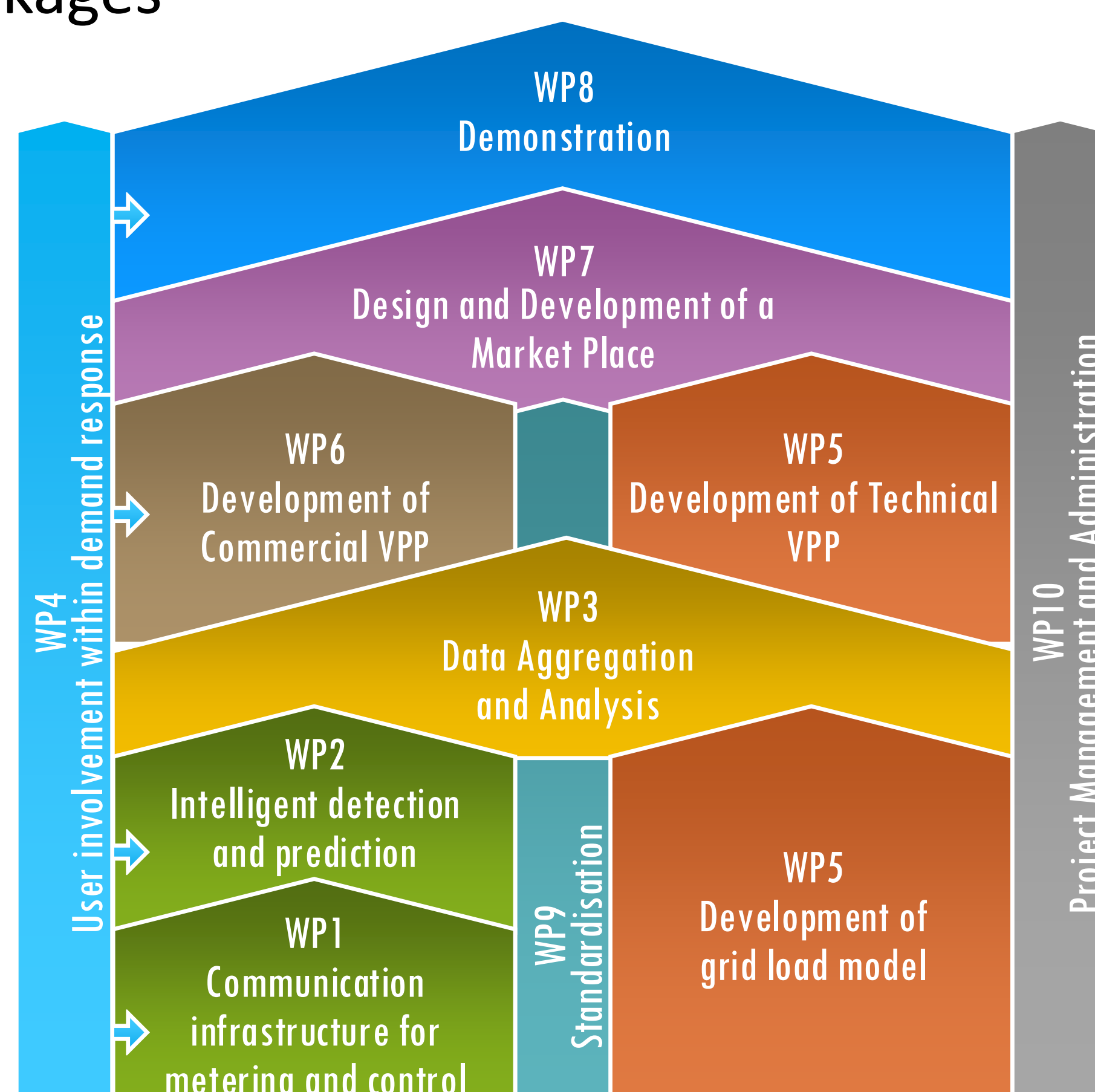


## A marketplace for flexibility

The **TotalFlex** project demonstrates a new marketplace for flexibility (demand response) coming from any flexible device. Flexibility as a commodity is traded, i.e. the right to decide when the consumption or production giving the flexibility is placed in time. Activating flexibility is an important mean to fit the increasing amount of fluctuating non-fossil based electricity in the grid. The DSO is intended to use the marketplace to reduce bottlenecks in the grid. The vision of **TotalFlex** is to develop a cost-effective, market-based relation between BRP, the DSO, and the prosumer which utilizes total flexibility in energy demand and production taking balance and grid constraints into account.

### Project facts

- **Time Schedule:** Jan 1<sup>st</sup> 2012 – Dec 31<sup>th</sup> 2016
- **Budget:** 4.7 M€
- **Management:** Neogrid
- **9 work packages**
- **Manpower:** 41 man years
- **7 PhD students**

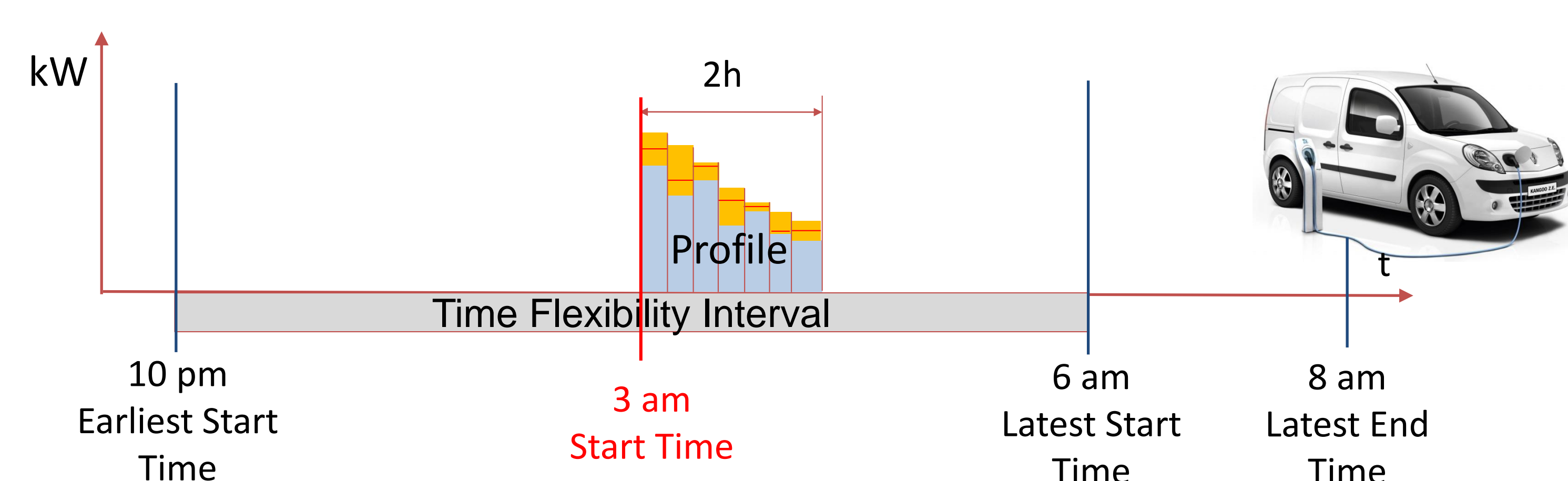


### Project background

- More than **27%** of electricity production should be “green” from 2030 in EU (**80%** in Denmark from 2020) – and “green” energy is mainly from wind turbines, which is fluctuating energy source.
- **Little incentive** or no for households to activate flexibility
- Activation of flexibility based on energy prices might lead to **bottlenecks** in the grid

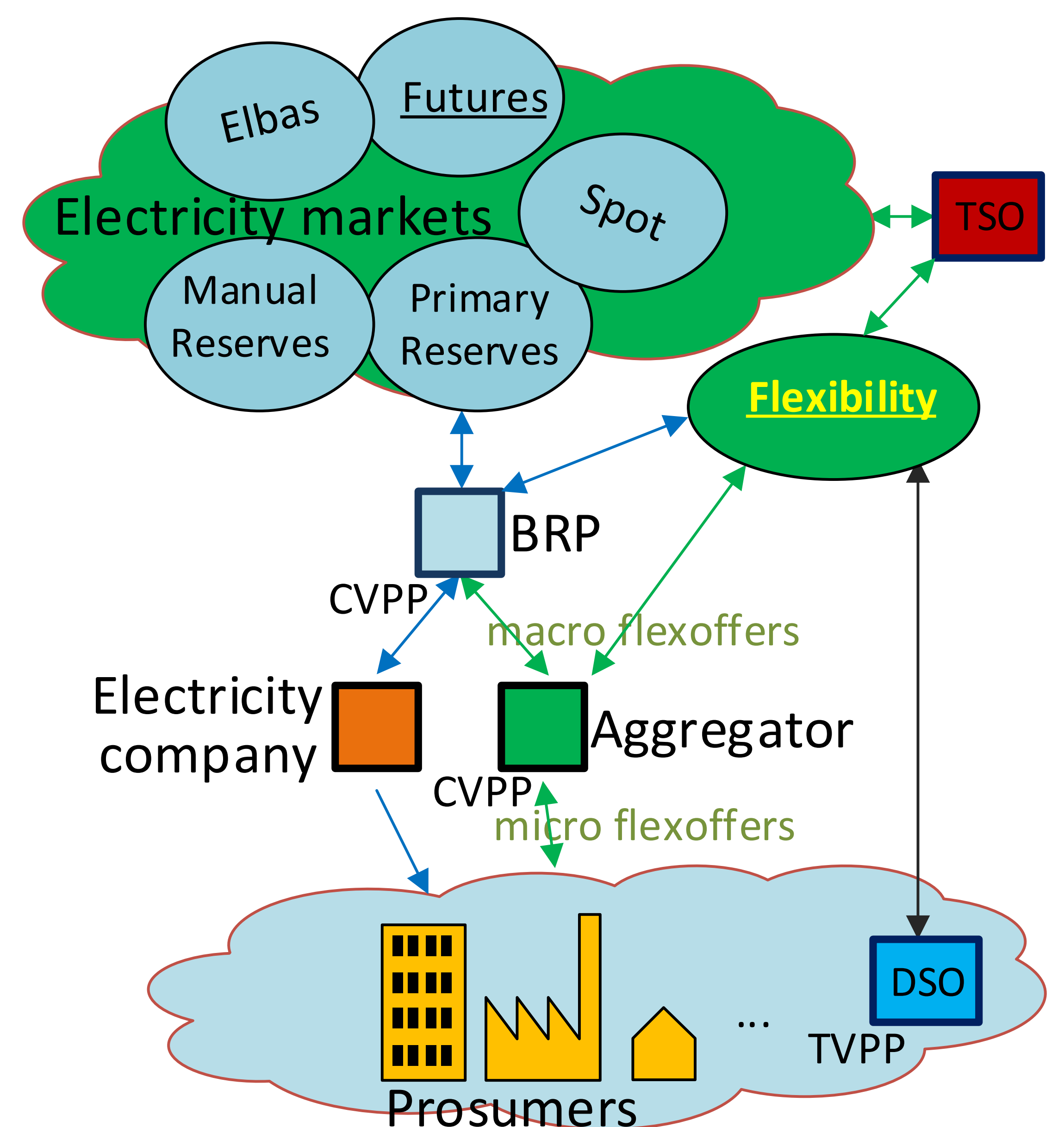
### Flex-offer concept

A key concept in **TotalFlex** is using the flex-offer concept, which can be made from a flexible Distributed Energy Resource, **DER**. Some devices are flexible (EV, heat-pump, freezer etc., i.e. consumption can be moved in time, others not. A flex-offer from an EV might look like:



A flex-offer goes through the following lifecycle:  
**aggregation – scheduling – disaggregation - execution**

### TotalFlex architecture



#### Main actors and operations

The aggregator role is included in **TotalFlex**. It coexists with an electricity company and aggregates the flexible part via micro-flexoffers. A new electronic marketplace for flexibility is introduced and can be accessed by several actors.

### Expected outcome

- Flexibility market, where the right to schedule flexibility is traded
- Methods for aggregating and disaggregating all sizes of flexibility from any device
- Commercial Virtual Power Plant (C-VPP) tool to facilitate a simple operation of a large number of devices
- Technical Virtual Power Plant (T-VPP) tool for a DSO to predict future bottlenecks in the grid

### Demonstration

**TotalFlex** is a **demonstration project**, where the life-cycle of flex-offers from the prosumers to the marketplace and return will be demonstrated. This will be demonstrated on a limited number of houses with flexible devices connected. The concepts of **TotalFlex** will be further tested in **Arrowhead** (an Artemis EU project) where flexibility from office buildings, industry processes, EV's etc. will be connected.