Solar Market in Egypt

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Egypt's Energy Facts

	Energy Generated GWH *
2007-2008	125,129
2008-2009	131,040
2009-2010	139,000
2010-2011	146,796
2011-2012	157,406

(*) including Experimental generation.

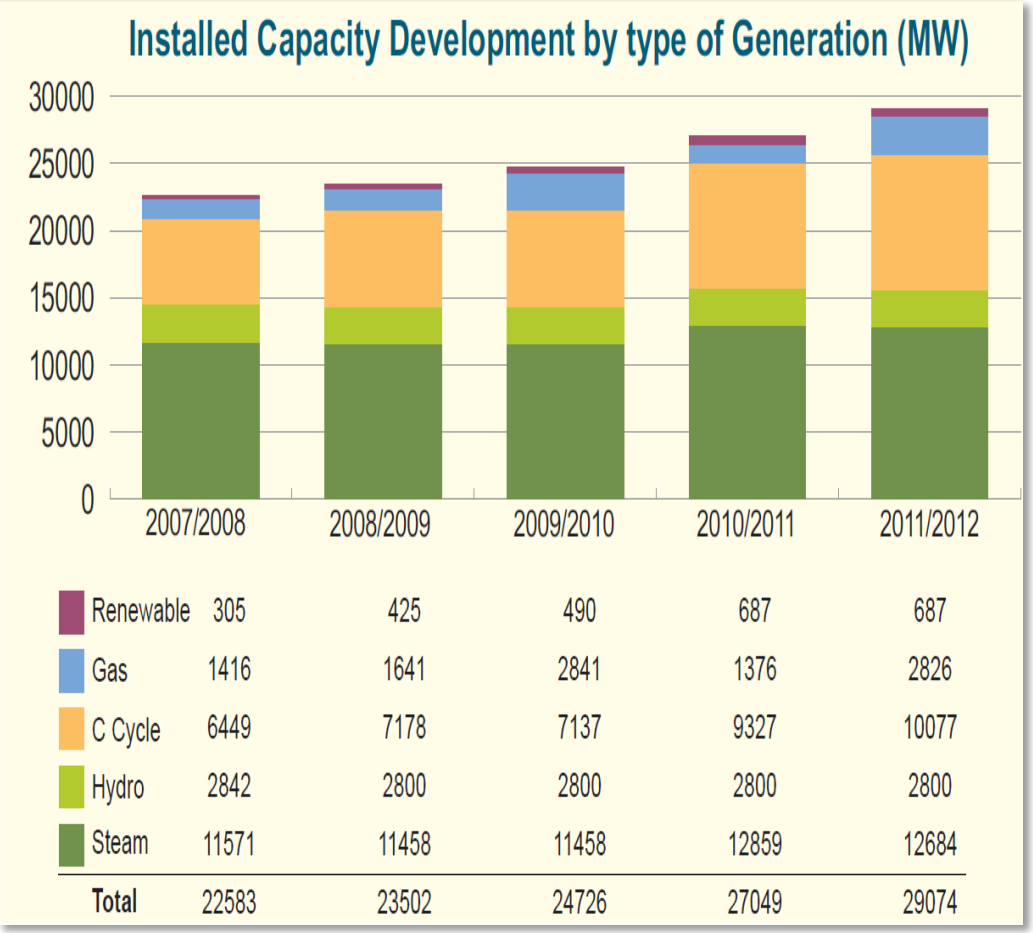
Source: Egyptian Electricity Holding Company Annual Reports

Egypt's Energy Facts

		2005	2006	2007	2008	2009	2010	2011	2012
Peak Load	MW	15,678	17,300	18,500	19,738	21,330	22,750	23,470	25,705
growth			10.3%	6.9%	6.7%	8.1%	6.7%	3.2%	9.5%
Installed Capacity	MW	18,775	20,452	21,944	22,583	23,502	24,726	27,049	29,074
growth			8.9%	7.3%	2.9%	4.1%	5.2%	9.4%	7.5%
Subscribers	Million		21.5	22.6	23.8	24.7	25.7	26.7	28.1
growth				5.1%	5.3%	3.8%	4.0%	3.9%	5.2%
Per Capita Consumption / year	Mwh		1.69	1.70	1.75	1.77	1.80	1.83	1.87
growth				1.0%	3.0%	0.9%	1.9%	1.7%	1.9%
Population	Million	72.99	74.23	75.49	76.78	78.08	79.39	80.72	82.06
growth				1.7%	1.7%	1.7%	1.7%	1.7%	1.7%

Source: Egyptian Electricity Holding Company Annual Reports

Egypt's Energy Facts



	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012
Renewable	305	425	490	687	687
Gas	1416	1641	2841	1376	2826
C Cycle	6449	7178	7137	9327	10077
Hydro	2842	2800	2800	2800	2800
Steam	11571	11458	11458	12859	12684
Total	22583	23502	24726	27049	29074

Source: Egyptian Electricity Holding Company Annual Report 2011/2012

Less than 2.5% of energy mix is coming from Renewable Energy

Energy subsidies at Egypt

- Diesel subsidies cost the state 4.5 LE per liter while the selling price 1.1 LE per liter, prices are expected to rise 20% annually.

- Electricity subsidies: 0.30 LE/kilowatt hour, while the average selling price 0.11, expected to be removed by 2019.

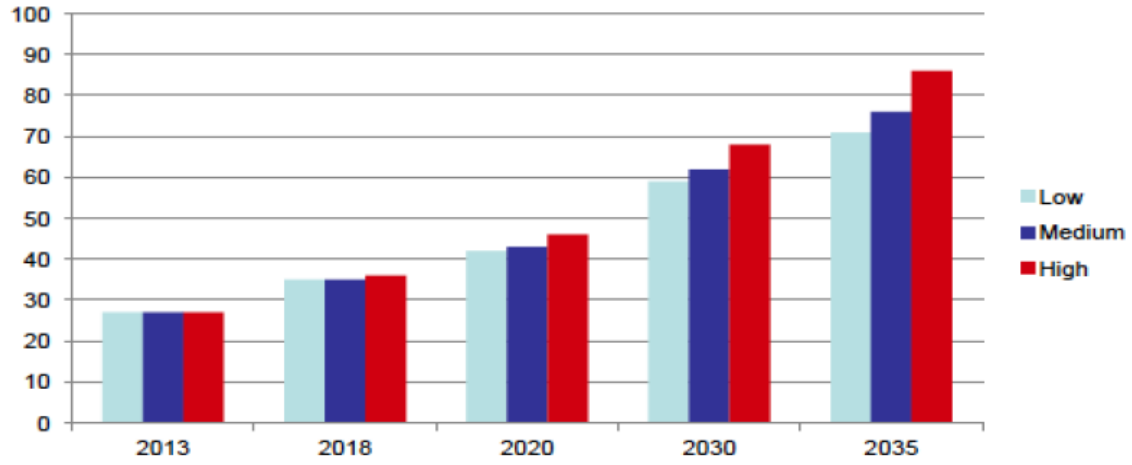
Source : SEDA

Egypt's Energy Plans

Electricity demand till 2035

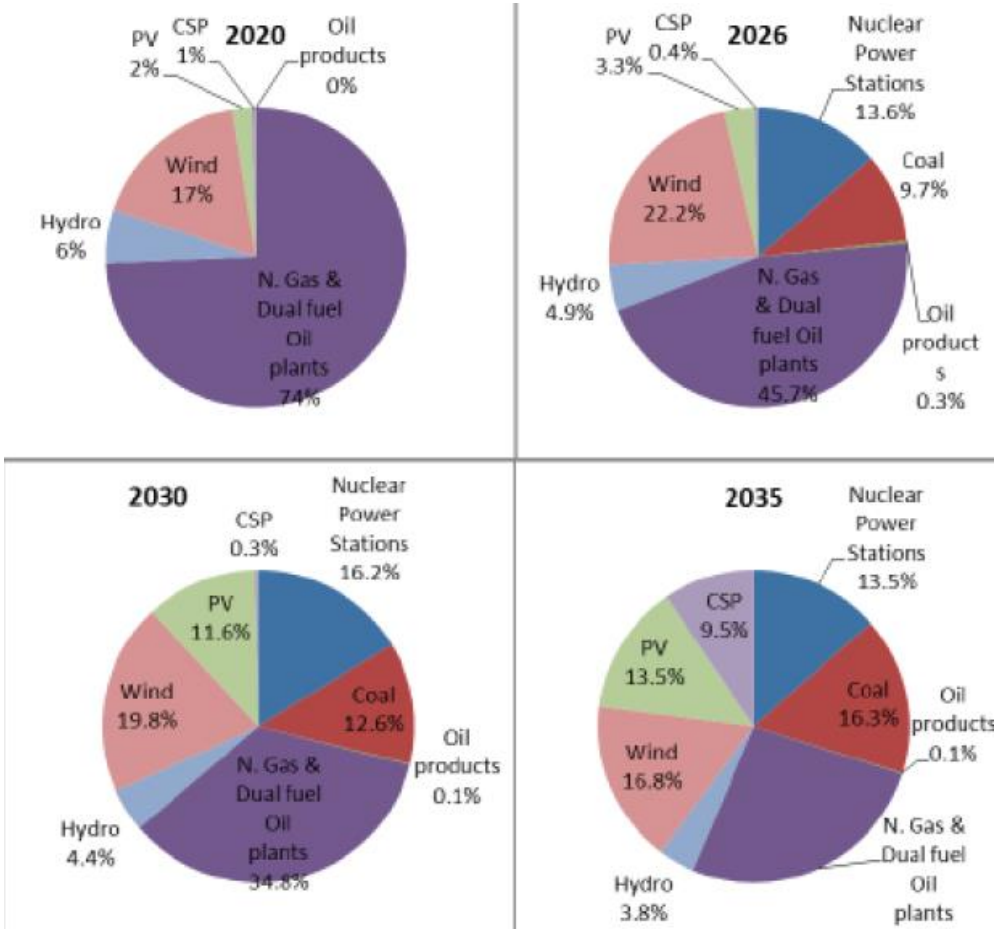
The projections derived from ***TIMES-Egypt Model*** and the 3 scenarios are related to the different economic growth estimations

	Peak Load Projections (GW)					
Scenarios	average growth (%)	2013	2018	2020	2030	2035
Low	5.2	27	35	42	59	71
Medium	6.2	27	35	43	62	76
High	7.1	27	36	46	68	86



Source: RE_Law_Egypt_Prof. Hafez A. El-Salmawy

Egypt's Energy Plans



Source: RE_Law_Egypt_Prof. Hafez A. El-Salmawy

Future Outlook

Government Strategy

20% of the Energy Mix by 2020 will be generated by RE
6% Hydro (~ 3000MW),
12% wind (~ 6000MW),
2% solar (~ 1000MW) ➔ Updated plan by 2027 to be 3500MW.

- Government projects 33% and private sector 67%.
- IPP allowed to investors in June 2012.
- Net metering to encourage PV roof top.
- Quota system (September 2013) to Heavy Industry energy consumers.
- Exempting RE equipment and spare parts from custom duties.
- Central Bank of Egypt will guarantee all financial obligations of EETC under the PPA.

Future Outlook

Recent Key Developments

The Government of Egypt (GoE) has declared that electricity production and distribution were not developed enough to keep up with consumption. It estimated that Egypt needs an additional 2,500 megawatts annually for the next five years to meet rising demands, at a total investment of $12.5 billion.

NREA, National Renewable Energy Authority, has prepared a study in cooperation with the German Government to identify suitable locations for thermal solar stations.

Recent Key Developments

10 x 20MW BOO system (PPA 20 years)

35 offers were received and 15 companies were shortlisted.

Project planned to be operation in 2017/2018

2 x 20MW NREA (National Renewable Energy Agency)
Projects are expected to be operation in 2016& 2017.

Electrifying Off Grid Rural Areas

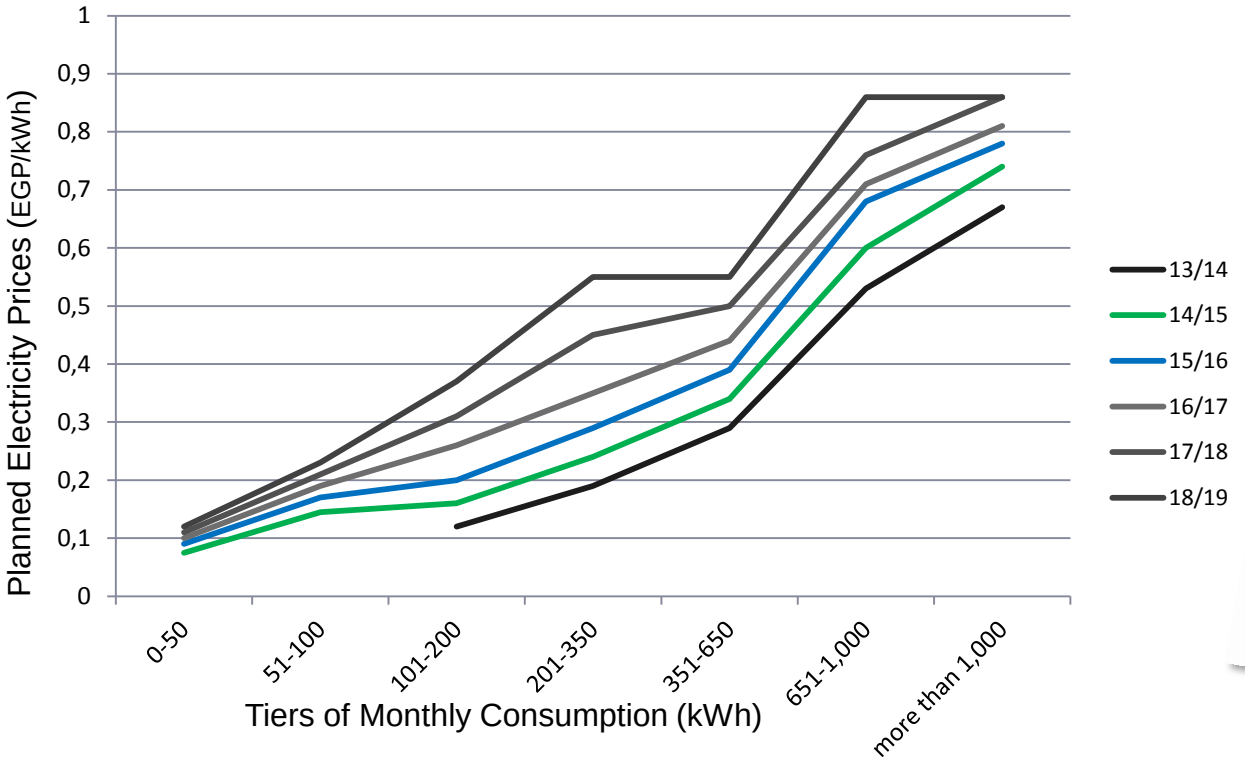
195 remote villages and cities through funds from UAE

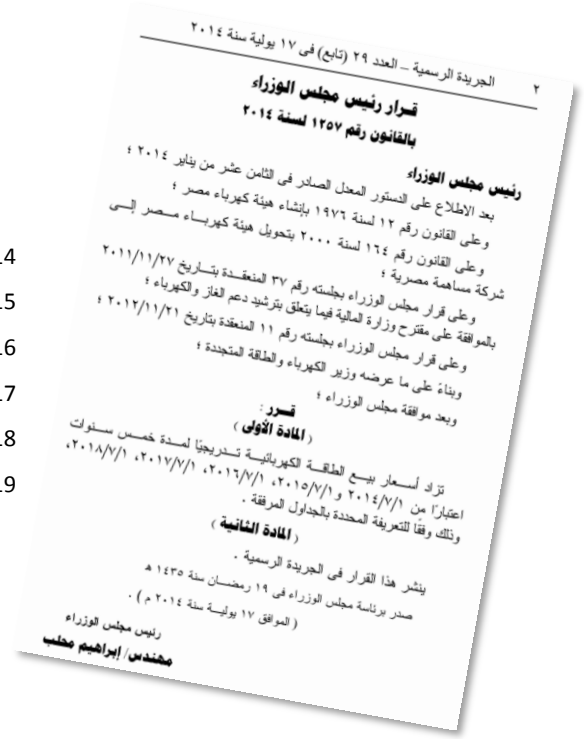
Tender awarded for remote villages in south of Egypt

Source: New & Renewable Energy Authority Annual Report 2012/2013

Egypt’s FiT, and potentials of PV market

Egypt's Energy Policy Reform





الجريدة الرسمية - العدد ٢٩ (تابع) فى ١٧ يولية سنة ٢٠١٤

قرار رئيس مجلس الوزراء

بالقانون رقم ١٢٥٧ لسنة ٢٠١٤

رئيس مجلس الوزراء

بعد الاطلاع على الدستور المعدل الصادر فى الثامن عشر من يناير ٢٠١٤ ؛

وعلى القانون رقم ١٢ لسنة ١٩٧٦ بإنشاء هيئة كهرباء مصر ؛

وعلى القانون رقم ١٦٤ لسنة ٢٠٠٠ بتحويل هيئة كهرباء مصر إلى شركة مساهمة مصرية ؛

وعلى قرار مجلس الوزراء بجلسته رقم ٣٧ المنعقدة بتاريخ ٢٠١١/١١/٢٧ بالموافقة على مقترح وزارة المالية فيما يتعلق بترشيد دعم الغاز والكهرباء ؛

وعلى قرار مجلس الوزراء بجلسته رقم ١١ المنعقدة بتاريخ ٢٠١٢/١١/٢١ ؛

وبناءً على ما عرضه وزير الكهرباء والطاقة المتجددة ؛

وبعد موافقة مجلس الوزراء ؛

قـرر :

(المادة الأولى)

تزاد أسعار بيع الطاقة الكهربائية تدريجيًا لمدة خمس سنوات اعتبارًا من ٢٠١٤/٧/١ و٢٠١٥/٧/١، ٢٠١٦/٧/١، ٢٠١٧/٧/١، ٢٠١٨/٧/١، وذلك وفقًا للتعريفة المحددة بالجداول المرفقة .

(المادة الثانية)

ينشر هذا القرار فى الجريدة الرسمية .

صدر برئاسة مجلس الوزراء فى ١٩ رمضان سنة ١٤٣٥ هـ

(الموافق ١٧ يولية سنة ٢٠١٤ م) .

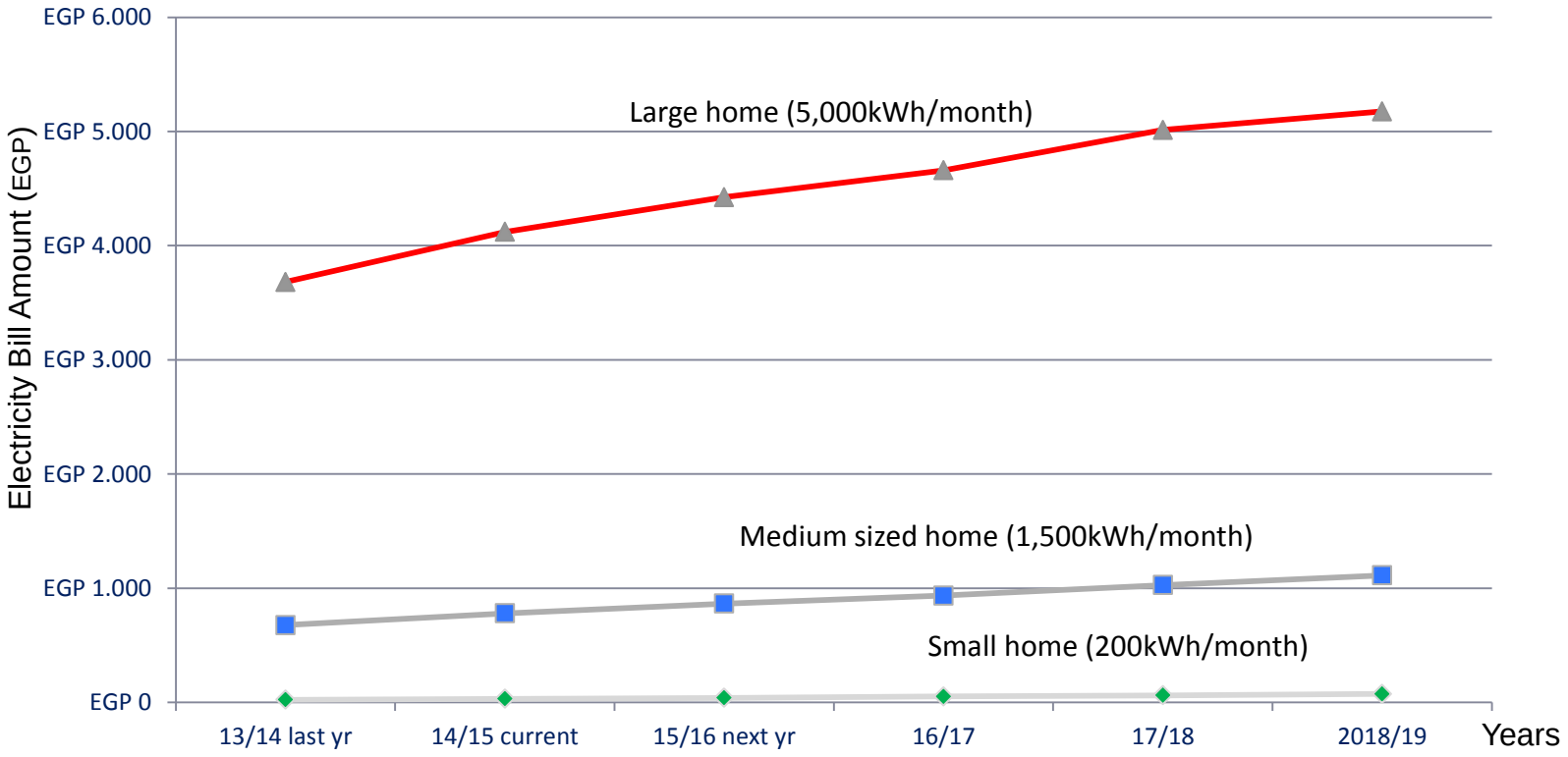
رئيس مجلس الوزراء

مهندس / إبراهيم محلب

Ministry of Electricity announced that subsidies on electricity prices will be phased out over the next 5 years.

Egypt's Energy Policy Reform

Projection of effect of subsidies cut down on household monthly billings



Egypt's Energy Policy Reform

جمهورية مصر العربية
وزارة الكهرباء والطاقة المتجددة

تعريفة التغذية الكهربية
لإنتاج الكهرباء من مصادر الطاقة المتجددة
٢٠١٤/٩/٢٠

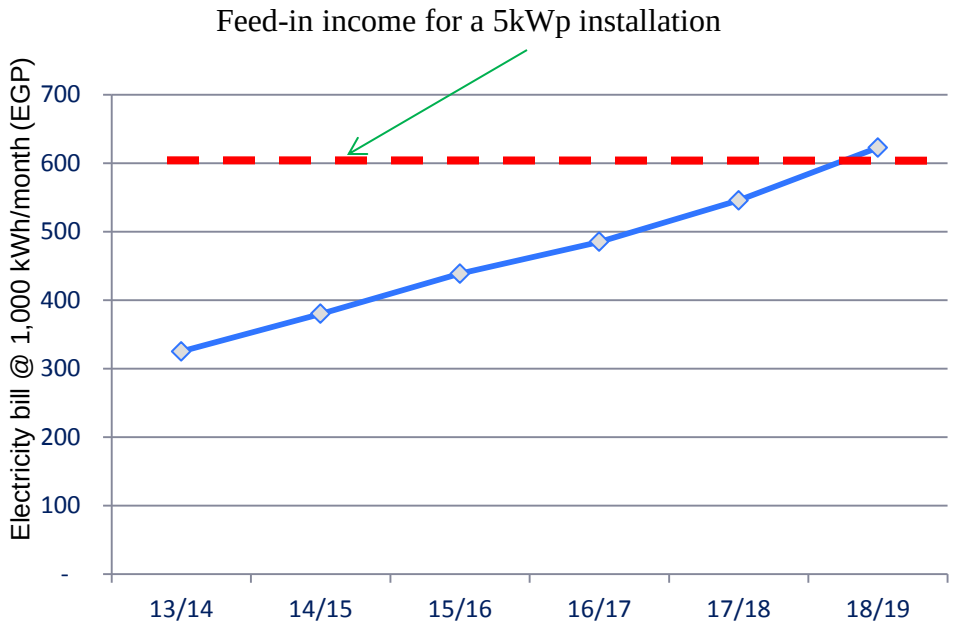
ويوضح الجدول التالي سعة المحطة وما يعادلها من تكلفة إستثمارية وتكلفة
المطبقة حالياً والضريبة المطبقة في كل حالة وقيم تعريفة التغذية التي تم الموافقة عليها من مجلس

قدرة المحطة	التمويل	التعريفة المقترحة (قرش/ك.و.س)
(منزلي)	ذاتي أو تمويل بشروط ميسرة من وزارة المالية (فائدة ٤%)	٨٤,٨ قرش/ ك.و.ساعة
أقل من ٢٠٠ ك.و.	ذاتي أو تمويل بشروط ميسرة من وزارة المالية (فائدة ٤%)	٩٠,١ قرش/ ك.و.ساعة
من ٢٠٠ك.و. حتى ٥٠٠ ك.و.	تمويل محلي بالعمله المحلية بشروط ميسرة من وزارة المالية (فائدة ٨%)	٩٧,٣ قرش/ ك.و.ساعة
من ٥٠٠ك.و حتى٢٠ ميجاوات *	تمويل أجنبي	١٣,٦ دولارسنت/ك.و.ساعة (او ما يعادل ٩٧,٣ قرش/ك.و.س)
من ٢٠ م.و. حتى ٥٠ م.و.	تمويل أجنبي	١٤,٣٤ دولارسنت/ك.و.ساعة (او ما يعادل ١٠٢,٥ قرش/ك.و.س)

Installed Power (kW)	Feed-in Tariff/kWh (EGP)
Less than 10 (Residential)	0.848
From 10 to 200	0.901
From 200 to 500	0.973
From 500 to 20,000	0.973
From 20,000 to 50,000	1.025

Feed-in tariff for solar and wind was fixed in Sept 2014 to encourage private investors to purchase solar and RE.

FIT vs. increase in electricity prices



Electricity bill @ 1,000 kWh/month (EGP)

Tiers	13/14	14/15	15/16	16/17	17/18	18/19
0-200	24	32	40	52	62	**74**
201-350	29	36	44	53	68	**83**
351-650	87	102	117	132	150	**165**
651-1,000	186	210	238	249	266	**301**
SUM	**325**	**380**	**439**	**485**	**546**	**623**

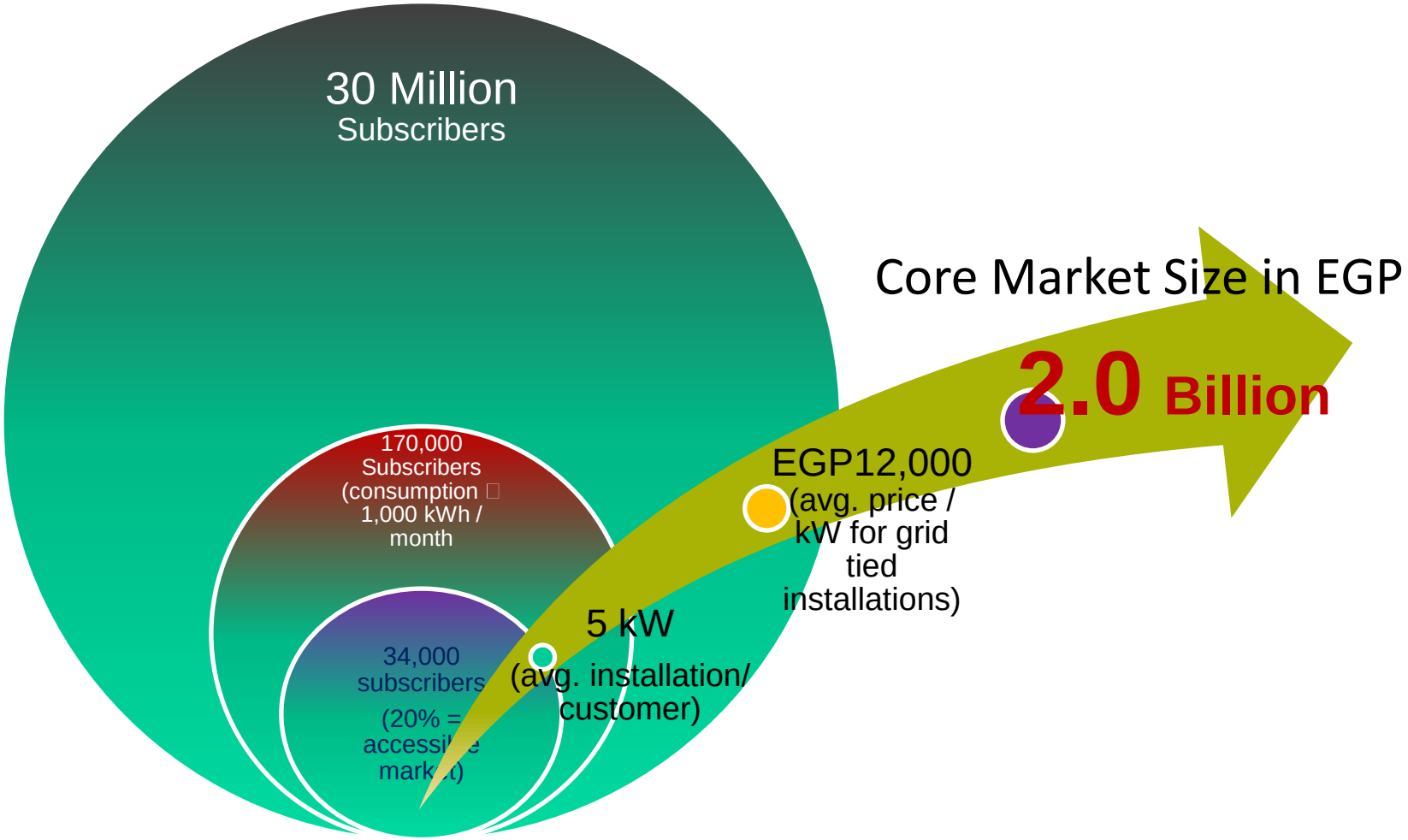
Projection electricity bill for an average house consuming 1,000 kWh/month (2014-2019)

Market insights

- For PV-pumping, for land reclamation ,that is away from Grid: off-grid application.
- For high-end customers, PV grid-tied with backup system.
- For energy-intensive industry, gated compounds, PV grid-tied.

This will of course change when the subsidy decreases and the tariff for conventional energy increases, as then grid-tied would be attractive to normal clients as well, like household.

Opportunity



Opportunity

	# of Subscribers	1st Year Target	# of Potential Customers	kW/ installation	Total kW
Residential	21,087,263	1%	210,873	5	1,054,363
Commercial	1,709,067	1%	17,091	100	1,709,067
Industrial	446,107	5%	22,305	300	6,691,605
Others (Banks, Hotels, etc)	534,350	1%	5,344	500	2,671,750
SUM	**23,776,787**				**12,126,785**

Source: Egypt's Solar Energy Development Association (SEDA)

Economics of grid tied systems

Installed Power (kWp)	System Cost (EGP)	Daily Yield (kWh) @90%	Monthly Yield (kWh)	Monthly Feed In Income (EGP)	Break Even (Months)	Payback Period (Years)	Total income in 25 years (EGP)	Overall ROI	Annual ROI
5	60,000	23.85	716	607	98.89	8.24	182,023	303%	12%
100	1,150,000	477.00	14,310	12,893	89.19	7.43	3,867,993	336%	13%
300	3,300,000	1,431.00	42,930	41,771	79.00	6.58	12,531,267	380%	15%

Procedures

Investor (client) contracts a certified EPC company	• Investor • EPC
EPC Co. prepares technical proposal and submits that to electricity distribution co. who approves/rejects the proposal	• EPC • Electricity Distribution Co.
Investor (client) signs a PPA with Electricity distribution co.	• Investor • Electricity Distribution Co.
EPC manage system installation & commissioning. Electricity distribution co approves the installation.	• EPC • Electricity Distribution Co.

Source: EgyptERA

Feed-In

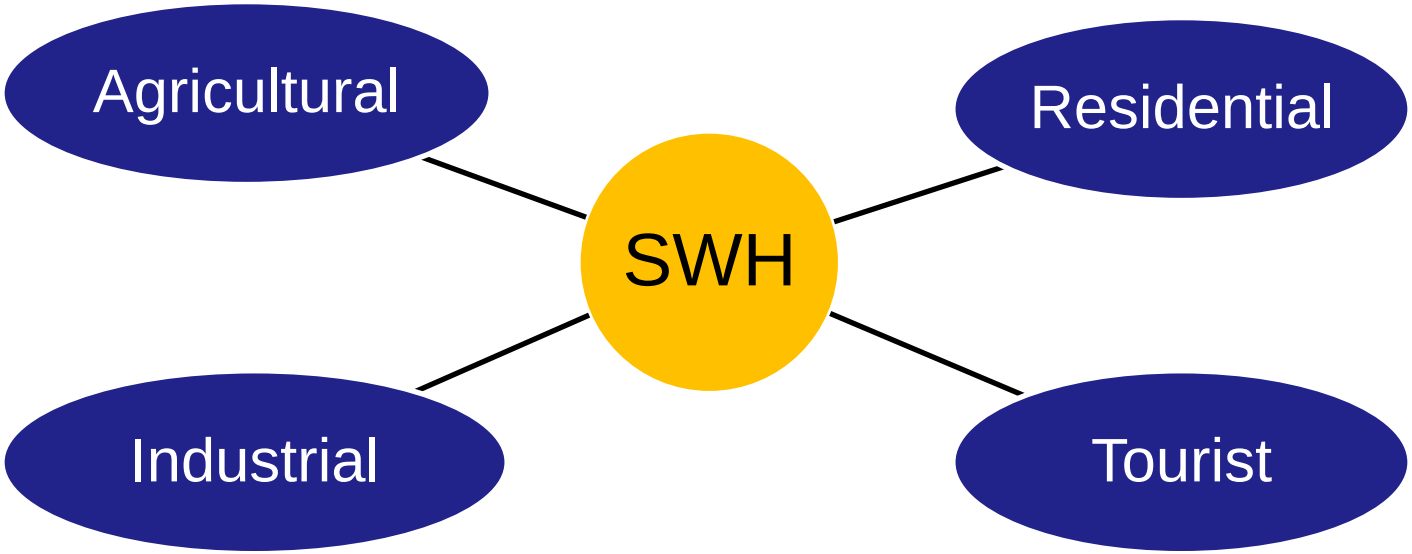
- GoE will purchase the energy generated from PV for 25 years. Flat rate,
- Priority on dispatch, and PPA based on take or pay,
- Provisional soft loans, 4% for residential projects, and projects up to 200kW. Interest 8% for projects between 200kW and 500kW.

Detailed explanatory regulations are still draft, including net metering contracts.

Solar Thermal

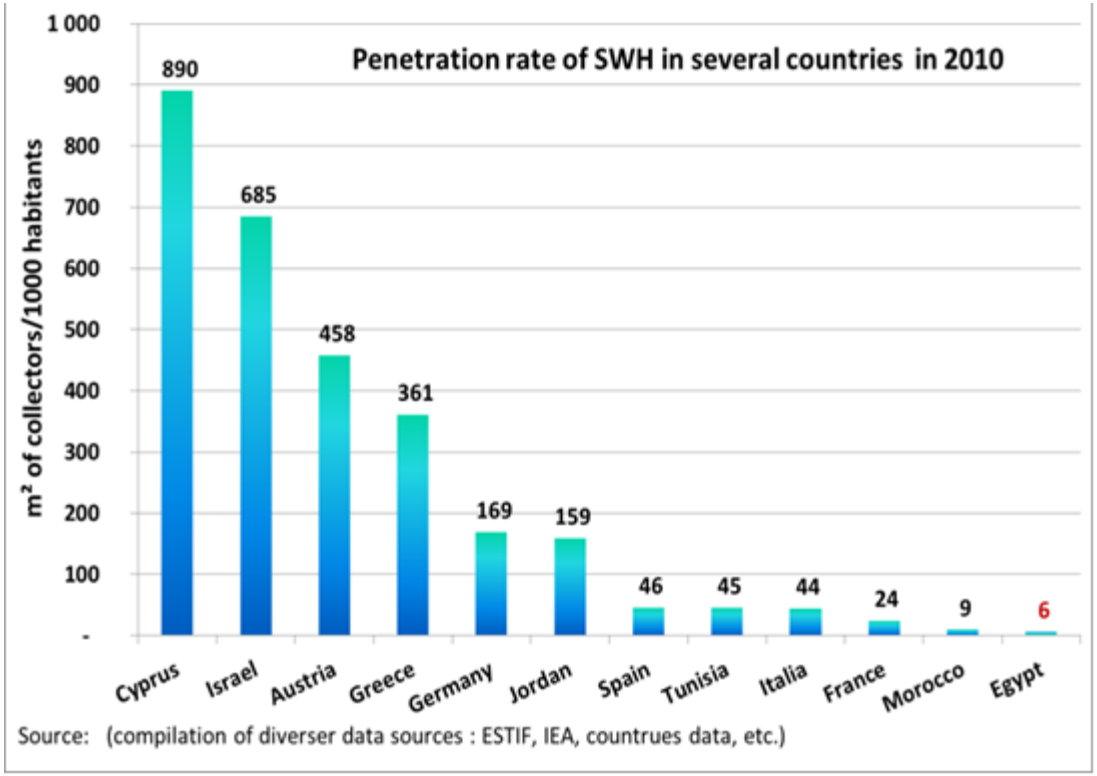
Solar thermal systems Customers - 2011

Solar Water Heaters are used in residential and commercial buildings and tourism. NREA estimates the number of solar water heaters in Egypt at about 400,000 heaters with collectors area at 800,000 square meters.



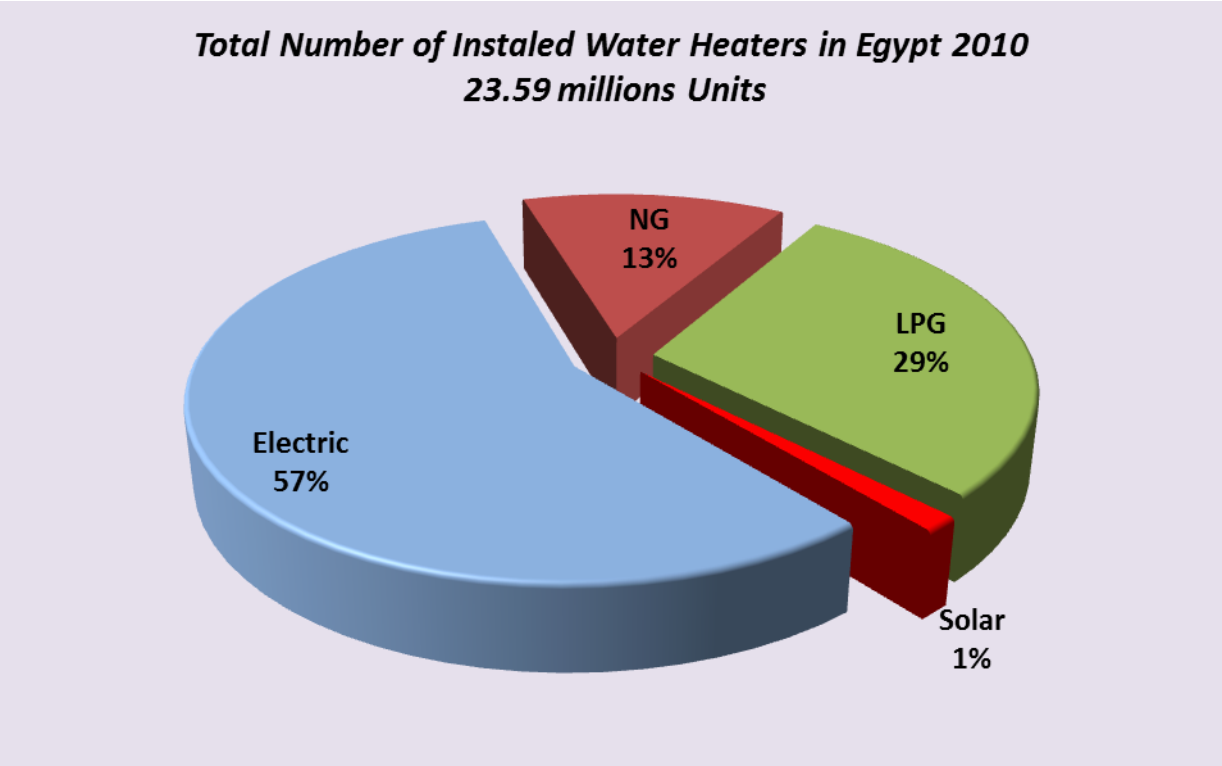
Why Solar thermal in Egypt ?

- 300 million square meters of solar collectors were installed in the world until 2010
- These solar collectors produce 162,125 MWh
- This amount of energy save 17 million tons of oil and 53 million tons of Co2



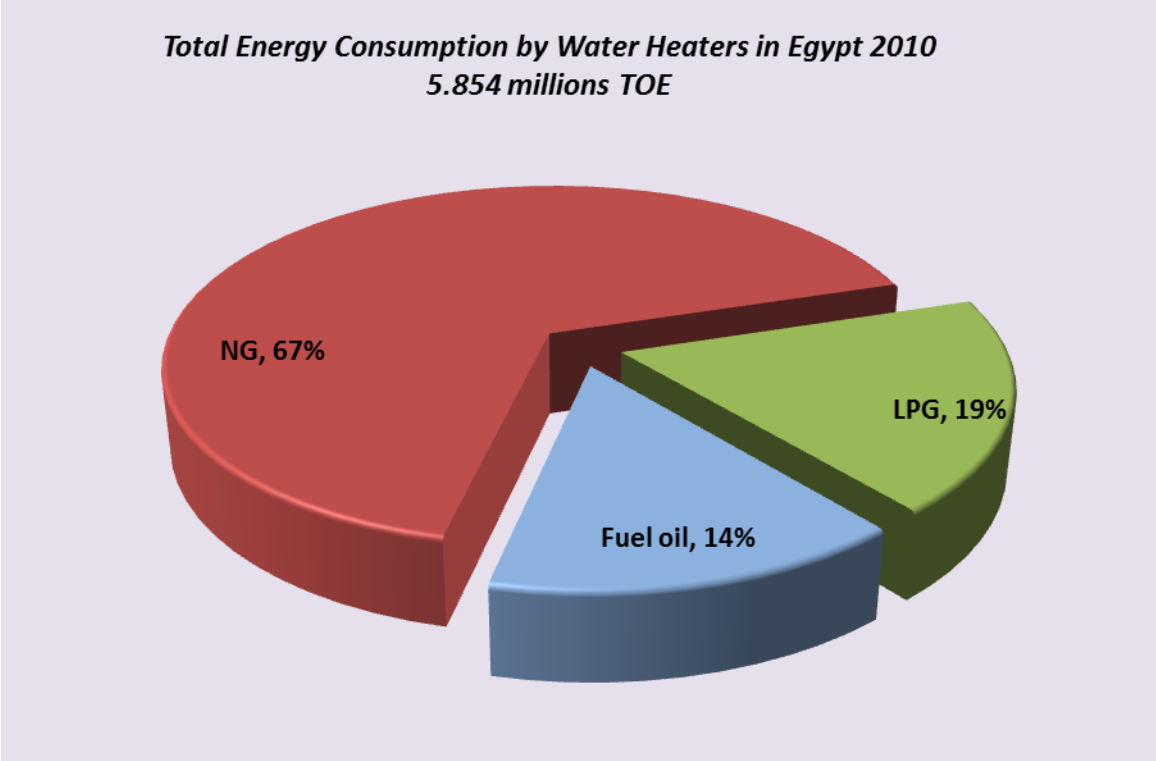
Source : SEDA

Solar Water Heaters & other heaters types



Source : World Bank

Solar Water Heaters & other heaters types



Source : World Bank

Market insights today

Although no complete market sizing or scoping is done, following are some examples that demonstrate actual insightful cases:

Source: SEDA.

Market potential - Residential

NREA is preparing a financing scheme, with the objective of replacing electric water heaters with solar (estimated as 7 Million units).

Source: SEDA.

Residential sector

Source : psdp-egypt.info

Source : ainnews.net

Market potential - Industrial

Market size for the low-temprature solar thermal application is estimated as 4.5 GWh/a, with a collector area of 4.6 mil.m^2.

Main industries:
- chemical industries, 1.47 mil.m^2,
- tourism, 1.42 mil.m^2,
- food 0.94 mil.m^2,

Source, IFC 2014.

Few pilot projects are installed by EPC companies, for pre-heating of boilers.

Industrial sector

Source : World Bank

Parabolic trough solar concentrators producing 170℃ process steam in El Nasr Pharmaceutical Co. in Egypt

Market potential – Tourism

Ministry of Treasury tentatively approved the co-financing of replacing 50,000 electric water heaters, at hotels.

Source: SEDA.

Tourism sector

Source : Egreen

Source : Egreen

Source : Egreen

Tourism sector & Egysol

- **The Solar Water Heating System Facility in Egypt for Hotels Project :**
  - The project is implemented within the framework of cooperation between the Egyptian government, the Italian government and UNEP.
  - The project was financing of the spread of solar heaters at the hotels and tourist villages at Red Sea and South Sinai governorates.
  - Total value of 500 thousand dollars.
  - Subsidies up to 25% of the cost of the system and support O&M for a four years.

Source : EGYSOL & UNEP

Tourism sector & Egysol

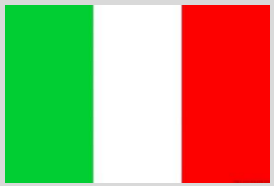
- **The Solar Water Heating System Facility in Egypt for Hotels Project :**

The project targets the following:

- Installation of more than 5,000 square meters of solar heating systems for water.

- Save about 4,000 tons of oil equivalent.
- Reduction of about 12,000 tons of CO_2 annually.

- 1130 square meters of solar collectors in 11 hotels, are installed. (as seen 2014)



Source : EGYSOL & UNEP

Market potential – food

Few projects exist, in the filed of pre-heating of boliers, in the order of few hundred square meters.

No clear market sizing.

Source: SEDA.

Market potential – Agriculture

Few projects exist, in the filed of drying, and water pre-heating.

No clear market sizing.

Source: SEDA.

Agricultural sector

Source : Egreen

Source : Egreen

Source : Egreen

Governmental Mega Solar Thermal projects

- Kuraymat combined cycle Power Plant, with Solar Thermal island integrated.

Capacity of Solar portion (MWe) 20

Net electric energy (GWhe/a) 852

Solar electric energy (GWhe/a) 33

Solar share 4%.

Source: New and renewable Energy Authority NREA.

Governmental Mega Solar Thermal projects

- Kom-Omb 100 MW - CSP.

3.5 km2, parabolic trough.

Source: New and renewable Energy Authority NREA.

Market Volume - 2011

- In total, the national market turnover in 2011 is estimated to around USD 17 million,
- Share of imported products to the total sales reached 20%.
- 90% are flat-plate collectors.

Source : www.teksam.dk

Thank you.