



Development of a
clean and energy self-sustained building
in the vision of integrating H₂ economy with
Renewable Energy Sources

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D'Appolonia S.p.A.
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General Information about the Project

- **Project Title:** Development of a clean and energy self-sustained building in the vision of integrating H₂ economy with Renewable Energy Sources
- **Project Acronym:** H2SusBuild
- **Grant Agreement No.:** NMP2-LA-2008-214395
- **Coordinator:** D'Appolonia S.p.A., Italy
- **Project Start date:** 01-10-2008
- **Project End Date:** 30-09-2012
- **Duration:** 4 years
- **Cost:** 9.9 Million Euro
- **EC contribution:** 6.7 Million Euro
- **Project URL:** <http://www.h2susbuild.ntua.gr>



Consortium (1/2)

D'APPOLONIA



SCAME
SISTEMI



Idrogen²

Schneider
Electric



COMAT
COMPOSITE MATERIALS GMBH

acciona



catator



ΚΑΠΕ
CRES

SKANSKA

UNStudio

decsoft

CAVE



H₂SusBuild

Consortium (2/2)

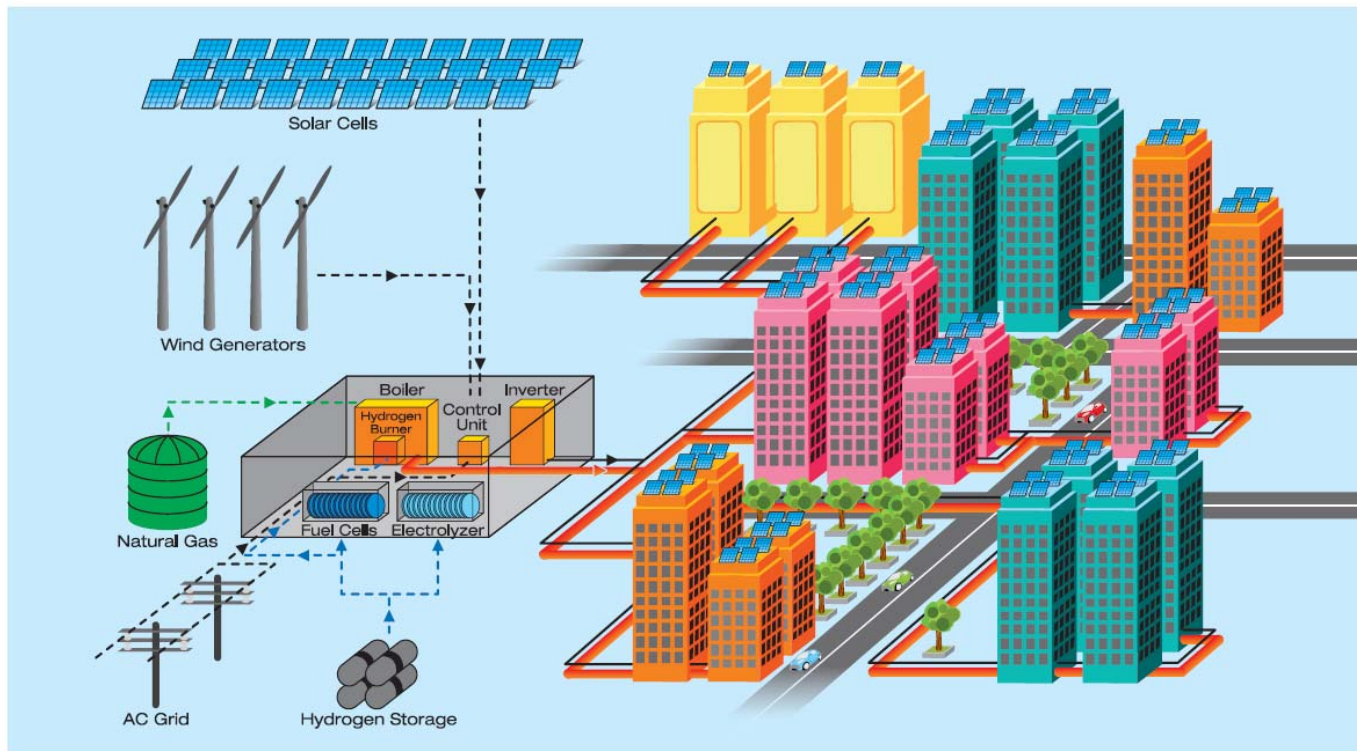
- D'Appolonia S.p.A. (Coord.)
- National Technical University of Athens
- S.C.A.M.E. Sistemi S.r.l.
- IKERLAN Sociedad Cooperativa
- IDROGEN2 S.r.l.
- SCHNEIDER ELECTRIC S.A.
- Institut Für Verbundwerkstoffe GmbH
- Comat Composite Materials GmbH
- Acciona Infraestructuras S.A.
- **Number of Participants: 18**
- I.C.I. Caldaie S.p.A.
- Catator AB
- The University Court of the University of St Andrews
- Centre for Renewable Energy Sources
- SKANSKA Nya Hem AB
- Van Berkel & Bos U.N. Studio B.V.
- DECISOFT Spółka Akcyjna
- CAVE S.r.l.
- Det Norske Veritas AS

Goal (1/2)

- To develop a self-sustained and zero CO₂ emission hybrid energy system to cover electric and thermal energy needs of buildings or districts of buildings
 - By RES availability, RES are used to harvest primary energy to be directly used to cover contingent loads
 - By excess RES availability, the **excess energy is converted to hydrogen** to be used as energy storage material
 - **By RES shortage**, the stored **hydrogen is applied as a green fuel** to cover the building's electric and thermal energy demand, through:
 - **combined heat and power generation** by means of **fuel cells**
 - additional **heat production** by means of **direct combustion**

Goal (2/2)

- To develop a self-sustained and zero CO₂ emission hybrid energy system to cover electric and thermal energy needs of buildings or districts of buildings



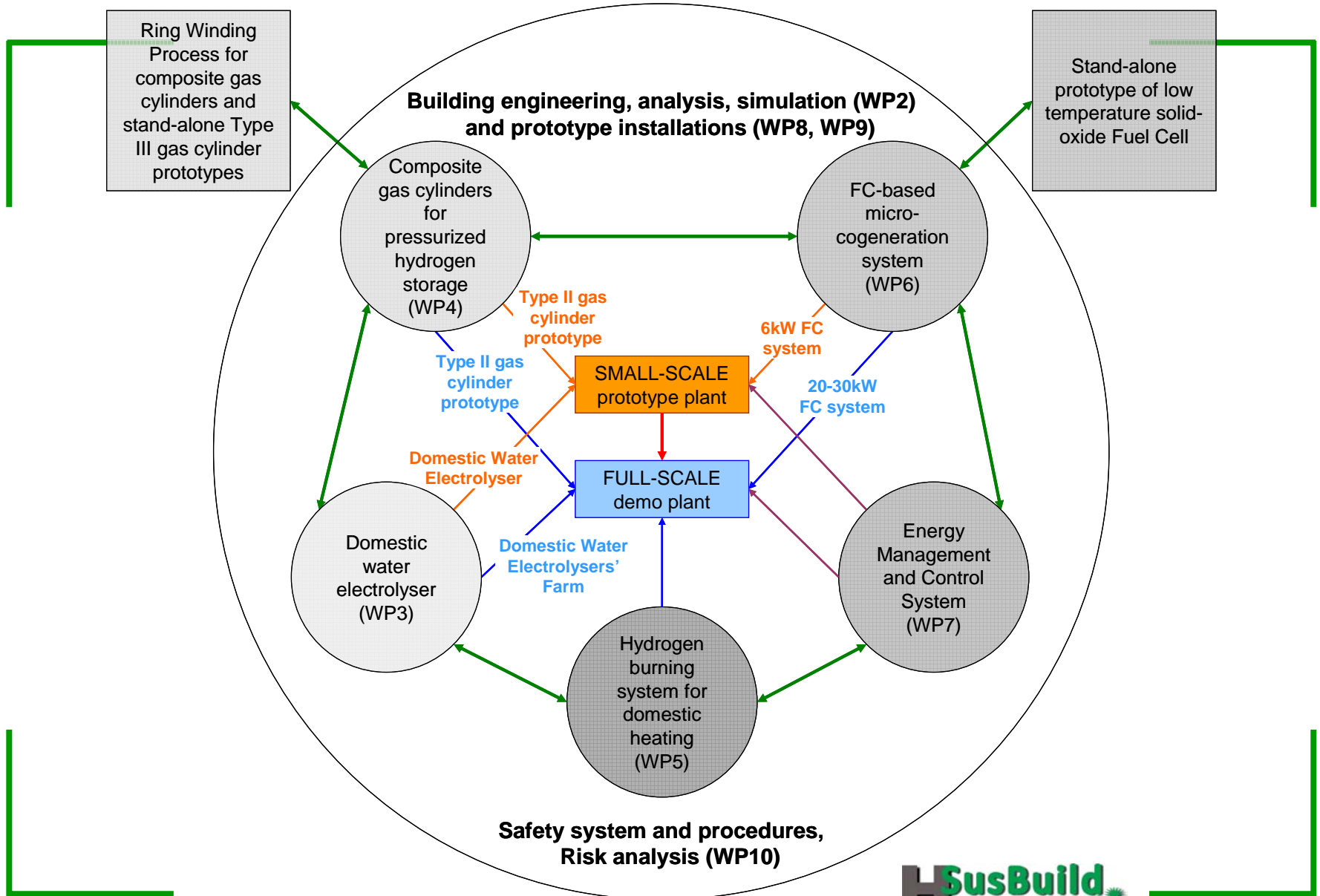
Activities Overview (1/3)

- RTD on **novel materials and technologies**
 - Cost-effective, high-efficiency, compact and modular **domestic water electrolyser** (WP3)
 - Lightweight and cost-effective **composite pressure vessels** for H₂ storage and related manufacturing technology (WP4)
 - Novel **catalytic H₂ burning system** and integration into a condensing boiler for domestic heating (WP5)
 - Novel materials for more cost-effective **low temperature Solid Oxide Fuel Cells** (WP6)

Activities Overview (2/3)

- **Demonstration of feasibility** of applying such a system in a real building environment
 - Building engineering, analysis and simulation, system design (WP2)
 - Energy Management and Control, hydrogen distribution (WP7)
 - Small-scale pilot prototype installation (WP8)
 - Scaling up to full-scale demo installation (WP9)
 - Safety system and procedures, risk assessment (WP10)
 - Economic evaluation and Business Modelling (WP11)

Activities Overview (3/3)



Main (expected) Results

- **Technical**
 - Demonstration of the novel concept by full-scale applications in residential/commercial buildings or districts of buildings
- **Organisational/Infrastructural**
 - Novel paradigms in energy generation and distribution enabling energetic self-sustainability of single buildings or districts of buildings
 - Contribution to energy diversification
 - More rational use of renewable energy resources
- **Environmental**
 - New generation of clean buildings with zero CO₂ emissions and no depletion of non-renewable resources
- **Economic/Society**
 - Increased security of energy supply
 - Decreased dependency on imported fossil resources

Acknowledgements and Contacts

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