

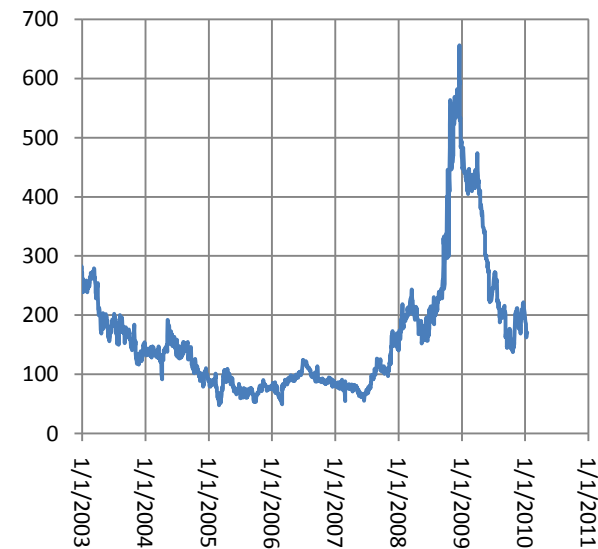
# **Power Sector Vulnerability Assessment**

**Impact of the Credit Crisis on  
Investments in the Power Sector:  
the Case of Tunisia**

# Macro Update on Crisis: Moderate Impact...

- The effects of the global crisis on Tunisia's economy are real but remain relatively moderate:
  - GDP started to slow down at the end of 2008, resulting in a 4.5% growth, against 6.3% in 2007
  - Expected GDP growth will be around 3.0-3.5% in 2009, instead of 5-6% initially planned
  - Growth would rise to a 3.5-4.0% range in 2010, and back to the 5-6% trend from 2011 on
- Exporting industries, including textile, footwear, electrical engineering, mechanical engineering, etc., have been the most impacted: exports declined by over 20% in the first half of 2009
- Tourism and workers' remittances were also impacted, but showed resilience
- The agriculture (about 10% of the GDP) will benefit from favorable climatic conditions
- As an illustration of the moderate impact of the crisis on Tunisia, the country's sovereign spread briefly increased to over 600bp in December 2008, but is now back to below 200bp. Similarly, the main agencies reaffirmed the investment grade rating of Tunisia (BBB/Baa2\*), with stable outlook
- One particular issue for the Tunisian economy in general, and future power demand in particular, lies in the few "mega-projects" announced by investors from the Gulf before the crisis (Sama Dubai-Tunis Lac Sud, Boukhater-Tunis Sports City, Cité des Roses, Zone Balnéaire de Korbus, Port Financier de Tunis, etc.). Significant delays are expected for a number of these projects, and cancellations are possible, but it is very difficult at this point to predict what will really happen and what the actual timetable will be

**Tunisia: Sovereign spread**  
(basis points over US Treasuries,  
source: WB)

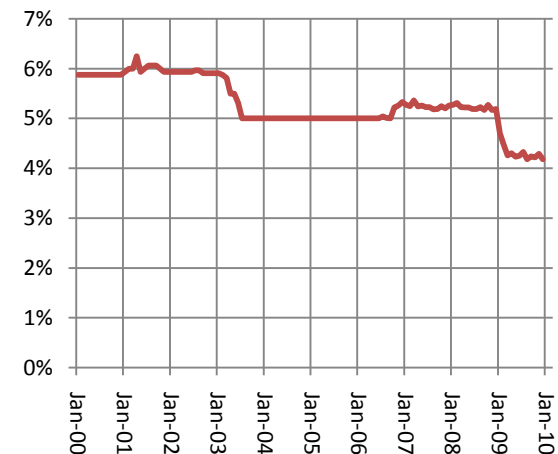


\* Standard & Poor's/Moody's

# ...Quick Public Action...

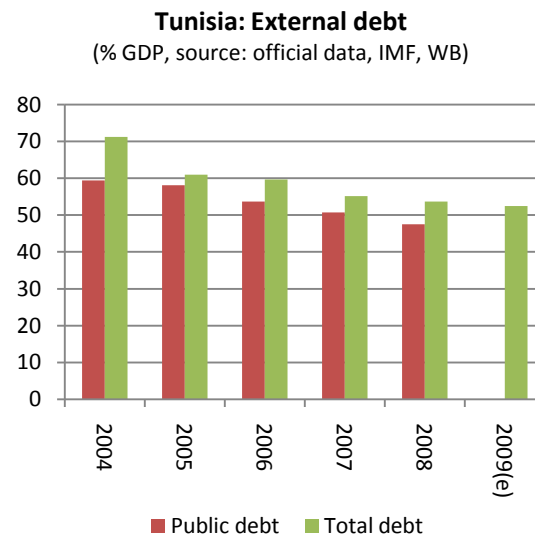
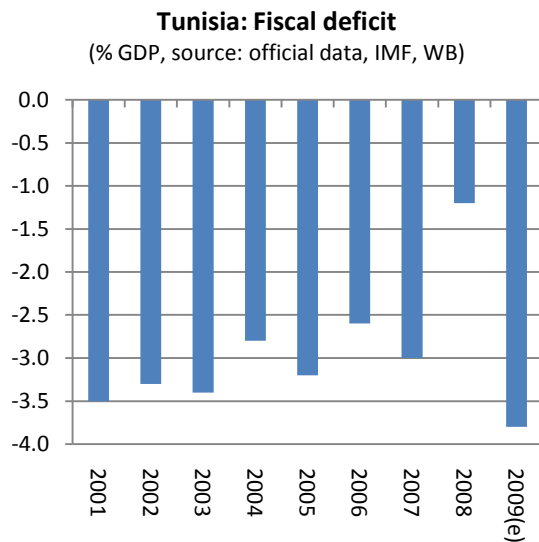
- The government took quick action to support the economy, with a macro stimulus package and direct support to certain affected sectors and agents (notably exporting firms)
- Fiscal measures include a 20% increase in public investment. Additional spending of TND 700m was approved by the parliament in July 2009, to be directed toward infrastructure projects from 2010 on
- Monetary measures include easing of the policy rate (TMM) by the central bank: almost 100bp during the first quarter of 2009 (see graph)
- Other measures include a number of reforms intended at facilitating business and foreign trade (trade tariffs, norms, business registry, urban code, financial sector, service sector, etc.)
- The government also decided to reduce domestic debt financing and increase external borrowing from official sources, in order not to crowd out the private financial sector in Tunisia. In the first half of 2009, Tunisia raised USD 600m from official sources, including USD 250m from the World Bank, for an Integration & Competitiveness DPL

Tunisia: Reference interest rate (TMM)  
(source: BCT)



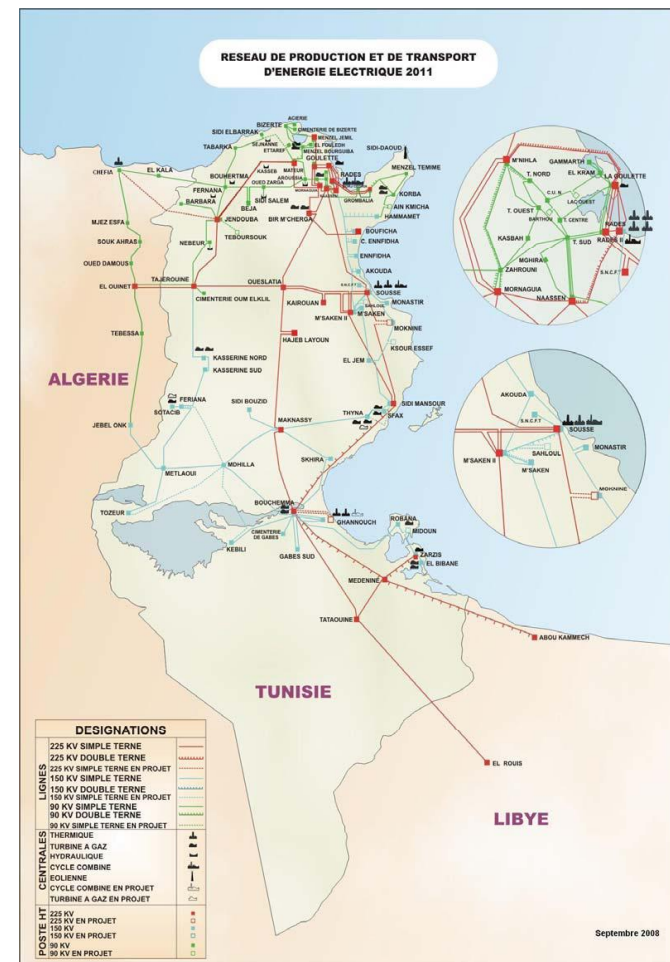
# ...And Preserved Fiscal Space

- The fiscal position improved in 2008:
  - The fiscal deficit fell from 3.0% in 2007 to 1.2% of GDP
  - The public debt ratio declined from 50.7% to 47.5% of GDP
- The fiscal deficit is expected to reach 3.8% of GDP in 2009, which remains acceptable in the current global economic:
  - Expenditure will be boosted to support the economy
  - However, growth of fiscal revenues should remain slightly positive
  - In addition, subsidies will be slightly reduced, thanks to the decline of world commodity prices
- The government intends to continue its proactive public debt management. Once the crisis subsides, fiscal consolidation is expected to bring back the public debt-to-GDP ratio to a declining path
- The external position of Tunisia remains comfortable, with reserves level of USD 9.5bn at end July 2009, i.e. around 4.2 months of imports



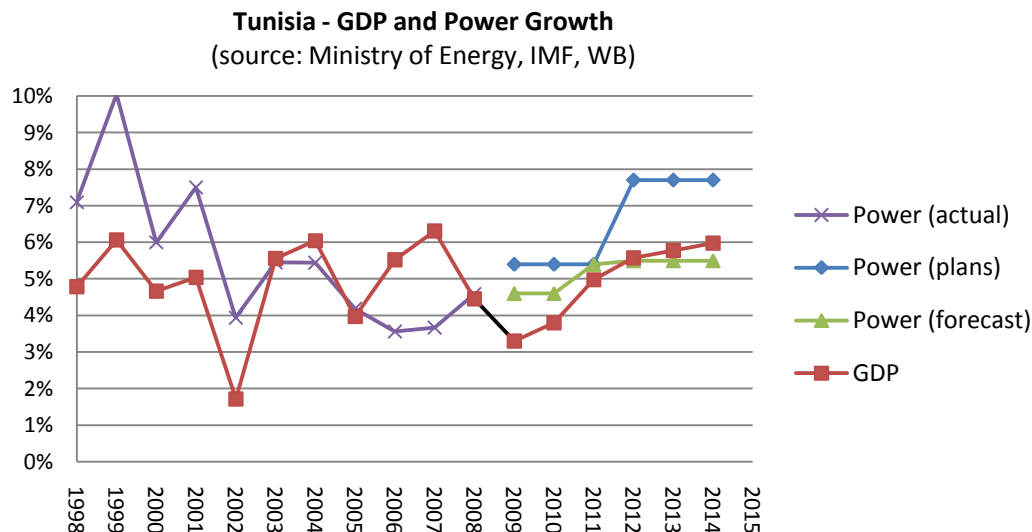
# Power Sector Structure: A Dominant Utility, a Major IPP

- According to law 96-27, introduced in March 1996, private operators are entitled to produce electricity under public concessions
- The vertically integrated utility Société Tunisienne de l'Electricité et du Gaz (STEG), which was established in 1962, still generates approximately 70-75% of Tunisia's power, and has a monopoly over transmission and distribution (of electricity and gas)
- Tunisia's first and main independent power producer (IPP) is a 471 MW combined cycle gas turbine (CCGT) plant, owned and operated by the Carthage Power Company (CPC), in Radès. It was commissioned in 2002. CPC is owned by Marubeni and BTU Ventures, a private equity group
- The second and only other IPP to date in Tunisia is a small 30 MW gas fired unit, that was commissioned in El Bibane by CME Energy in 2003. It was designed to burn associated gas from an oil field
- STEG's transmission network is connected to Algeria (a new 400 kV line is under construction to reinforce the link). Interconnection with Libya would allow for the possible extension of the synchronous zone with Machrek countries. A link between Tunisia and Italy is also being considered (as part of the Elmed project)



# Demand: Steady Growth Confirmed

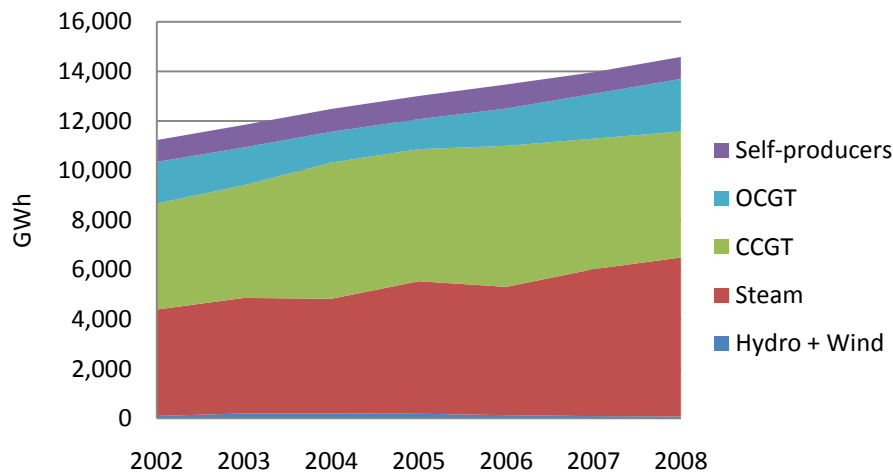
- During the past two decades, the GDP of Tunisia grew by around 5% per year on average
- Power demand grew by more than one percentage point above GDP until 2002 (6.2% vs. 4.8% during 1990-2002)
- In recent years, power demand started to grow at a much reduced pace (around 4.5% p.a.), as a result of the country's efforts to promote energy conservation
- The government's forecast for the 11<sup>th</sup> Development Plan was 5.4% for power demand growth over 2007-2011, in line with GDP trend
- Then, for the 12<sup>th</sup> Plan, for the period 2012-2016, power demand growth was expected to jump at 7.7% p.a., thanks to the mega-projects and the subsequent economic push (housing, tourism, business...) that would have caused the extra 2% of growth over the 11<sup>th</sup> Plan power forecast
- More cautious forecast is currently being considered, taking into account the global economic slowdown and the probable delays in several mega-projects: the trend for power demand growth is more likely to remain in the 5-6% interval



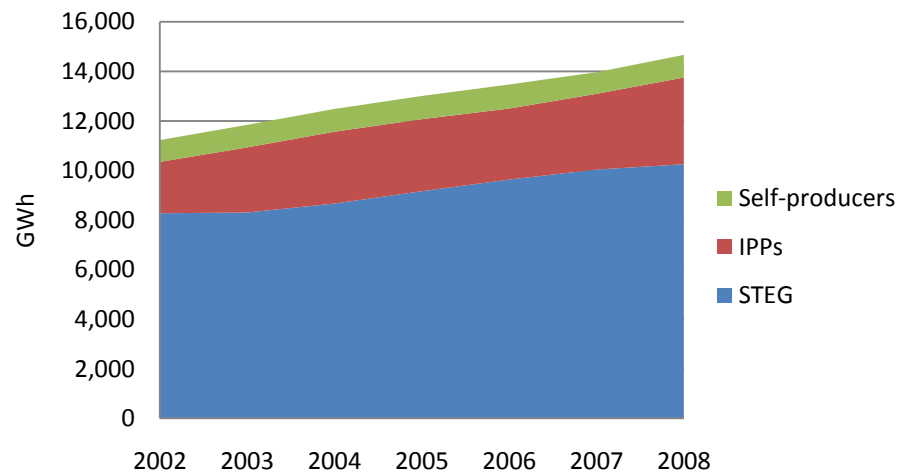
# Generation: Gas Domination

- STEG accounts for a little over 70% of local supply, and CTC for about 20%. The remaining 7-8% come mostly from self generators (including cogenerators) , and marginally from El Bibane IPP. Net exchanges with Algeria are very limited
- Natural gas accounts for over 90% of power generation (gas supply is 60% local and 40% from Algeria), most of the balance being heavy fuel oil. Hydropower typically accounts for less than 1% of generation, and wind for less than 0.5%
- Both conventional steam and combined cycle plants represent 40-45% of the electricity delivered to the grid, while open cycle turbines account for 10-15%

Tunisia - Power Supply by Technology (source: STEG)



Tunisia - Power Supply by Producer (source: STEG)



# Capacity: Relatively Modern Fleet

- At the end of 2009, total installed capacity will reach 3.3 GW
- STEG's capacity will be 2.9 GW:
  - About 120 MW based on renewable energies (hydro and wind), everything else gas or oil-fired
  - 1,100 MW of conventional baseload steam cycle units, in Sousse (gas) and Radès (two plants, one fuel oil-fired, one natural gas-fired)
  - One combined cycle baseload plant in Sousse (400 MW)
  - Several open cycle mid merit and peaking gas turbines, totaling 1,300 MW and including 5 recently commissioned 120 MW machines (Thyna 1 in 2004, Feriana 1 and La Goulette in 2005, Thyna 2 in 2007, Feriana 2 in 2009)
- The two gas-fired IPPs account for just under 0.5 GW:
  - Carthage Power (471 MW)
  - El Bibene (27 MW)

Capacity (2009)	MW	
<b>STEG</b>	<b>2,851</b>	
Hydro	62	
Steam	1,090	Sousse A, Radès B, Radès Fuel
OCGT	1,280	
CCGT	364	Sousse CC
Wind	55	Sidi Daoud
<b>IPPs</b>	<b>498</b>	
Carhage Power	471	CCGT
El Bibane	27	OCGT
<b>Total</b>	<b>3,349</b>	



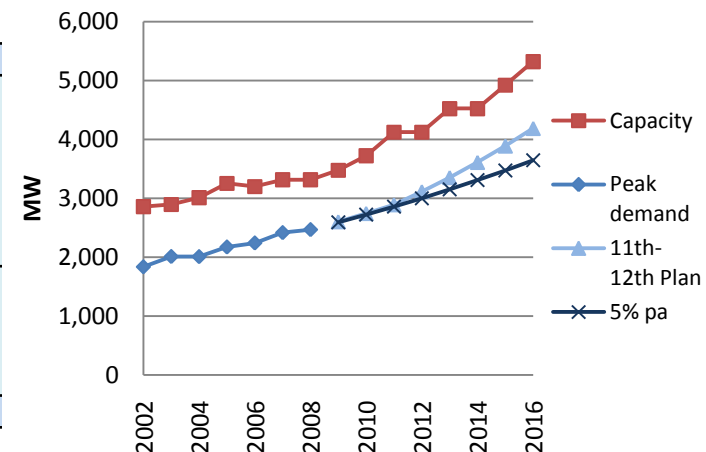
# Generating Investment Plan: Ambitious Program

- Tunisia’s reserve capacity is adequate, but demand is growing steadily, so capacity will have to keep up
- One 120 MW OCGT to be commissioned in 2009 (Feriana 2)
- Another, identical OCGT in 2010 (Thyna 3), together with two wind farms near Bizerte, totaling 120 MW (Kchabta and Métline, financed by Spanish soft loans and local banks)
- Beyond 2010:
  - Two major Steg projects: Ghannouch (400 MW CCGT, under construction, 2011) and Sousse (400 MW CCGT, 2013)
  - A new IPP planned in Bizerte (400 MW CCGT, 2014-2015)
  - The Elmed project, with a domestic component of 400 MW (CCGT or coal), would come on line around 2016
- This program is based on the 11<sup>th</sup> and 12<sup>th</sup> Plans growth rates for demand (5.4% p.a. to 2011, 7.7% p.a. for 2012-2016). It implies approximately 150 MW p.a. of new capacity to 2011, and 270 MW p.a. thereafter
- In STEG’s initial projections, the mega-projects would have accounted for an additional 1,000 MW of demand in the next 5-7 years, so that total needs for the country reached almost one 400 MW CCGT per year in total
- Taking into account slower deployment of the mega-projects, one can assume, as already stated, that demand growth will stay around 5-6% per year, i.e. just below 200 MW per year, or one standard 400 MW CCGT every two years
- In summary, Tunisia’s investment plan for new generation is well suited to demand forecast, with some flexibility that would allow reasonable delay in project development

Tunisia: New Capacity (source: STEG)

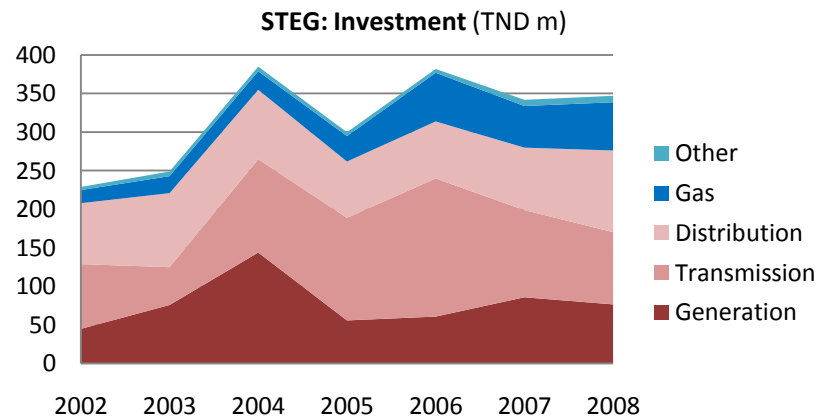
MW	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
<b>STEG</b>														
Hydro														
Steam				-55										
CCGT								400	400					
OCGT		118	241		117		126	126						
Wind	9					36		120						
<b>IPPs</b>														
Existing IPPs	27												400	
Bizerte													400	
Elmed (domestic tranche)														400
<b>Total</b>	<b>36</b>	<b>118</b>	<b>241</b>	<b>-55</b>	<b>117</b>	<b>36</b>	<b>126</b>	<b>246</b>	<b>400</b>	<b>400</b>	<b>400</b>	<b>400</b>	<b>400</b>	<b>400</b>

Tunisia - Power Sector Balance



# STEG: Accelerated Investment

- Although the financial situation of STEG is formally acceptable (in terms, for instance, of debt/equity or debt/EBITDA ratios), the company heavily relies on subsidies, as tariffs are far from covering costs (even in the Tunisian context, where internal gas prices are lower than international prices)
- Investment is however planned to accelerate in the years to come, at USD 500m (TND 700m) per year to 2016 according to STEG (including gas):
  - Average 2004-2008: TND 350m
  - About USD 450m (TND 600m) per year to the end of the 11<sup>th</sup> Plan (2011)
  - About USD 550m (TND 800m) per year during the 12<sup>th</sup> Plan (2012-2016)
- The expected increase is mainly due to needs for new capacity. Transmission and distribution (T&D) investment could be limited if necessary, after a phase of significant spending in the past few years:
  - Only TND 70m per year on generation over 2005-2008
  - TND 215m per year on T&D over the same period. This was partly financed by the EIB, through a 2002 EUR 150m loan. A new USD 66m loan was recently approved by the AfDB for further improvement of the Tunisian power grid
- The Ghannouch plant, a EUR 400m project, is being financed mostly by donors (EIB, AFESD). Amounts they lent are higher than initially expected, due, besides lower STEG/budgetary financing, to much higher EPC cost than anticipated
- The Sousse project will be in every aspect comparable to Ghannouch. It should be financed by donors (EIB, AFD, IsDB, etc.), probably with local banks, without international banks, and probably without ECAs. Selection of the contractor is expected by late 2009-early 2010
- More generally, STEG can count on a variety of international sources of finance, and no shortage is expected: IFIs and bilateral donors, ECAs, Arab funds



# Private Sector: Two Major Projects

- Over a decade after Carthage Power, two new major IPP projects are being launched, Bizerte and Elmed
- Bizerte:
  - Very similar to Carthage Power: 400 MW CCGT, 20 year PPA, commissioning expected in 2014-2015. The option for another 400 MW tranche is likely to be delayed due the crisis and the reduced demand growth
  - 17 manifestations of interest after the prequalification process, including major developers from Europe, Asia and the Gulf countries, with letters of support from major international banks. 5 bidders have been shortlisted (Marubeni, Mitsui, IP, GDF Suez, Powertek-Siemens), for final selection in 2010. Financial closing is not expected before end 2010, when the impact of the crisis will hopefully be much reduced
  - Prequalification was launched before the crisis. Most bidders have confirmed their interest, as well as most commercial banks. No problem is expected regarding financing, due to the relatively modest size of the project (USD 300-500m) and its good risk profile (Tunisia risk, proven technology, conventional PPA with a well known offtaker)
  - The main issue might be the financial conditions of the banks, which are still constrained. This would have an impact on the PPA price, and therefore on STEG's finances and/or electricity tariffs
  - Donors are being approached (EIB, AfDB, IFC, etc.), and ECAs could be involved, which would help mitigating the financial burden
- Elmed:
  - The project includes two separate components (with potentially separate financings):
    - Subsea interconnection between Tunisia (Cap Bon) and Sicily (400 kV HVDC, 1,000 MW, approximately 200 km)
    - Generation in Tunisia: 400 MW for the domestic market (PPA with STEG), 800 MW for export to Italy (with reserved capacity on the interconnector)
  - Total cost around USD 3bn, commissioning expected in 2015-2016
  - The sponsor will be responsible for the offtake arrangement in Italy and the choice of technologies (coal or gas for the main capacity, renewable component)
  - At this stage, there is some skepticism among international players, if not about the project itself, at least about its timing, not so much because of the financial crisis, but because of the project's complexity and uncertainties. Banks do not expect the project to reach financial close before at least 2-3 years
  - The selection process has been launched for the power plant(s). 16 bidders were prequalified (including Mubadala, Macquarie Capital, Siemens, SNC Lavalin, Edison, Enel, Marubeni, Sumitomo, IP, BG, etc.). The formal RFP is to be issued soon, for final selection of the sponsor by end 2010

# Renewable Energy:

## Tunisian Solar Plan, MENA CSP Scale-Up

- Tunisian Solar Plan (PST):
  - Ambitious plan to develop energy efficiency and renewable energy, recently announced
  - 40 projects identified in solar, wind, biomass and energy efficiency
  - EUR 2.0bn to be invested, including EUR 1.4bn by the private sector
  - Includes Bizerte wind farms (120 MW), together with over 500 MW of additional capacity (cf. table)
- MENA CSP Scale-Up
  - World Bank/AfDB sponsored program to develop 1,000 MW of concentrated solar power (CSP) in the MENA region, with concessional finance from Clean Technology Fund (CTF, up to USD 750m)
  - 3 projects identified in Tunisia, including the Elmed interconnector and a 100 MW CSP component within the Elmed generation complex, as well as the 100 MW CSP plant already in the Tunisian Solar Plan

MENA Scale-Up Tunisian Projects (USD m)	IPP-CSP (100 MW)	Elmed CSP (100 MW)	Elmed Trans- mission
CTF	73	73	40
Other concessional Equity	128	128	0
Commercial/ECA dabt	100	100	100
	150	150	1,000
<b>Total</b>	<b>450</b>	<b>450</b>	<b>1,140</b>

Tunisian Solar Plan	MW	Sponsor	Financing (TND m)			Implemen- tation	Remarks
			Private	Public	Total		
<i>Solar</i>							
Hybrid Concentrated thermal-Gas	150	STEG	0	355	355	2010-14	25 MW solar, 125 MW gas
Concentrated thermal	100	Private	600	0	600	2010-16	Mainly for export, also in MENA Scale-Up (IPP-CSP)
Hybrid Concentrated thermal-Gas	40	Private	98	0	98	2012-14	El Borma gas field, 10 MW solar, 30 MW gas
Photovoltaic	18	Various	118	62	180	2010-14	Off-grid plants
Photovoltaic	10	STEG	0	64	64	2010-16	One large on-grid plant
Photovoltaic	10	Private	64	0	64	2010-16	Small on-grid plants
<i>Other</i>							
Wind	120	STEG	0	360	360	2009-11	Bizerte wind farms
Wind	100	Private	280	0	280	2012-16	One large wind farm
Wind	60	Private	180	0	180	2010-14	Smaller wind farms (self production)
Biomass	26	Private	76	0	76	2010-14	Poultry droppings, landfill gas, etc.
<b>Total</b>	<b>634</b>		<b>1,416</b>	<b>841</b>	<b>2,257</b>		

# Local Banks:

## Cash Rich, Lack of Long Term Finance

- The Tunisian financial sector has not been directly affected by the crisis
- The authorities have continued their long-term strategy of reinforcing the banking sector. For instance, non-performing loans have decreased from 17.6% of total loans in 2007 to 15.5% in 2008. The central bank keeps a 15% target for 2009
- Local banks are cash rich, with a stable level of excess liquidity during the first quarter of 2009 (latest available data). They were able, for instance, to replace international banks and donors in the Hasdrubal financing (an offshore gas field and a USD 400m financing): a project finance scheme was initially contemplated, but the proposed conditions were considered too expensive (over 250-300bp for a 7 year financing, instead of the expected 120-130bp and 10-12 year maturity); local banks provided 5 year corporate finance at around 150bp
- Although liquid, the local banking market is not well equipped to provide long term finance (beyond 7 years). In addition, the size of Tunisian banks is relatively limited, and it would be difficult for the local banking system alone to finance projects amounts of several hundred million USD
- Foreign currency availability is also limited (and decreasing, due to decreasing export revenues)

# Conclusion and Recommendations

# Projects Are Unchanged, With Delays

- Since the beginning of the crisis, power demand growth has slowed down
- However, medium to long term prospects have not significantly changed, as the fundamentals of the Tunisian economy remain solid, and the government' response to the crisis has been prompt and well targeted
- The electricity supply-demand situation is relatively balanced: new capacity will be needed in the next few years, but there is some flexibility that would allow reasonable delay in project development
- Readjustments in the implementation schedule of the mega-projects might have a significant impact on the power sector investment plan. However, as of now, no project has been cancelled. Some have experienced minor delays, which are only partly due to the crisis, and are relatively normal delays in project development

# Funds Are Available, But Expensive

- Following completion of CPC, the first IPP in the country, about a decade ago, Tunisia has relied on the public sector (STEG) for power generation investment. Several private sector projects are now being considered for future capacity extension
- Public sector projects are typically financed through International Financial Institutions (IFIs), bilateral donors, Export Credit Agencies (ECAs) and local banks. No major financing problem is expected for such projects in Tunisia. In spite of the crisis, IFIs, donors and ECAs are still willing to finance. Local banks remain liquid and consider the power sector a good risk: they are also willing to participate in financing power projects. However, their capacity is limited in terms of maturity and foreign currency lending
- Private projects, which rely more on international banks, can face a more difficult financing situation. However, Tunisia is considered an attractive, investment grade risk among emerging countries. In spite of a still paralyzed syndication market, sector players are generally confident that the “good” projects will be financed, thanks, if need be, to alternative sources: local tranches, international public or quasi-public players (ECAs, IFIs, donors)
- While most projects remain bankable in spite of the crisis, the key issue is the overall cost of finance, regardless of sources, and of the public/private nature of the projects. The high “cost” of finance includes higher margins, but also shorter tenors, higher fees, stricter covenants, etc. This is mostly true for international commercial lenders, although it also applies, to some extent, to public sector entities (IFIs, ECAs). This would lead to higher electricity tariffs, or to more burden on public finances (tariff subsidies, financial support to public utilities)



# Recommendations

- The main issues for the power sector are delays in structuring projects, as attracting banks has become more difficult, and more difficult terms of conditions for loans
- In this context, financial support from the World Bank and other multilateral institutions could be required as follows:
  - In order to prevent tariffs from too much increasing, they can blend their long term, reasonably priced, foreign currency resources with less competitive funds (higher margins and/or shorter tenors and/or local currency only)
  - This is especially true for the new IPP projects, for which project finance funds, although available, are likely to be expensive: significant co-financing would contribute to keep PPA price conditions reasonable
  - Financing of renewable energy projects may also be needed: the government expressed strong political support for renewables (as shown for instance by the PST), but financing projects could prove difficult in the current financial context, as capital costs are generally higher than for conventional technologies. The MENA solar scale-up program would be one component of this effort, but other initiatives may be necessary
  - Another way of helping projects to reach prompt financial closing at reasonable conditions, and attract enough commercial banks, would be to provide adequate security offerings, such as the IBRD Partial Risk Guarantee
- The government may also need technical assistance in several fields:
  - Assistance in the Elmed project preparation, from bidding to structuring: the complexity of this project might be cause for delay (as shown by concerns expressed by several private sector developers and financiers)
  - Assistance in preparing the CSP projects proposed in the CTF investment plan
  - Sector regulation, as several IPPs are likely to be commissioned in the next few years. Regulatory issues regarding cross border transmission will also need to be addressed, in relation with Elmed and regional grid integration
  - Tariff policy, in order to reduce the gap between costs and pre-subsidy revenues
  - Sector long term strategy, including future energy mix options (gas vs. coal, renewables...)

# Appendix: STEG's Financial Statements

# STEG

P&L (TND m)	2004	2005	2006	2007	2008
Sales	1,027.9	1,157.1	1,316.6	1,433.0	1,877.6
<i>growth</i>		13%	14%	9%	31%
Subsidy			589.7	672.7	1,232.4
Cost of sales			-1,621.0	-1,774.6	-2,754.1
<i>growth</i>				9%	55%
EBITDA	238.6	275.9	285.3	331.0	355.9
<i>%sales</i>	23%	24%	22%	23%	19%
EBIT	95.6	100.0	84.5	107.8	110.9
<i>%sales</i>	9%	9%	6%	8%	6%
PBT	25.5	14.3	25.2	30.0	-14.8
Income tax	-0.7	-6.2	-12.2	-18.4	-3.2
Net profit	24.9	8.1	13.0	11.6	-18.0

Cash flow statement (TND m)	2004	2005	2006	2007	2008
Cash flow from operations	112.9	100.4	228.0	182.3	274.2
Investment	-366.5	-276.5	-432.8	-320.1	-460.0
Free cash flow	-253.6	-176.1	-204.8	-137.8	-185.8
Asset disposals	3.6	4.4	4.0	8.7	5.6
New net debt	269.1	170.0	233.4	223.7	180.7
Change in net cash	19.1	-1.7	32.6	94.6	0.5

Balance sheet (TND m)	2004	2005	2006	2007	2008
Net fixed assets	2,583.0	2,687.4	2,921.7	3,065.1	3,405.2
Net current assets	-113.4	-62.4	-129.1	-162.1	-334.4
Net worth	1,387.9	1,421.5	1,415.4	1,449.9	1,470.1
Long term liabilities	110.4	121.7	169.6	183.9	234.9
Long term debt	774.6	876.6	996.6	1,142.3	1,241.9
Short term debt	196.6	205.3	210.9	126.8	123.9
Net financial debt (NFD)	971.2	1,081.8	1,207.5	1,269.1	1,365.8
<i>NFD/Net worth</i>	70%	76%	85%	88%	93%
<i>NFD/EBITDA</i>	4.1	3.9	4.2	3.8	3.8