

GEYSER: Data Centres as Prosumers within the Smart City

Green IT Amsterdam
Vasiliki Georgiadou

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Greenit

amsterdam region

A consortium of public-private cooperation in the Amsterdam region that aims to stimulate:

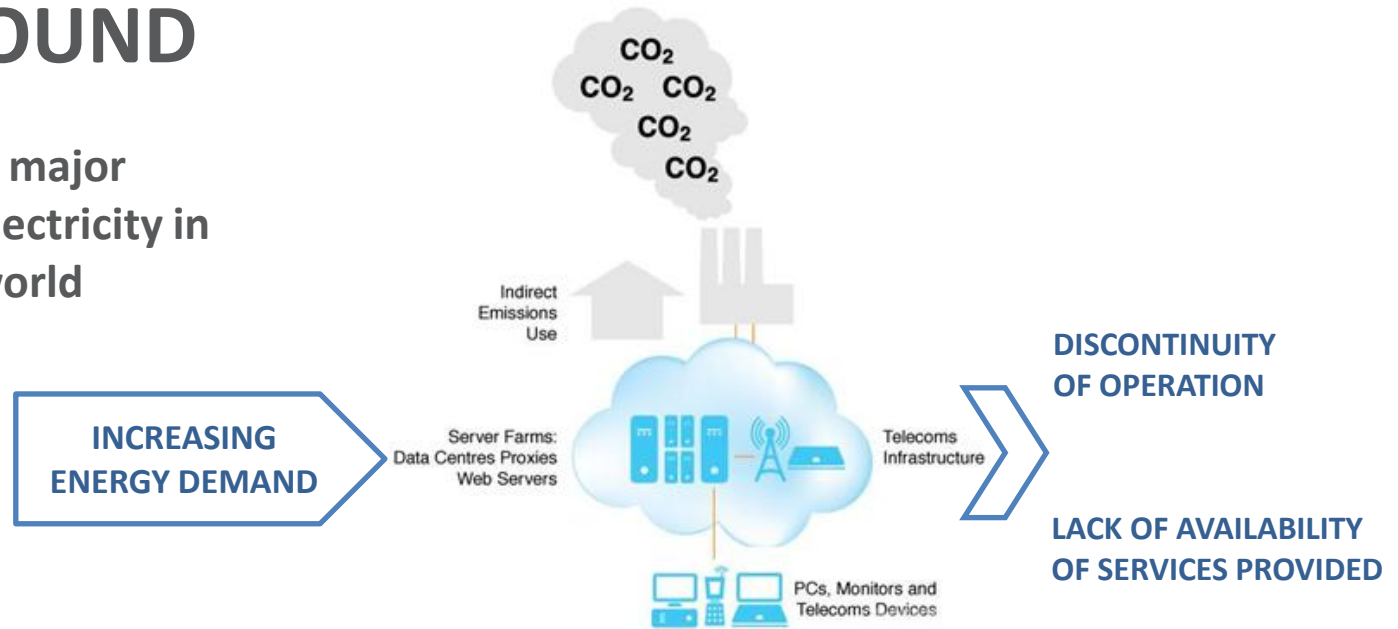
- » IT energy efficiency and sustainability aka “Greening of IT”
- » Reduction of environmental footprint and CO2 emissions aka “Greening by IT”
- » New business opportunities for a “Green Collar Economy”



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BACKGROUND

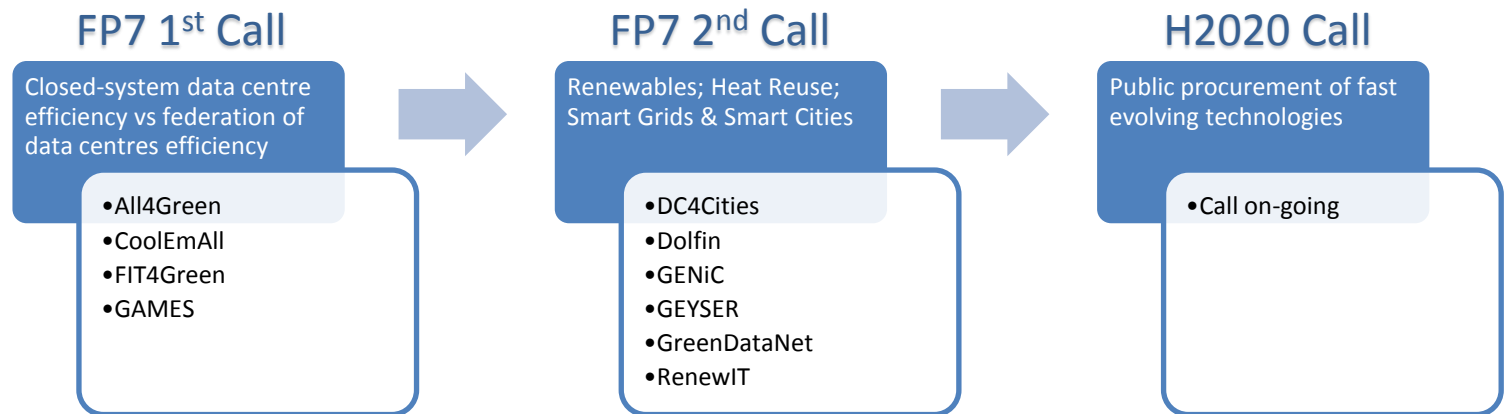
Data Centres as major consumers of electricity in industrialised world



ENERGY EFFICIENCY AND INTEGRATION
WITH SMART GRID AND SMART CITY

EU RESEARCH INITIATIVES

On Sustainable Data Centres



SMART CITY COLLABORATION CLUSTER

6 projects co-funded by EC

50 partners involved

Call for projects

“Development of system level technologies and associated services that improve the energy and environmental performance of urban data centres”

- » System level technologies/services for energy monitoring and optimization
- » Integration of networks of renewable energy sources
- » Efficient heat reuse at urban neighbourhood level
- » Integration of data centres with smart grid schemes
- » Standardization of energy measurement/environmental footprint
- » Validation in real settings/use cases



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THE PROJECT



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GREEN NETWORKED DATA CENTRES AS ENERGY
PROSUMERS IN SMART CITY ENVIRONMENTS

Facts sheet

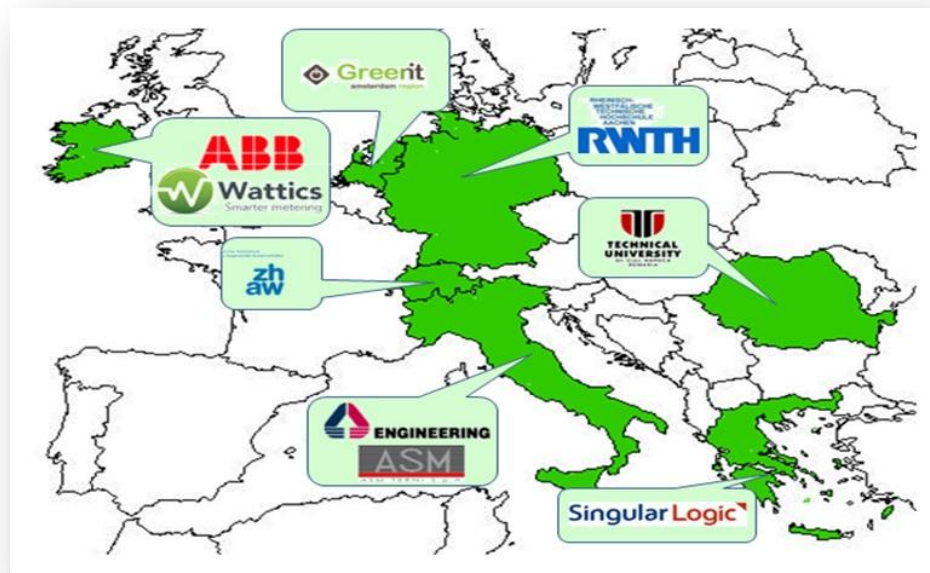
Full Title: Green networked data centres as energy prosumers in smart city environments

Duration: 36 months, started November 2013

EU max financial grant: 2.979.000,00 €

Partners: 9, spanning end users, industrial players and academia

2 Pilot Sites: Italy, The Netherlands, & Germany



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DATA CENTRE INTEGRATION WITH SMART CITY AND SMART GRID

Towards a new active role of Data Centres

Data Centres as key players

- » participating actively to the demand of energy from the Smart City
- » offering ancillary services to the power grid distributors

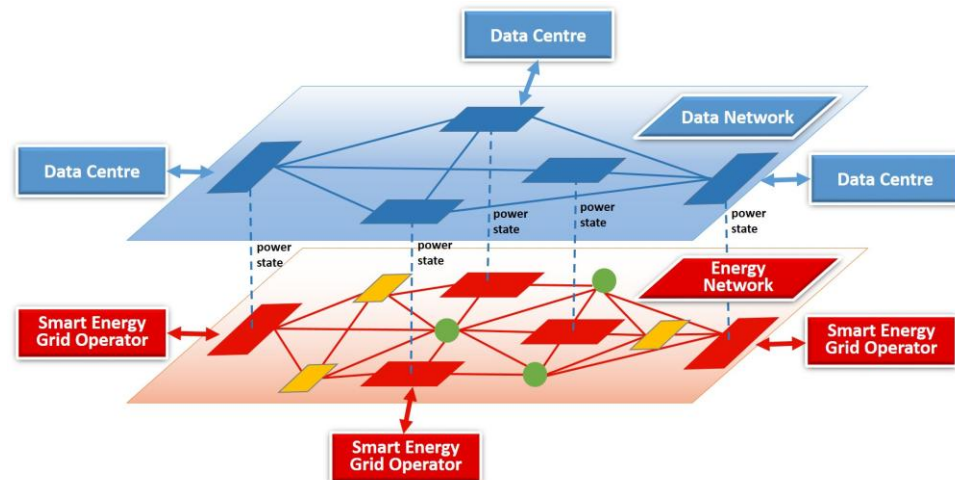
to support local, sustainable energy supply systems



THE GEYSER APPROACH

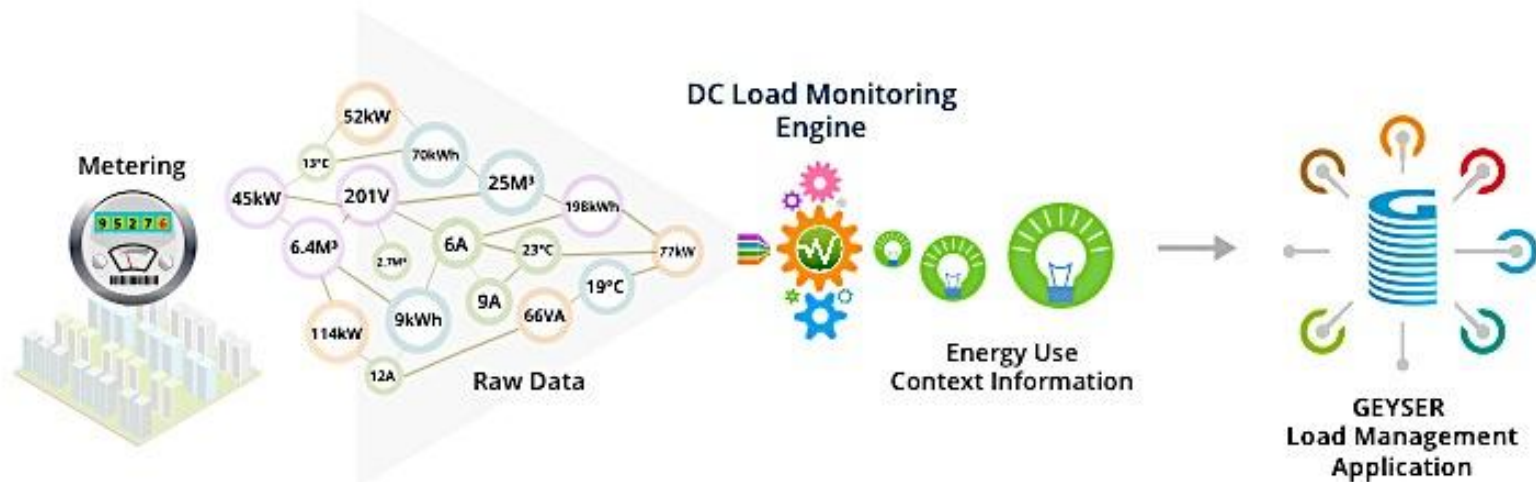
Environmentally sustainable Data Centres as active connection hubs at the crossroads of two bidirectional, interwoven network overlays

Data Centres to maximize the overall use of renewable energy while ensuring network stability, by offering energy consumption flexibility to Smart Cities and delivering support services specifically tailored to the distribution grid operators



THE GEYSER SUITE

Transforming Data Centres to adjustable, adaptive power consumers



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NEXT GENERATION DATA CENTRES

As enabled by GEYSER

Environmentally Sustainable aka. “Green”

- » monitor, control, reuse and optimize their energy consumption and production, coming especially from renewable energy sources

Prosumer (“unified energy provider” and “energy-aware consumer”)

- » partially enable its energy self-sustainability
- » sustain energy demand of the nearby Smart City, within the policy-driven strategy of maximizing the usage of available renewable energy sources at local level

Cooperating with

- » Smart City through a Local Energy Marketplace
- » Smart Grid through a Market of Ancillary Services



THE GEYSER LOCAL ENERGY MARKETPLACE

Leveraging on (near) real time unexpected energy availability fluctuations

Environment

- » Optimized renewable energy usage
- » Minimized transmission energy losses

Smart City

- » Energy demands are met locally, at all times

Data Centre

- » Increased amount of energy to be auctioned to the grid
- » Buying a greater amount of energy at a lower price

Smart Grid

- » Increased reliability as operational security and adequacy savings is implied for the smart energy grid



GEYSER MAIN INNOVATIONS

Next generation of Data Centres as key players within the Smart City and Smart Grids

- » Data Centres as a stakeholder exchanging **energy**, including both **electricity** and **heating/cooling**
- » Data Centre level optimized management of energy, including data centres powered by **Renewable Energy Sources** or with green energy contracted at the meter
- » Comprehensive set of **Local Balancing Services** offered to DSOs (**ancillary services** like voltage regulation and frequency regulation), going beyond Demand Response
- » Data Centres participating to the optimized energy management of a Smart City by provisioning energy to the **Local Energy Marketplace**

EPILOGUE

**“Ask Not How Much
The Grid Can Give To You;
Ask How Much
You Can Give To The Grid.”**

**The Upcycle, by W. McDonough
and M. Braungart**

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Thank You

Questions?

For more information:

<http://www.geyser-project.eu/>

<http://www.linkedin.com/groups/Networked-Data-Centres-Smart-Grids-7485057>

Contact us:

Vasiliki Georgiadou

Project Manager at Green IT Amsterdam Region

vgeorgiadou@greenitamsterdam.nl



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