Co-funded by the European Union

The Role of Energy Efficiency in Europe's Flexibility Agenda

International Energy Agency

# Role of demand response in Europe's flexibility agenda: the DR BOB project


Dr Vladimir Vukovic

Teesside University

Paris, France
October 24, 2018

Vukovic, V., Role of demand response in Europe's flexibility agenda: the DR BOB project, IEA's workshop on The Role of Energy Efficiency in Europe's Flexibility Agenda, Paris, France, Oct 24, 2018.

Co-funded by the European Union

International Energy Agency

IEA's workshop on The Role of Energy Efficiency in Europe's Flexibility Agenda, Paris, France, Oct 24, 2018.

# Demand Response in Blocks of Buildings
## EU H2020 funded Innovation project
## Mar 2016 – Feb 2019
## 10 partners, 5 EU countries, 4 demos

**Teesside University, UK, Project Coordinator**

Centre Scientifique et Technique du Bâtiment, France

Siemens Energy Management Division, UK

R2M Solution, Italy

NOBATEK, France

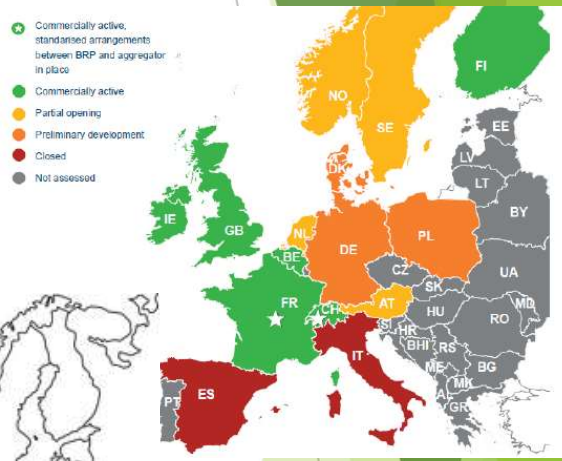
Grid Pocket SAS, France

Duneworks BV, Netherlands

Fondazione Poliambulanza, Italy

Servelect, Romania

Universitatea Tehnică din Cluj–Napoca, Romania





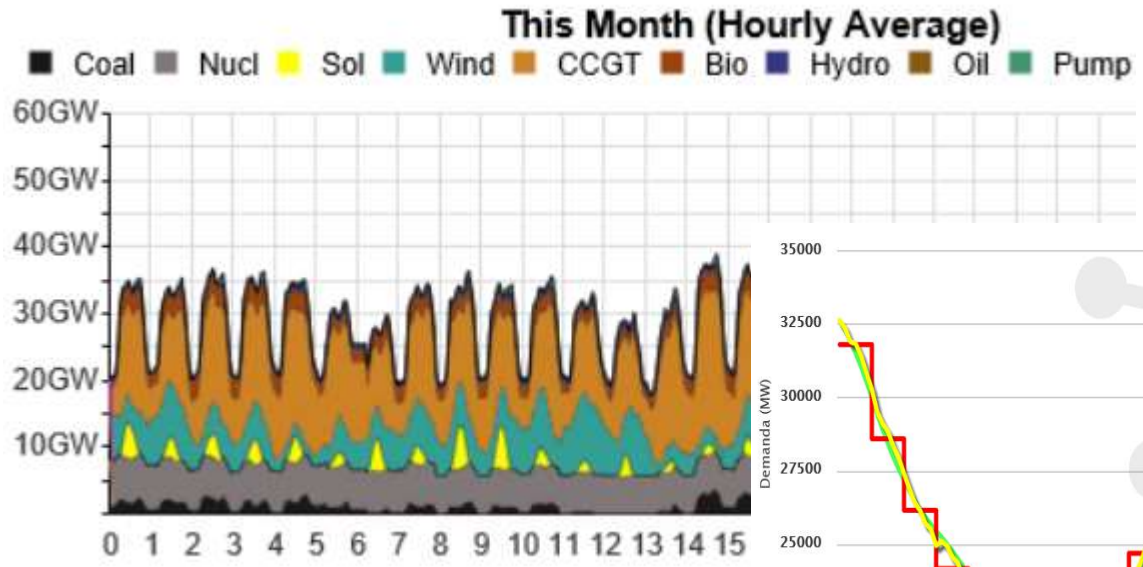
Source: Smart Energy Demand Coalition: Mapping demand response in Europe today (2015).

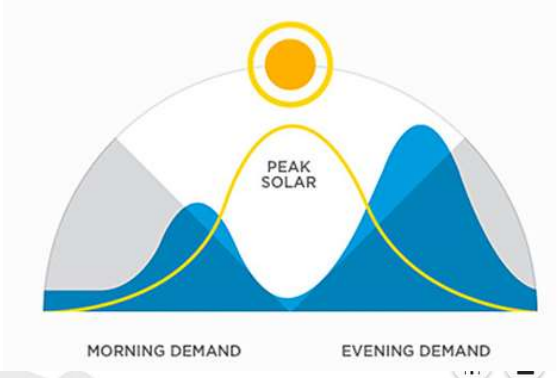
Co-funded by the European Union

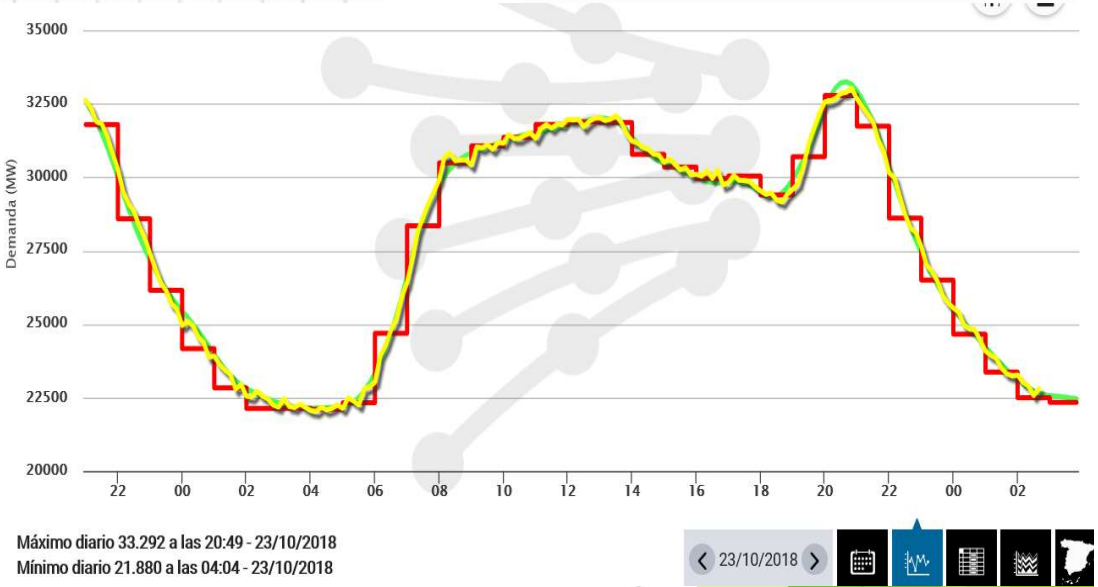
International Energy Agency



# What is demand response ?




- Demand Response involv
  **or reducing** their electr
  periods in response to ti
  other financial incentives

Sources:
UK Electricity National Grid Demand and Output per Production Type, http://gridwatch.co.uk/
Real-time demand and generation, Red Eléctrica de Espana, https://demanda.ree.es/visiona/peninsula/demanda/total/2018-10-23

Co-funded by the European Union

International Energy Agency

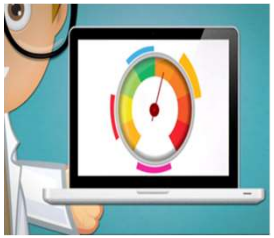
IEA's workshop on The Role of Energy Efficiency in Europe's Flexibility Agenda, Paris, France, Oct 24, 2018.

# Aim of DR BOB

- To demonstrate the economic & environmental benefits of demand response in **blocks of buildings** for the actors required to bring it to market

Crosbie, T., Vukovic, V., Short, M., Dawood, N., Charlesworth, R. and Brodrick, P., Future Demand Response Services for Blocks of Buildings, in Smart Grid Inspired Future Technologies (Hu, J. et al. Eds.) (2016).

| Market type | Characteristics |
|---|---|
| Short term operating reserve (STOR) | Demand or supply regulation in case of short term supply interruptions |
| Capacity market | Supply payments for power reserve |
| Triads - Transmission Network Use of System charges | Demand charges during 3 annual half-hour peaks across UK |
| Distribution Use of Systems (DUoS) | Demand daily time of use tariff |
| Frequency response | Demand or supply second notice |
| Fast reserve | Supply with fast (within 2 min) delivery |
| Retail supply side contract hedging | Demand day ahead notice by retailers to offset peak supply prices |
| DNO Traditional Network Reinforcement Offset | Demand 24hr notice by DNOs to avoid planned outages |



Co-funded by the European Union

International Energy Agency

IEA's workshop on The Role of Energy Efficiency in Europe's Flexibility Agenda, Paris, France, Oct 24, 2018.

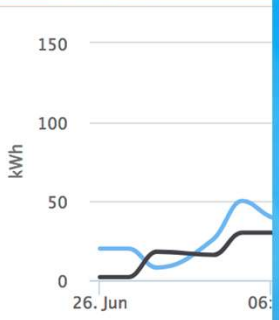
# DR BOB solution implemented

DR events | Building & assets | **Analytics** | Manage users & groups

DR events | Fore

## Coming DR events

| Program Name |
|---|
| FR-Scenario-5 |
| FR-Scenario-5 |




Legal Notice

## Events participation results

Seach and filter

| Program | StartTime | Duration | Results |
|---|---|---|---|
| STOR-UK-Scenario-1 | 05/02/2017 | 5 | 0 kWh |
| DTU-UK-Scenario-2 | 04/25/2017 | 10 | 0 kWh |
| TRIAD-UK-Scenario-3a | 04/21/2017 | 30 | 0 kWh |
| DR-Program-UK-1 | 04/05/2017 | 5 | 0 kWh |
| DR-Program-UK-1 | 04/05/2017 | 3 | 0 kWh |
| DR-Program-UK-1 | 04/04/2017 | 5 | 0 kWh |
| DR-Program-UK-1 | 04/04/2017 | 5 | 0 kWh |
| DTU-UK-Scenario-2 | 04/03/2017 | 10 | 0 kWh |

## Feedback

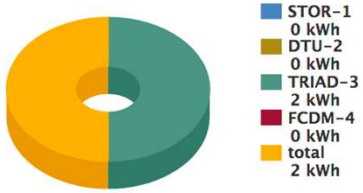
**Test**
*a month ago by Paps*
*Type/Time: 15/05/2017 15:00*
Low temperature

**Test**
*2 months ago by Paps*
*Type/Time: General*
Test feedback

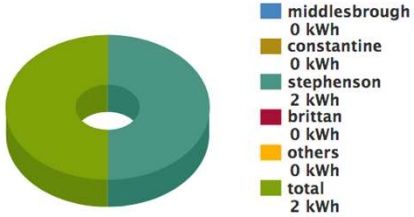
**CSTB Building**
*3 months ago by Nicolas*
*Type/Time: undefined*
Test feedback of occupants

**Building test Building**
*3 months ago by Papa*
*Type/Time: undefined*

## Energy saved per program




## Energy saved per building




## Economic results

| | |
|---|---|
| STOR-1 | 754 £ |
| DTU-2 | 17.4 £ |
| TRIAD-3 | 80 £ |
| FCDM-4 | 278 £ |
| TOTAL | 1129.4 £ |

Co-funded by the European Union

International Energy Agency



# Questions?

V.Vukovic@tees.ac.uk

www.dr-bob.eu

## Related projects:

www.integridy.eu
edream-h2020.eu

The work presented was carried out as part of the DR-BOB project (01/03/16 - 28/02/19) which is co-funded by the EU's Horizon 2020 framework programme for research & innovation under grant agreement No 696114.