

STORAGE IN A USEF CONTROLLED MICRO GRID

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OKTOBER 4th 2017



OUR OPERATING AREA

OUR MISSION
SUSTAINABLE
ENERGY
FOR EVERYONE

OUR CHALLENGE
DEVELOPING A
SUSTAINABLE
ENERGY SYSTEM



Stedin operating area electricity

Stedin operating area gas

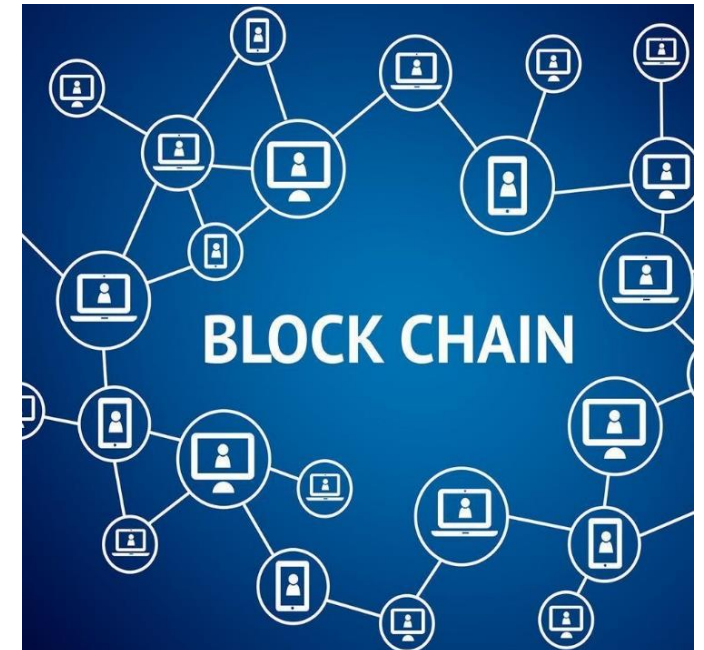
THE CHANGING ENERGYWORLD

HOW TO CREATE A SUITABLE ENERGY SYSTEM



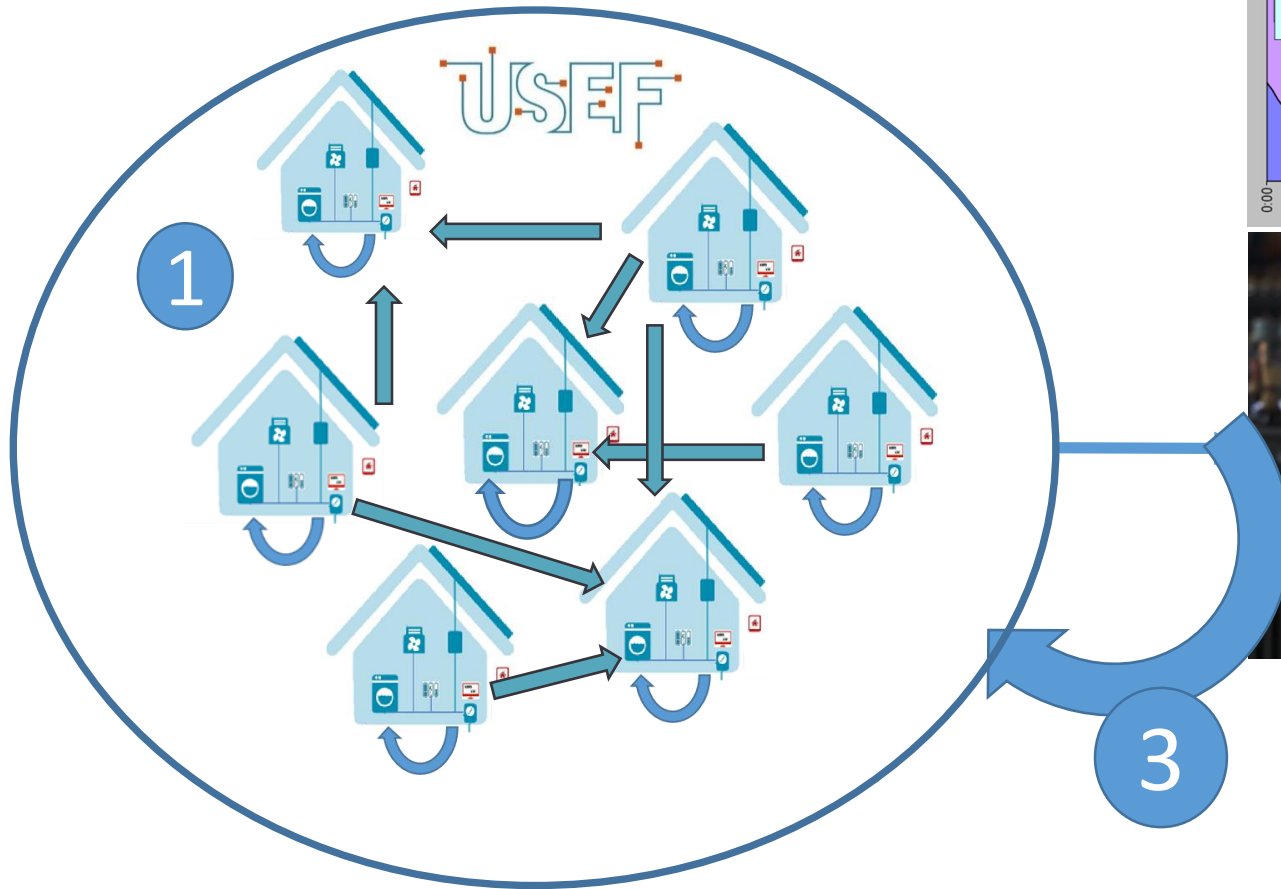
THE CHANGING ENERGY WORLD

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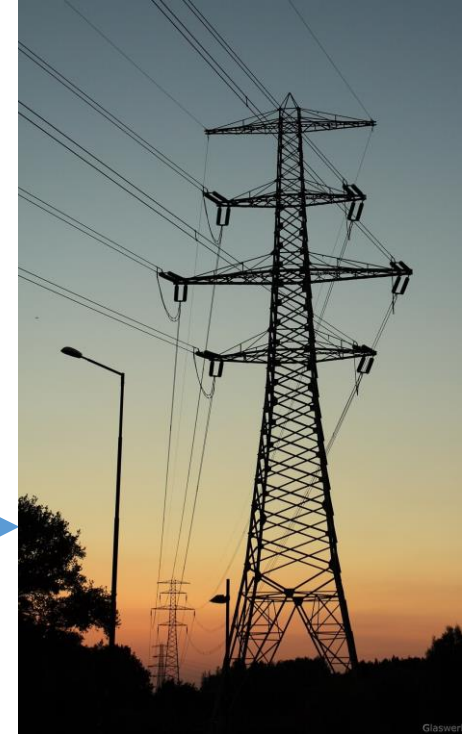
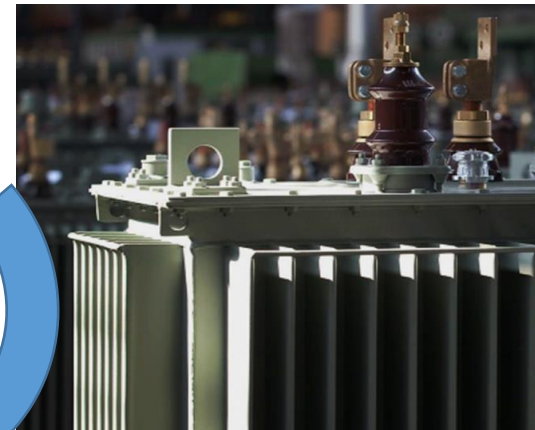
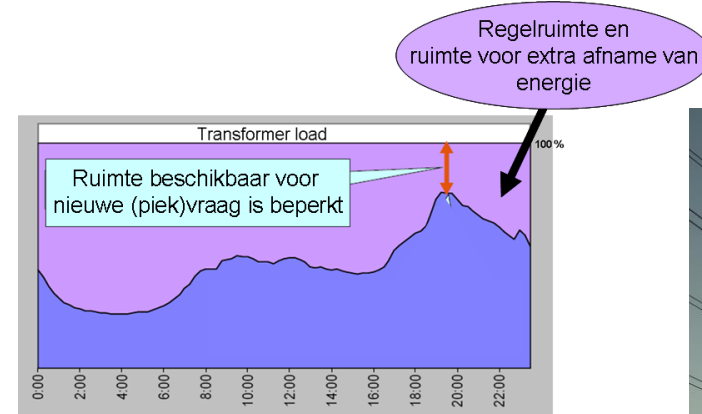


THE PLAN

THREE STEP APPROACH

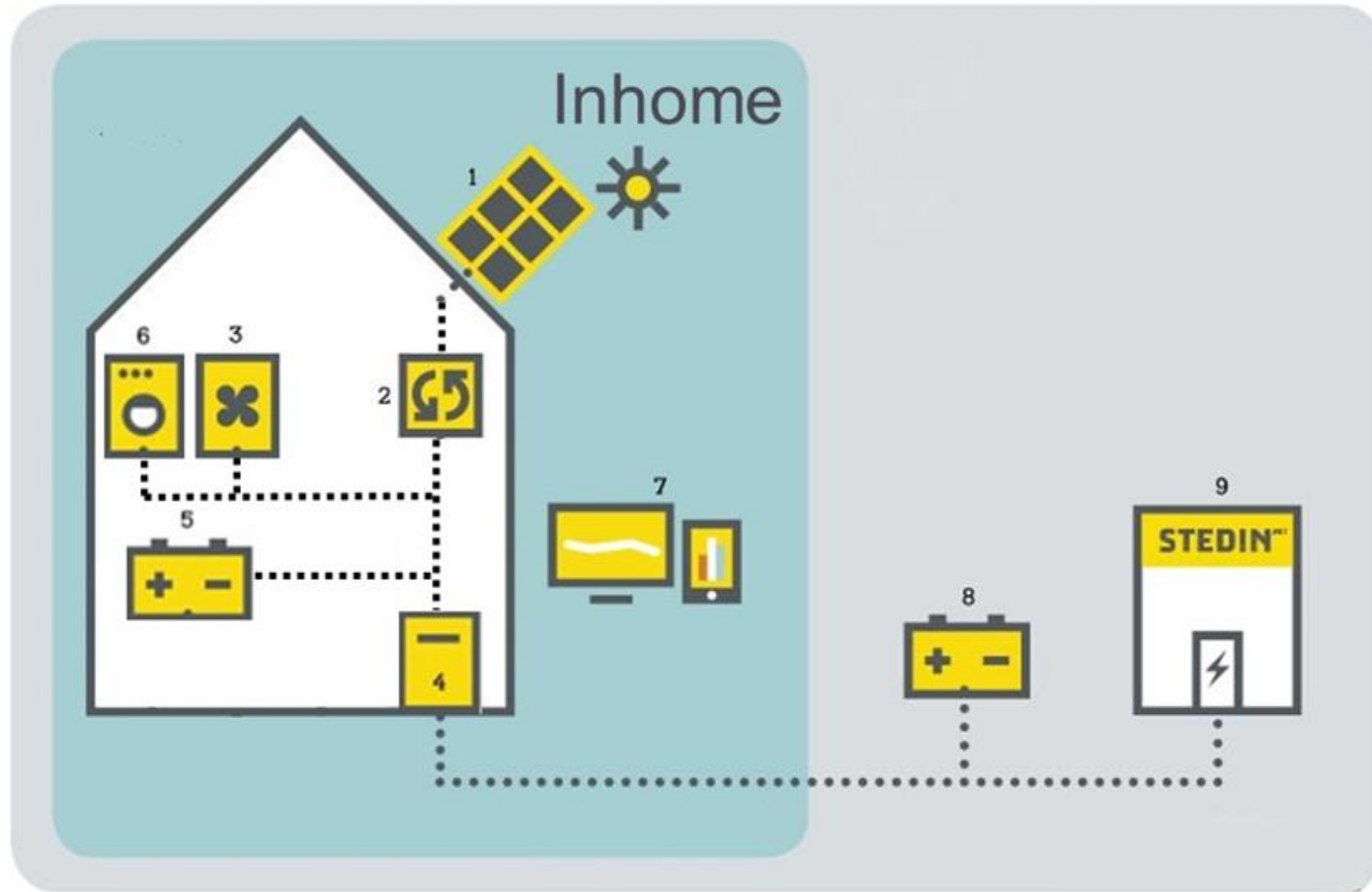
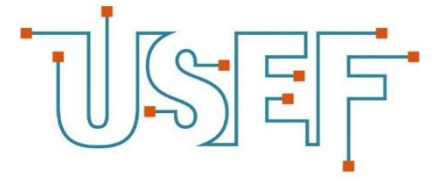


2



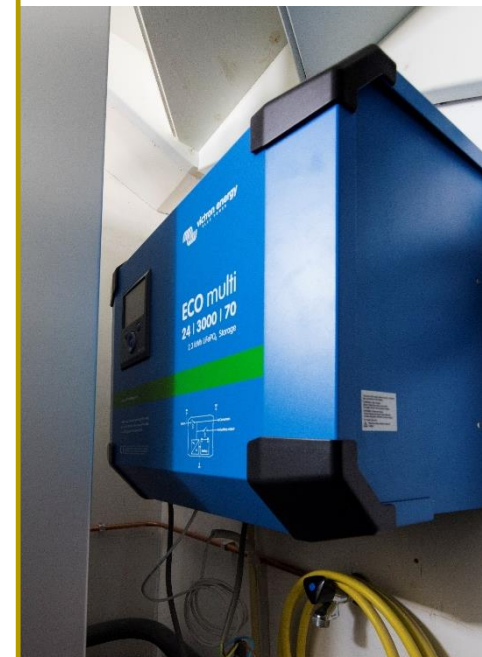
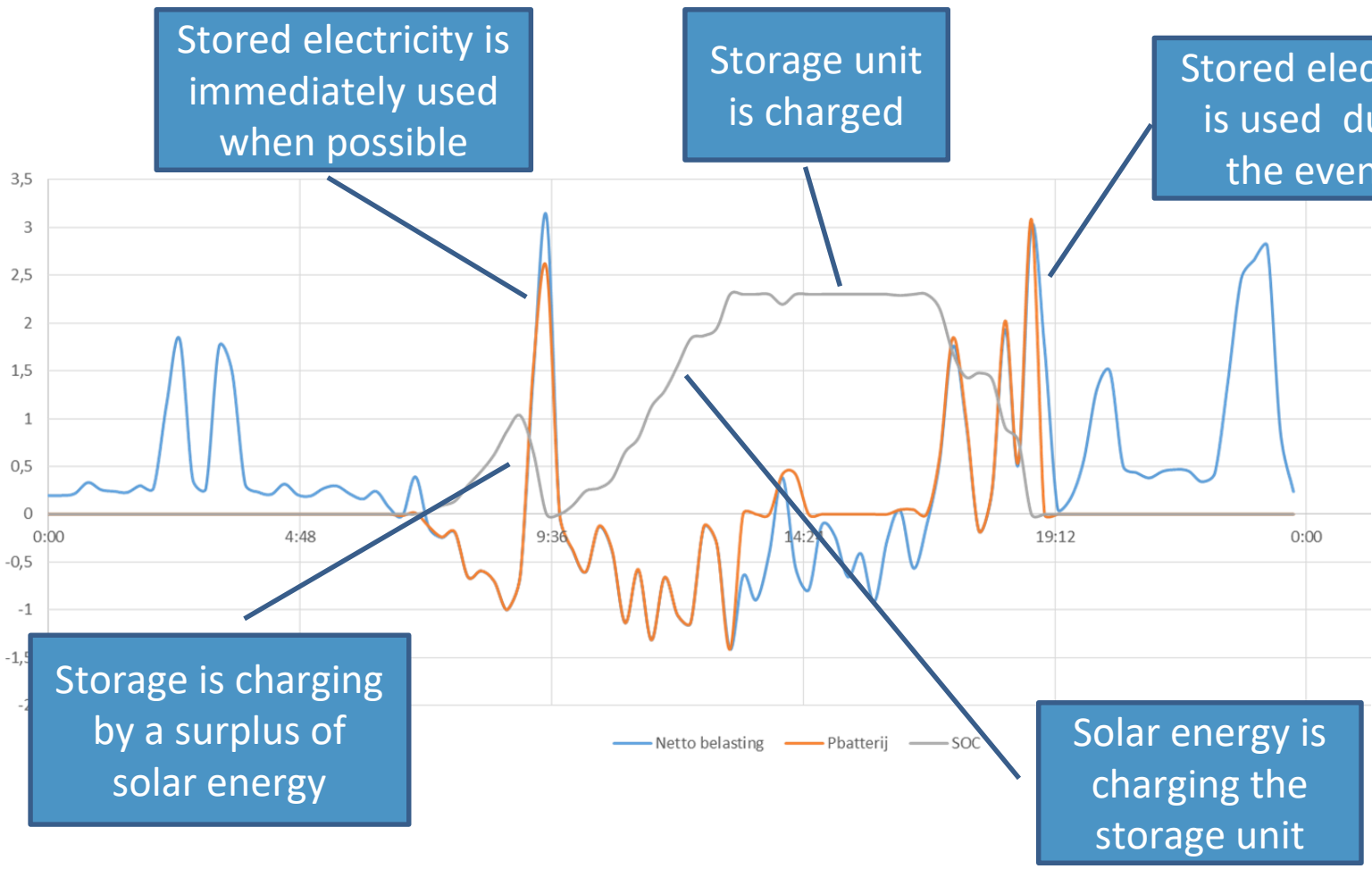
TAKE ACTION

REAL LIFE TEST IN A LOCAL GRID



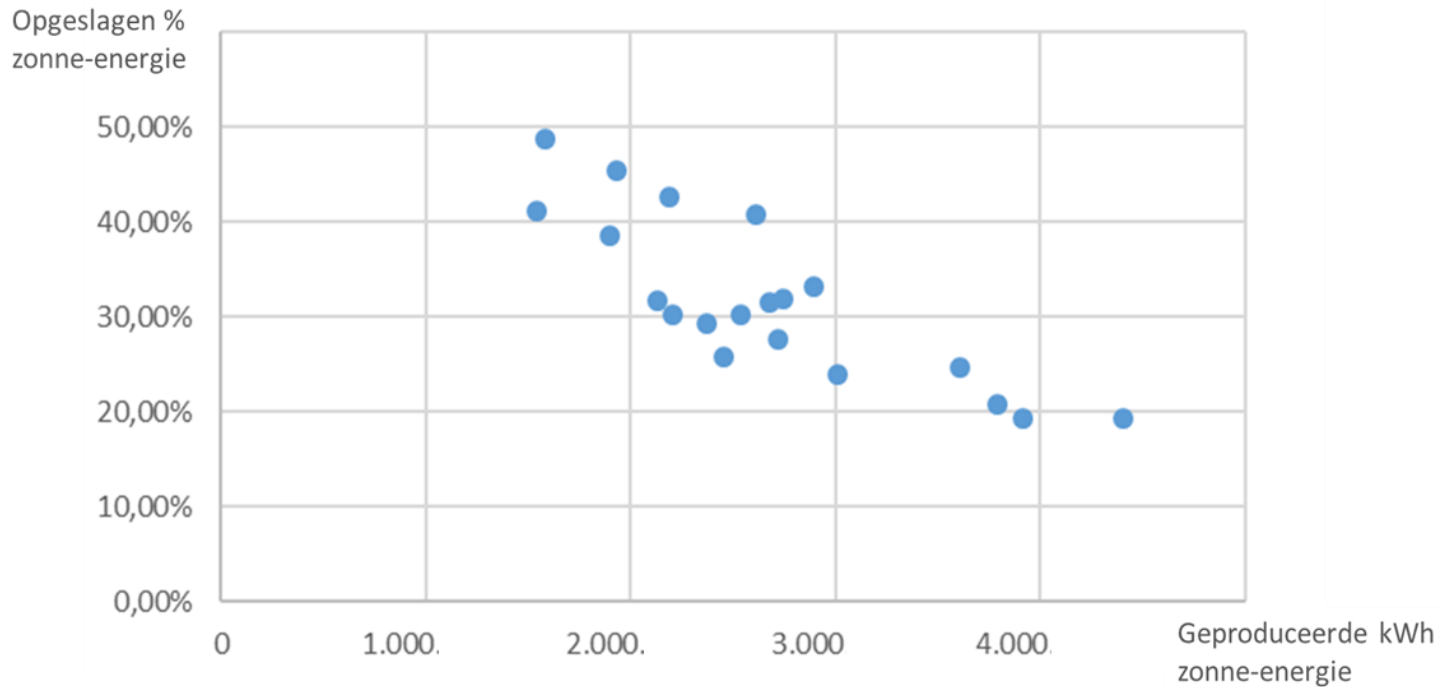
1. Solar panels
2. Converter
3. Heat pump
4. Smart control unit
5. Battery system
6. Smart appliances
7. Webportal
8. Neighborhood battery
9. Distribution substation

STEP 1 – DIFFERENT USE STORE SELF PRODUCED ENERGY



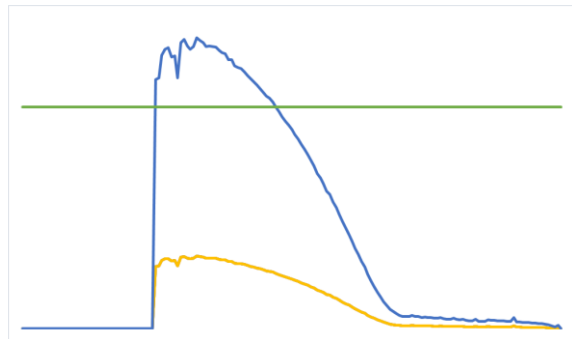
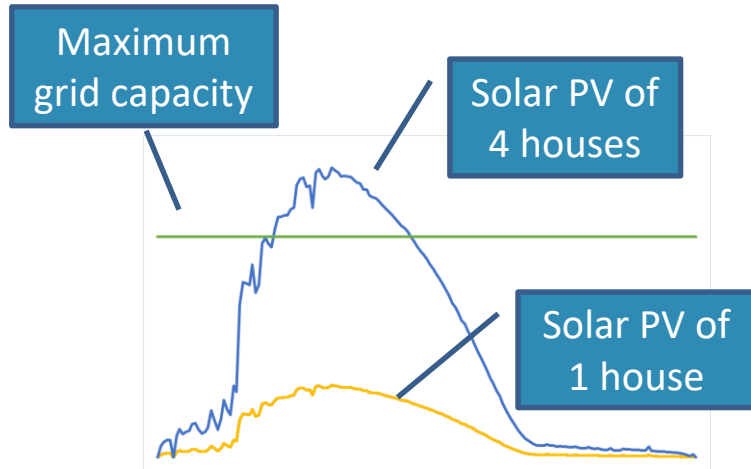
STEP 1 – DIFFERENT USE STORE SELF PRODUCED ENERGY

Average of almost 800 kWh/y in a 2.3 kWh battery



STEP 2 – GRID INTEGRATION

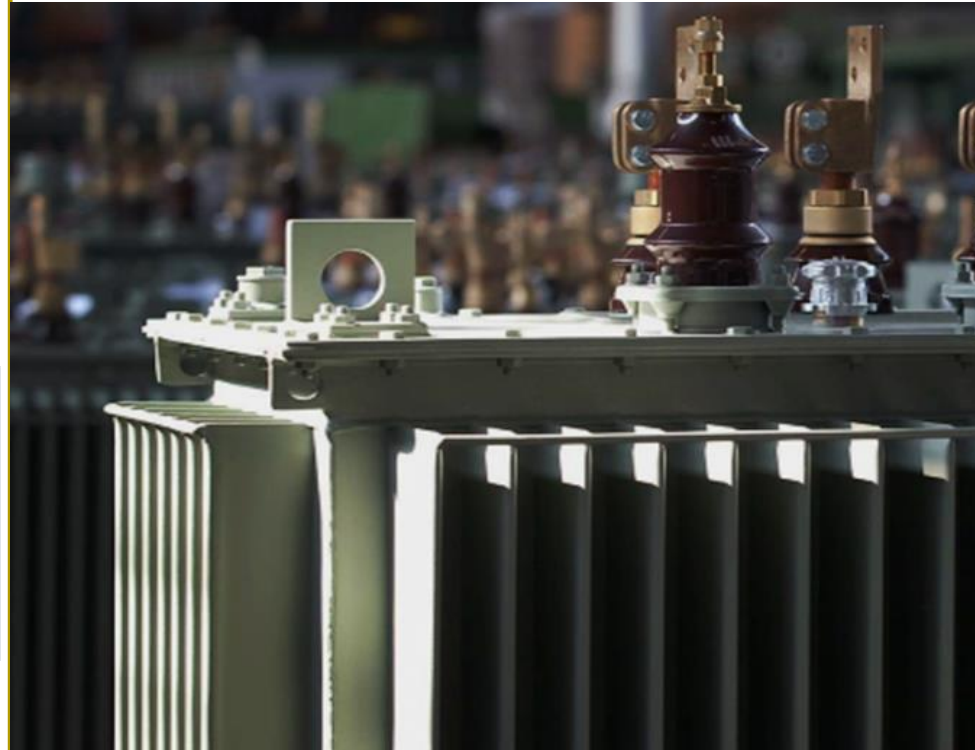
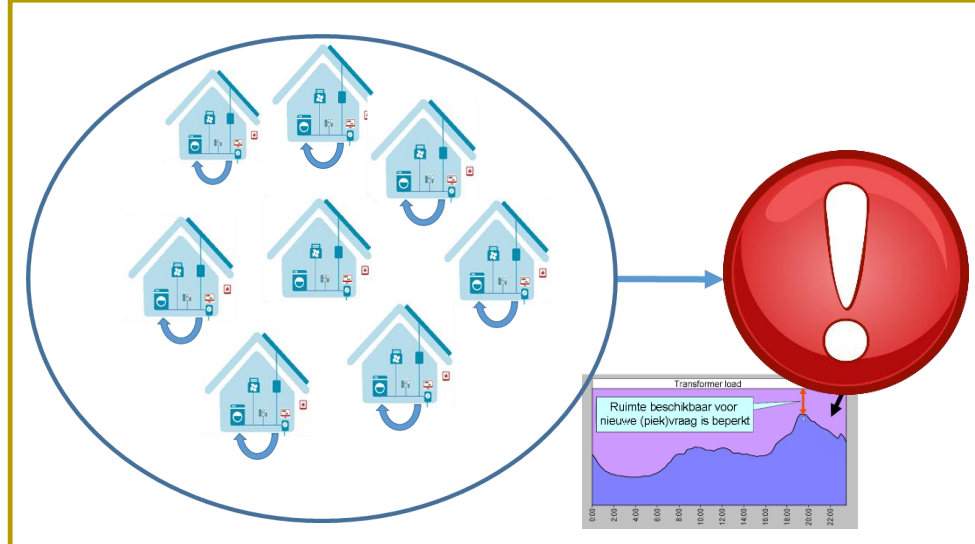
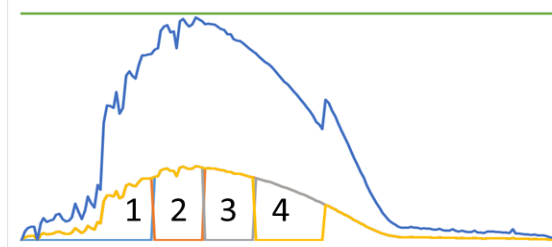
SOLAR PRODUCTION – PEAK LOAD



Solar production of 4 houses exceeds the maximum grid capacity

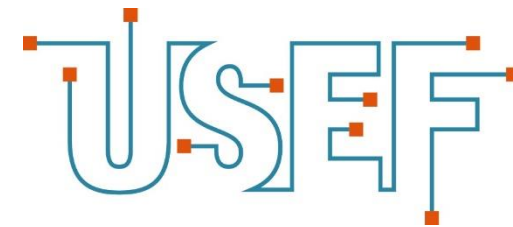
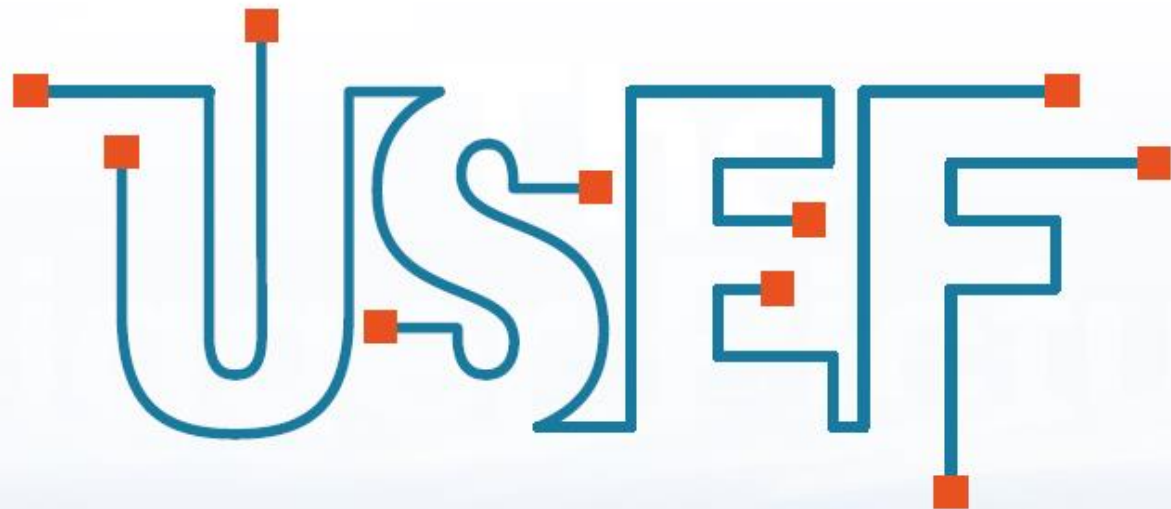
If 4 accu's start charging at the same time the problem won't be solved

The USEF process prognosticizes the solar production over the day and regulates the storage capacity



STEP 2 – GRID INTEGRATION

PEAK CONTROL BY USEF



Contract

Plan

Validate

Realisation

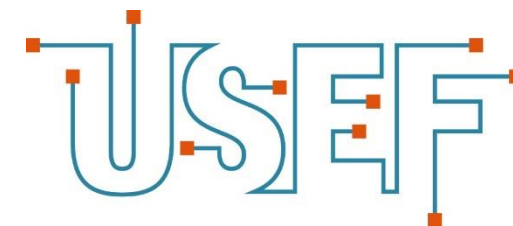
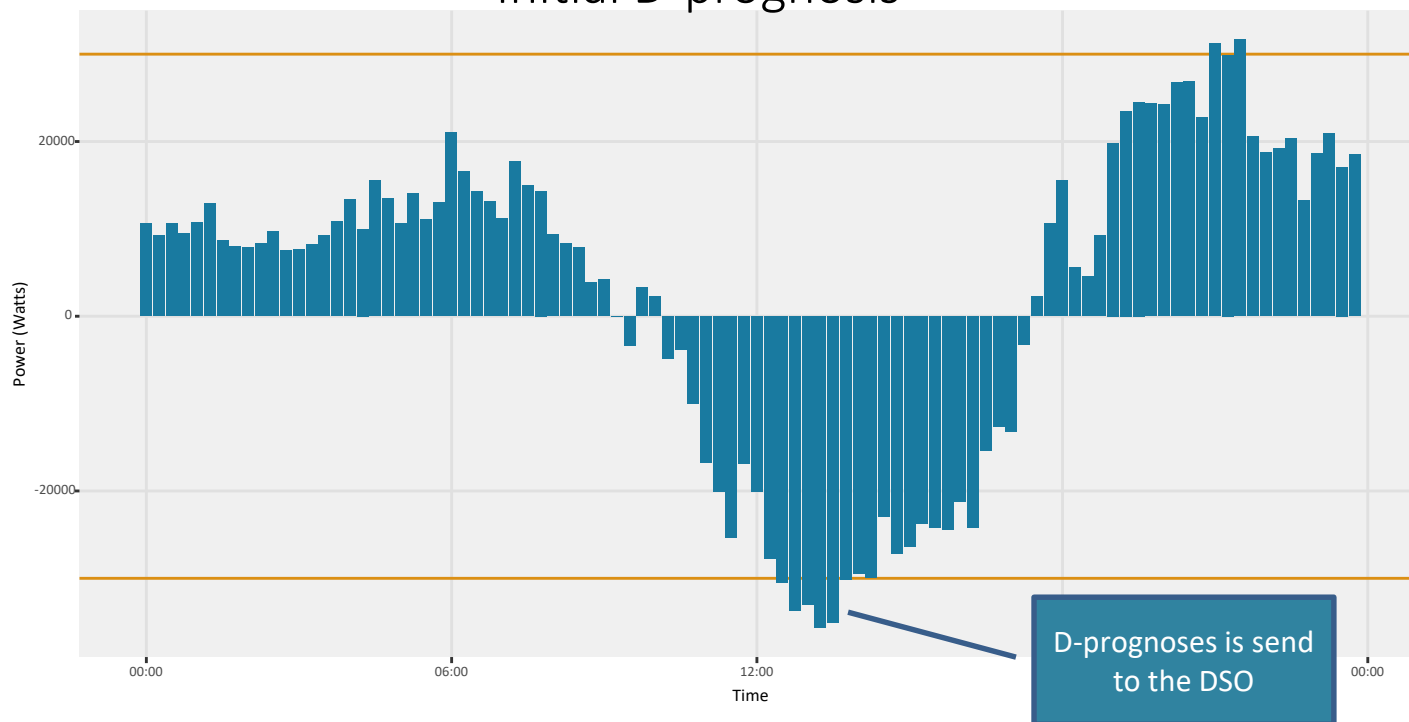
Settlement

STEP 2 – GRID INTEGRATION

PEAK CONTROL BY USEF

USEF proces; proof of principle

Initial D-prognosis



Contract

Plan

Validate

Realisation

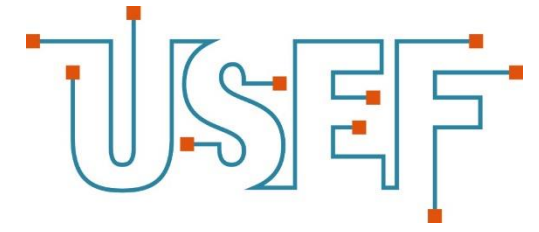
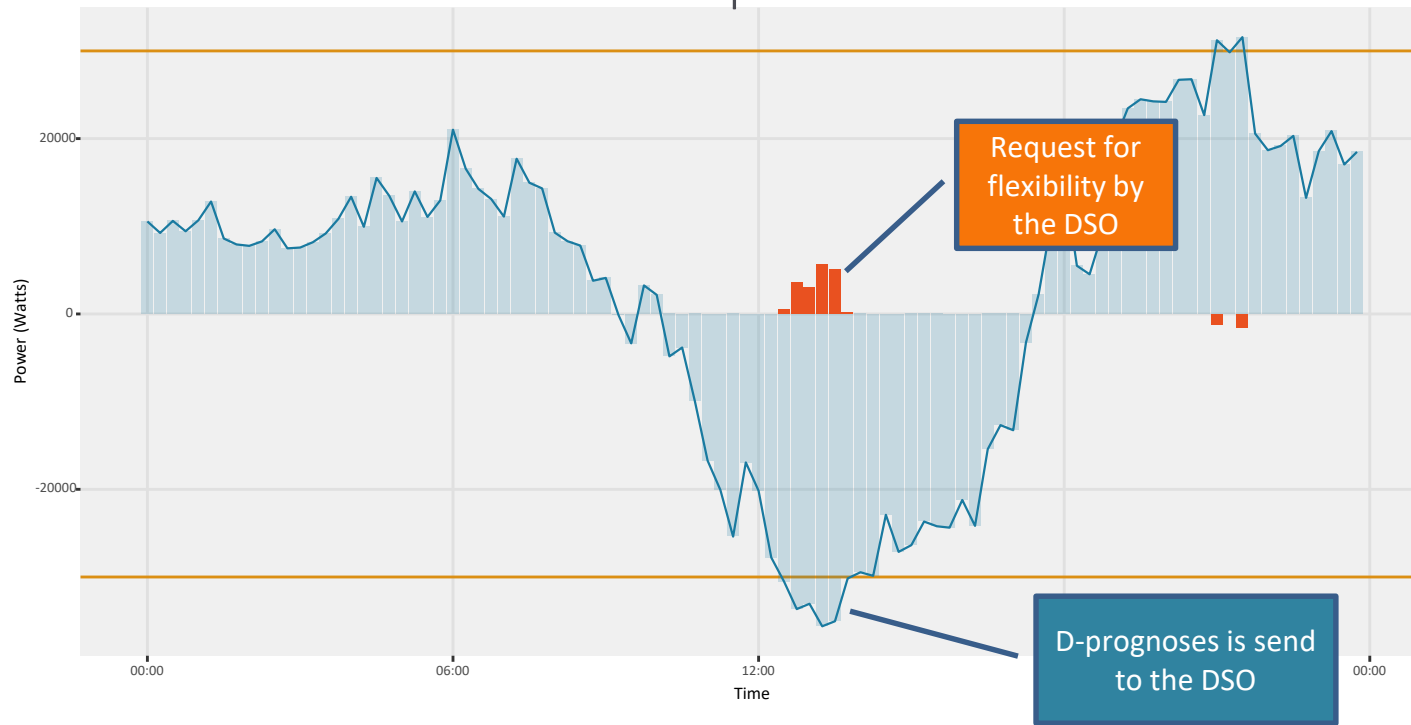
Settlement

STEP 2 – GRID INTEGRATION

PEAK CONTROL BY USEF

USEF proces; proof of principle

FlexRequest



Contract

Plan

Validate

Realisation

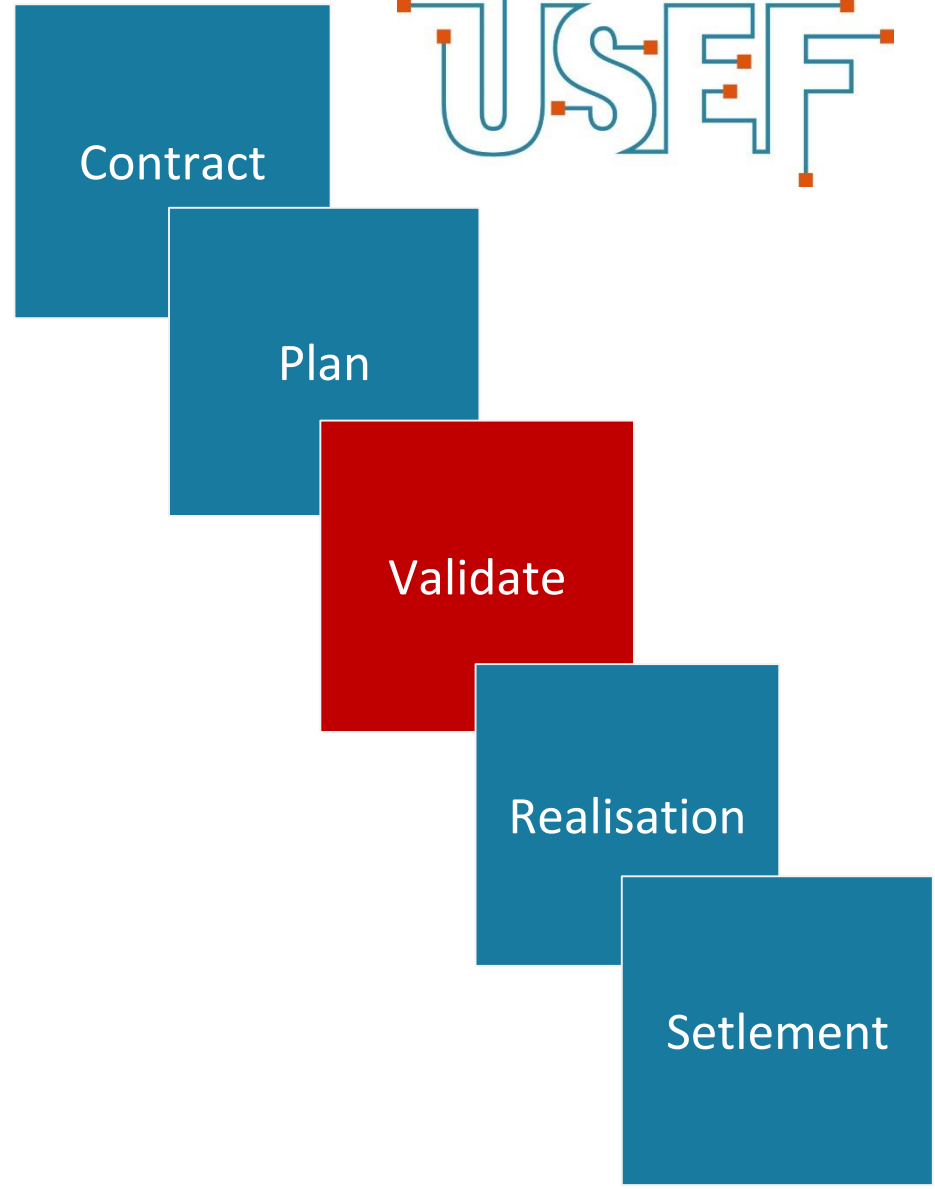
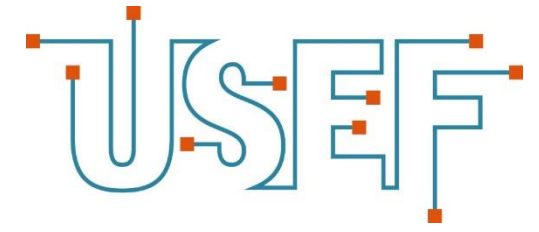
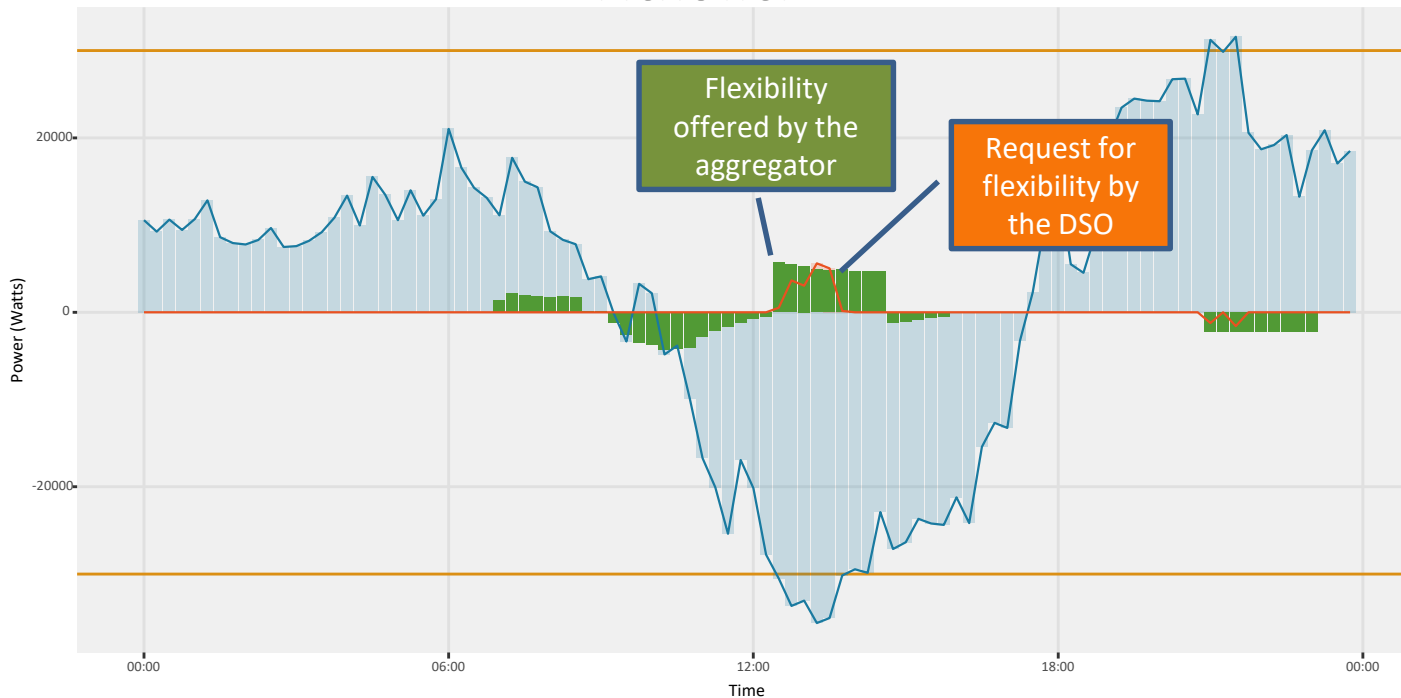
Settlement

STEP 2 – GRID INTEGRATION

PEAK CONTROL BY USEF

USEF proces; proof of principle

FlexOffer

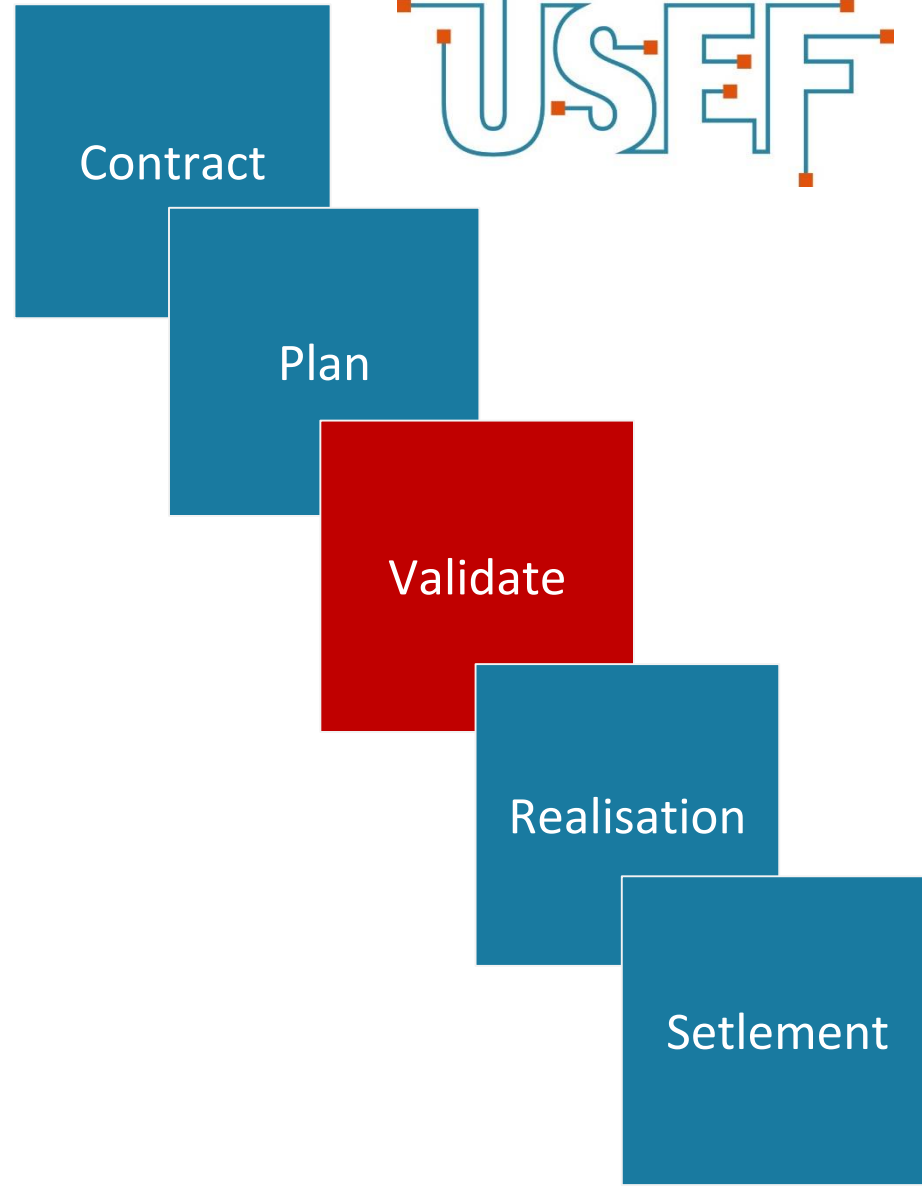
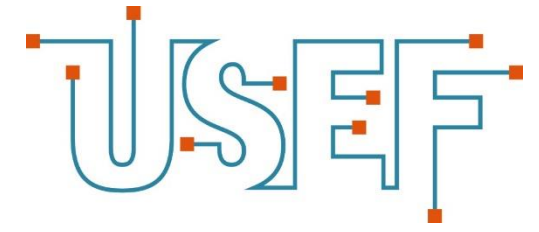
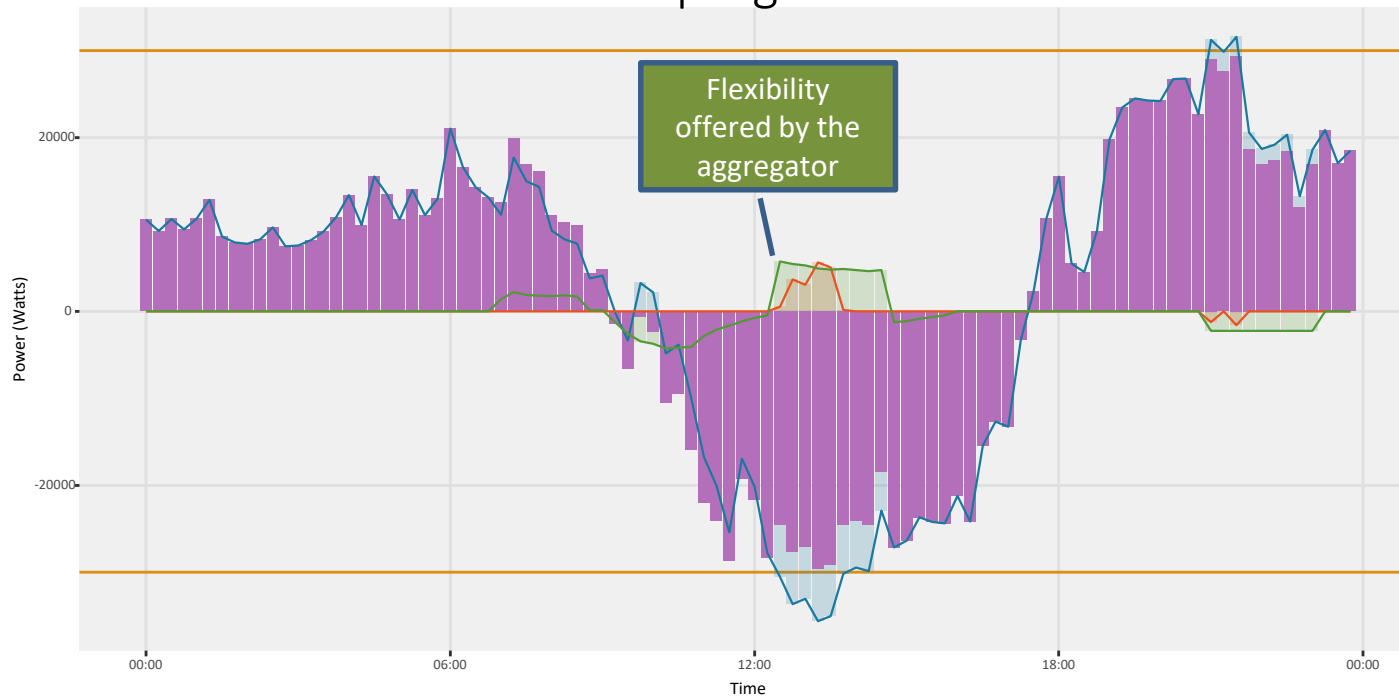


STEP 2 – GRID INTEGRATION

PEAK CONTROL BY USEF

USEF proces; proof of principle

Final D-prognosis

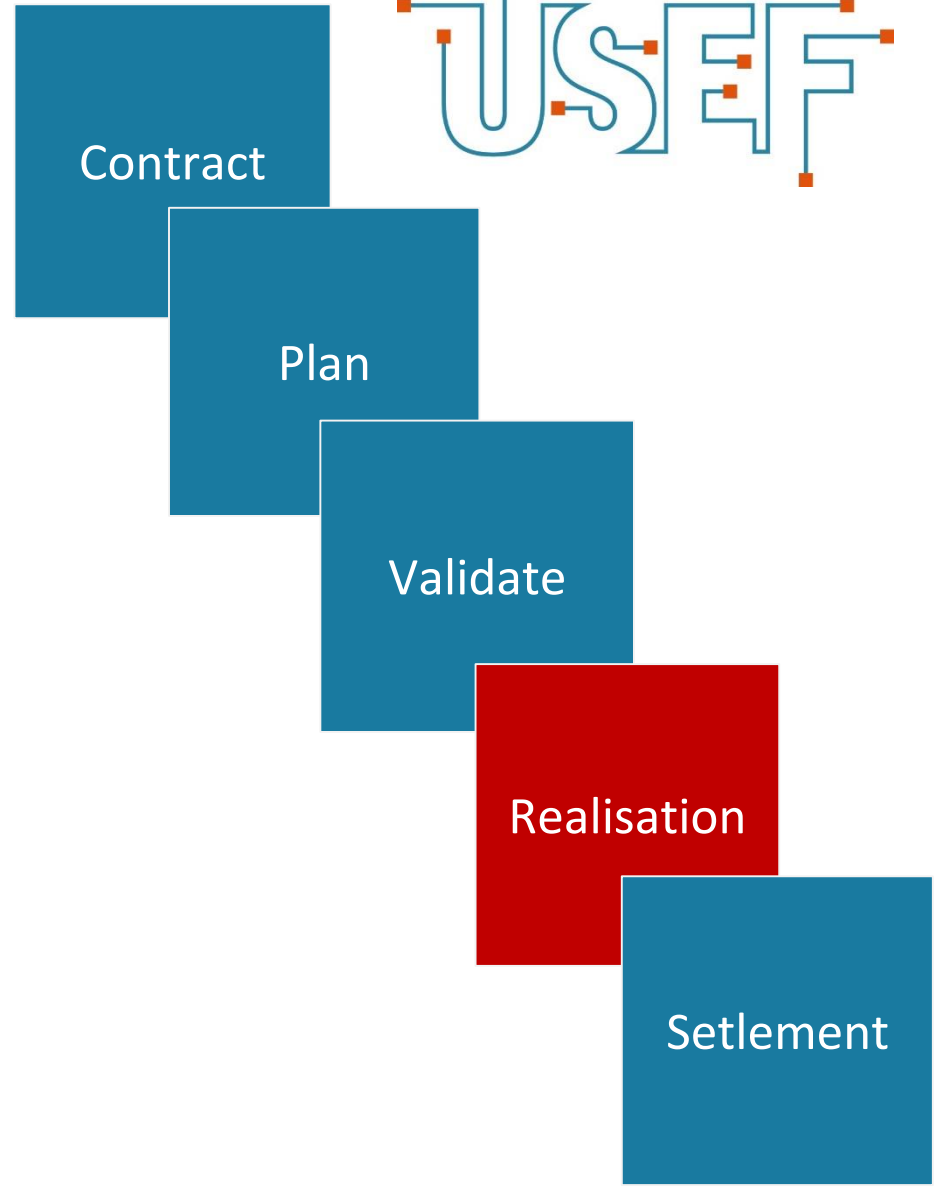
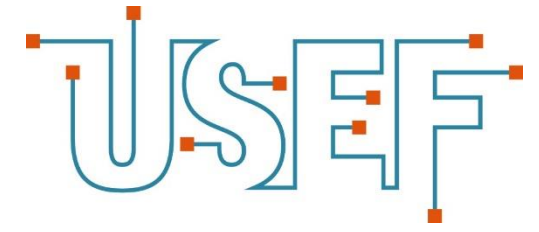
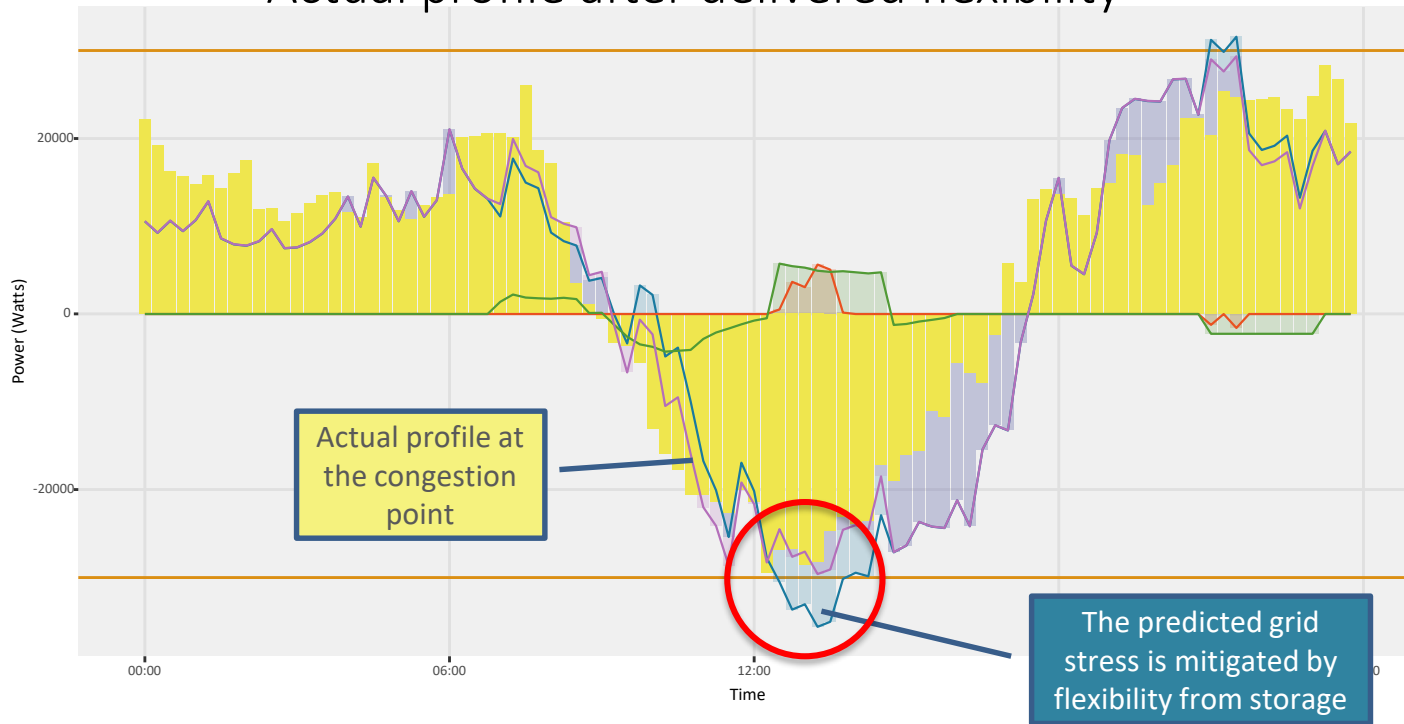


STEP 2 – GRID INTEGRATION

PEAK CONTROL BY USEF

USEF proces; proof of principle

Actual profile after delivered flexibility



STEP 3 – SHARE ELECTRICITY

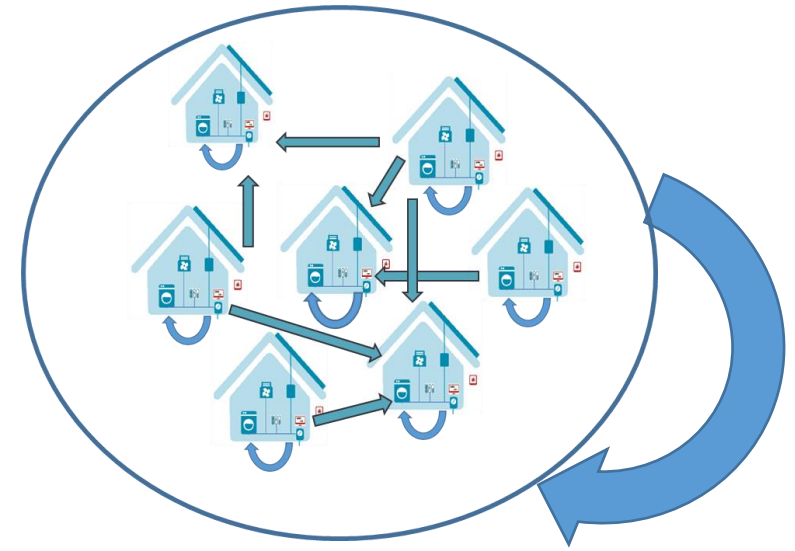
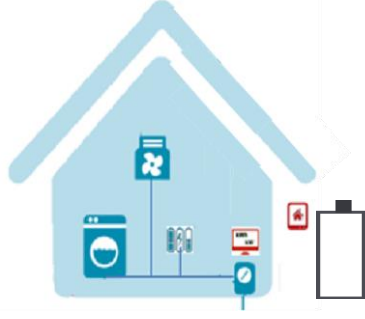
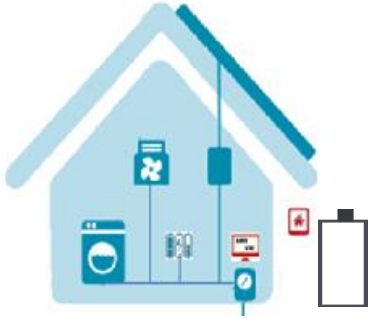
4 TYPE OF HOUSES

✓ Solar panels
✓ Storage

✗ Solar panels
✓ Storage

✓ Solar panels
✗ Storage

✗ Solar panels
✗ Storage



Community



STEP 3 – SHARE ELECTRICITY

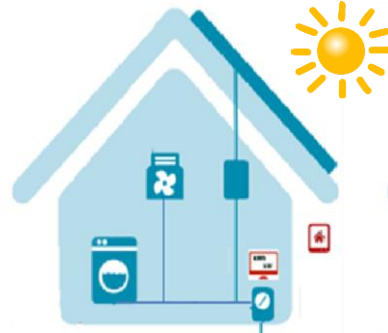
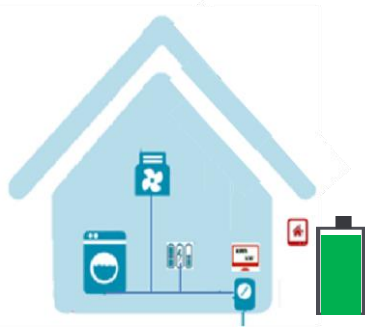
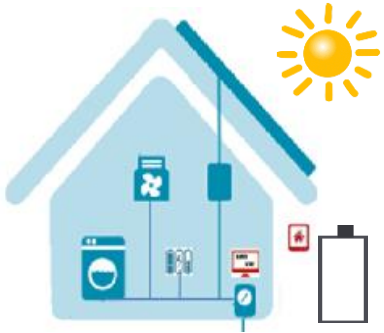
7.00 AM

- ✓ Solar panels
- ✓ Storage

- ✗ Solar panels
- ✓ Storage

- ✓ Solar panels
- ✗ Storage

- ✗ Solar panels
- ✗ Storage

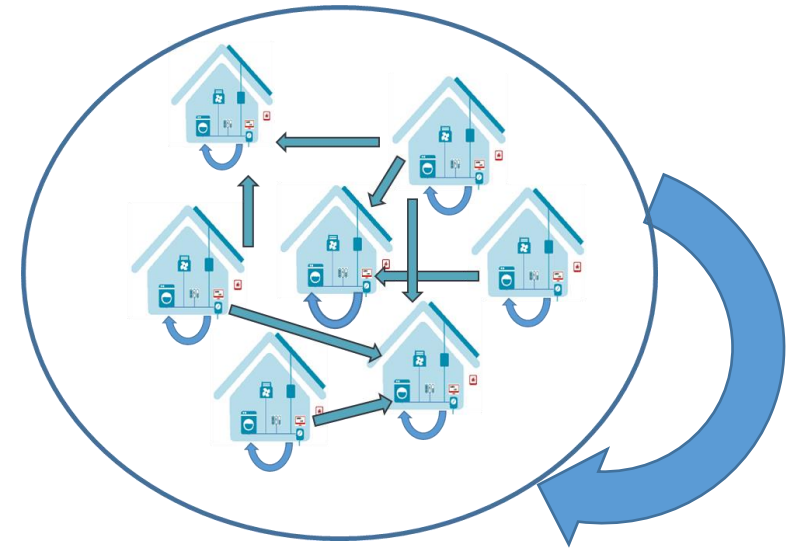


Start to use and store self produced solar energy

Start to use cheap energy stored during night and buy from the grid

Start to use self produced solar energy and feed into the grid

Buy from the grid or **buy from the neighbors with solar panels**



Community



STEP 3 – SHARE ELECTRICITY

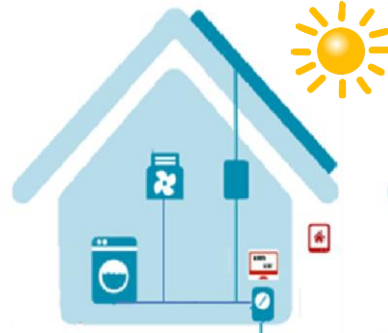
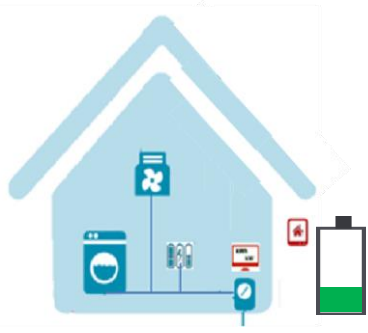
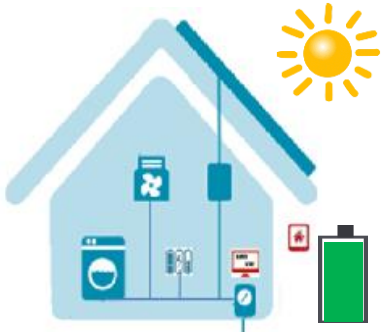
1.00 PM

- ✓ Solar panels
- ✓ Storage

- ✗ Solar panels
- ✓ Storage

- ✓ Solar panels
- ✗ Storage

- ✗ Solar panels
- ✗ Storage

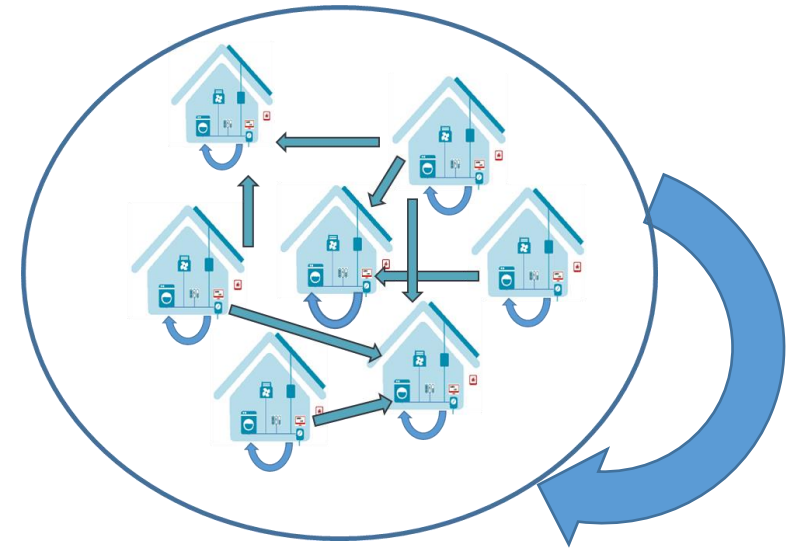


Use self produced solar energy and feed into the grid

Buy from the grid or **buy from the neighbors** for direct use or to store

Start to use self produced solar energy and feed into the grid

Buy from the grid or **buy from the neighbors with solar panels**



Community



STEP 3 – SHARE ELECTRICITY

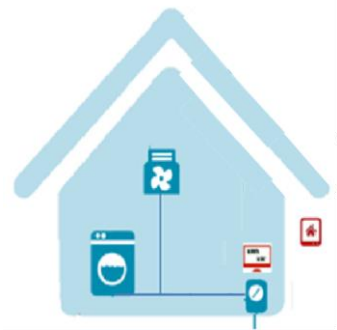
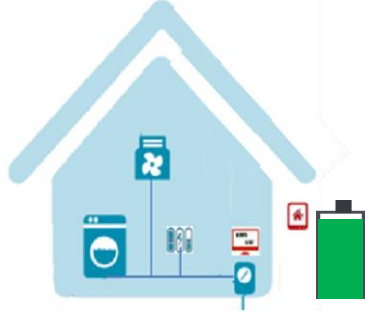
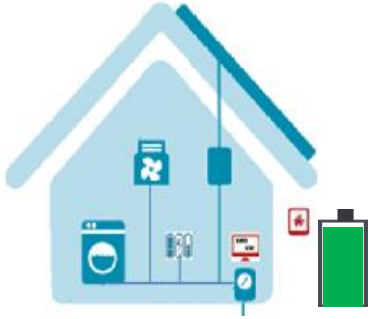
7.00 PM

- ✓ Solar panels
- ✓ Storage

- ✗ Solar panels
- ✓ Storage

- ✓ Solar panels
- ✗ Storage

- ✗ Solar panels
- ✗ Storage

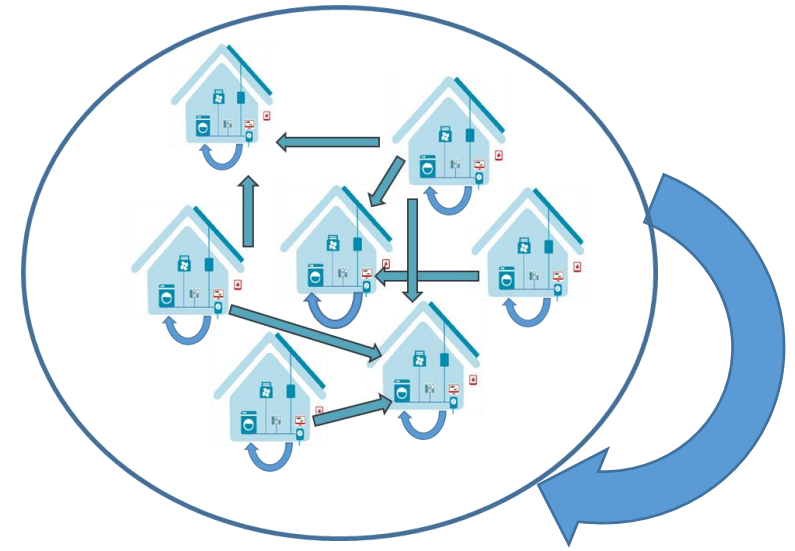


Use stored electricity and buy from the grid

Use stored electricity and buy from the grid

Buy from the grid

Buy from the grid



Community



STEP 3 – SHARE ELECTRICITY

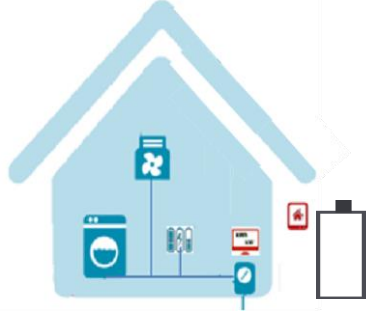
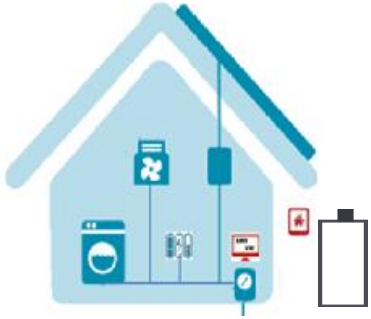
11.00 PM

- ✓ Solar panels
- ✓ Storage

- ✗ Solar panels
- ✓ Storage

- ✓ Solar panels
- ✗ Storage

- ✗ Solar panels
- ✗ Storage

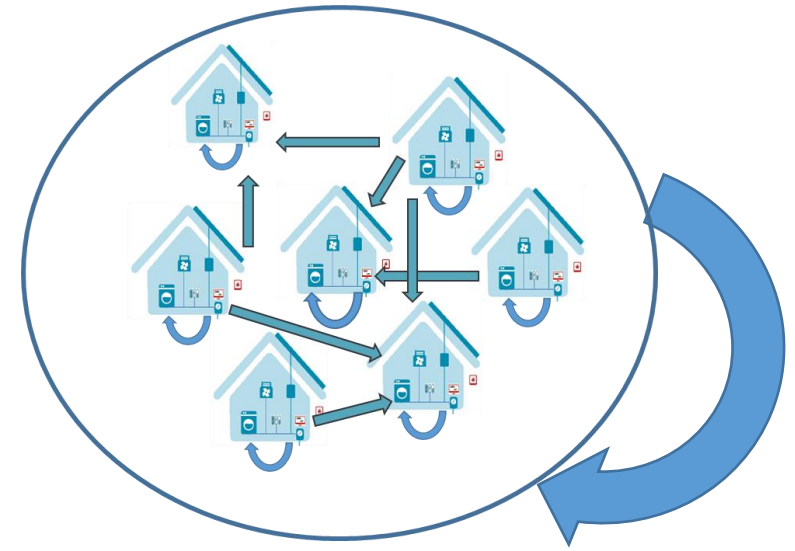


Buy from the grid

Store cheap energy from the grid

Buy from the grid

Buy from the grid



Community



STEP 3 – SHARE ELECTRICITY

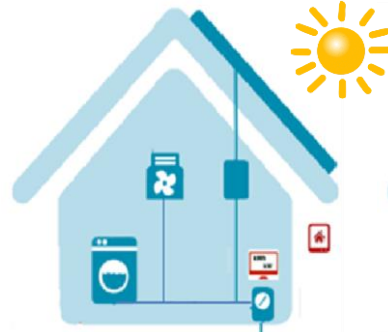
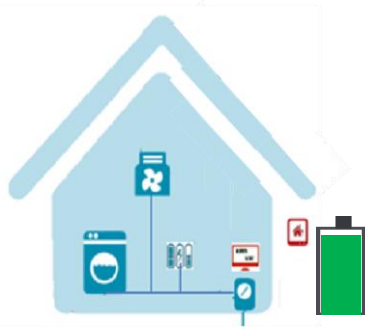
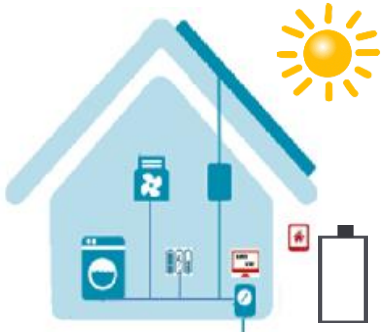
7.00 AM

✓ Solar panels
✓ Storage

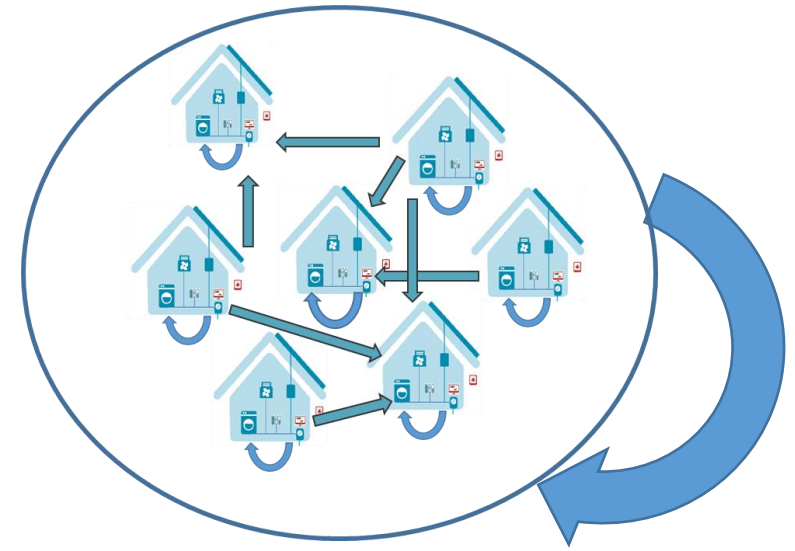
✗ Solar panels
✓ Storage

✓ Solar panels
✗ Storage

✗ Solar panels
✗ Storage



Start new day-cycle

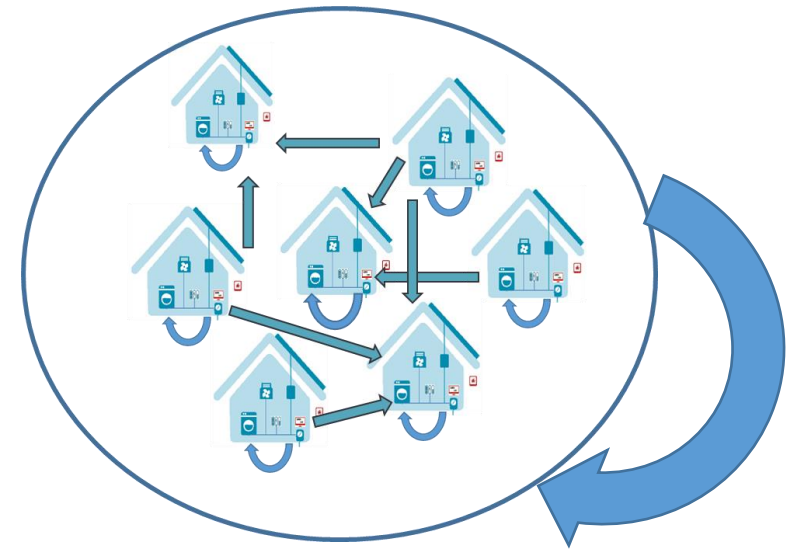


Community



STEP 3 – SHARE ELECTRICITY GETTING STARTED

- Share information about:
 - The results of fase 1 and 2
 - Explain the idea behind step 3
- Start contracting the customers



Community





Learn how to use energy
in a different way



Optimize new load and
solar energy in the grid



Create a micro grid in
a local energy market



STEDIN.NET

FOR THE NEW
ENERGY GENERATION