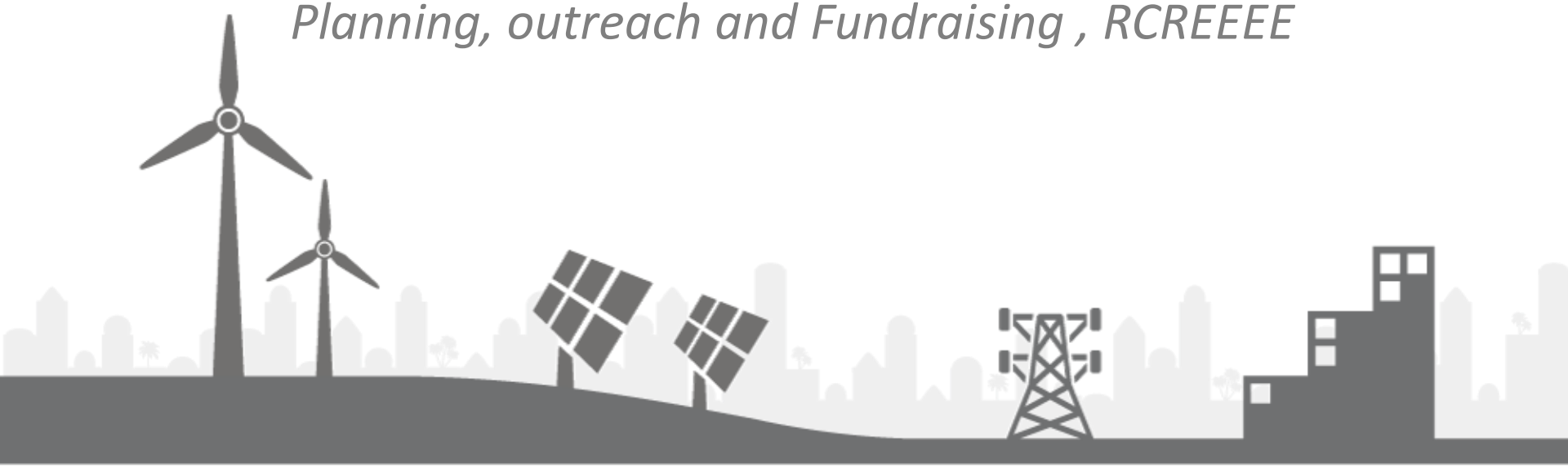
Solar Heating and Cooling in the Arab region

Eng. Ashraf Kraidy,

Director,

Planning, outreach and Fundraising , RCREEEE



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Regional Center for Renewable Energy and Energy Efficiency

المركز الإقليمي للطاقة المتجددة وكفاءة الطاقة

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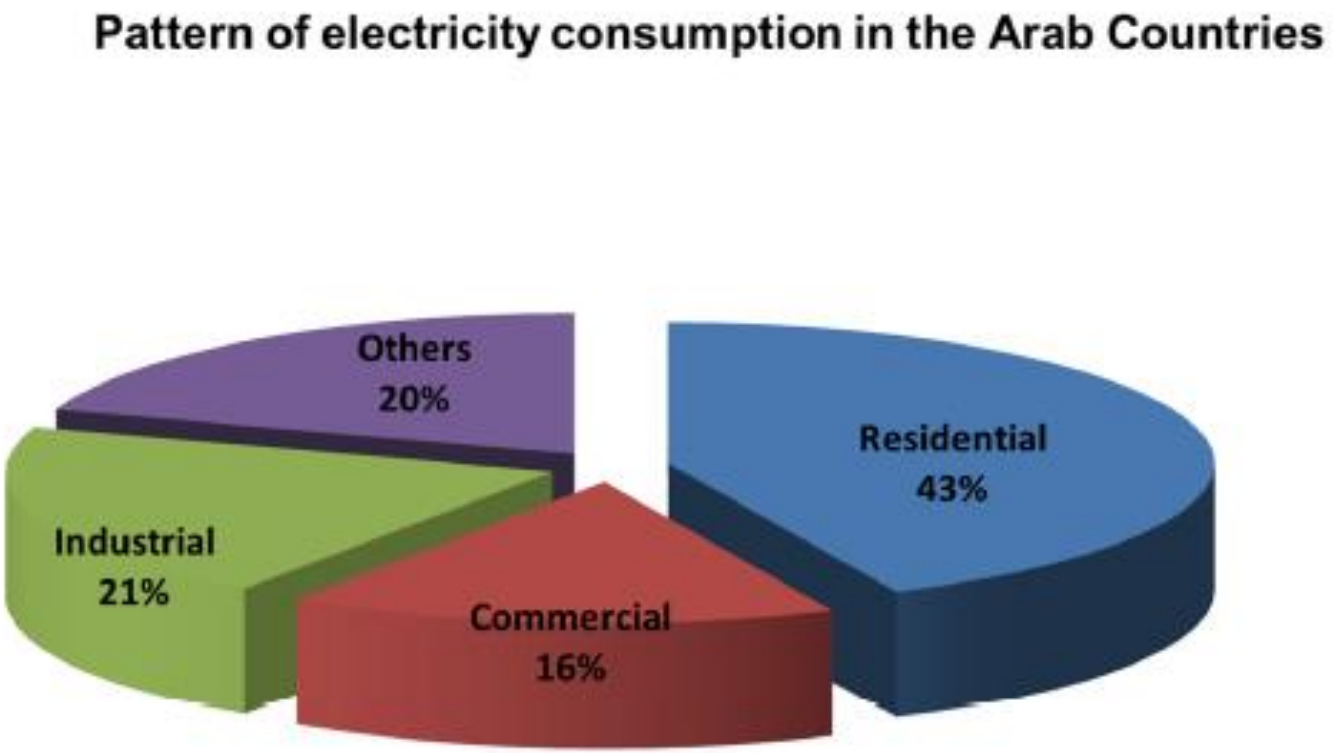
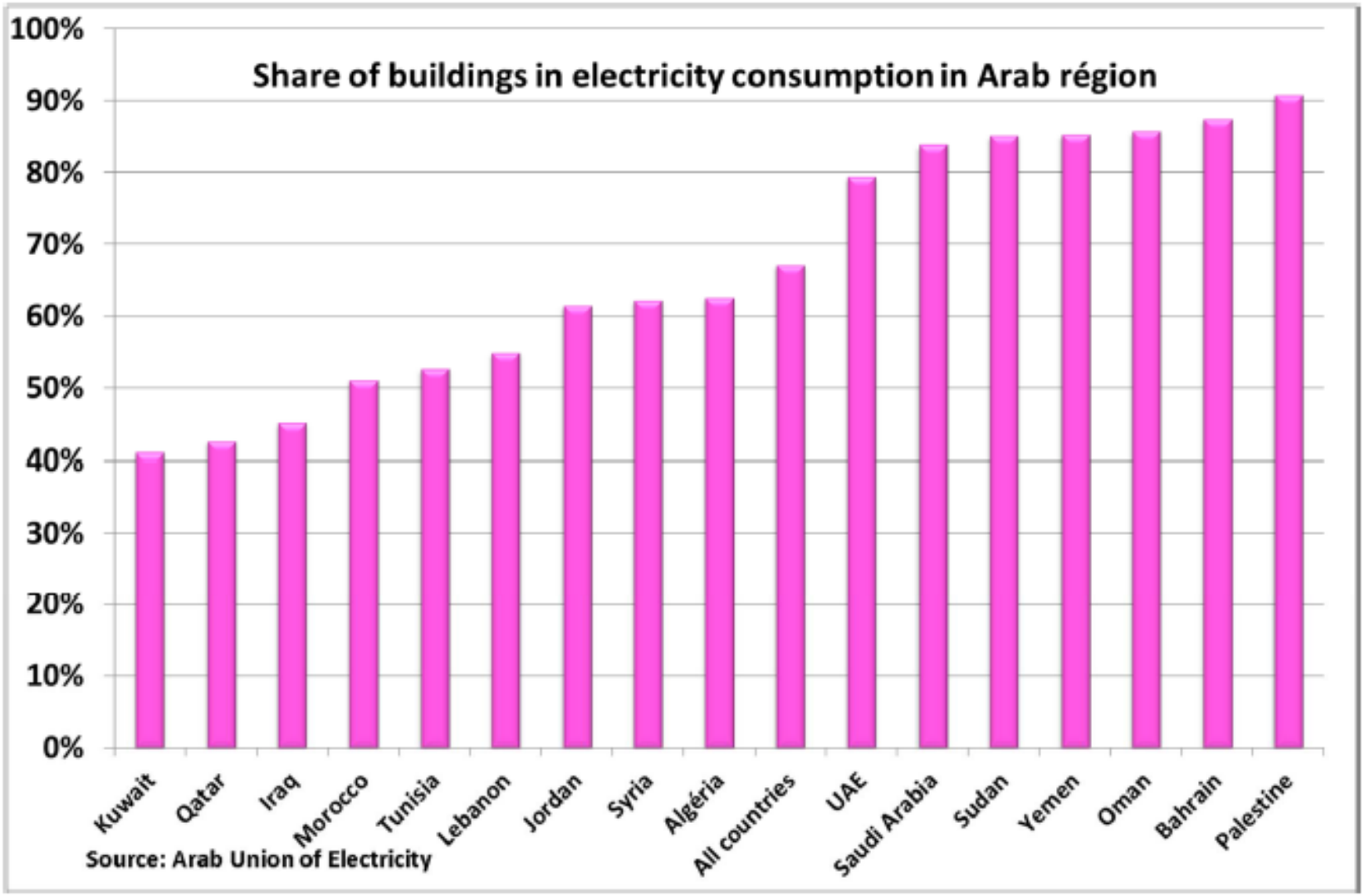
Share of Building In total Energy Consumption in the Arab Region



Source: Arabe Union of Electricity

Share of Building In Electricity Consumption in the Arab Region



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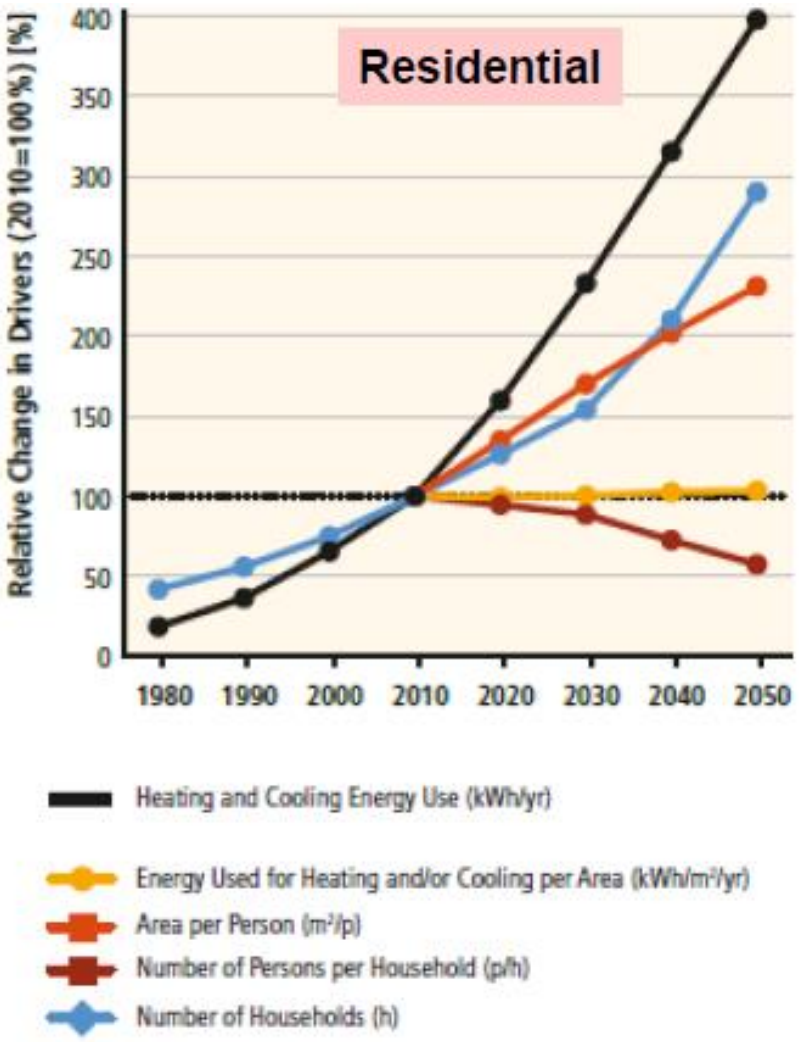
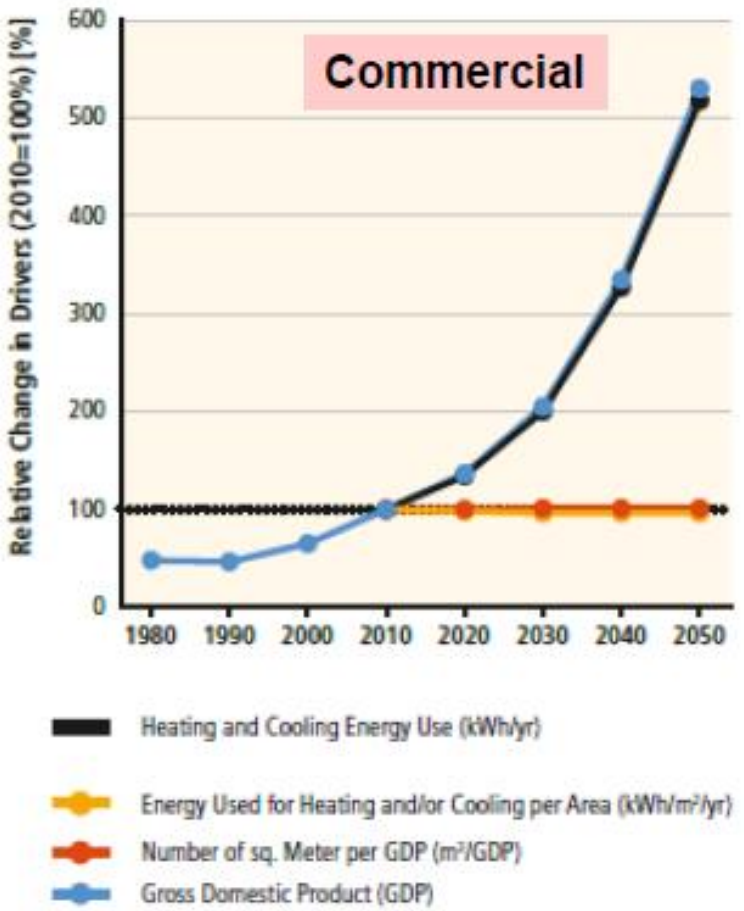
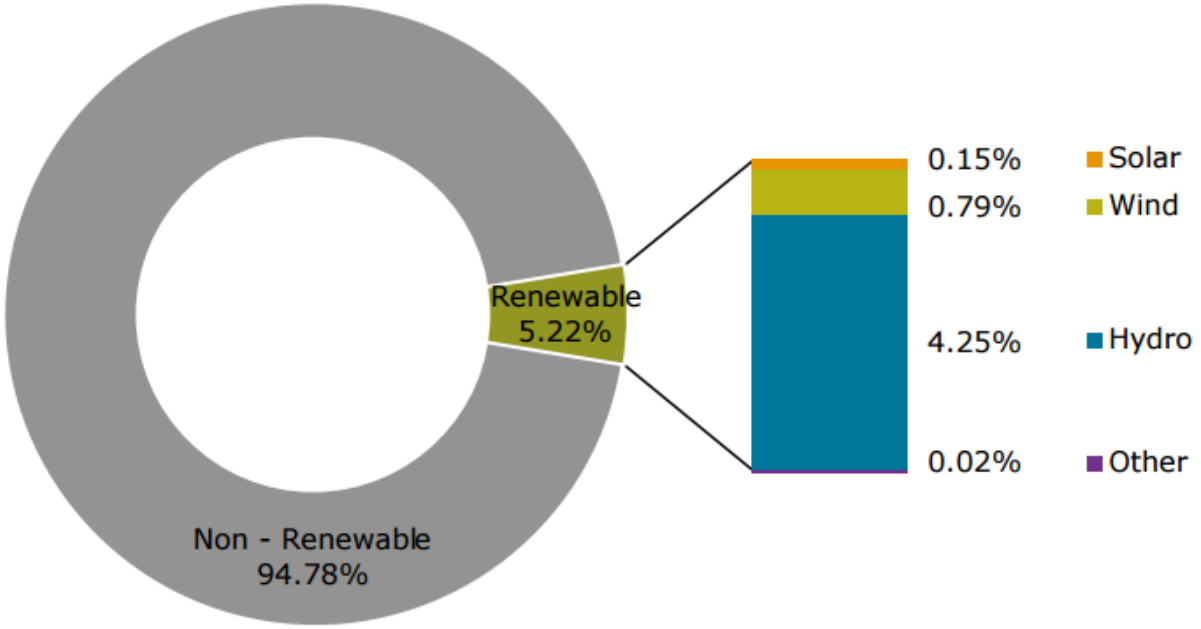
Trends of different driver for H&C demand in Residential and Commercial Sector in The Arab Region





RE Share in Primary Energy Consumption

1- Arab Region and RE Status



Source: AUE (2014), RCREEE focal points

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RE Installed Capacities,

1- Arab Region and RE Status

	Wind MW	PV MW	CSP MW	Other MW	Total RE in 2014		Total RE in 2012	
					MW	% of total installed capacity	MW	% of total installed capacity
Algeria	10	7.1	25	0	42.1	0.37	25	0.22
Bahrain	0.5	5	0	0	5.5	0.14	0.5	0.01
Egypt	610	15	20	0	645	2	585	1.88
Iraq	0	0	0	0	0	0	0	0
Jordan	1.45	13.6	0	3.5	18.55	0.59	6.55	0.1
Kuwait	0	1.8	0	0	1.8	0.01	1.8	0.01
Lebanon	0.5	1.6	0	0	2.1	0.09	1.1	0.05
Libya	0	5	0	0	5	0.05	5	0.06
Morocco	**750**	15	20	0	**785**	**10.9**	325	5.08
Palestine	0.7	4	0	0.2	4.9	3.38	1.52	1.06
Qatar	0	1.2	0	40	41.2	0.46	41.2	-
Saudi Arabia	0	19	0	0	19	0.03	7	-
Sudan	0	0	0	0	0	0	0	0
Syria	0.15	2	0	0	2.15	0.02	2.15	0.02
Tunisia	245	20	0	0	265	**6.63**	158	3.91
UAE	0	**33**	**100**	1	134	0.49	22.5	-
Yemen	0	3	0	0	3	0.20	1.5	0.1
Arab Region	1618	146	165	44	1974	1	1184	

Solar Heating Market Analysis

2- Solar Heating Market Analysis

Source: AFEX 2015, RCREEE

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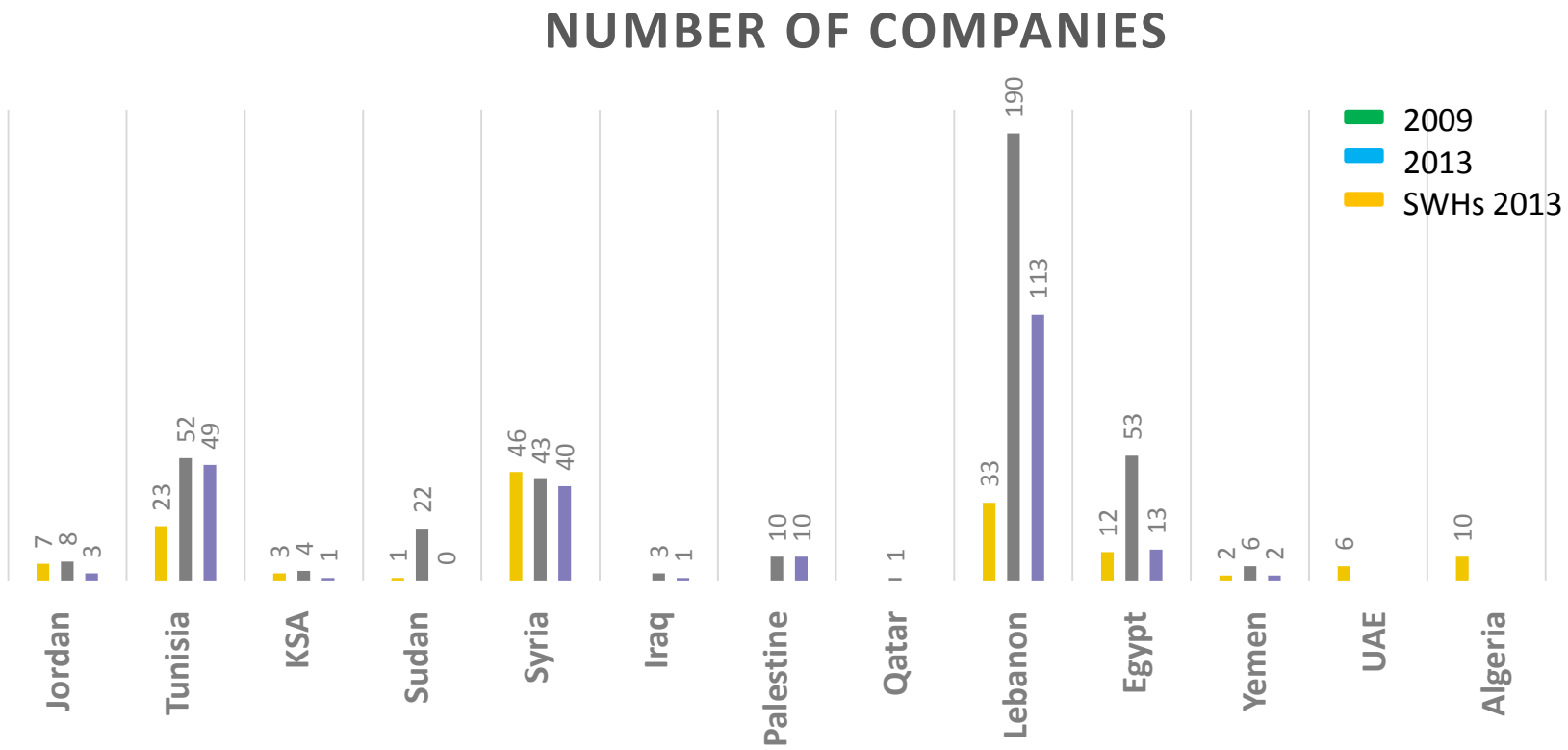
RE & SWHs Private Sector Development

2- Solar Heating Market Analysis



Source: RE&EE Dalil, LAS, 2013

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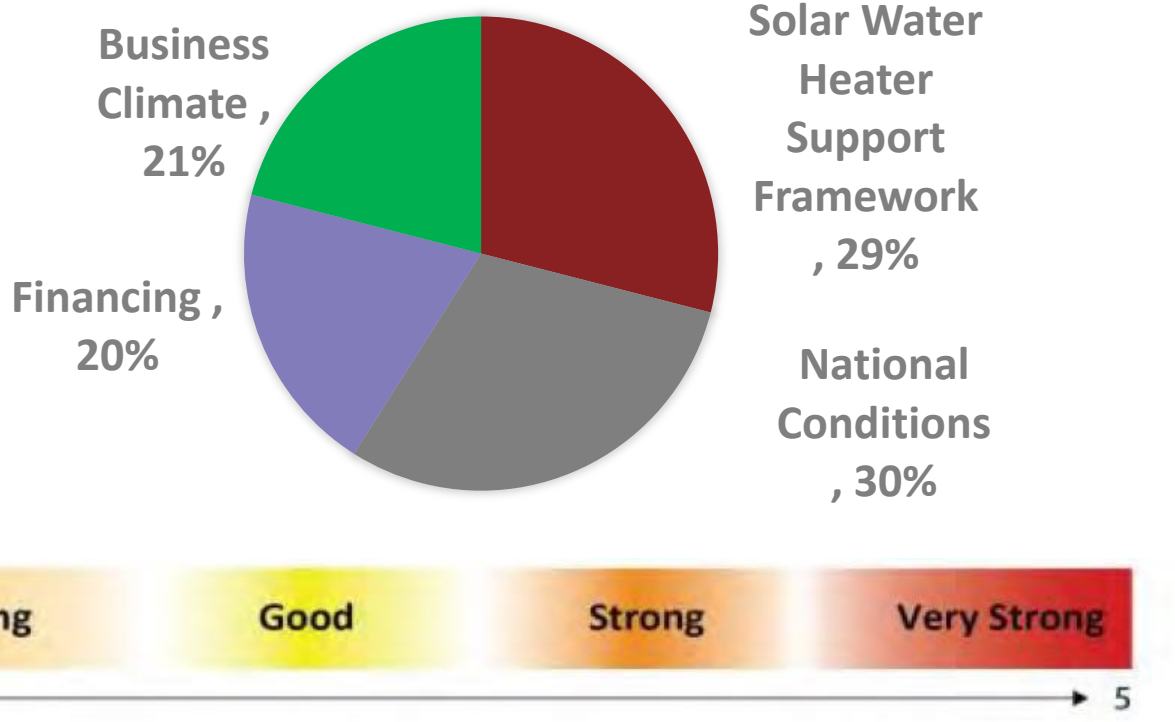
SWHs Market Assessment in the Arab region- Techscope Assessment tool

2- Solar Heating Market Analysis



Countries
Algeria
Tunisia
Morocco
Jordan
Palestine
Lebanon
Egypt
Sudan
UAE

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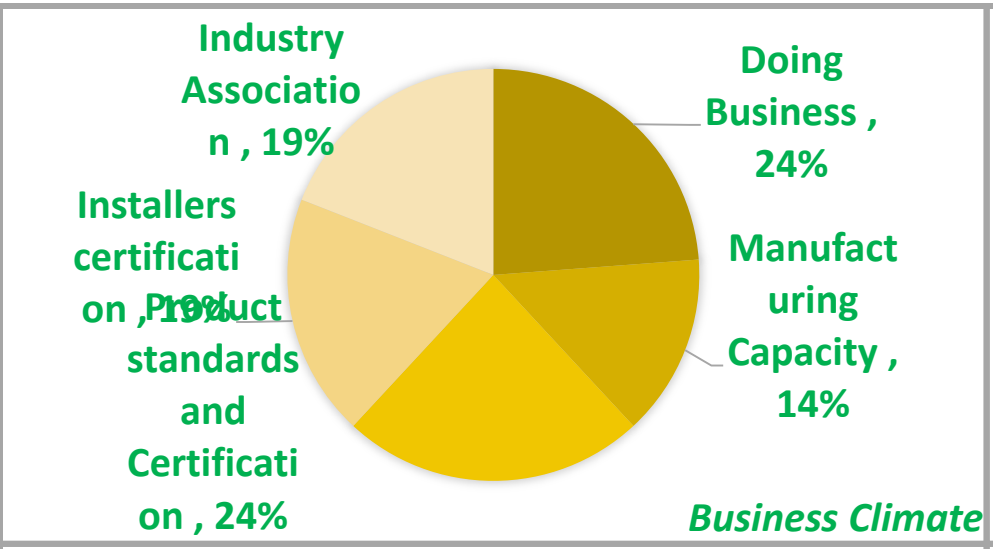
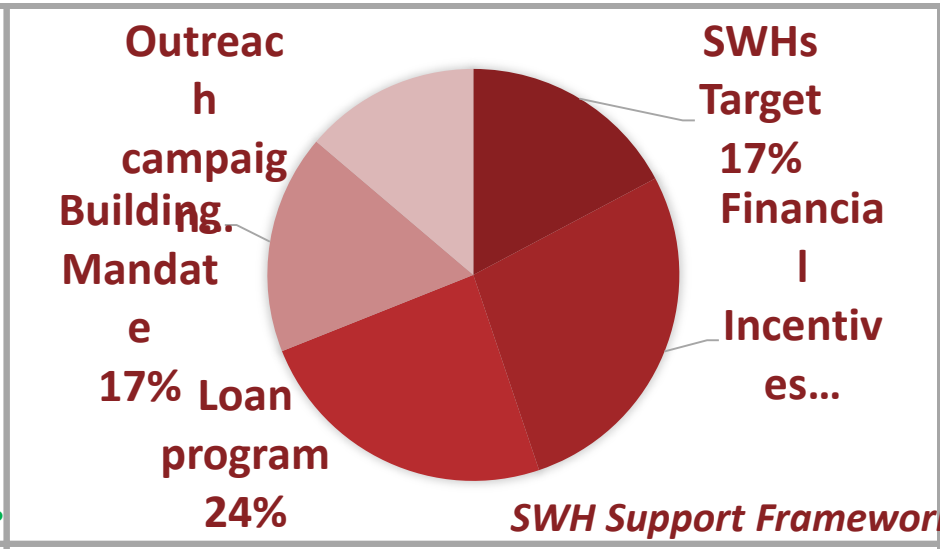
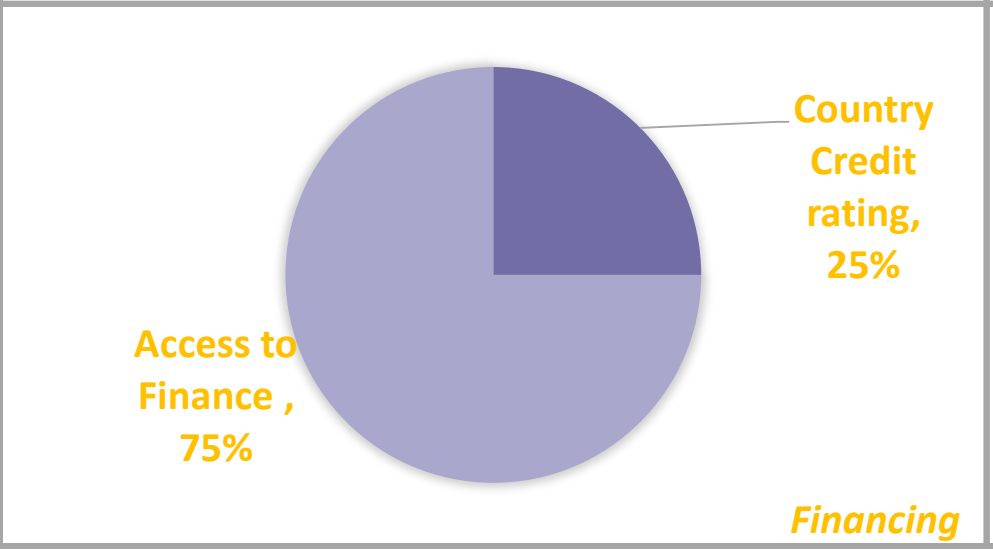
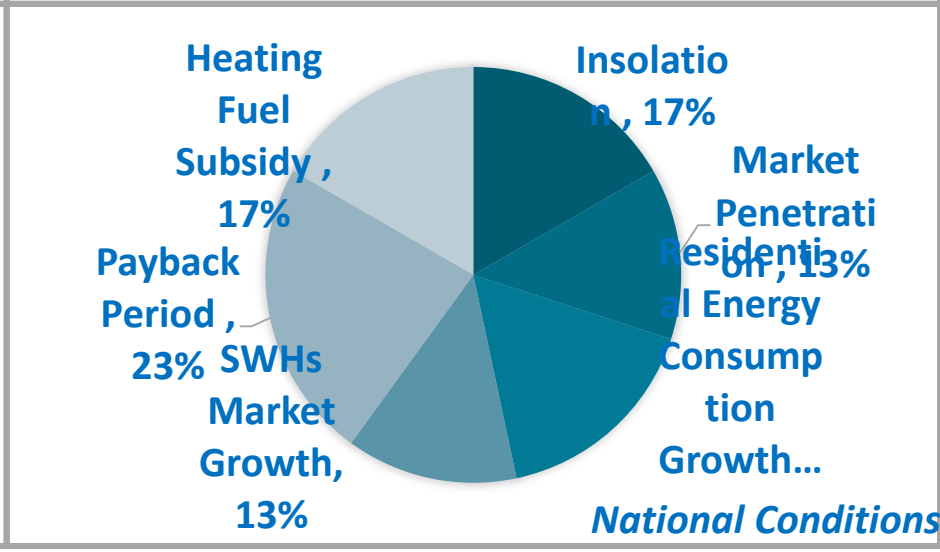

Industry Association , 19%
Doing Business , 24%
Installers certificati on , 19%
Manufact uring Capacity , 14%
Product standards and Certificati on , 24%
Business Climate

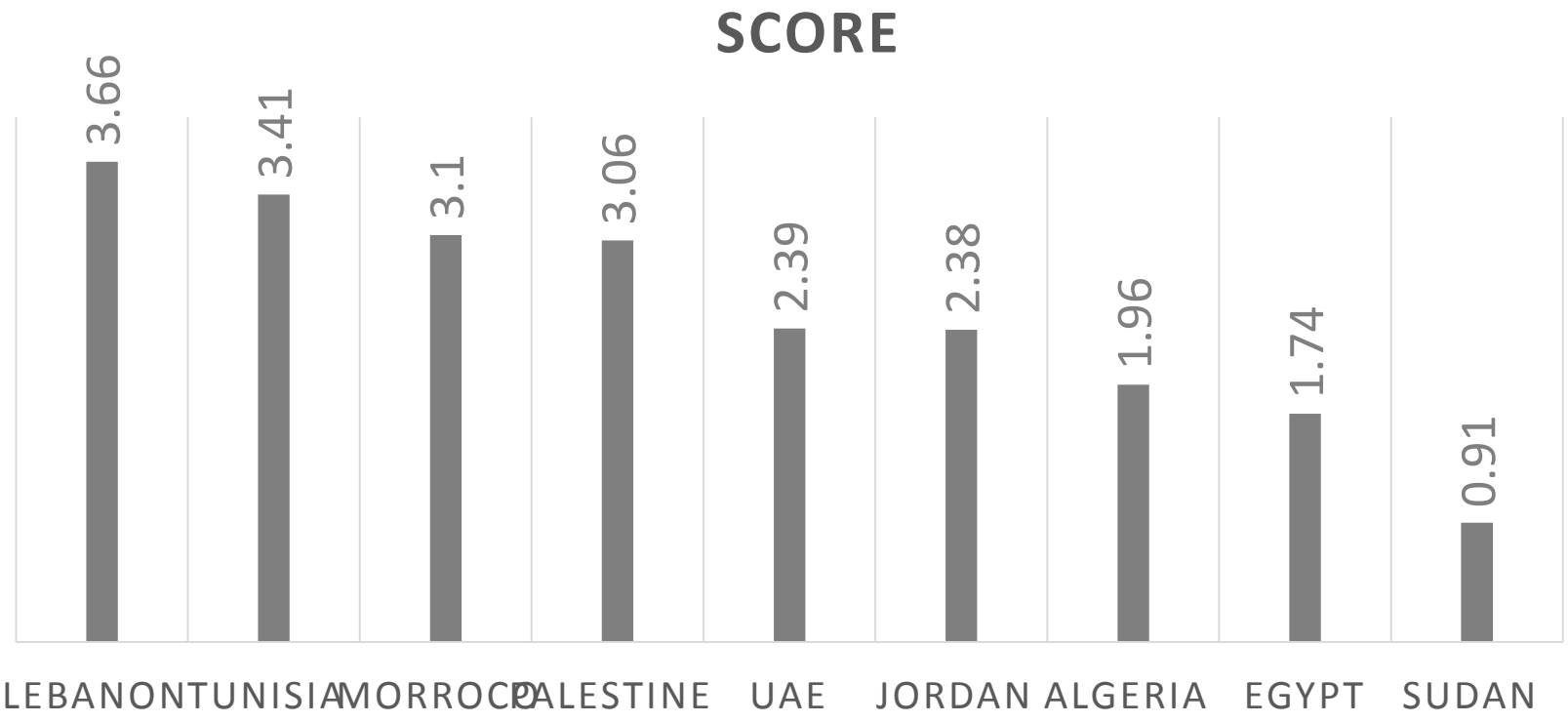

Outreac h campaig ns. 17%
SWHs Target 17%
Building Mandat e 17%
Financia l Incentiv es… 24%
Loan program 24%
SWH Support Framewor


Country Credit rating, 25%
Access to Finance , 75%
Financing


Heating Fuel Subsidy , 17%
Insolatio n , 17%
Market Penetrati on , 13%
Payback Period , 23%
Residenti al Energy Consump tion Growth… 17%
SWHs Market Growth, 13%
National Conditions

Assessment Final Score

2- Solar Heating Market Analysis



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Assessment on the Commercial Viability of Solar Cooling Technologies and Applications in the Arab Region

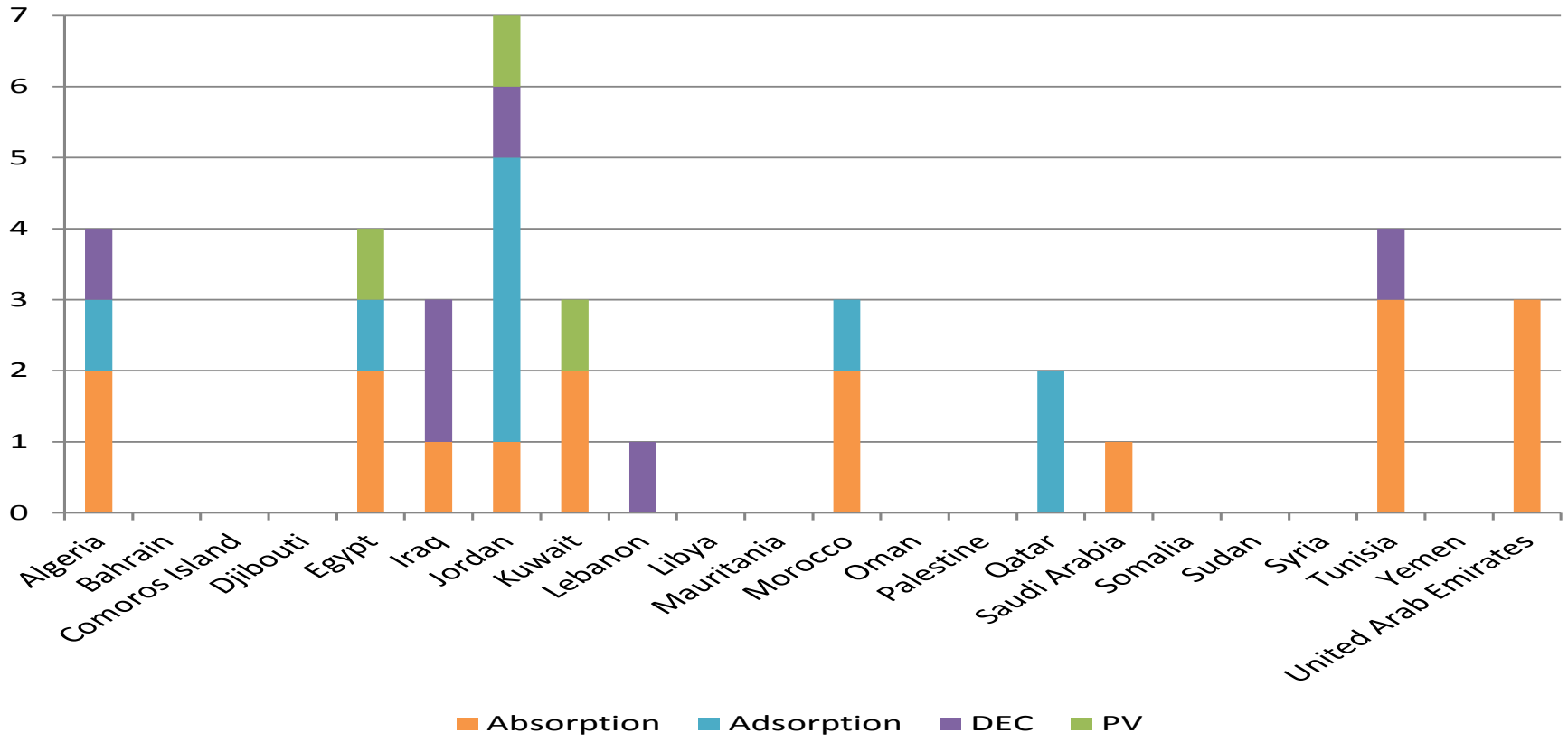
3- Solar Cooling Market Analysis

Scope:

To create a logical pathway to identify the most efficient reliable, and cost competitive solar cooling technology for the Arab region.

Diffusion of solar cooling technologies

3- Solar Cooling Market Analysis



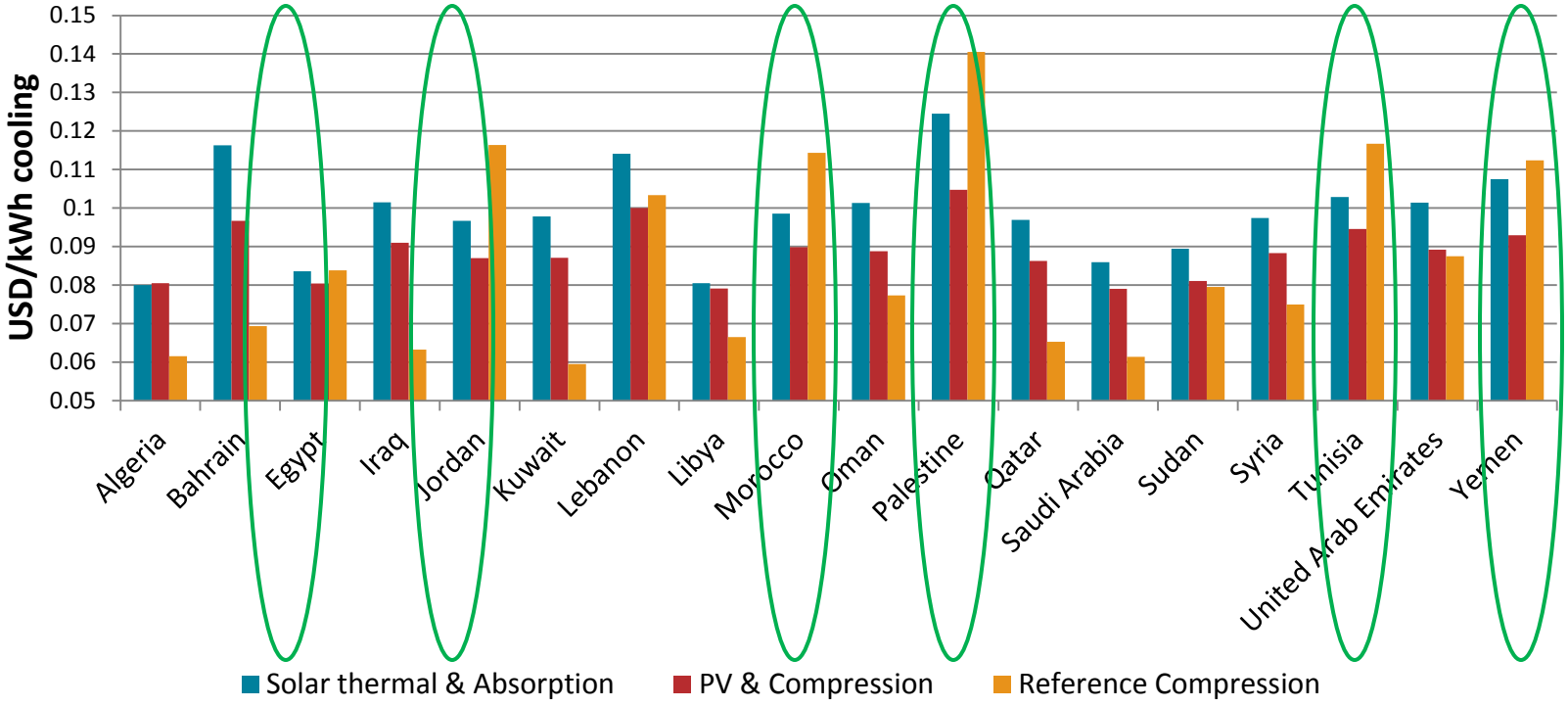
Assumptions

Two different building types in the Arab region have been defined, with a cooling load of 100 kW_c and 1 MW_c cooling capacity, respectively. Each building type has been investigated using three different cooling technologies:

- Double-effect absorption chiller and concentrating collectors
- Vapour compression scroll chiller and photovoltaic modules
- Vapour compression scroll chiller and grid operation (reference case)

Levelized Cost of Cooling Energy (LCCE) for different configurations /100 kW system

3- Solar Cooling Market Analysis



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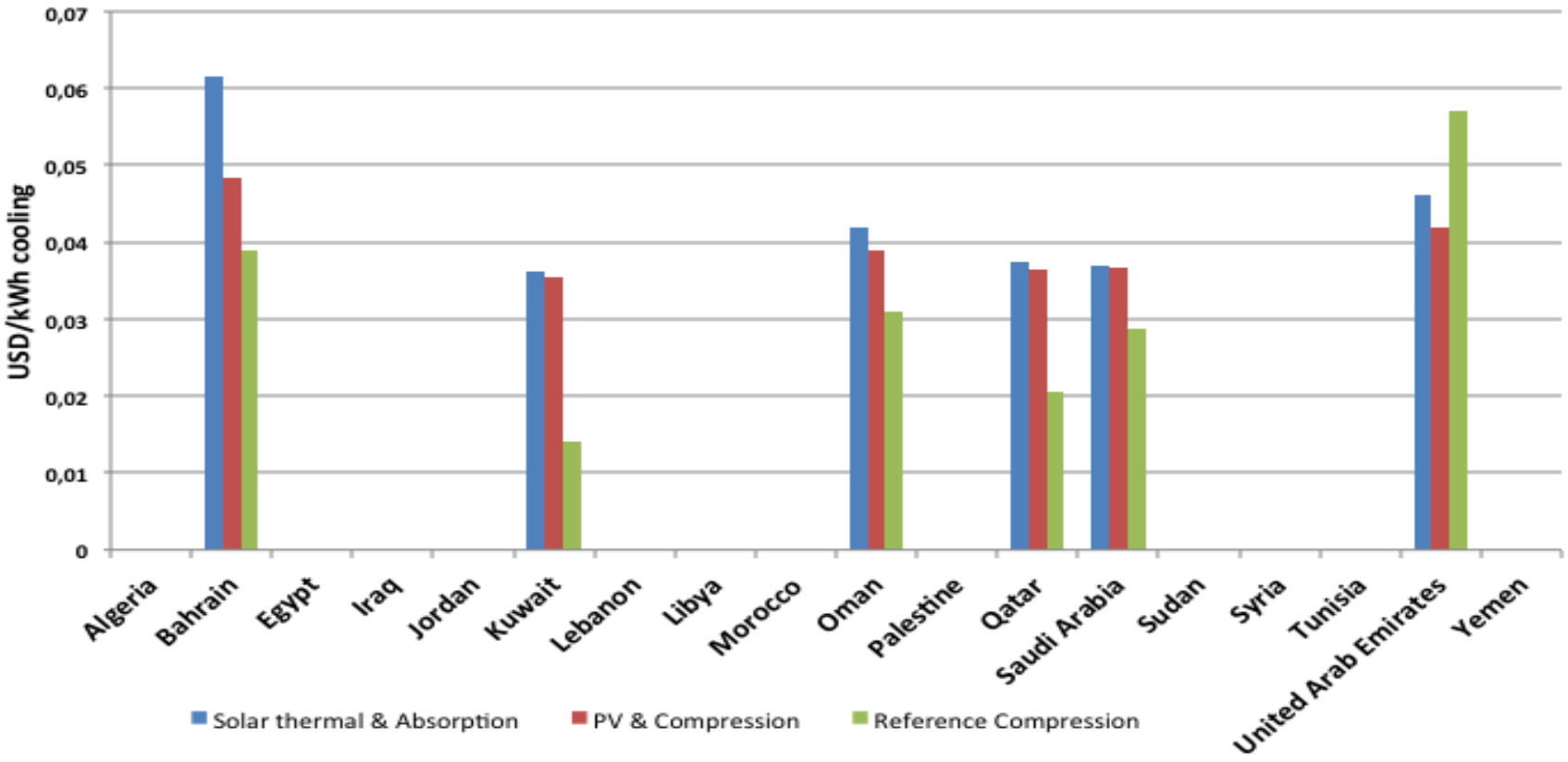
Levelized Cost of Cooling Energy (LCCE) for different configurations /1 MW system

3- Solar Cooling Market Analysis



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Project proposal for Future Follow UP

- **Solar cooling roadmap for Arab region**
  - investment cost reduction,
  - overall energy performance increase
  - system quality improvement.
- **R&D program**
  - Heat rejection
  - Adaption of existing products/kits to Arab region
  - Storage
- **Demonstration program for PV Cooling and SHC systems**

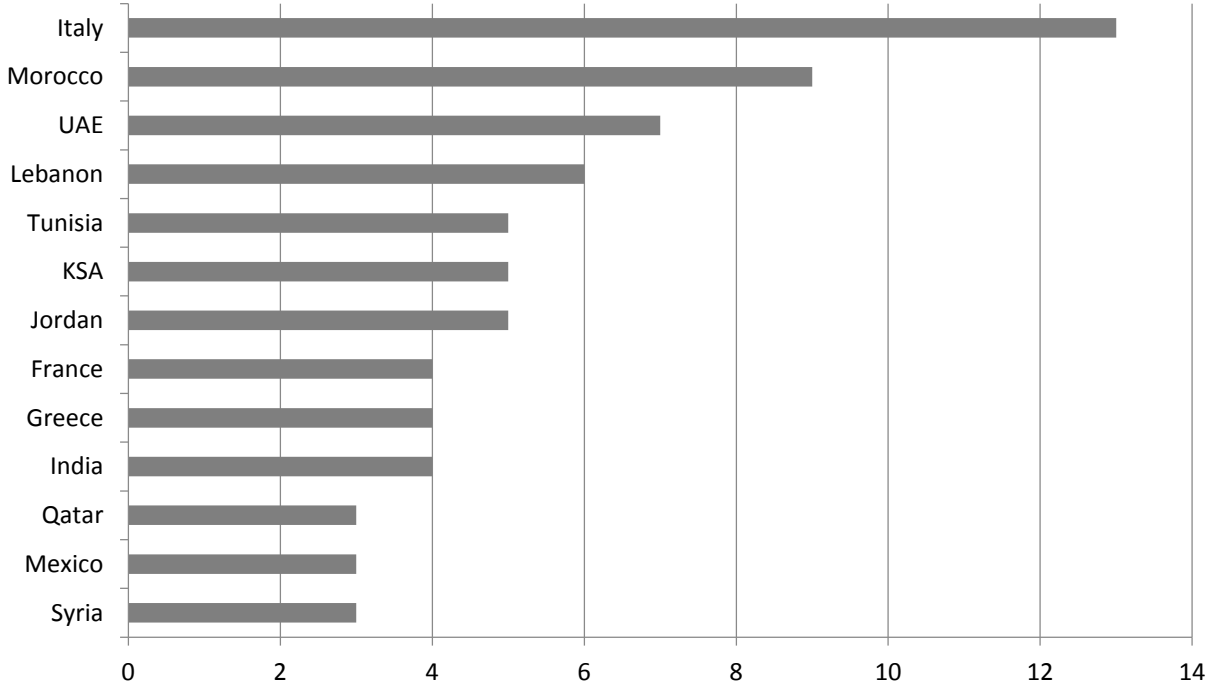
Challenges for Solar Heating and Cooling

- ***Renewable electricity is a priority***
- ***Lost in the plan***
- ***Lack of qualified service provider***
- ***Weak Markets and market players***
- ***Lack of incentives schemes***
- ***Lack of capitals***

Expectations....

5- Future Expectations

Future Most Important Markets for SWHs



Source: Sun and Wind Market Survey 4/2013

Less Europe and More Arab

Sales of thermosiphonic systems are flattering in Europe. Attention is therefore increasingly turning to new Markets in the Arab region

Jen Peter Meyer- Sun and Wind Magazine 4/2013

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Thank You….

Ashraf Kraidy

Director
Planning, Outreach and Fundraising
Regional Center for Renewable Energy and Energy Efficiency (RCREEE)

Hydro Power Building (7th Floor)
Block 11 - Piece 15, Melsa District
Ard El Golf, Nasr City, Cairo, Egypt

T. +20 2 2415 4755 (Ext. 124)
M. +20 111 066 8503
F. +20 2 241 54661
E. ashraf.kraidy@rcreee.org
W. www.rcreee.org
Skype: ashrafkraidy