwares for day ahead load and PV generation forecasts
- Secured and standardized exchanges between the NEM and others stakeholders (agregators, LINKY IS, Geographical IS, forecasts…)
- Dedicated meter downstream devices able to control residential or industrial customer appliances
- Advanced functions of the smart meter LINKY tested
- A “solar” OLTC MV/LV transformer
- …

More information on www.nicegrid.fr and www.grid4eu.eu

Thank you for your attention

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