SMI

Smart Meter Inclusif

SUSTAINABLE PLACES 2021

Sep. 28 - Oct. 1, 2021 | Rome, Italy

SMI – Smart Meter Inclusive

www.smi.uha.fr

INTERREG V (September 2019)

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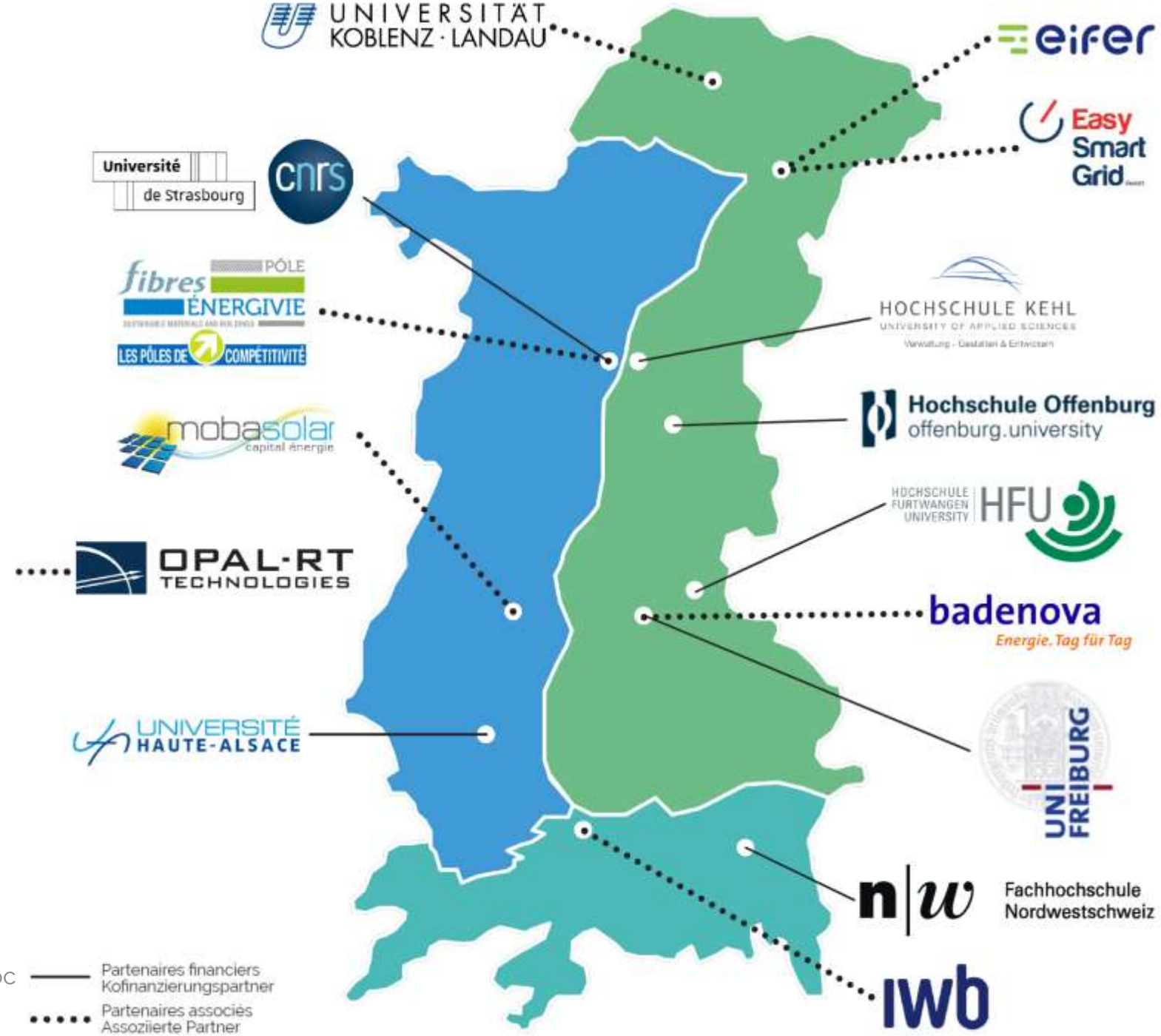
Fonds Européen de Développement Régional (FEDER)
Europäischer Fonds für Regionale Entwicklung (EFRE)

Dépasser les frontières : projet après projet
Der Oberrhein wächst zusammen, mit jedem Projekt



SMI
Smart Meter Inclusif

15 partners
~ 2 million €

SMI Project Kick-Off Meeting
Mulhouse, Octobre 2019

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Background of the project

- "**If you cannot measure it, you cannot improve it**."

  This common management saying also holds true for the area energy efficiency. Without a clear understanding of their energy usage, consumers are unable to take steps to reduce their consumption.

- The project is multidisciplinary and addresses the following aspects:
  - Social,
  - legal,
  - environmental,
  - technical.

Objectives

- **Mapping smart meters and their types** *in order to have a clear and precise understanding of the existing potential in the Upper Rhine.*

- **Undertake a general public survey to understand what are the barriers for smart meter deployment**, *how they are being accepted in society and what main features are required for an AI-enabled meter.*

- **Design a new AI-enabled and secure smart meter** *that will enhance our understanding of how energy consumers in Upper Rhein consume energy and empower these consumers to take action to reduce energy costs and emissions.*

- **Improve the security level of the smart meter**.

- **Modification and harmonization of the current legal framework for smart meters** *for a compatible cross-sectoral legal framework.*

- **The elaboration of a white paper in 3 languages (French, German and English)** *about Smart Meters, showing beyond the state of the art also the prospects for future development.*

Research Questions and Challenges

❑ *Advanced Power Meters (called "smart meters"):*

- ✓ *Real-time consumption display*
- ✓ *Energy Saving (around 15%)*
- ✓ *Demand Side Management*

- x *No automatic data processing for decision making*

❑ **Smart Meter Inclusif (SMI)**

- ✓ **Linking artificial intelligence and micro-societal analysis for decision making**
- ✓ **Design a laboratory prototype that will communicate with power meters of utility companies**

Research Questions and Challenges

❑ **Monitoring Energy Consumption**

✓ Needs clear understanding of the energy usage and activity

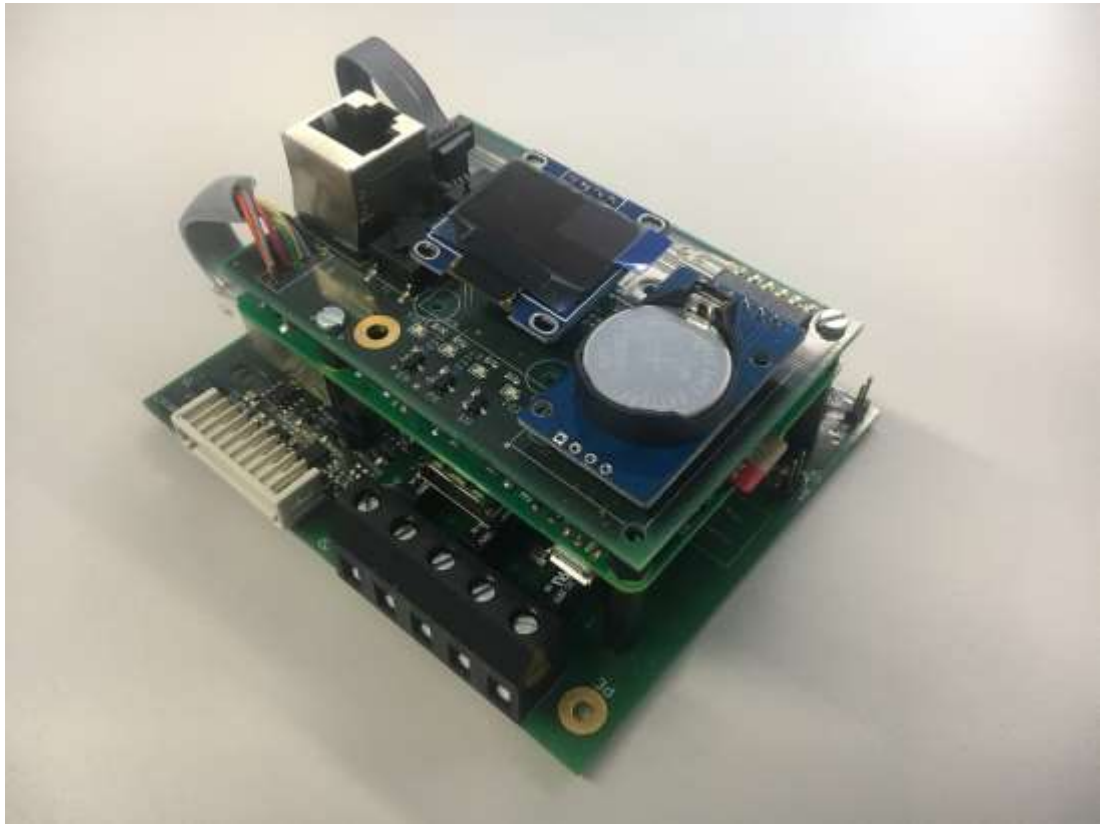
the 1st step of the AI-enabled smart meter

SMI : The idea of NILM (Non Intrusive Load Monitoring)

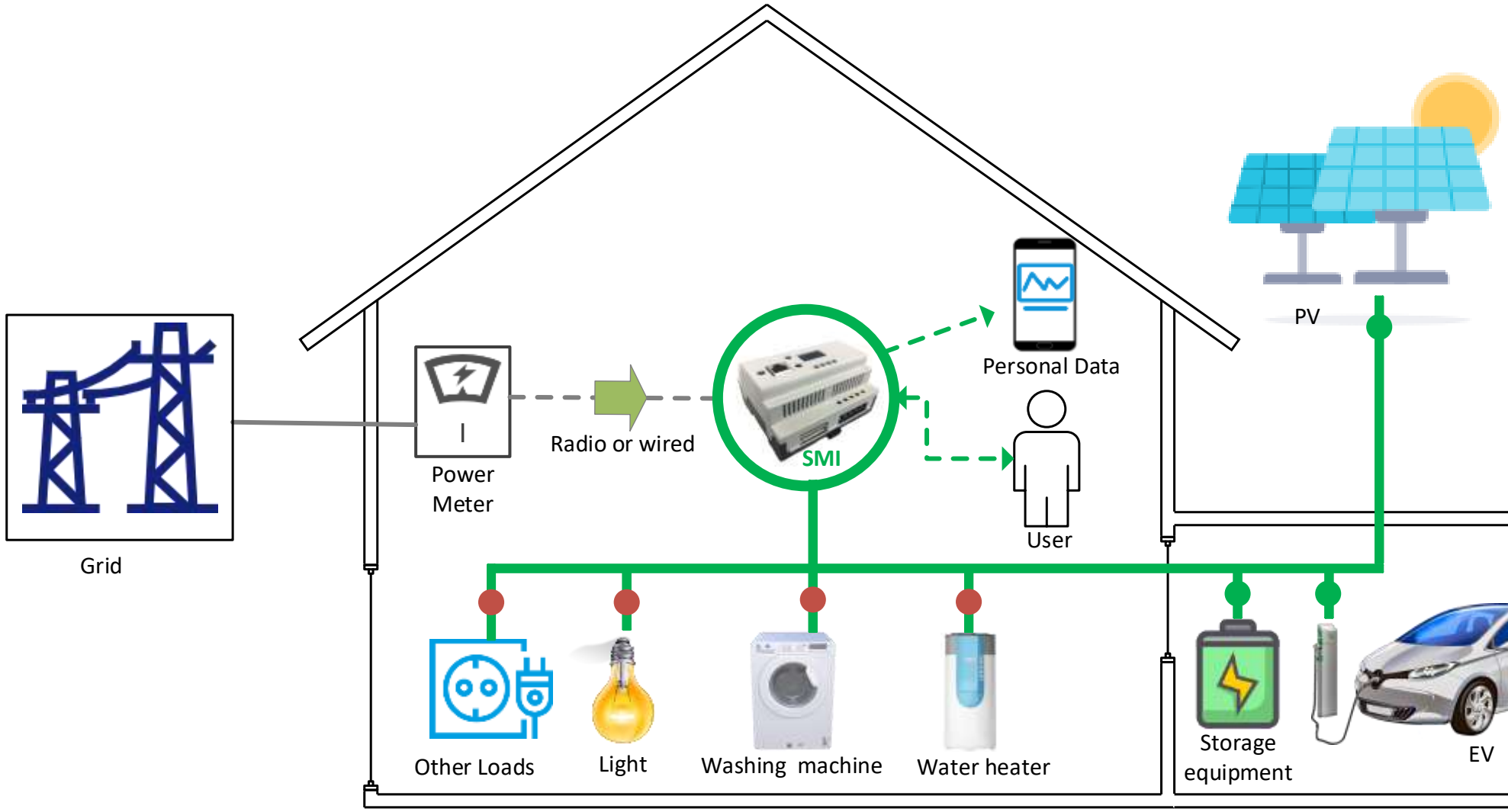
Analogy of NILM

White light decomposition through a prism

SMI Prototype (AI-enabled smart meter)



SMI in Household (Prosumer)



- Read the power meter data
- Disaggregate and control loads (NILM)
- Control PV, Batteries and EV by prediction of the production and consumption
- Improve Self consumption
- Demand Side Management

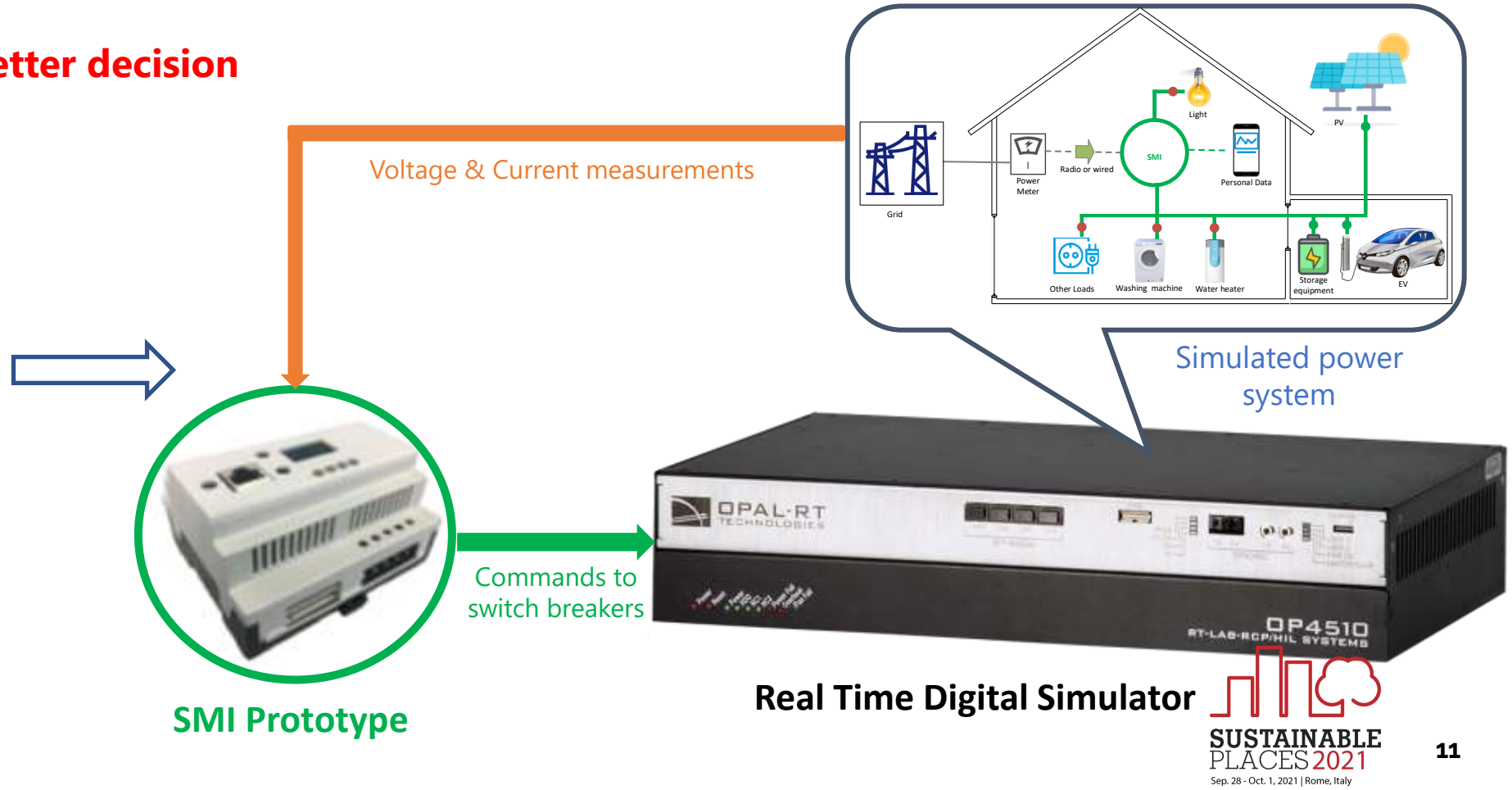
- Learning from the user's habits
- Displays the data (personal)

SMI Learning by HIL (Hardware In-the-Loop)

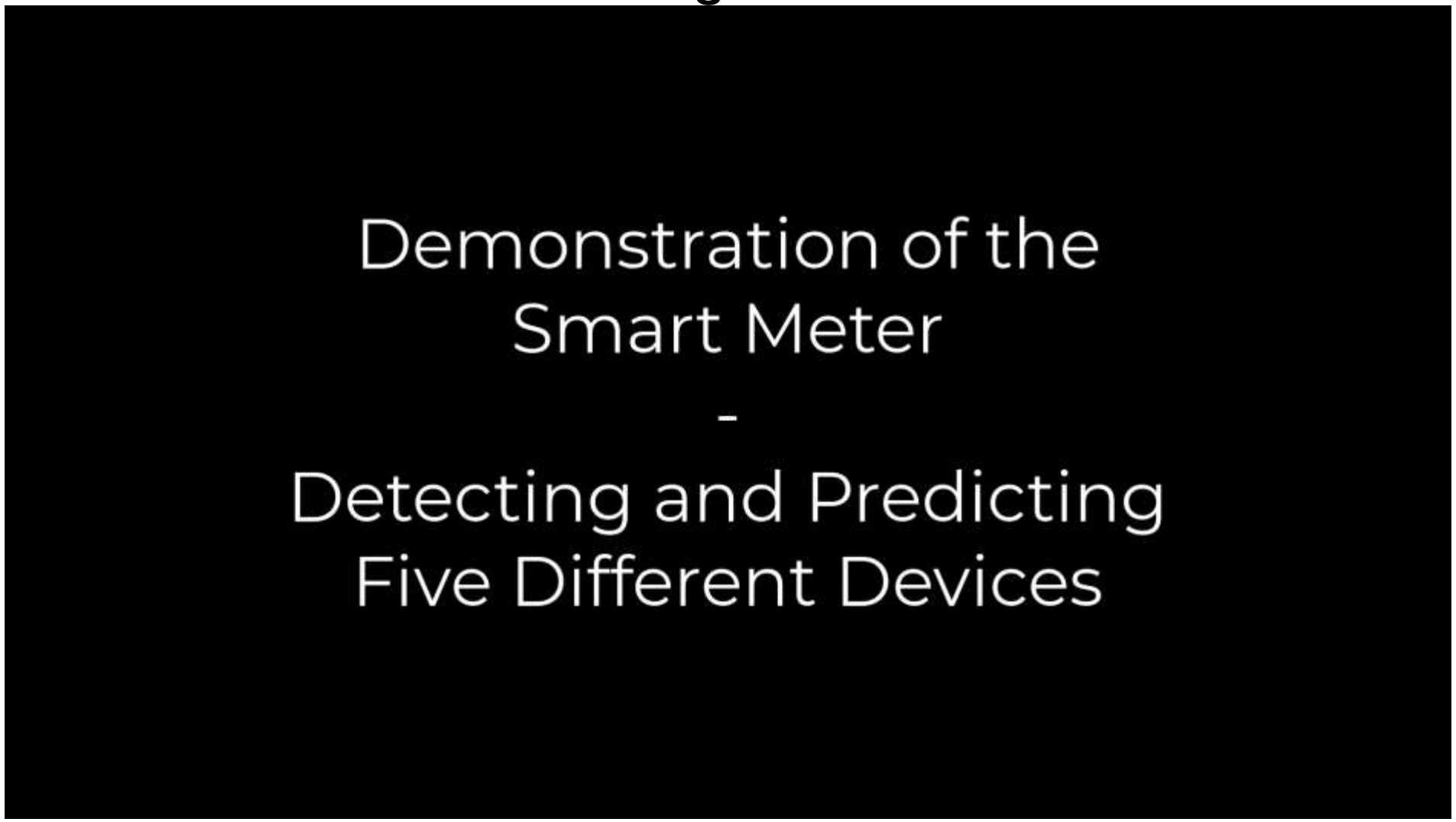
Google's Chief Scientist Peter Norvig (2011) says:
"We don't have better algorithms than anyone else; we just have more data,"

AI needs a big data for better decision making

- Build the household in HIL
- Create several scenarios
- Build data base
- Perform tests safely
- Test final AI algorithm in easier conditions



SMI NILM demonstrator: 5 single devices



SMI project was invited for general presentations in:

- Virtual Event on Artifical Intelligence in France, organised by BADEN-WÜRTTEMBERG INTERNATIONAL Agency für International Economic and Scientific Cooperation (March 2021)

- 360 Grand Est (Grand Est Region Event) : SmartGrids put digital intelligence at the service of optimized energy management (December 2020)

- Visit of State Secretary Dr. Andre Baumann, the representative of the State of Baden-Württemberg to the Federal Government and State Secretary at the Ministry of State in Stuttgart since February 2020, at Eucor - The European Campus (University of Freiburg) (August 2020)

Thank you

Fonds européen de développement régional (FEDER)
Europäischer Fonds für regionale Entwicklung (EFRE)

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

BASEL LANDSCHAFT

Kanton Basel-Stadt

KANTON AARGAU