GrowSmarter
Transforming cities for a smart, sustainable Europe

CASE STUDY:
THE GROWSMARTER PROJECT 2015-19

Creating a Market for 12 Smart Solutions


Cities face the same challenges..

GrowSmarter shows 12 smart solutions!

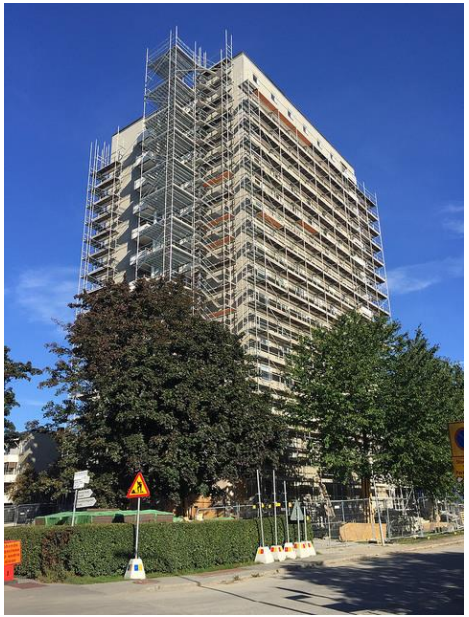
- **Low energy districts: 4**
- Integrated infrastructure: 4
- Sustainable mobility: 4

More than 120.000 m2 retrofitted!

GrowSmarter
Transforming cities for a smart, sustainable Europe

Low Energy Districts

- Building energy retrofitting
- Home automation tools and energy surveillance platforms
- Local energy generation



Evaluation and Research

Impact on energy savings of a specific measure

Possible business models

Municipal and National regulations

GrowSmarter
Transforming cities for a smart, sustainable Europe

Stockholm

- 356 dwellings
- Offices
- Cultural centre

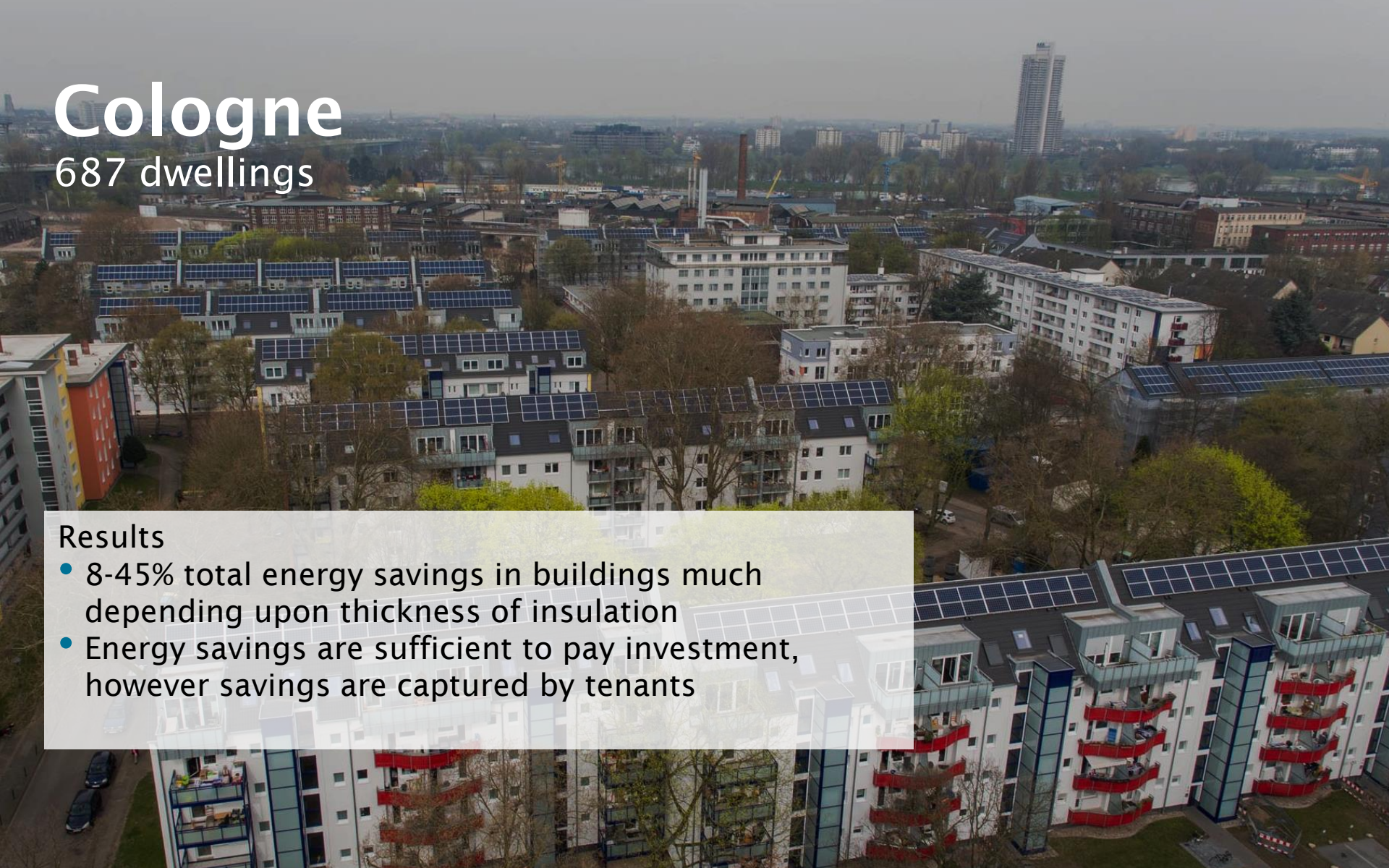
Results

- Up to 79% energy savings in building from 1960:ies (last 10-15% are high investments)

- 14% savings in new condominium by better control
- 47 % energy savings in old industrial building

Cologne

687 dwellings

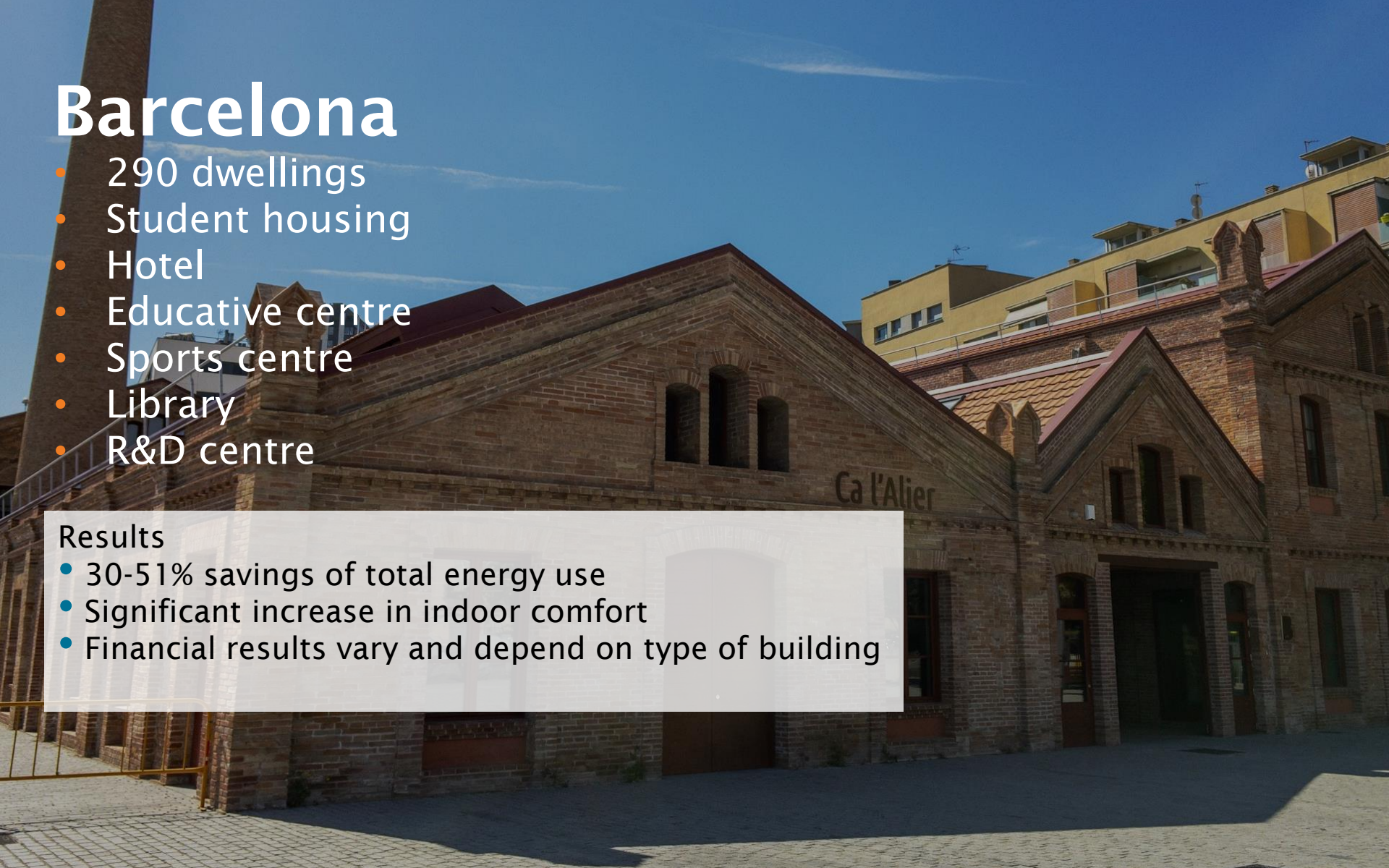


Results

- 8-45% total energy savings in buildings much depending upon thickness of insulation
- Energy savings are sufficient to pay investment, however savings are captured by tenants

Barcelona

- 290 dwellings
- Student housing
- Hotel
- Educative centre
- Sports centre
- Library
- R&D centre



Results

- 30-51% savings of total energy use
- Significant increase in indoor comfort
- Financial results vary and depend on type of building

Home automation tools and energy surveillance platforms

STOCKHOLM

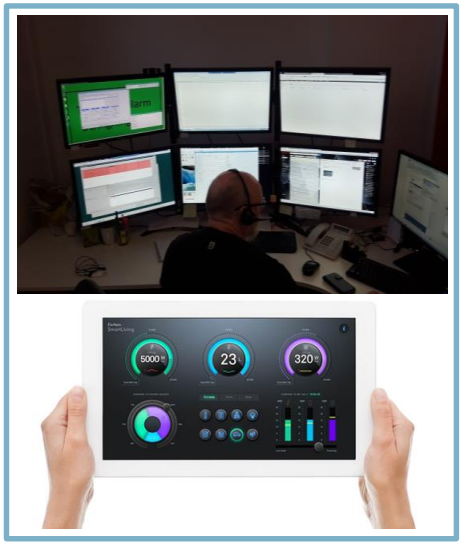
- Energy Saving Center
- Active House

COLOGNE

- SmartHome

BARCELONA

- HEMS
- Resource Advisor
- Virtual Energy Advisor



GrowSmarter
Transforming cities for a smart, sustainable Europe

Local energy generation and smart management

STOCKHOLM

- EnergyHUB
- OpenDH

COLOGNE

- Virtual Power Plant

BARCELONA

- Smart management of PV+ESS systems
- Connection to local DHC

GrowSmarter
Transforming cities for a smart, sustainable Europe

Technical feasibility - achievements

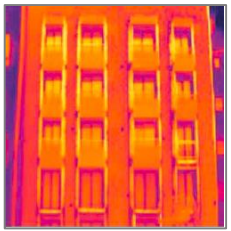
60% energy savings are feasible in cold climates

(1) Upgrade of thermal envelope

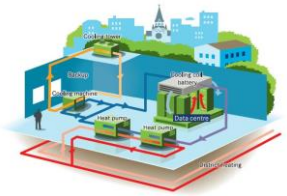
(2) Active solutions

(3) On-site PV generation

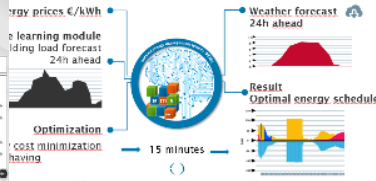
Ensuring the quality of works in energy retrofitting



Waste heat integration with support of DH networks



Smart control of local energy generation in buildings



GrowSmarter

Transforming cities for a smart, sustainable Europe

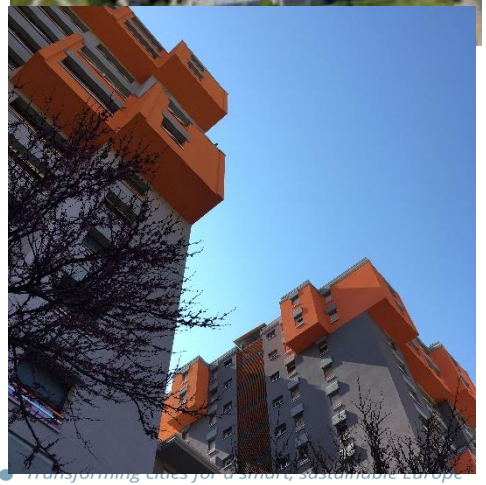
Economic feasibility

Residential buidings
- Colder/warmer climates
- differrnt rent models includig/discluding energy
- Economies of scale

Tertiary buildings
- Financial results vary from building to building due to income structure

Energy management systems
- have weak financial sustainability due to the low interest from users to pay for the investments. Scale of use may change this.

Other conclusions
- Include energy efficiency when retrofitting!
- Consider externalities such as improved indoor climate/better heat distribution
- Guaranteed energy savings contracts/Design Build Operate (DBO) contracts
- Guarantee quality of measures
- Consider increased value of asset in financial assessment
- Consider interest rates for energy efficiency measures



Influence of local and national regulation

Heritage preservation regulation	Lack of regulation for reconciling energy efficiency and heritage conservation concerns
Local urban planning regulation for the installation of PVs	New ordinances to promote the use of rooftops for renewable energy generation
Exploitation of data from official smart meters	Influence on the scalability of Home Energy Management Systems
National regulation on energy trade	To broaden functionalities for Smart control Local energy communities

Involvement of building users and social relevance

- Engagement campaigns aimed at private owners
- Occupancy use of the building: educate on good practices
- Information about the increase of thermal and noise comfort
- Use energy efficient public buildings as showcases
- HEMS: Focus on gamification to keep users engaged and involved








Help cities
Grow Smarter!


Stockholms stad
Stadt Köln
Ajuntament de Barcelona
I·C·L·E·I
Local Governments for Sustainability
KTH VETENSKAP OCH KONST
IESE Business School University of Navarra
GRAZ
tm Transport Malta
Porto.
Comhairle Cathrach Chorcaí Cork City Council
REC
envac REMOVING WASTE – CREATING VALUE
VEOLIA
Fortum
Carrier Dygnet Runt 08 6850000 TRANSPORT & LOGISTIK
SKANSKA
info 24
INSERO E-MOBILITY
RheinEnergie
ampido Parking is fun
cambio
KVB Kölner Verkehrs-Betriebe AG
AGT international
DEUTSCHE WOHNUNGSGESELLSCHAFT mbH
endesa
cellnex driving telecom connectivity
anteverti
BSC Barcelona Supercomputing Center Centro Nacional de Supercomputación
CENIT CENTER FOR INNOVATION IN TRANSPORT
gasNatural fenosa
i2cat
IREC Institut de Recerca en Energia de Catalunya Catalonia Institute for Energy Research
Schneider Electric
urbis up Cities Development
POLIS
IBM
Stockholmshem
[ui!] the urban institute
NoAE Network of Automotive Excellence