A.

General information regarding the action presented

Bolzano

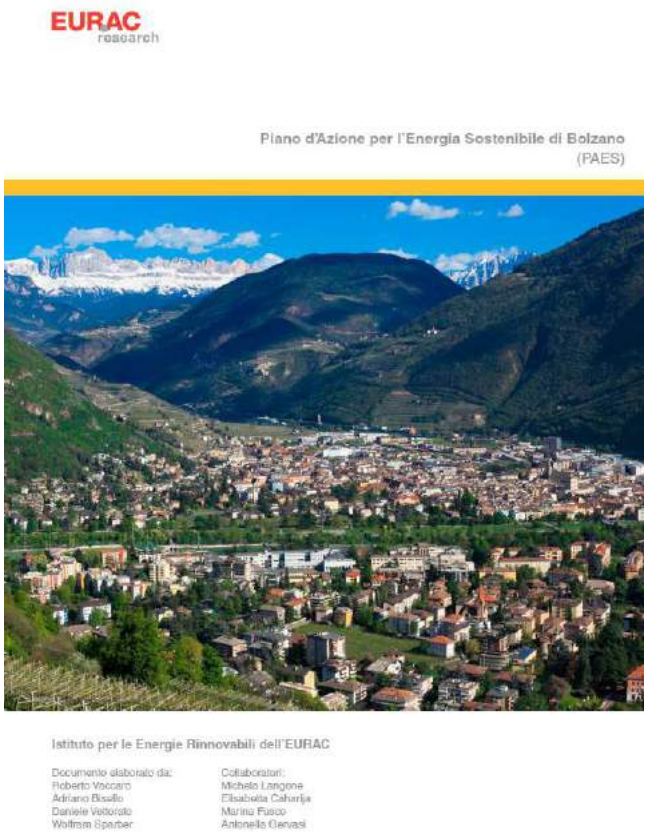

AT
IT

Inhabitants 104.000
Surface 5.240 ha
Settlement area 900 ha
Industry 450 ha
Agriculture 1.300 ha
Forest 2.600 ha

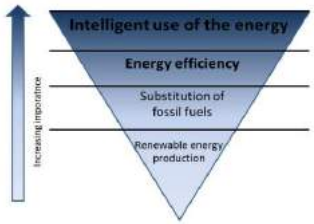
Context

- Existing framework of energy and mobility plans
- Mobility plan and Master plan of the city
- Several European projects activated and related to:
  - energy efficiency in buildings and stakeholder involvement (EPOURBAN, 3ENcult, BRICKER, COmmonENERGY);
  - Reduction of greenhouse gas emmissions from transport in urban areas (REZIPE);
  - ICT and sustainable mobility for environmental data management (INTEGREEN);
- Energy planning office in the Municipality
- Sustainable Energy Action Plan (2011-2014)

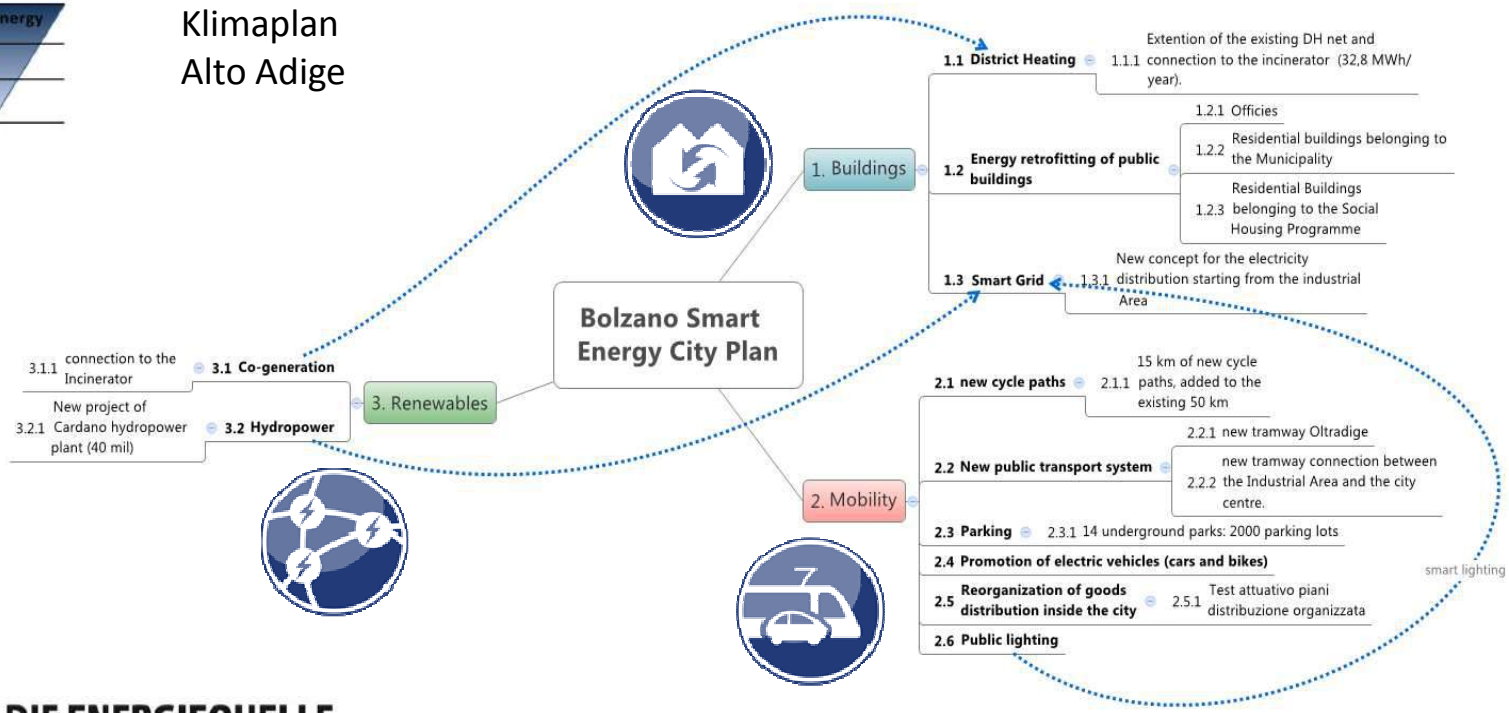
Source: Forumcommunity, Gem. Bozen, Bilfinger



SUSTAINABLE ENERGY ACTION PLAN



Klimaplan
Alto Adige



BOZEN. DIE ENERGIEQUELLE.
BOLZANO. FONTE DI ENERGIA.

CO2 EMISSIONS IN BOLZANO (2010)

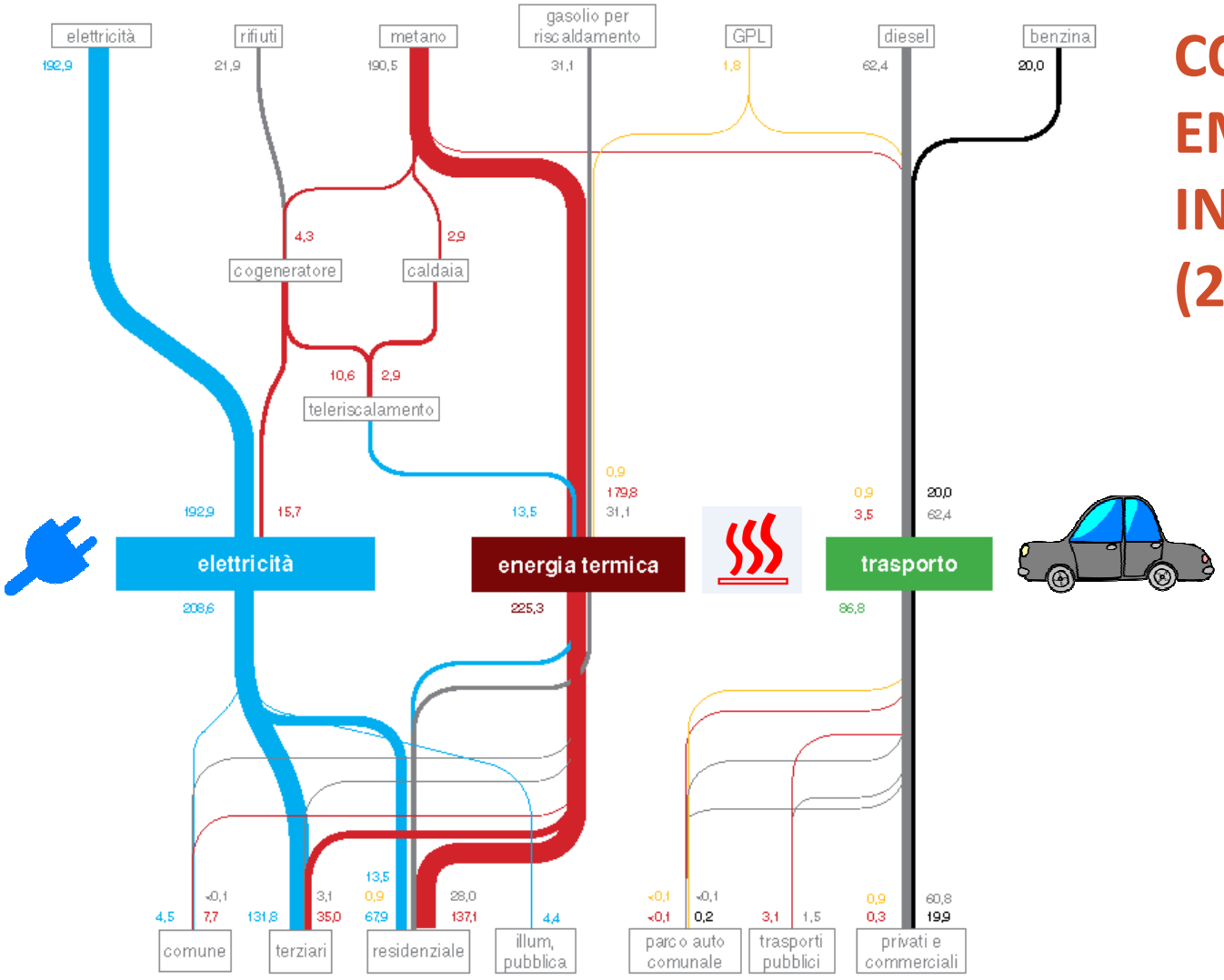
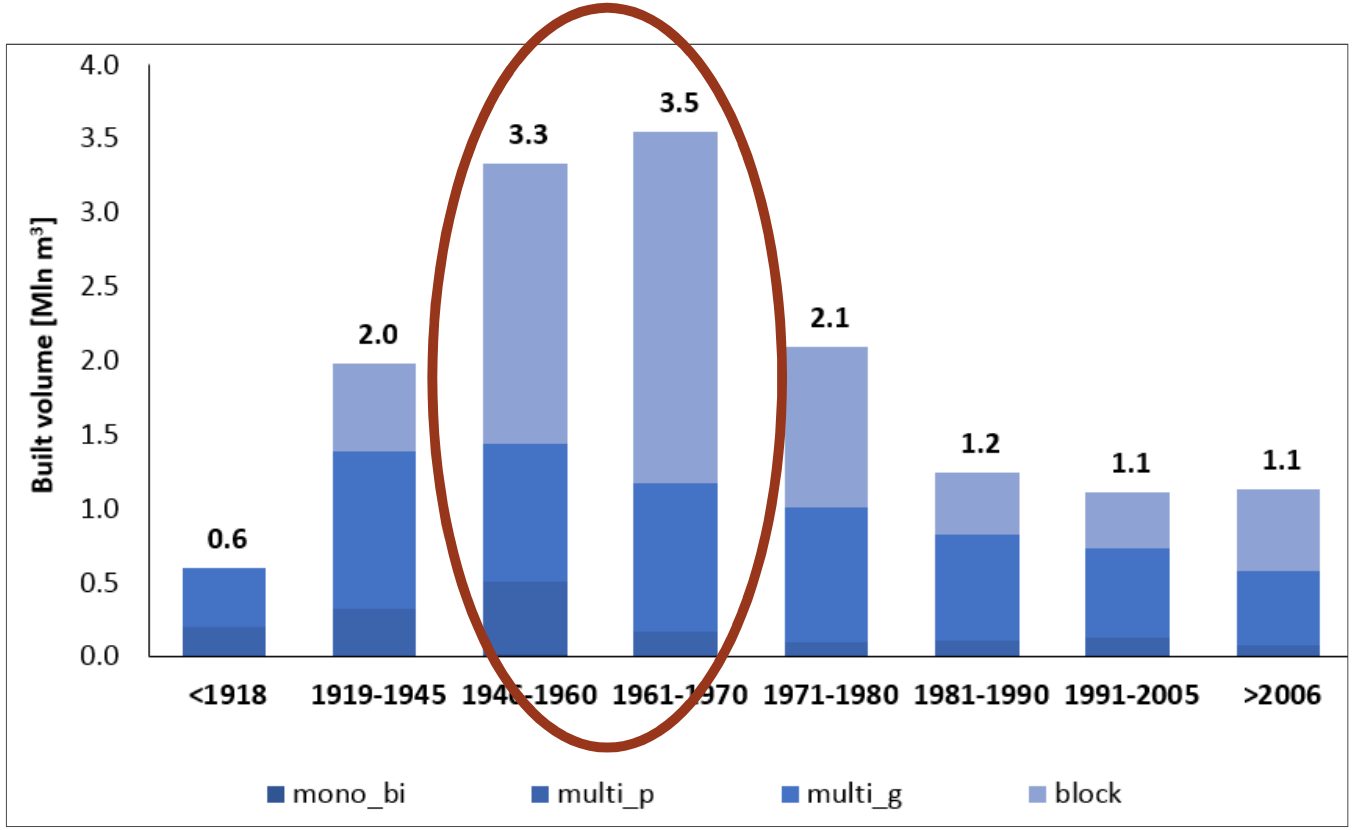


FIGURE 32. NUMBER OF BUILDINGS AND TOTAL SURFACE PER EACH CONSUMPTION CATEGORIES

TABLE 9. AVERAGE VALUES FOR ENERGY CONSUMPTION PER SQUARE METER DISTINCT BY BUILDINGS AGE AND TYPOLOGY; COLOURS HIGHLIGHT LOWER CONSUMPTION IN GREEN AND HIGHER CONSUMPTION IN RED

kWh/m² year	mono-bifamily	multifamily small	multifamily big	block
until 1918	168.01	112.64	107.33	
1919-1945	199.95	128.41	116.12	111.89
1946-1960	159.36	119.31	114.50	114.39
1961-1970	191.04	129.51	153.61	137.16
1971-1980	114.05	128.12	173.48	167.49
1981-1990		120.38	129.27	147.64
1991-2000	205.78	140.35	110.40	114.30
2001-2005	104.92	105.82	102.68	100.48
from 2006	101.56	99.56	98.19	77.37



BREAKDOWN PER BUILDING TYPOLOGY AND CONSTRUCTION PERIOD

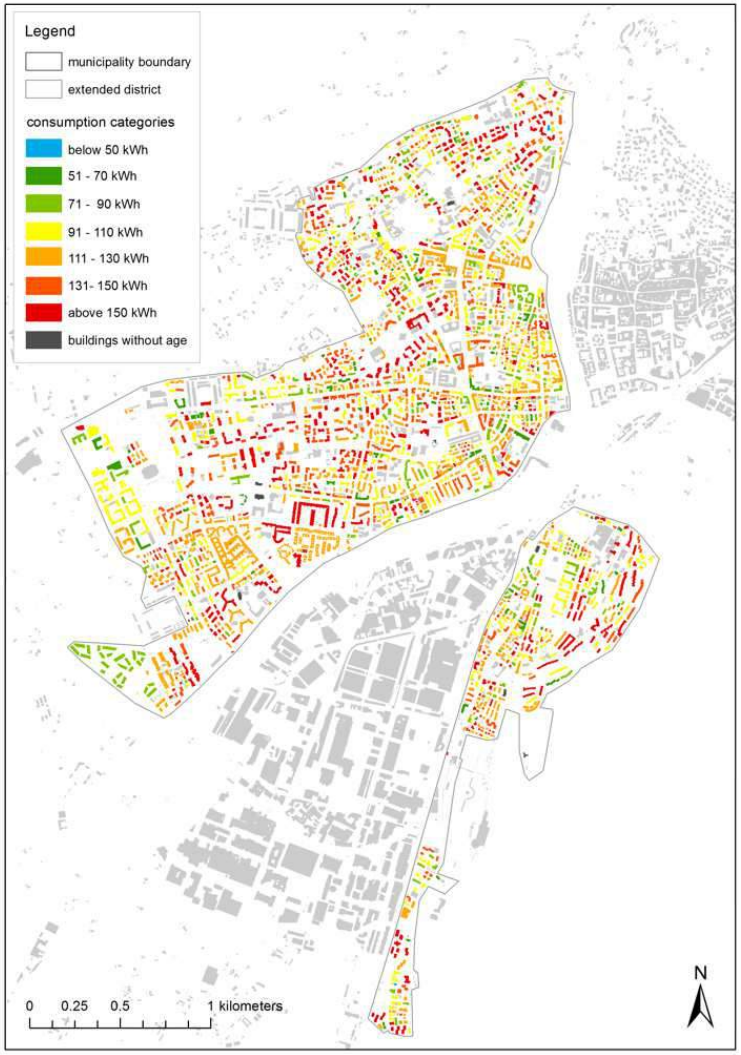


FIGURE 33. DISTRIBUTION OF BUILDINGS IN THE EXTENDED DISTRICT OF BOLZANO DIVIDED FOR CONSUMPTION CATEGORIES

SEVENTH FRAMEWORK PROGRAMME

SINFONIA PROJECT – FP7 8.8.1 ENERGY SCC

Project submission: OCTOBER 2012
project start: JUNE 2014

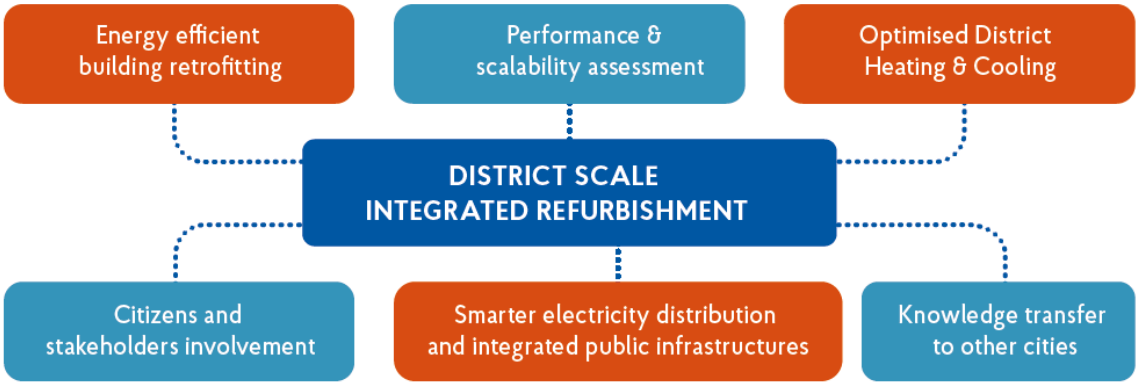
SINFONIA MAIN FIGURES

MAIN FIGURES	
Total Budget EU	43 Mln Euro 30 Mln Euro
Duration	5 years (started 06.2014)
Partners	23 partners + 10 third parties

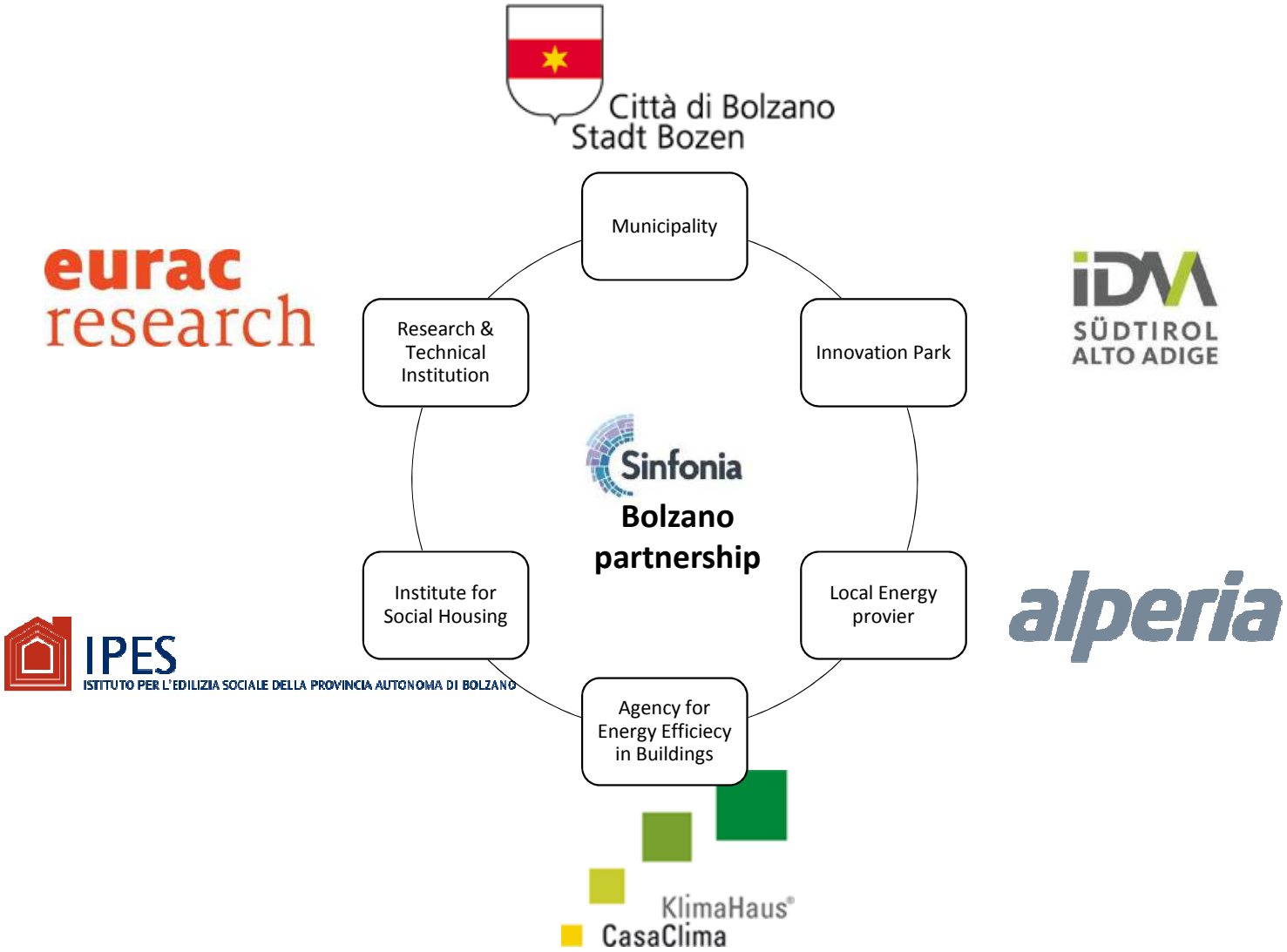
B.

Rationale for initiating the action

SINFONIA: STRUCTURE AND OBJECTIVES



DISTRICT SCALE**, Replicability of interventions** To: • Save up to 40 - 50% primary energy in the DEMO cities; • Increase the share of Renewable Energy by 20% in the energy consumption	• Building reburbishment ; • Energy network optimization; • DHC network optimization


Città di Bolzano
Stadt Bozen
Municipality
Innovation Park
Local Energy provier
Agency for Energy Efficiecy in Buildings
Institute for Social Housing
Research & Technical Institution
Sinfonia
Bolzano partnership
eurac research
IDM SÜDTIROL ALTO ADIGE
IPES
ISTITUTO PER L'EDILIZIA SOCIALE DELLA PROVINCIA AUTONOMA DI BOLZANO
alperia
KlimaHaus
CasaClima

C.

Financial aspects

BOLZANO IMPLEMENTATION VALUES

BOLZANO Implementation	Values
Total EC contribution in Bolzano	8 M € (out of 30 M €)
Total Project value (incl. Cofin)	15 M € (out of 43 M€)
Total financial allocation in the city	~100 M €

D.

Mechanism of Implementation

ACTIONS in BOLZANO


Sinfonia
Low Carbon cities for better living

Sinfonia a Bolzano

BUILDING REFURBISHMENT

Citizens living in refurbished area	15,000
Total refurbished area	37,000m²
Dwellings retrofitted	451
Estimated Energy Savings	50%

SOCIAL HOUSING BUILDINGS OF 1950-70TIES

- Building envelope insulation;
- Integration of renewable energy sources for electricity, heating and domestic hot water;
- PV panels;
- Additional storeys using innovative timber construction technologies.

Sinfonia a Bolzano

BUILDING REFURBISHMENT

Sinfonia a Bolzano

BUILDING REFURBISHMENT

Test of the Bonus on Volume Program

Up to 20% of additional volume if an energy retrofit at A class is done

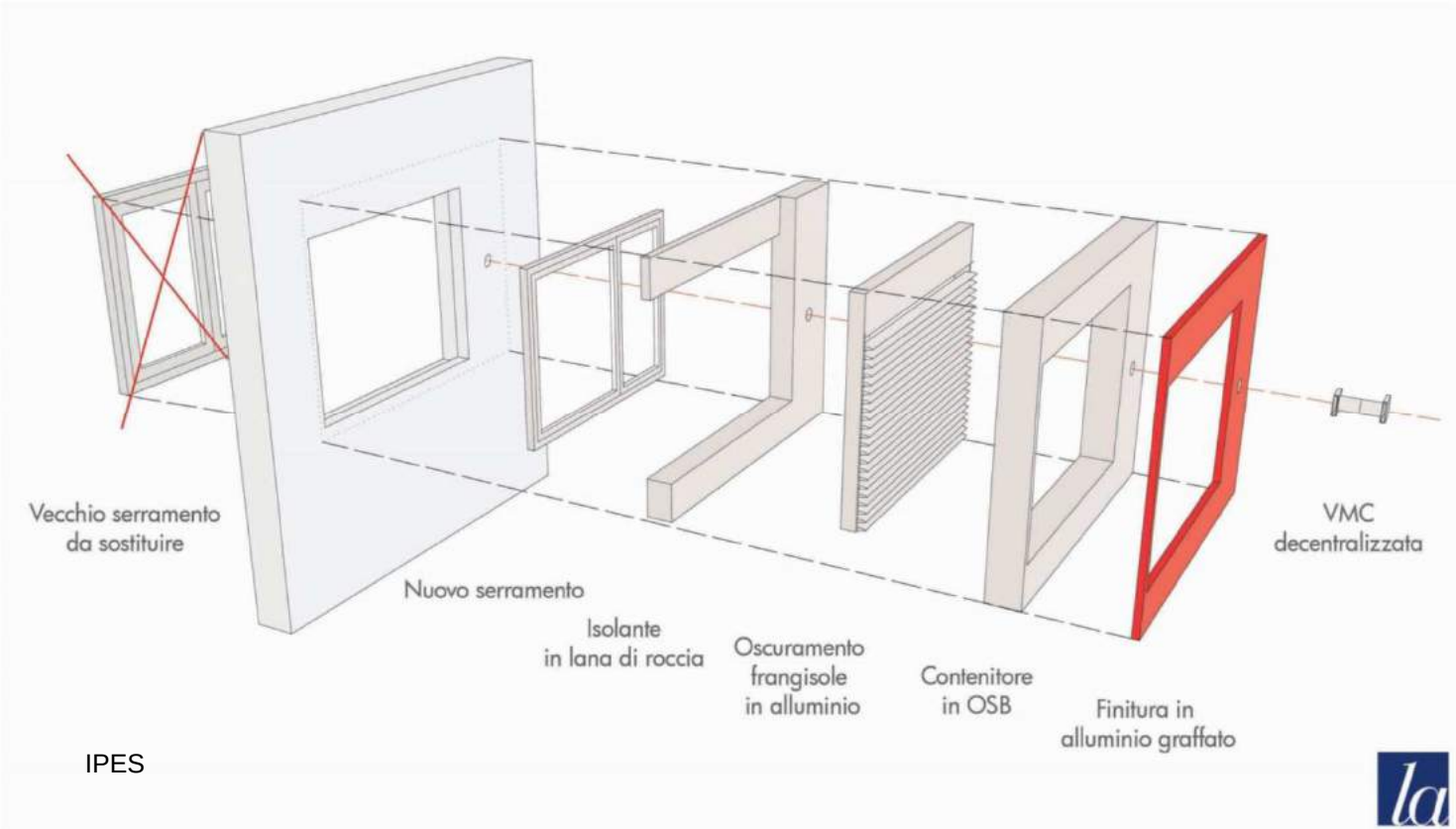

Via Palermo 38+10

Via Similaun 59+10 flats

Example of applied measures – external insulation

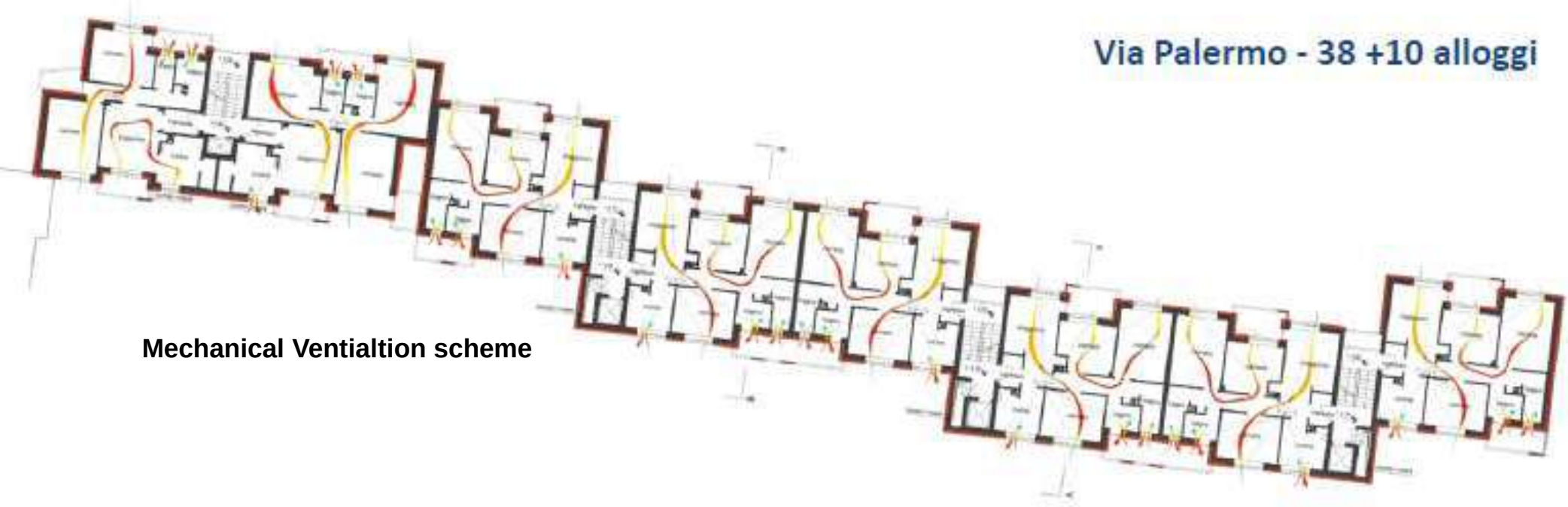
- Different types of façade refurbishment are applied
- In some buildings prefabricated façade elements are used in order to reduce intervention time on sight

Example of applied measures –



IPES

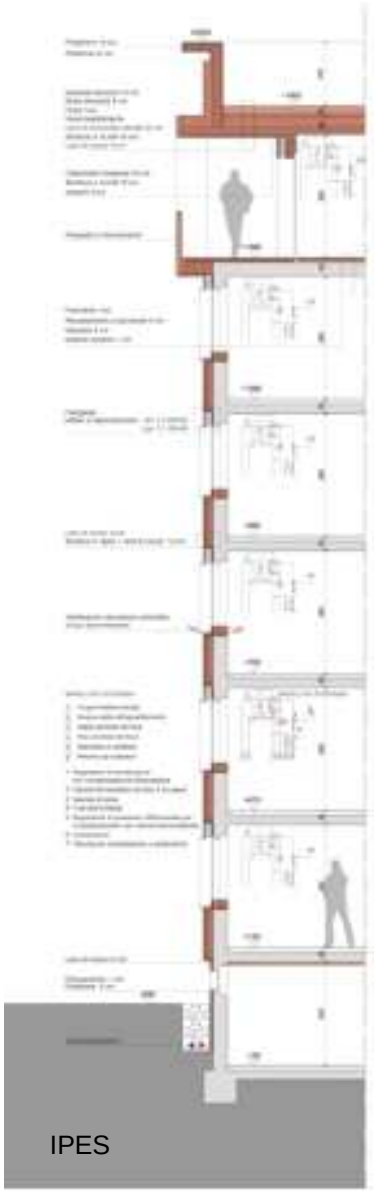
Example of applied technologies



Mechanical Ventialtion scheme

Example of applied measures – “bonus on volume”

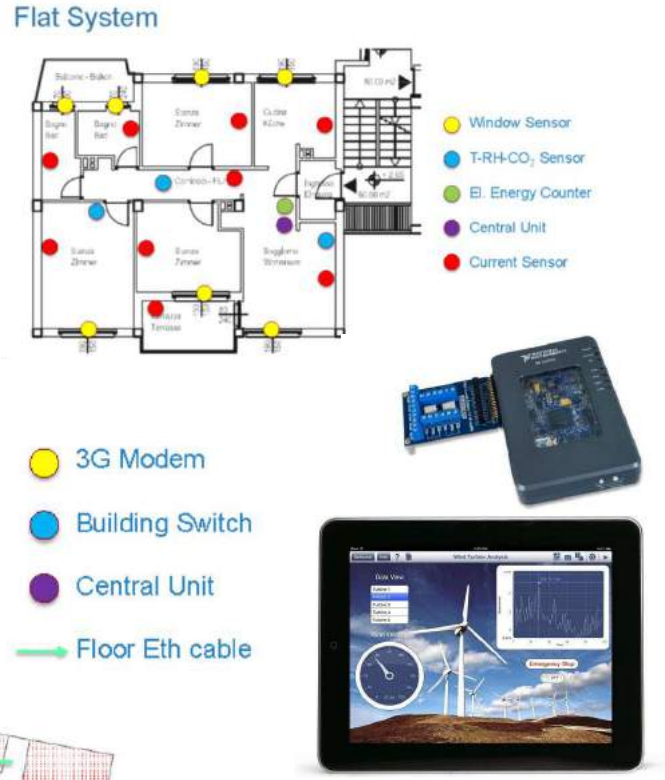
Comune di Bolzano, M7 Architecture –Marco Sette architetto

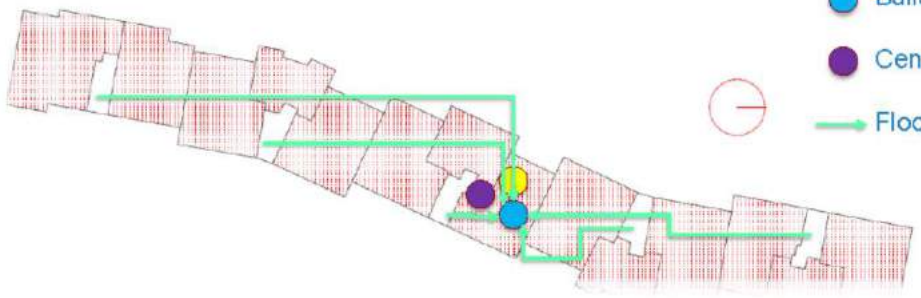


IPES

Large scale monitoring system and data aquisition
170 apparments

- ✓ Better building energy management
- ✓ Direct feedback to tenants
- ✓ Tenant awareness and participation





Example - Via Parma

Actual situation:

- Casaclima G

(186 kWh/m²y)

- 77 flats

After refurbishment:

- Casaclima A

(18 kWh/m²y)

- 77 + 16 additional flats

Example - Via Aslago

Actual situation:

- Casaclima G

(228 kWh/m²y)

- 70 flats

After refurbishment:

- Casaclima A

(21 kWh/m²y)

- 70 + 14 additional flats


Via Palermo
74
BLUMEN BAK FIORI
IPES


Via Similaun
IPES

Via Parma

Comune di Bolzano, M7 Architecture –Marco Sette architetto

Via Aslago

Comune di Bolzano - Area Architetti

Passeggiata dei Castani

Comune di Bolzano - Studio Mellano con ARCH+MORE

FINANCIAL FIGURES ON BUILDING REFURBISHMENT

Comune of Bolzano:

- Investment for refurbishment: ~ 450 – 500 €/m²
- Investment for additional floor: ~ 1500 €/m²

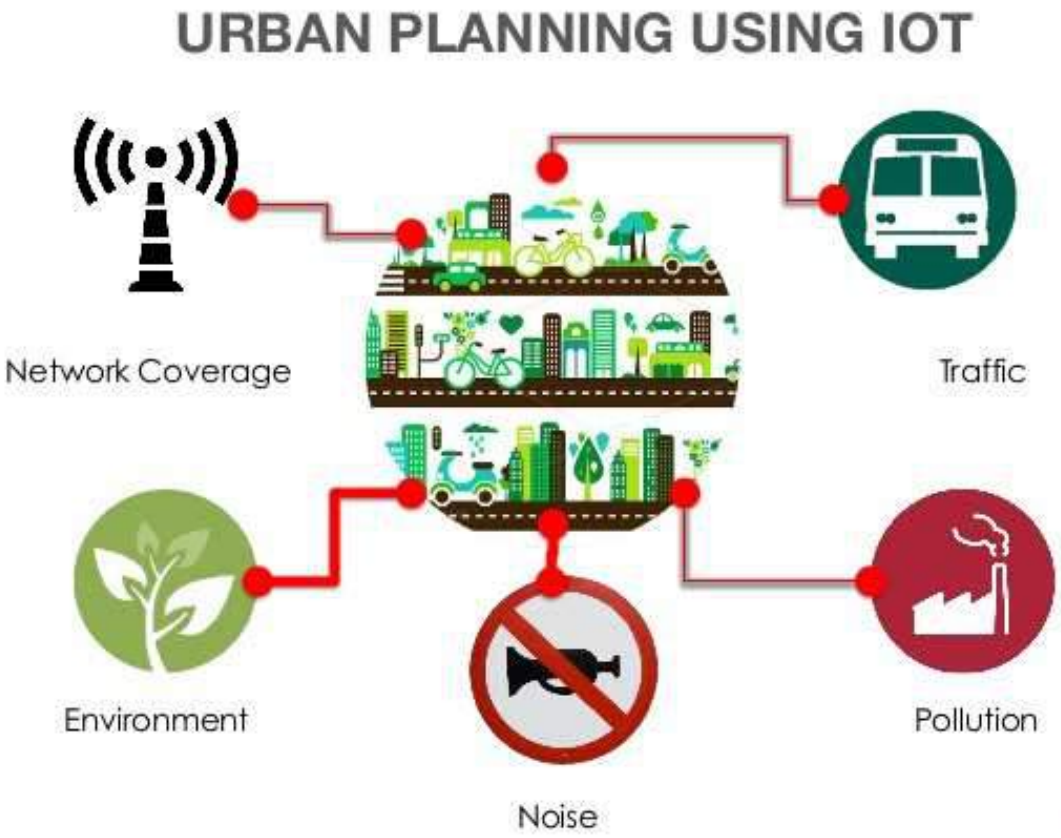
=> Reference price for new buildings of the Province of Bolzano: 1420 €/m²

IPES:

- Investment per flat: ~ 45.000 €

SMART STRATEGIES ICT

ELECTRICITY GRID



Sinfonia a Bolzano

ELECTRICITY GRID

Smart points	150
Different services	6
Citizens involved	50,000

URBAN SERVICE-ORIENTED SENSIBLE GRID (USOS-GRID)

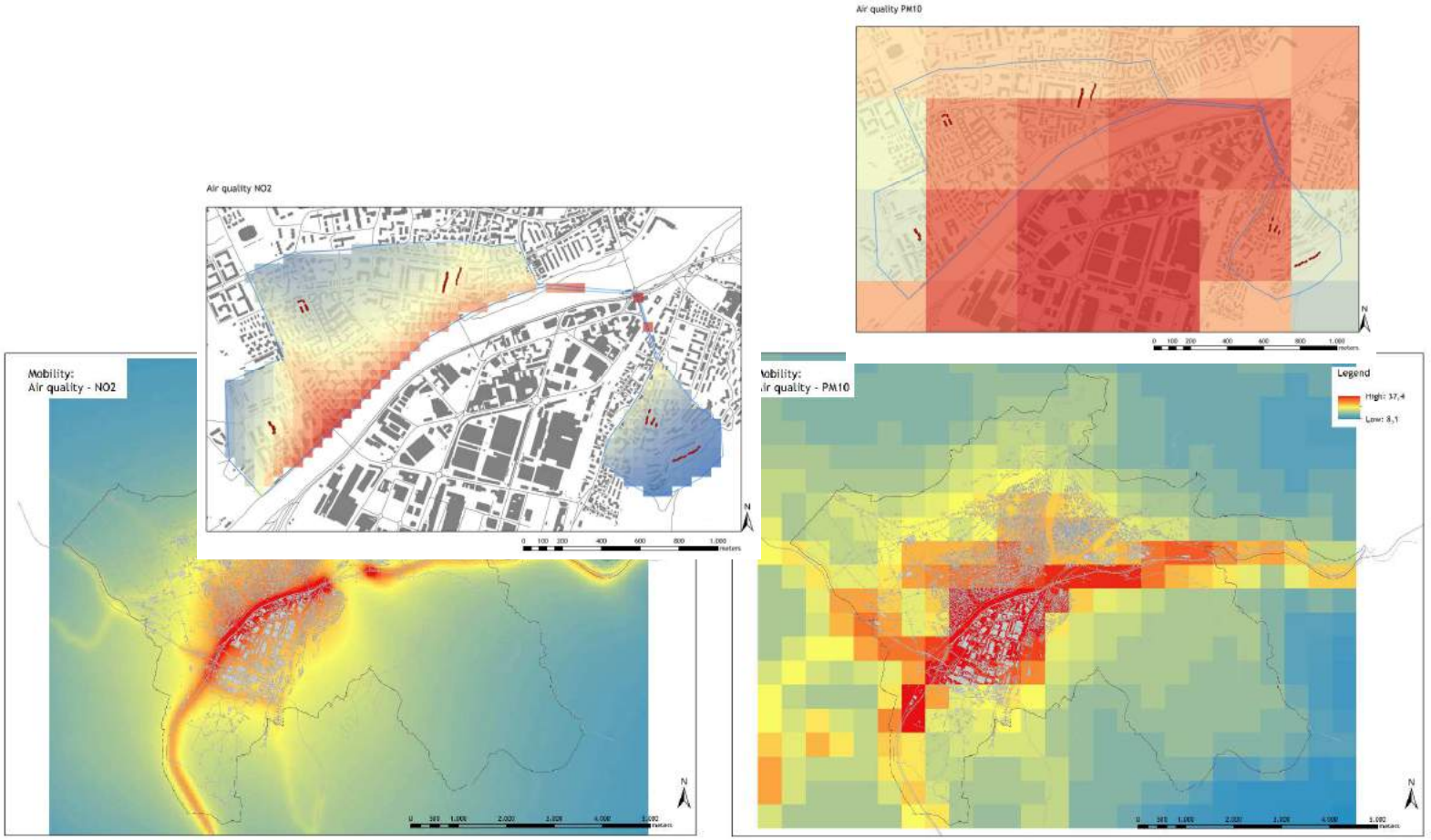
- Recharge points for vehicles and bicycles;
- Meteorological stations for local climate condition monitoring;
- Smart retrofitting of the public lighting system.

- **Strategic** and **operational financial savings** though the scale of energy savings;
- **Re-use** and exploitation of **existing assets** through focus application;
- **Energy saving** potential through LED and smart lightening systems installation (50-75%);
- **GHG emissions reduction** by better traffic/parking management and provision of the charging services to sustainable means of transport;
- High scalability and **replicability** potential;
- General city **ICT** data collection network **optimization**, data management and services provision

Source:EURAC

MOBILITY: AIR QUALITY

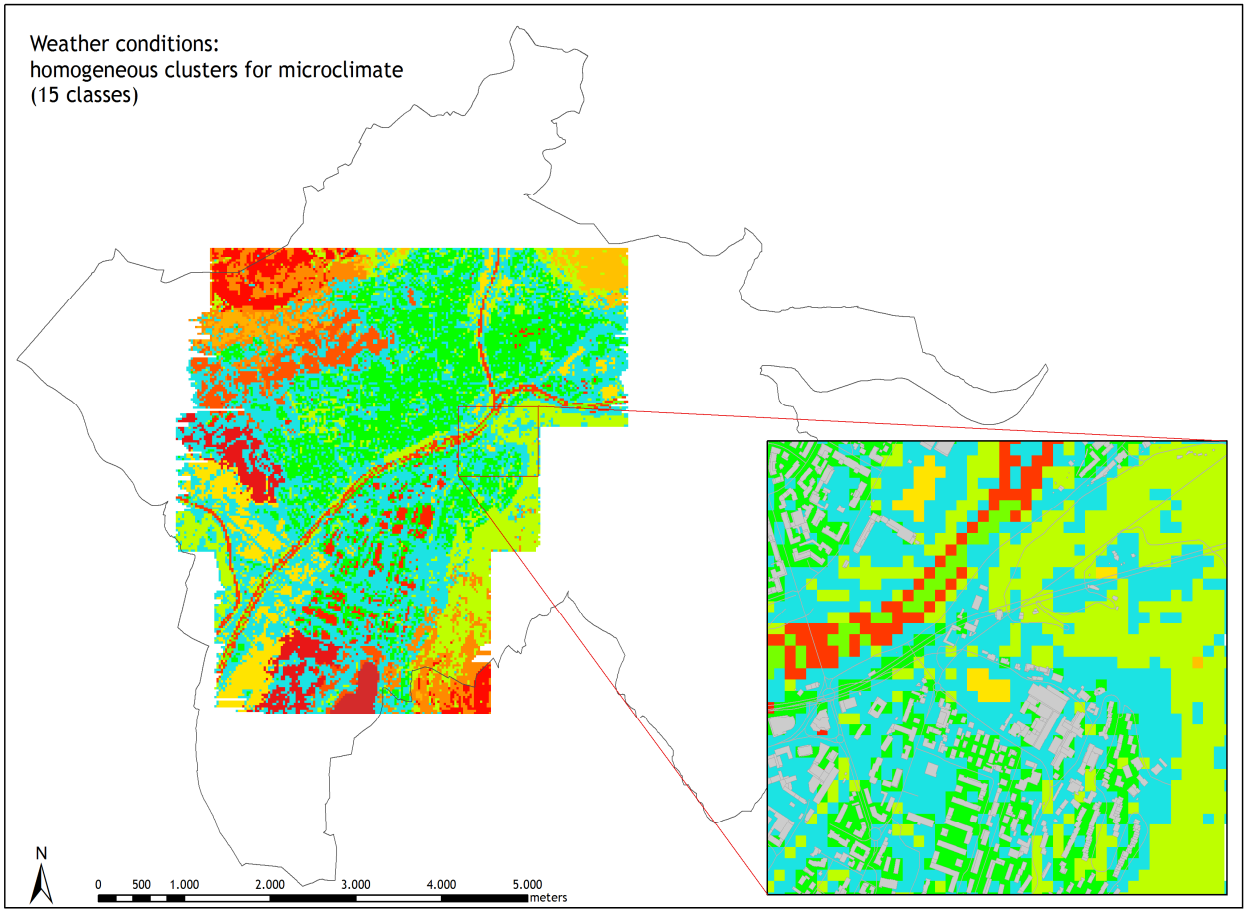
ELECTRICITY GRID



Sinfonia a Bolzano

MICROCLIMATE: WEATHER CLUSTERS

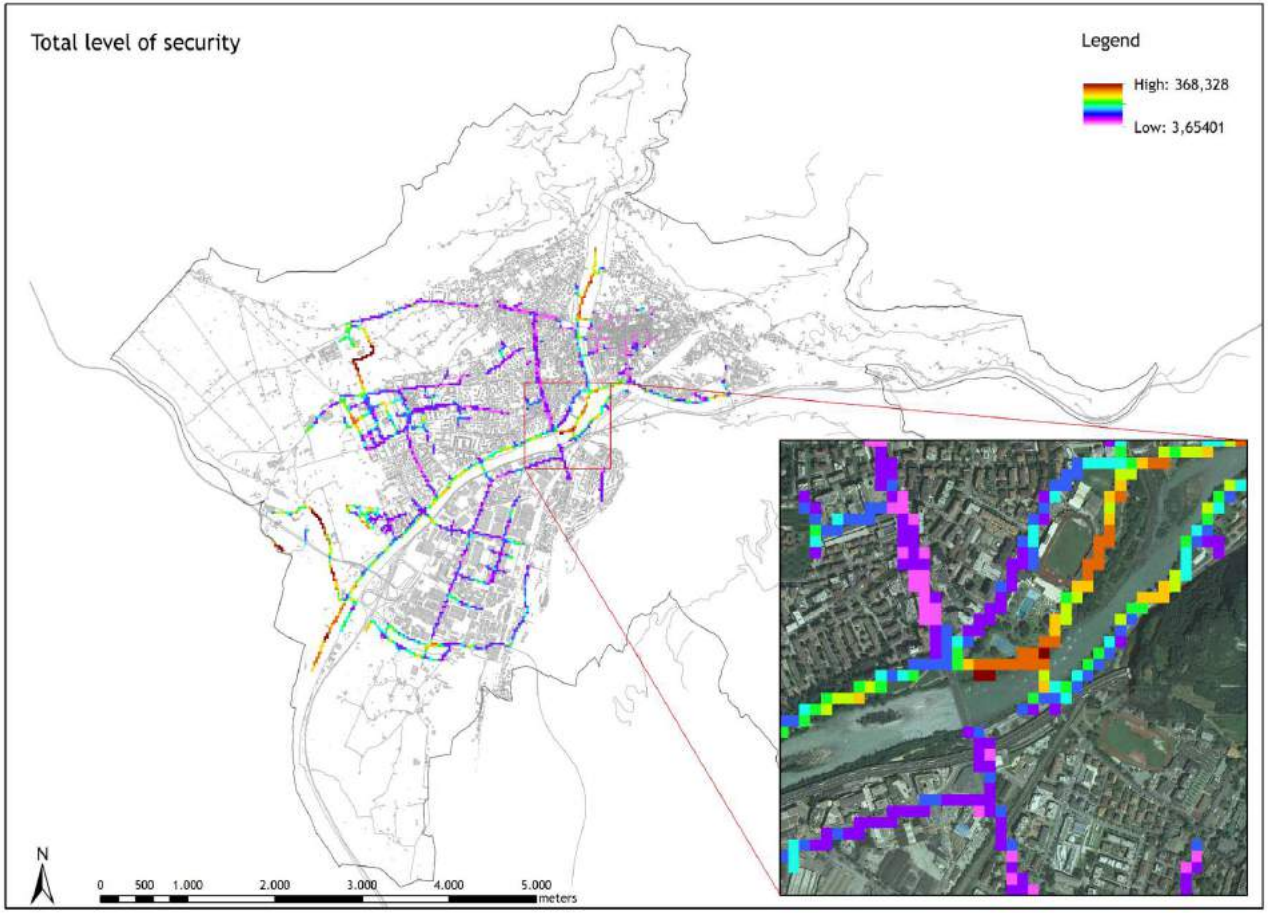
ELECTRICITY GRID



Sinfonia a Bolzano

SECURITY

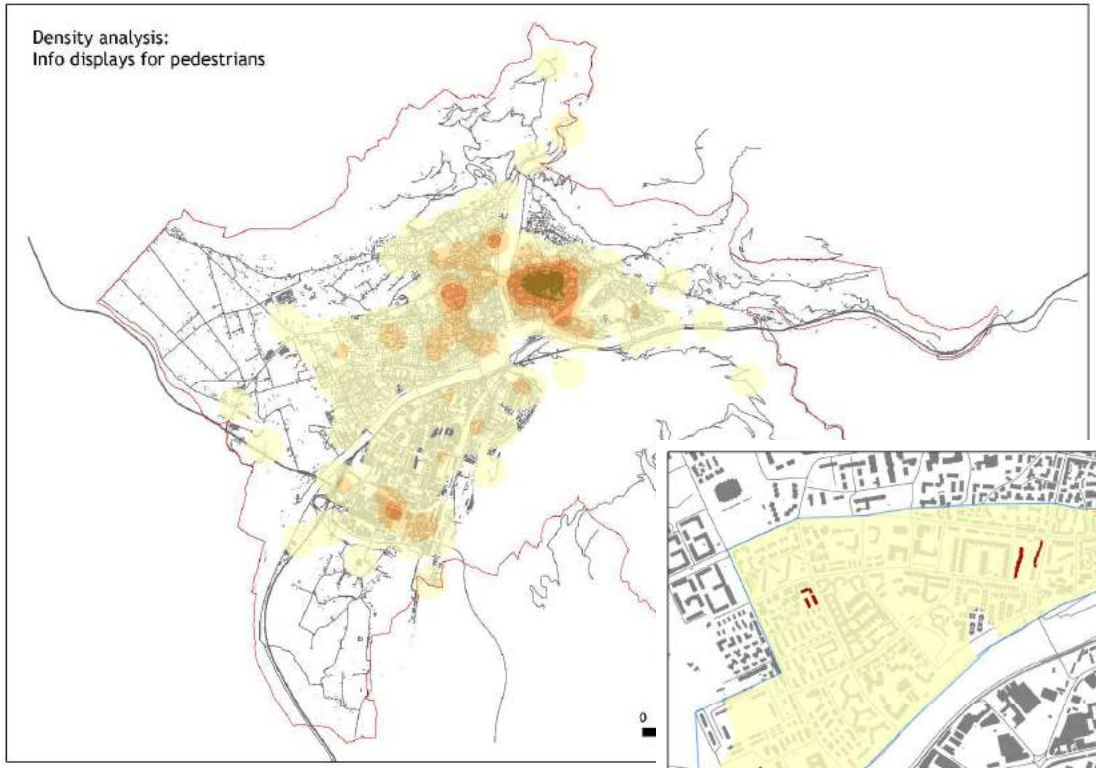
ELECTRICITY GRID

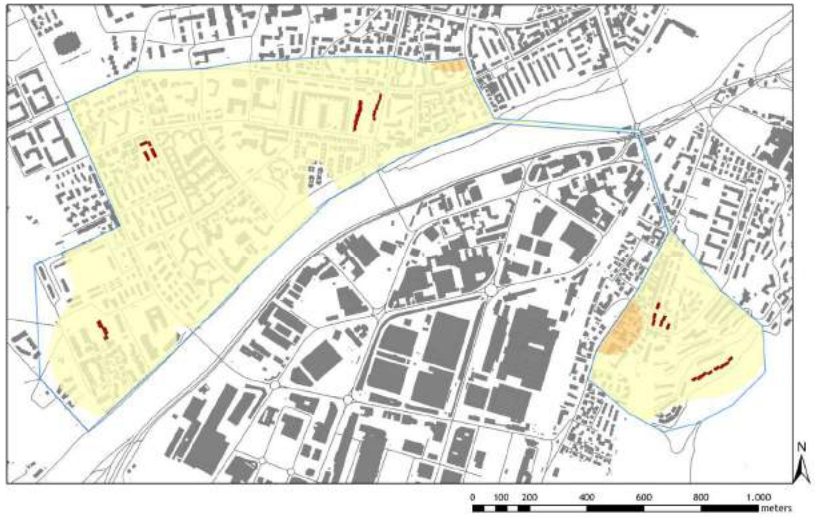


Sinfonia a Bolzano

INFO/SERVICES TO CITIZENS

ELECTRICITY GRID

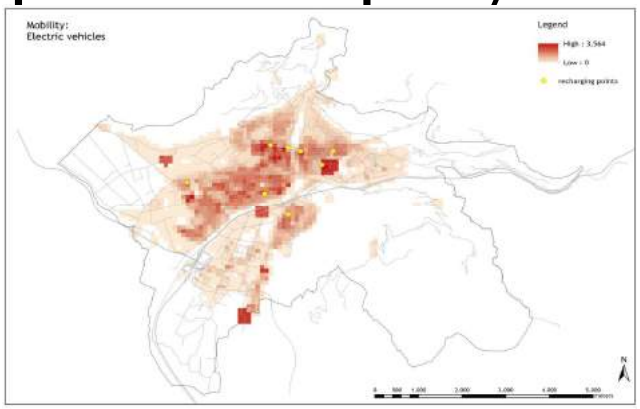




DENSITY WEIGHTED ANALYSIS OF:

- **schools** (with internal weights),
- **bars/restaurants, stores** (>= 50 workers),
- **theaters/museums, parking** (no hospital and >= 150 places),
- **stations** (bus and train),
- **principal squares**

Examples of smart point/services



EURAC - Formaxxiom

"Totem Urban Area"

- Optic fiber connection;
- Electricity connection;
- Integration of the electricity connection with the separated PV module integrated in the roof
- display touch
- Light art
- Smartphone charger USB, cables, inductive charging
- NFC reader
- Webcam
- Microphone

"Totem green areas"

- Optic fiber connection;
- Electricity connection;
- Light;
- SOS point;
- Display touch;
- wi-fi,
- cell phone charger,
- webcam,
- NFC
- Water source
- Microphone

Examples of smart point/services

"Totem Parking area (Optional)"

- Optic fiber,
- Electricity connection
- EV charger
- Wi-fi
- Webcamera
- Display
- Camera for the parking lots availability monitoring

Diffused sensors

- Air quality monitoring
- Traffic information panels
- Bluetooth car trackers
- Bicycle trackers
- Safety cameras
- Smart lighting systems

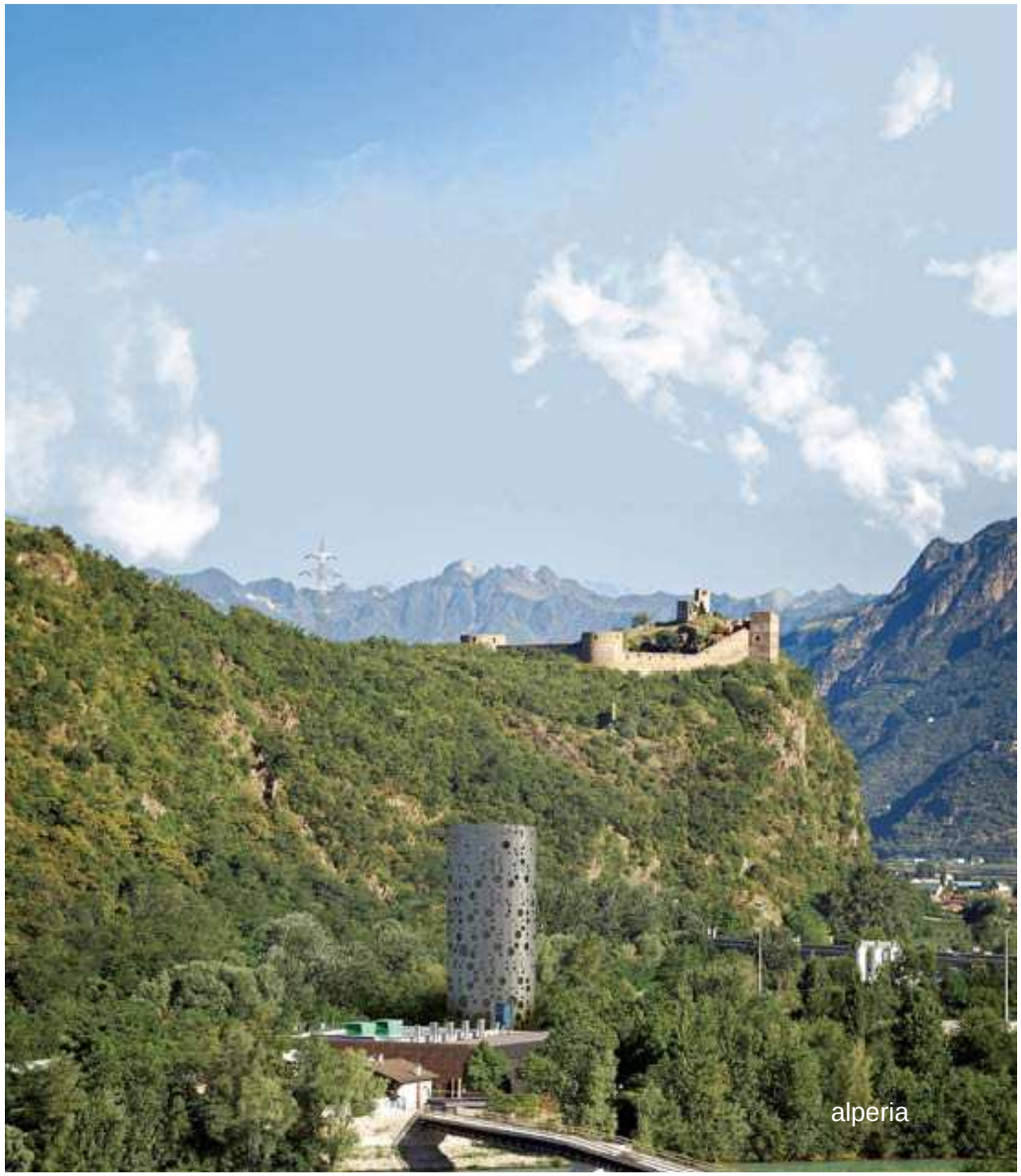
Bolzano – district heating

Bolzano – waste incineration

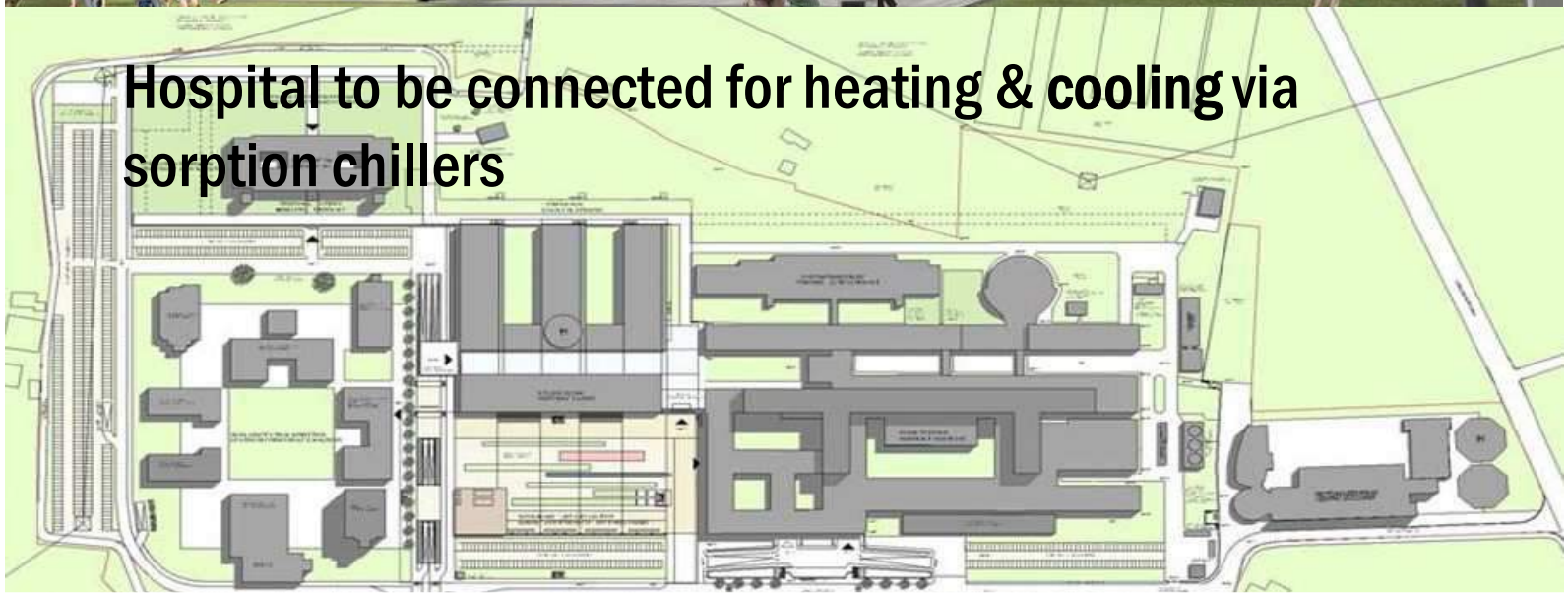
Thermal energy storage

- Thermal energy storage under construction by Alperia

- To serve as buffer between waste incineration production and the city consumption




New city quarter to be connected applying lower temperatures


Hospital to be connected for heating & cooling via sorption chillers

DISTRICT HEATING & COOLING

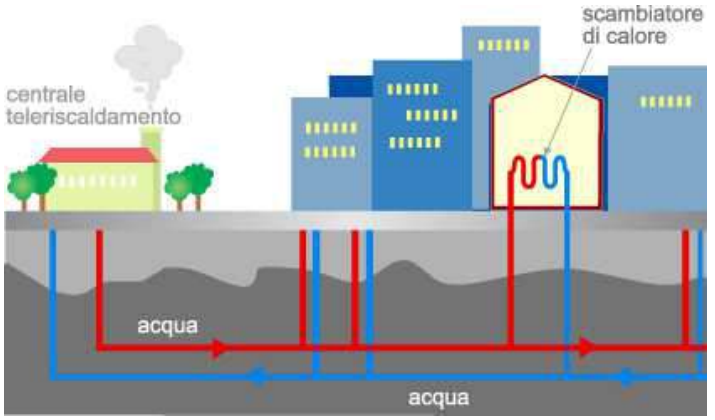
Expected reduction of

CO2eq up to **30%**

NOx up to **60%**

THE DISTRICT & COOLING NETWORK EXTENDED AND OPTIMISED

- Real time monitoring and forecasting of peak loads and energy demand;
- Hybrid hydrogen/methane backup system;
- Feasibility study for recovery of wasted energy in the local industrial park.



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DISTRICT HEATING & COOLING

Sinfonia a Bolzano

www.sinfonia-smartcities.eu

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