

ANIE
Rinnovabili



FEDERAZIONE NAZIONALE
IMPRESE ELETTROTECNICHE
ED ELETTRONICHE



Overview of Renewable Energy Sector and Made in Italy Technologies

Dr. Alberto Pinori
President of ANIE Rinnovabili Association

Rome, 16th March 2017



About FEDERAZIONE ANIE

Federazione ANIE has been representing the **Italian Electrical Engineering and Electronic Industry** for 70 years.

The **Italian Electrical Engineering and Electronic Industry** in figures (in 2015):

- ❖ **54 billion Euros of total turnover**
- ❖ **29 billion Euros of export**
- ❖ **410,000 employees**
- ❖ **4% intra-mural R&D expenditure on Total Turnover (less than 1% the corresponding % for Manufacturing Industry)**
- ❖ **almost 60% of the production value comes from SMEs**

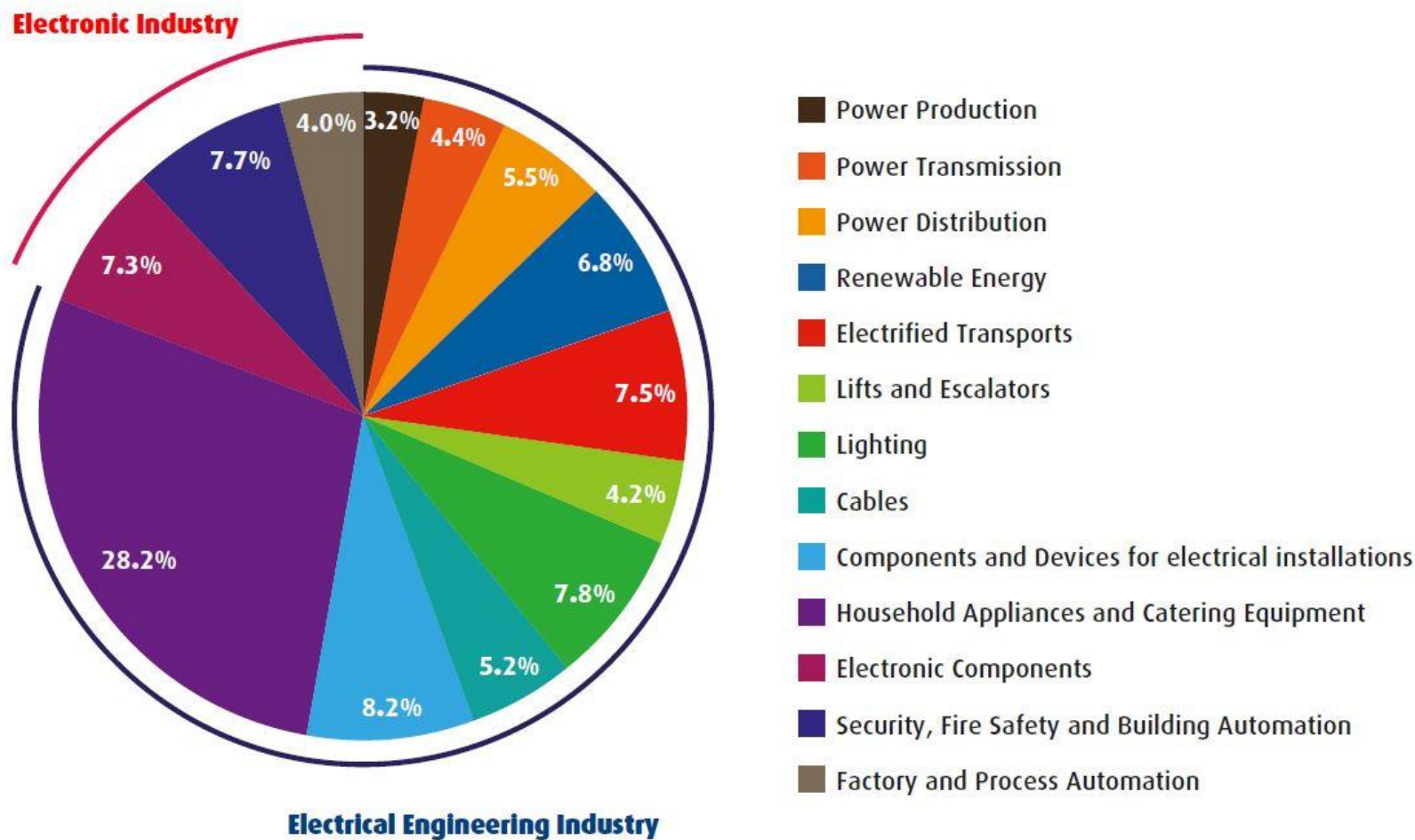
The **ANIE system** supplies the technologies for public and private infrastructures in strategic markets such as **industry, transport, energy and building**.



About FEDERAZIONE ANIE

ANIE TECHNOLOGIES IN 2015

% distribution of total turnover by sector





About ANIE Rinnovabili

ANIE Rinnovabili is the **Italian Renewable Energy Industry Association**

- ☪ Founded in June 2014 - member association of Federazione ANIE
- ☪ Over **220 member companies**

The **Italian Renewable Energy Industry** in figures (in 2015):

- ☪ **3.6 billion Euros in total turnover**
- ☪ **2.1 billion Euros in export** (almost 60% the export % rate on total turnover)
- ☪ **more than 1 billion Euro in trade balance**

ANIE Rinnovabili represents and supports:

- ☪ **Manufacturers of components and/or turnkey power plants**
- ☪ **O&M service providers**
- ☪ **Power producers from renewable energy sources**

☪ Photovoltaic

☪ Hydroelectric

☪ Geothermal

☪ Wind

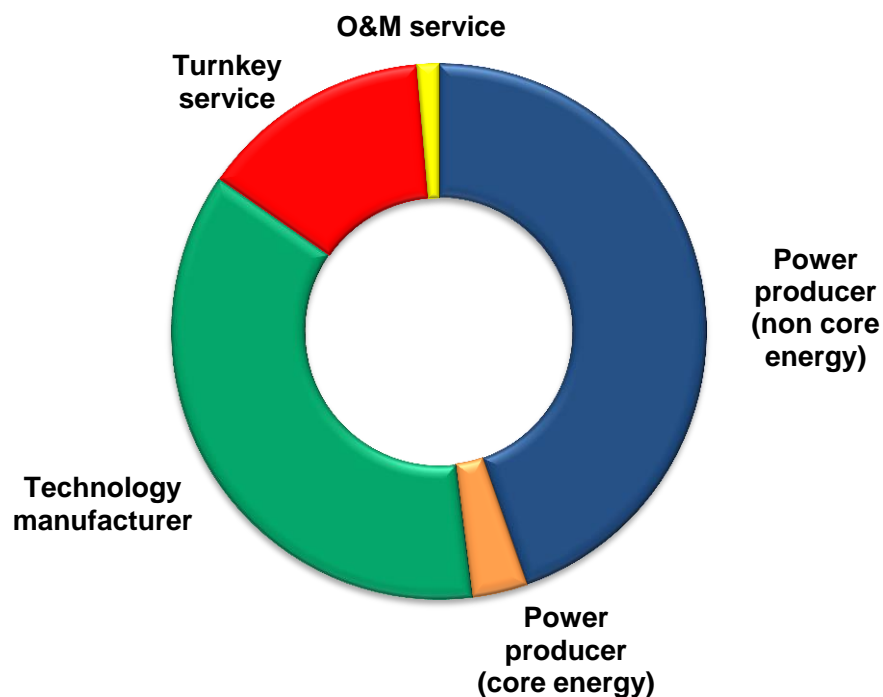
☪ Bioenergy

☪ Concentrated Solar Power

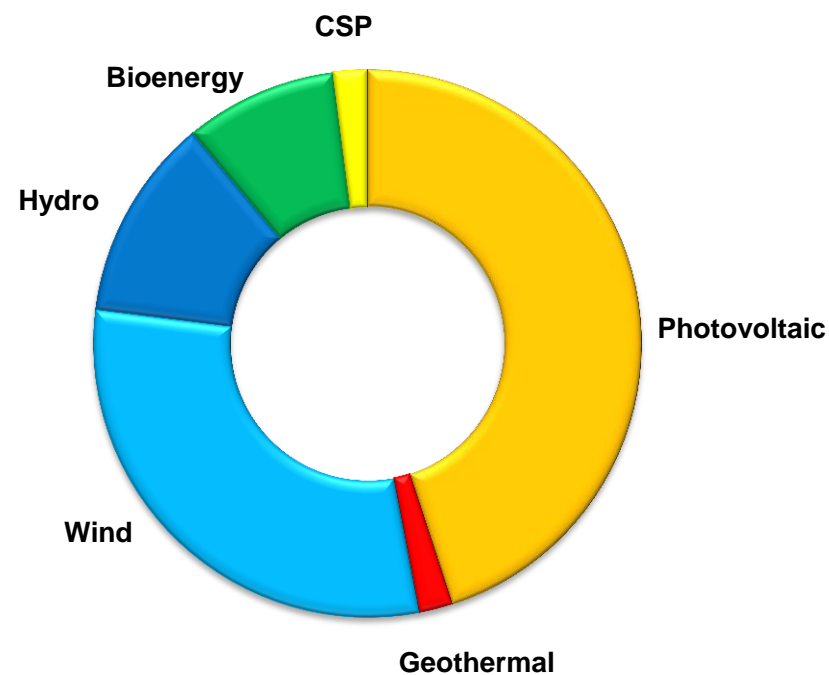


About ANIE Rinnovabili - Italian Renewable Energy Industry Association

Member companies by sector
% distribution



Member companies by sources
% distribution





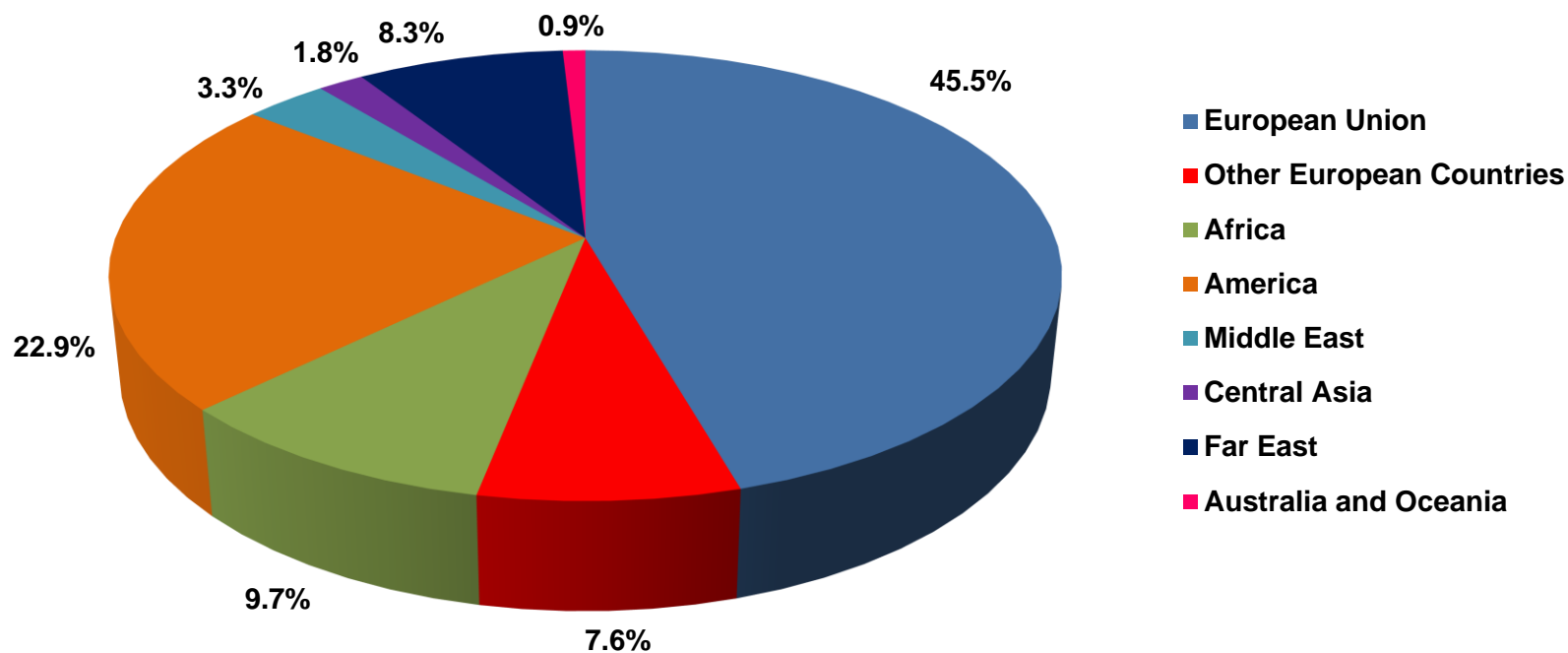
The Italian Renewable Energy Industry

	2013	2014	2015	2014/2013	2015/2014
	<i>million euro</i>			<i>annual % rate of change</i>	
INTERNAL MARKET	5,986.0	2,037.0	2,622.0	-66.0	28.7
TOTAL TURNOVER	6,614.0	3,037.0	3,653.0	-54.1	20.3
EXPORT	2,069.0	2,015.0	2,139.0	-2.6	6.2
IMPORT	1,441.0	1,015.0	1,108.0	-29.6	9.2
TRADE BALANCE	628	1,000.0	1,031.0		



The Italian export of technology for renewable energy

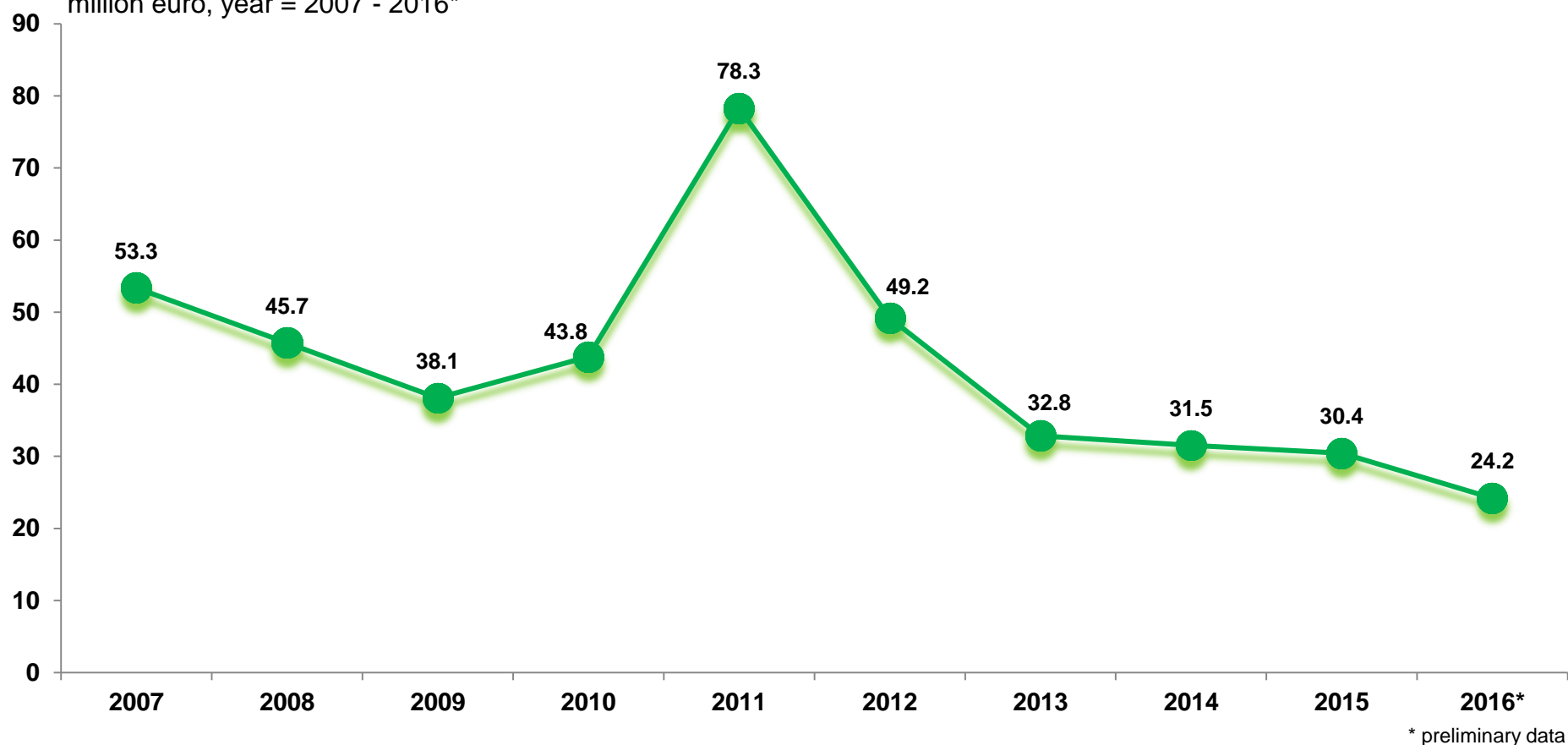
% share by main areas,
2.1 billion euro (Year 2015)





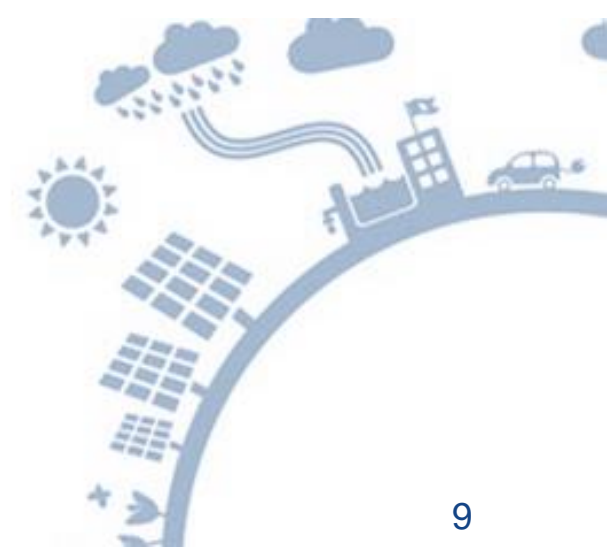
The Italian Export of Technology for Renewable Energy to Indian Market

The Italian Export of Technology for Renewable Energy to Indian Market
million euro, year = 2007 - 2016*



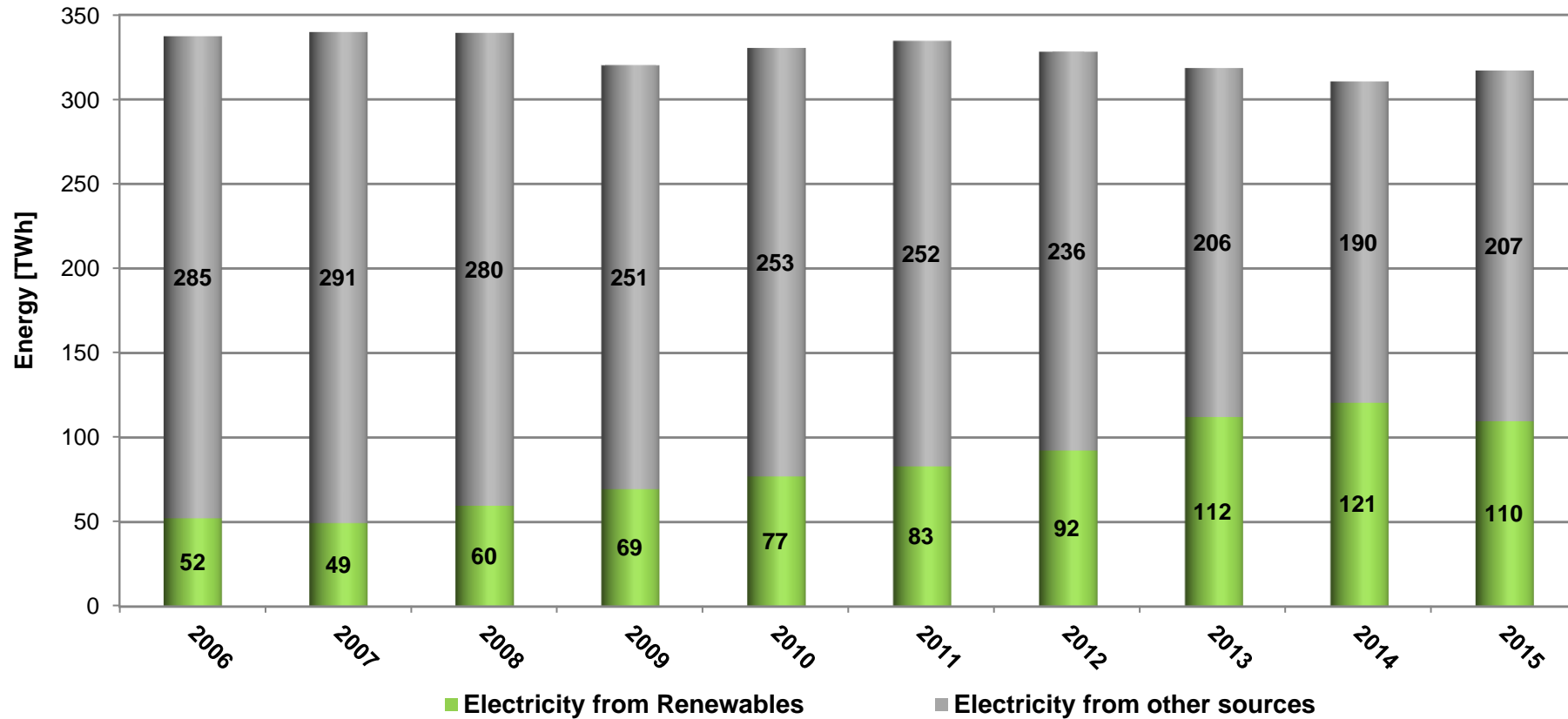


Italian Renewable Energy Development





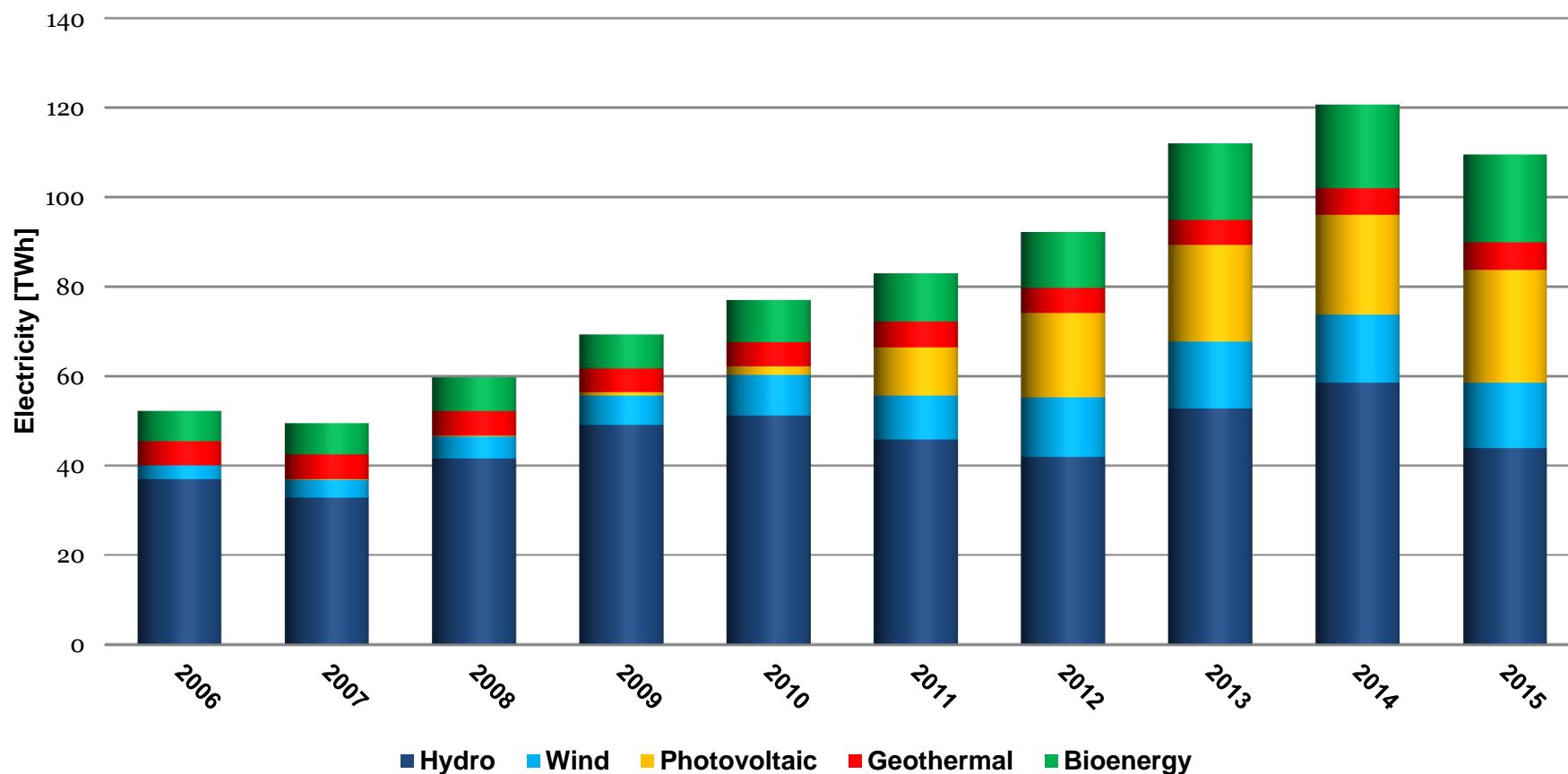
Italian total electricity production vs production from renewables (2006-2015)



- **Share of electricity production from renewables : 15% in 2006 - 35% in 2015!**
- The amount of electricity from renewables doubled in 7 years
- **Extraordinary contribution** of hydropower in 2013-2014



Gross electricity production from renewables (2006-2015)

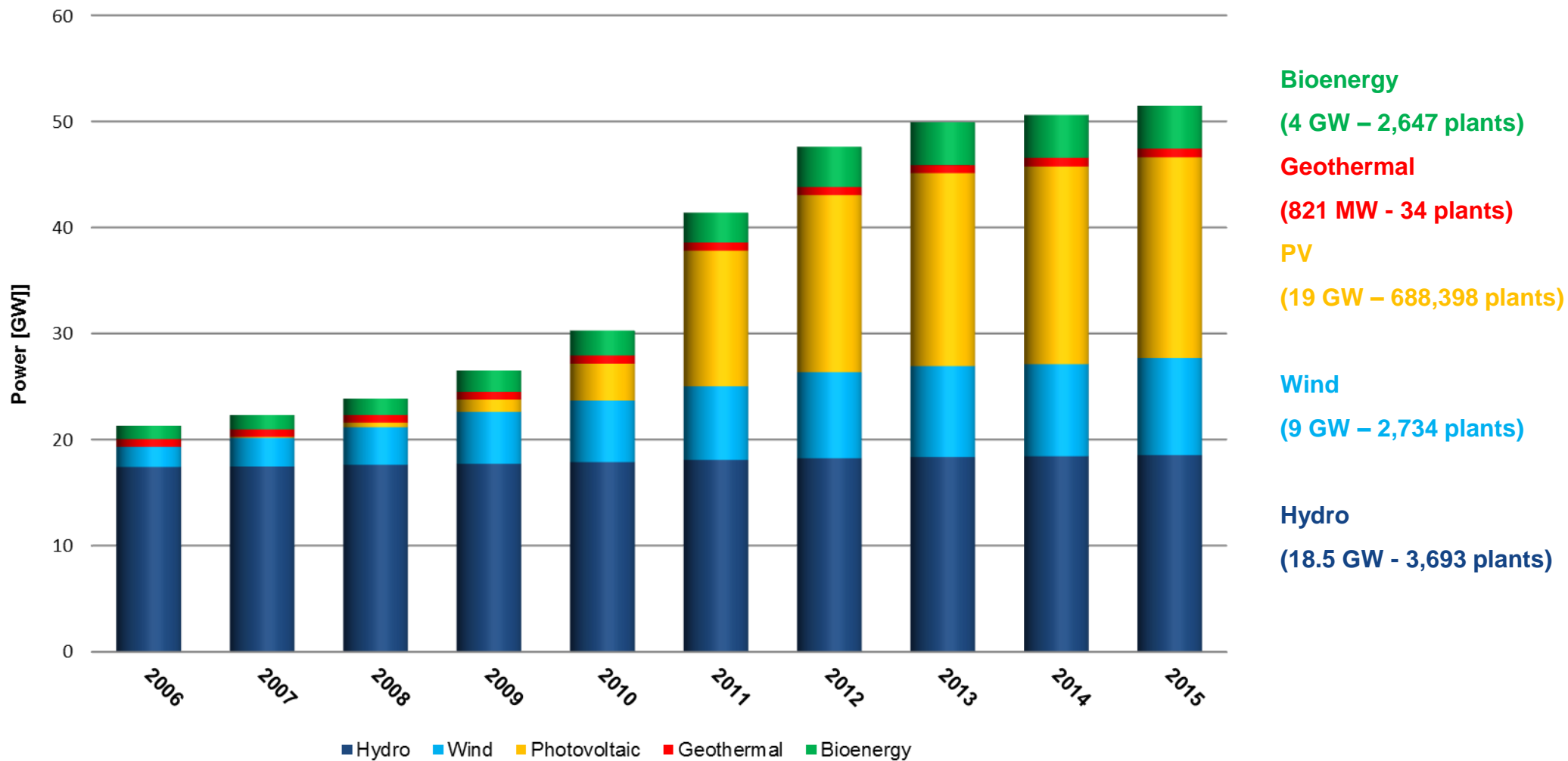


Share of electricity production from renewables (in 2015):

Hydro **40%** Photovoltaic **23%** Bioenergy **18%** Wind **13%** Geothermal **6%**



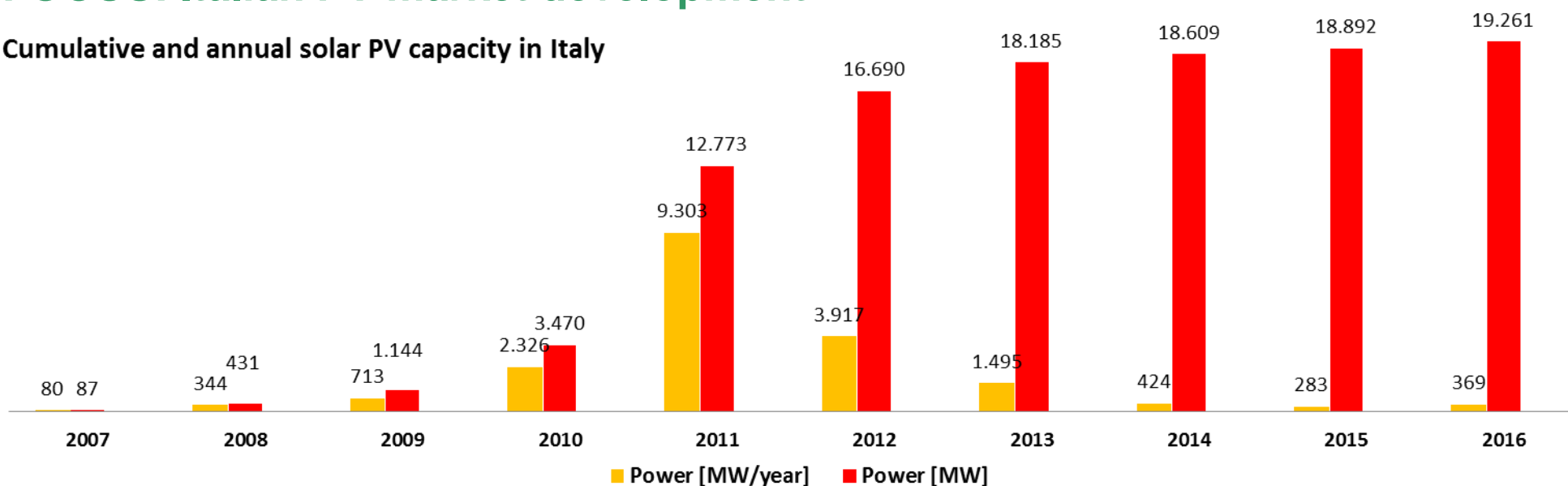
Renewable power capacity in Italy (2006-2015)



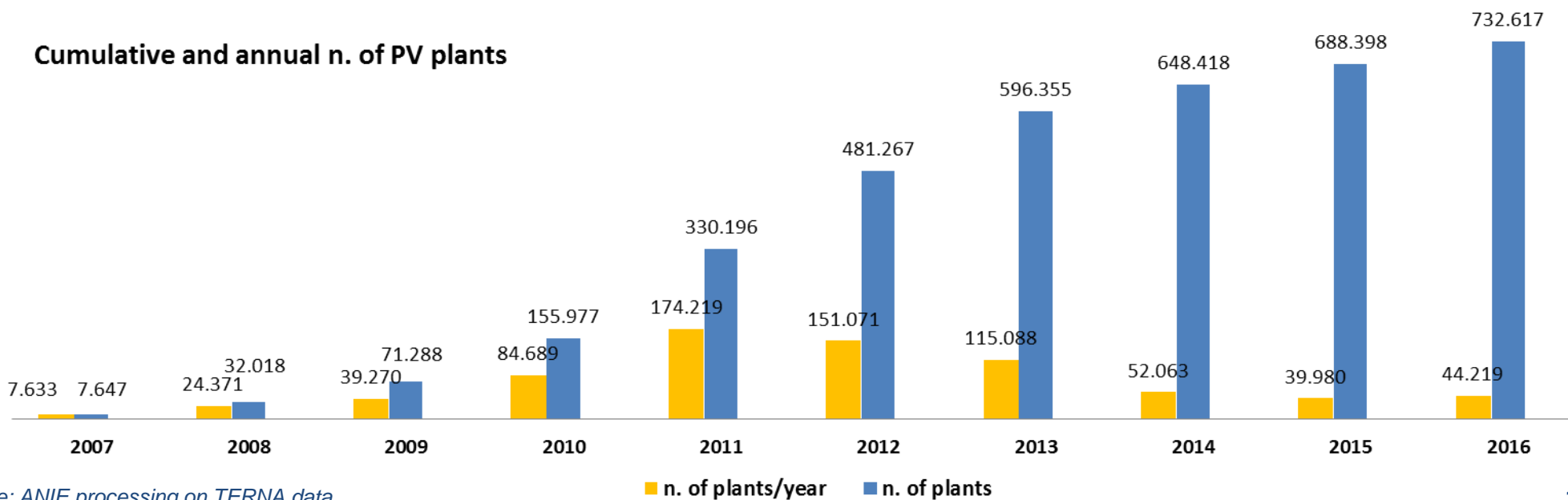


FOCUS: Italian PV market development

Cumulative and annual solar PV capacity in Italy

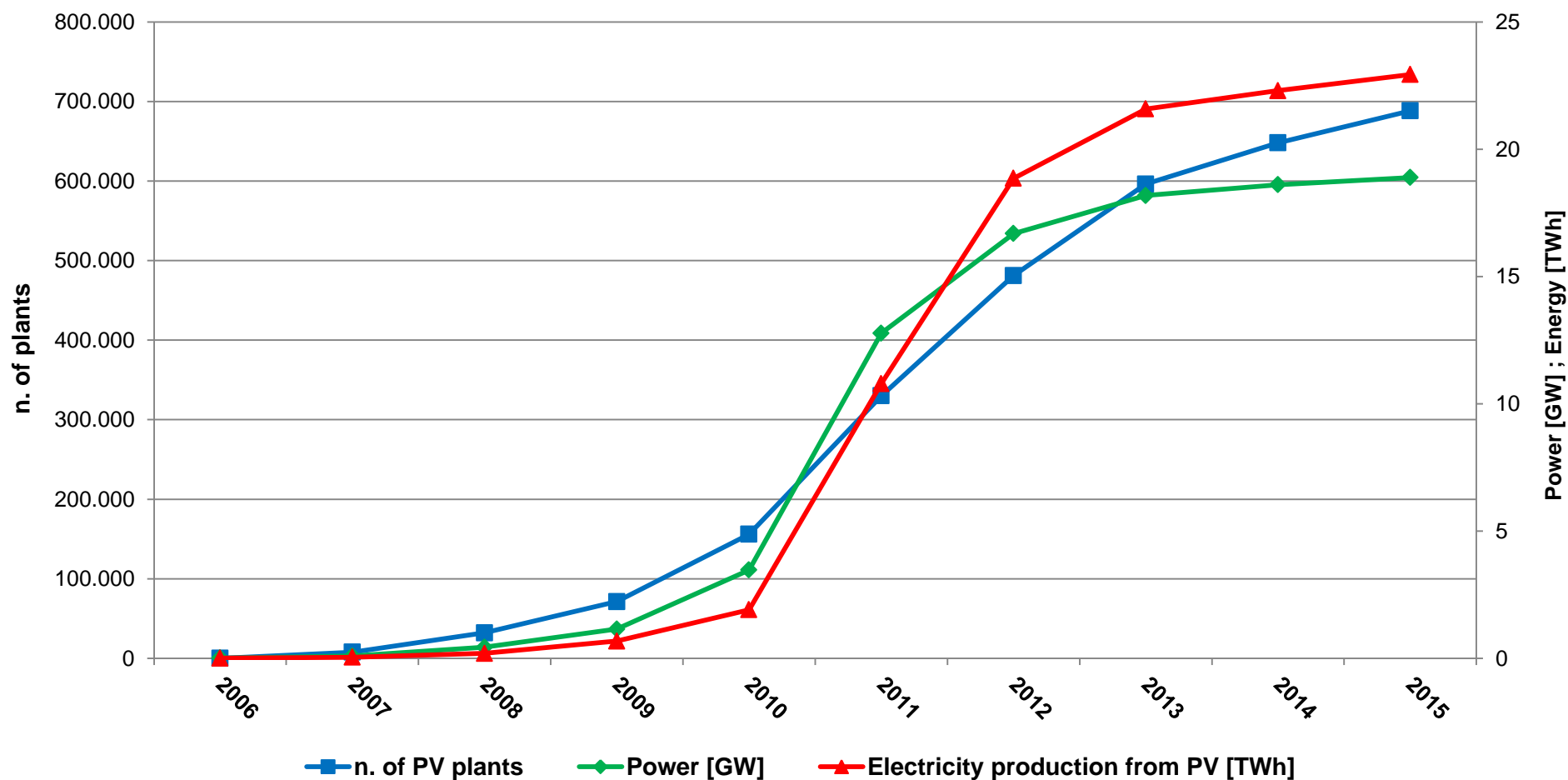


Cumulative and annual n. of PV plants





FOCUS: Solar PV





FOCUS: Solar PV innovation

Solar Module

- **Efficiency improvements**
 - cell 24 % (in 2015)
 - module 21 %
 - Bifacial module 22%
- Module Efficiency improvements
 - **PIDbox** to solve Potential Induced Degradation

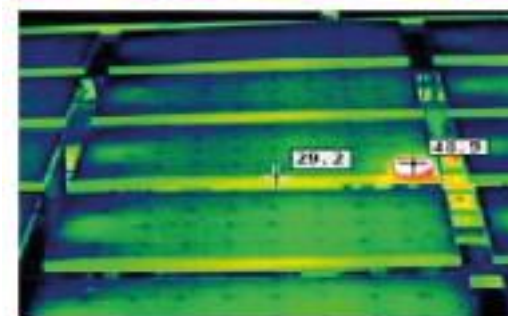
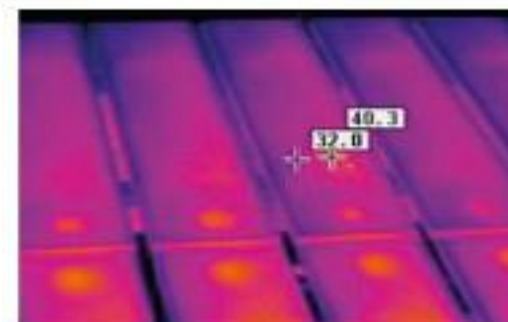
Other components

- **Performance improvements**
 - Efficiency of **MPPT**
 - Solar power **optimizer**
 - **Inverter** more efficient

Innovative diagnostic techniques

Electroluminescence and **Thermografic inspection** to detect

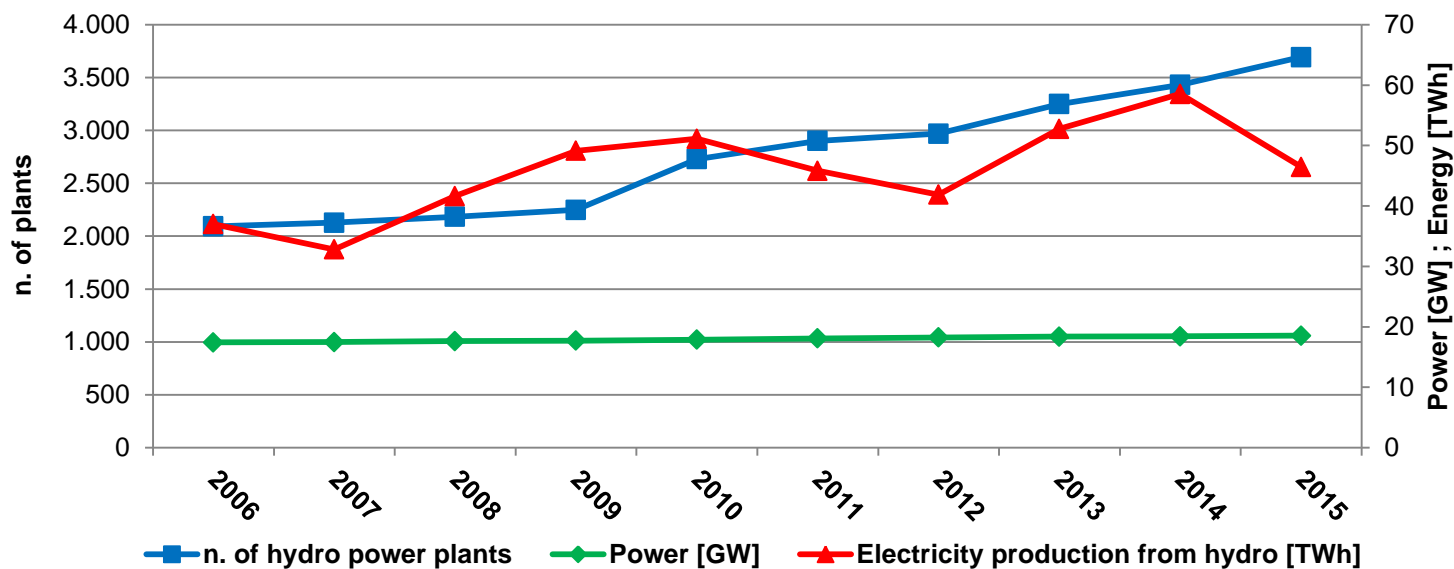
- Local faults and irregularities
- Damage due to Transport and Installation



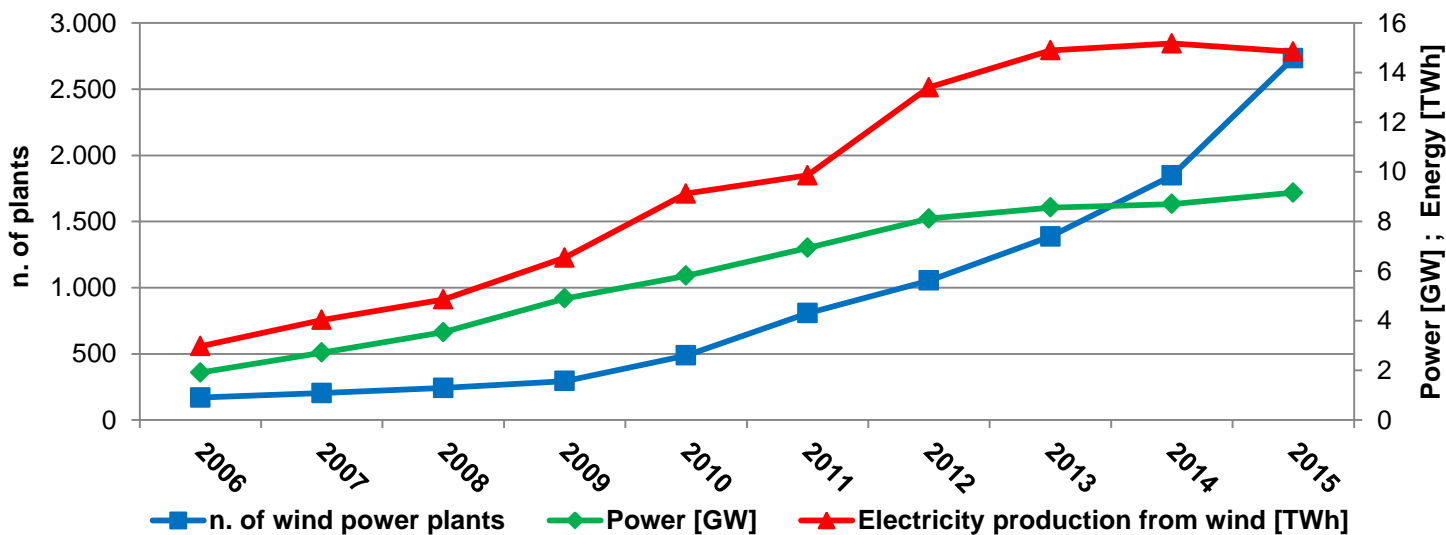


FOCUS: Hydro and Wind Power

Hydroelectric



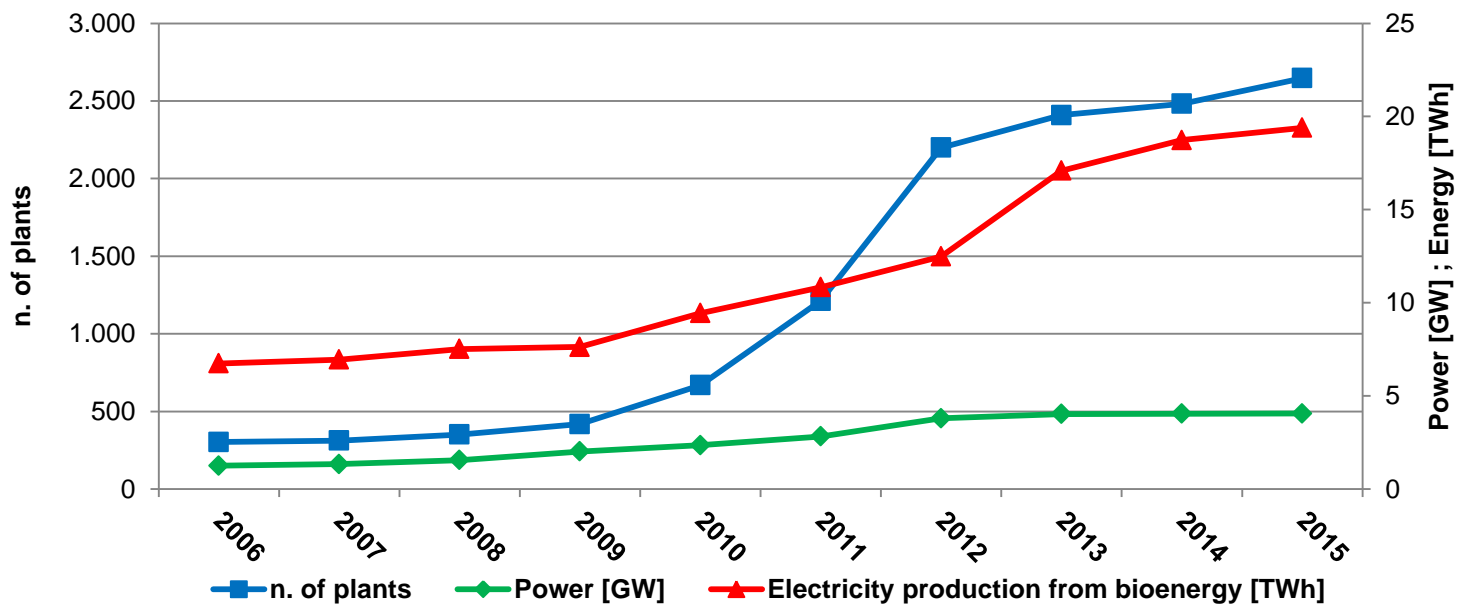
Wind



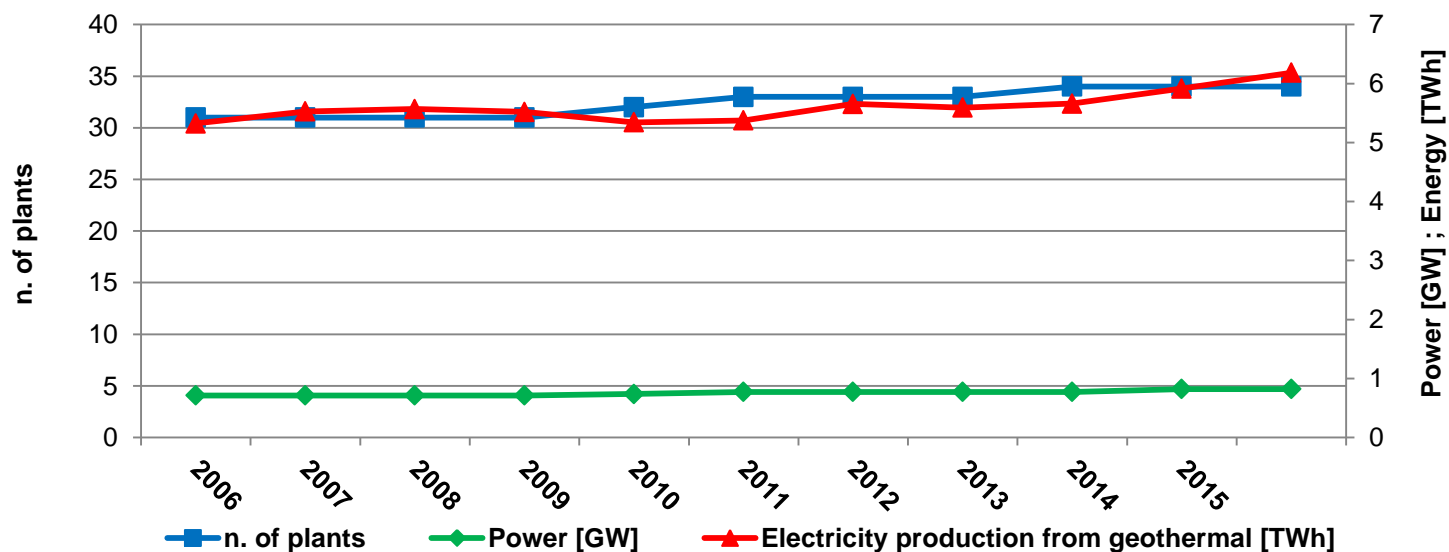


FOCUS: Bioenergy and Geothermal Power

Bioenergy



Geothermal





FOCUS: Energy Storage

Electrical Energy Storage Systems (EESS) installed with solar PV in Italy:

2015: about **2,000** EESS

2016: about **6,000** EESS

2017: (forecast) about **8,000-10,000** EESS



Future improvements

- Increasing **battery life**
- Increasing **efficiency of charge cycle and discharge cycle**



SOLAR PV - Italian technology and know-how



on barrier



noise barrier



semi-transparent



on ground



cantilever roof



green house



WIND POWER - Italian technology and know-how



Example of wind installation



MINI HYDRO POWER - Italian technology and know-how



Example of control system: real time measurement, data and image acquisition



CSP - Italian technology and know-how

Number of CSP plants and capacity installed in Italy

2015 n. plants	2015 Power [MW]
3	6



Example of new CSP technology: a solar accumulator integrated to a PV plant



Thank you

Dr. Alberto Pinori

President of ANIE Rinnovabili Association

 **Contacts:**

ANIE Rinnovabili
Viale Lancetti, 43 – 20158 Milano

02 3264 666
rinnovabili@anie.it
www.anierinnovabili.it
www.anie.it