FEDERAZIONE NAZIONALE IMPRESE ELETTROTECNICHE ED ELETTRONICHE

CONFINDUSTRIA

mostra convegno expocomfort
13-16 Marzo / March 2018 | Fiera Milano

THAT'S SMART

Case History: il progetto EnergyKeeper

Michele Liziero

Delegato ANIE Rinnovabili

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ENERGY KEEPER

EnergyKeeper – Keep the Energy at the right place!

www.energykeeper.eu

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Partners

Energy Team SPA - Sistema di monitoraggio e controllo smart grid

Jena Batteries - Large-scale, organic redox-flow-battery (100 kW – 350 kWh)

PISGA software - Central Grid Control System (CGCS)

ECN - Sviluppo membrana batteria e integrazione di sistema

LEI - Coordinatore, dissemination, business models

Inspiralia - Ingegnerizzazione, dissemination

LEITAT - Sviluppo organic redox pairs

WUR -Test site @ ACCRES, Olanda

ICM - System integrator

Litgrid – Project Advice

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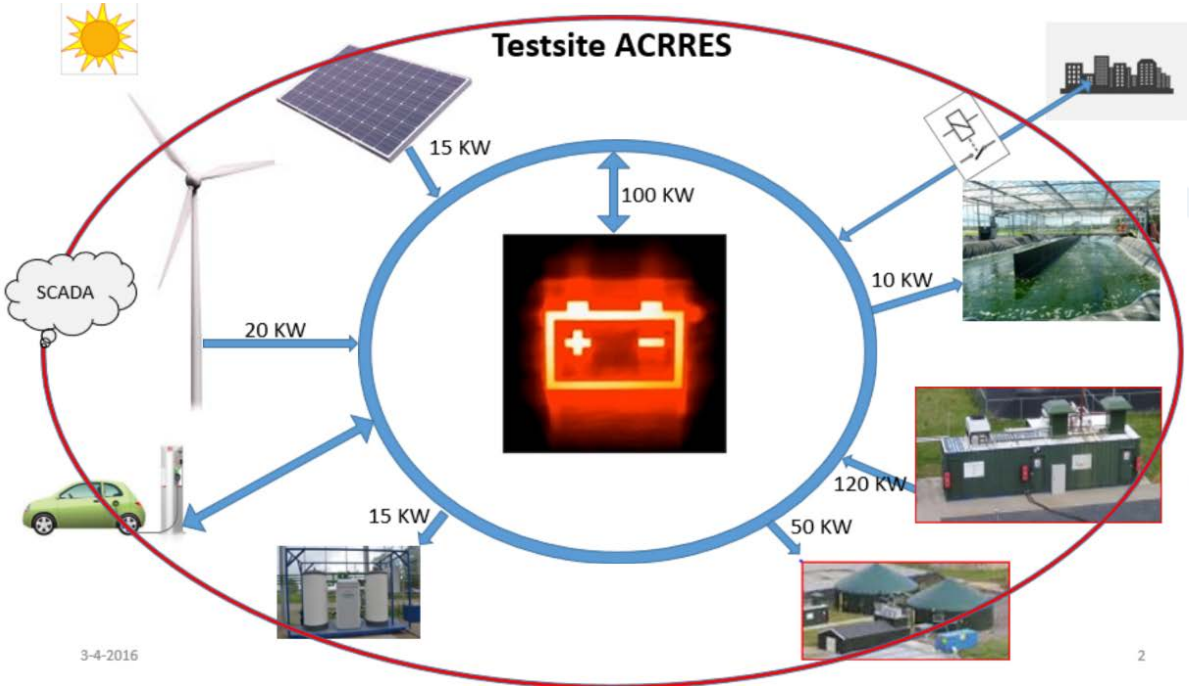
Project Overall



- Test della batteria innovativa e del BMS
- Sviluppo grid control e communication layer (architettura di comunicazione, demand side management
- Sviluppo di prosumer business model

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Test site

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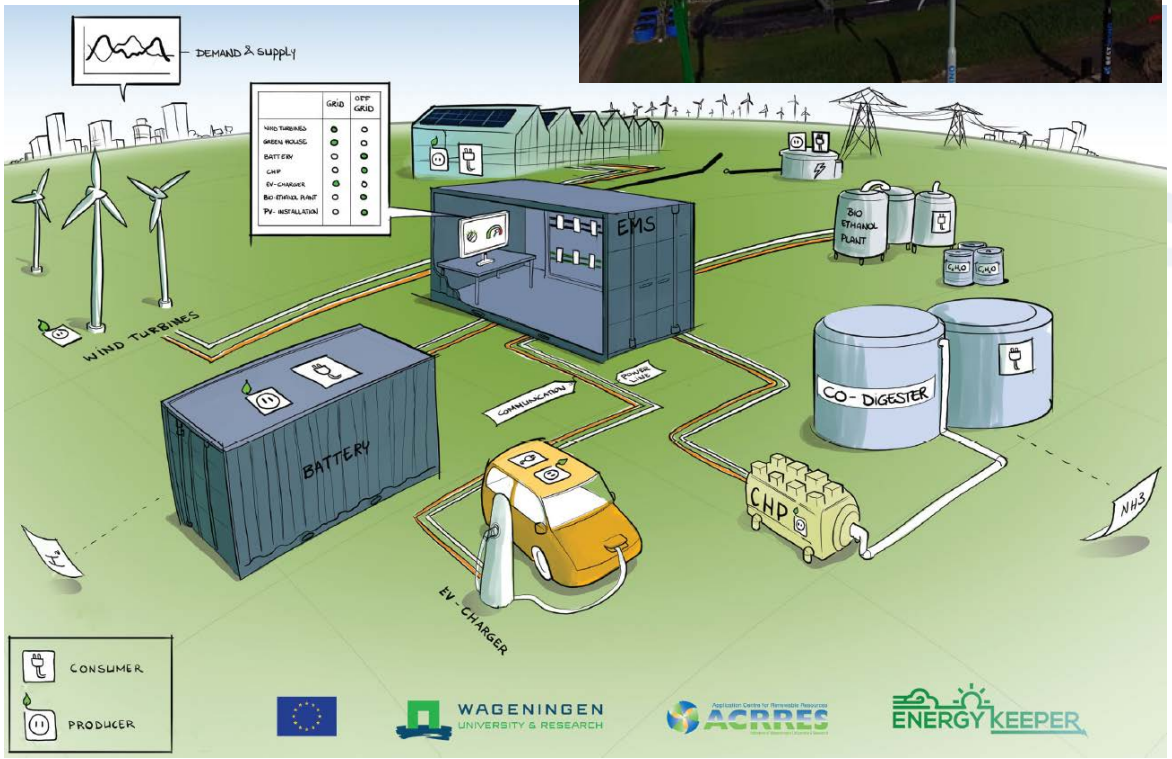

ACCRES test site:

- 3 turbine eoliche da 30 kW
- 1 FV da 15 kW
- EV charger
- Cogeneratore biogas 150 kWe 250 kWth
- Digestore Biogas
- Impianto a bioetanolo
- …

Il sito ha lo scopo di testare tecnologie innovative

Può funzionare sia off grid che grid connected, permette test quali variazione frequenza di griglia, black start, etc.

ENERGY KEEPER

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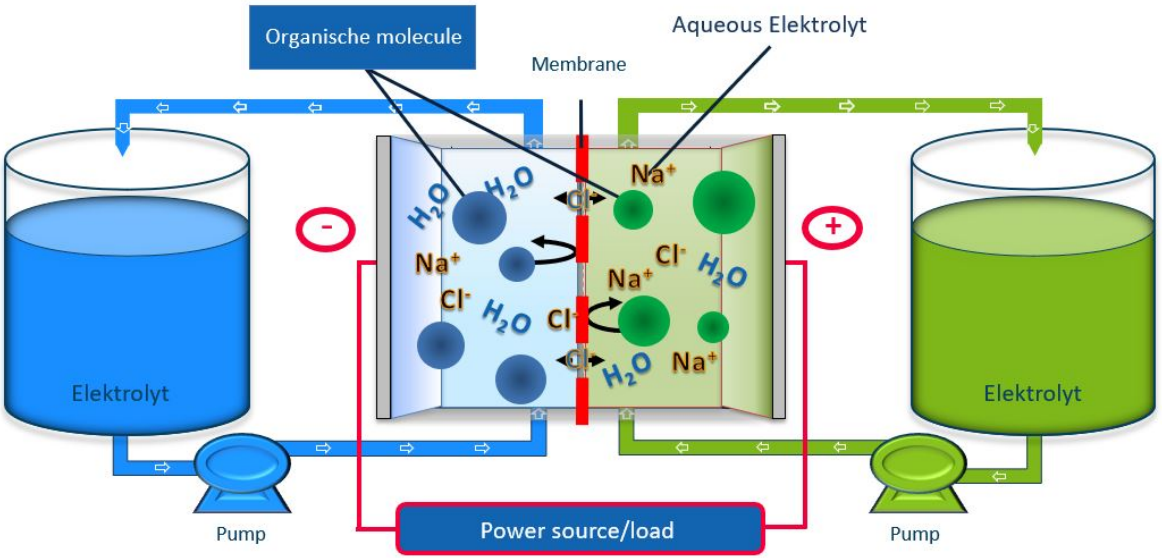
Batteria



Obiettivo progetto

- Ingegnerizzazione batteria industriale 100 kW – 350 kWh

Vantaggi

- Basso costo (target 100 € / kWh)
- Soluzione salina e organica
- Nessun uso di metalli pesanti, basso impatto ambientale
- Non esplosiva, non infiammabile
- Scalabile (10 kW – 2 MW, 40 kWh – 10 MWh)

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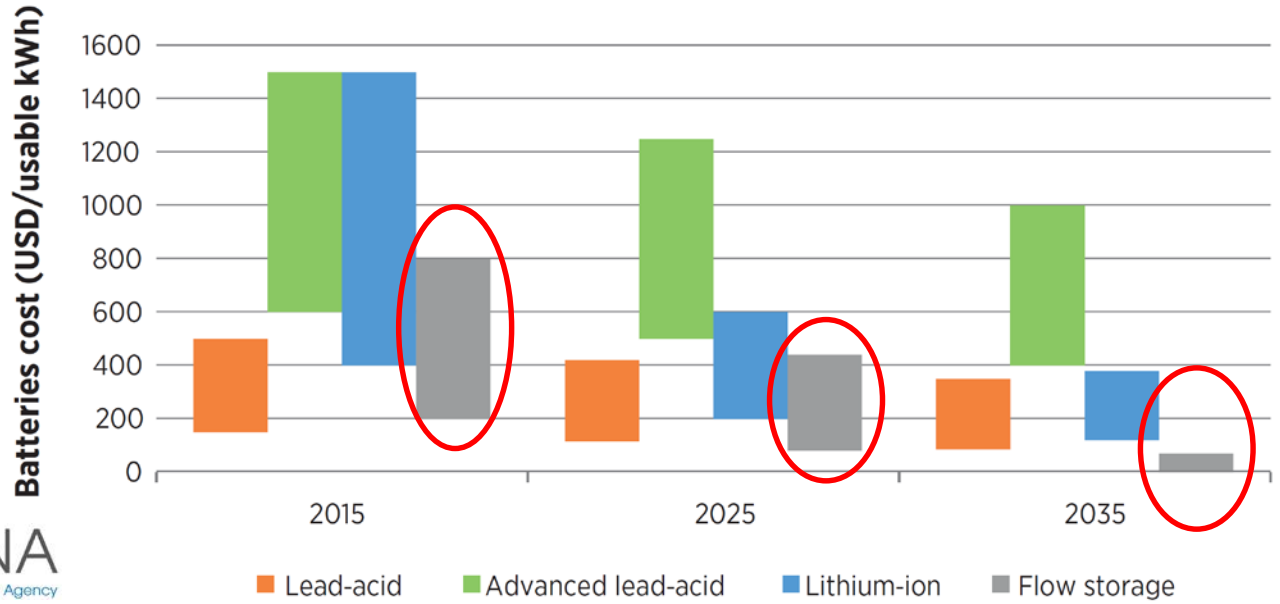
Batteria

Figure 2: Expected cost reductions in lead-acid, advanced lead-acid, lithium-ion and flow storage batteries by 2015, 2025 and 2035



Fonte: INNOVATION OUTLOOK
RENEWABLE MINI-GRIDS (2016)

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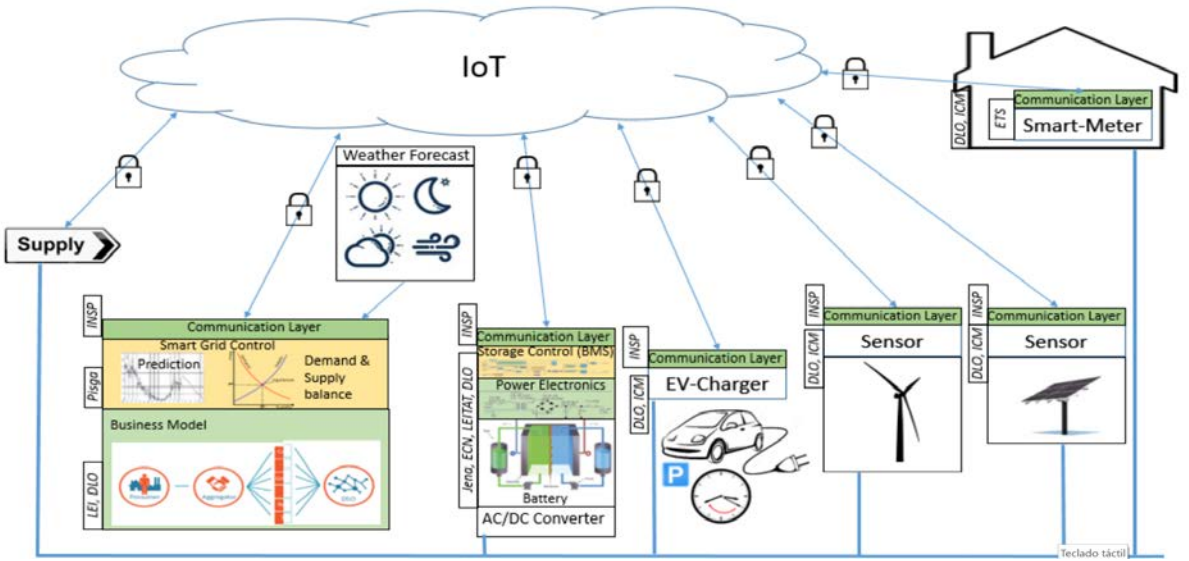
Grid control and metering



- Schema funzionale della micro grid

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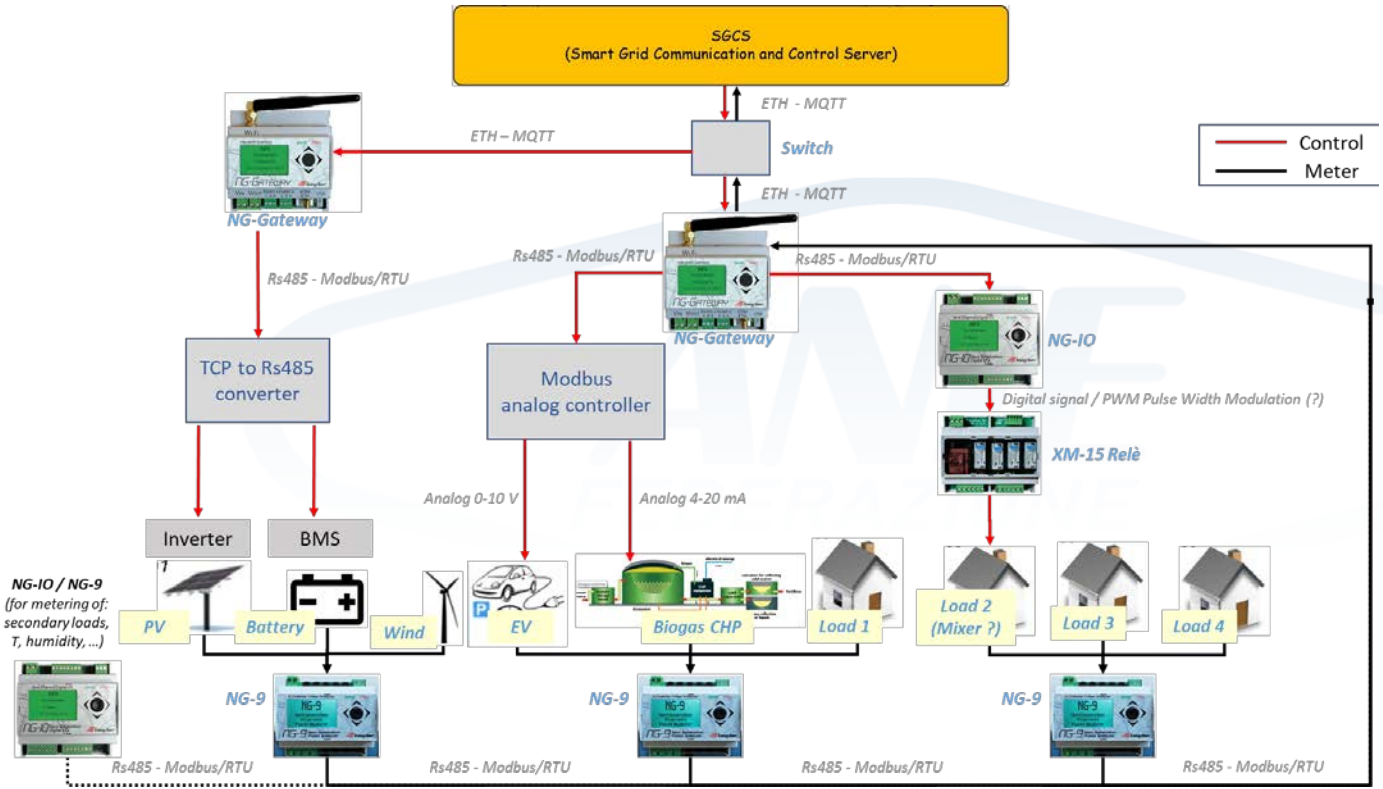
Grid control and metering



Schema del sistema di acquisizione e controllo della smart grid

- Utilizzo protocollo IoT MQTT
- Comunicazione SSL 128 bit

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Business models

Table 1: Types of mini-grids

	Lower Tier of Service	Higher Tier of Service
Autonomous	**Autonomous Basic (AB mini-grids)** **Generation Sources:** PV, hydro and biomass **Tier of service:** Less than 24-hour power **End-users:** Remote community without major commercial or industrial activity **Added value:** • Enable enhanced energy access • Alternative to grid-extension • Improve quality of life • Cost savings	**Autonomous Full (AF mini-grids)** **Generation Sources:** PV, hydro and wind **Tier of service:** 24/7 power **End-users:** Remote communities with major commercial or industrial requirements; industrial sites disconnected from grid **Added value:** • Alternative to expensive polluting imported fuels • Diversification and flexibility of supply • Cost savings
Interconnected	**Interconnected Community (IC mini-grids)** **Generation Sources:** PV, wind and biomass/biogas **Tier of service:** High critical/interruptible **End-users:** Medium to large grid-connected community, such as university campus **Added value:** • Community control • Improved reliability • Response to catastrophic events • Cost savings	**Interconnected Large Industrial (ILI mini-grids)** **Generation Sources:** PV, wind and biomass/biogas **Tier of service:** Very high: Critical/uninterruptible **End-users:** Data centres, industrial processing or other critical uses **Added value:** • High reliability for critical loads • Enhance environmental performance • Resiliency

Tipologie di mini-grid
- on-grid e off-grid
- Servizi limitati o ampi

Il sito test permette di applicare questi 4 schemi, ma non ha carichi bilanciati con i livelli di produzione di energia

Fonte: INNOVATION OUTLOOK RENEWABLE MINI-GRIDS (2016)

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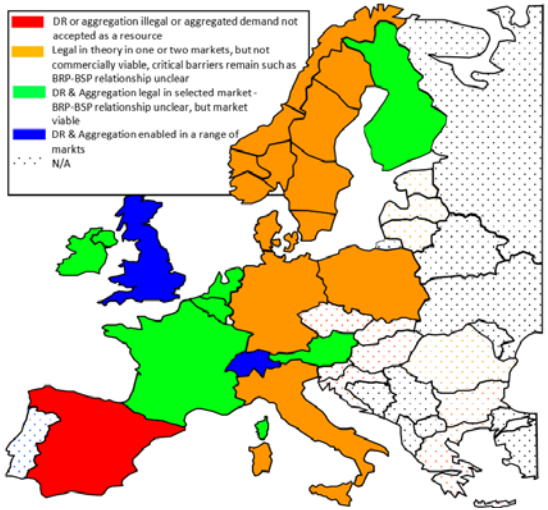
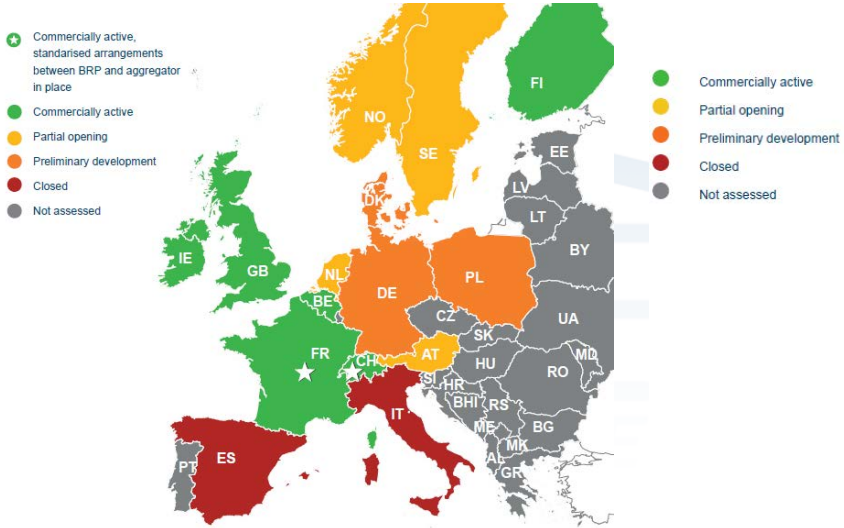
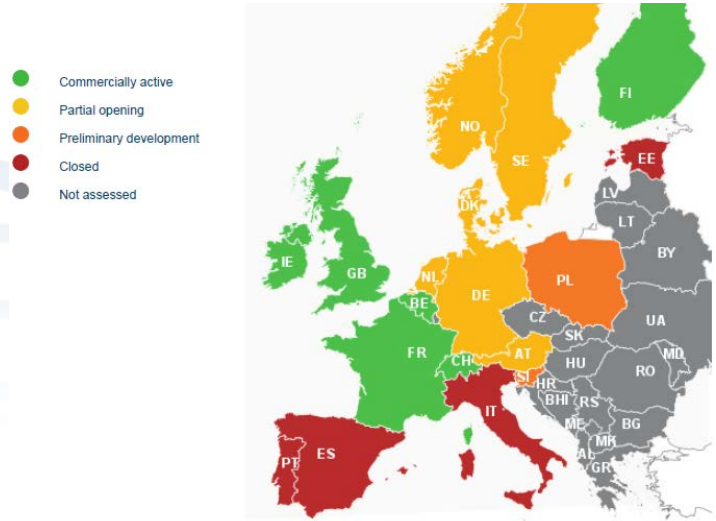
Business models



2014



2015



2017

SEDC Smart Energy Demand Coalition

Fonte: SEDC Report 2014, 2015, 2017: Explicit Demand Response in Europe – Mapping the Markets

Esempio evoluzione del demand response Europa
Il contesto evolve molto velocemente

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Business models

- Vendita di surplus energia ai distributori
- Demand response con aggregatori
- Altri business model innovativi (valutazione blockchain?)

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Conclusioni

- Installazione batteria e sistemi di metering e controllo nel 2018, progettazione test
- Sviluppo test tecnici e analisi business models 2019
- Visit the website www.energykeeper.eu
- Follow us on
  https://www.linkedin.com/company/18110389/

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