RES4MED
RENEWABLE ENERGY SOLUTIONS FOR THE MEDITERRANEAN

UNITED NATIONS
الاسكوا
ESCWA

شركة الاستثمارات الطاقية
SOCIÉTÉ D'INVESTISSEMENTS ÉNERGÉTIQUES

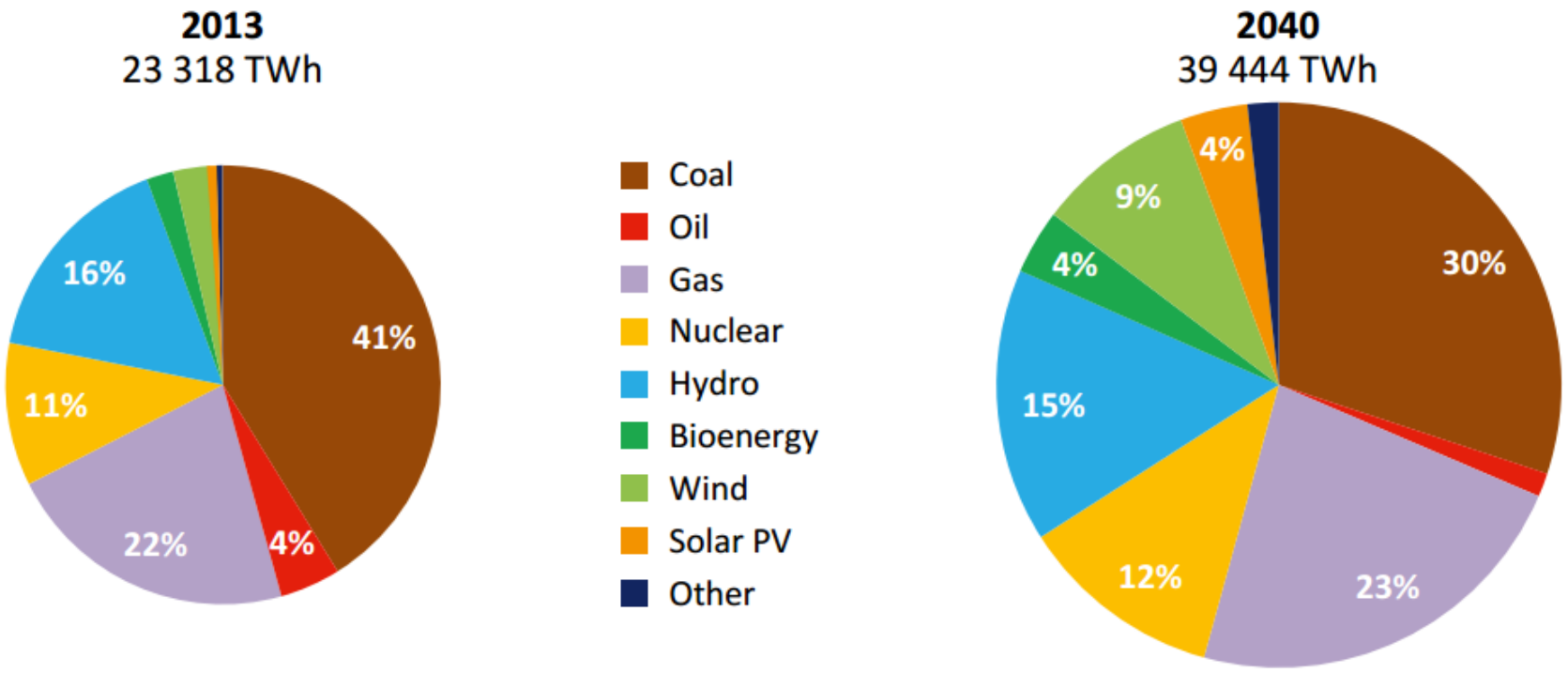
A call for public - private efforts for accelerating investments in renewables in MENA and Africa

Roberto Vigotti
Secretary General

Regional Training Workshop on: "Renewable Energy project development, finance and business planning" –3-4 May 2016, Hotel Rabat, Rabat, Morocco

1. Trends for global RE deployment

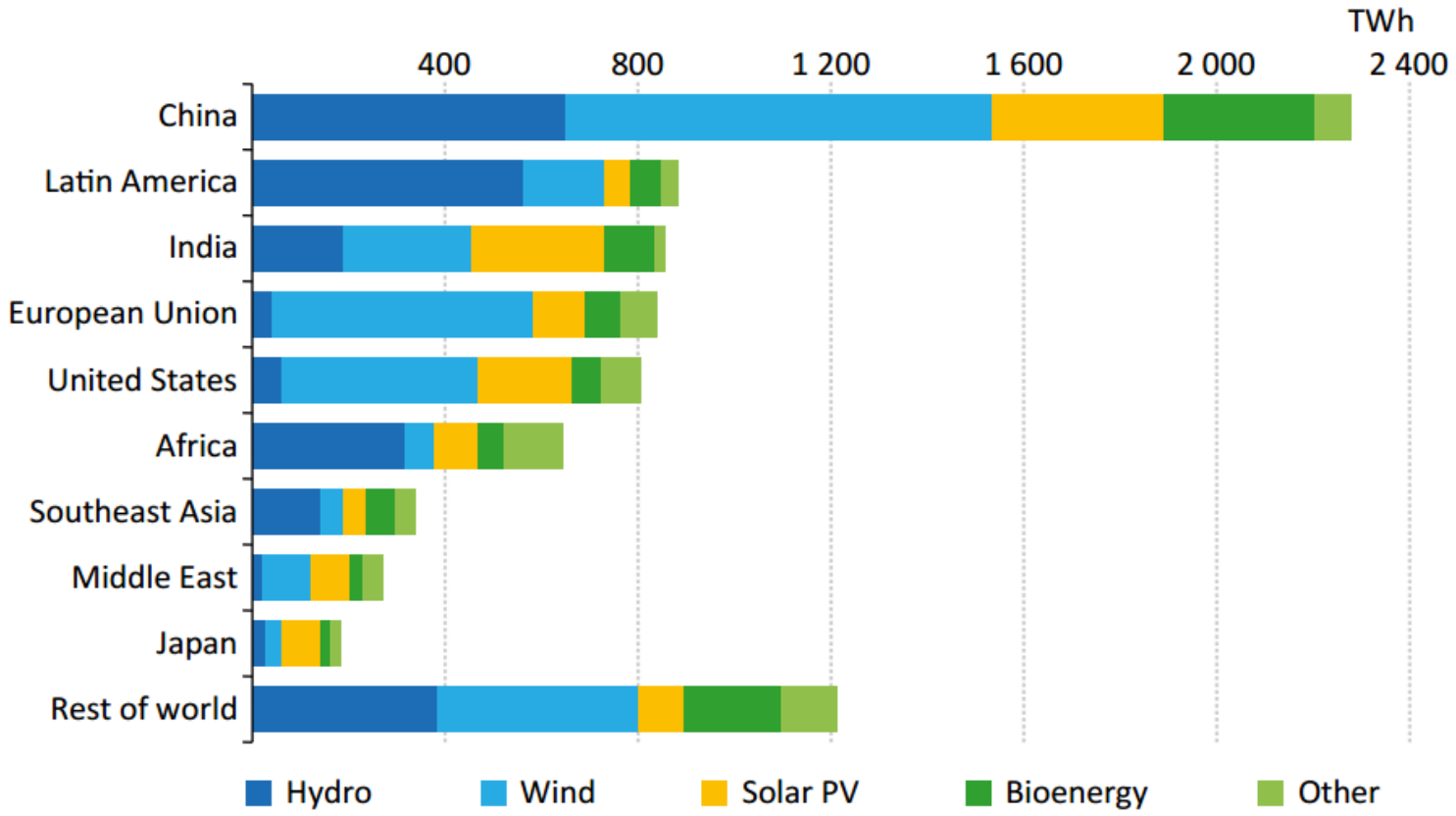
World electricity generation in the new policies scenarios



❑ **Capacity additions of RE exceed those of all other types of power plants combined.**
Global generation in 2040 grows 70% up to 10.600 GW; wind +150% up to 1400 GW
PV +300% up to 1000 GW;

❑ **World electricity from RE surpassed gas generation in 2014** and will continue to expand rapidly becoming the **largest source of electricity supply by early 2030s** *and going to* ***account for more than 1/3 of the world's electricity supply in 2040***

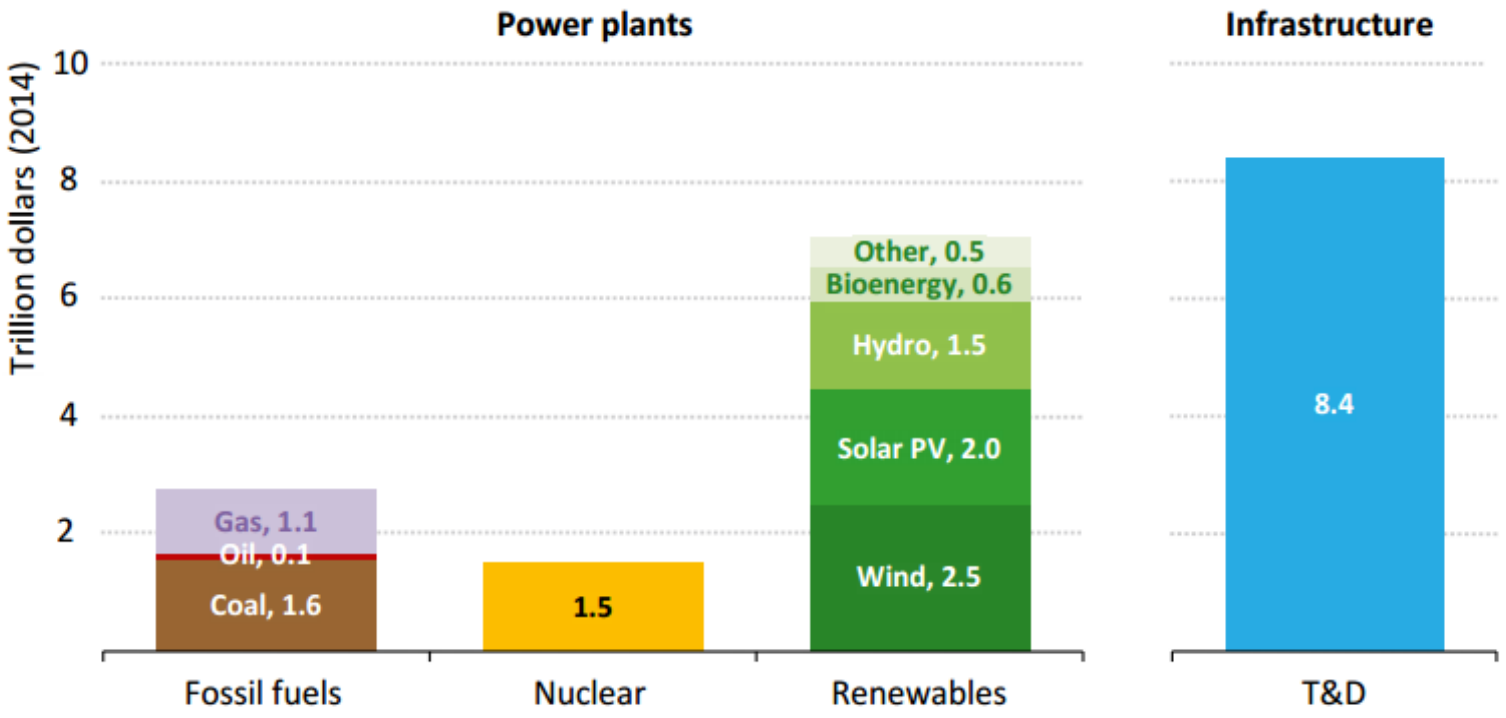
Growth of RE generation 2013-2040



Note: Other includes geothermal, concentrating solar power and marine.

- **70% of global increase of RE occurs in non OECD markets;** half of China investment in power plants goes to RE-3 times more than coal power plants; India second for PV;
- **Overall level of CO2 emission 33% lower**

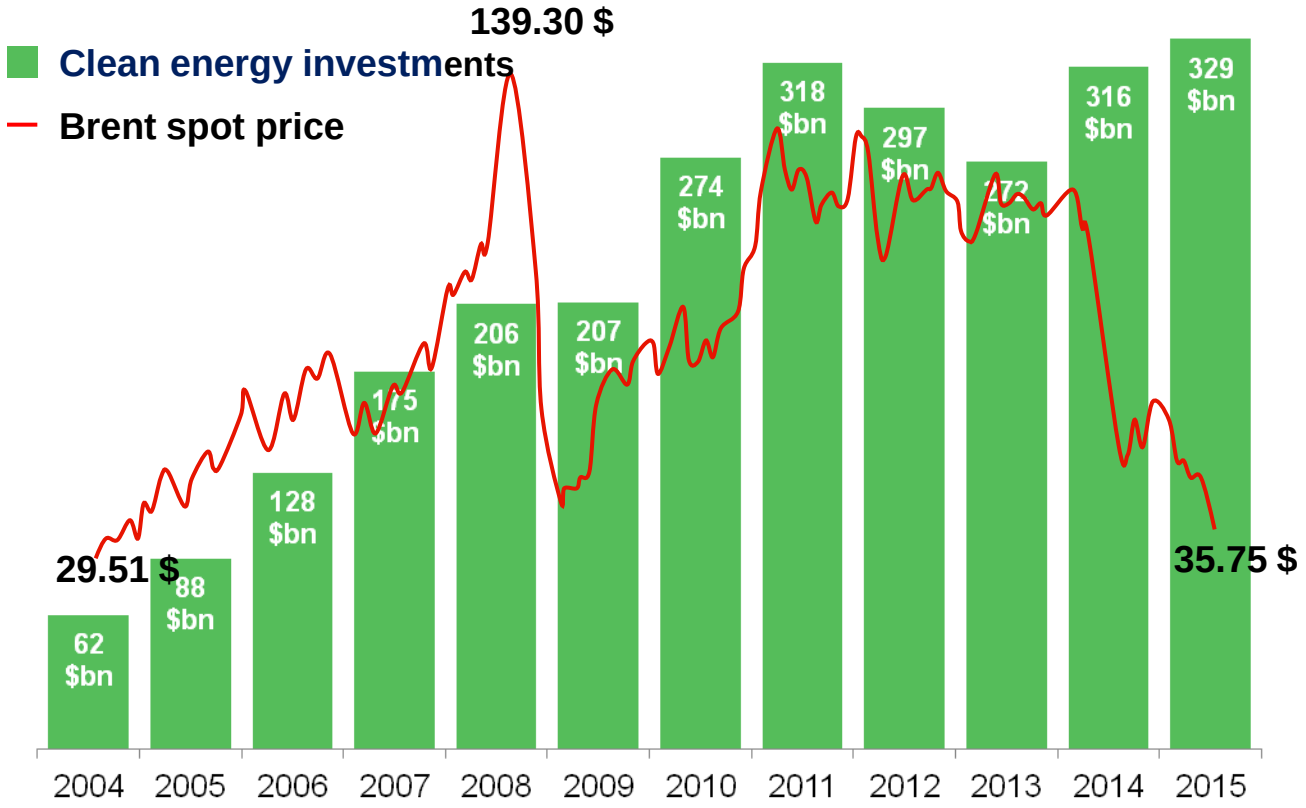
Global cumulative investments in the power sector 2015-2040



❑ **Cumulative investment in power sector 19.7 trillion $-** average 760 billion $/year
RE accounts for 62% of global investment in new power plants – coal 14%, gas 10%, oil 1%

❑ **T&D additional** 75 millions km lines with global investment of 230 million/year for a **cumulative 8.4 trillion $.** *55% to expand system for new demand, 40% to refurbish and replacing existing lines and 5% for integrating RE. ¾ in distribution lines*

Clean Energy Investments vs. Brent Price



NO relationship between oil price and clean energy investments

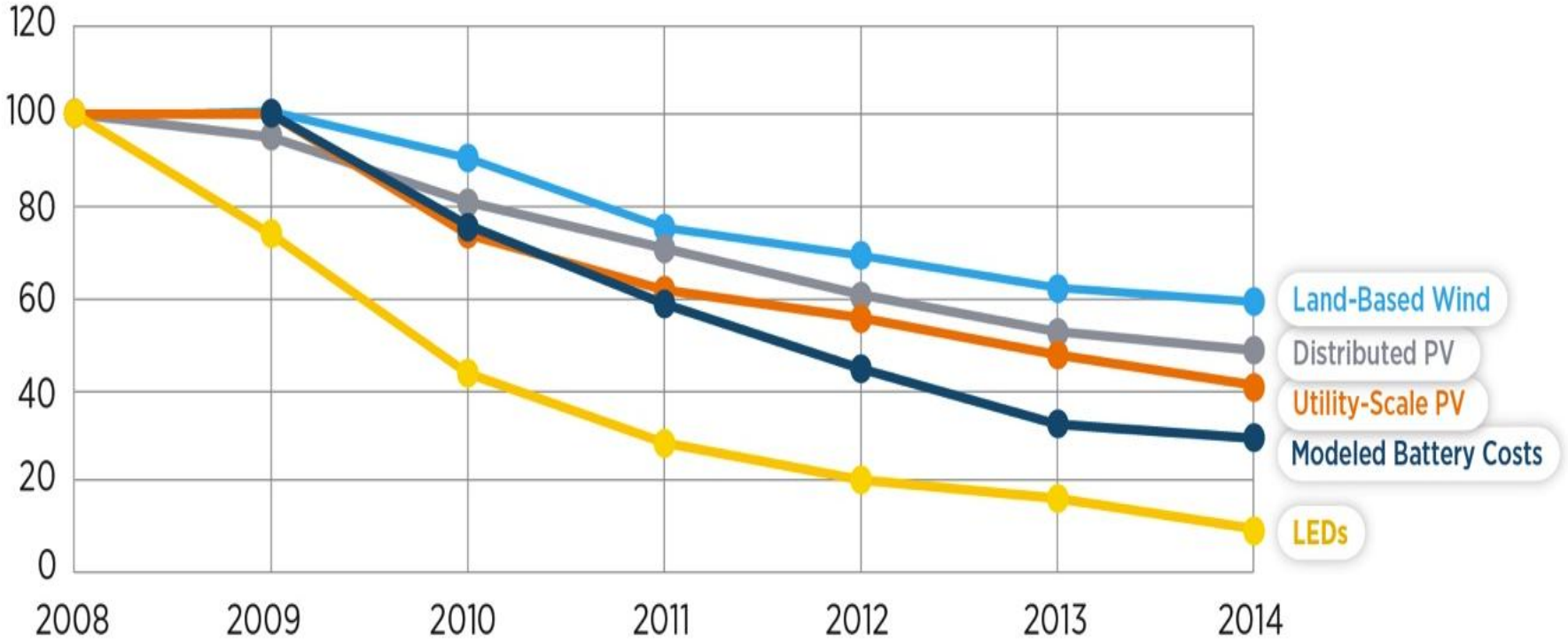
Source: Bloomberg New Energy Finance

Innovation is driving costs down

International Energy Agency
Secure
Sustainable
Together

COP21 Paris France

Indexed Cost Reductions Since 2008



The future arrives for Five Clean Energy Technologies.

Source: Ernest Moniz, US Secretary of Energy, IEA Ministerial, 18 November 2015

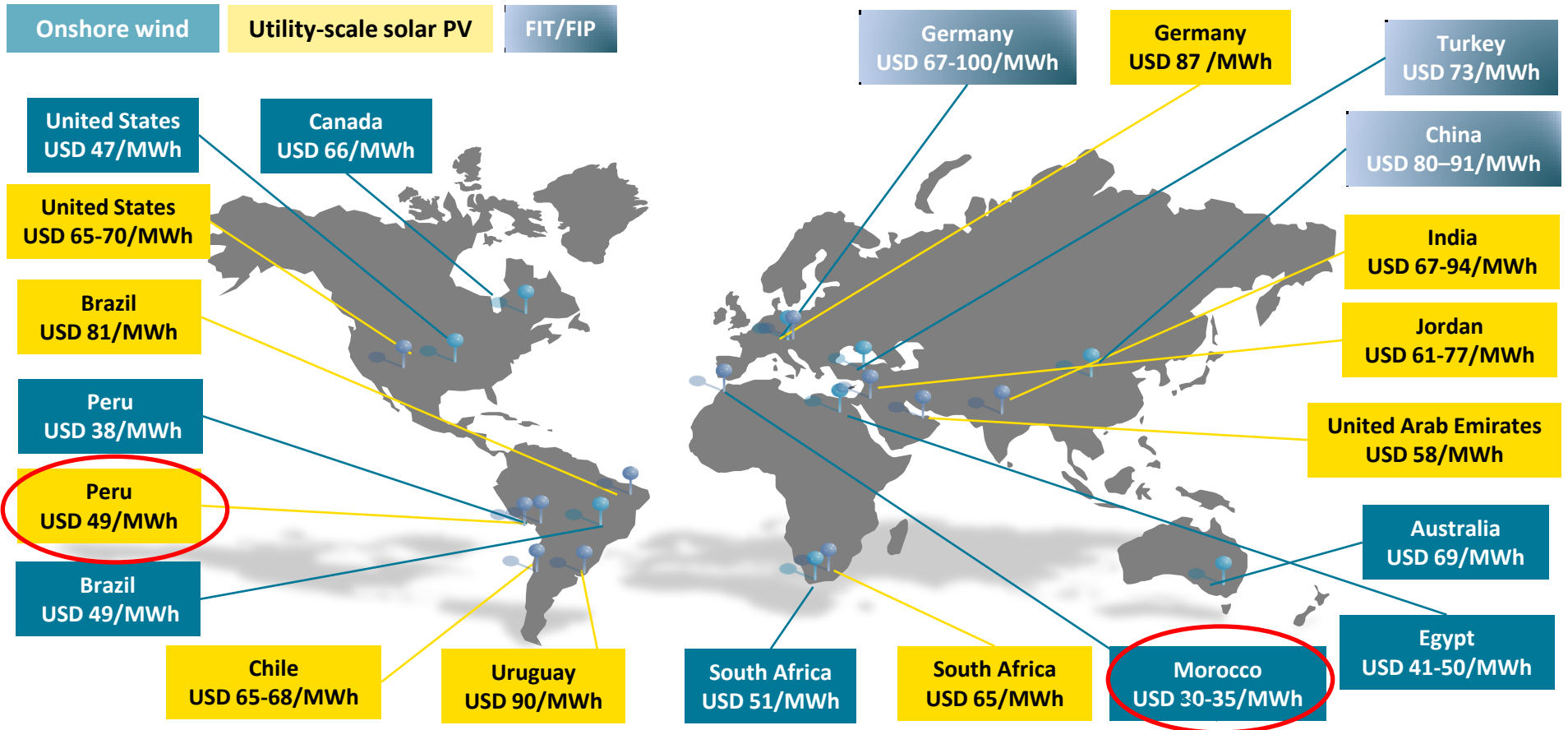
International Energy Agency

Secure • Sustainable • Together

Wind and Solar PV prices declining

www.iea.org

Recent announced long-term contract prices for RE power to be commissioned over 2016-2019



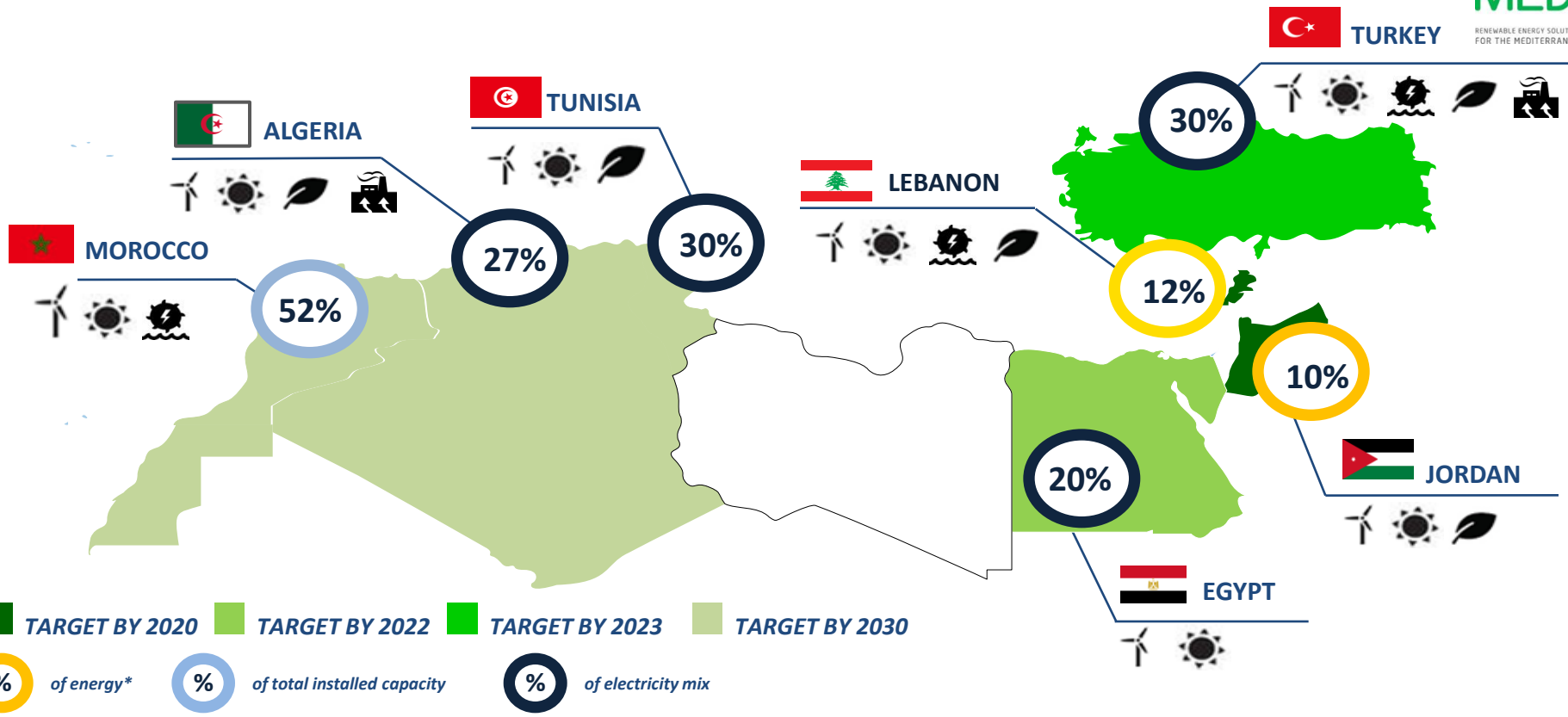
This map is without prejudice to the status or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area

Note: Values reported in nominal USD includes preferred bidders, PPAs or FITs. US values are calculated excluding tax credits. Delivery date and costs may be different than those reported at the time of the auction.

Best results occur where price competition, long-term contracts and good resource availability are combined

2. Euro Mediterranean energy context

Renewable energy targets* in SEMCs



*RENEWABLE ENERGY INVESTMENTS***

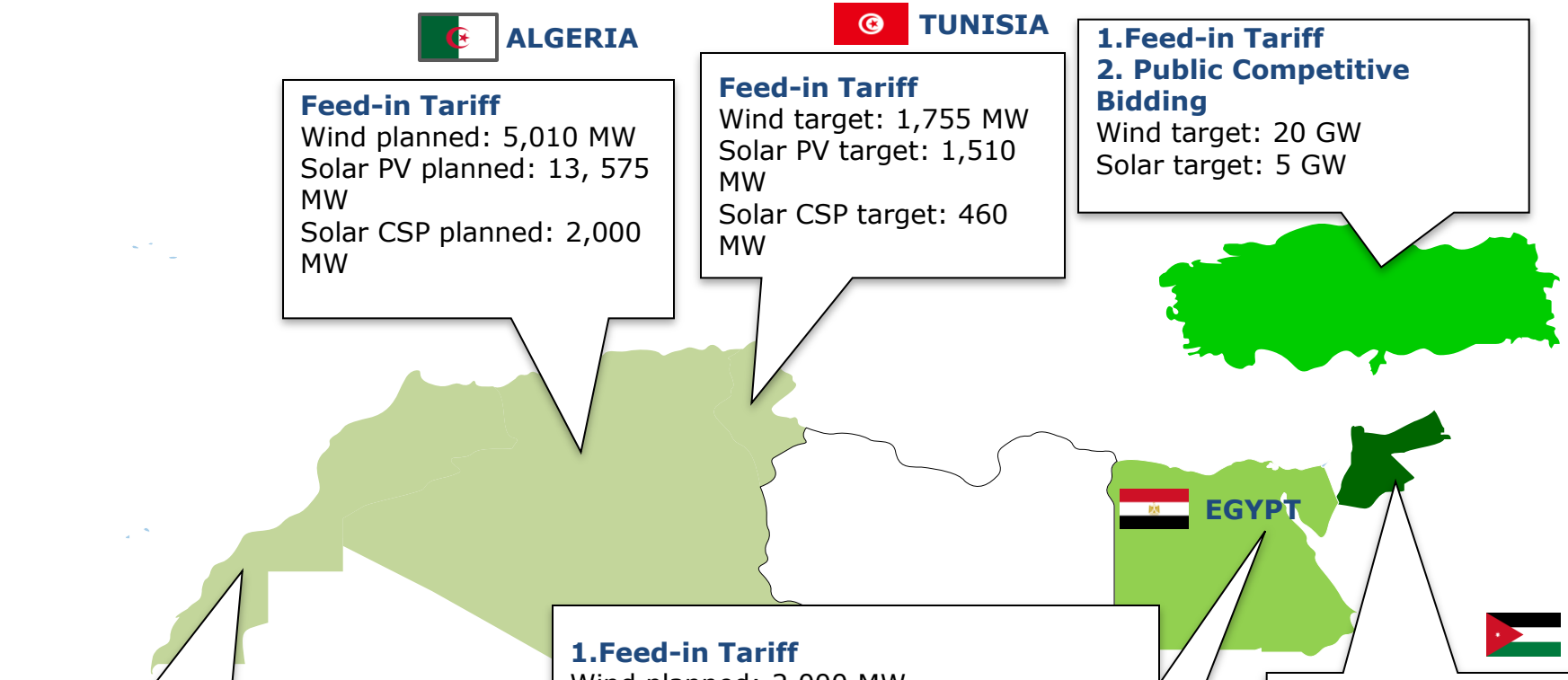
Cumulative public and private investments in RES power plants to reach country targets

WIND
SOLAR
HYDRO
BIOMASS
GEOTHERMAL

MOROCCO	TUNISIA	JORDAN	EGYPT
€ 10 Billion	€ 6 Billion	€ 2 Billion	€ 10 + Billion

*Target as % of: total electricity and thermal energy (Lebanon); primary energy (Jordan), RES4MED elaboration. Investment figure for Tunisia (STEG data)

Supporting Policies for Large-scale Projects



TURKEY

1.Feed-in Tariff
2. Public Competitive Bidding
Wind target: 20 GW
Solar target: 5 GW

TUNISIA

Feed-in Tariff
Wind target: 1,755 MW
Solar PV target: 1,510 MW
Solar CSP target: 460 MW

ALGERIA

Feed-in Tariff
Wind planned: 5,010 MW
Solar PV planned: 13, 575 MW
Solar CSP planned: 2,000 MW

EGYPT

1.Feed-in Tariff
Wind planned: 2,000 MW
Solar planned, 2,300 MW
2. Competitive Bidding (EPC)
Wind planned: 3,140 MW
Solar planned: 77 MW
3. Competitive Bidding (BOO)
Wind planned: 750 MW
Wind Tendered: 500 MW
Solar planned: 450 MW
Solar tendered: 450 MW
4. Merchant Scheme
Wind planned: 920 MW

JORDAN

Direct Proposal Submission
Round 1: 13 PPAs concluded at $0.17 per kWh for 210MW aggregate PV capacity

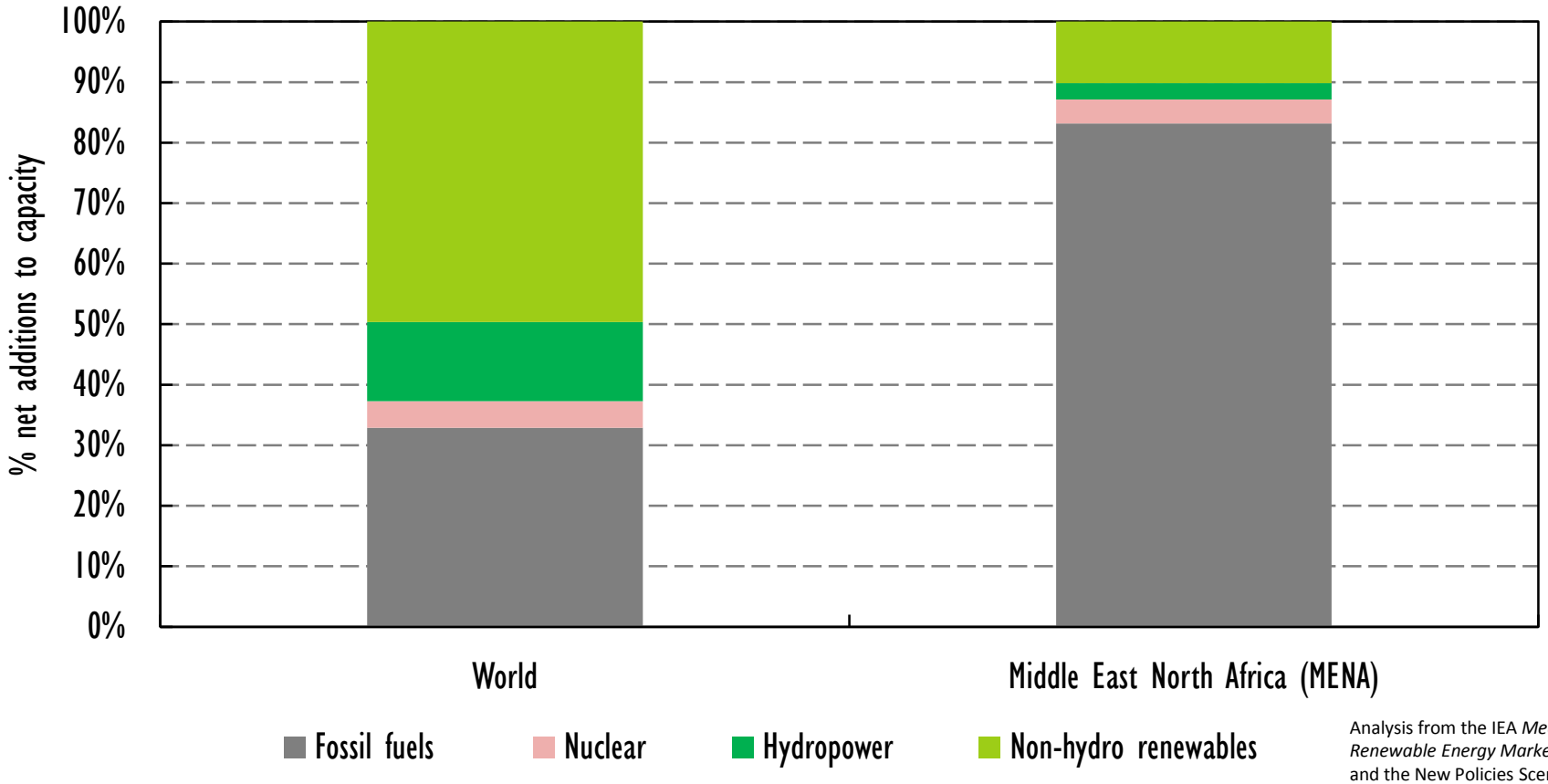
Round 2: 4x50 MW proposals have been selected (200 MW), PPAs concluded in the range $0,0613- $0,0767 / kWh

MOROCCO

1. Public Competitive Bidding
Wind Target: 1,000 MW
Wind Tendered: 1,000 MW
Solar Target: 1,000 MW
Solar Tendered: 510 MW
2. Third-Party Supply

RE dominate new global generation capacity…but progress is slower in MENA

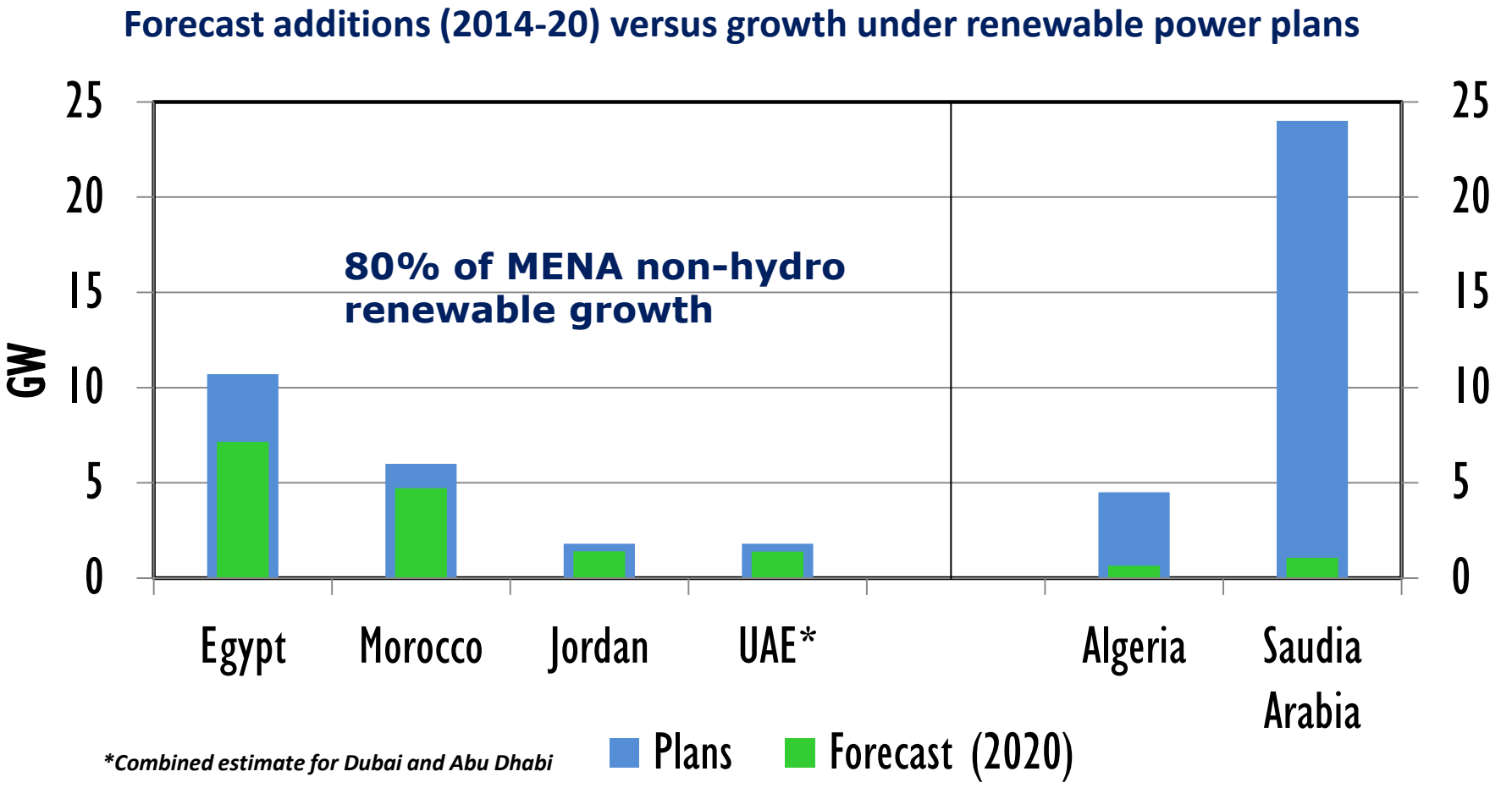
Net additions to power capacity 2014-20, world vs MENA region



Analysis from the IEA *Medium-Term Renewable Energy Market Report 2015* and the New Policies Scenario of the *World Energy Outlook 2015*.

Renewables set to account for almost two thirds of global net capacity growth over the medium-term, but in MENA they comprise less than 15%

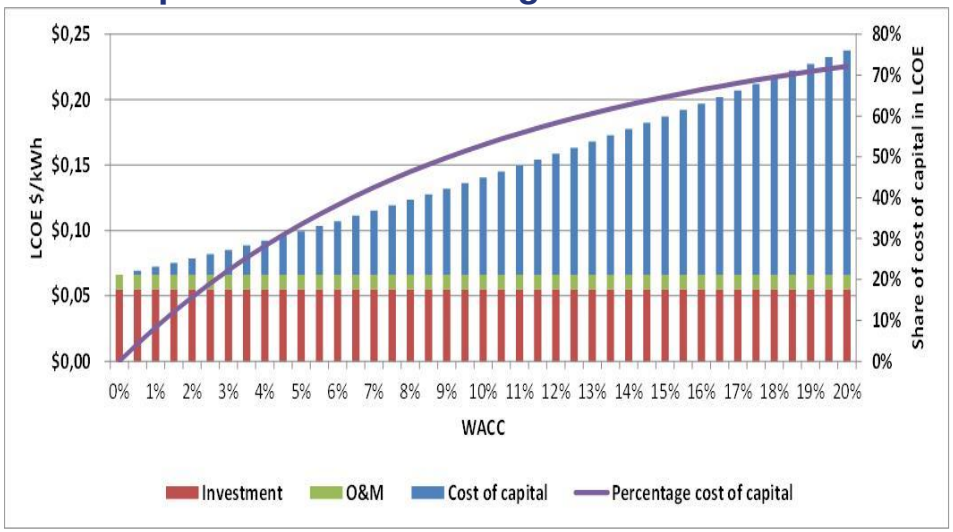
In MENA RE progress concentrated in a few key markets



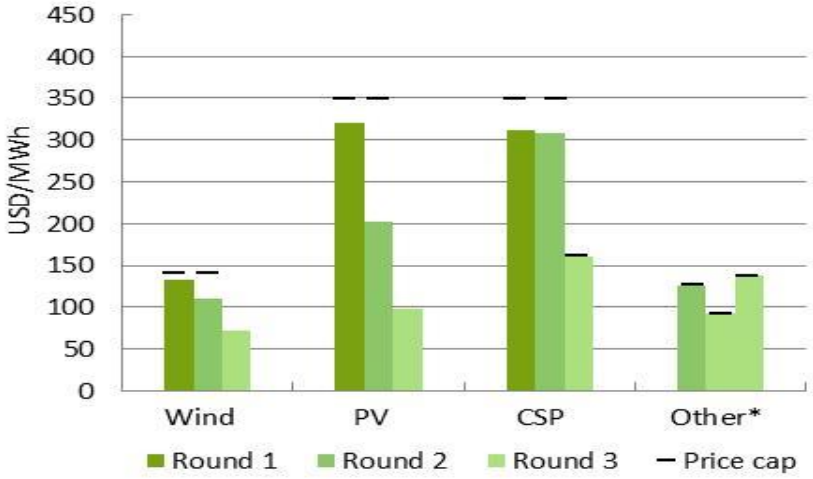
Countries where meeting power demand relies on imported fuels have been the first-movers in creating a supportive enabling environment for renewables

Cost of capital increasingly key for cost reductions

Components of solar PV generation costs



Average awarded tender prices under South Africa Renewable Energy Independent Power Producer Procurement Programme



- **Cost of capital** an increasingly important component of cost
- **WACC can be reduced by:**
  - **Sustainable long-term power purchase agreements** that provide revenue certainty and facilitate access to debt and equity capital markets
  - **Reducing non-economic barriers, reducing grid integration risks, increasing the creditworthiness of off-takers and reducing currency risks**
- **Competition for long term PPAs have been effective at driving cost reductions**

Industrial Perspective to address RES growth

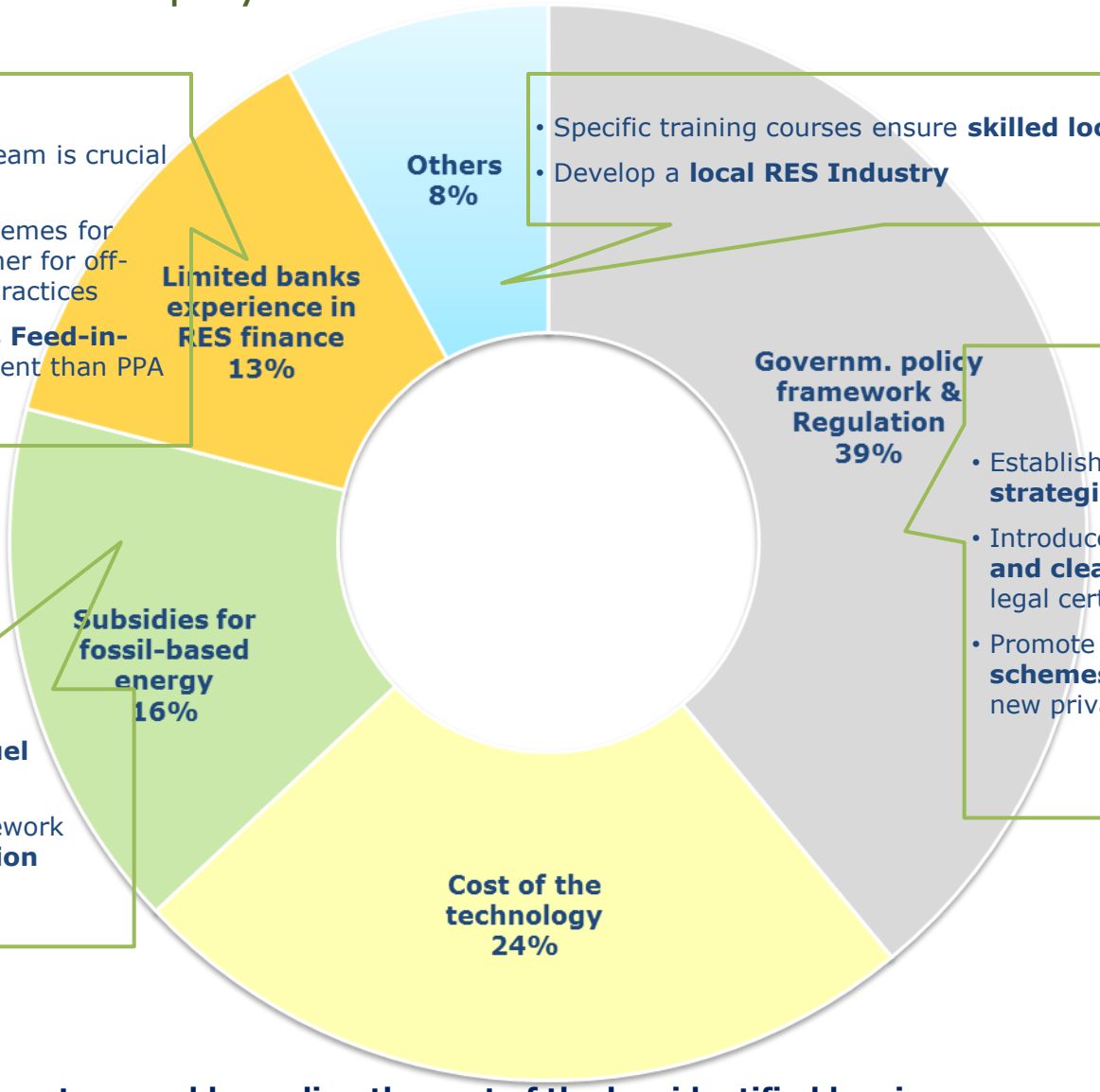
RES Regulatory Framework Overview – lesson learned

	Advantages	Disadvantages
Feed in Tariffs	• Attractive even for **low-risk investors** • Impressive **capacity boost** generated by this solution • Simple structure, applicable to mass market technologies: E.g. **decentralize energy**	• **No meritocratic approach** • **Wrong tariff setting** can lead to RES under- or over- development vs. target • **Limited adaptability**: in case of technology rapid evolution, many changes required • In case of large premium offered, **high system cost**
PPA trough Auctions	• Effective use of **budget** • **Specific capacity targets** can be set • **Meritocratic mechanism** with cheapest and higher quality projects selected • **Learning effect** over time for both parties	• **Risk of not prequalified players** to under-bid disrupting competition • Remuneration value strongly linked to **competition level** • **Not pre-defined** when a player decides to enter • **Not** adequate for **small size** projects

Two different approaches to develop renewables were selected globally with substantial different effects on the national energy systems

Industrial perspective to address RES growth

Main barriers to the deployment of RE in MENA



- **Stability of revenue** stream is crucial for project bankability
- **PPAs** are appropriate schemes for **large scale projects** either for off-take models or tenders practices
- For **small scale projects Feed-in-Tariffs** can be more efficient than PPA

- Specific training courses ensure **skilled local workforce**
- Develop a **local RES Industry**

- Establish consistent **long term strategies and plans**
- Introduce the necessary **stable and clear legislation** promoting legal certainty
- Promote adequate **support schemes for RES/EE** to trigger new private investments

- **Phase out high fossil fuel energy subsidies**
- Create a regulatory framework which enhance **competition among technologies**

- **Governments can address directly most of the key identified barriers.**
- **The RE industry is reducing Capex and O&M costs, and in dialogue with institutions proposes business models, jobs and local value chain, training**

Source: EY, MENA Cleantech Survey

1.Public private partnership

implement national programs for achieving renewable energy targets

1. encourage the setting-up of **partnership formulas** (e.g. Business Forum, Industry Board, etc.) aiming at providing decision makers with the viewpoint of the private sector;
2. **stimulate investment opportunities** along the entire supply chain through networking activities among market operators, industry associations and other key stakeholders;
3. promote **innovative business models** and to facilitate the implementation of demonstration and sustainable renewable energy projects;
4. promote incentive mechanisms intended to **enhance local industrial capacity and enterprise culture**, to realize industrial districts and innovation technology centers.

2.Policy and regulations

create a business-friendly environment is the pre-requisite for RE deployment.

1. encourage **clear, consistent and visible long-term strategies** that define the proper incentives for both producers and consumers and provide the necessary guarantees for investors;
2. promote the adoption of instruments aiming at **assessing the socio-economic benefits** generated by investments in renewable energy projects in terms of jobs creation and enhancement of competitiveness;
3. endorse "**Euro**-**Mediterranean" partnership** aimed at stimulating and enhancing the development of specific activities related to local supply chain and contributing to increase employment rates;
4. promote supporting mechanisms - both institutional and financing - addressing **jobs creation and training programs**.

3.Training and capacity building

contribute to local economic and social development and to create the best conditions for attracting investments

1. promote **training programs** focusing on the workforce to create jobs that meet industrial local needs;
2. facilitate the **dialogue and the exchange of experiences** between professionals coming from regulatory, financing and industrial contexts;
3. support actions aimed at strengthening the **institutional and administrative capacity,** defined as the ability of institutions to define objectives and create the best conditions to achieve those objectives;
4. promote **empowerment mechanisms** for tertiary education and vocational training, aimed at facilitating knowledge transfer.

3. Association profile

a truly Euro-Mediterranean platform

RES4MED Association
Strategy and membership

Renewable Energy Solutions for the Mediterranean is a not for profit association created in 2012 with the mission **to contribute to the deployment of renewable energies in Mediterranean region**, both large scale and distributed energy, facilitating their integration in domestic and regional markets **to satisfy local energy needs**

Strategy

- **Platform for public-private dialogue** on renewable energy issues in the Mediterranean in light of the partnerships with selected international stakeholders
- **Advisor and facilitator** to regional institutions, local Governments and regulatory bodies
- **Awareness and institutional advocacy** through dialogue with Southern and Eastern Mediterranean countries (SEMCs) governments and regulators
- **Capacity building and training**, disseminating best-practices and procedures on RES regulation, policies, standardization, operation

Membership

- Network of leading **utilities, industries, TSO, agencies, technical service providers and academia**, actively engaged in the Southern and Eastern Mediterranean Countries and **partners from SEMCs**
- **Involvement of financial actors** within a Stakeholders Committee aiming at providing advice, sharing analysis, market intelligence

RES4MED members and partners

RES4MED
RENEWABLE ENERGY SOLUTIONS FOR THE MEDITERRANEAN

RES4MED CORE MEMBERS

SOUTHERN MED PARTNERS

REGIONAL NETWORK

Survey on RE investment risks in Southern and Eastern Mediterranean Countries (SEMCs)

- **Identifying risks which are commonly perceived** as hampering factors for developing RE investments
- **Rating the main risks** related to the investments and the main barriers for the specific target market
- Defining the scope for a wider analysis that includes **risk mitigation solutions** and **policy recommendations**

Focus countries:

- **Egypt**
- **Jordan**
- **Morocco**
- **Tunisia**

RES4MED WG led by pwc

Results to be discussed in the RES4MED Annual Conference in Rome on May 19th 2016

Survey on RE investment risks in Southern and Eastern Mediterranean Countries (SEMCs)

Participant companies with **planned activities** (screening for investment planning) and **ongoing investments** (development/construction/operational) clustered into **3 groups**:

- **Industry players**: IPP, technology providers, EPC, O&M operators;
- **Financial players**: Commercial Banks (International and local), Multilateral Development Banks, Investment Funds, Credit insurances, etc;
- **Professional services**: Engineering, Management Consulting, Financial, Legal, etc

14% Financial players

43% Industrial players

43% Professional services

The analysis of risks takes into account the entire life cycle of RE investments.

This survey structure is divided in **5 main areas** of evaluation **for a total of 36 specific topics**:

Area 1 - Legal framework enabling investments
Area 2 - Risks affecting Revenues
Area 3 - Risks affecting Costs
Area 4 - Risks affecting Financial structuring
Area 5 - Environmental and Social issues

Survey on RE investment risks in Southern and Eastern Mediterranean Countries (SEMCs)

Rationale - Mapping risk areas throughout the project life cycle

- **Area 1 - Legal framework enabling investments**
  - Risks arising from **Business environment framework**: Starting a business (e.g. market access rules, procedures, costs, duration), Property/concession rights (e.g. cadaster evidence, limitations for foreign investors), Dispute resolution issues
  - **Policy/regulatory risks**: Change in law, Long term RES targets and incentive framework stability, PPA/FiT schemes, Concurring policies (e.g. Subsidies to conventional fuels)
  - **Grid connections** availability, stability and rules

- **Area 2 - Risks affecting Revenues**
  - **Revenue stability** (e.g. off-take pricing rules, adjustments rules, etc)
  - Availability of pre-feasibility studies covering **resource assessment**
  - Curtailment (e.g. **network capacity**)

Survey on RE investment risks in Southern and Eastern Mediterranean Countries (SEMCs)

- **Area 3 - Risks affecting Costs**
  - **Construction risks**: Land rights, Permitting, Delays due to local conditions, Availability of local workforce, Logistics, Milestones, Testing & acceptance, etc
  - **Operational risks**: Tear&Wear, Availability of spare parts, Availability of local workforce, Logistics

- **Area 4 - Risks affecting Financial structuring**
  - **Long term financing availability (Equity/Loan)**
  - **Short term credit avai**lability
  - **Interest** rates
  - **Exchange** rates
  - **Inflation** rates
  - **Tax regime**, new taxes or changes

- **Area 5 - Environmental and Social issues**
  - **Environmental Impact Assessment** (EIA) procedures clarity (e.g. approval steps, reference authorities, time)
  - **Social acceptance**

ENHANCING INVESTMENTS FOR CLEAN TECH SOLUTIONS, BEYOND MENA TOWARDS AFRICA: CHALLENGES AND OPPORTUNITIES

19th May 2016
Auditorium Enel S.p.A., viale Regina Margherita 125, Rome

Public and private sector stakeholders from the Euro-MENA region and Sub-Saharan Africa to discuss lessons learned and identify remaining gaps, challenges and emerging issues on a smooth deployment of renewables. Beyond MENA and towards Africa: launch of the Project" RES4Africa".
RES4MED Survey on "Derisking investments in MENA" to be presented and discussed.

By invitation only – please send confirmation to res4med@meetingenel.com

Analysis of the Integration of Renewable Generation in the National Electric System of Algeria

The study, ongoing, is **performed by RES4MED, CESI, Sonelgaz**
Supported by EnelGreenPower experts

Objective

- Provide an **assessment of the maximum amount of non-dispatchable renewable generation** that is possible **to install in Algeria**, ensuring the reliability, integrity and efficiency of the power system
- **Execute reliability and market based analyses to assess the benefits** for the Algerian system due to the integration of the new renewable generation and the impact they will have on the cost of energy
- **Evaluate the adequacy of the transmission and sub-transmission systems** to transport the power generated by the new power plants to the identified local and regional demand centers

Time schedule

To be **presented in Algiers on 28-29th September** at RES4MED conference

Advanced Training Course 2016

RES4MED and **Enel Foundation** agreed on the organization of the **3rd Advanced Training Course** to be held at Politecnico di Milano on **2nd- 3rd week November 2016,**

- Aimed to create a **network of skilled people** and to strengthen the dialogue between public and private sector
- Integration between **academia and industry point of view**
- Frontal lessons and **site visits to Italian power plants/laboratories**
- Creation of a **Community platform** to facilitate networking
- Openness and **sharing of materials**

- ***Participants***
  - **30 scholarships granted** to selected participants from target countries
  - **5** *of them* will be granted to **SubSahara African** participants
  - **10 PhD students and 10 RES4MED members** will access with free tuition fee

Energy Efficiency Training Course

RES4MED, in partnership with **Asja** and **Iren** and in cooperation with **Politecnico di Torino**, organizes the training course "***Enhancing energy efficiency solutions in the Mediterranean Region***" on **May, Monday 16th – Friday 20th**

- ***Organization***

  - Jointly financed by Asja and Iren; Res4Med in charge of Project Management and PoliTo contribute by providing lecturers, facilities and logistics.
  - Lectures on technical, regulatory and financial features by qualified experts, academics and skilled and visits to innovative laboratories and facilities.

- ***Objectives***

  - Strengthen the capacity of the key stakeholders and decision makers to develop effectively energy efficiency programs
  - Fostering Public Private Partnership (PPP) to generate a positive climate for opportunities and investments

- ***Target audience***

  The target audience consists of at least **35** professionals:

  - 10 professionals from **Southern and Eastern Mediterranean** countries
  - 5 professionals from **Balkan** countries
  - 10 professionals from **RES4MED members**
  - 10 Ph.D. students and Researchers from **Italian Universities**

Focus

Archive

13 Apr 2016
KEY MEDITERRANEAN ENERGY STAKEHOLDERS COME TOGETHER TO BOOST RE SOURCES AND ENERGY EFFICIENCY MEASURES ACROSS THE REGION

News

Archive

12 Apr 2016
RES4MED'S NEW SHAREHOLDER-ENERRAY

Res4med is pleased to announce that Enerray S.p.A joined Res4med as Ordinary Member

Events

Archive

16 May 2016 - 17 Apr 2016
SECOND STAKEHOLDER FORUM OF THE AFRICA-EU ENERGY PARTNERSHIP

aeep-forum.org

Newsletter

N°40/ APRIL 2016

RES4MED NEWSLETTER

Thanks for your attention!

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Graduated in 1971 at the University of Pisa in Electrical Engineering, he is currently **General Secretary of RES4MED**. He is the Coordinator of the Renewable **Industry Advisory Board (RIAB) of the IEA.**

*He joined in 1974 ENEL at the R&D Division, involved in the co-ordination of research and demonstration programs in the field of **renewable energies**. From 2001 to 2005 he was senior strategy advisor in the Business Development of Enel Green Power and responsible for external relations at the International Department of Enel.*