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The Apulian background – sustainable energy and smart grids

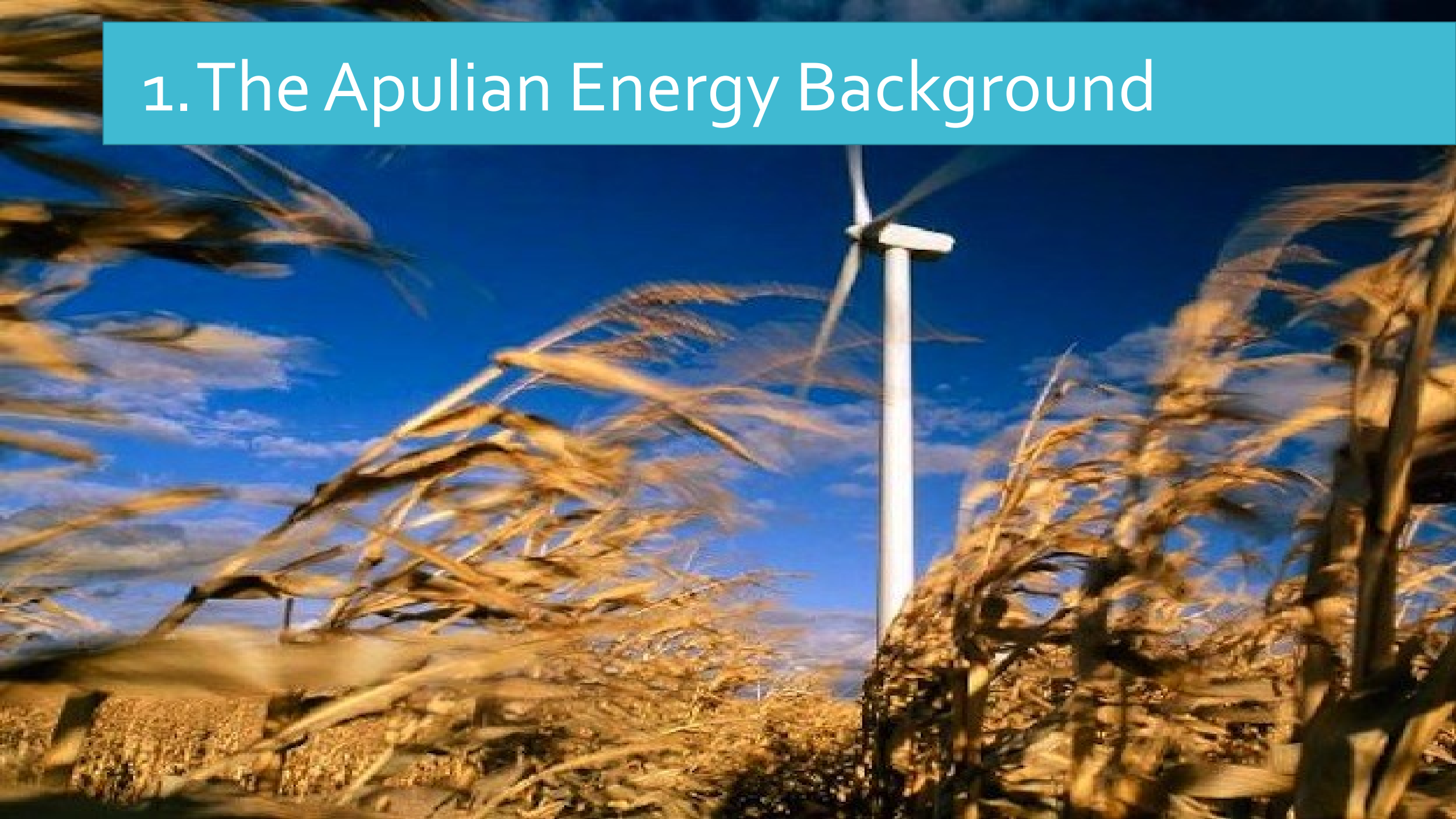
Carlo Gadaleta Caldarola – ARTI

Smart Mediterraneo – 23/24 June 2016

Index

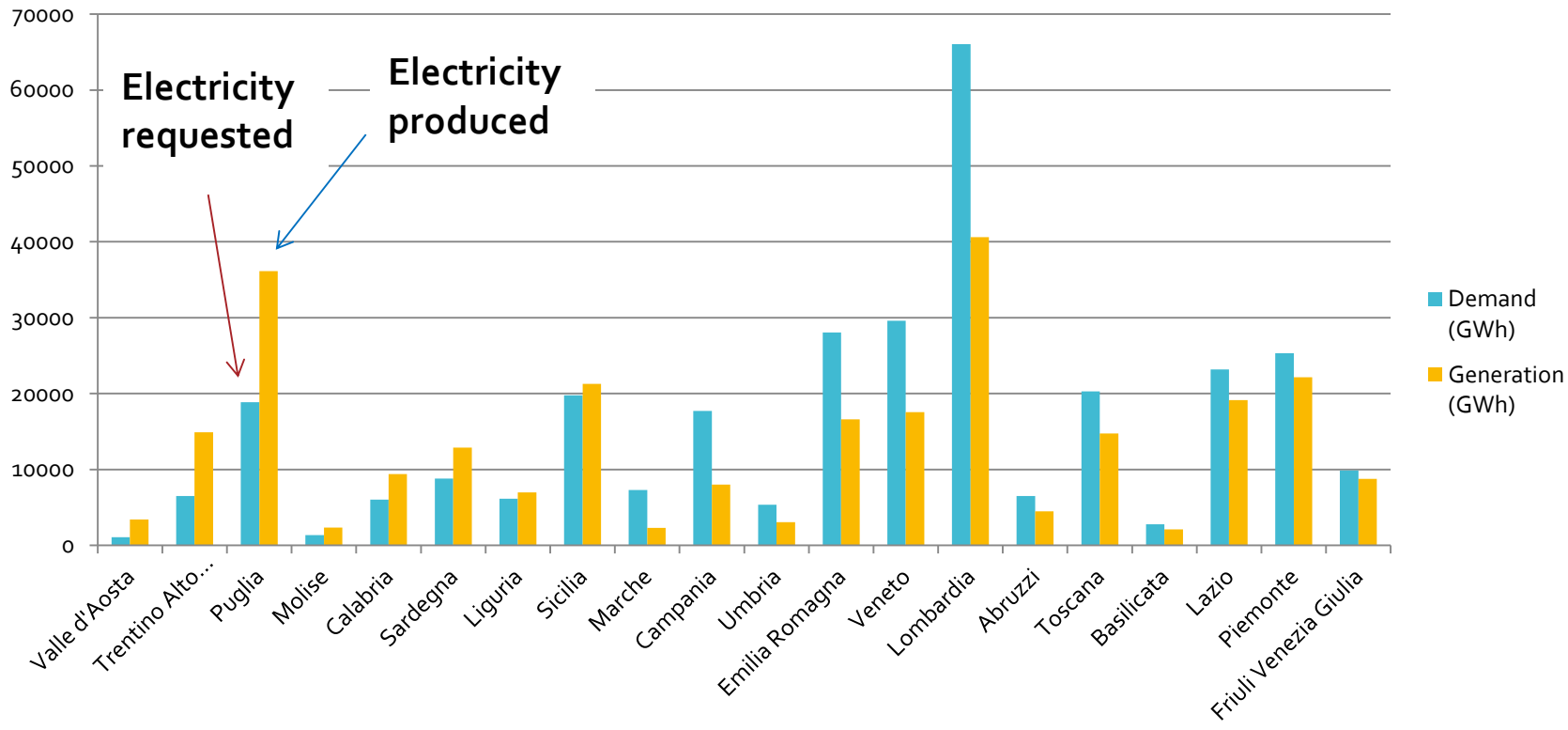
1. The Apulian energy background
2. A regional project on Smart Grids: Ingrid
3. Conclusions

1. The Apulian Energy Background



The electric production in Apulia

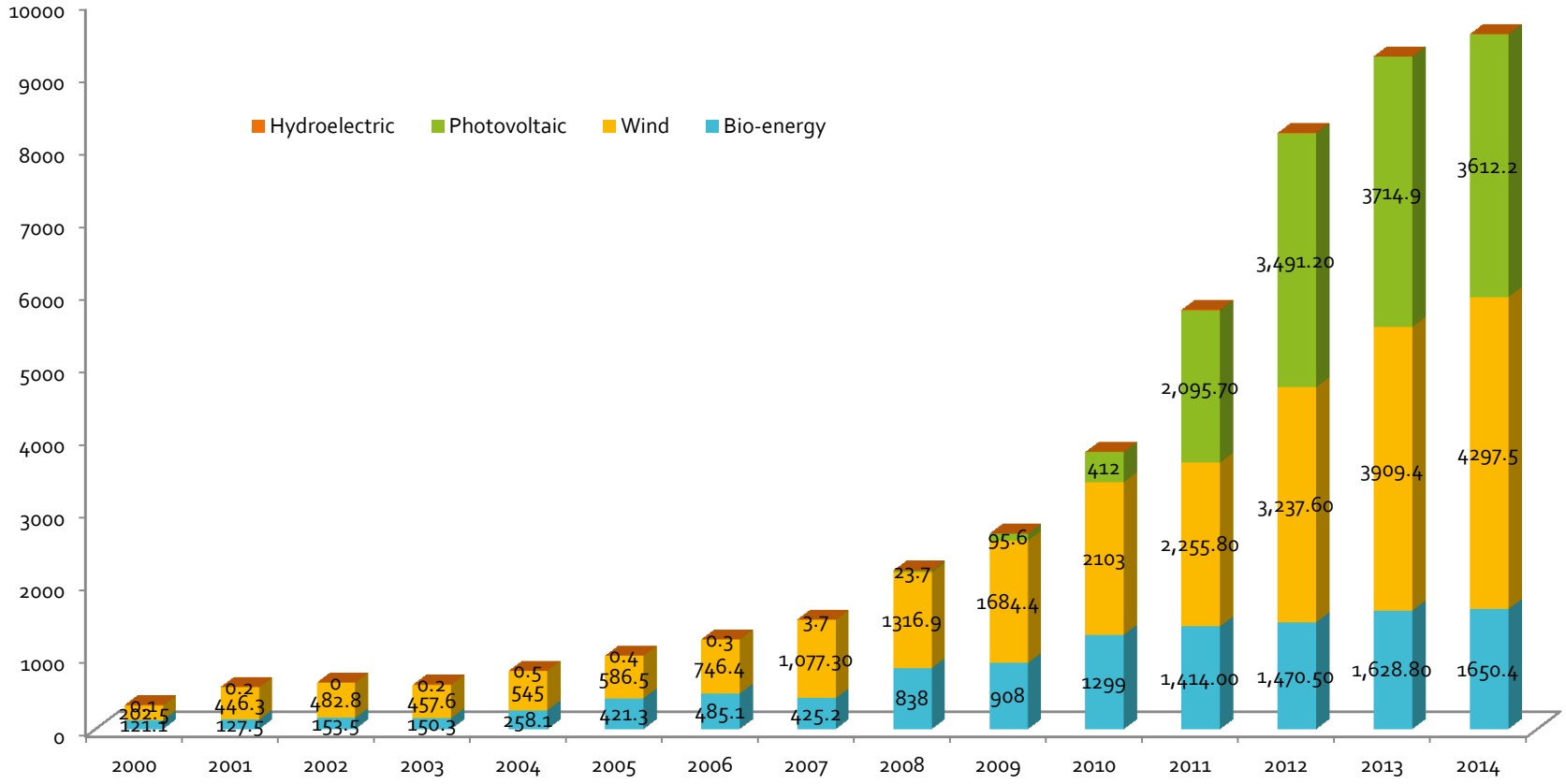
- Apulia region is the second electricity producer in Italy and the first exporter
- Nearly half of the electric energy produced is exported (91.4% surplus)



Source: ARTI elaboration on Terna 2014

The RES growth in Apulia

- Apulia produces 28% of the entire Italian wind production and 16% of the PV one (first region for PV installed capacity)
- In 2014 the share of RES on the electricity produced was 25,1%



Source: ARTI elaboration on Terna, 2014 (data in GWh)

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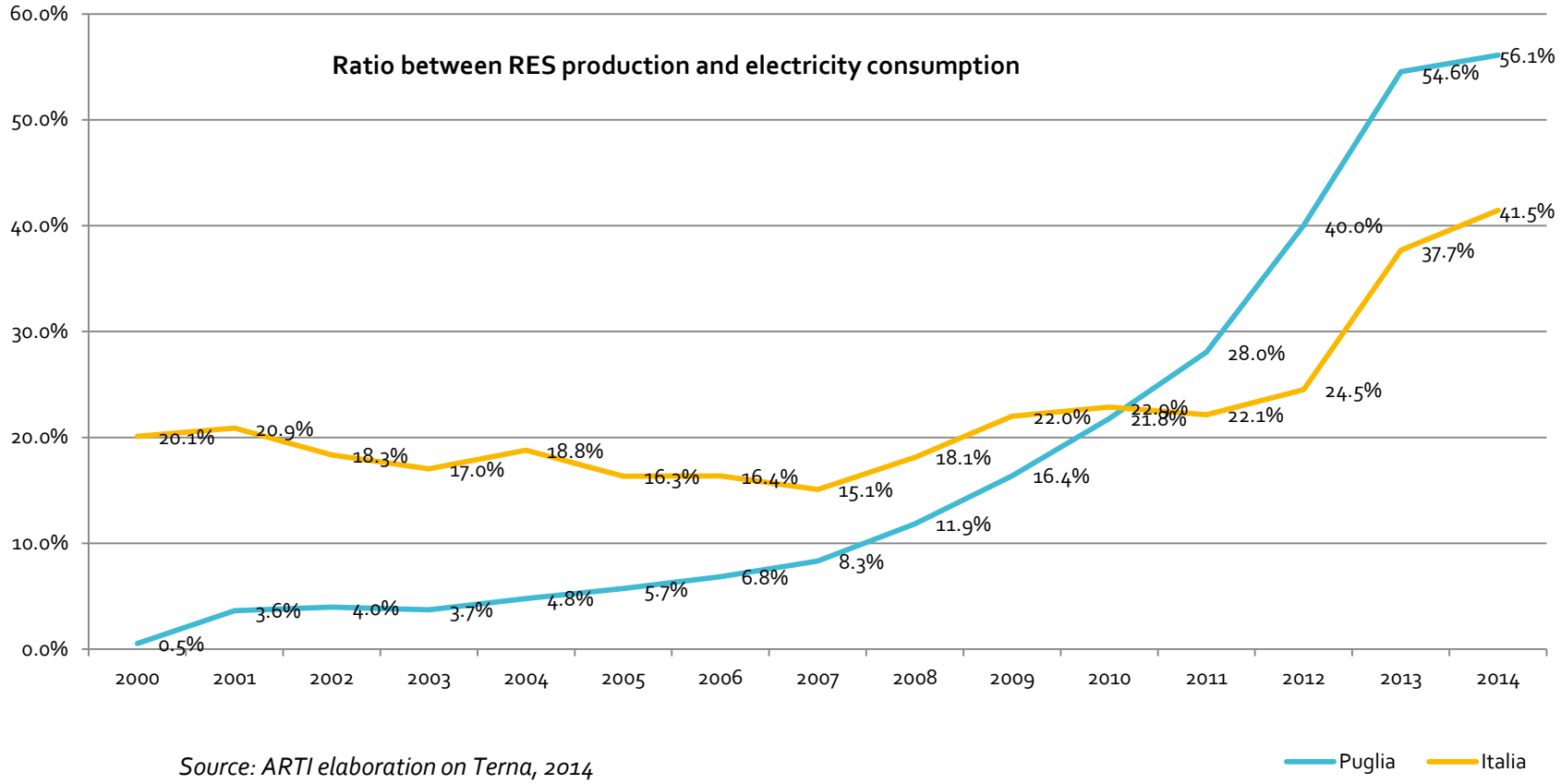
The RES growth in Apulia and Italy

- In 2014, about half of regional electricity needs was covered by RES



Source: ARTI elaboration on Terna, 2014

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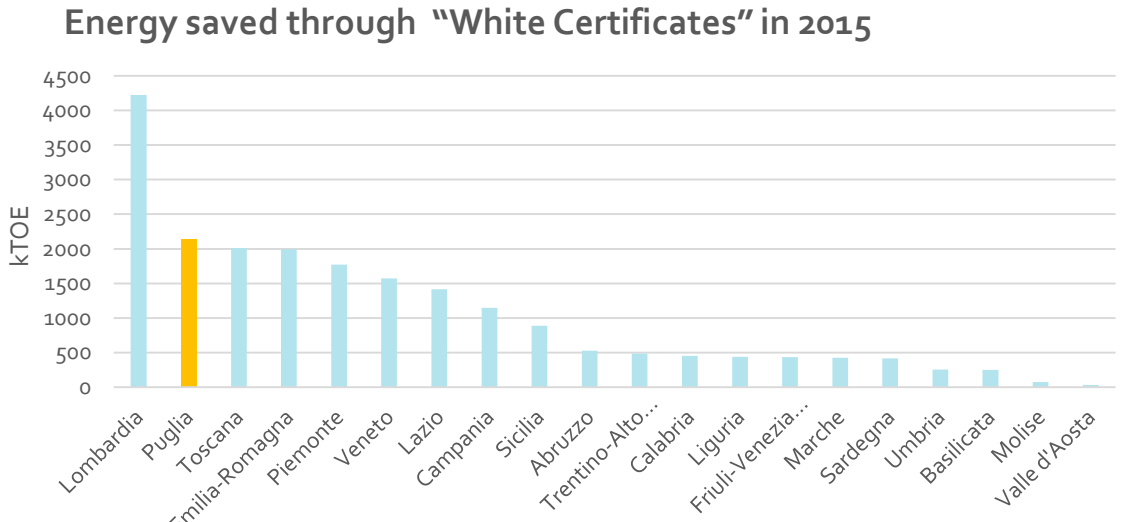
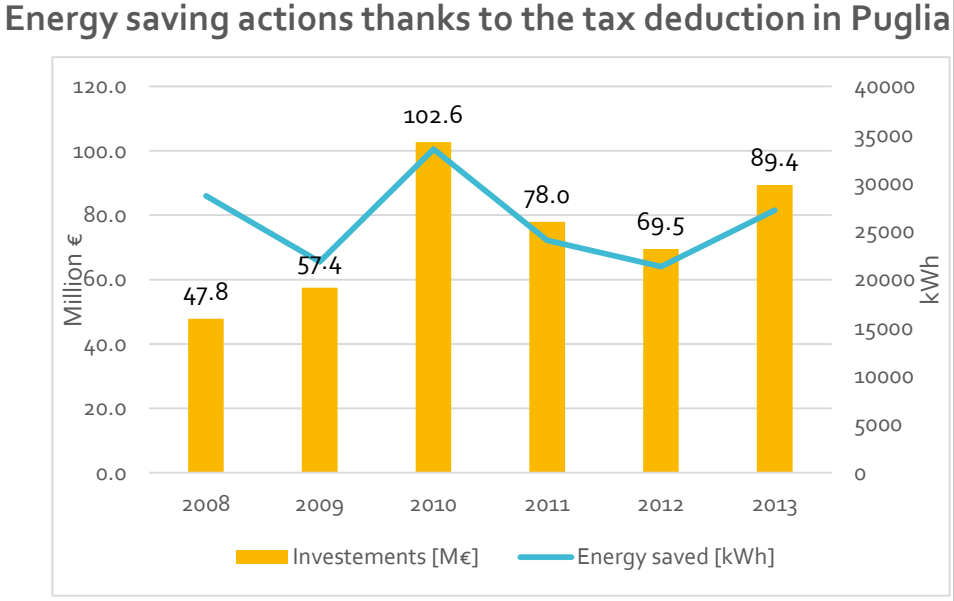
Apulian performances in Energy Efficiency and Energy Saving



Source: ARTI elaboration on GSE, 2015

- In 2015 Apulia was the second Italian Region for Energy Efficiency Certificates issued and the fifth Region for energy efficiency operators (301 licensed ESCOs)

- In 2008-2013, 450 million € were invested in Puglia for energy efficiency by end-users thanks to tax deduction incentives



Source: ARTI elaboration on Enea, 2013

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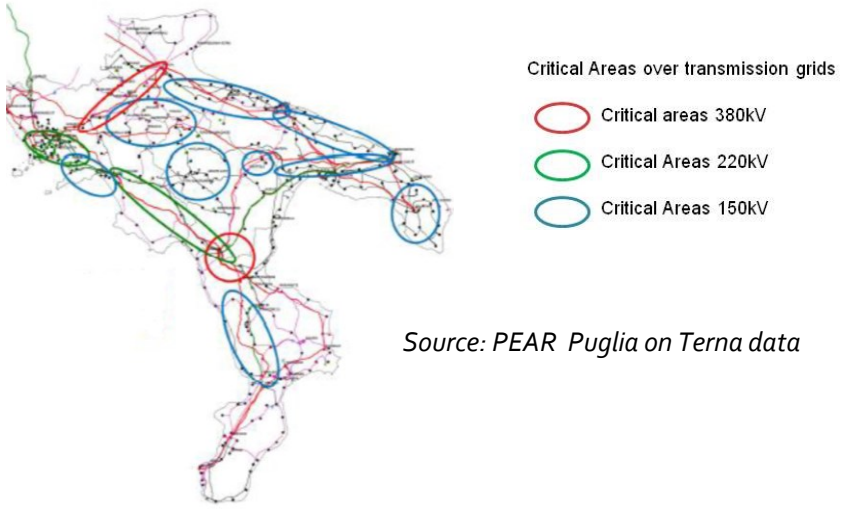
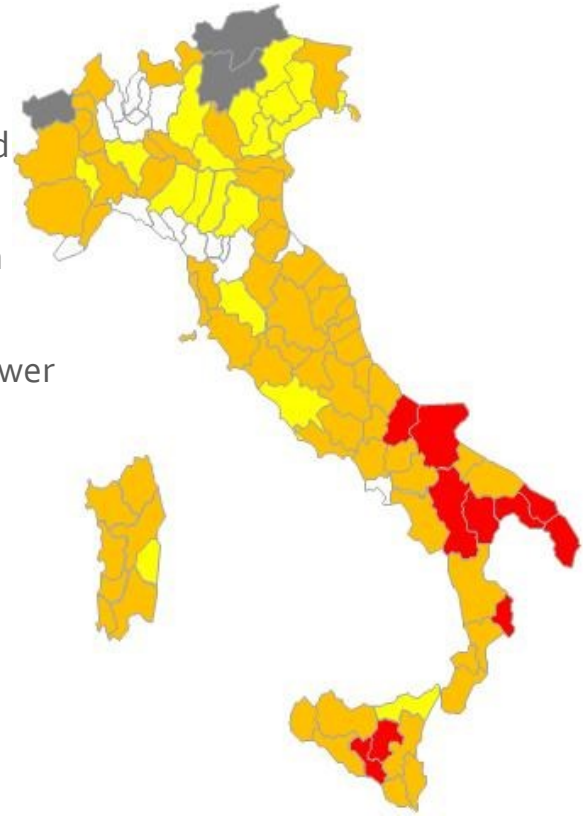
The Apulian grid criticalities

- Due to the high electric production and the mismatch between generation and consumption sites, the grid reports:
  - Congestion on the network between the substations of Foggia and Campania Region
  - Congestion on the network portion close to the Bari Station and in the area of Salento
  - Congestion on the network between Bari and Brindisi, carrying power generated locally to the loading areas of Bari
  - High reverse flow (from distribution to transmission grid) in the Foggia province and in the Salento Area



Source: PEAR Puglia on Terna data



Reverse flow in Italy (Source: Terna, 2013)

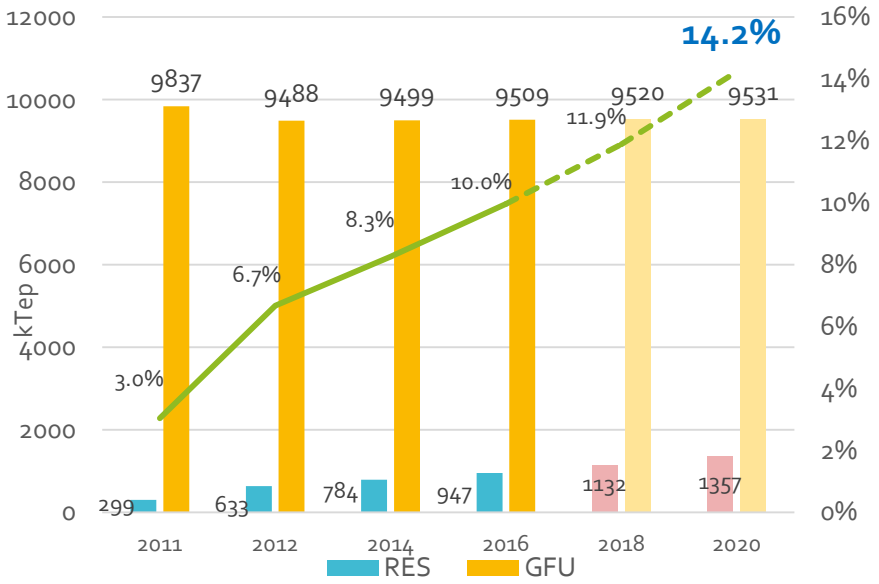
The RES targets of Apulia

The Italian Burden Sharing sets, for each Region, a specific objective in terms of ratio between RES production and gross final energy consumption

Apulian 2020 target (RES/EC): 14,2%

In 2016 = 11,9% (estimated)

RES APULIAN OBJECTIVE



Source: ARTI elaboration on PEAR PUGLIA, 2015

PEAR OBJECTIVES

Source	Baseline 2011	2020
Thermal Solar	8 ktep	+84,6 ktep
Wind	2.250 GWh	8.000 MW
Geothermal	-	+10 ktep
Hydro	1,5 MW	+10 MW
Energy Saving	-	+1Mtep/year
Biomass & Biofuel	401 ktep	+430 ktep

Source: ARTI elaboration on PEAR PUGLIA, 2015

The Regional Operational Programme 2014-20

Priority Axis IV of ROP2014-2020 - ***Sustainable energy and quality of life*** includes the following measures:

- RA4.1 - Reducing energy consumption and integrating RES in public buildings (102 M€)
- RA4.2 - Reducing energy consumption and CO_2 emissions and integrating RES in industrial companies (20 M€)
- **RA4.3 - Increasing the share of energy needs covered by distributed energy systems, through the development of smart grids (15 M€)**
- RA4.6 - Improving sustainable mobility in urban areas (61 M€)

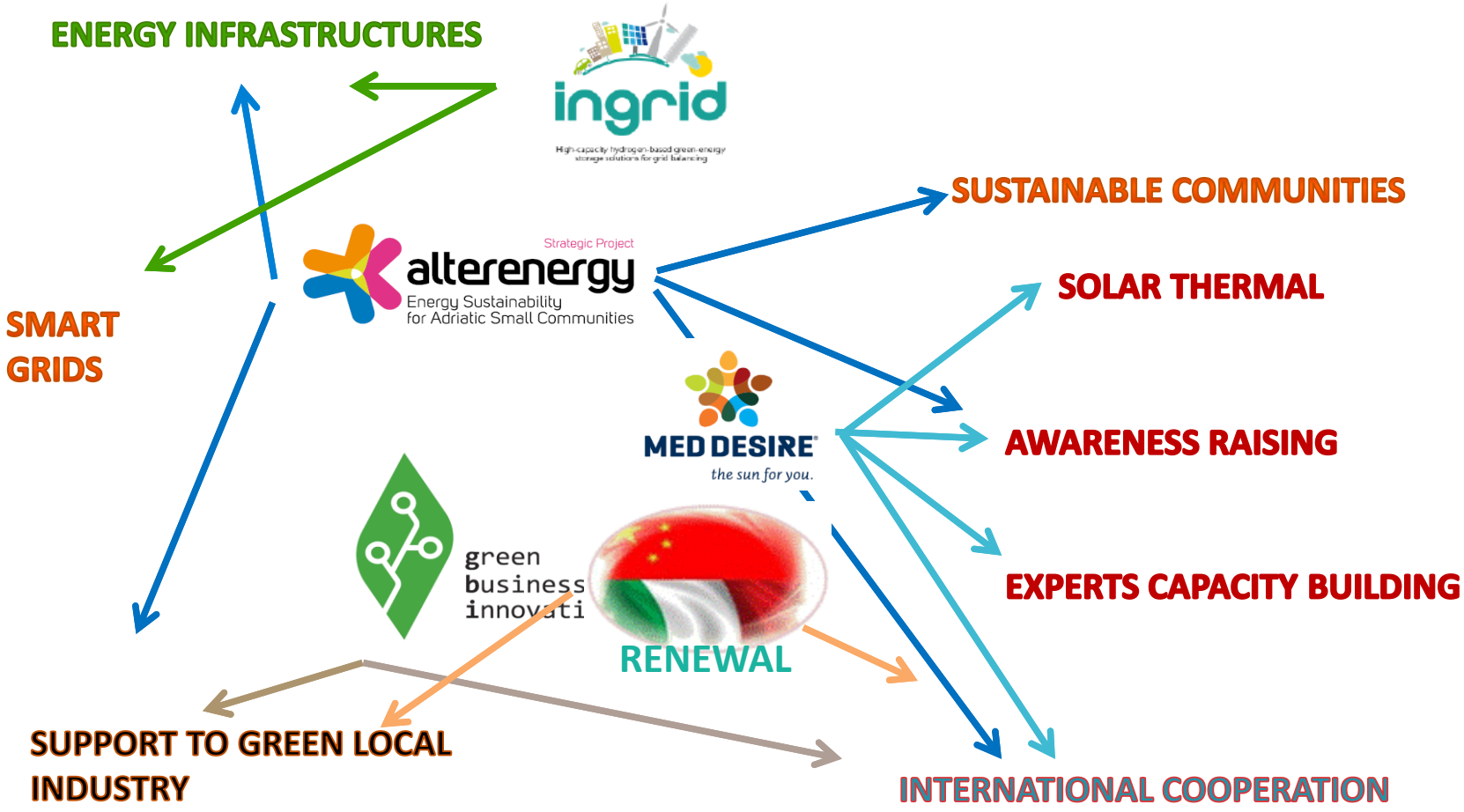
2. A Regional Project on Smart Grids: Ingrid

ingrid

High-capacity hydrogen-based green-energy storage solutions for grid balancing

ARTI's international projects on energy

ARTI has taken part to several international projects on energy, being one of the most active regional players



The Ingrid Project

- Ingrid is a R&D project co-funded by the 7thFP, with a budget of 24 million €
- The project combines the cutting edge in ICT technologies with hydrogen-based energy storage
- The challenge is to optimize the electricity generated by intermittent RES while ensuring security and stability of the distribution network
- Ingrid aims at demonstrating in what regulatory and market conditions hydrogen storage can be feasible

www.ingridproject.eu

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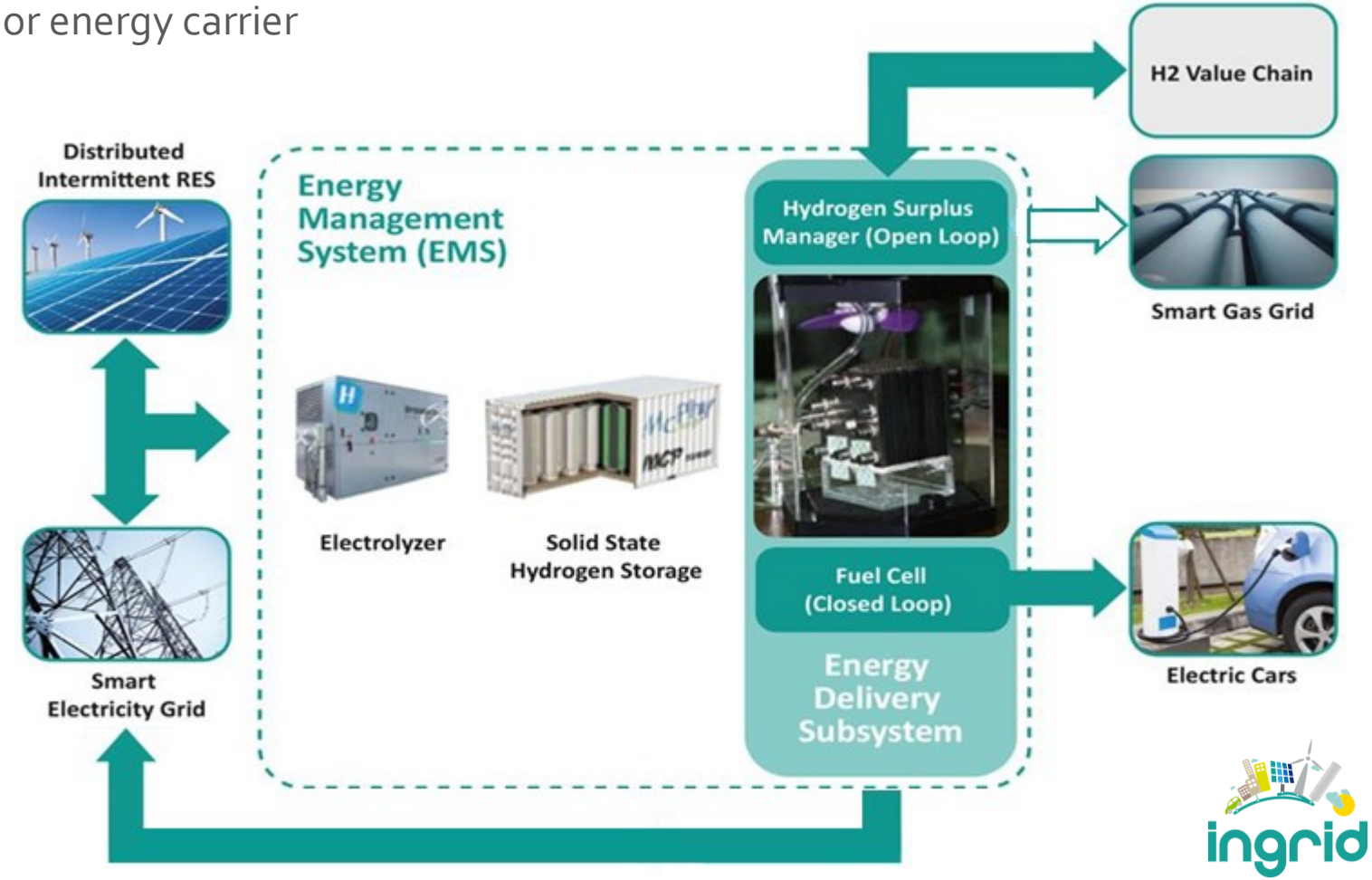
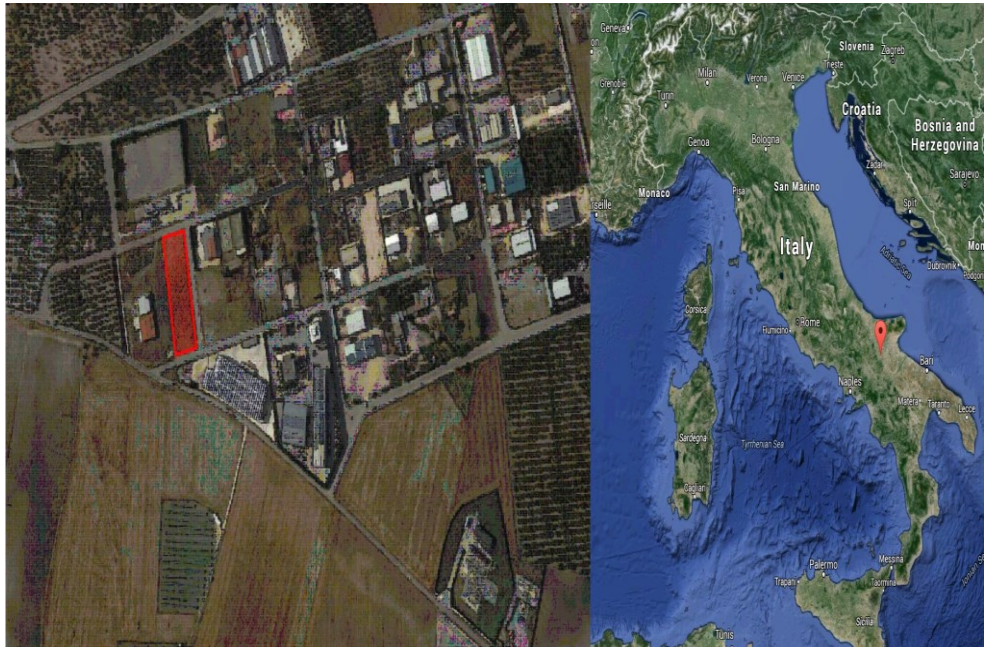
The Ingrid project – the process

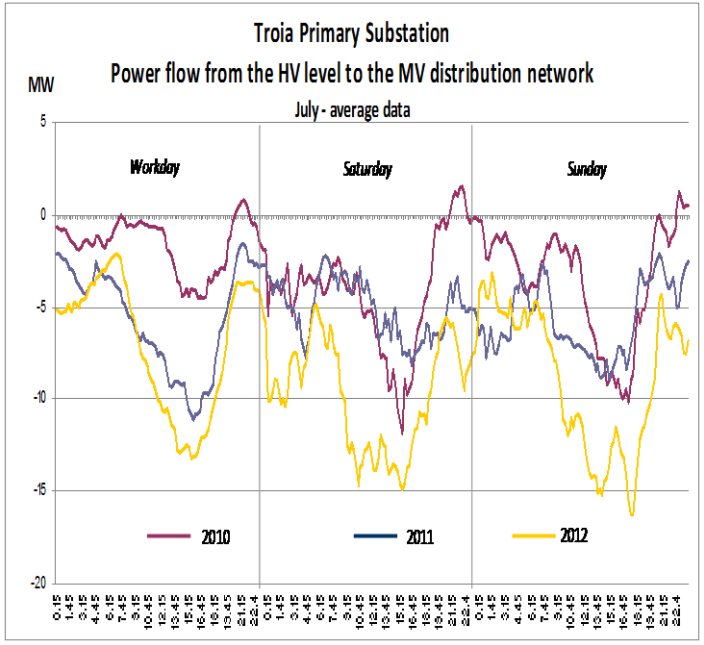
- INGRID will offer a systemic vision of energy grids, aiming more at the decarbonization of the energy value chain, than the efficiency of the single grid or energy carrier



The Ingrid demonstrator localization

- The INGRID project contemplate the construction of a 39 MWh size demonstration plant, located in Troia Municipality, in Foggia province
- The power reverse flow in Troia is the highest among the regional primary substations (62%)





The Ingrid project: the demonstrator

- The civil work started in **April 2016** and should be completed **in July 2016**

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High-capacity hydrogen-based green-energy storage solutions for grid balancing

The Ingrid Project : the demonstrator

- The key components of the demonstrator will be deployed in **summer 2016**
- The project will close the demonstration phase in **spring 2017**

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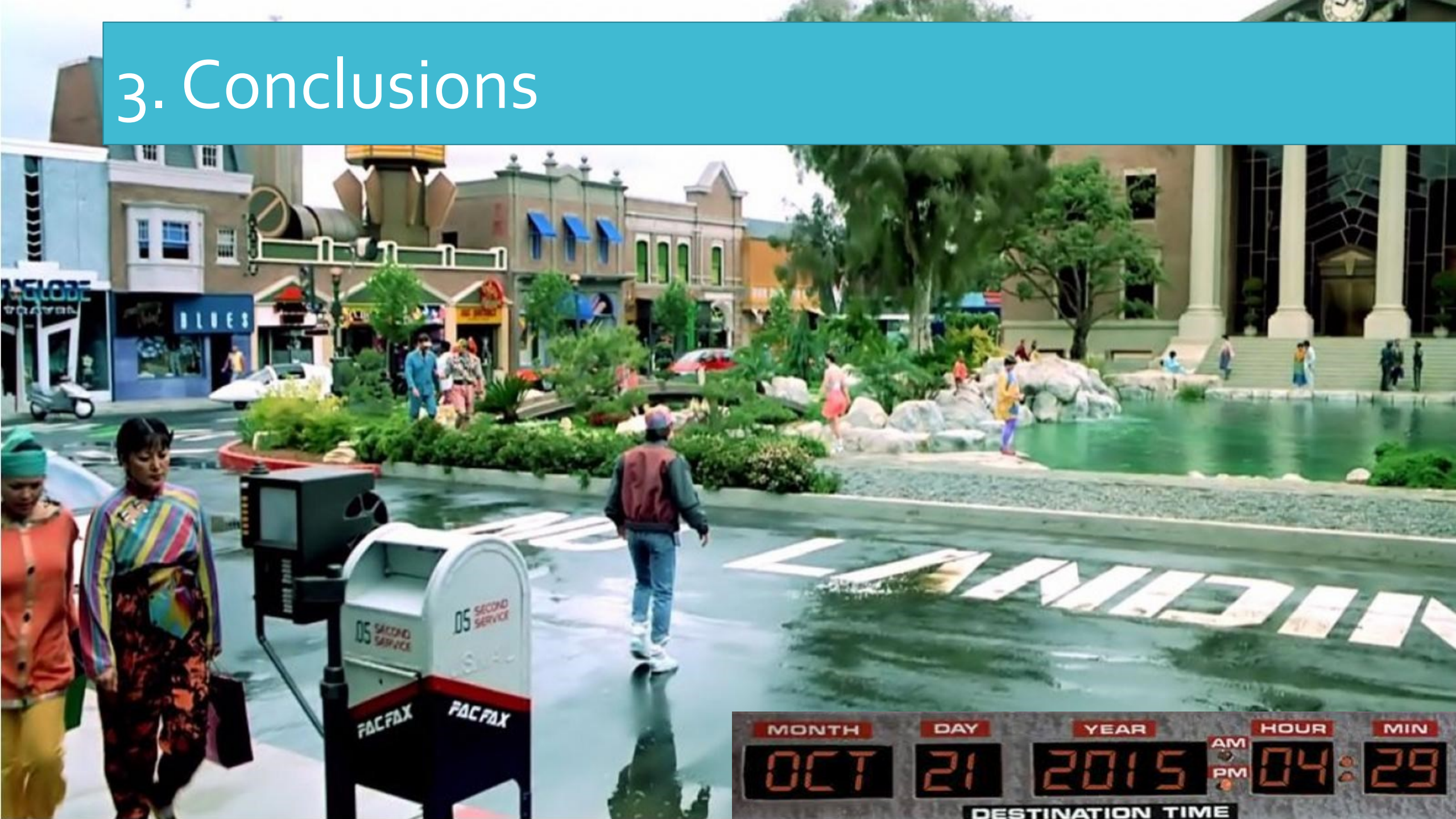
High-capacity hydrogen-based green-energy storage solutions for grid balancing

http://www.virtualereale.com/vr.html

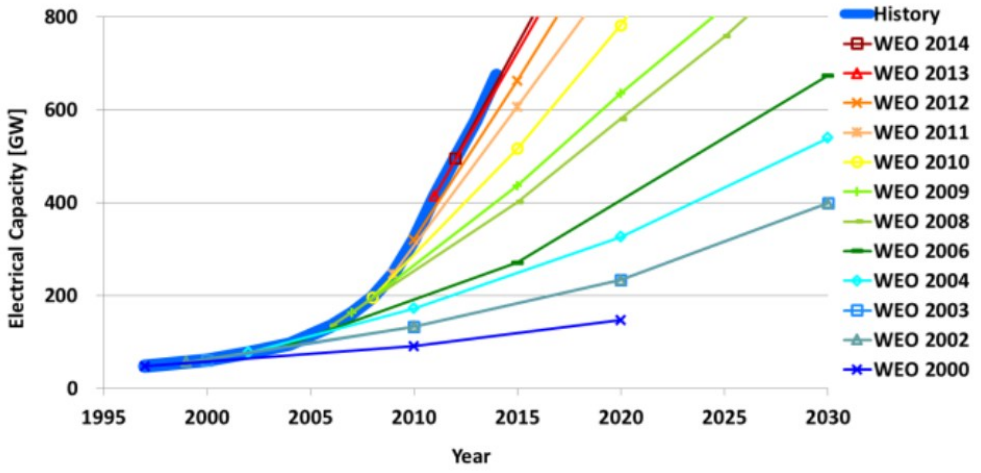
3. Conclusions



The world energy model is already changed

- Until less than 10 years ago, RES were considered by a lot of experts a market niche, an expensive way to produce energy
- In 2015 the World RES capacity surpassed 600 GW, 6 times the value foreseen by IEA in 2000
- In Apulia, the PV installed capacity has reached 2.490 MW, 16 times the objective of the PEAR of 2007 (150 MW for 2016)

World RES Electrical Capacity (ex. Hydro) according to WEO estimates and history




SMART ENERGY
FOCUS
La fotografia in Italia
Rinnovabili, crescita a pieni giri
In 39 comuni italiani il 100% dell'energia consumata è prodotta da fonti pulite
«Le regole tecniche vanno adeguate alla produzione»
Sistemi di accumulo al centro dell'innovazione

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Conclusions

… and in this new world, smart grid will be essential

"A nation that can't control its energy sources can't control its future" – Barak Obama

Thanks for your attention

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e-mail: c.gadaletacaldarola@arti.puglia.it
Linkedin: it.linkedin.com/in/carlogadaleta
Skype: carlo.gadaleta.78
www.arti.puglia.it - facebook.com/artipuglia - twitter.com/artipuglia - youtube.com/artipuglia

Via Giulio Petroni 15/F.1 70124 Bari (BA) - Italy