

# DESERT POWER



Een verslag van de conferentie van het  
Desertec industrial initiative in Rabat  
en de reis naar en door Marokko  
Sietse de Haan en Truus Koppers

# Plataforma Solar d'Almeria

## AAN TE BEVELEN ONDERZOEKSCENTRUM

- Onderzoek naar :
- Trogspiegels
- Torencentrales met heliostaten.
- Fresnel-spiegels
- Paraboolspiegels met sterling motor

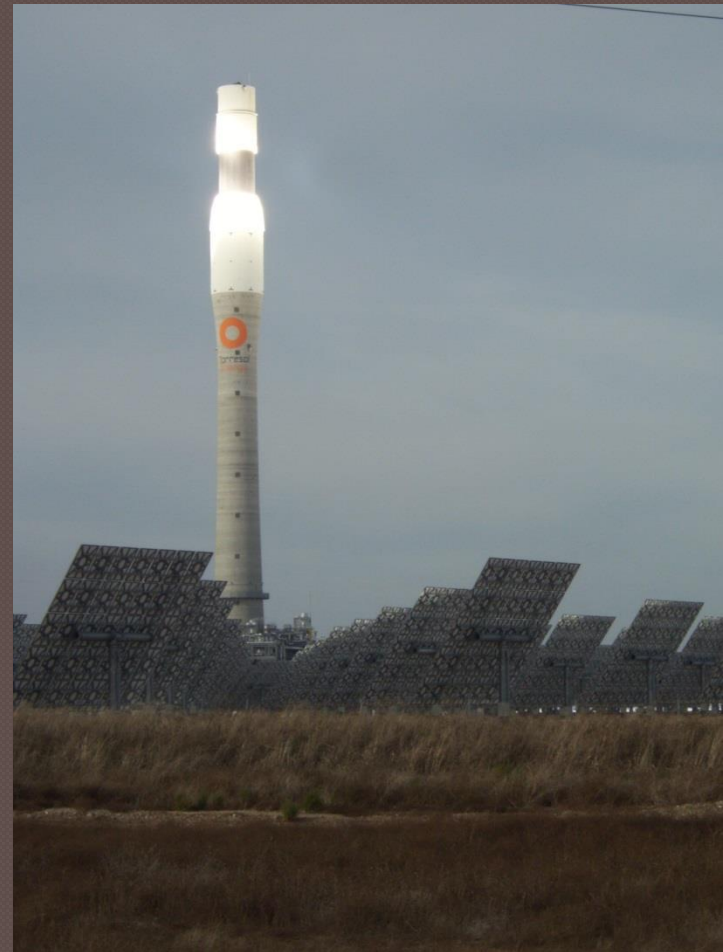


- Vanzelfsprekend onderzoek naar de genoemde vormen om die te optimaliseren.
- Onderzoek naar hoge temperaturen
- Wind is een groter probleem dan stof
- Sterling motor blijft problematisch



# Gemasolar

- Helaas door de bezuiniging zijn er geen rondleidingen meer mogelijk.
- Spaanse eenzijdige opzegging van bestaande contracten!



# Conferentie Desertec industrial initiatief in Rabat

- Groot verschil met drie jaar geleden
- Nu veel Noord-Afrikaanse vertegenwoordigers, ook uit het Midden-Oosten.
- Drie jaar geleden veel vertegenwoordigers uit Europa.



# Onderwerpen dag 1

- ◉ Bertrand Piccard
- ◉ Wat is de politieke agenda
- ◉ Commitment van de industrie
- ◉ Desert power getting started
- ◉ Het mogelijk maken van RE projecten
- ◉ Financiële aspecten



*“Er komt een tijd dat energie uit de woestijn zo vanzelfsprekend is dat men zich niet kan voorstellen dat er ooit conferenties aan gewijd werden.”*

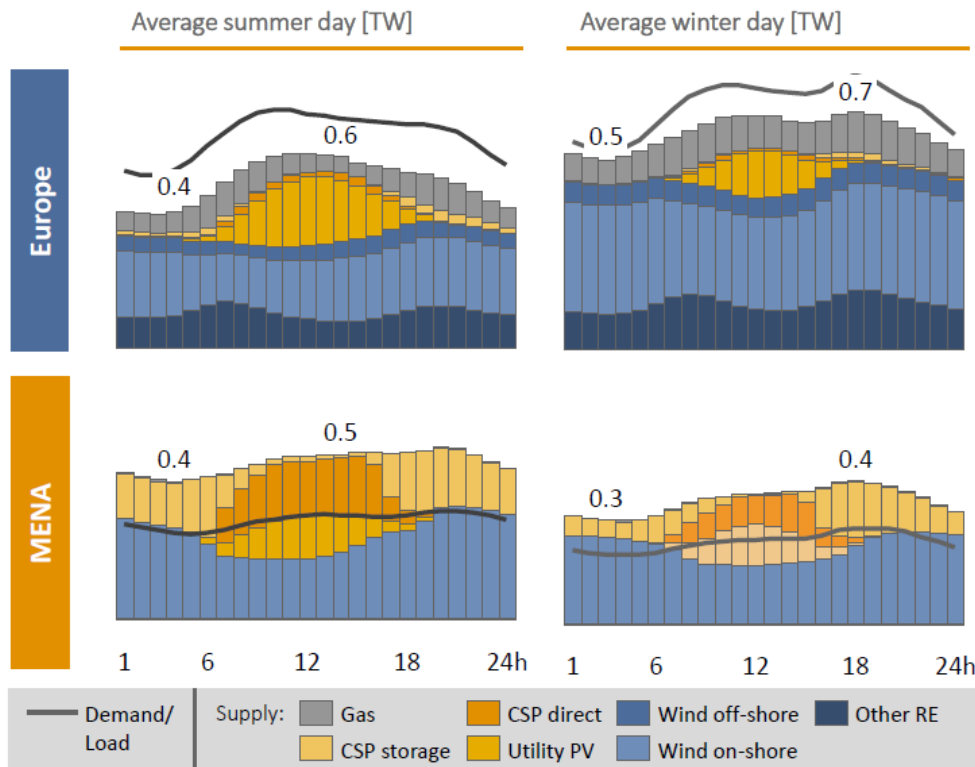


# Desert Power getting started

Long term: MENA and Europe perfect partners since demand as well as supply complimentary



From „Desert Power 2050“



## Lessons learned for 2050

- MENA and Europe demand with seasonal fit
- MENA and Europe Wind regimes complimentary
- MENA solar power strongest when European winds weak
- Strong grids needed in any case, EUMENA grid integration ensures best payback

Source: Dii, Fraunhofer ISI

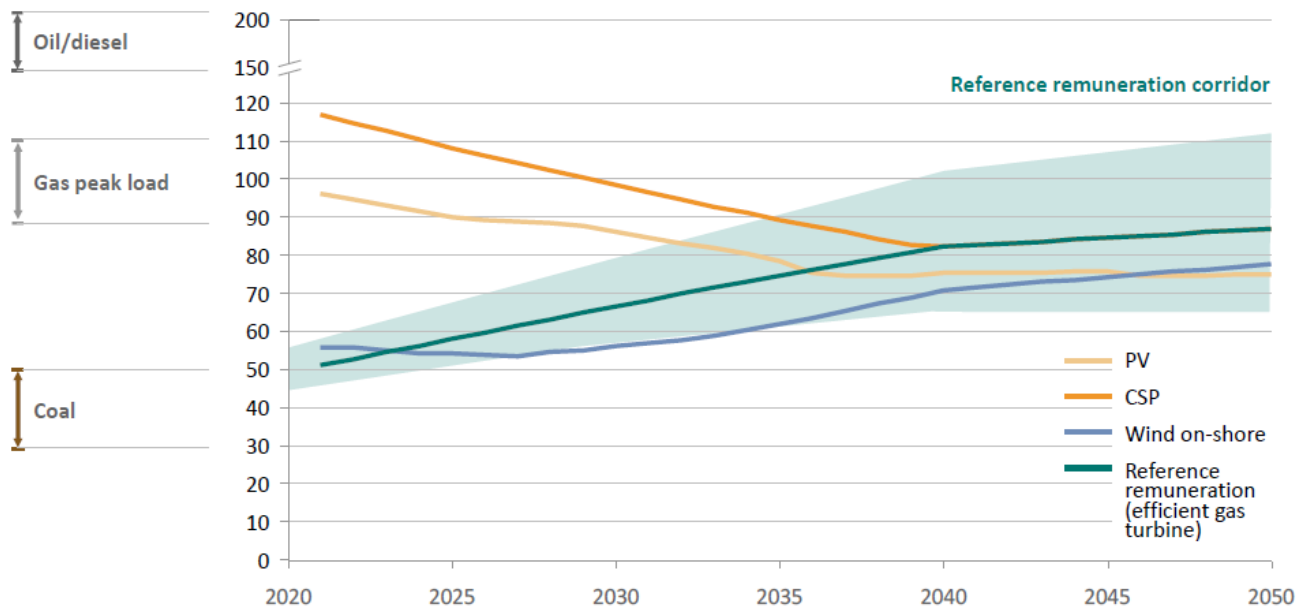
# Desert Power getting started

As RE shares become dominant, fluctuating RE cannot earn same revenue as firm power



## 3 Market

EUMENA-wide RE remuneration needs (average €/MWh)



Note: Calculated with harmonized FiP and real values in €2013, no discounting;  
 gas peak load = Open Cycle Gas Turbine (OCGT); Efficient gas turbine = Combined Cycle Gas Turbine (CCGT)  
 Source: TU Wien, Dii, Fraunhofer ISI



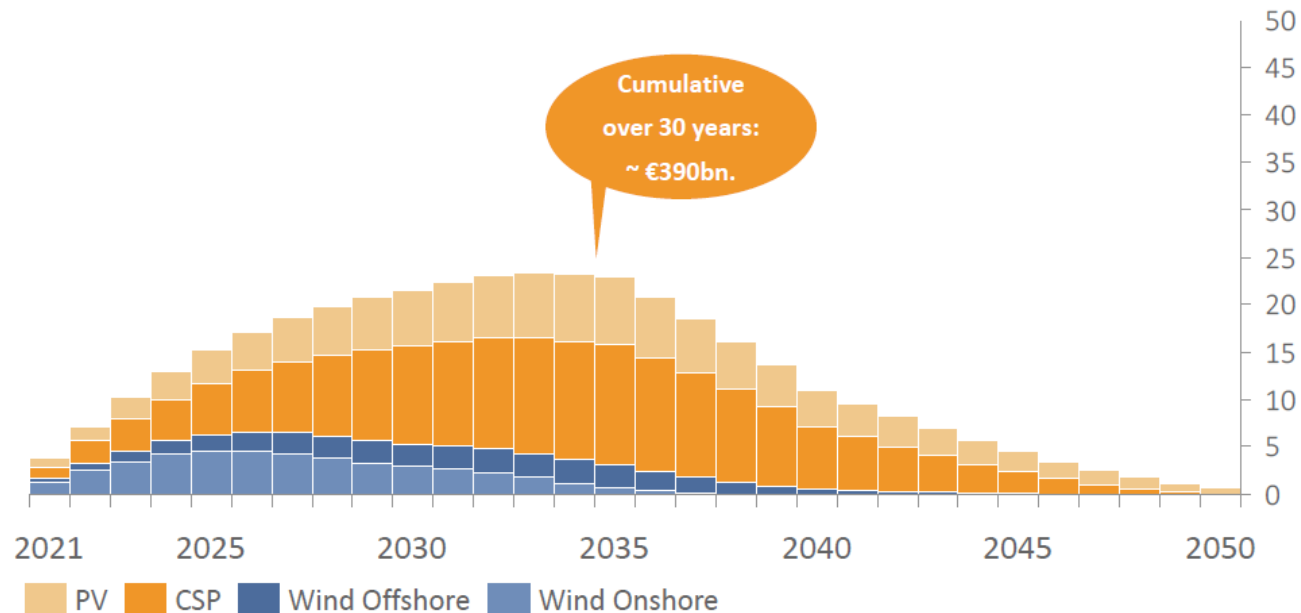
# Desert Power getting started

To close gap to conventional firm power after 2020, €390bn. needed over 30 years in all of EUMENA



3 Market

RE support expenditures<sup>1</sup> for post-2020 RE in EUMENA [bn EUR]



1. Calculated based on a harmonized FiP across EUMENA  
 Source: Dii, Fraunhofer ISI, TU Vienna Note: RES-E only includes PV, CSP, Wind offshore, Wind onshore  
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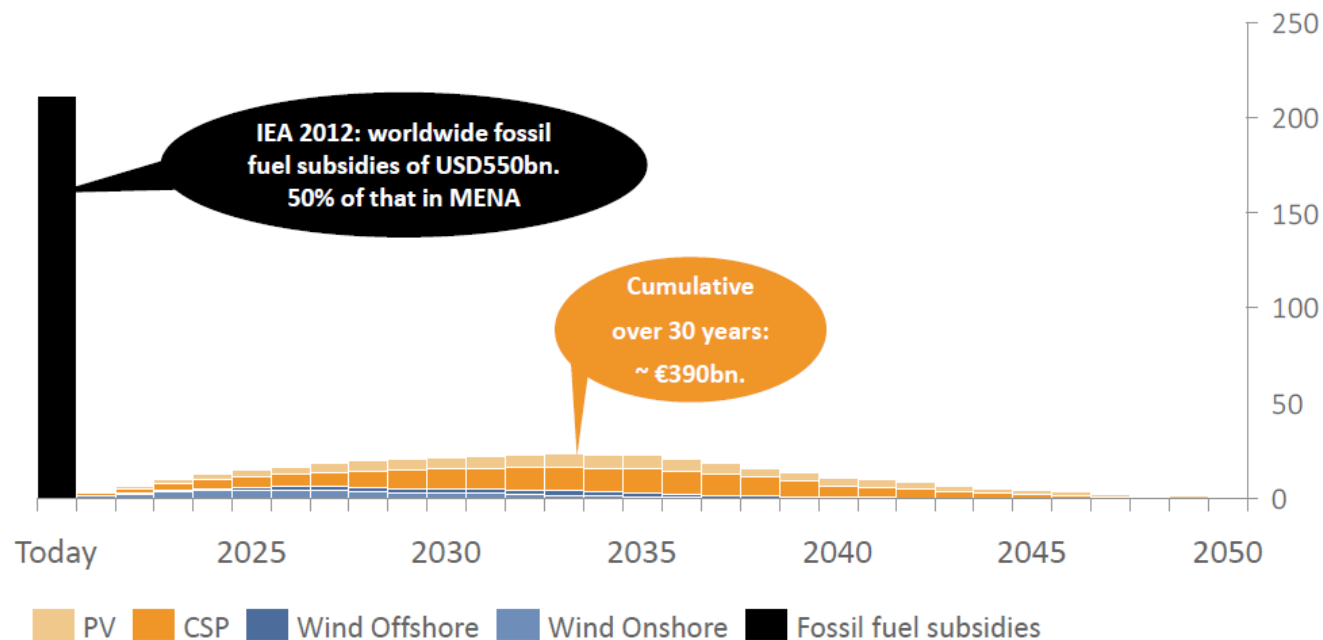
# Desert Power getting started

Today's fossil fuel subsidies dwarf the needed RE support



3 Market

RE support expenditures<sup>1</sup> for post-2020 RE in EUMENA [bn EUR]



1. Calculated based on a harmonized FiP across EUMENA

Source: Dii, Fraunhofer ISI, TU Vienna Note: RES-E only includes PV, CSP, Wind offshore, Wind onshore

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31 October 2013

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# Financiële aspecten

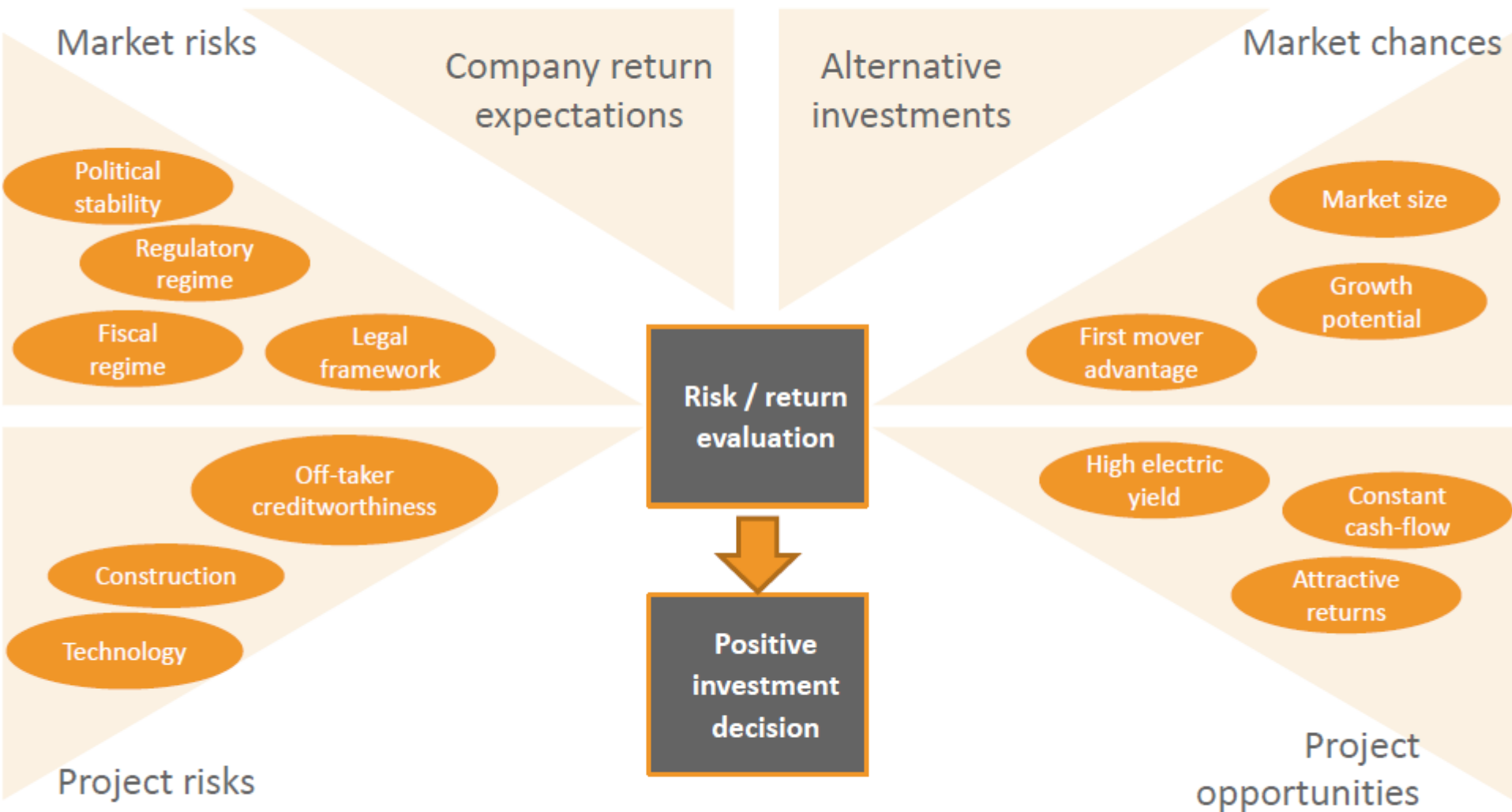
- Het is een voorfinanciering van 25 jaar elektriciteit
- Elektriteitsprijs voornamelijk bepaald door overheden
- Dat is een zeer onzekere factor zie Spanje.



Louis Bedoucha Worldbank

# An investment decision is based on a detailed analysis of returns, risks, chances and alternatives

All components have to fit together, else no investment will take place



Positive investment decisions are based on a match of risks and returns

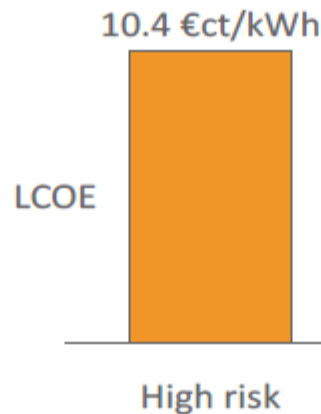
# Increasing returns or decreasing risk are options to get more positive investment decisions

## Why are finance conditions so important?

### Increase returns / chances

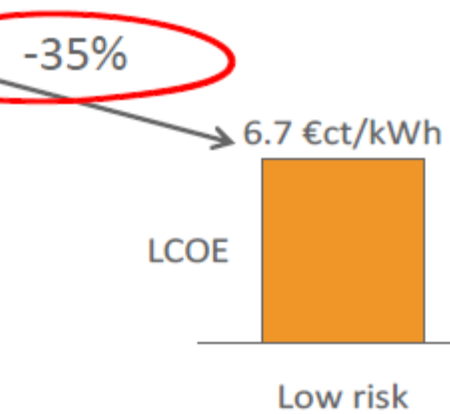
- Offer subsidies
- Look for best natural resources
- Decrease system cost
- Choose markets with higher demand/electricity prices

### High risk – high returns expectations



50 MWp PV Plant	
Leverage (Equity/Debt)	40/60
IRR on equity	15%
Debt all-in interest rate	8%
Min. DSCR	1.4
Tenor	10 yrs
Export credit guarantee	7%

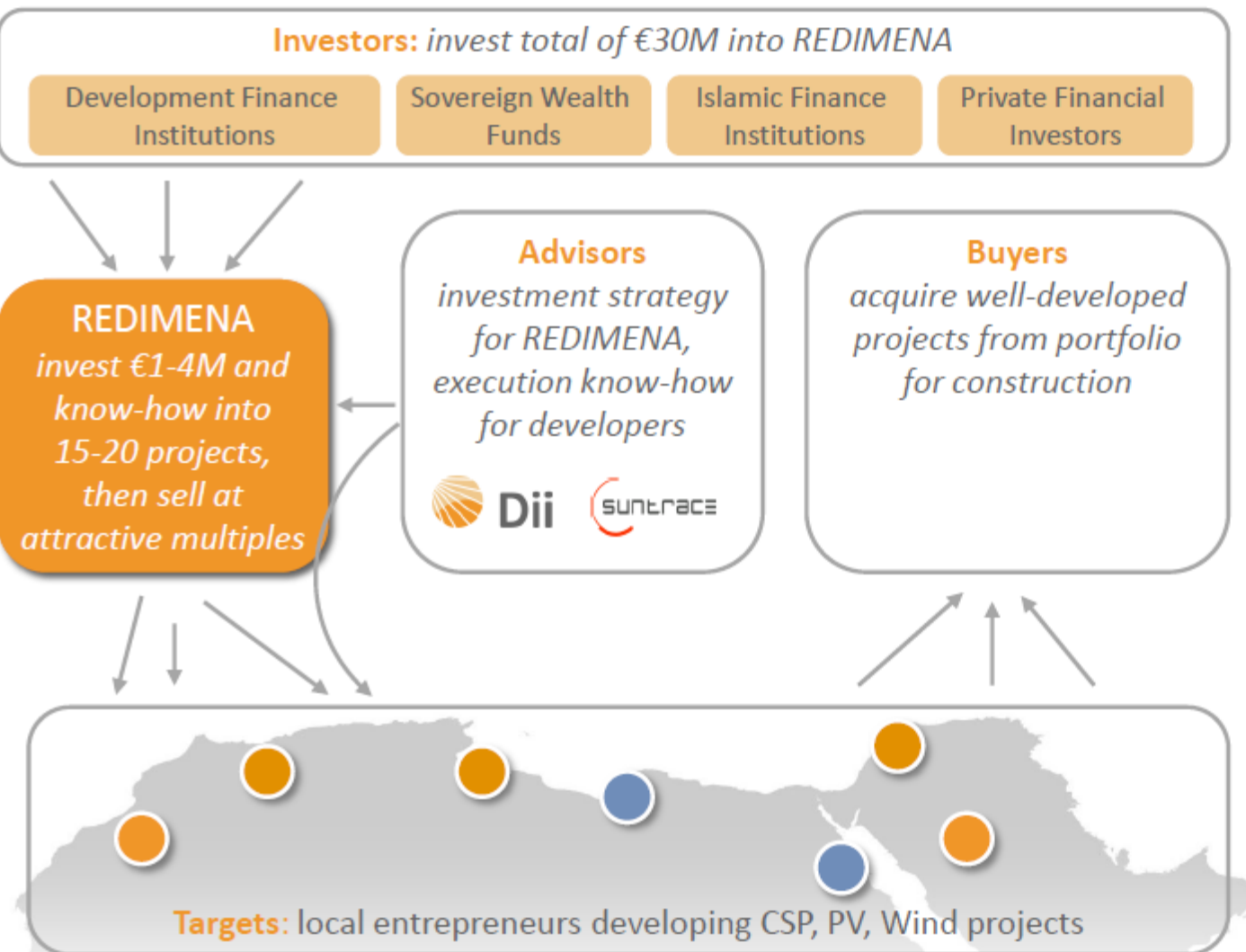
### Decreased risk = lower return expectations



50 MWp PV Plant	
Leverage (Equity/Debt)	20/80
IRR on equity	8%
Debt all-in interest rate	3.75%
Min. DSCR	1.25
Tenor	18 yrs
Export credit guarantee	-

Lower risks makes electricity cheaper and leads to more RE projects

# REDIMENA is an innovative concept for successful project development



## Expected results

- Pipeline of high quality projects brought through initial stages until shovel-ready status
- Attractive returns for investors at reduced risk profile due to combined advisors' & local expertise
- Portfolio of countries and technologies minimizes risks
- Building capacity among local developers
- Private sector-driven approach with no reliance on subsidies
- Sustainable and scalable

# Onderwerpen dag 2

- Het creëren van een RE markt in MENA
- Grid: continenten verbinden – bottlenecks oplossen
- Samenwerking naar een geïntegreerd systeem
- Impact van RE voor werkgelegenheid en duurzaamheid

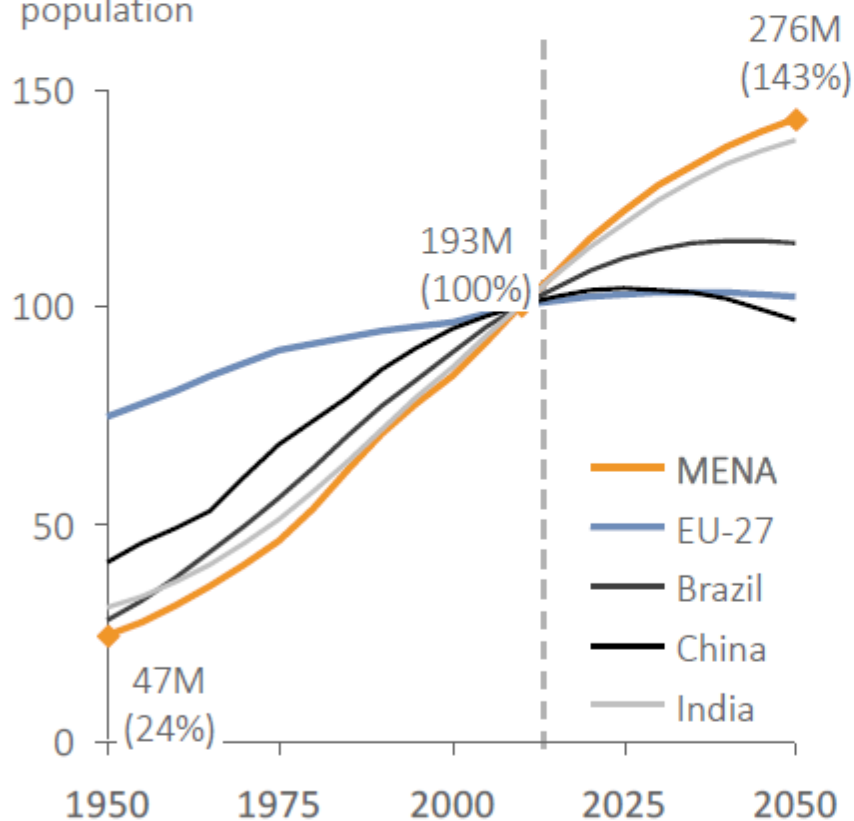


# MENA population growth challenges not only power supply but also labor markets

**Preliminary**

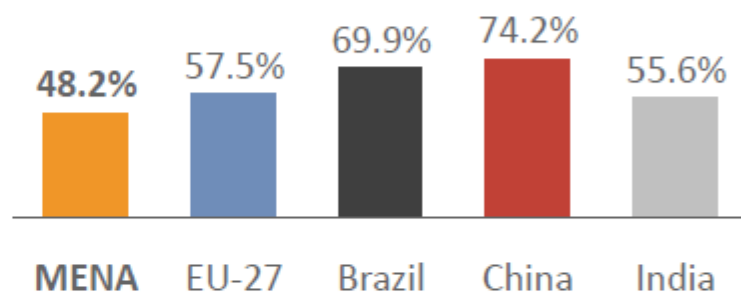
## Population

% of 2010 population



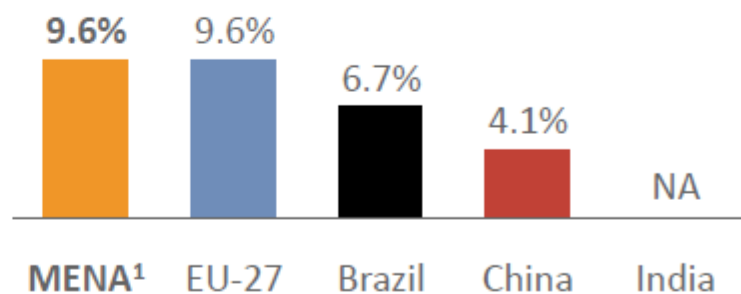
## Labor participation rate in 2010

% of total population ages 15+



## Unemployment rate in 2010

% of total labor force



Note: 1) Libya is not included as no unemployment rates are available

Source: United Nations - Department of Economic and Social Affairs, International Labor Organization, International Monetary Fund



## Job creation potential per EUR 1bn invest (one year jobs, in manufacturing and construction)

	CSP	PV	Wind
Morocco	29-35k	15-23k	36-46k
Egypt	51-59k	22-42k	60-82k
Saudi Arabia	3-4k	1-4k	3-6k
Sectors with most near term job effects	<ul style="list-style-type: none"> <li>• Minerals</li> <li>• Metals</li> <li>• Transport</li> <li>• Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Metals</li> <li>• Machinery</li> <li>• Construction</li> </ul>	<ul style="list-style-type: none"> <li>• Metals</li> <li>• Transport (incl. blades)</li> <li>• Construction</li> </ul>

## Lessons learned

- Job creation needs a stable market for several years
- Job creation depends on
  - Industry capabilities
  - Productivity
  - Import shares
- industrial policy can maximize capabilities and increase local content
- In the near term, most jobs created are skilled technical jobs not requiring a university degree

# Het diner

- Luxe
- Lekker
- Lang warm
- Loop buik



# Ouarzazate

- 33 km<sup>2</sup>
- Vier fases
- De eerste wordt nu gerealiseerd. Saoedi Arabië (Acwa) heeft de leiding over het eerste gedeelte. Het Spaanse Acciona bouwt de CSP centrale met technologie van SENERtrough® .  
Investering 500 miljoen voor een 160 MW centrale met opslag.
- De derde is financieel rond
- In totaal 1000 MW



- 
- Bedankt voor uw aandacht  
Sietse de Haan  
Truus Koppers

