

Paolo Scalera, Green City Energy On The Sea, Genova, 10 Novembre 2011

# Stockholm Royal Seaport Studio e realizzazione di una Smart Grid a scala di distretto urbano

# Stockholm Royal Seaport Agenda

- Panoramica e organizzazione del progetto
  - Vision, Obiettivi
  - Contesto, Membri
- Descrizione del progetto
  - Scopo del progetto
  - Work Packages
- Prossimi sviluppi
- Conclusioni

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# Panoramica

## Vision e Obiettivi

### **Vision:**

Royal Seaport – A sustainable urban city performing **world class**

### **Obiettivi:**

2030: “fossil free”

2020: emissioni CO2 sotto  
1.5 tonnellate/persona



### **Aree tematiche:**

- Efficienza energetica
- Mobilità sostenibile
- Riciclo
- Life style

# Panoramica Il contesto

**C40**  
**CITIES**  
CLIMATE LEADERSHIP GROUP



**CLINTON**  
**CLIMATE**  
**INITIATIVE**



STOCKHOLM  
winner 2010  
**EUROPEAN**  
**GREEN CAPITAL**

**TIME**  
Northern Star  
By Aysha and Parag Khanna

Call it recycling opportunity. After their failed bid to host the 2014 Summer Olympics, Stockholm city leaders decided to turn a would-be sports village in the Hammarby Sjöstad district into one of the world's most successful eco-villages. The practices of powering homes with biogas, recycling rainwater for irrigation and using organic waste for fertilizer spread to other districts of Sweden's largest city. Today the city's water is so clean that fishermen actually stand on bridges in the central business district, catching fresh salmon and trout.

Stockholm was named the first European Green Capital in 2010. Since then, green innovation has become a pillar of Swedish national competitiveness. With its target to become a fossil-fuel-free city by 2050, Stockholm hopes to turn green into gold by exporting smart power to an energy-conscious world. (See a video of what makes a city smart.)

Construction has just begun at the new Royal Seaport, where a smart grid will allow renewable energy (including solar and wind power) to flow among the homes and offices of residents. Buildings will become "green houses" that not only use but also store green energy and then feed it back into the grid whenever possible. This should enable yearly carbon emissions to be reduced to less than 1.5 tons per person by 2020 — well below the U.S. average of 20 tons. Ships will be able to plug in and charge up using the onshore electric grid, meaning they can shut off noisy engines, making the harbor area more attractive to live in.

Delegations from nearby Copenhagen and Helsinki and places as far-flung as China have become regulars in Stockholm, taking notes on how the city government is building out its grid through public-private partnerships involving Finnish utilities and Swiss engineering titan ABB. (See how NYC is greening its buildings.)

The next step is to export Stockholm's smart energy to the world. Denmark, for example, is connected by underwater cables. There's talk of using such physical connections to enable development of a pan-European energy grid that would theoretically allow all of Scandinavia to export wind and hydropower overflow. Swedish historian Gunna Wetterberg made waves when she called for the five Scandinavian countries to form a United Nordic Federation in the next 20 years. There'd be plenty of votes for Stockholm as its capital.

*Aysha and Parag Khanna are directors of the Hybrid Reality Institute, a think tank that explores the implications of emerging technologies*



**URBAN CHALLENGES**  
**SUSTAINABLE SOLUTIONS**  
**EUROCITIES 2009**  
**STOCKHOLM 25-28 NOVEMBER**

L'articolo completo su:

[http://www.time.com/time/specials/packages/article/0,28804,2026474\\_2026675\\_2079618,00.html](http://www.time.com/time/specials/packages/article/0,28804,2026474_2026675_2079618,00.html)

# Overview

## Membri del progetto

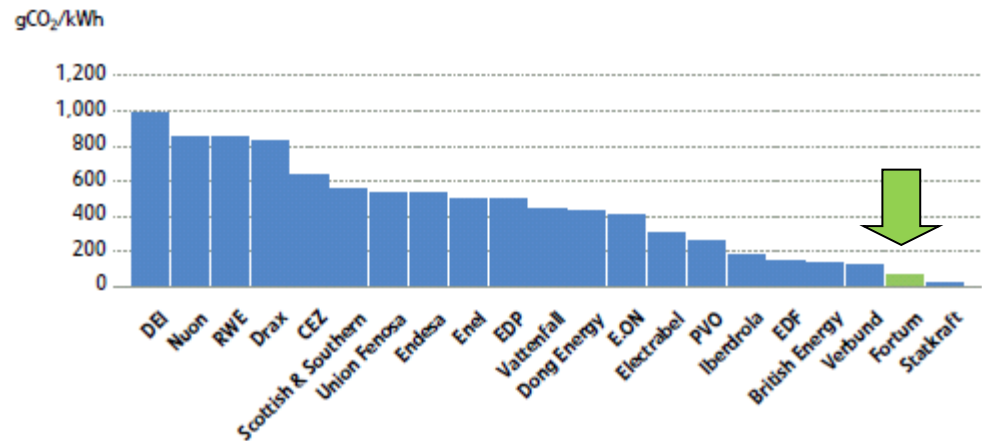
- Partner principali



- Membri associati



Carbon exposure of major European power companies in 2007



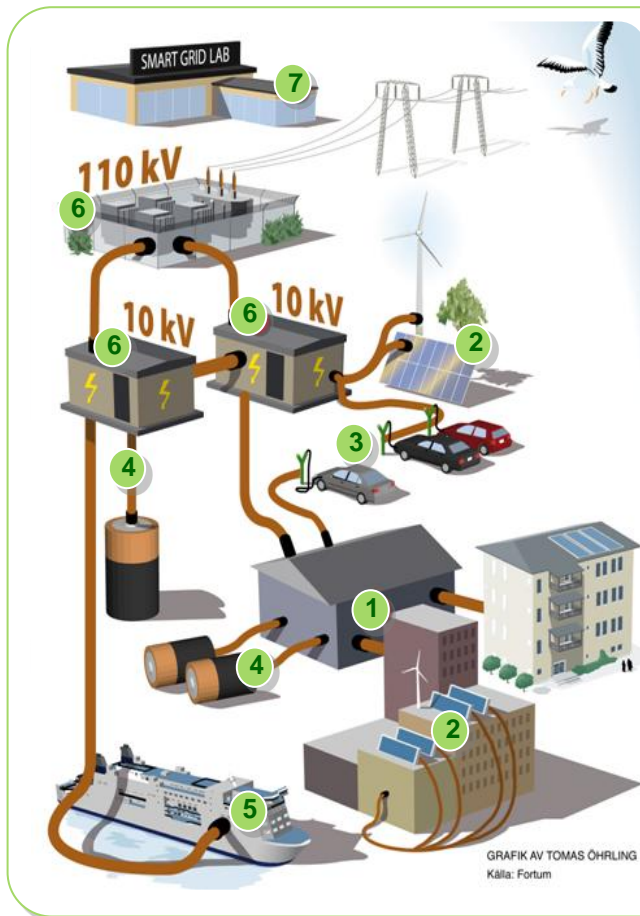
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# Descrizione del progetto

## Scopo del progetto

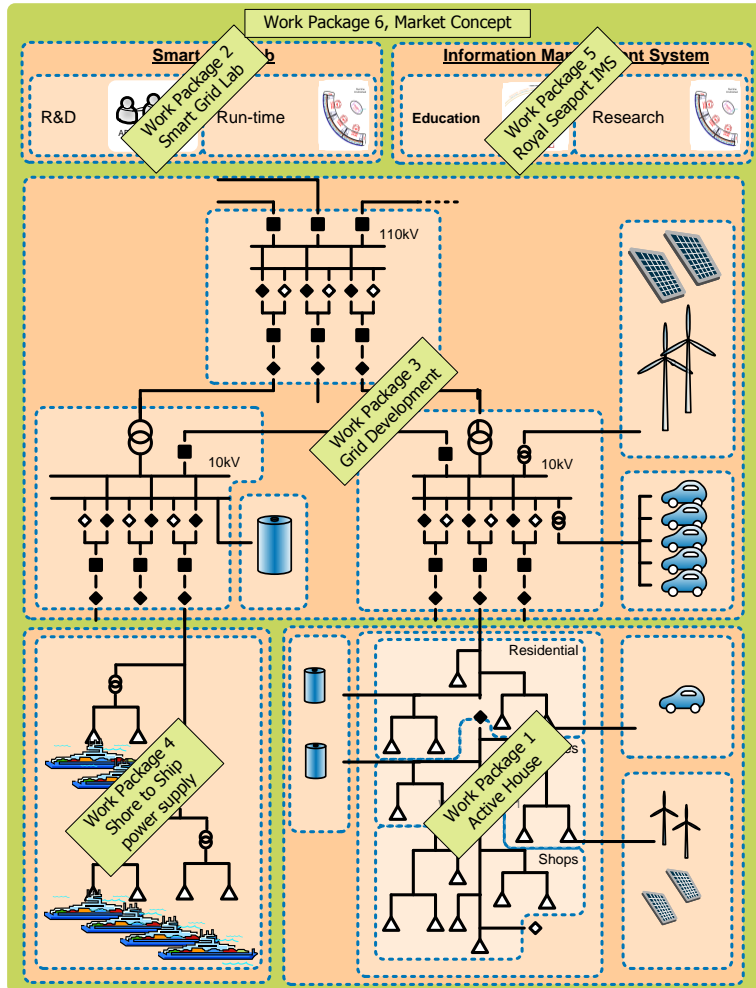


- 1 Abitazioni attive con demand response
- 2 Integrazione di produzione locale di energia
- 3 Veicoli elettrici e infrastruttura di ricarica
- 4 Soluzioni per l'accumulo di energia
- 5 Elettrificazione porto
- 6 Infrastruttura Smart Grid
- 7 Smart Grid Lab



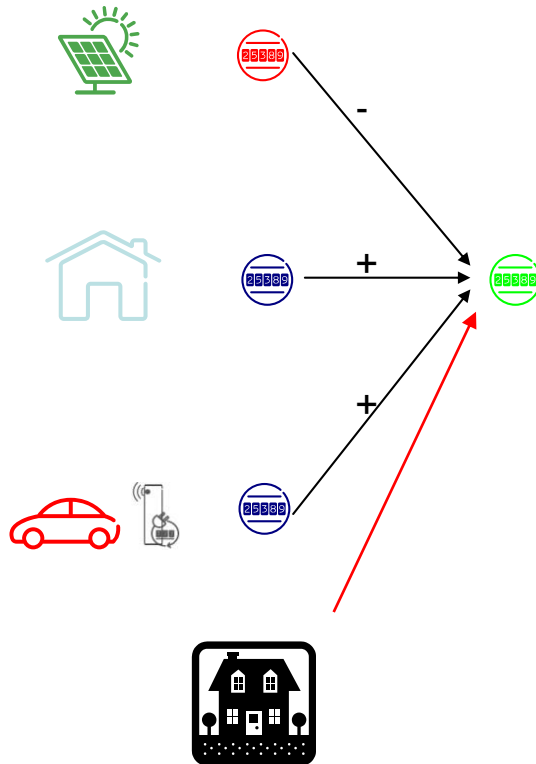
# Descrizione del progetto

## Scopo del progetto – Work Packages



- WP 1 – Active House**  
 Riduzione picchi di carico e incremento dell'efficienza tramite partecipazione attiva dei 'prosumer', basata su soluzioni di Demand Response, e che include anche infrastruttura ricarica veicoli elettrici e home automation
- WP 2 – Smart Grid Lab**  
 Un ambiente completo run-time per sperimentazioni di applicazioni Smart Grid su larga scala, con SCADA/DMS
- WP 3 – Grid Development**  
 Valutazione e ricerca di nuovi assetti di rete che includano nuovi componenti attivi e passivi per ridurre costi e perdite, e per migliorare power quality e interazione dei prosumers
- WP 4 – Shore to Ship Power Supply**  
 Soluzioni per porti intelligenti e sostenibili, con interazione con generazione locale, teleriscaldamento e infrastruttura ricarica di bus elettrici
- WP 5 - Royal Seaport Information Management System**  
 Sistema informatico avanzato, con possibilità di follow up degli obiettivi operativi del progetto di distretto sostenibile.
- WP 6 – Market Concept**  
 Definizione e sperimentazione di nuovi business model e contesti normativi per il mercato elettrico

# Work Packages Market Concept



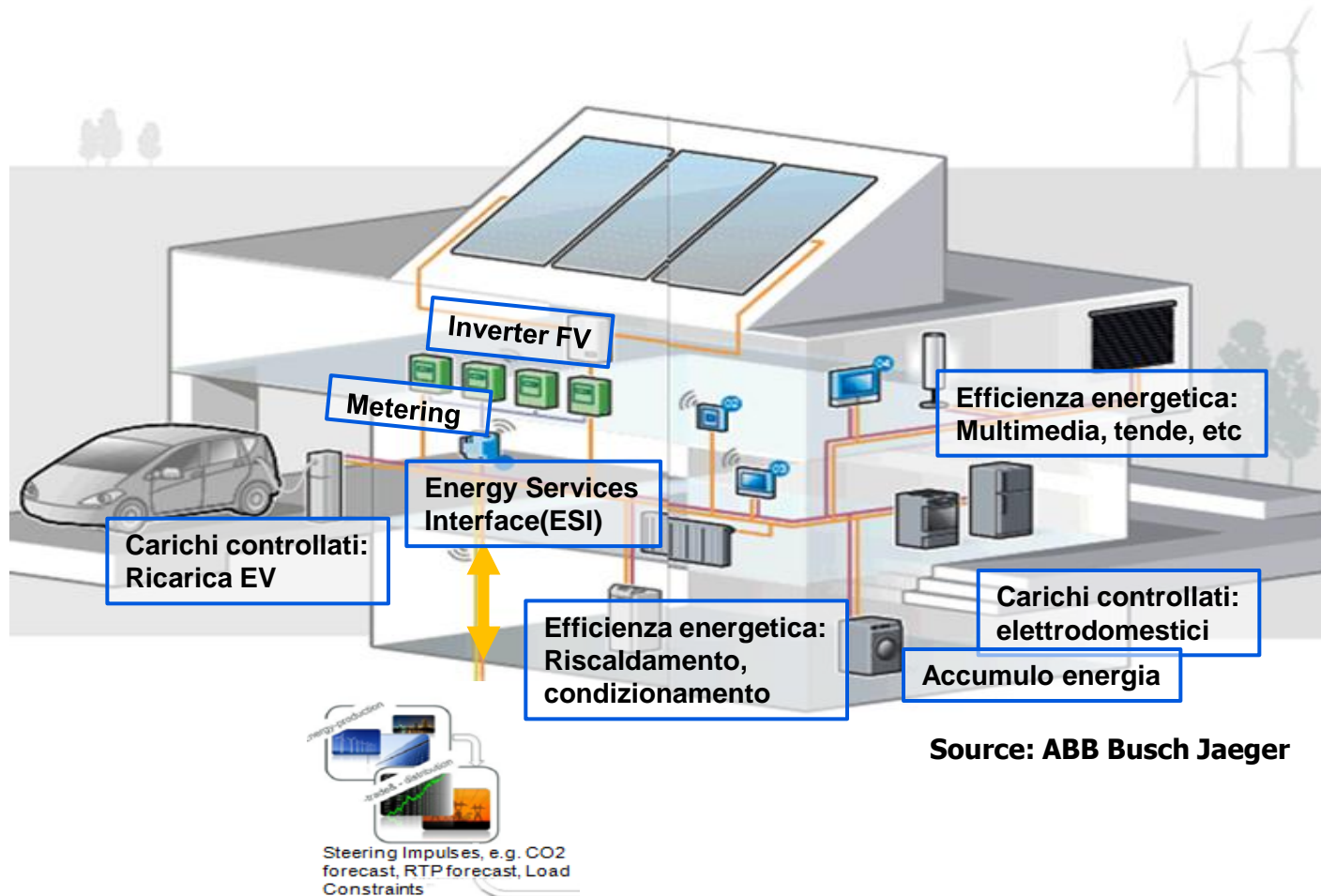
- Obiettivo:
  - Use case, ipotesi, business model, proposte di nuove regolamentazioni, standardizzazione ed interoperabilità
- Risultato: 15 Statement
  - **#15:** Demand Response
    - Segnali orari di prezzo per il giorno dopo
    - Previsione emissioni CO2 per il mix di produzione
  - **#2:** Virtual Delivery Points
    - DR di tipo economico (“day-ahead”)
    - DR di emergenza, su evento (“intra-day”)

Decentralizzato

Centralizzato

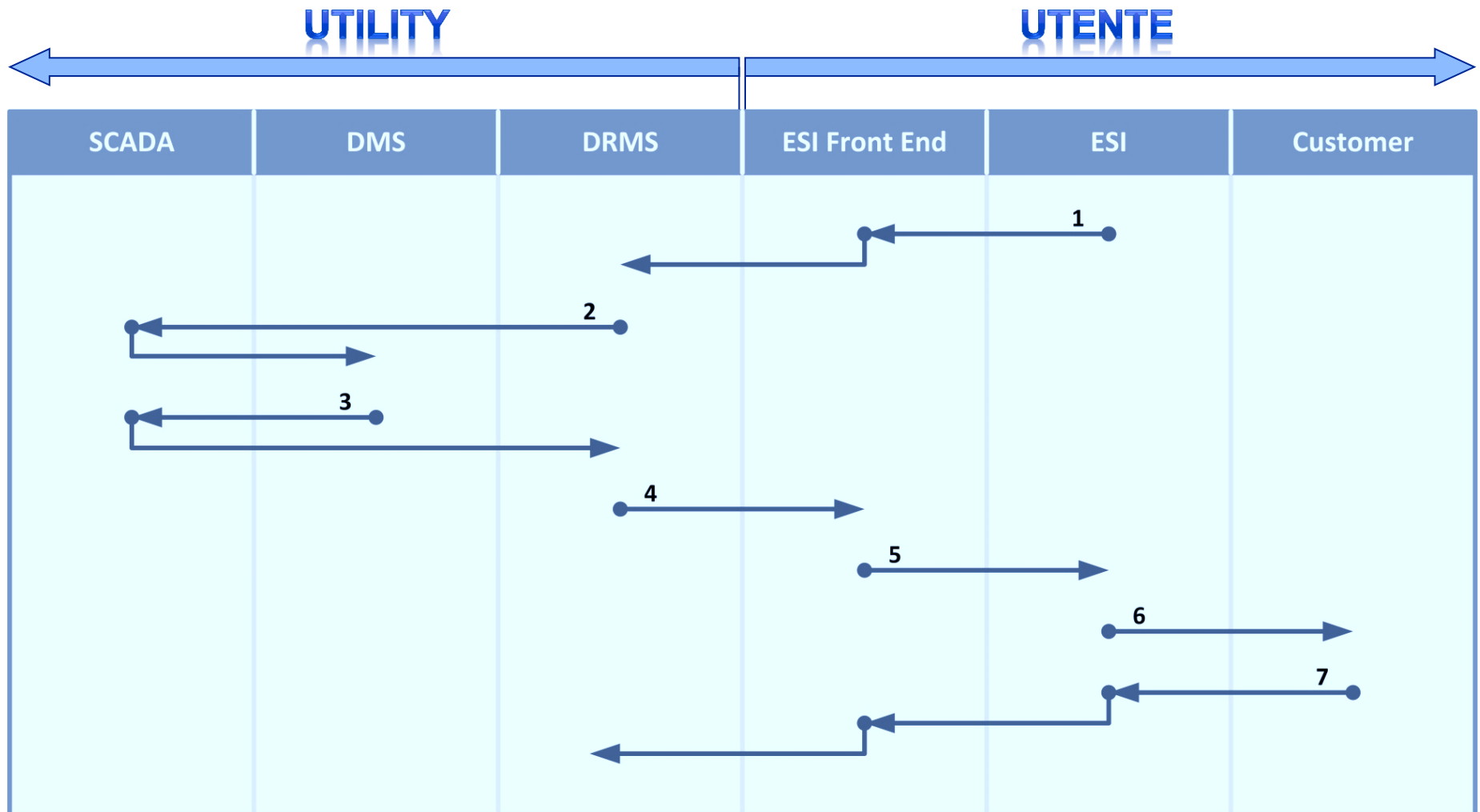
# Work Packages

## Active House e Demand Response



# Work Packages

## Active House e Demand Response



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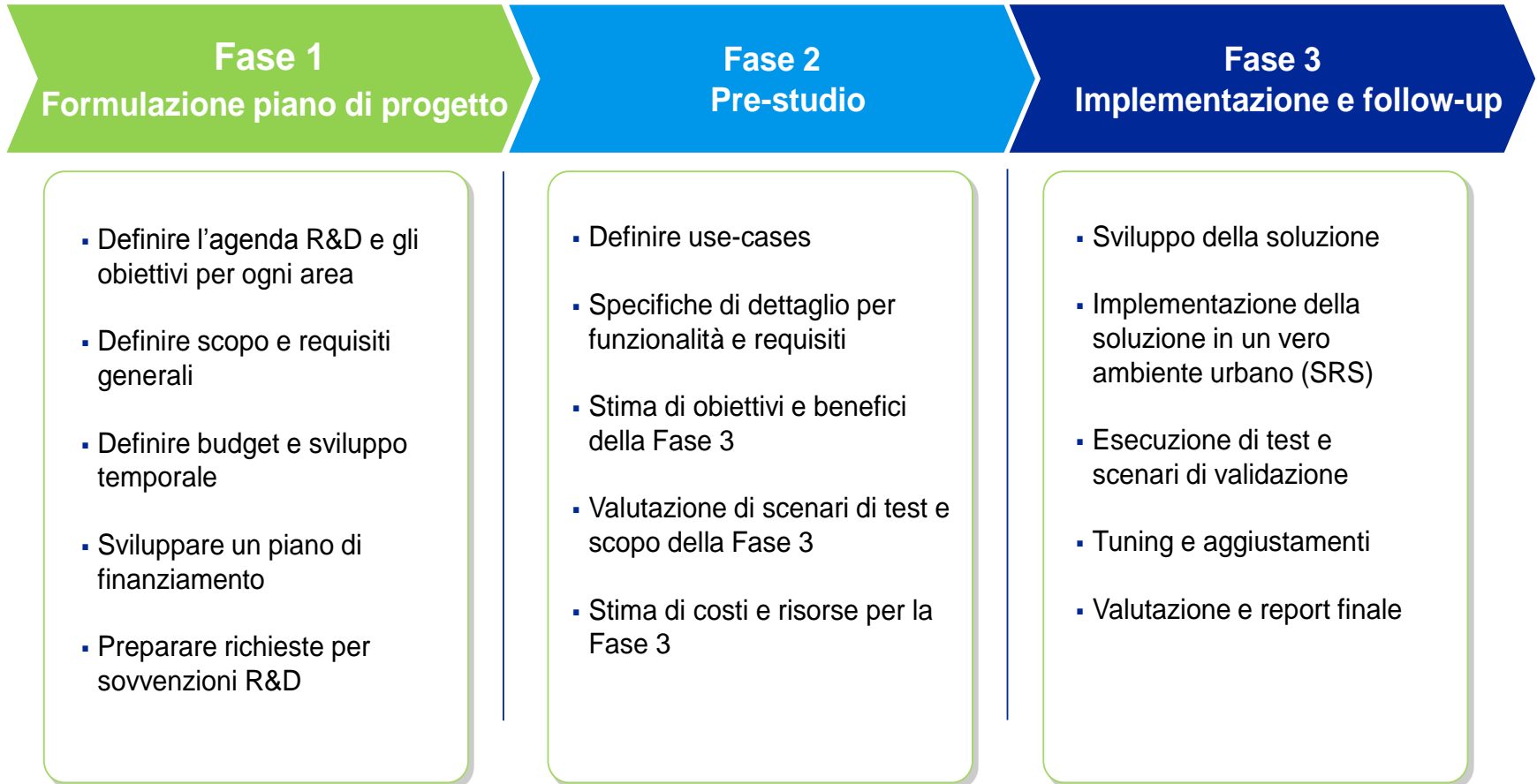
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# Lo stato del progetto

## Prossimi sviluppi

Siamo qui!



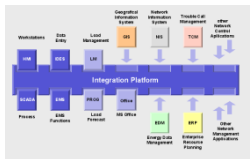
# Stockholm Royal Seaport Conclusioni



- Fattori eterogenei => necessità di una rete intelligente, in tempi stretti

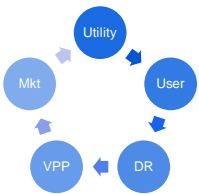


- Le tecnologie sono già esistenti e disponibili



- Importanza di progetti pilota per:

- Integrazione delle tecnologie
- Sviluppo di nuovi business model



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