Smart Cities Infrastructures

Some glimpse on or research

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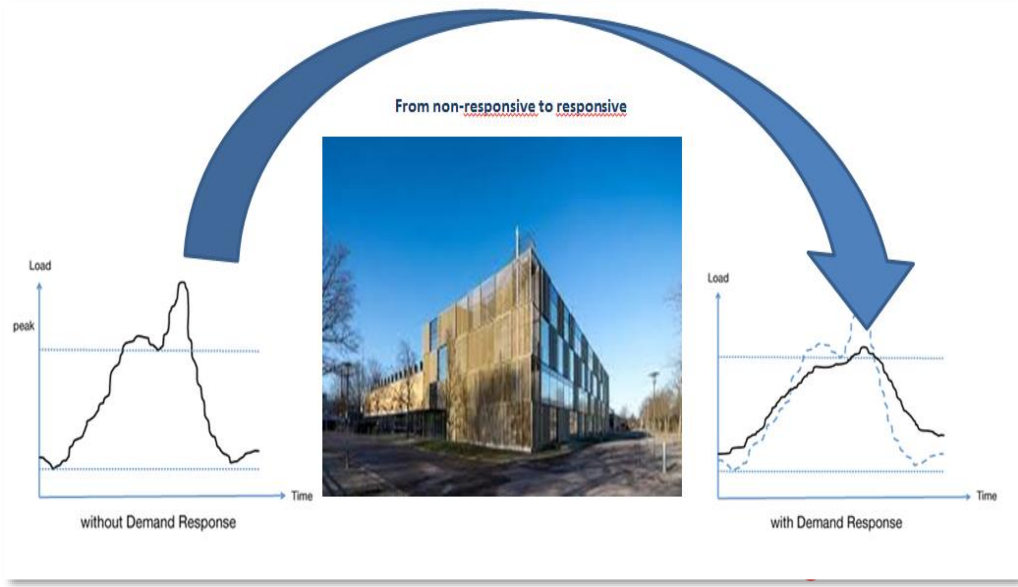

Cloud’en

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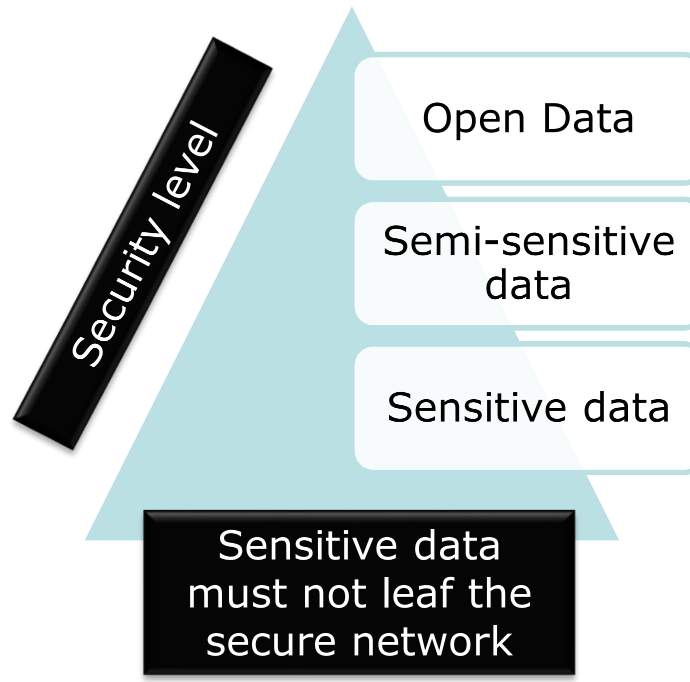
Demand for Data Services

Data Storage

Computer Power



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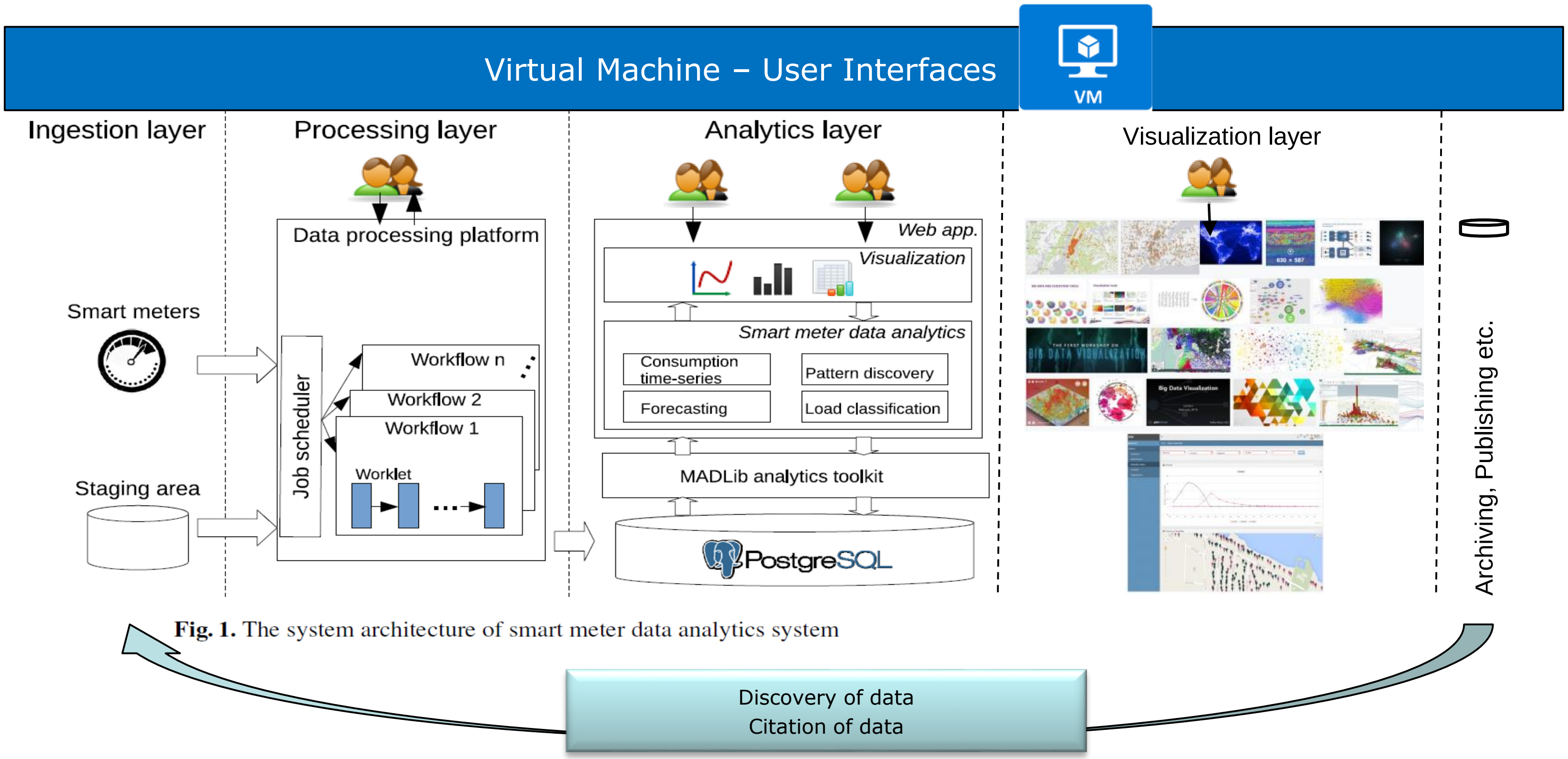
CITIES Data Management System



Source: Streamlining Smart Meter Data Analytics (2015) Xiufeng Liu and Per Sieverts Nielsen, DTU (adjusted by Alfred Heller.

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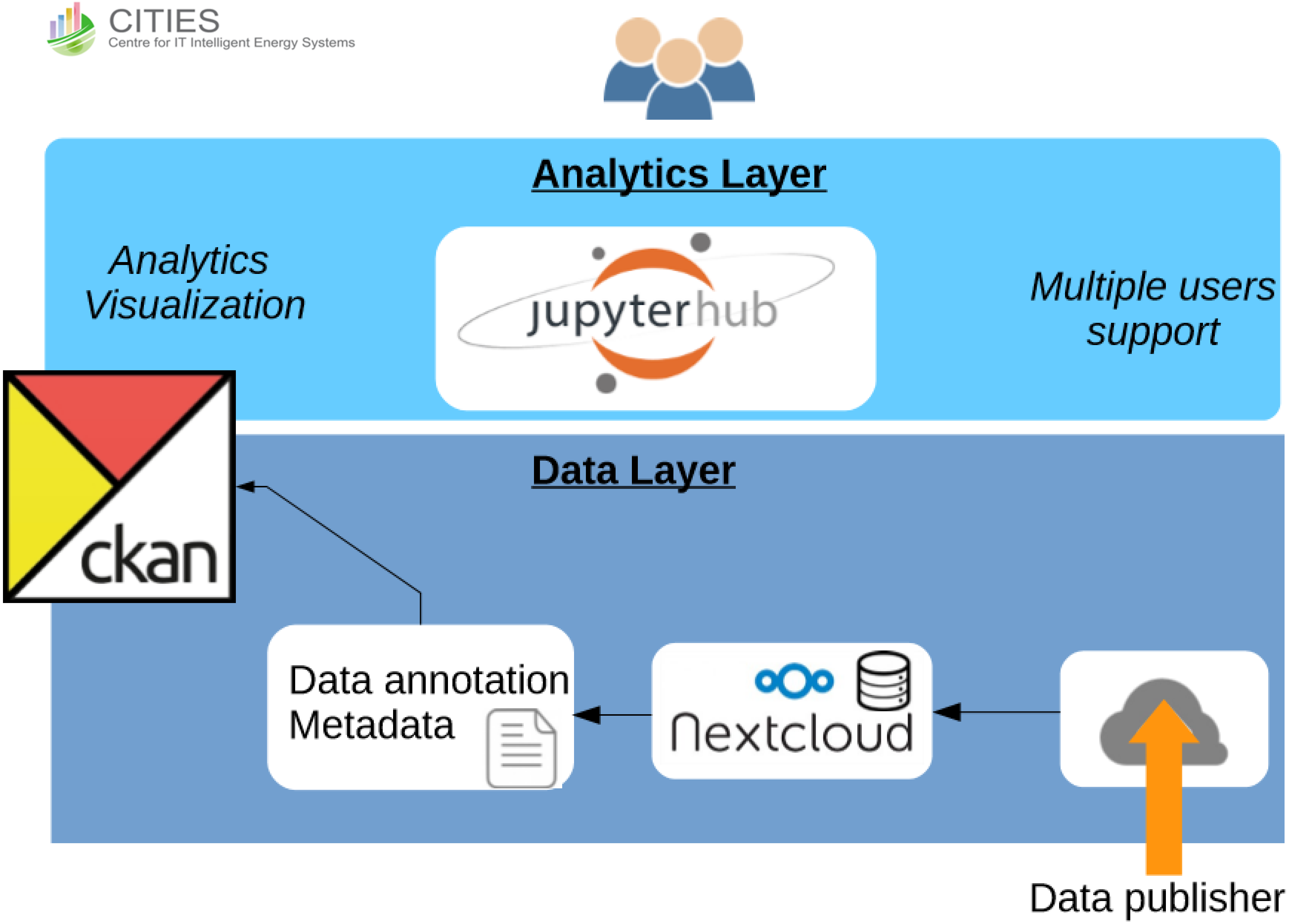

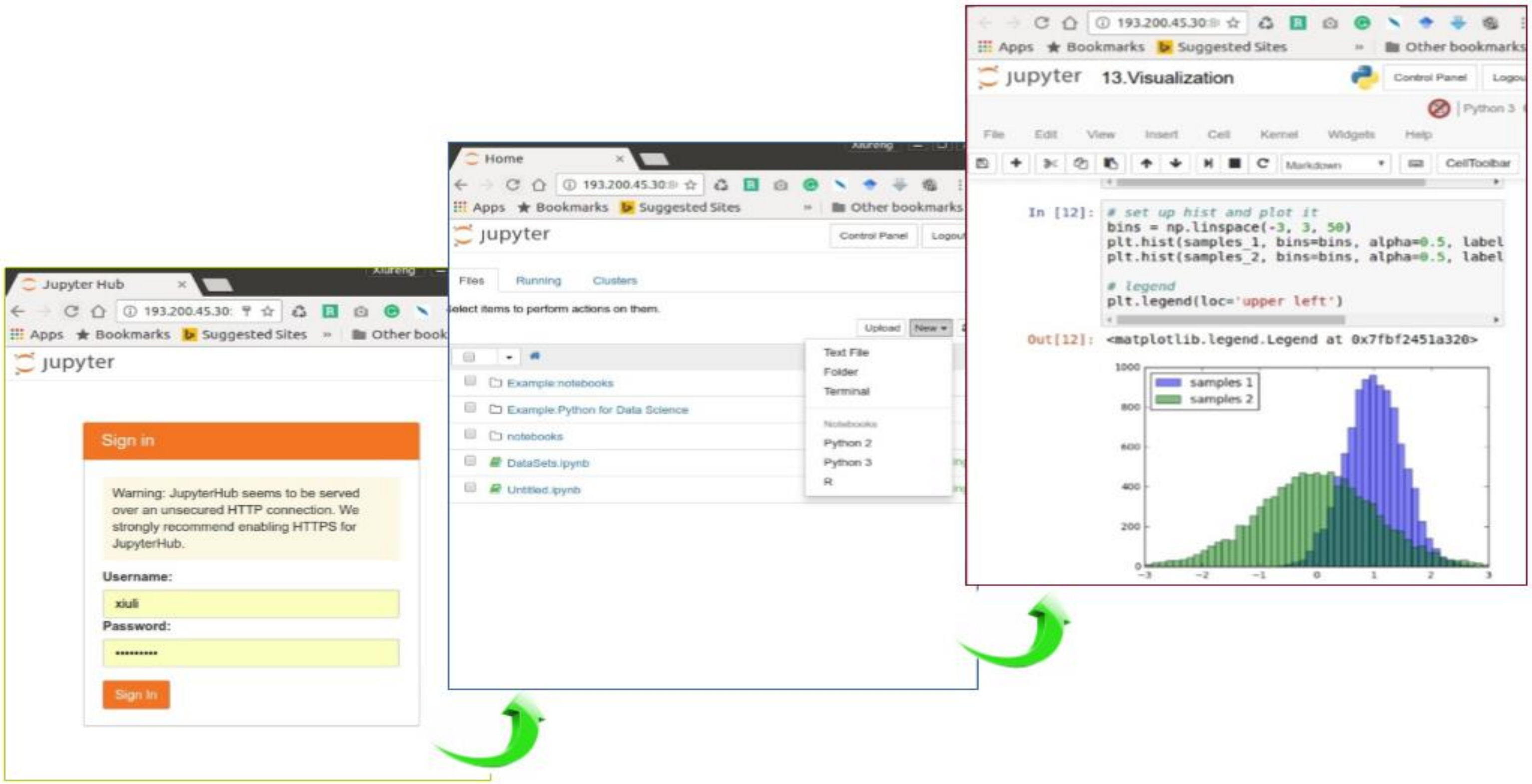
Jupyter Hub
jupyter
Sign in
Warning: JupyterHub seems to be served over an unsecured HTTP connection. We strongly recommend enabling HTTPS for JupyterHub.
Username:
xiuli
Password:
Sign In
Home
jupyter
Control Panel
Files
Running
Clusters
Select items to perform actions on them.
Upload
New
Example notebooks
Example Python for Data Science
notebooks
DataSets.ipynb
Untitled.ipynb
Text File
Folder
Terminal
Notebooks
Python 2
Python 3
R
jupyter
13.Visualization
Control Panel
Python 3
File
Edit
View
Insert
Cell
Kernel
Widgets
Help
CellToolbar
In [12]:
# set up hist and plot it
bins = np.linspace(-3, 3, 50)
plt.hist(samples_1, bins=bins, alpha=0.5, label
plt.hist(samples_2, bins=bins, alpha=0.5, label
# legend
plt.legend(loc='upper left')
Out[12]:
<matplotlib.legend.Legend at 0x7fbf2451a320>
samples 1
samples 2

Værktøjet muliggør

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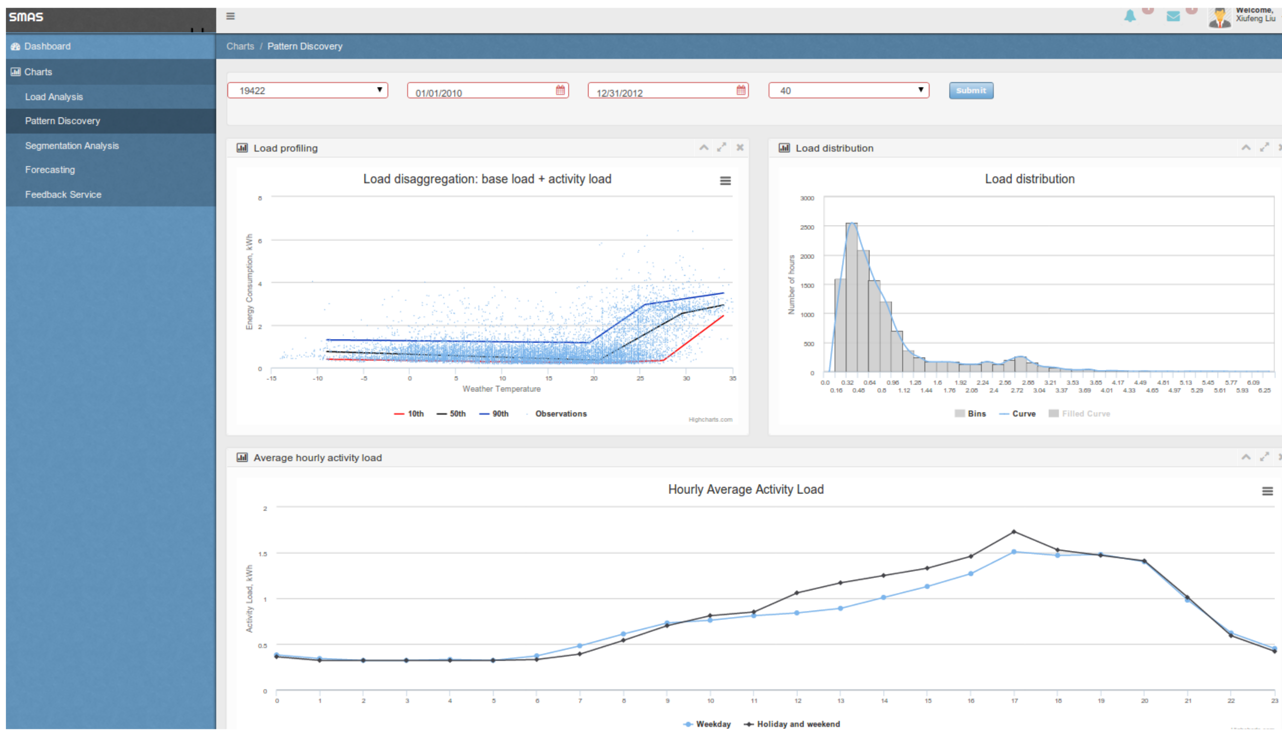
- visualisere og
  analysere af data



Application Examples

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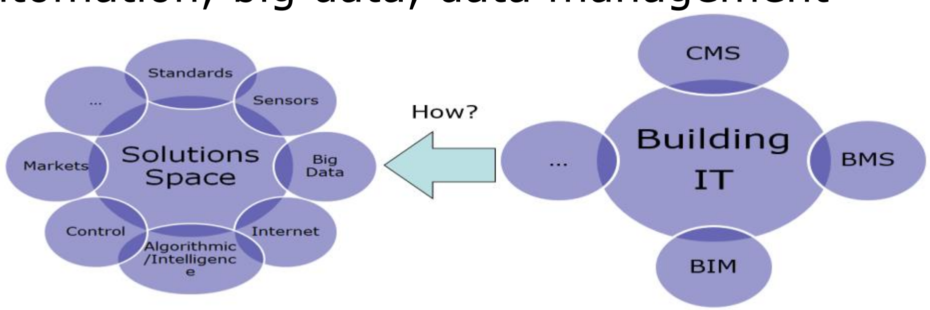
Thermal Systems & Buildings

- Flexibility

Aggregation models (districts, cities, regions …)

- IT, sensors, automation, big data, data management



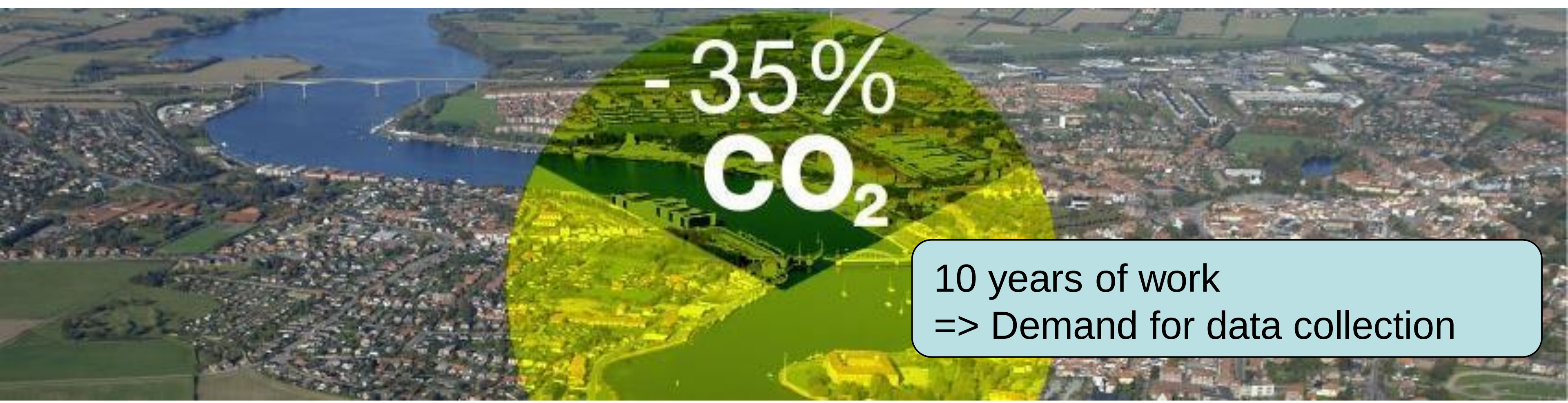
- Thermal Energy for Smart Cities
  - District Systems Heating/Cooling/
  - Central Solar
  - Seasonal thermal storage

Sønderborg CO_2 accounting automation)

54 buildings

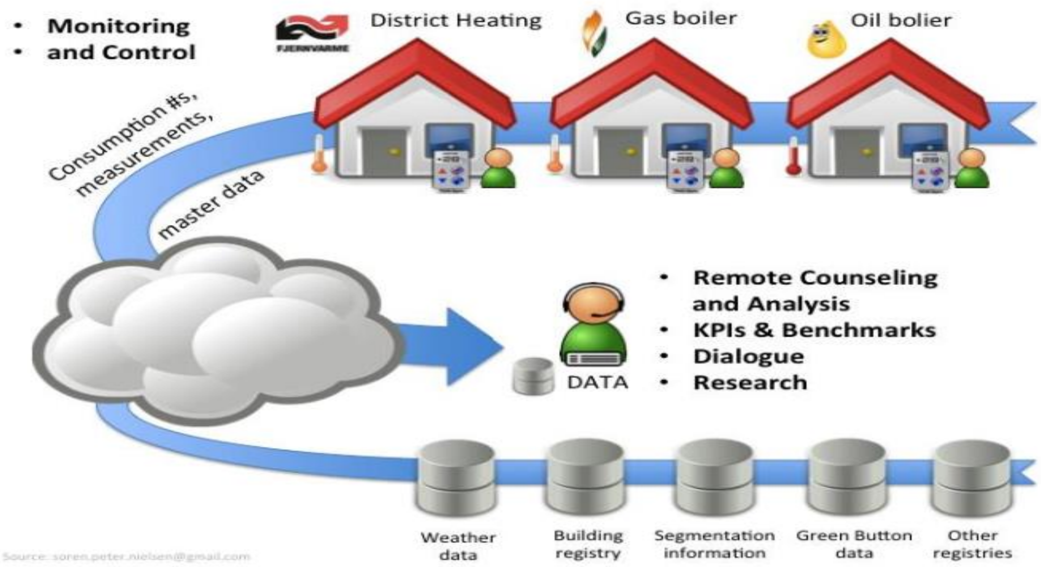
Bright Green Business
ProjectZero

- Hourly data, collected every day to the cloud
- Made ready for usage with different time scales
- Open Access data set(s)



10 years of work
=> Demand for data collection

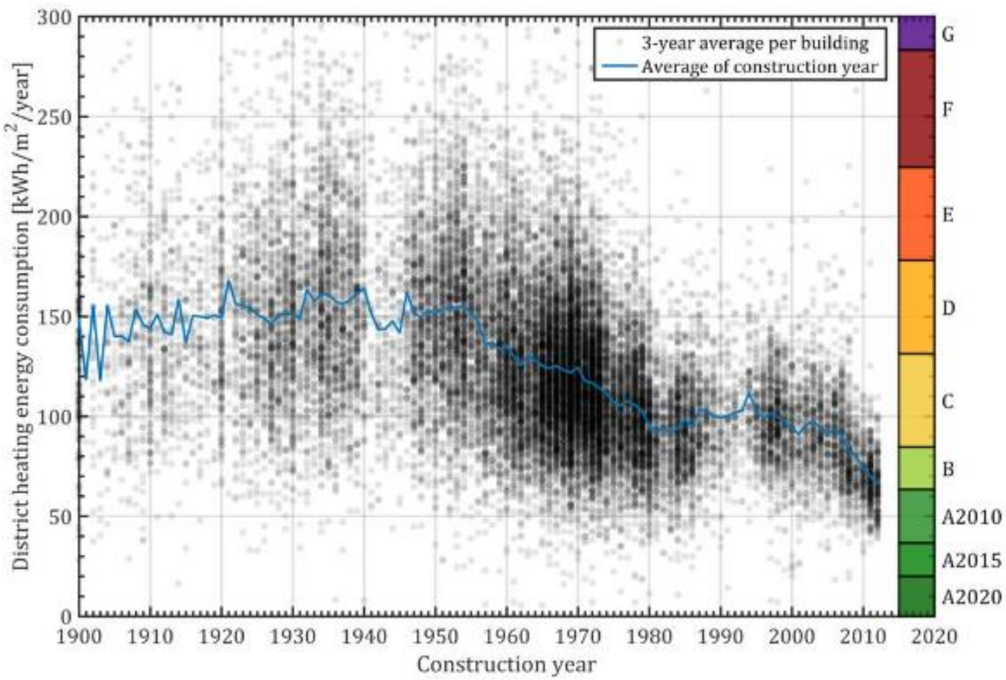
Middelfart data
144 Single family houses



Consulents available to help

Middelfart KOMMUNE

Århusdata - Enfamiliehuse



- Statistiske data
- 1 måling pr. år (afregning)

- Visualisering

Viden springer frem
af sig selv …

Yearly data
=> Demand for data collection

Aiming at City level modelling

- BOTTOM-UP

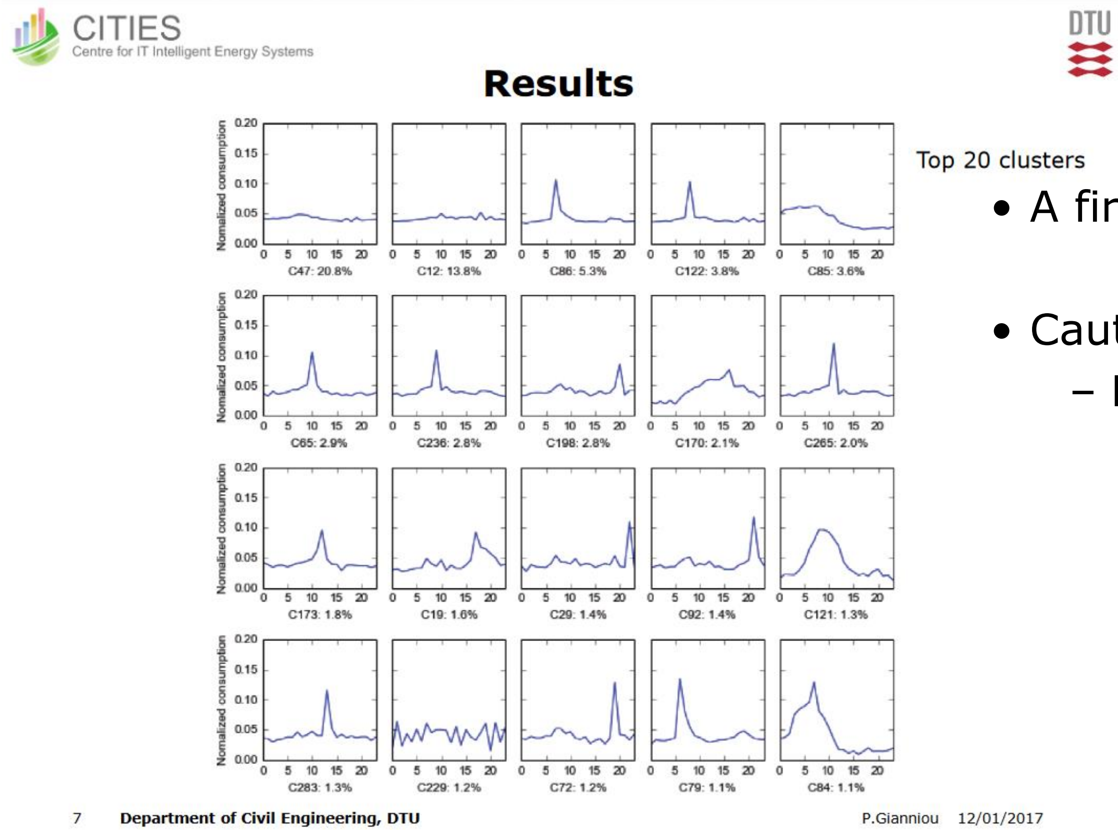
- Work by Panagiota Gianniou, DTU Civil Engineering

- Types of buildings
- Summarizing towards districts and cities

- Uncertainties, how to handle stochasticities
  - In the building construction
  - Systems
  - Users
  - On the district level

- TOP-DOWN
  - Modelling in planning tools

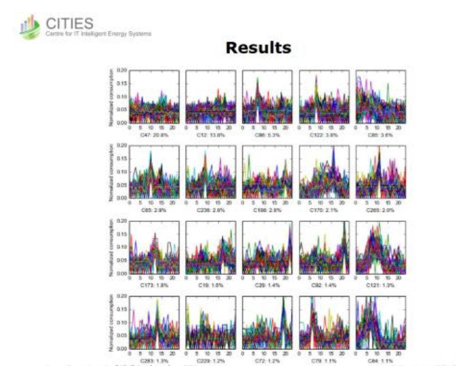
Aarhus data
1.000 > single family houses
50.000 building in all (e-meters)



Top 20 clusters

- A first experience

- Cautions
  - Be critical



IoT what's the fuzz?

Building automation

… cloud supported

… by prediction

… by consultant support

… online

Source: http://www.computerworld.dk/art/234247/her-kan-du-spinde-guld-paa-internet-of-things-der-ligger-milliarder-gemt-i-disse-omraader