



Work-in-progress

DREAM KPIs overview

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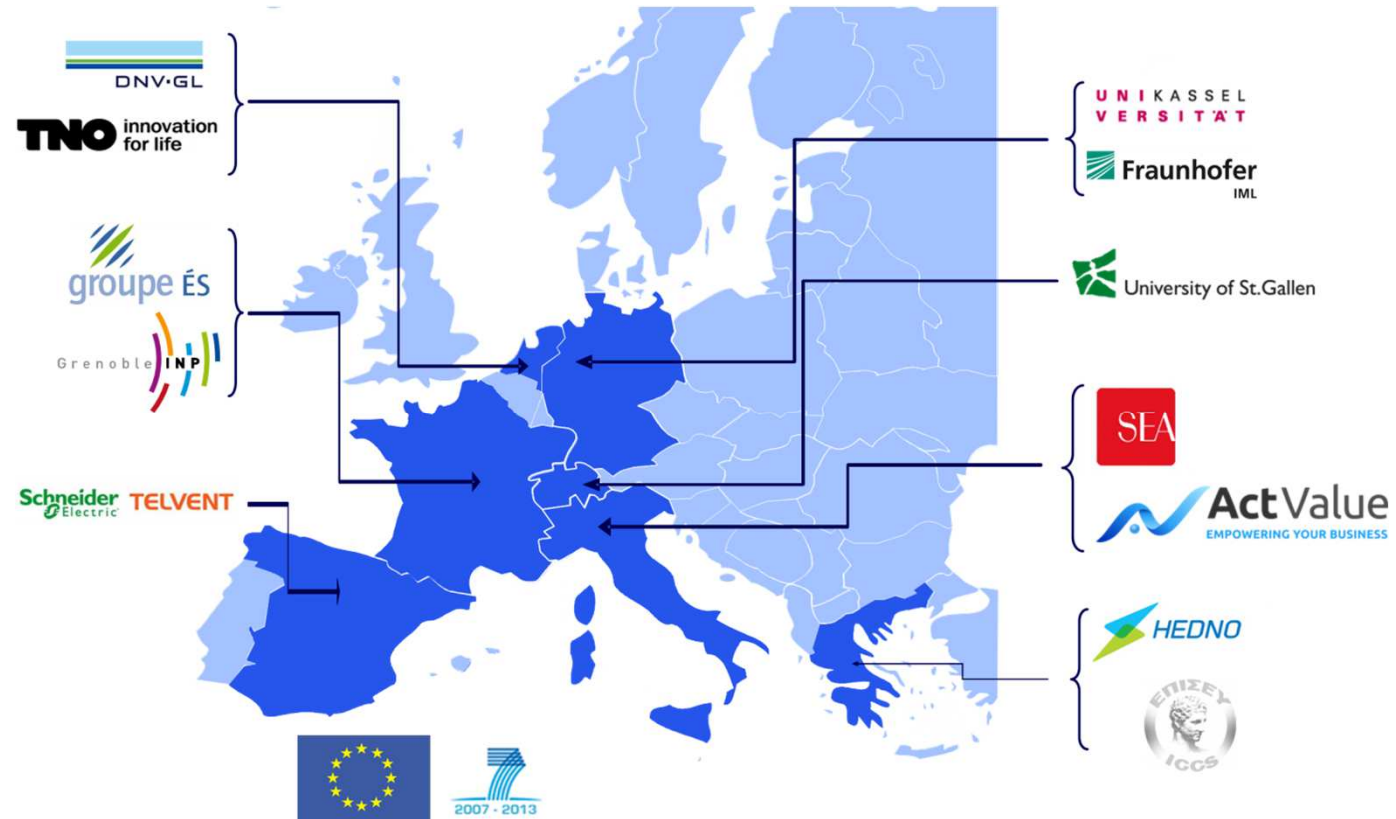
DREAM consortium

12 partners

7 countries

36 months
(9/2013-8/2016)

3 types of players
(DSOs, manufacturers,
R&D centers)



The DREAM project aims to **build** and **demonstrate** an industry-quality reference solution for **DER aggregation-level control and coordination**, based on commonly available ICT components, standards, and platforms **for all actors** (DER owners, grid operators, etc...) of the Smart Grids.

DREAM develops new algorithms for heterarchical grid management and implements them in the field

Smart Grid Drivers

- Market-based approach for flexibilities at distribution level needed
- Novel, robust, and economical solutions

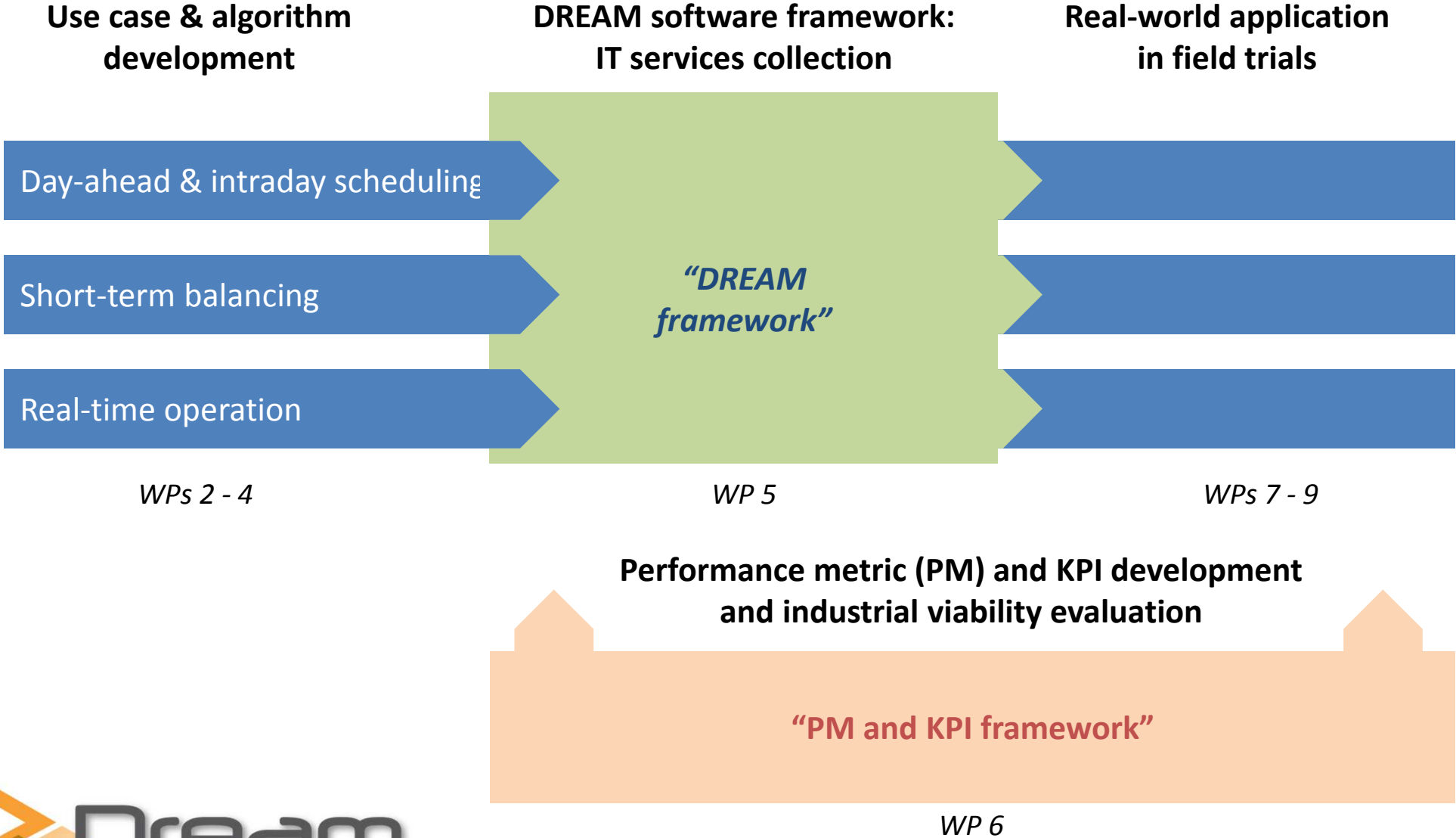
DREAM Concepts

- Autonomous, agent-based system („heterarchical management“)
- Works with different grid operation modes

DREAM Benefits

- Allow larger amounts of DER with minimum structural investments
- Tested hardware and software

We test and evaluate the DREAM framework and the field trial applications with a KPI-based approach

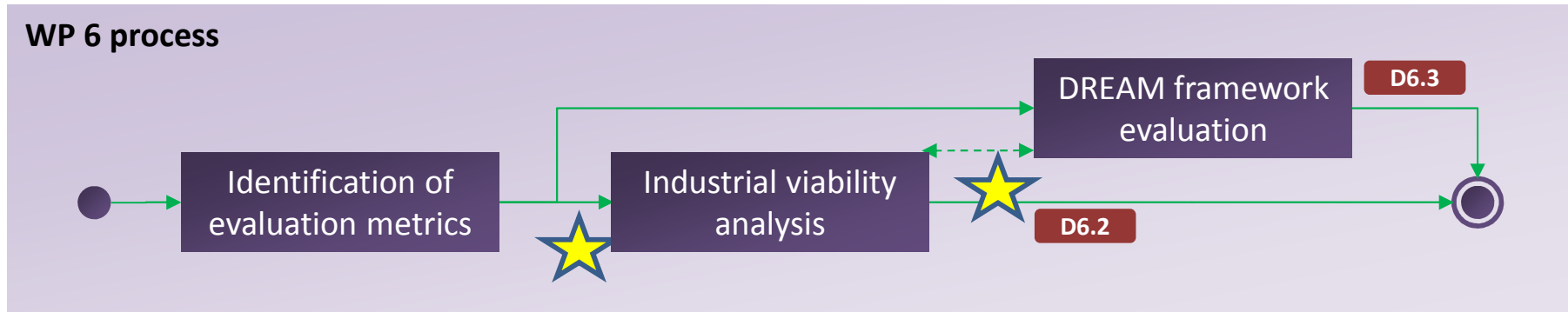




KPIs in DREAM



KPIs in DREAM help to define objectives for the solutions and to measure their success



ISO/IEC/IEEE
29119 (2013)

We need KPIs as an objective and predefined evaluation tool

- Input for test execution
- Standardize and normalize test outputs

How to get exportable, comparable and industry relevant results?

DREAM goals = same EEGI KPIs goals plus more actor-specific (mainly DSO)

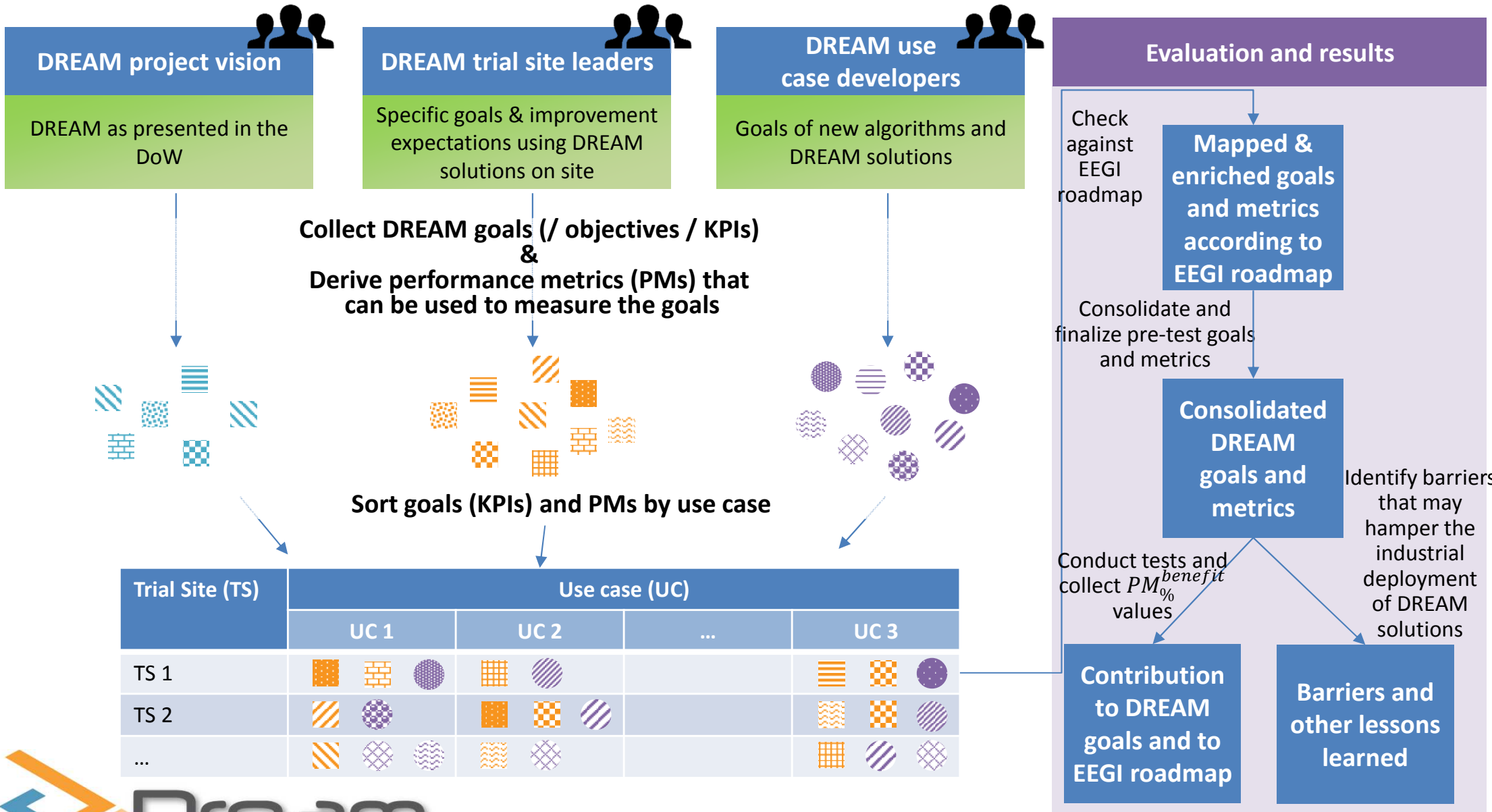
- “Smartness” of the grid → “DREAM works”
- Economic interests → “DREAM is worth the effort”
- Asset life management
- Market competitiveness



DREAM - EEGI



The DREAM evaluation roadmap uses internal goals and reference sources for KPIs



DREAM builds on the EEGI KPIs and extends them

EEGI Lvl 2 KPIs

(DREAM additions in blue font)

Enable...

B.1 Increased RES and DER hosting capacity

B.2 Reduced energy curtailment

B.3 Power quality and quality of supply

B.4 Reduced total costs of future grid investments and extended asset life time

B.5 Increased flexibility from energy players for diverse grid levels /situations

B.6 Improved competitiveness & efficiency of el. market and its players

B.7 Non intrusiveness for DSO operations

General, overarching DREAM project goals

D_g.1 Allow larger amounts of DER that enable the grid to constantly adjust to operational conditions and make it robust to external disturbances

D_g.2 Enable distributed intelligence with limited structural modifications

D_g.3 Make flexibility from grid reconfiguration and from consumers usable

D_g.4 Support changing DSO role to market enabler / facilitator + market participant

Trial-site specific goals (summary)

DREAM as decision-support tool for fewer grid reinforcements

Flexibility for real-time congestion management / grid contingencies on LV and MV levels

Flexibility from loads and the network („self-healing“)

Flexibility for frequency regulation

Flexibility offerable on day-ahead markets

Efficiency improvements for the daily operating distribution network topology





Challenges and lessons learned



Challenges and lessons learned from the DREAM KPI approach (project still ongoing)

Approach- & content-related challenges

- How to choose between two possible approaches for KPI development:
 - 1) begin with use case goals (=university partners), then move to trial sites/demo site goals (implementation partners)
 - 2) the other way around: begin with trial sites/demo site goals and develop KPIs and use case solutions accordingly?
- At the beginning of research-driven projects, not all information about the final use cases tested in trials is available
 - Use cases naturally evolve after closer interaction with the trial sites
 - KPIs thus difficult to be planned early in a one-time effort
- Demo site leaders have difficulties specifying what they want to achieve / what they need, especially early on in the project

Other organizational challenges

- How to engage stakeholders to contribute to the KPI definition process: For both developers and trial site owners, other things often have a higher priority!

Best practices and solutions

- Use both approaches in an iterative process:
 - 1st: use-case oriented KPI determination;
 - 2nd: trial-site oriented KPI determination
 - discuss and repeat these two iteratively.
 - Only then you can ensure getting a complete KPI list that emerges with the project
- Especially later on in the project: discuss goals and KPIs in one-on-one sessions per demo site (moderated by KPI development leaders)
 - Often more effective than meetings across use cases
 - Then check across cases and harmonize
- Propose a good set to start with from a reference list → many similar KPIs exist across projects!

Thank you

