



European
Copper Institute
Copper Alliance

Introduction by European Copper Institute

October 13, 2016

Hans De Keulenaer



Your hosts today

Cu

The Role of DSM to Provide Flexibility in Electricity Systems

October 13, 2016
Renaissance
Brussels Hotel



Cu European
Copper Institute
Copper Alliance

economie
Ministère de l'Énergie et des Ressources naturelles

ieadsm
energy efficiency

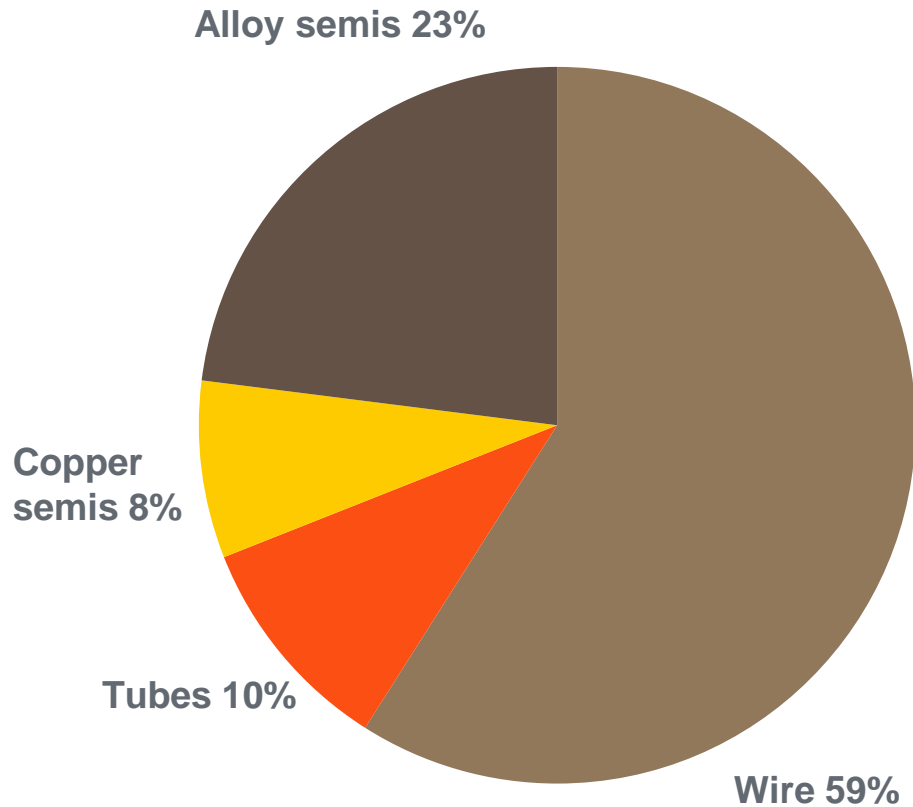
ISGAN
International smart grid action network

Leonardo
ENERGY

Register at
<http://j.mp/IEADSM2016>

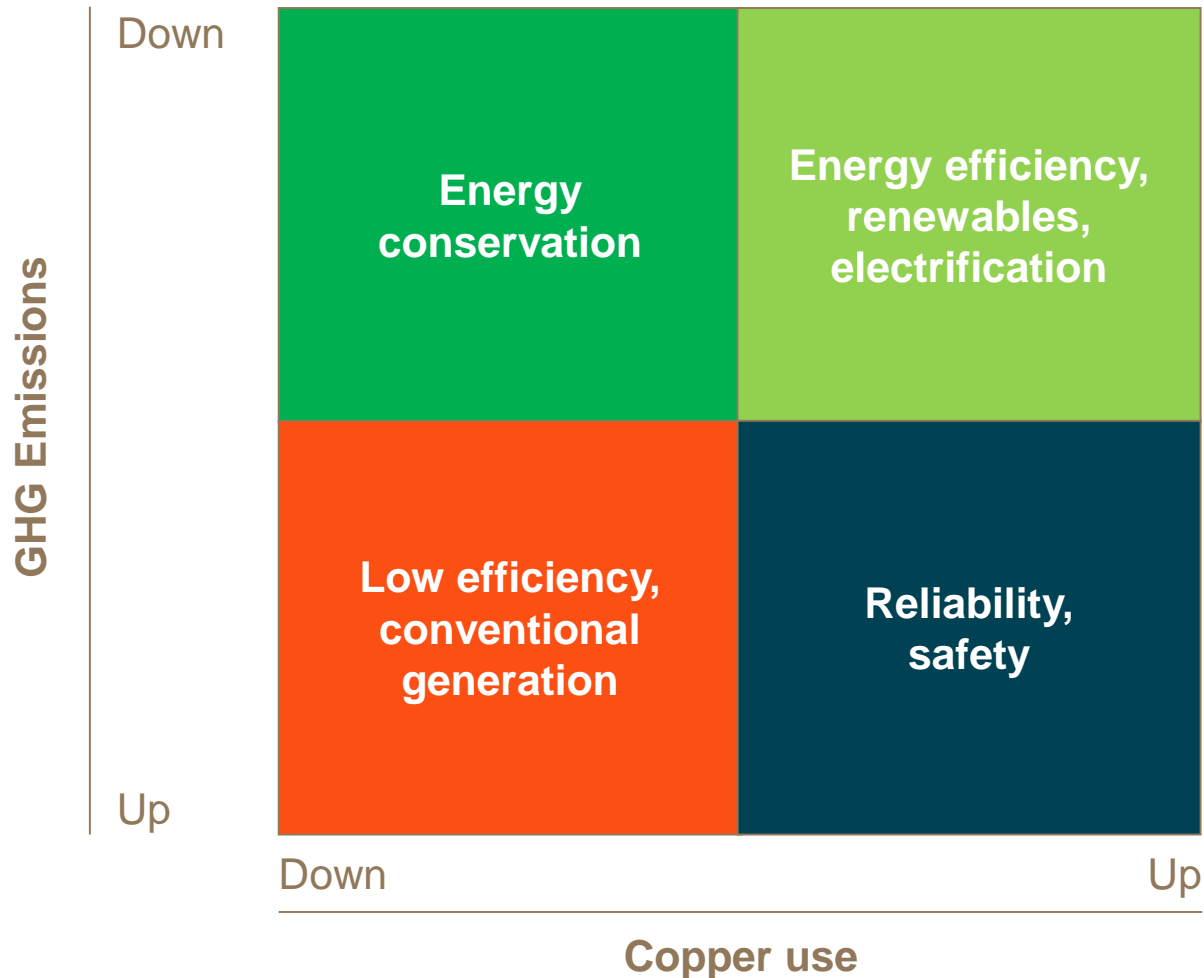
2014 EU copper demand by product +/- 3.8 million tonnes

Cu



The strong link between copper use and energy sustainability

Cu



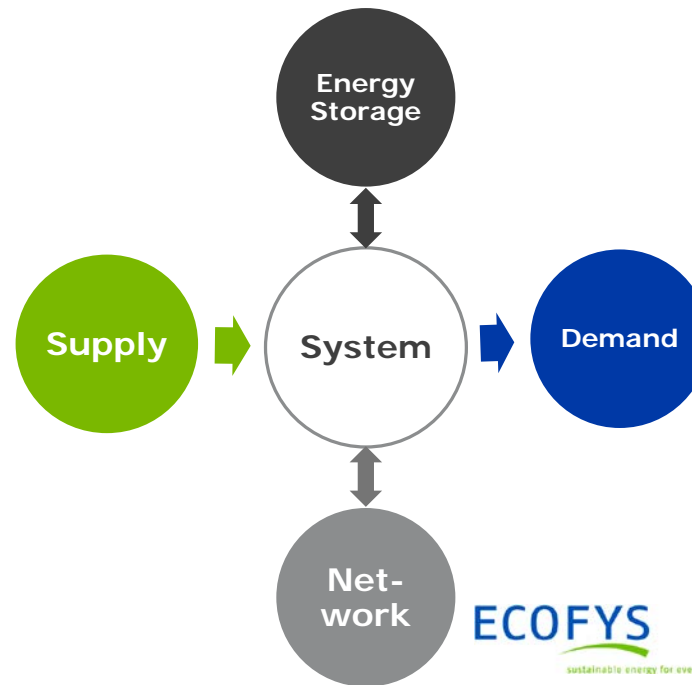
Project

Copper in renewable electricity systems

Cu

Lithium batteries:
+ 0.6 kg Cu / kWh

Wind & PV: up to 12
times more copper
intensive



Building automation:
+10%
Home automation:
+43%
Electric vehicles:
+28 kg
Heat pumps:
+8 kg

Efficient grids; interconnectors; subsea grid; ...
(370 – 450 ktons Cu over next decade)

Project DSM for RE integration - IndustRe

Cu



2012 ECI
Idea for
wind
powered
industrial
processes

**April 2014
IFIEC & CEFIC**
Workshop on
DSM avenues
in industry

May 2014 ECI
H2020 Project
application on
DSM for further
RE integration

**October 2014
ECI**
Wins H2020
Project
application for
execution 2015-
2018

January 2015
Kickoff of the
IndustRe project
www.industre.eu



Activities

Good Practice Guide



Since 2001, 70+ application notes in 10 themes
Tools for engineers to manage the energy transition
www.leonardo-energy.org/GPG

Update every 3 years

Power Quality & Energy Efficiency handbooks

Activities

Webinars & e-learning

Cu



Since 2005, 400+ webinars

Training for professionals to manage the energy transition

www.leonardo-energy.org/WEBINARS

150 webinars archived as 24/7 education library

Basis of e-learning program



<http://j.mp/leonardotube>

Overview of e-learning initiatives

Cu



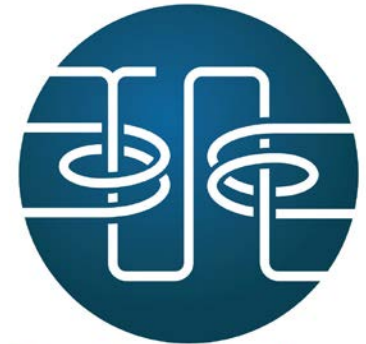
DSMUNIVERSITY



EU Energy &
Climate Policy



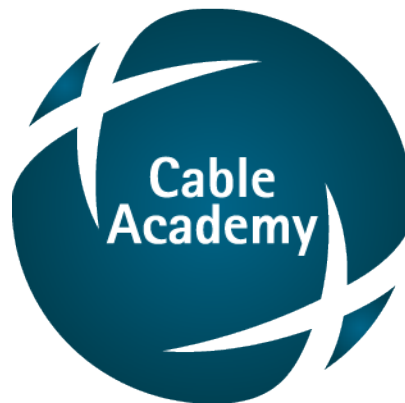
Copper Academy



Transformer Academy



ISGAN
ACADEMY



Cable
Academy



Power
Quality
Academy



Low
Carbon
Economy



ANNEX 8- ISGAN Academy

Update to
12th ISGAN Executive Committee Meeting
Paris, France October 12-14, 2016



Objectives



- **The objectives of the ISGAN academy are to offer the ISGAN community of high level engineers and decision makers a means of rational and efficient continuous technical skills **complement** and **update** in the field of smart grids.**
- **Channel: e-learning platform**
 - **Topics:** power system fundamentals to more specialised courses on breakthrough smart grids solutions
 - **Structure information** (public material) about recent developments, best practices, interesting methodologies, etc. on smart grids theory, application, deployment, events, etc.
- **Program Committee:**
 - draft the core structure of the e-learning platform
 - learning trajectory, existence and relation between modules, extent of the learning modules of the fundamentals, structure of the additional reading material etc.
- **Leonardo Energy will provide the e-learning campus, will structure the e-learning architecture and will produce the webcasts based on material (ppt presentations) generated by ISGAN**
- **The e-learning units:**
 - Recorded lectures: voice over a PPT slides
 - Lecturer will be provided by ISGAN (task share).
 - No direct teacher-student interaction is foreseen.
 - Blogs and communities can be implemented.

Preliminary list of contents



Theme 1. Fundamentals

- The structure of power systems: transmission and distribution
- The structure of power systems: generation and supply
- Regulatory economics, monopolistic activities: network businesses
- Regulatory economics, competitive activities: generation and retailing
- Introduction to smart grids
- Smart devices for smart grids

Theme 2. Technical aspects: technologies, devices and system operation

- Integration of RES in power systems: transmission networks issues
- Integration of DER in distribution networks
- Electric mobility and the impact in power systems
- The role of storage in power systems and networks
- The active participation of demand: DSM
- Smart devices & technologies for transmission networks

- Smart devices & technologies for distribution networks
- Communication systems in distribution networks: operation and control
- Communication systems in distribution networks: metering

Theme 3: Economics and regulation

- Tariff designs in the Smart grid context
- Cost and benefit analysis of smart grids functionalities
- Scalability and replicability of smart grids
- The use of reference network models
- Economics and business models
- Regulation of network activities
- Standards & interoperability
- Sustainability policies
- Social aspects and consumer involvement
- TSO-DSO coordination

Theme 4: International case studies and perspectives

- Jeju Island Smart Grid Project
- GRID4EU project, innovation for energy networks
- PRICE project, integrating Smart grids from two major distribution utilities in Spain

Today's program

Cu

Session 1
Topics 1 & 2
Setting the scene

Session 3
Topics 5-8
Demand response

Session 5
Topics 11-12
Market design

Session 2
Topics 3 & 4
Policy

Session 4
Topics 9-10
Integration

Session 6
Topics 13
Conclusion

Thank you for your attention

For more information:

Hans.dekeulenaer@copperalliance.eu