US TREASURY INTERNATIONAL PROGRAMS

LIBYA

"With downside risks still threatening the global economic outlook, MDB assistance to poor and emerging economies also means preserving and advancing the interests of U.S. business and American workers of companies that trade and invest in these countries."

Henry Kissinger, Lee Hamilton, Brent Scowcroft, William Cohen, Charlene Barshefsky and other members of the Bretton Woods Committee Joint Letter to Congressional Leaders.

October 4, 2011

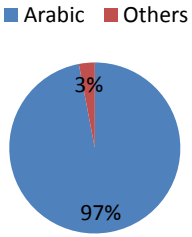
COUNTRY PROFILE

Population:	5613380
Density:	3,7 (per squared km)
Migration Rate:	0 migrant(s)/1,000 population
TFR:	2.12 children born/woman
IMR:	19.34 deaths/1,000 live births
% Urbanized:	0.78
Life Expectancy:	77.83 years
Rank:	61
AIDS Rate:	10000
Rank:	75
Literacy Rate:	89,2 %
Languages:	Arabic, Italian, and English are all widely understood in the major cities Berber
Religions:	Sunni Muslim (official) 97%, other 3%

Geography

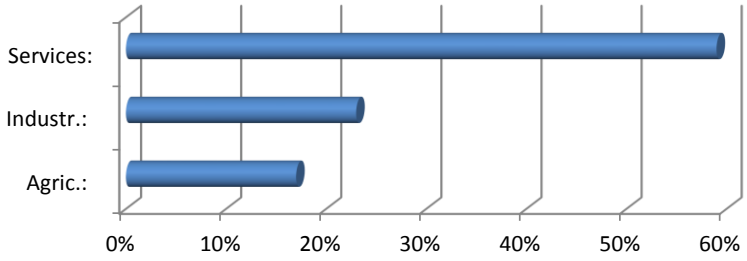
Region:	North Africa
Area (square mi.):	1,759,540 sq. km brder countries
Climate:	Mediterranean along coast; dry, extreme desert interior
Arable Land:	1,03%
Capital City:	Tripoli
Top 3 Cities:	Banghazi, Sabha, Misratah

ETHNICITY



Political:	Transitional Government		
Legal System:	NA		
Freedom House:	6		
Pol.rights score:	7		
Civil rights score:	7		
Freedom Index	38.60/100		
CPI:	2.0/10	**World Rank:**	168
Economy:	Libyan Dinar (LYD)		
GDP (ppp)	$37.97 billion	**World Rank:**	101
GDP (ppp) p.c.:	$14,100	**World Rank:**	90
HDI Status:	High	**HDI World Rank:**	64
Labor % :	1.16 million	**Unempl.:**	0.3

Labour allocation (%)



OVERVIEW

The 2011 has been for Libya and its economy a difficult year: its own citizens have had to fight with the former dictatorship and then after a tough struggle they are trying to rebuild what they have lost. From an economical point of view we can observe a significant contraction of with GDP by an estimated 60 percent. The civil war disrupted normal economic activity and as a result the oil producing sector rapidly has decline. With the gradual improvement of the political and security situation, the economy has stabilized and is expected to recover by the end of the 2012 with a year-to-year growth rate of over 75 percent.

Due to the fact that civil war had disrupted supply lines the results were shortages of food, fuel, medicines and other essentials, affecting the food security situation of a large number of people. The freezing of the country's assets impacted on the country's levels of liquidity. Accordingly, the rate of inflation has increased to over 14 percent in 2011, compared to 2.5 percent in 2010. With imports resumed to almost normal levels, the rate of inflation is expected to ease although an upward pressure on prices from housing and transportation shortages is likely.

Nevertheless the transitional Government efforts on structural reforms, the unemployment rate – estimated at 30 percent as of end-2011 – is likely to remain elevated.

A GREEN LIBYA

Albeit the contest, there are some programs or projects able to improve the dramatic situation.

Longer term projects and recovery activities could help to restore a little Libya's economy. In this respect, what we want to show you is a natural resource of Libya that one can exploit in the framework of renewable energy: the silicon, used in photovoltaic cells production.

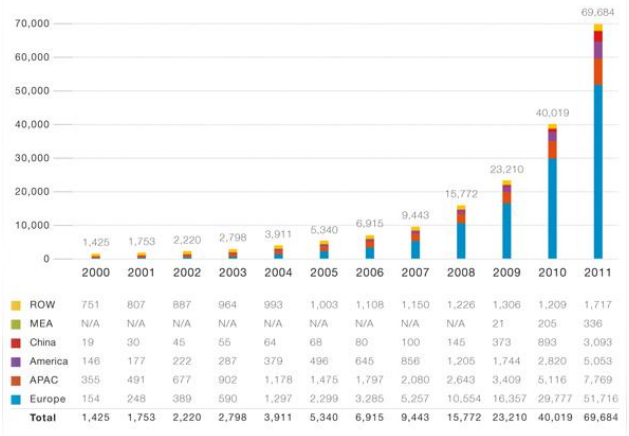


Figure 1 – Evolution of global cumulative installed capacity 2000-2011

1. Photovoltaic industry worldwide

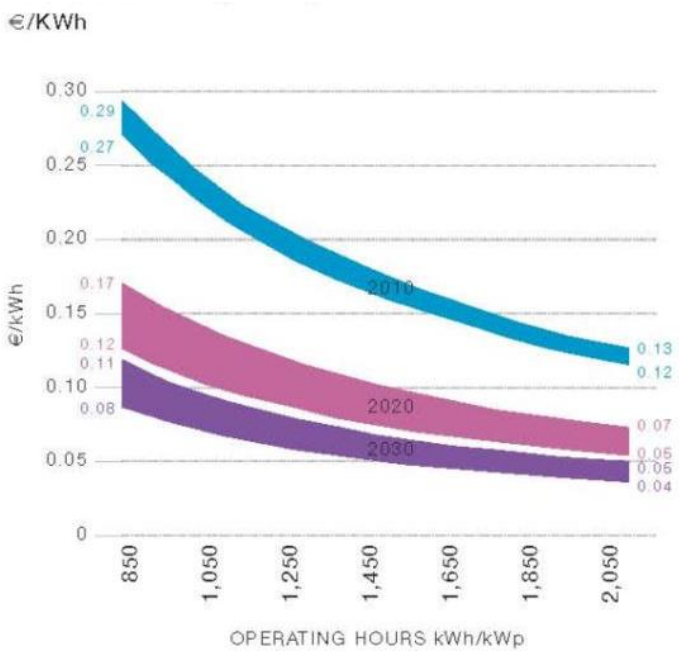


Figure 2- Levelised costs of electricity

Photovoltaic cells industry is one of the fastest growing sectors in the current world economy.
The industrial production of photovoltaic cells has a growth rate which goes over the 50% year-to-year rate since 2006. There are countries, such as Europe, US, Japan, Taiwan, that are making the bigger capital investments in photovoltaic. These investments have created in the 2007, 7.7 GWP of installed photovoltaic cells that have produced 1.5 million of houses with photovoltaic roofing.
What is likely one can do is to seek for more information about this sector.
In the last thirty years, photovoltaic costs have sharply decreased. The cell costs is decreased about of the 22% for every doubling of installed capacity.

Consequently, also solar energy creation costs have decreased.
According to a world-wide perspective we can say that today in Europe kwh costs fluctuated between $ 0.19 and $ 0.37, considering the lower value characteristic of a South location with a sun exposition year of 1650 hours, and an available year-energy equal to a 1900 kWh/m^2 whilst the higher value is typical of Scandinavian venues with about 850 h of sun and with an availability of solar energy of 1000 kWh/m^2.
Lower than European price there are the North-Africa and middle-East areas, where the kWh decreases till $ 0.15 and sun exposure rises till 2200 kWh/m^2. Projections foresee further decrement of photovoltaic electricity cost. This is because of favorable factors such as innovation technology, the optimization of the production process, scale economies, the rise of the ratio performance, the breadth of the PV system lives. We also have to underline that photovoltaic energy, in the south, is already competitive with the bulk power . The grid parity is almost available.

2. The Libyan investment

The mineral we are dealing with ids the Libyan Desert Glass that is silica-rich; the percentage of silicon dioxide is 96.5 to 98 and it is used for producing photovoltaic panels. One can find it above all in the Gulf of Kebir.
Libyan Desert Glass (LDG) is a naturally occurring glass made of silica (silicon dioxide), and generally found in the Libyan Desert - the Western Desert of west Egypt, widely scattered along the Libyan-Egyptian border (the Great Erg). Scientists say the glass is the largest known deposit of a natural silica glass on the planet Earth (about 98% SiO2). The transparent-to-translucent pieces are

clear-to-opaque white or yellow-to-green in colour, which glitter like gems in the bright desert sun. They vary in size from small pieces to large chunks weighing up to 16 pounds. Crystalline silicon cells are made of silicon atoms connected to one another to form a crystal lattice. This lattice comprises the solid material that forms the photovoltaic (PV) cell's semiconductors. This section describes the atomic structure and bandgap energy of these cells.

For producing photovoltaic cells there are three important points, and you have to remember that a cell can conserve for a long time the maximum power output. First of all it is need to begin from a careful attention to the raw material, that is the silicon. Secondly it has to have a right fusion of the mineral and purification to shaping silicon bars. Third the use of an excellent tempered glass, with a correct millwork temperature and a high quality junction box upon solar panel.

2.1 Market attractivenesses

The governmental budget for 2012 is 68.5 billion dinars ($52.7bn) according to a statement from Prime Minister El-Keib's office in February. Oil accounted for over 80% of the former government's income, and given that there are plans to raise production and considering the $180bn of frozen funds abroad awaiting release, it is well within financial possibility for an alternative energy industry development program to take place parallel to reconstruction.

Let us see what market attractiveness will be, considering that new entrants and existing PV suppliers in the Libyan Solar Power industry have some attractive parameters, such as solar photovoltaic manufacturers and solar installers.

As far as concerning the first point, one have to know is that with the competition from local players and imported panels from China, the market will become very competitive for module manufacturers. However, by optimizing the costs, utilizing Government subsidies and selling panels at competitive prices, both locally and abroad, the profits are expected to be lucrative.

In the respect of the second point, the choice for panels are multiple, with different technologies like monocrystalline/ polycrystalline/ thin-film, and a large number of suppliers are willing to offer lower prices. Even if a lot of studies say that the most competitive production technology is the silicon ribbon one. In fact this kind of method allows a better use of the materials, lower energy costs and in an ideal case the energy payback time would be reduced from 3-5 to 1-2 years.

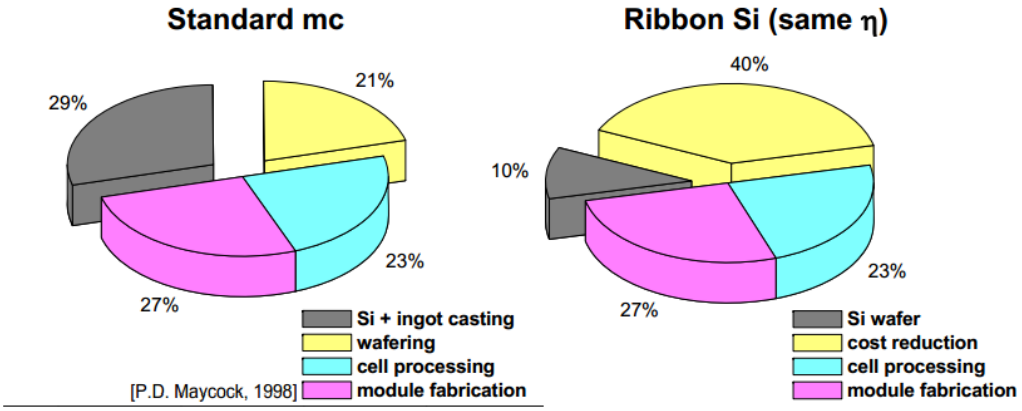


Figure 3 – Silicon PV trends_Choise from panels producted with different technoligies

2.2 Market weaknesses

The photovoltaic market deployment is, to a large extent, dependent on the political framework of any given country. Support mechanisms are defined in national laws. The introduction, modification or fading out of such support schemes can have profound consequences on PV industries. PV market forecasts therefore depend on a deep understanding of the political framework. Due to its close contact with key entrants in the industry, with national PV associations and its deep knowledge of PV policy and support schemes.
What we have to analyse, on a country basis, are the historical development of the PV market, existing support policies, their attractiveness and expected developments, administrative procedures in place, national renewable energy objectives and the potential for solar PV.

3. Final considerations

All things considered Libya can be identified as a place with high potentiality which can be used in different applications for renewable energy production: from the photovoltaic cells production to the use of a stand-alone PV power supply in some contexts water pumping. It would be also a way to give the possibility to local people to buy at a low cost the panels and, some studies, said that social changes have been noticed in the villages which have been electrified. Investments in new production capacities will only take place if the PV demand increases as expected by the industry, which supposes, among others, the putting in place of appropriate policy frameworks for PV, low administrative barriers, a lack of reforms in the infrastructure field and easy procedures to connect PV to the grid. Till that day, investments in this sector, are not indicated.