University of Applied Sciences and Arts
of Southern Switzerland

SUPSI

International seminar

**Toward Smart cities: integrated approaches**

**Topic E- Smart Environment**

Astana 15 june 2017

Bruno Storni

# An integrated sustainable water supply management project

**Implemented by Azienda Acqua Potabile Gordola (Canton Ticino Switzerland)**

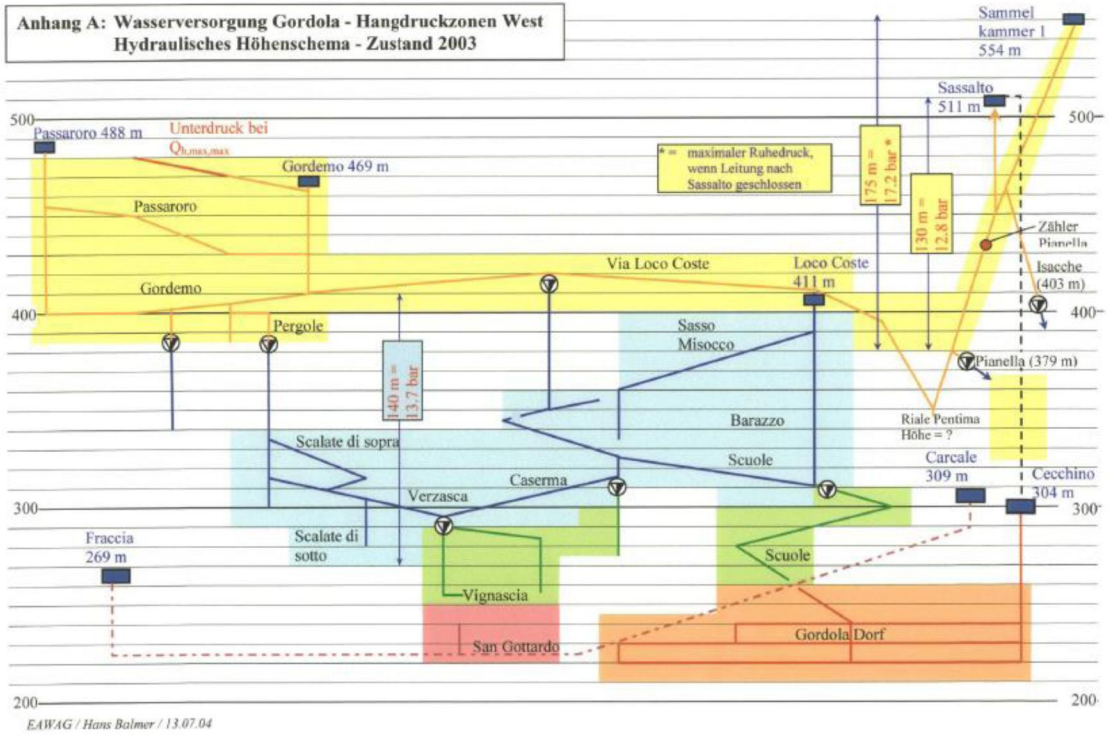
Vincitrice del Premio

Watt d'Or2010

Riconoscimento assegnato dall'Ufficio federale dell'energia ai migliori progetti nel campo del risparmio energetico

# 1990 our challenge

- Hot summer days very high demand
- Insufficient aumont of water produced from springs
  - Difficult hydraulic system Insufficient pressure in certain areas



# 1993 a huge project for more water

- Large scale expansion of water supply system
- Planned for a demografic evolution more than doubling population
- Foresaw a yearly increase of water consumption of **0,8 %** per inhabitant
- Cost **15 milions** over 15 years

# Also an economic problem

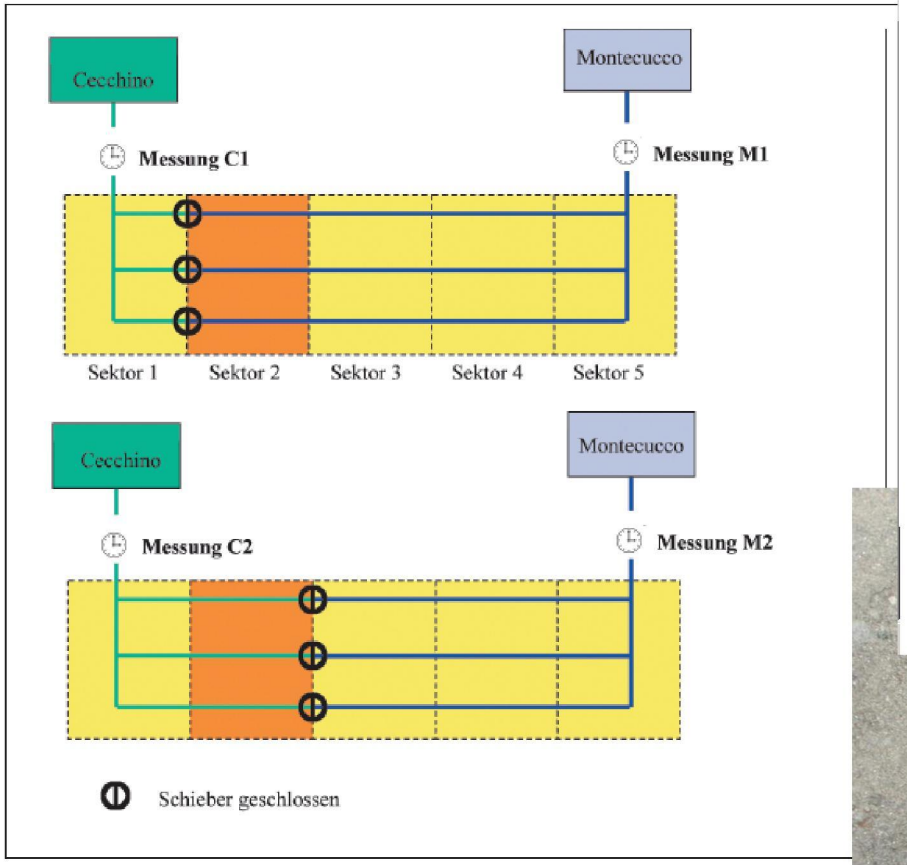
- Why spend so much ?
- Why increase water usage ?
- Other solutions ?

- 2002 Request to **EAWAG** Swiss Federal Institute of Aquatic Science and Technology ETH
  - Urban Water Management Departement

# Can we reduce water demand

- How ?
- Waterworks pipes network leaks
- Consumer : **Demand Side Management**

# Searching for leaks ? new methods





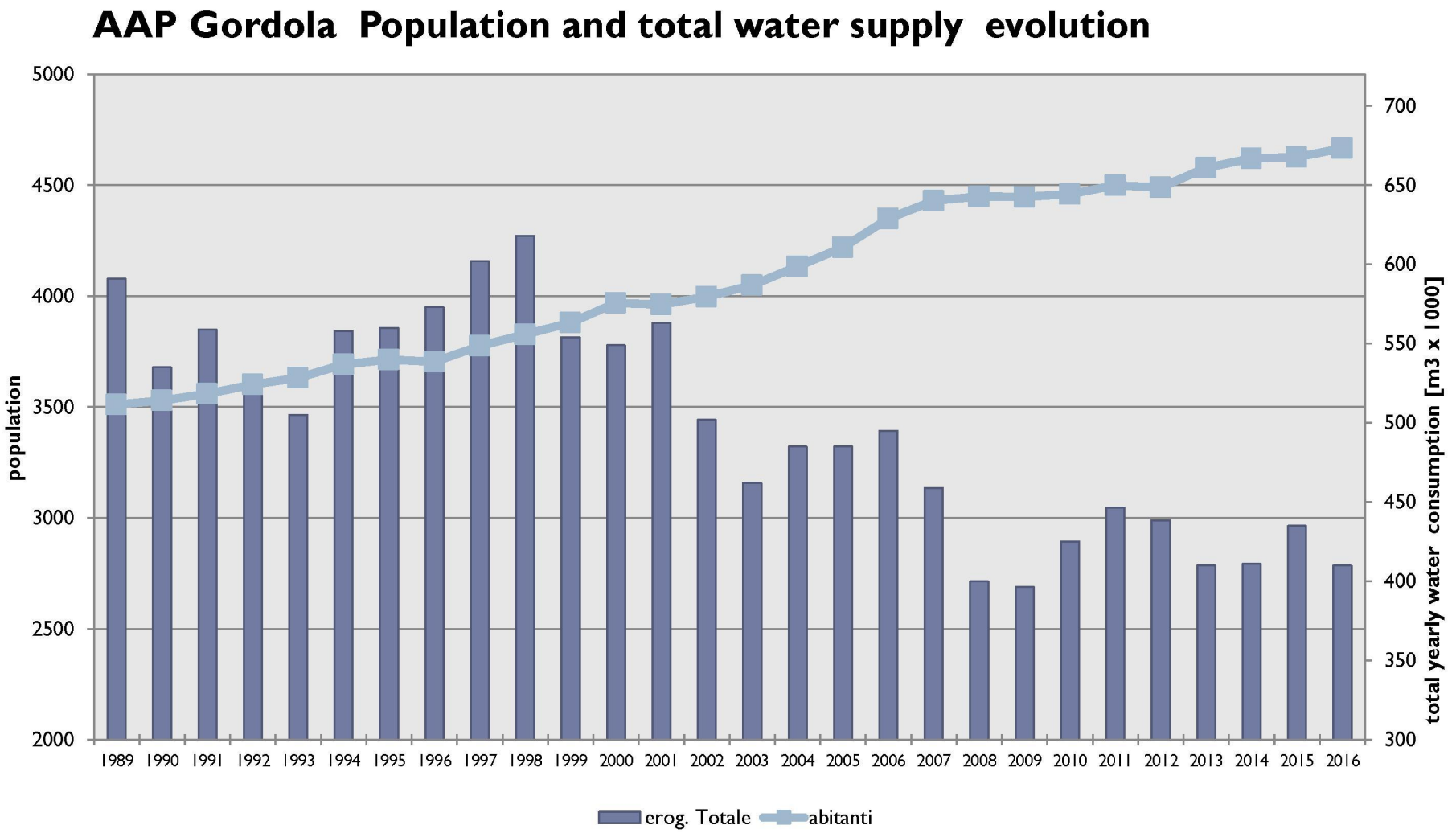
# Consumer information

- Consumer survey to know habits and requests on Water Supply ?
- Water consumption analysis e.g. on peak days
- Regular information about water conservation
- Regulation on swimming pools filling control

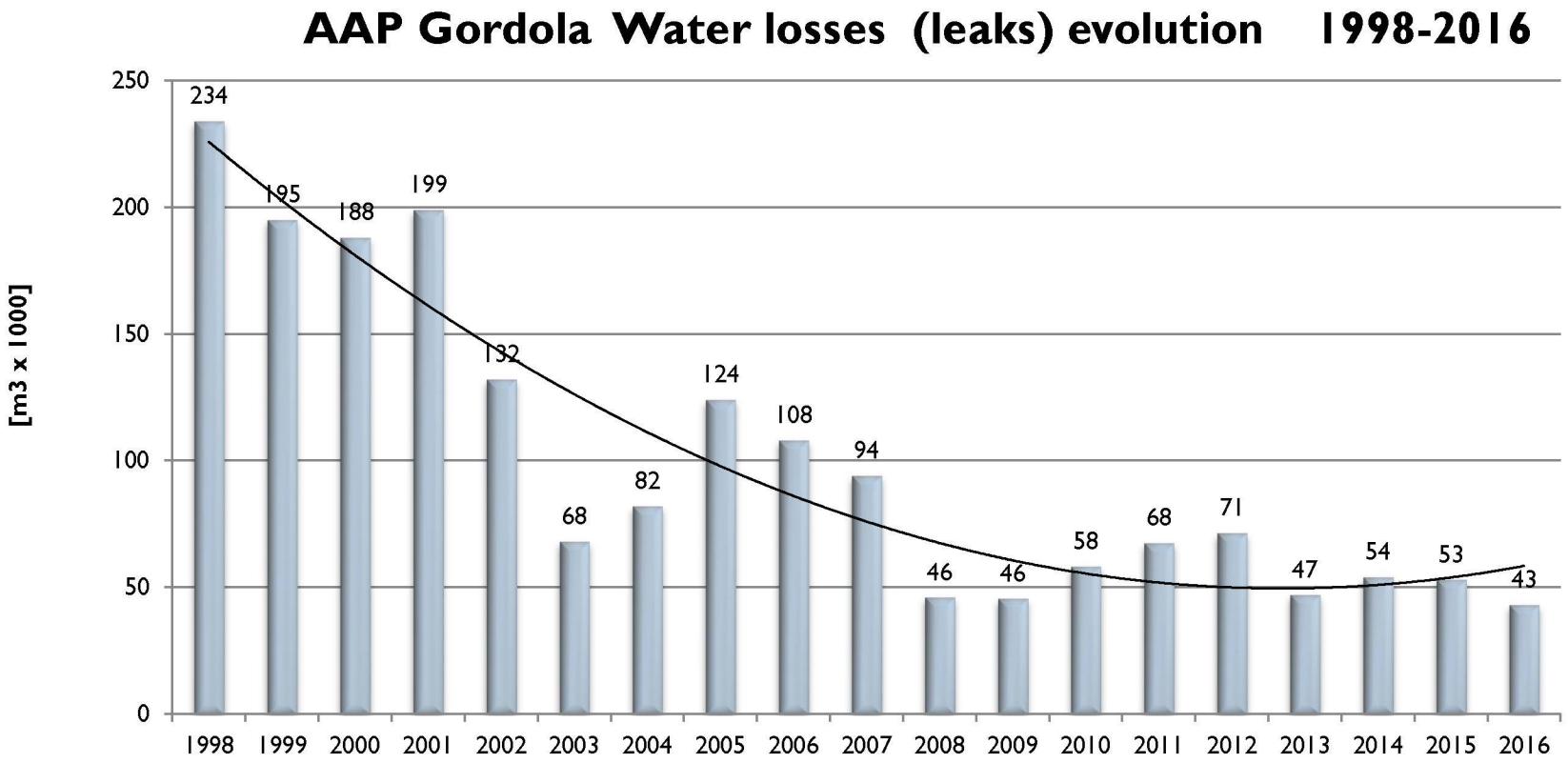
# Results

- Reduction of lost water (leaks) **> 500 mc/day**
- Peak day consumption down from **2700 mc/day** to **1800 mc/day**
- Yearly average consumption per inhabinant down from **>100 mc** to **80 mc**
- Saved **10-15 milions CHFr** investment costs

# Result: reduced demand of water



# Result: reduced water loss



# ..effects on Energy

- Wanted to save money  by saving water

- Saved water = saved energy
  - Pumping energy
  - Heating Domestic Hot Water energy
  - Wastewater treatment energy

# Leaks ? Cost energy

- Since 2002 reduced permanently leaks
  - **500 - 550 mc day**
- Required energy for pumping the leaked water from ground (avoided)
  - **110 - 120 000 kWh/year** @ 0,6 kWh/mc

# Integrated approach

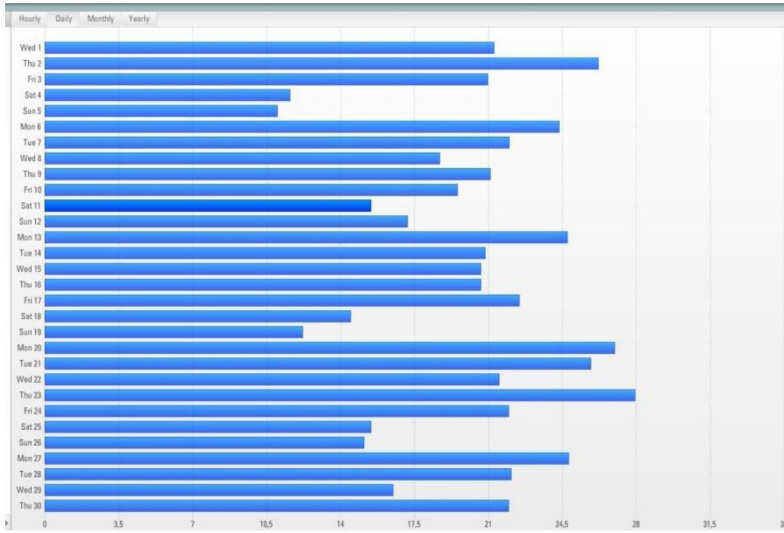
- ..means solving a problem with different measures
  - new technologies
  - demand side management
  - new good practices


- **..means also that Water conservation**
  - **saves energy**
  - **saves money**
- ..means Less for more

- **…toward smart water supply and beyond**

# Integrated approach

- Continuous innovation process
- Next step: Digitalisation ICT, Internet of Things
  - Smartmeter
    - Means
      - Waterworks online monitoring
      - Online leaks detection
      - Dynamic tarifs , peak reduction

Integrated approach means also …exploiting the 250 meter slope from springs to reservoir, drinking water produces electricity
first counterpressure turbine in Ticino  37 kW

# Since 2012 waterwork produce 250’000 kWh/year

# Continuous innovation

- **SUPSI projects**
  - **smartH2O EU FP7**
    - **Social Awarness**
    - **Gamification**
    - proactively **engage citizens** by means of **cooperative awareness tools**, such as water **consumption profiling and feedback**, **persuasive games** for behavior change, and **computer-supported community work**.


  - **AcquaProTI (in prep)**
    - **Digitalisation**
    - **Zero Leaks**
    - **Good pratices**
    - **Dynamic tarifs**
    - **Investements optimisation**