Perspectives for future electricity and heat markets

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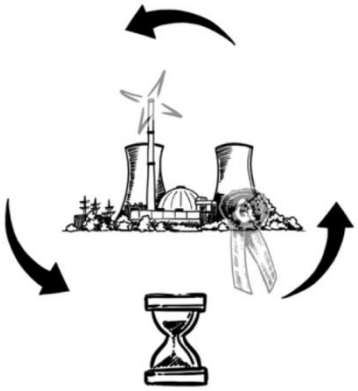
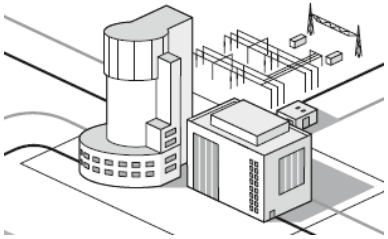
Kernenergetisches Symposium - Dresden

Nuclear Projects & E.ON Innovation Center Nuclear

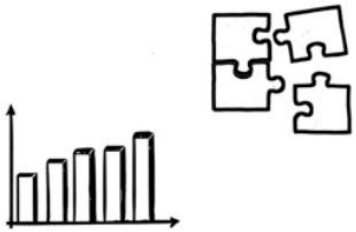
Keep license to operate



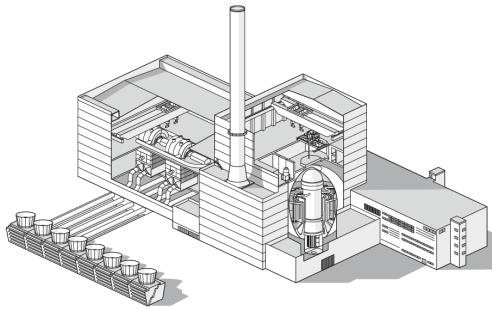
Operational Excellence



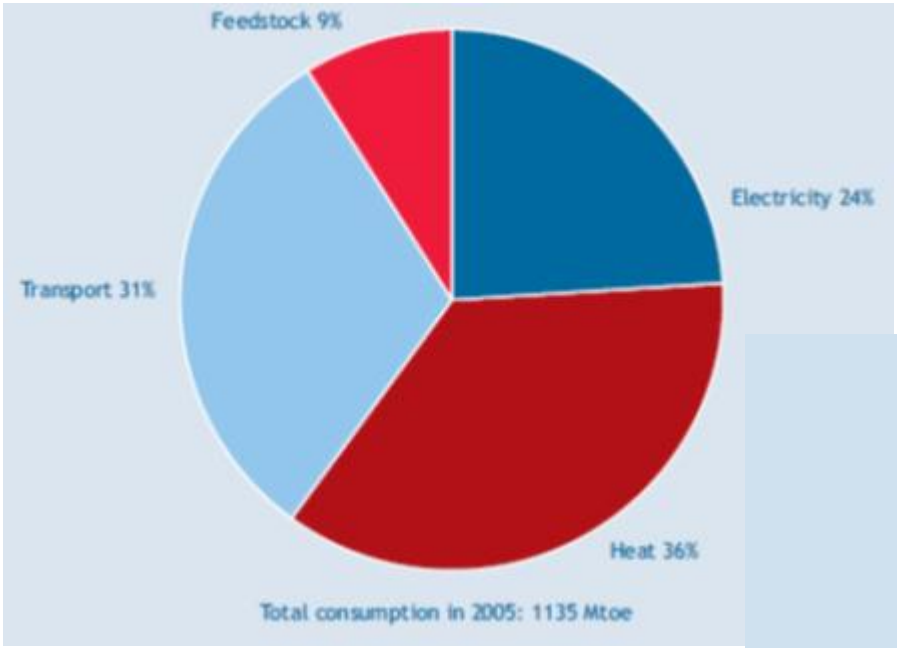
New business service commercial deployed

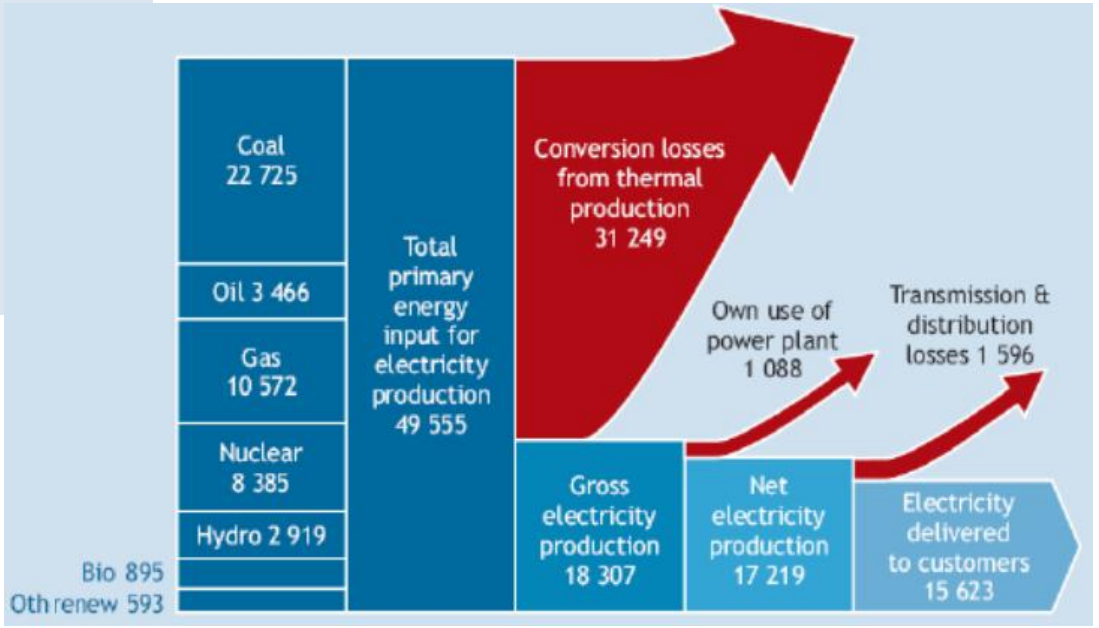


Informed Buyer of SMR



EU energy demand & Energy flows in the electricity system



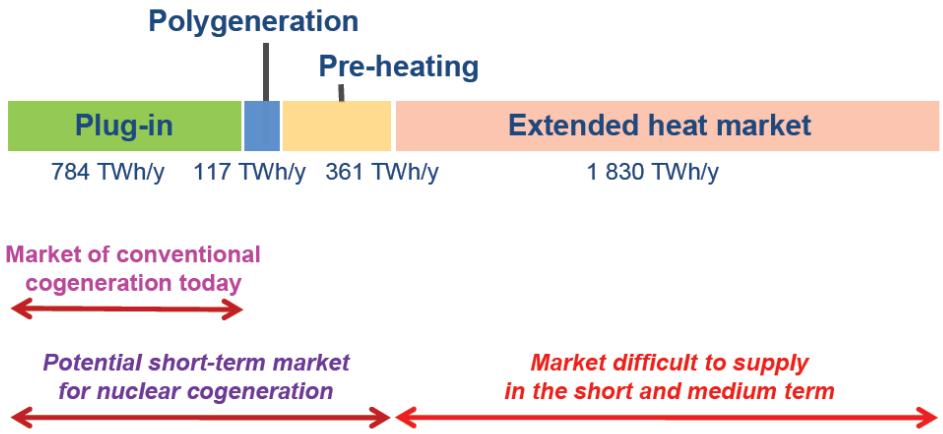


Source: CHP - Evaluating the Benefits of Greater Global Investment - © OECD/IEA, 2008

European market size for Heat and Power

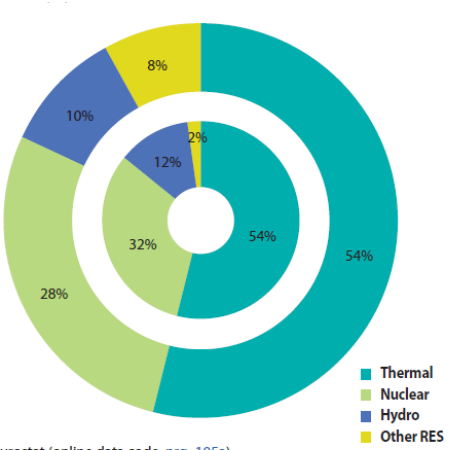
The European heat market is large, ranging from 2 526 to 3 091 TWh/y, as compared to the 3 183 TWh/y of electricity production in Europe in 2009

Wärmemarkt



Source: EUROPAIRS study on the European industrial heat market

Strommarkt



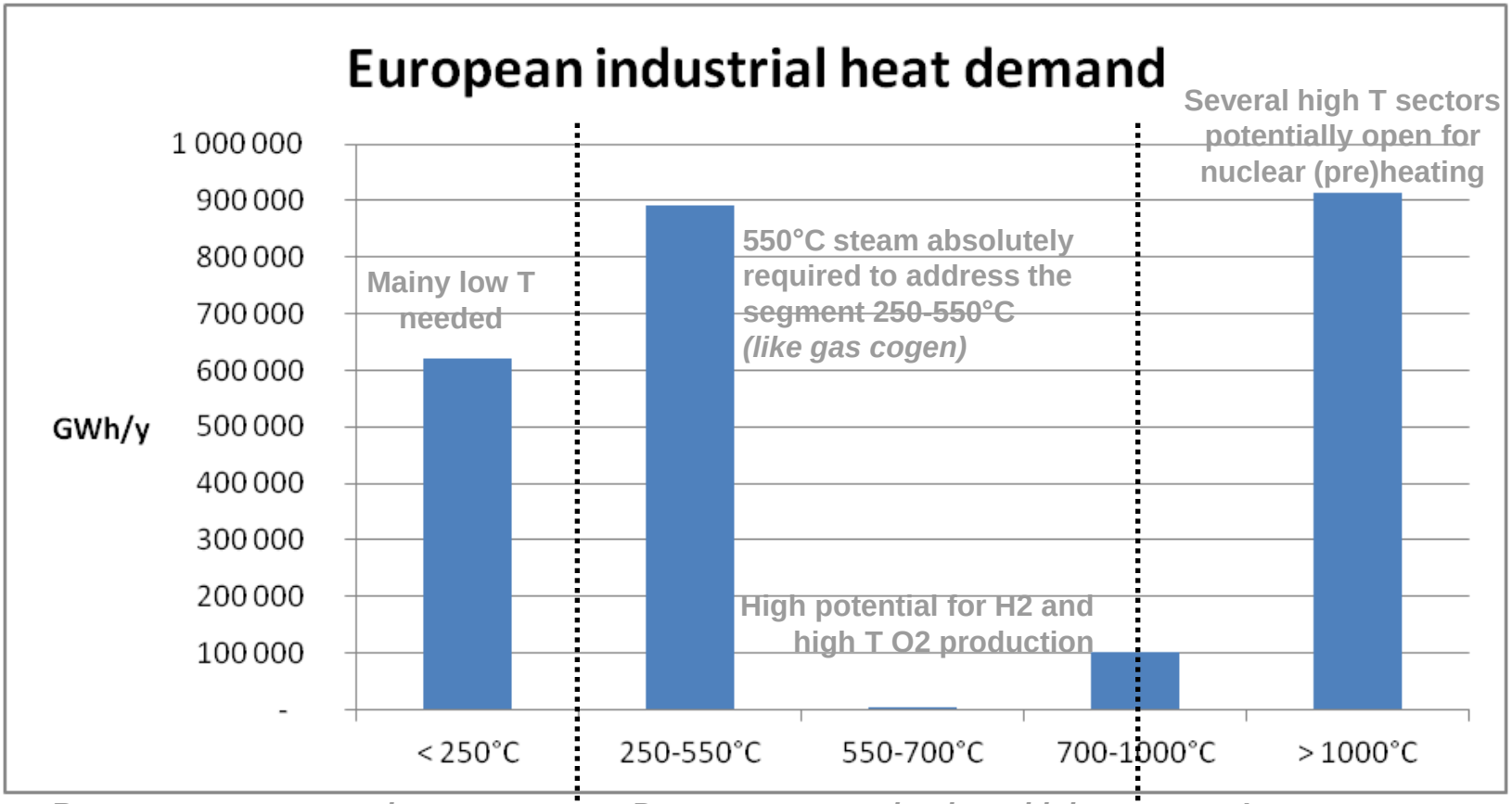
Source: Eurostat (online data code: nrg_105a)

Table 2.5.2a: Power station generation, by type, EU-27 (TWh)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total	2 918	3 001	3 082	3 103	3 192	3 259	3 279	3 324	3 339	3 346	3 183
Thermal	1 585	1 642	1 662	1 714	1 792	1 805	1 833	1 861	1 897	1 859	1 710
Nuclear	943	945	979	990	996	1 008	998	990	935	937	894
Hydro	340	353	372	315	305	323	305	309	310	327	327
Other RES	49	61	68	84	99	123	143	165	197	222	252

Source: EUROSTAT, 2011

Nuclear cogeneration could enter the market



Reactors mature + exp, in cogen

Proven reactor technology, high potential for cogen

Long-term

LWR, FBR

District heating, pulp & paper, desalination

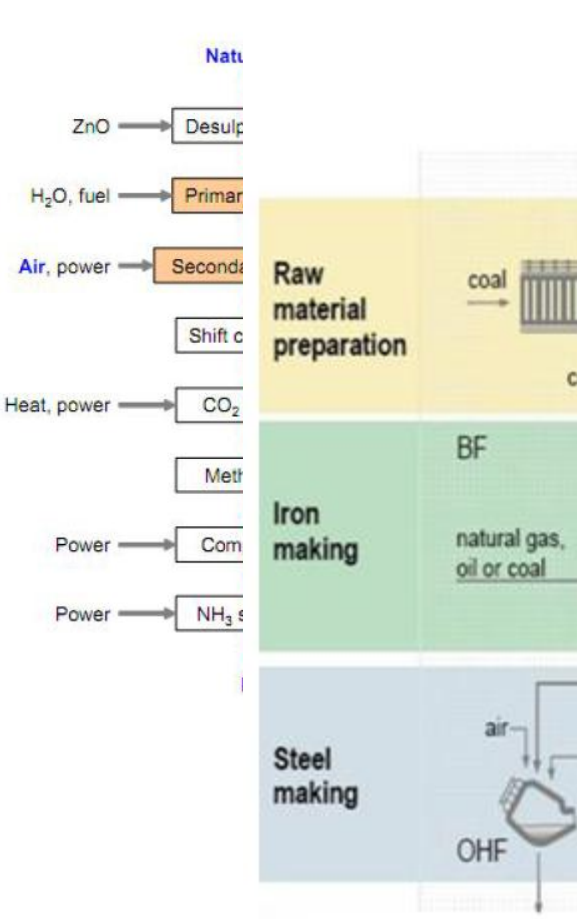
HTR

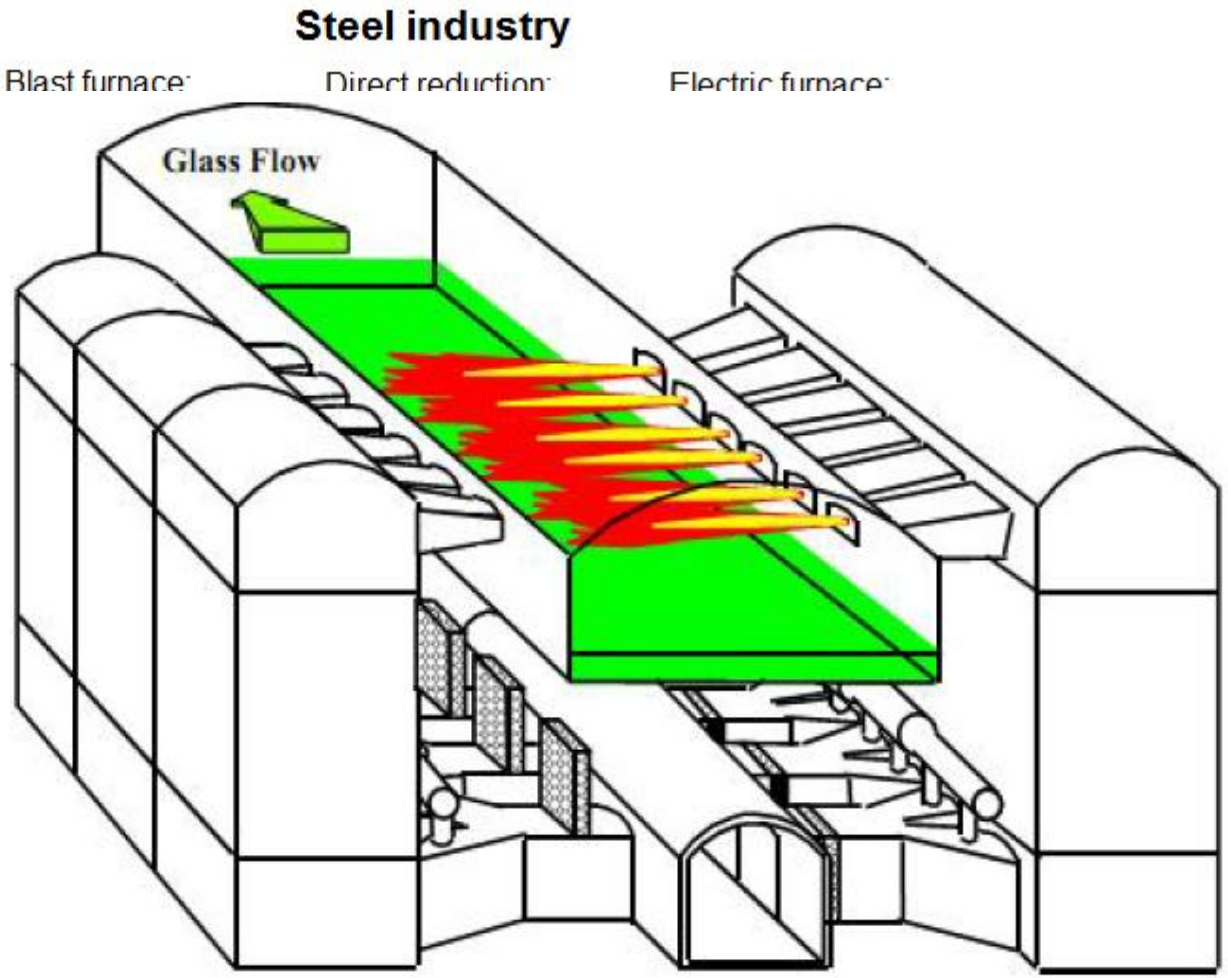
VHTR

Chemicals, refining, H2, steelmaking, soda ash, lime, glassmaking, industrial gases, etc.

Source: EUROPAIRS study on the European industrial heat market

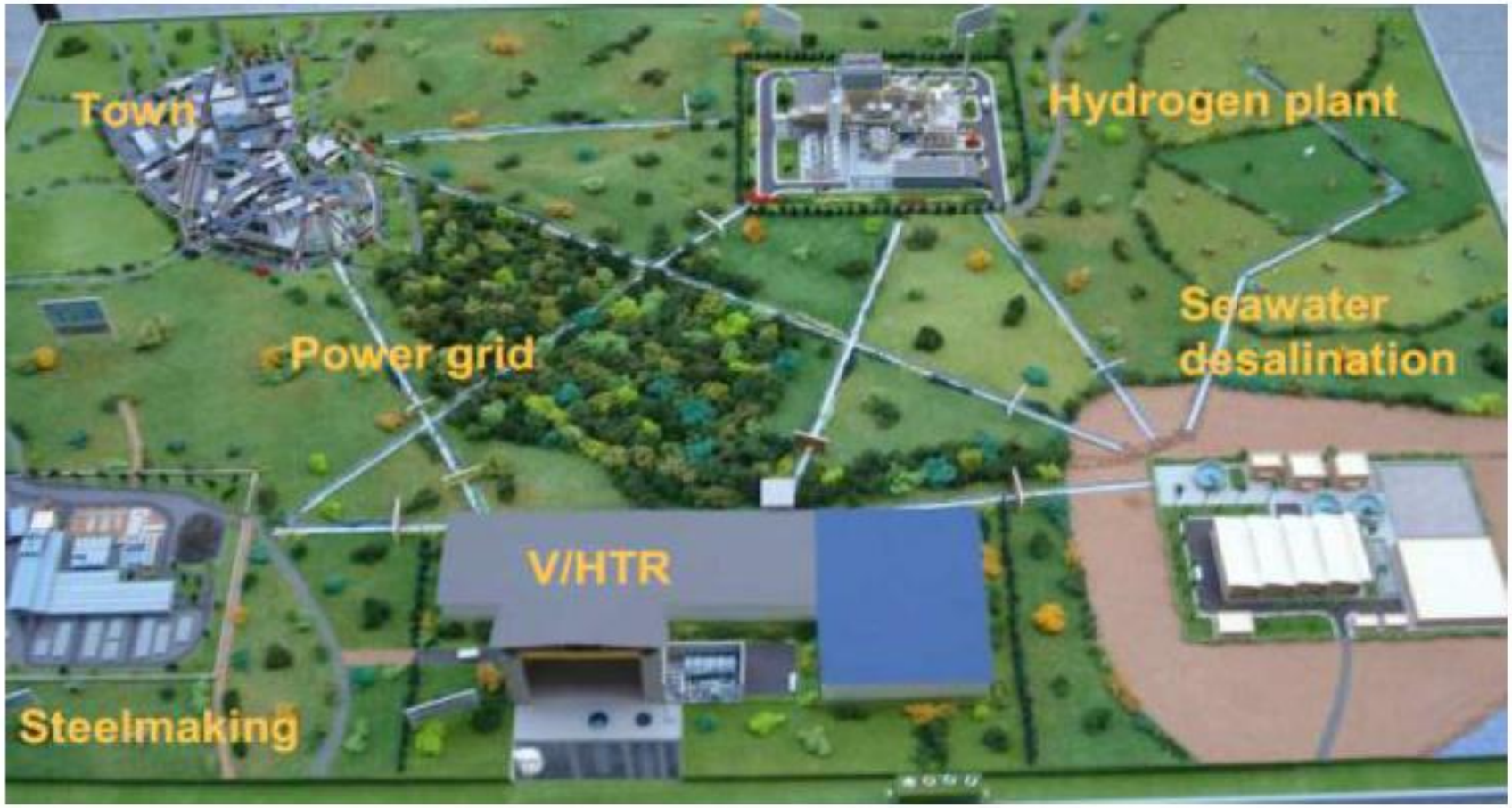
Potential cogeneration…





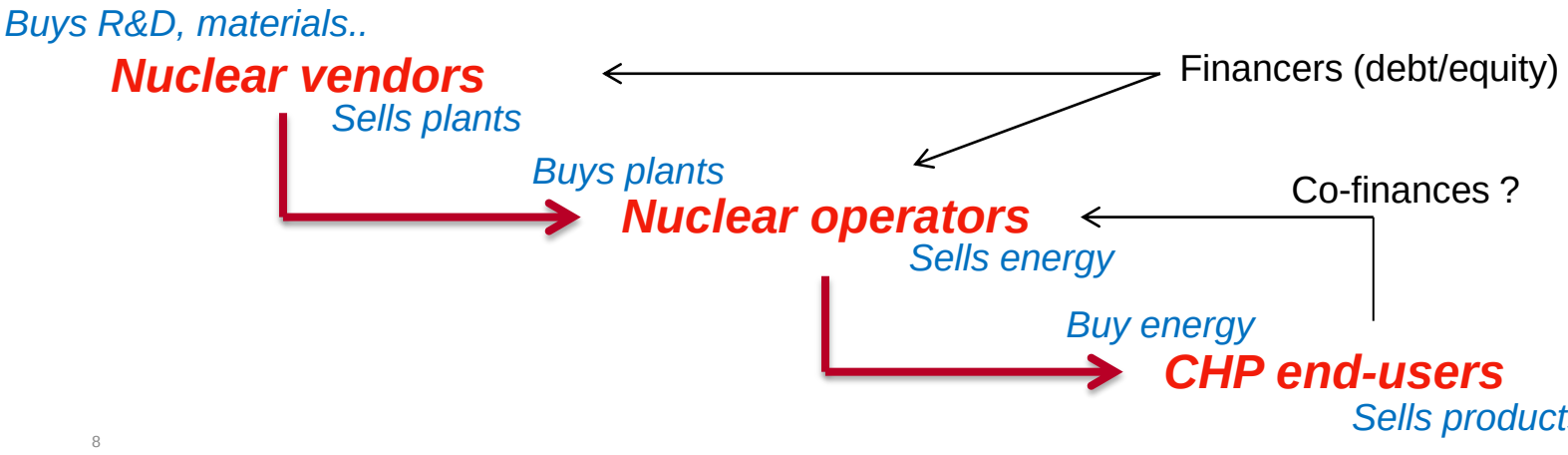
Direct process use, Auxiliary systems, pre-heating…

Tomorrow…


Town
Hydrogen plant
Power grid
Seawater
desalination
V/HTR
Steelmaking

The challenge(s) !

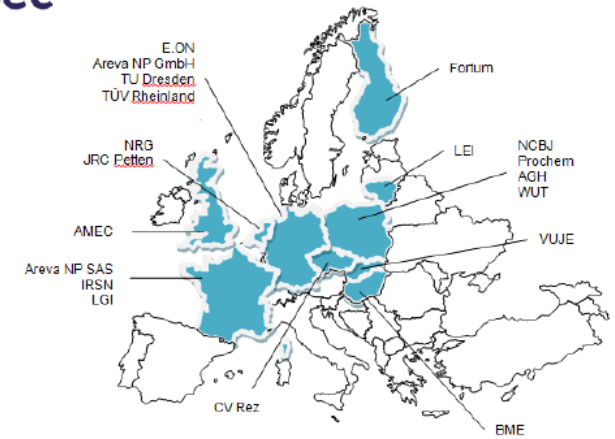
- **Reconcile Nuclear with public opinion**
  - Learning lessons of Fukushima
- **Present Nuclear CHP as reliable, economic and safe alternative**
  - Reduce CO2 emissions
  - Stretching fossil resources (oil, gas, coal)
- **Forge Alliance between global users**
- **Establish an Industrial Initiative on Nuclear Cogeneration**



NC2I Partners

- 20 partners:
  - Industrial companies
  - Utilities
  - Nuclear vendors
  - Consulting
  - Universities

National Centre for Nuclear Research
European Commission Joint Research Centre
Nuclear Research and Consultancy Group
Technische Universitaet Dresden
Areva NP GmbH
Institut de Radioprotection et de Sureté Nucléaire
E.ON Kernkraft gmbh
Fortum
Prochem
LGI Consulting
Akademia Gorniczo-Hutnicza im. Stanislawa Staszica w Krakowie
Lietuvos Energetikos Institutas
Noordwes Universiteit
VUJE AS
Budapesti Muszaki es Gazdasagtudomanyi Egyetem
TÜV Rheinland Industrie Service GmbH
AMEC Nuclear UK limited
Areva NP SAS
Technical University of Warsaw
Centrum vyzkumu Rez s.r.o.



EUROPEAN COMMISSION

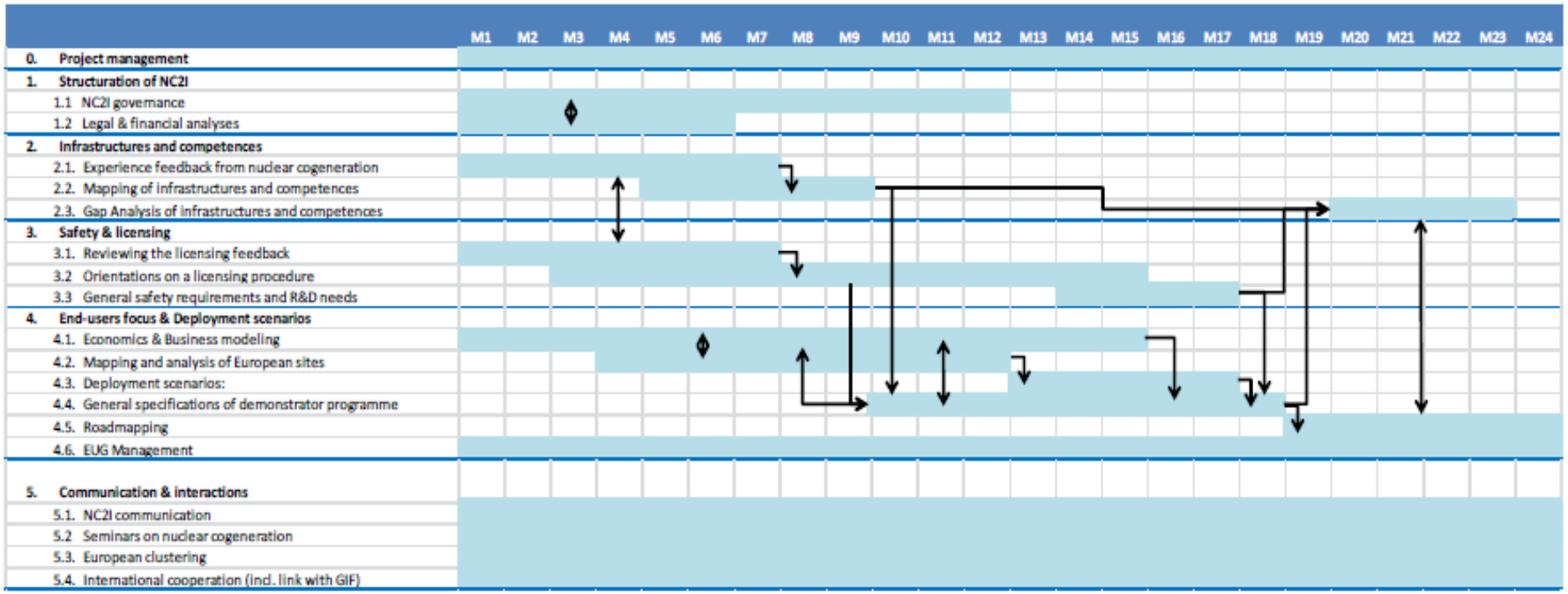
Work packages

WP0: Project Management	
WP1: Structuration of NC2I	Governance (stakeholder involvement, management procedures…) and legal & financial aspects
WP2: Infrastructures and competences	Inventory of infrastructures and competences that are crucial for the nuclear cogeneration
WP3: Safety & licensing	Licensing process, safety requirements and R&D needs to support the safety demonstration
WP4: End-users focus & Deployment scenarios	Deployment strategy for nuclear cogeneration
WP5: Communication & interactions	interactions with private investors, industrial research actors from nuclear and conventional industry, safety organisations, international institutions, and the general public.

Detailed description of WP4
End-users focus & Deployment scenarios

WP leader: E.ON Kernkraft GmbH	
Task1: Economics & Business modeling	Identify the economic and financial parameters impacting the economic viability
Task 2: Mapping and analysis of European sites	Mapping of most promising chemical sites in Europe, specifics of the industrial site to be analysed
Task 3: Deployment scenarios	Identify nuclear cogeneration markets to draw a long-term transition model up to 2050
Task 4: General specifications of demonstrator programme	Issue general specifications for a demonstrator (e.g. thermal capacity, heat/electricity ratio, load follow...)
Task 5: Roadmapping	Detailed roadmap to deliver the demonstrator
Task 6: End-User Group management	Build a network to gather industrial companies and associations interested in being supplied with nuclear cogeneration

Timeframe of the project



Thank you