

KEY ENERGY

THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale per l'energia
rinnovabile e la mobilità sostenibile

Energy Transition Hub

6-9 Novembre 2018

Rimini Italy

IN CONTEMPORANEA CON

ECOMONDO

ORGANIZZATO DA

ITALIAN EXHIBITION GROUP

Providing the future

Le prospettive del solare dopo la SEN e le nuove incentivazioni

3 maggio 2018, 14.00-18.30

Hotel Michelangelo, Sala Sistina - Milano, Piazza Luigi di Savoia, 6

Angelo Guardo - RES4MED

Contesto

Internazionale

Focus Maghreb ed Africa

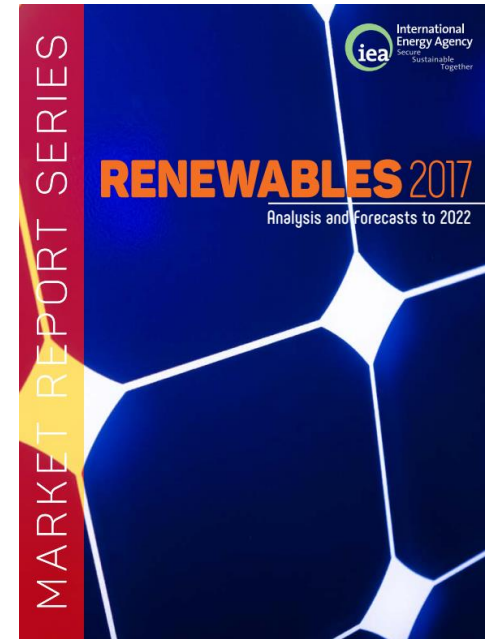
SSA





Renewables 2017

From Medium Term Market Report



KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



Policy support & technology progress continue to drive robust growth in renewables:

- Policies creating new markets
- Industry delivering technology improvements and cost reductions
- Arrival of “giant” emerging economies

Solar PV grew faster than any other form of generating capacity and broke new records in 2016, led by China

- PV capacity 1st time grew faster than any other fuel, including coal
- Chinese market equal half of global demand while 6 out of 10 PV cells are manufactured by Chinese firms- some of them 5 GW/year: China determines global demand, supply and prices of solar pv!



Competitive auctions are seeing record-low prices for wind & solar resulting from 3 factors:

- More competition through actions
- Innovation and cost reductions all along the supply chain
- Expanding into markets with better RE sources

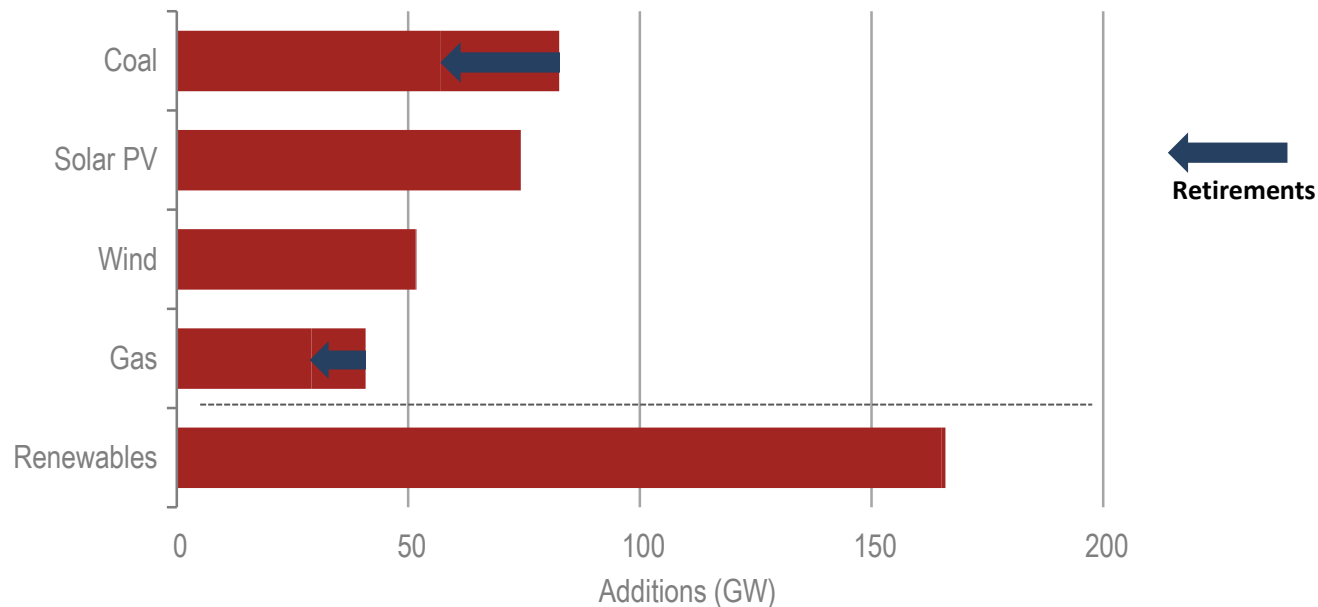
Prospects for renewables underpinned by need to **address core energy challenges**

- Air pollution still a major problem – millions premature deaths
- Universal access to modern energy remains a distant goal- 1.2 billions no electricity access, 2.7 billions no clean cooking
- Current climate pledges fall short of meeting mitigation goals



2016 – Renewables hitting new records driven by solar PV

Power capacity additions by fuel 2016



**Renewables breaking an all-time record accounting for two thirds of global net capacity additions;
For the first time solar PV becoming the global leader in net capacity growth**

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

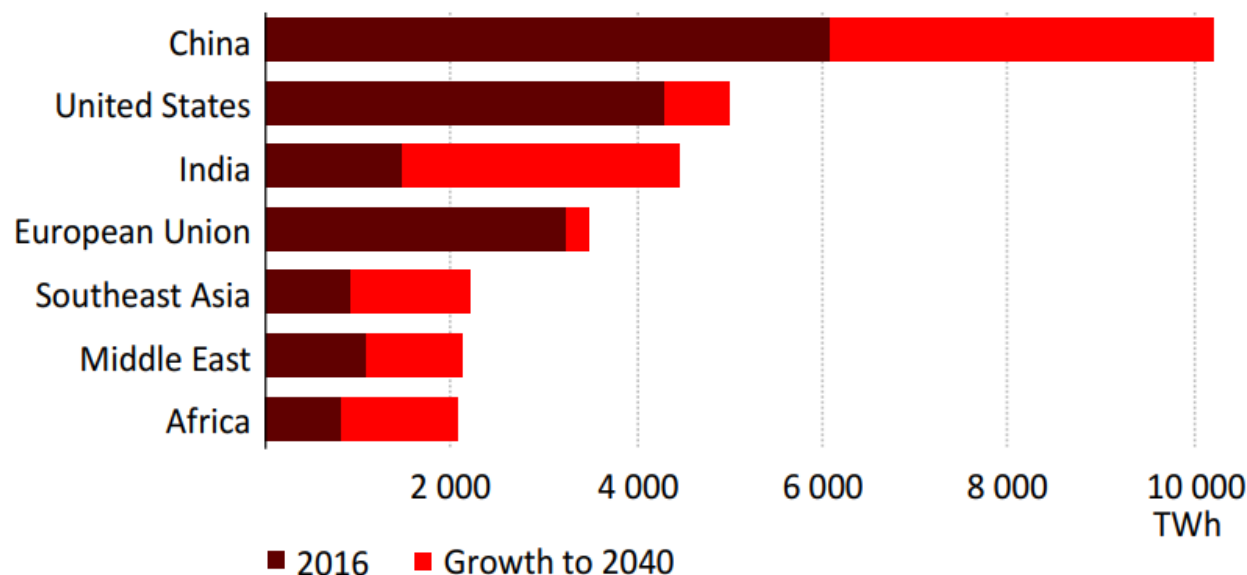
Energy
Transition
Hub



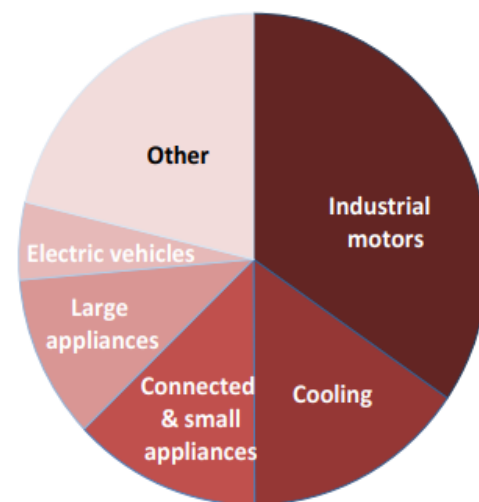
The future is electrifying



Electricity generation by selected region



Sources of global electricity demand growth



Source: World Energy Outlook 2017

India adds the equivalent of today's European Union to its electricity generation by 2040, while China adds the equivalent of today's United States

© IEA 2017

KEY ENERGY
THE RENEWABLE ENERGY EXPO

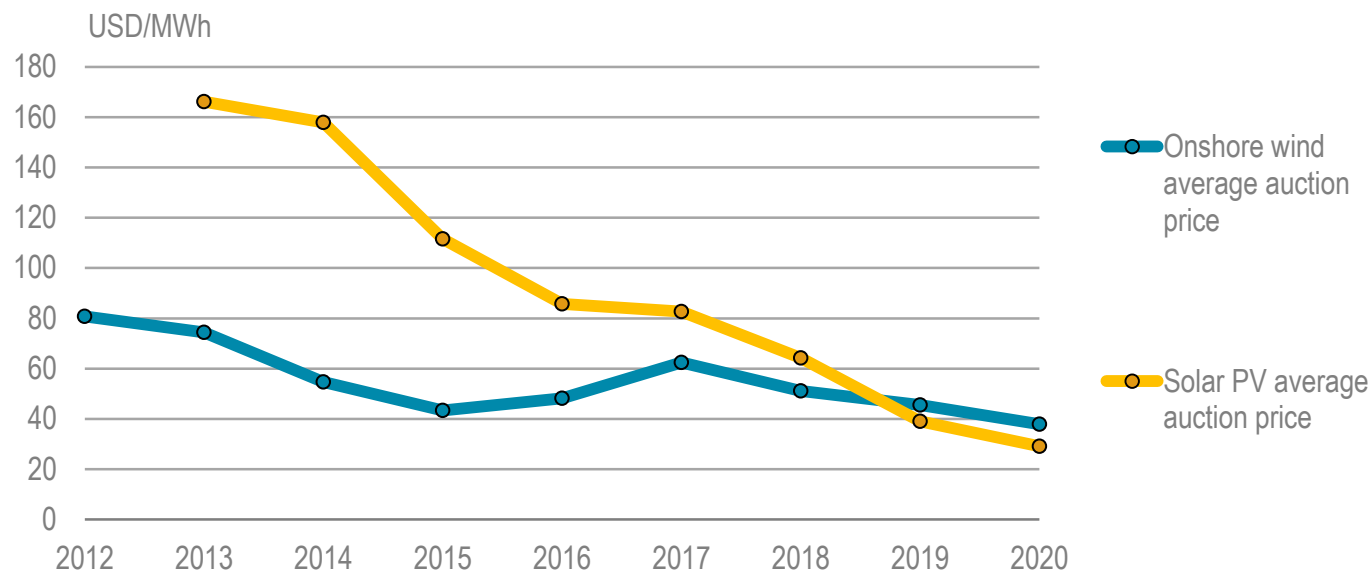
12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



Competition driving costs down

Announced wind and solar PV average auction prices by commissioning date



**Price discovery through competitive auctions effectively reduces costs along the entire value chain;
Auctions with long-term contracts will drive almost half of new capacity growth over 2017-22**

KEY ENERGY
THE RENEWABLE ENERGY EXPO

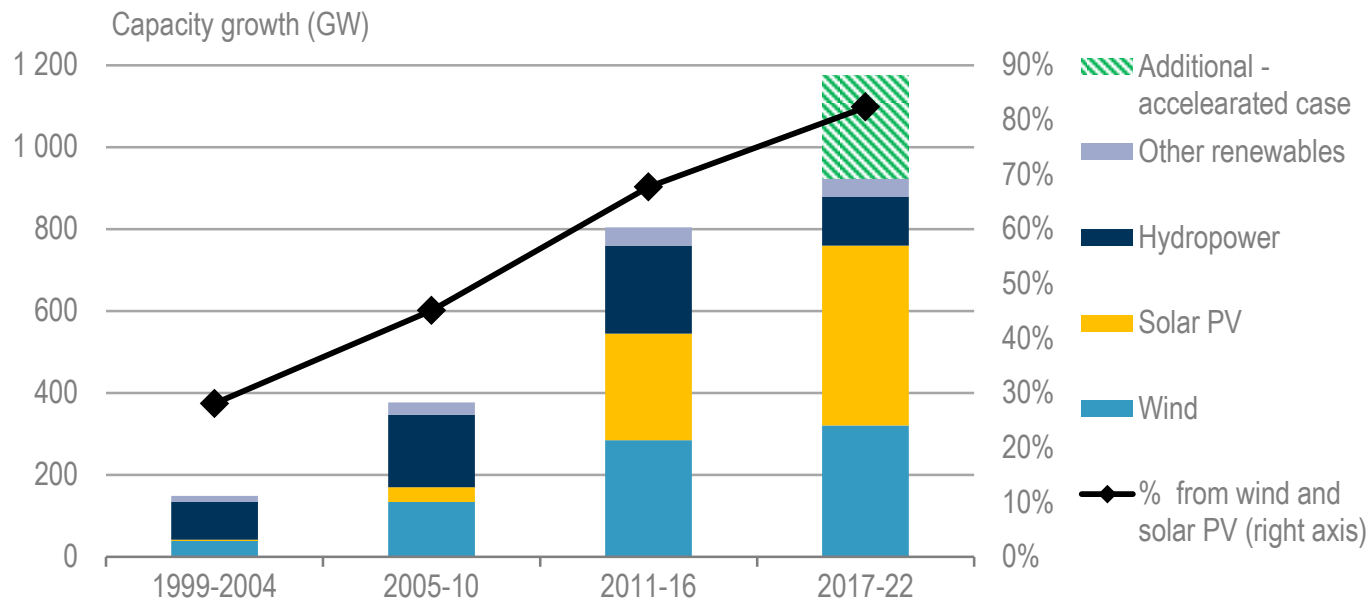
12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



Renewables growth more dependent on wind and solar

Renewable electricity capacity growth by technology



Solar PV enters a new era, becoming the undisputed leader in renewable power capacity growth; PV also accounts for 60% of the upside potential in the accelerated case

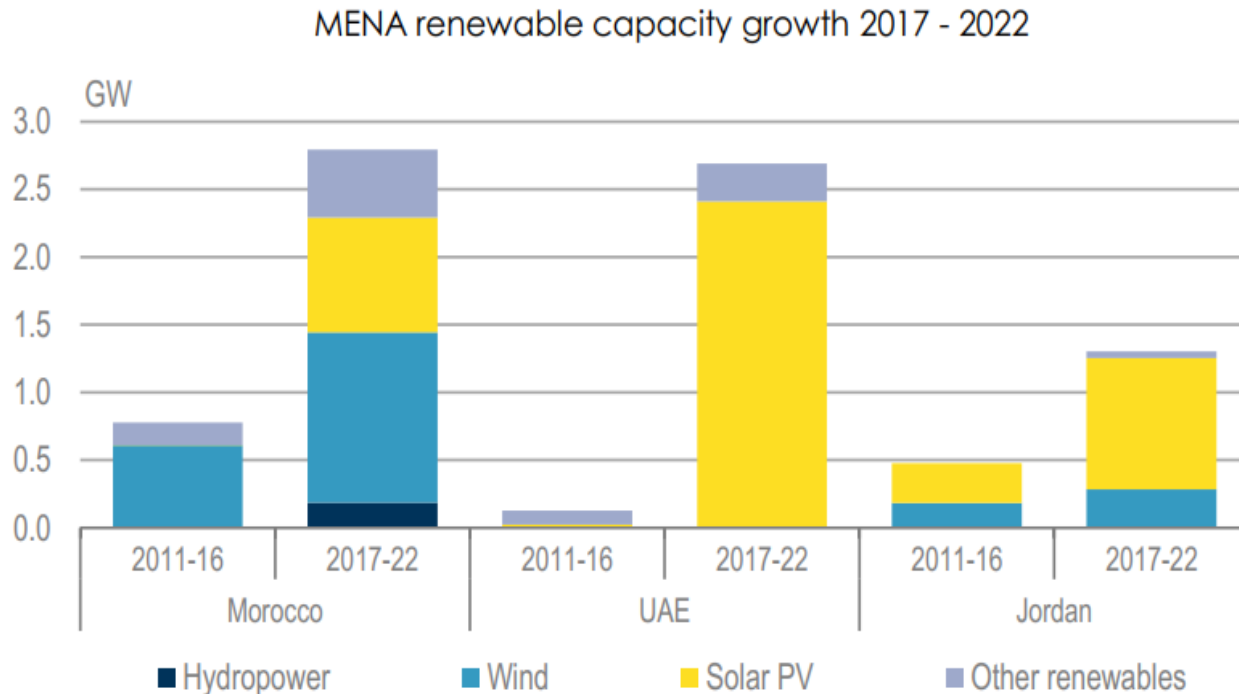
KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



UAE and Morocco lead MENA's non-hydropower growth



Over 80% of MENA's renewable growth is from wind and solar – led by markets where remuneration levels are competitively set

KEY ENERGY
THE RENEWABLE ENERGY EXPO

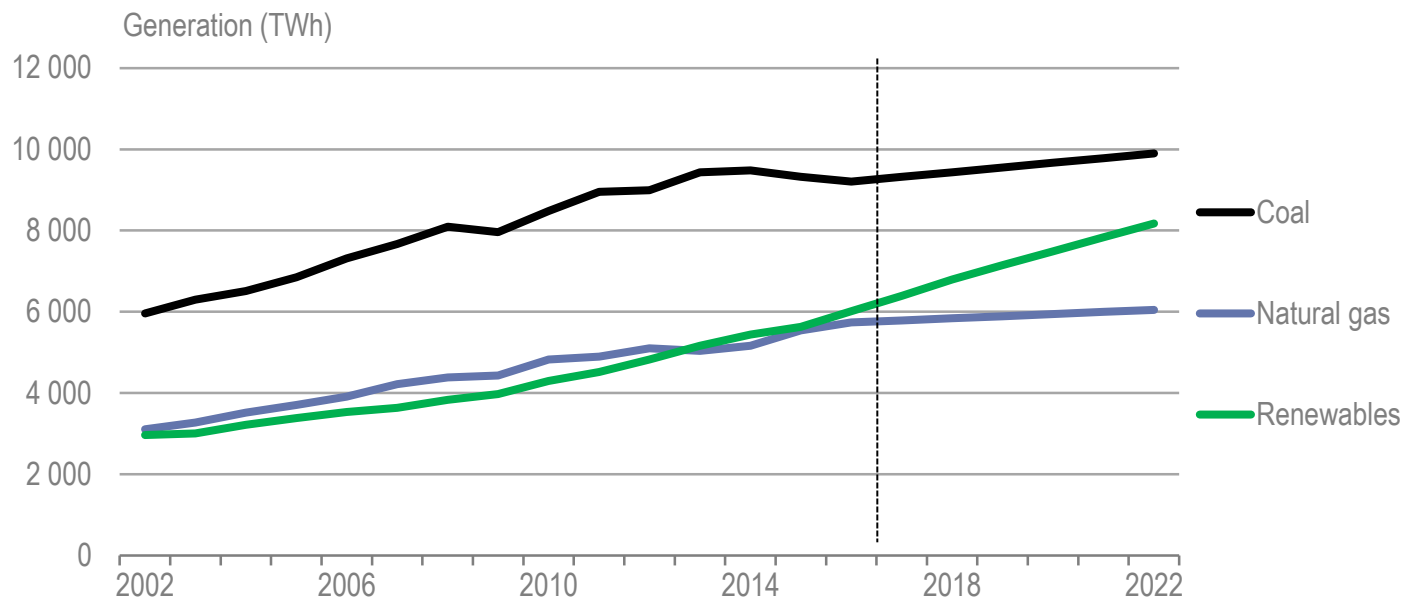
12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



Renewables closing the gap with coal

Electricity generation by fuel



Renewable generation to expand by over a third with its share increasing from 24% in 2016 to 30% in 2022, rapidly closing the gap with coal

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

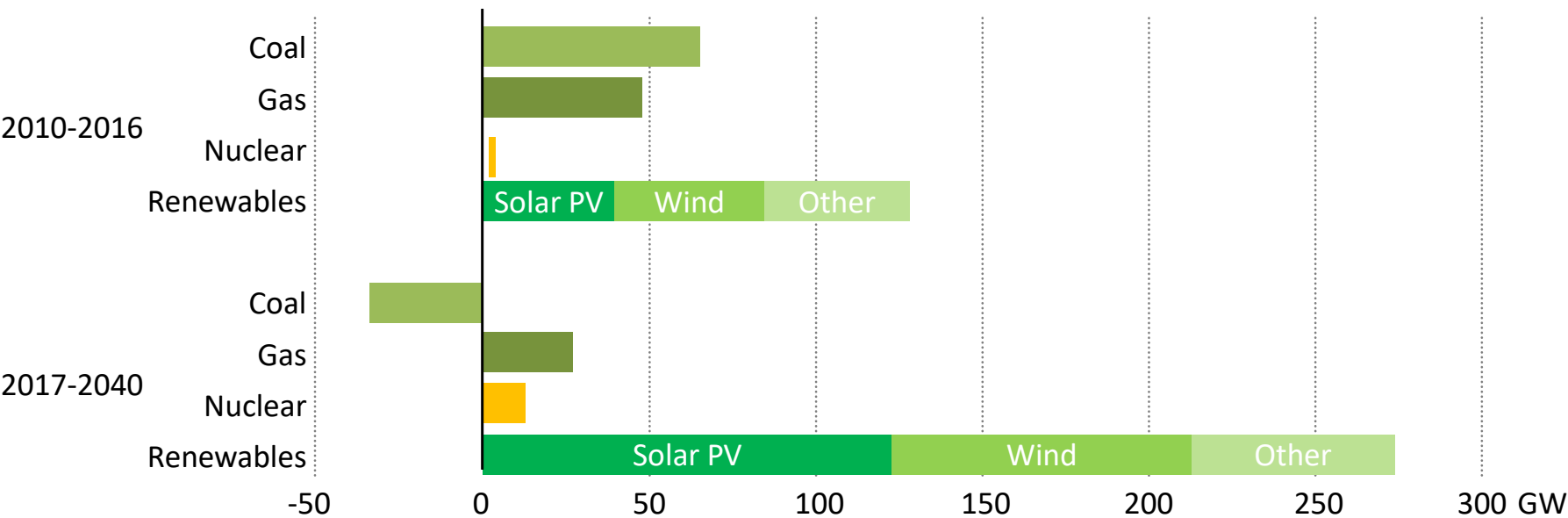
Energy
Transition
Hub



Solar PV forges ahead in the global power mix



Global average **annual net capacity additions** by type in the Sustainable Development Scenario



China, India & the US lead the charge for solar PV, while Europe is a frontrunner for onshore & offshore wind. Renewables deliver 63% of total world generation by 2040 in the SDS, requiring 12 USD trillion of cumulative investment

THE RENEWABLE ENERGY EXPO

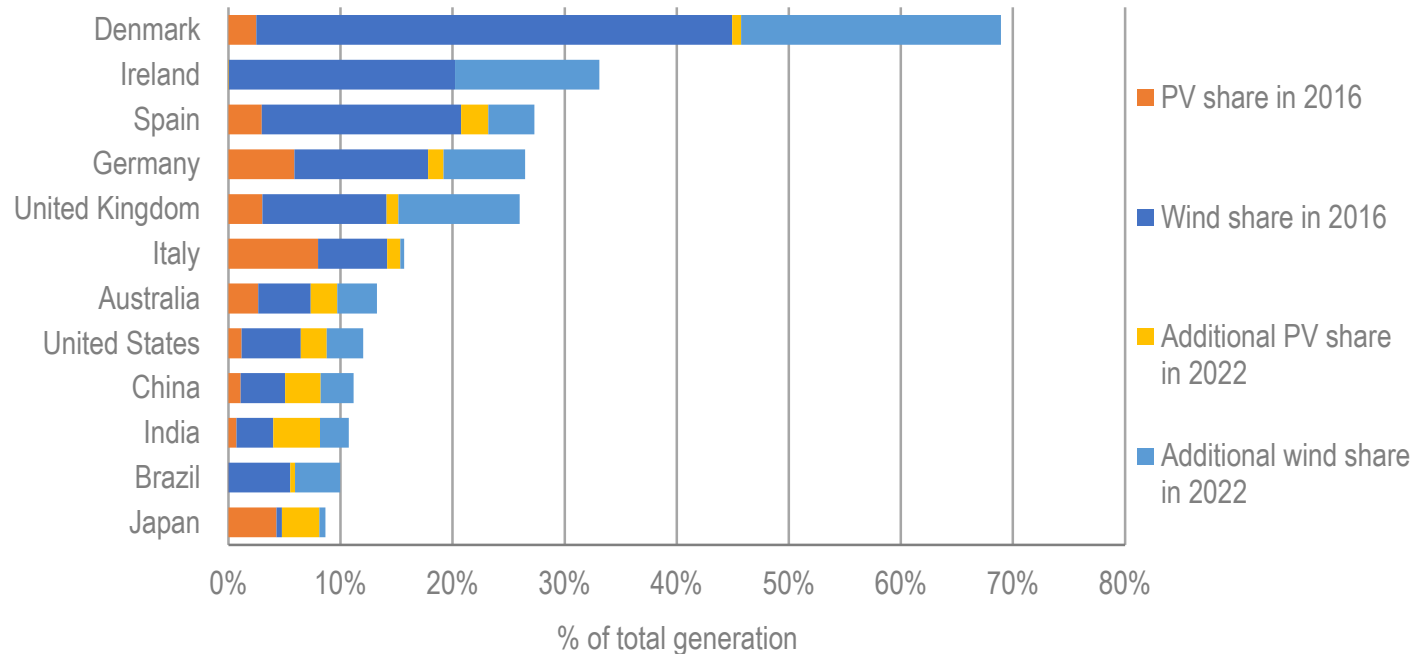
12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



Wind and solar transforming power sector – system integration becomes key

VRE share in annual electricity generation 2016-22



More flexible power systems, adapted market design and policies will have to play a key role in integrating larger shares of wind and solar in a secure and cost-effective way

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



- **Renewables rise by 1,000 GW to 2022**, *equal to half of current total coal capacity*
- **Renewables generation exceeds 8,000 TWh by 2022**, *equal to total electricity consumption of China, India & Germany combined*
- **Solar PV enters a new era** leading the growth in renewables, *driven by a rapid expansion in deployment & manufacturing capacity in China*
- Despite rapid growth in EVs, **decarbonization of transport is a long way off**
 - ❑ Only 30% of electricity used by EVs is sourced from renewables
 - ❑ Advanced biofuels require specific incentives to bolster deployment
- **Policymakers have to turn their focus to system integration & expanding the use of renewables for heating & cooling**



International Context

Focus on Maghreb and SSA

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



RES4MED&Africa Members



KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub





2013

*"Renewable Energy **solutions within the MED** electricity market"*



2014

*"Delivering Renewable Energy investments in **Morocco**: Challenges and opportunities"*



2015

*"Delivering Renewable Energy investments in **Egypt**: Challenges and opportunities"*



2016

*Enhancing investments for clean tech solutions, **beyond MENA towards Africa**: challenges and opportunities*



2017

***Innovation** as the key enabler to power Africa*

...22 June 2018

Sustainability and bankability of RE power projects

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



2016 - RES4MED Day Morocco -
"Morocco and Italy for the transition to
clean energy towards Africa"

**2017 - European Commission
Executive Seminar**



2014 - RES4MED Day Morocco
- "A step change in the
deployment of RE solutions in
the Mediterranean"

2015 - RES4MED Day Egypt - "A
step change in the deployment of
RE solutions in the Mediterranean"

2017 - Algeria Executive Seminar
In collaboration with Sonelgaz

2017 - Tunisia Executive Seminar
In collaboration with STEG and ANME

**2017 - RES4Africa Program
Launch Ethiopia**

**2016 - RES4Africa Program
launch Kenya** - "A step
change in the deployment
of RE in Eastern Africa"

**2018 - RES4Africa EXPO
event Kenya** - "Renewable
Energy in East-Africa: New
Frontiers"

Pdf of all interventions available on RES4MED and RES4Africa websites

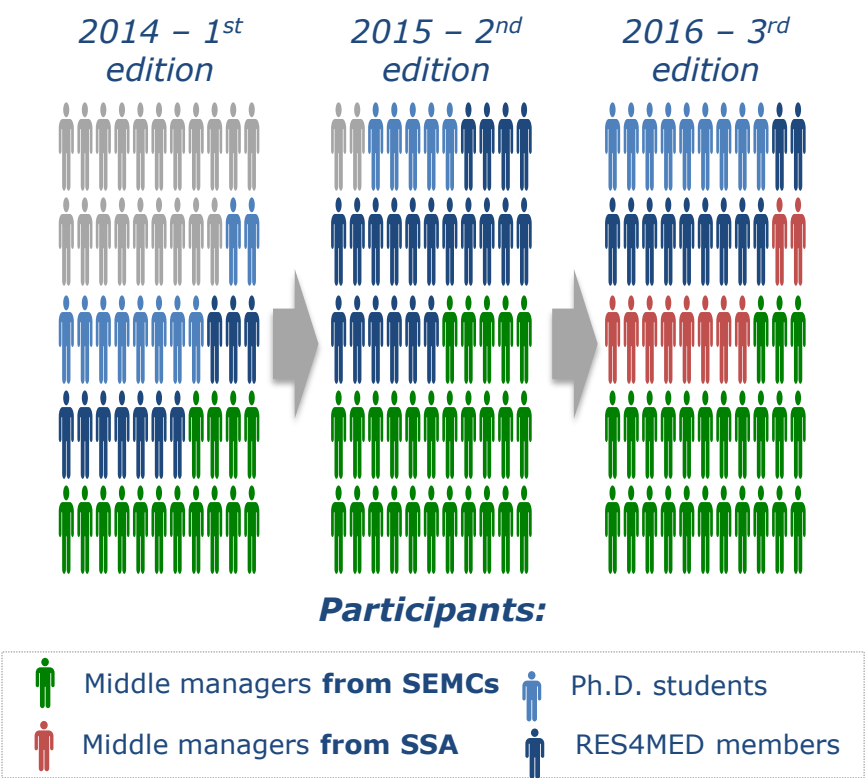
KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



The two-week course consists of lectures on the main technical, regulatory and financial features given by qualified international and Italian experts, academics (PoliMi, Bocconi) and highly skilled technicians, matched with visits to innovative laboratories and power plants.



2017 edition

18 from Middle East and North Africa countries

- Algeria
- Egypt
- Morocco
- Tunisia

17 from sub saharan African countries

- Ethiopia
- Ghana
- Kenya
- Nigeria
- Zambia



Pdf of all lessons available on RES4MED website

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale per l'energia rinnovabile e la mobilità sostenibile

Energy Transition Hub



Participants:

- Project aims to gather **young local individuals** and just-graduated international students;
- The “cultural clash” has a huge role in terms of **innovative ideas and creation of start-ups.**
- Target: **300/500 students** per year!

Training activities:

1. Advanced training courses;
2. Permanent training;
3. On-occasion knowledge-deepening activities;
4. Online remote classes;
5. Experimental activities.



*The geographical coverage of the project, endorsed by EACREEE, is the **Eastern Africa region**, while the training activities are intended to take place in **Nairobi, Kenya**.*

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



Our idea for a "Renewable-energy-powered Community Business Hub"



KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



TABLE OF CONTENTS

- 1 MACROECONOMIC CONTEXT
- 2 POWER MARKET OVERVIEW
 - 2.1 Legislative and regulatory framework
 - 2.2 Electricity key stakeholders
 - 2.3 Current market structure
 - 2.4 Future market structure
 - 2.5 Electricity demand
 - 2.6 Electricity Supply
 - 2.7 Subsidy reform
- 3 RENEWABLE ENERGY
 - 3.1 Renewable energy potential
 - 3.2 Renewable energy policy
 - 3.3 Renewable energy implementation mechanisms
- 4 CURRENT AND PLANNED PROJECTS
 - 4.1 State-owned power plants
 - 4.2 Build Own and Operate (BOO) scheme
 - 4.3 Feed in Tariff (FiT)
 - 4.4 Merchant scheme
- 5 MAIN MARKET DYNAMICS
 - 5.1 Renewable energy and the economy
 - 5.2 Bilateral market agreements
 - 5.3 Energy investments and co-operation
 - 5.4 Manufacturing initiatives
 - 5.5 Investments and Capital

Available on RES4MED website



November 2015



March 2016



November 2016



January 2018

Next: Algeria, Jordan

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub

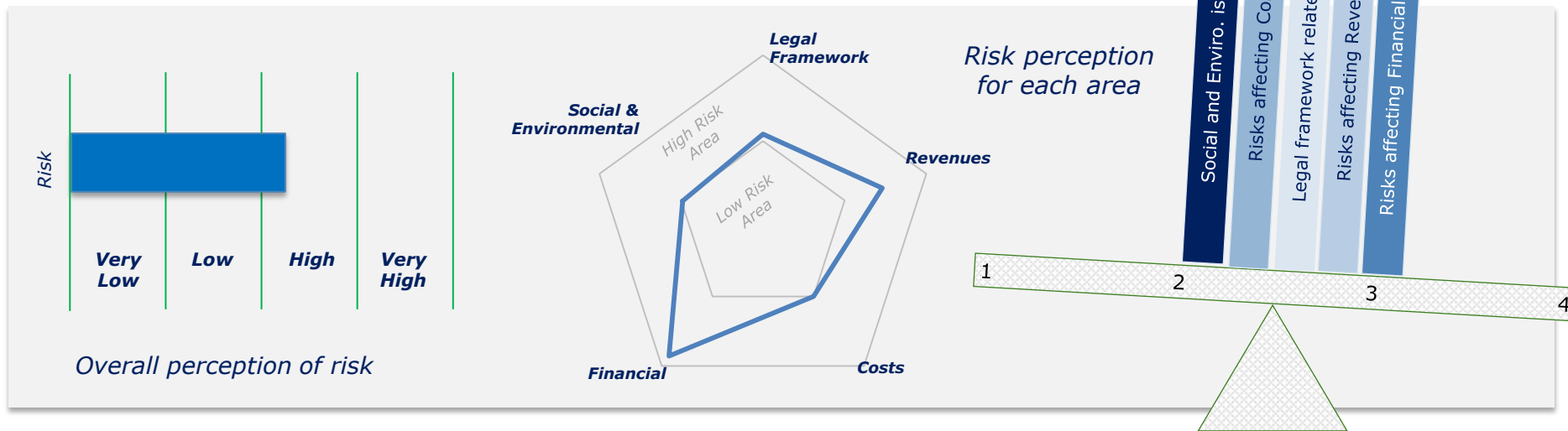


Survey on main risks to RE investments

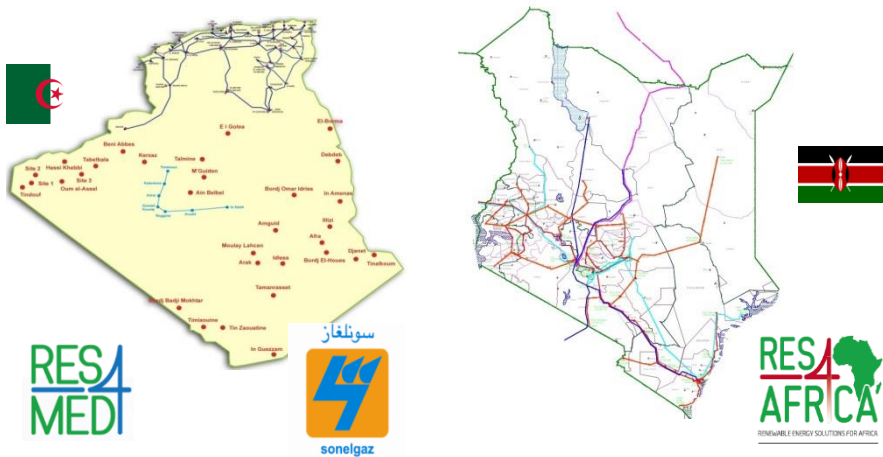
This survey aimed to create basis for an open discussion between the two sides of the business arena (public policy makers and private investors), in order to match their respective viewpoints.

The Survey participants were composed by companies which have planned activities or are already engaged in investments, clustered into 3 stakeholders groups: industry, financial players and professional services.

The main findings – Egypt example



Integration of Non-Programmable Renewable Energy in the National Electric System of Algeria and Kenya



Scope of Work:

- Assessment of the **maximum amount of non-programmable renewable generation** that is possible to integrate ensuring the reliability, integrity and efficiency of the power system.
- Assessment of **benefits related to renewable energy integration** in the system and impact on the energy cost by means of reliability and market-based analysis.
- Evaluate the **adequacy of transmission and sub-transmission system** to transport the power generated by the non-programmable RES power plants and **propose network reinforcements** needed to maximize the non-programmable RES integration.

Key Outputs

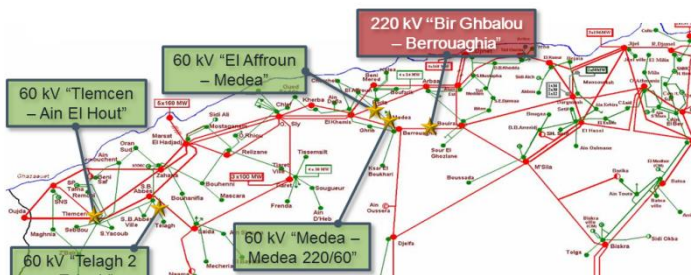
1 – Maximum Acceptable RES Penetration

Limitation of PV installed capacity at 2030 without network reinforcement and enhancement of conventional

Photovoltaic installed capacities						
Year	LFE	Calculated values [MW]	Algerian programme [MW]	Residual capacity [MW]	Applicable limit [MW]	Target
2020	8%	2,878	1,950	+928	1,950	✓
	5%	3,125	1,950	+1,175	1,950	✓
2030	8%	5,191	8,600	-3,409	5,191	⚠
	5%	5,473	8,600	-3,127	5,473	⚠

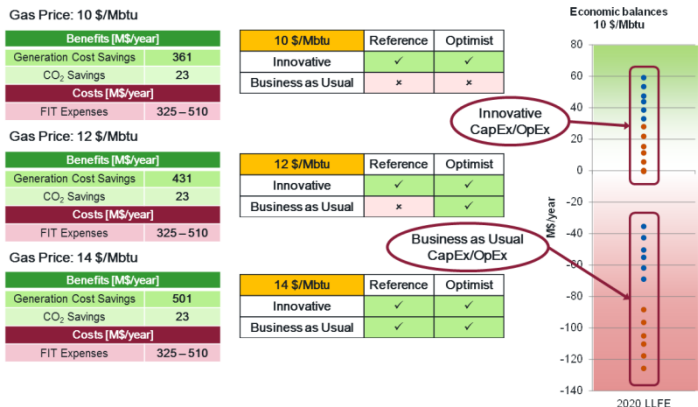
2- Required Network Reinforcement

Line reinforcements needed to reduce the production curtailment of 15,600 MW non-programmable RES at 2030



3- Detailed Cost Benefit Analysis

Quantification of associated benefit and costs in different scenarios for Gas Price, CO2 costs, Capex for technology procurement and FIT.



"Key factors for successful renewable energy auction" Algeria, Tunisia

Auction schemes considered as a successful scheme by Governments to **attract competition-based RE investments through low prices.**

Objective:

To support SEMCs countries in **structuring the tenders adapted to their contexts and attractive to foreign investors.**

Content of the study:

- (i) General presentation of the tender; (ii) development framework; (iii) **Analysis of the country's tender**; (iv) Expert opinion and **recommendations.**

Appel d'offres Tunisie pour les
Energies Renouvelables
Présentation des mécanismes d'appel d'offres et
recommandations.



"Job creation and local content" Tunisia

Objective:

To support **MED countries** in the development of an **ideal local workforce to stimulate job creation and local jobs** for future RE projects.

Content of the study:

1. Global **analysis of job creation** in RE sector;
2. Presentation of the **skills needs** in RE project;
3. Study Case : job creation on wind project development;
4. **Country focus** : presentation of the **current workforce and recommendations.**



Job creation



Investments



Local Content



Socio-Economic Development



Enterprise Development



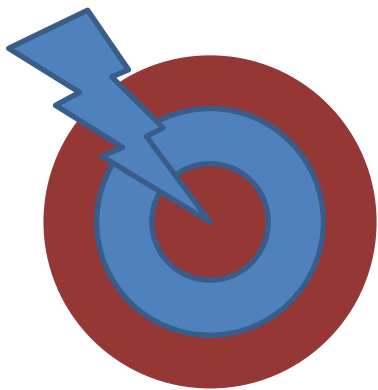
Local Community development

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12^a Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub





Gap
Analysis



Cost
Benefit
Analysis



Impact
Modelling





















































Stakeholders
SWOT
Analysis



Support **hand on hand** our local partners and institutions to create the **conditions** for the **energy market liberalization transitions** by stimulating the **dialogue** on the liberalization of the L/M voltage as a way to increase the **appetite for investment** and the **value creation** over the entire value chain.



	RE SHARE*	WHOLES. MARKET	DSO UNB.	RET-SALES	RE-DSO	RE-WDG
 15%  						
 85%  						
California  25%  	 California ISO					
 29%  						
 33%   						
 14%   						

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12ª Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub



Grazie

Contatti:



Angelo GUARDO
Senior Project Manager
via Ticino 14
00198 Rome Italy
Tel. +39 06 8552236
Mob. +39 320 5391552
angelo.guardo@res4med.org
www.res4med.org

KEY ENERGY
THE RENEWABLE ENERGY EXPO

12ª Fiera internazionale
per l'energia
rinnovabile e la
mobilità sostenibile

Energy
Transition
Hub

