



European
Copper Institute
Copper Alliance



Renewables Powered Industrial Process Concept Proposal - SPIRE

06 December 2013



Who we are?

Cu



European Association servicing and representing the EU non-ferrous metals industry.



ECI, member of Eurometaux, is a joint venture between the International Copper Association Ltd. (ICA) and the European copper industry.



ECI Sustainable Energy Program

- **Advocacy** (efficient motors, transformers, buildings, wind and PV)
- **Education** ([Leonardo Energy](#), webinar program, e-learning program)
- **Technology development** (heat exchange, energy storage, conductivity)

Mobilize the potential of flexible industrial process (electrically driven) to improve competitiveness and accommodate additional renewable energy capacity

- Upcoming electricity landscape: North Sea off-shore wind generation, high PV penetration... Increased requirement for storage capacity: avoid excess generation, limit firm generation capacity.
- DSM called to play a major role, but currently struggling to unlock its potential: a business model is needed and a concrete valorization is to be provided. Otherwise, it will remain latent.
- **Project: analyzing and implementing concrete the valorization avenues of flexible processes:**
 - On-site wind, off-site wind, on-site PV, capacity markets, DSM to TSOs / DSOs
- **Results: provide a concrete value to flexibility and avenues for implementation from today (with the tools already available)**

Concept Proposal – Work Program

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2012

- **Findings:** For 10 industrial processes*, **68 GW of on-site wind** could be accommodated under economic conditions, producing **170 TWh/year** and allowing to provide **55% of overall energy demand** of these industries

2013

- Identify the most promising industrial sectors and markets
- Carry out a number of detailed feasibility studies in cooperation with industrial partners ([AkzoNobel](#) , [Rießner-Gase GmbH](#), [KME](#))
- Quantify a realistic potential for EU27
- Engage partners that are willing and able to develop demonstration plants within the near future.

2014 onwards

- Demonstration of the concept on real plants
 - Energy Management Systems
 - Eventually investments in process or storage capacity
 - Integration of the energy signal (on-site wind, off-site wind, PV, TSO, market signal...)
- Replication
- Regulatory analysis and proposals for larger penetration

**Chlorine, E-Steel, Aluminium, Desalination, Cold Storage, Air Separation, Mechanical Pulping, Paper recycling, Cement production, Cu and Zinc production*

Relevance for SPIRE

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SPIRE Key Component	PROCESS
SPIRE Key action	2.5 New energy and resource management concepts
Impact	Increased competitiveness of electro-intensive industry Further accommodation of variable renewables (10 to 70 GW) High replicability, cross sectoral approach
Time horizon	2014 – 2016 for initial demo projects and policy recommendations 2017 – 2020 for replication
Existing project consortium	European Copper Institute, Synlift, AkzoNobel , Rießner-Gase GmbH, KME
Welcome partners	Electro-intensive industries Energy Management System providers and analysts Transmission System Operators / Distribution System Operators Wind industry, PV industry Electricity market, regulatory and policy experts Demand Side Management experts

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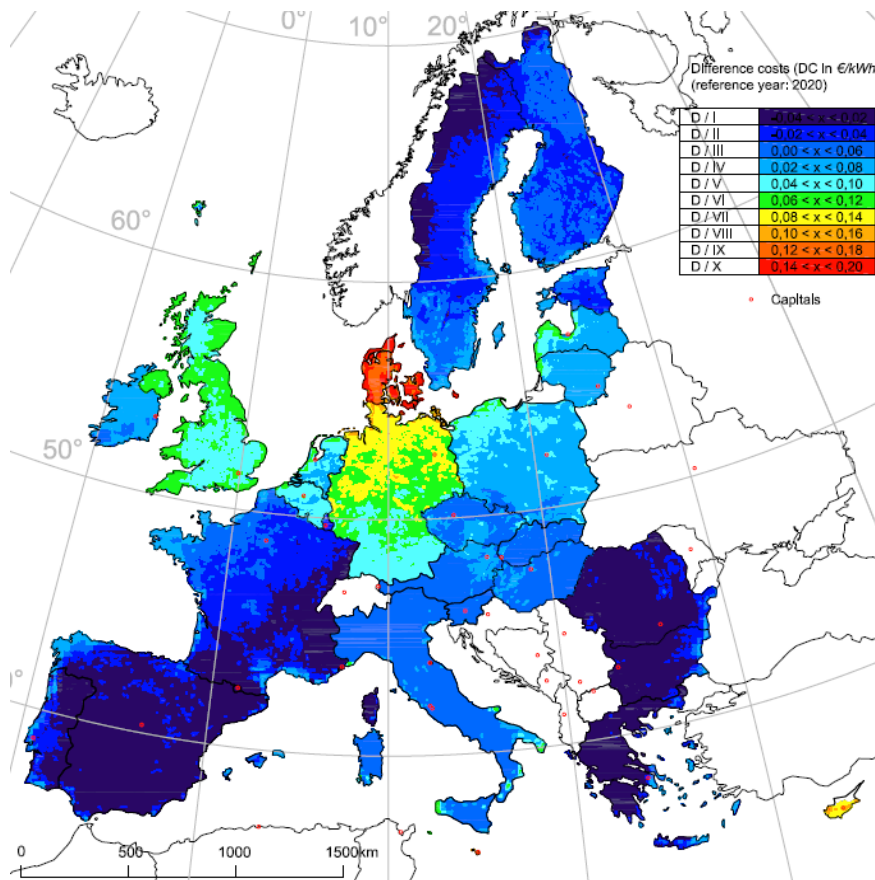
www.leonardo-energy.org

ANNEX - 2012 Analysis

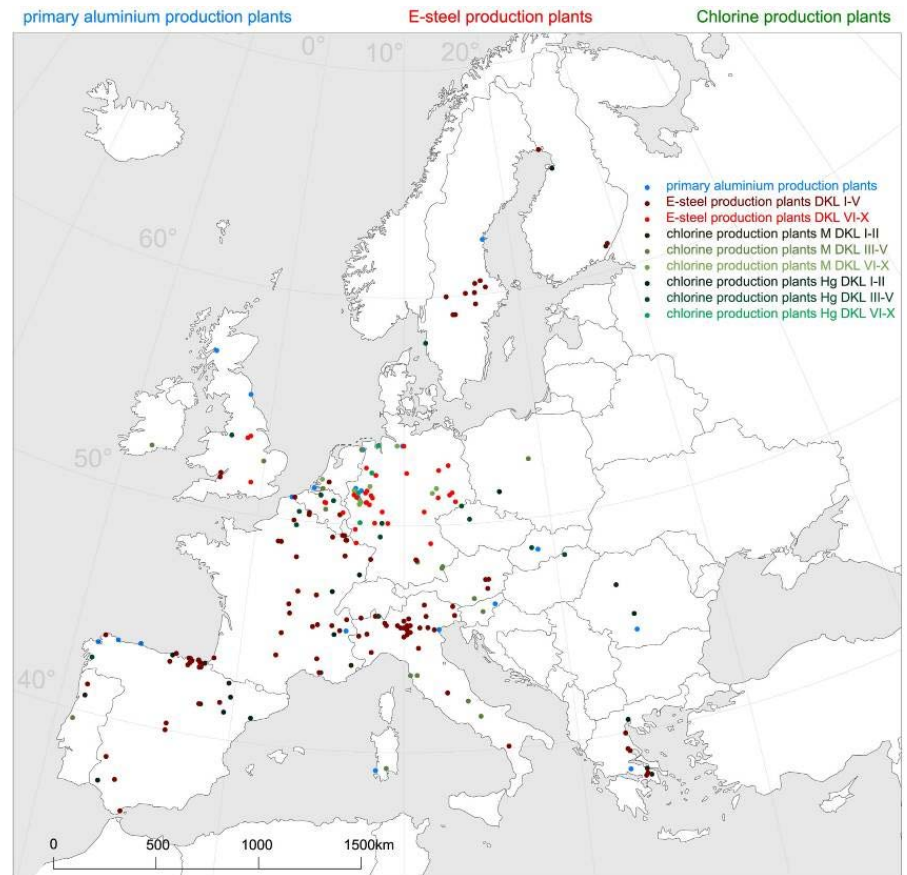
Grid price minus Wind Levelized Cost of Energy

Concrete location of major industrial plants

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[2020 projected industrial electricity price] minus
[Wind Levelized Cost of Energy] (> 2000 MWh/year)



Location of E-steel, primary aluminium and chlorine
main factories in EU