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CONTENTS

Executive Summary

BMI View: *The tantalising prospect that Iran will develop its nuclear capacity is central to the country's power industry and its ability to meet its energy requirements, but there is no certainty of continuing availability, let alone additional reactors for capacity expansion. Global resistance to the nuclear programme will persist and sanctions will make it hard to maintain a high level of investment. Iran would benefit from more rapid development of its renewables potential as a means of reducing oil and gas dependency.*

During the period 2011-2015, Iran's overall power generation is expected to increase by an annual average of 2.14%, reaching 216 terawatt hours (TWh). Driving this growth is an annual 2.9% gain in gas-fired generation and a 1.8% rise in hydro supply, accompanied by the build-up of output from the country's first nuclear power station. Non-hydro renewables are expected to deliver average annual supply growth of 4.3%.

As a result of significant state investment in the generation sector, a number of new power plants (mainly hydro-electric and combined-cycle) have come online in recent years. Conventional thermal sources are expected to remain the dominant fuel for electricity generation, with many power projects under construction that will use gas. Expansion of Iran's nuclear capacity is planned, but external political resistance means it is far from certain that further reactors will be built.

Following an estimated 0.84% increase in 2011 real GDP**, BMI** forecasts average annual growth of 2.25% between 2011 and 2020. The population is expected to rise from the current level of 74.8mn to 78.6mn during the period 2011-2020, and net power consumption looks set to increase from 156TWh to 173TWh by 2015, rising further to 202TWh by 2020. During the period 2011-2015, the average annual growth rate for electricity demand is forecast at 2.29%. This will accelerate later in the decade to an average 3.07% in 2016-2020.

Thanks partly to the projected rise in net generation, growth of which only slightly exceeds the underlying demand trend, Iran's power supply surplus is unlikely to increase over the near term, but could fall appreciably later in the decade as demand picks up. A slight rise in the percentage of transmission and distribution losses from around 18.5% will do little to help balance the market. The theoretical net export capability by 2015 is put at 1.2TWh, but could be no more than 0.1TWh by 2020.

SWOT Analysis

Iran Power SWOT	
Strengths	▪ The country has vast oil and gas riches, which provide the basis for energy self-sufficiency. It also has some hydro-electric resources and in 2011 began generating electricity from its first nuclear reactor.
Weaknesses	▪ The price of natural gas to residential and industrial consumers is state controlled at extremely low prices, encouraging rapid consumption growth and replacement of fuel oil, kerosene and liquefied petroleum gas (LPG) demand.
Opportunities	▪ Iran is believed to have the potential to produce some 6.5GW of electricity from wind energy. It also has solar power potential. ▪ Iran is controversially developing nuclear energy capability to reduce its increasing dependence on natural gas as a power station fuel.
Threats	▪ UN and EU sanctions on the republic pose a significant threat to the participation of foreign firms in the power sector. ▪ International resistance to the nuclear energy programme could result in delays to capacity expansion.

Global Industry Overview

OECD Markets To Underperform, Coal and Nuclear Under Scrutiny

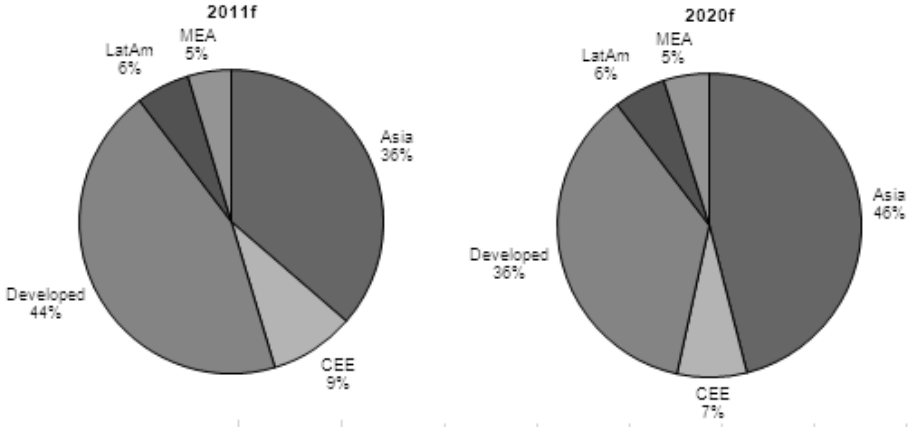
BMI View: *Beyond the weakness of 2008/2009, and given the current demographic and economic trends, global electricity consumption and generation are expected to grow significantly in the coming years. However, there will be differences across regions and a wide variation of trends by fuel source. While Asia is expected to outperform regionally, the developed countries in* ***BMI****'s universe are expected to suffer from sluggish supply and demand growth. Among the key themes for 2011 and beyond, we also stress that there will be major developments with regard to coal prices and carbon reduction technologies, as well as significant changes in the nuclear sector, which has been in a state of flux in the aftermath of the Fukushima crisis.*

Non-OECD Markets To Dominate Supply And Demand Growth

Overall, non-Organisation for Economic Cooperation and Development (OECD) countries are expected to dominate the supply and demand trends, overshadowing the developed markets. In particular, sharp increases in electricity generation, consumption and capacity will make the Asia region our global outperformer. While China and India are undoubtedly the biggest markets in the region, we anticipate that power-hungry Cambodia, Vietnam and Indonesia will also make a significant contribution to the regional performance, owing to their elevated average growth rates. Power markets in the Middle East and Africa are also likely to see significant - if less spectacular - changes, as additional capacity is added to meet rising demand and increase low electrification rates. Regional governments have already put in place various plans to refurbish and expand their electricity generating capacity, with a handful of major projects proposed or already underway. Yet, we stress that downside risks for such projects remain elevated, and delays and funding difficulties are bound to have an impact on their development.

Developed States Leading, But Not For Long

BMI Power Universe Total Net Installed Capacity, % By Region



f = BMI forecast. Sources: UN Data/National Statistical Agencies/GWEC/EWEA/BMI Calculations.

Conversely, the power markets in the countries which currently make up our developed universe are expected to see a steady, albeit moderate, expansion over our forecast period. The sheer size of installed generating capacity in these markets is unrivalled, with the population enjoying full access to electricity and power-intensive economies. However, weak demographic dynamics, sluggish economic performance and austerity programmes are expected to take a toll, capping possible rises in generation and consumption. We hold a similar outlook for Central and Eastern Europe (CEE), where Turkey has been the prominent exception. Yet, we stress that recent economic developments in the country might cloud this picture, constituting a downside risk to our forecast.

Thermal To Maintain Its Reign, Growing Concerns Over Coal

We anticipate that thermal power generation will continue to dominate; gas will gain market share at the expense of oil, while coal will hold its ground. Expansion of gas- and coal-fired power supply is at its greatest in the Asia and the Middle East and North Africa (MENA) regions, although the likes of China are likely to see rapid growth in virtually all forms of electricity supply and demand.

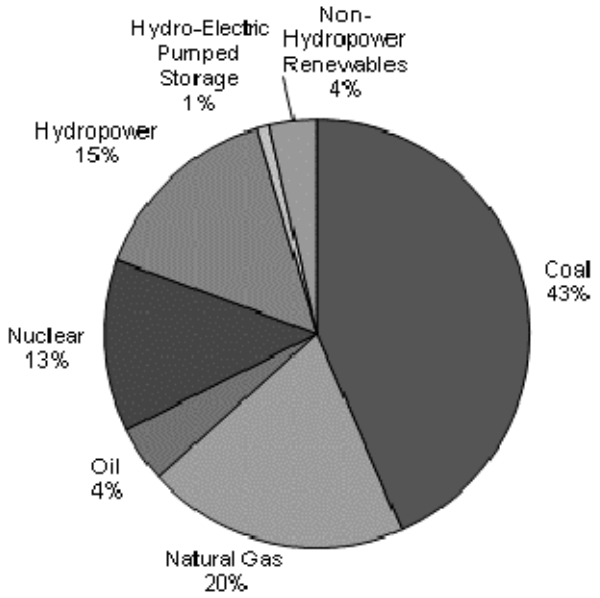
Oil is set to continue to lose market share, particularly if prices remain high, with cleaner natural gas remaining first choice for many countries and regions. Regulatory uncertainties linked to new or fast-changing environmental legislation, low natural gas prices and stable capital costs for new gas-fired plants are all contributing strongly to make gas the favourite fuel for new thermal power plants. This is especially so in the US where proliferation in shale gas exploration and production is providing ample domestic supply of natural gas. We further note that if exploration for shale gas in Europe (Poland, North Germany, UK, Ukraine and Central Europe) yields commercially viable reserves, then the case for greater

gas-fired power capacity will become compelling, representing a major upside to our forecasts. We also highlight that even member countries in the Gulf Cooperation Council (GCC), which have traditionally relied on indigenous oil resources, have recently started to seek new ways of generating power, with a view to conserving oil and gas supplies for more lucrative export deals and maximising income.

Our expectations for coal are more nuanced. Coal capacity is dominant in several countries and numerous new coal projects are planned or under construction, with developing countries inclined to make the most of existing infrastructure and/or indigenous resources. However, rising coal prices - a trend **BMI** has been tracking since the end of 2010 - have been hitting utilities' bottom lines substantially, presenting pronounced downside risks to our forecasts. We also stress that the difficulties encountered by carbon capture and storage (CCS) technology constitute a further threat to coal-fired generation capacity, especially in developed countries. So far, national efforts to develop this technology have had very limited success, with financing concerns playing an important role in delaying projects. Furthermore, the absence of a specific regulatory framework and the need to gain popular acceptance of CCS has further impaired its rapid deployment.

Thermal Primacy To Continue

BMI Power Universe Total Net Generation By Fuel In 2011, % (Forecast)



Sources: EIA/World Bank/National Statistical Agencies/BMI Calculation.

Nuclear Renaissance Under Threat

Over the past decade, rising energy needs as well as growing environmental concerns had prompted a shift in sentiment regarding nuclear power generation. Projects for new nuclear power plants were thus

put forward by countries all over the world, creating positive investor sentiment and supporting a view that a nuclear renaissance was underway.

However, many projects in Europe have been facing funding difficulties following the economic and financial crisis. Furthermore, and even more significantly, rising shale gas production in the US has increased doubts over the economic viability of new nuclear power plants, as illustrated by our special report *Changing The Economics Of Nuclear Power: Impact Of Shale Gas E&P*. The Fukushima accident has further galvanized wider public opinion against nuclear power, thus causing - in our view - the stagnation in construction of new reactors much faster than shale gas would have done. Taking this into consideration, we expect the pace of new builds will moderate significantly in all regions over the coming years.

However, the global picture is far from uniform. While delays and rising costs are expected to effect the nuclear sector globally, we highlight that countries in the Middle East and Asia appear more likely to continue with their programmes. On the contrary, European countries are more reluctant, with countries such as Germany, Italy and Switzerland committed to phasing out their existing nuclear capacity and/or abandon plans for new plants.

Increasing Space For Renewables, But Worrying About Costs

Over the forecast period, renewables should see the most dramatic growth - from a very low base - in response to environmental pressures and the higher cost of conventional energy sources. Numerous renewables projects are planned or already underway all over the globe, and there has been a remarkable increase in average capacity over the past few years. A number of governments have set or are planning to introduce specific renewables targets, to be coupled with fully fledged renewables policies based on policy tools such as quotas, feed-in-tariffs (FiTs), tax credits, and tradable renewables certificates.

So far, developed countries have obtained the most significant results, especially through the use of FiTs. However, cash-strapped governments have been forced to introduce austerity measures following the financial crisis of 2008/2009, thus reducing their pecuniary commitment to green resources. As a consequence, we expect that the increasing level of uncertainty will have a chilling effect on new major project commitments (as analysed in our Special Report entitled *"Feed-In Tariffs: From Certainty To Uncertainty"*).

In terms of non-hydro renewables technologies, wind and solar are the best placed in terms of installed capacity, and they are expected to continue to dominate the project pipelines over the coming years. With regard to wind, we note that there is a growing focus on offshore projects, at least in Europe. Solar photovoltaic (PV) is also becoming more popular, not only in the US, but also in the MENA region and in Asia, where China has doubled its target for PV installations by 2015, raising it from 5GW to 10GW. We also highlight that biomass projects are receiving increasing attention across the globe.

Regional Industry Overview

Strong Commitment To Nuclear, But Thermal To Maintain Its Reign

BMI's new Power industry forecasts for the Middle East and Africa (MEA) region have played out well in the last quarter, and we reconfirm the trends previously identified. **BMI** anticipates that power generation and consumption in the MEA region are both expected to see a sharp expansion between 2011 and 2015. With demand likely to be boosted by economic and demographic growth, governments in the region have already pledged to hike power generating capacity to meet growing consumption and increase the relatively low electrification rates in Africa. Yet, we stress that many of the proposed projects are extremely ambitious, and delays and funding difficulties are bound to have an impact on their development. We also stress that additional focus on mix diversification in the region would be highly desirable, as an excessive reliance on hydrocarbons and/or hydropower has already exposed a number of these countries to price hikes and droughts.

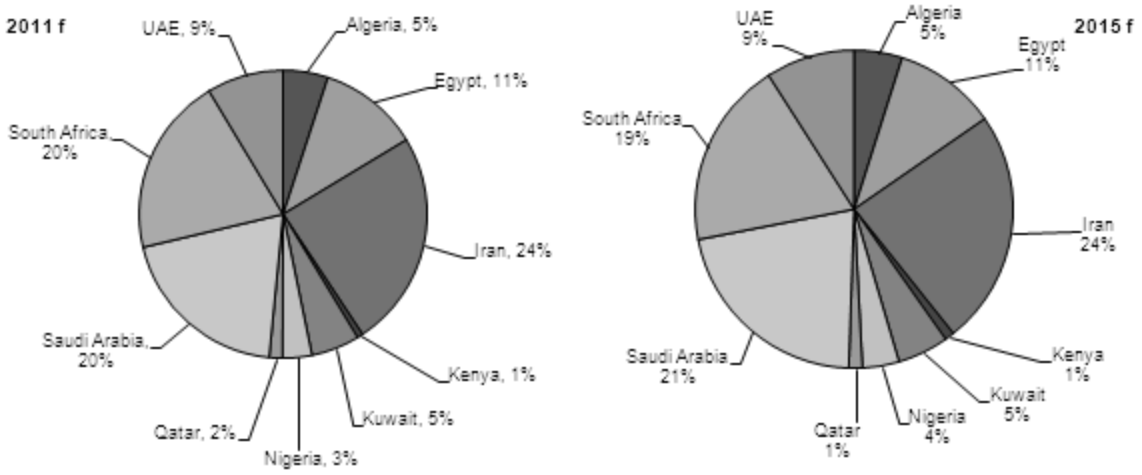
Thermal To Reign Over Attempt To Meet Demand...

Hikes in power demand are expected in the MEA region over the coming years, sustained by a growing population and generally positive economic performance, as well as by widespread commitments to increase relatively low electrification rates in the African countries. This will prompt regional governments to refurbish and expand their electricity generating capacity, with a handful of major projects proposed or already under way.

Yet in spite of the significant expectations, **BMI** notes that numerous declarations, and plans for renewables and nuclear power, cannot be taken at face value. While oil exporters in the Middle East are well placed and even incentivised to invest in social and economic infrastructure by the recent unrest, funding difficulties are likely to delay some of the projects in Africa. Furthermore, we expect that nuclear projects in the region (some of which are at an embryonic phase) will be subject to delays following the Fukushima accident in Japan in March 2011. Similarly, political unrest will certainly play a role in postponing Egypt's nuclear ambitions. Overall we expect that, in spite of the significant development programmes, the share of total installed capacity among countries in the region will remain roughly the same over the short-to-medium term, with Iran, Saudi Arabia and South Africa retaining their primacy.

Capacity To Increase, But National Shares Remain The Same

MEA Region Total Installed Capacity By Country, %



f = BMI forecast. Sources: UN Data/National Statistical Agencies/GWEC/BMI Calculations.

Overall, conventional thermal sources are expected to remain the dominant fuel for electricity generation in the region in the coming years, with many power projects under construction - or planned - set to use oil or gas in the Middle East and coal in South Africa. Countries in the region are inclined to favour generation based on indigenous resources rather than diversify their thermal sources, maintaining demand for other fuels within an uncertain domestic supply capability.

For instance, in June 2011 the government of Enugu State in Nigeria signed a memorandum of understanding (MoU) with Indian utility **ESSAR Group** for the construction of a 600MW coal power plant. **BMI** notes that the decision is in line with the federal government's reform and capacity expansion plans to revive the country's energy sector. Furthermore, the fuel choice will allow the state to capitalise on cheap indigenous resources, while diversifying the power mix away from gas. Similarly, the **Dubai Electricity and Water Authority** (DEWA) announced plans to double the capacity of a planned coal-fired power plant to prevent summertime electricity shortages in the emirate. Conventional thermal sources, namely gas (and to a lesser extent oil), are currently the dominant fuels for electricity generation in the UAE. However, in an unexpected move, the UAE is considering reducing its dependency on gas through the development of coal-based projects. Yet, we note that a lack of domestic resources and the size, cost and environmental implication of coal-fired facilities are likely to limit these plans.

... But Renewables To Attact Greater Attention

Even if several power projects in the planning stage or under construction use oil, gas or coal depending on domestic endowment, renewables, especially solar and wind power, are slowly gaining momentum.

Currently, non-hydro renewables make no appreciable contribution to electricity generation in the majority of MEA countries. However, we highlight that hydropower represents one of the principal sources in the electricity mix for a number of countries in Africa, as illustrated by Kenya and Nigeria. Gulf oil producers (especially the UAE) and African countries alike have recently started to seek new ways to generate power, with a view to conserving fossil supplies for more lucrative export deals and to maximise income.

Renewables are therefore attracting more attention, and in the past few years countries such as South Africa and Kenya have approved relatively appealing feed-in tariff (FiT) schemes to attract investment. While the Emirates, Saudi Arabia and Algeria plan to exploit their high levels of insolation, Egypt and Iran have been focusing on wind power. Similarly, Kenya is also trying to make the most of its significant geothermal potential. The UAE has also recently reconfirmed its renewable energy aspirations, revealing that the government aims to boost investment in clean energy technology over the next five years and attract AED367bn (US$100bn) of investment in alternative and sustainable energy projects by 2020.

The addition of renewables capacity to the mainly thermal-fuelled electricity mix is certainly positive, both from an energy security and environmental perspective. In the case of oil/gas importing countries, favouring exploitation of indigenous sources will also reduce exposure to fluctuation in international prices. However, we highlight that in order to be successful, renewables expansion strategies need to factor in and develop adequate transmission and distribution networks as well as back up capacity to tackle intermittency issues linked to weather conditions.

This problem has been clearly illustrated by the widespread and prolonged drought in East Africa, which has badly affected power output in the region, where most of the electricity is hydro-powered. Although in July 2011, the **Ethiopian Power Corporation** announced plans to build four additional hydroelectric dams on the Nile as part of its strategy to become a regional power hub, the power crisis in drought-stricken countries is illustrating how major reforms and capacity expansion programmes are essential to sustain economic growth in the region. Unreliable and insufficient electricity generation represents a major obstacle to economic development and the case of East Africa also shows how the rising cost of power generation can contribute to soaring inflation and, indirectly, to currency weakness.

Committed To Nuclear

Nuclear power has also seen growing support over recent years, with various countries in the Arabian Peninsula and in North Africa expressing their interest through declarations and preliminary agreements. Similarly South Africa, which already has a nuclear fleet, has been negotiating with France to expand its current capacity.

BMI notes that, contrary to what has been observed in other regions, countries in the Middle East and Africa appear unshaken by the Fukushima accident. In light of this, Jordan's decision in June 2011 to accept technical bids for the construction of the country's first nuclear reactor, despite continuous protests, did not come as a complete surprise. However, we stress that the majority of these nuclear programmes are still in their infancy, and even without highly probable delays will take years to develop.

Industry Forecast Scenario

Iran Snapshot (Macro)

Country Snapshot: Economic and Demographic Data

	2010	2015 f	2020 f
GDP, US$bn	404.13	683.56	867.39
GDP per capita, US$	5,471.21	8,702.05	10,469.66
Real GDP growth, %	1.61	2.54	2.61
Population, mn	73.86	78.55	82.85

Source: BMI Economics Database

Country Snapshot: Power Sector

Access to Electricity, % of population	**97.90**
Quality of Electricity Supply	130/139

Sources: World Economic Forum - Global Competitiveness Report 2010-2011/World Bank/BMI

Iran Forecast Scenario

Electricity Generation and Power Generating Capacity

Table: Iran Total Generation Data

	2007	2008e	2009e	2010e	2011f	2012f	2013f	2014f	2015f
Total Generation, TWh	192.65	201.66	186.30	194.33	197.73	203.76	208.19	211.01	216.07
Total Generation, Growth % y-o-y	2.18	4.68	-7.62	4.31	1.75	3.05	2.18	1.35	2.40
Total Generation, KWh per capita	2,713.35	2,800.88	2,555.26	2,630.93	2,642.32	2,688.55	2,713.47	2,717.58	2,750.64
Thermal Generation, TWh	174.71	196.77	180.28	181.97	183.28	186.03	189.20	191.80	196.56
Thermal Generation, Growth % y-o-y	2.56	12.63	-8.38	0.94	0.72	1.50	1.71	1.37	2.48
Thermal Generation, KWh per capita	2,460.63	2,732.94	2,472.91	2,463.59	2,449.18	2,454.64	2,466.05	2,470.20	2,502.25
Thermal Generation, % of Total Electricity Generation	90.69	97.57	96.76	93.64	92.69	91.30	90.88	90.90	90.97
Coal Generation, TWh	0.54	0.37	0.34	0.00	0.00	0.00	0.00	0.00	0.00
Coal Generation, Growth % y-o-y	1.59	-32.17	-8.38	-100.00	0.00	0.00	0.00	0.00	0.00
Coal Generation, KWh per capita	7.61	5.09	4.61	0.00	0.00	0.00	0.00	0.00	0.00
Coal Generation, % of Total Thermal Electricity Generation	0.31	0.19	0.19	0.00	0.00	0.00	0.00	0.00	0.00
Coal Generation, % of Total Electricity Generation	0.28	0.18	0.18	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas Generation, TWh	143.96	162.99	149.33	153.81	155.68	161.19	166.35	170.89	177.01
Natural Gas Generation, Growth % y-o-y	3.66	13.22	-8.38	3.00	1.22	3.54	3.20	2.73	3.58

Table: Iran Total Generation Data

	2007	2008e	2009e	2010e	2011f	2012f	2013f	2014f	2015f
Natural Gas Generation, KWh per capita	2,027.58	2,263.82	2,048.42	2,082.34	2,080.39	2,126.91	2,168.22	2,200.92	2,253.38
Natural Gas Generation, % of Total Thermal Electricity Generation	82.40	82.83	82.83	84.52	84.94	86.65	87.92	89.10	90.05
Natural Gas Generation, % of Total Electricity Generation	74.73	80.83	80.15	79.15	78.73	79.11	79.91	80.99	81.92
Oil Generation, TWh	30.21	33.41	30.61	28.16	27.60	24.84	22.85	20.91	19.55
Oil Generation, Growth % y-o-y	-2.36	10.61	-8.38	-8.00	-2.00	-10.00	-8.00	-8.50	-6.50
Oil Generation, KWh per capita	425.44	464.03	419.88	381.25	368.79	327.73	297.83	269.28	248.87
Oil Generation, % of Total Thermal Electricity Generation	17.29	16.98	16.98	15.48	15.06	13.35	12.08	10.90	9.95
Oil Generation, % of Total Electricity Generation	15.68	16.57	16.43	14.49	13.96	12.19	10.98	9.91	9.05
Nuclear Generation, TWh	0.00	0.00	0.00	0.00	2.00	5.00	6.00	6.00	6.00
Nuclear Generation, Growth % y-o-y	0.00	0.00	0.00	0.00	#DIV/0!	150.00	20.00	0.00	0.00
Nuclear Generation, KWh per capita	0.00	0.00	0.00	0.00	26.73	65.98	78.20	77.27	76.38
Nuclear Generation, % of Total Electricity Generation	0.00	0.00	0.00	0.00	1.01	2.45	2.88	2.84	2.78
Hydropower Generation, TWh	17.81	4.71	5.82	12.13	12.22	12.48	12.72	12.93	13.22
Hydropower Generation, Growth % y-o-y	-1.53	-73.58	23.72	108.34	0.73	2.13	1.96	1.69	2.23
Hydropower Generation, KWh per capita	250.80	65.35	79.85	164.19	163.24	164.62	165.79	166.58	168.34
Hydropower Generation, %	9.24	2.33	3.12	6.24	6.18	6.12	6.11	6.13	6.12

Table: Iran Total Generation Data

	2007	2008e	2009e	2010e	2011f	2012f	2013f	2014f	2015f
of Total Electricity Generation									
Hydro-Electric Pumped Storage Generation, TWh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro-Electric Pumped Storage, % of Total Electricity Generation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-Hydropower Renewables Generation, TWh	0.14	0.19	0.21	0.23	0.24	0.25	0.26	0.27	0.29
Non-Hydropower Renewables Generation, Growth % y-o-y	14.39	37.01	12.00	12.00	1.89	5.47	4.86	4.07	5.27
Non-Hydropower Renewables Generation, KWh per capita	1.91	2.59	2.86	3.16	3.18	3.31	3.43	3.53	3.67
Non-Hydropower Renewables Generation, % of Total Electricity Generation	0.07	0.09	0.11	0.12	0.12	0.12	0.13	0.13	0.13
Wind Generation, TWh	0.14	0.19	0.21	0.23	0.24	0.25	0.26	0.27	0.29
Wind Generation, Growth % y-o-y	14.39	37.01	12.00	12.00	1.89	5.47	4.86	4.07	5.27
Wind Generation, KWh per capita	1.91	2.59	2.86	3.16	3.18	3.31	3.43	3.53	3.67
Wind Generation, % of Total Electricity Generation	0.07	0.09	0.11	0.12	0.12	0.12	0.13	0.13	0.13

e = BMI estimate, f = BMI forecast. Sources: EIA/World Bank/BMI Calculation.

Table: Iran Total Generation Data

	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Total Generation, TWh	203.76	208.19	211.01	216.07	221.60	228.08	234.93	241.98	249.43
Total Generation, Growth % y-o-y	3.05	2.18	1.35	2.40	2.56	2.92	3.00	3.00	3.08
Total Generation, KWh per capita	2,688.55	2,713.47	2,717.58	2,750.64	2,788.13	2,837.71	2,891.95	2,948.81	3,010.69
Thermal Generation, TWh	186.03	189.20	191.80	196.56	201.79	207.97	214.49	221.20	228.30
Thermal Generation, Growth % y-o-y	1.50	1.71	1.37	2.48	2.66	3.06	3.14	3.13	3.21
Thermal Generation, KWh per capita	2,454.64	2,466.05	2,470.20	2,502.25	2,538.89	2,587.43	2,640.34	2,695.66	2,755.70
Thermal Generation, % of Total % of Total Electricity Generation	91.30	90.88	90.90	90.97	91.06	91.18	91.30	91.42	91.53
Coal Generation, TWh	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coal Generation, Growth % y-o-y	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coal Generation, KWh per capita	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coal Generation, % of Total Thermal Electricity Generation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coal Generation, % of Total Electricity Generation	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas Generation, TWh	161.19	166.35	170.89	177.01	183.03	189.20	195.72	202.44	209.54
Natural Gas Generation, Growth % y-o-y	3.54	3.20	2.73	3.58	3.40	3.37	3.45	3.43	3.51
Natural Gas Generation, KWh per capita	2,126.91	2,168.22	2,200.92	2,253.38	2,302.77	2,353.93	2,409.31	2,466.96	2,529.18
Natural Gas Generation, % of Total Thermal Electricity Generation	86.65	87.92	89.10	90.05	90.70	90.98	91.25	91.52	91.78
Natural Gas Generation, % of Total Electricity Generation	79.11	79.91	80.99	81.92	82.59	82.95	83.31	83.66	84.01

Table: Iran Total Generation Data

	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Oil Generation, TWh	24.84	22.85	20.91	19.55	18.77	18.77	18.77	18.77	18.77
Oil Generation, Growth % y-o-y	-10.00	-8.00	-8.50	-6.50	-4.00	0.00	0.00	0.00	0.00
Oil Generation, KWh per capita	327.73	297.83	269.28	248.87	236.12	233.49	231.02	228.70	226.52
Oil Generation, % of Total Thermal Electricity Generation	13.35	12.08	10.90	9.95	9.30	9.02	8.75	8.48	8.22
Oil Generation, % of Total Electricity Generation	12.19	10.98	9.91	9.05	8.47	8.23	7.99	7.76	7.52
Nuclear Generation, TWh	5.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
Nuclear Generation, Growth % y-o-y	150.00	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nuclear Generation, KWh per capita	65.98	78.20	77.27	76.38	75.49	74.65	73.86	73.12	72.42
Nuclear Generation, % of Total Electricity Generation	2.45	2.88	2.84	2.78	2.71	2.63	2.55	2.48	2.41
Hydropower Generation, TWh	12.48	12.72	12.93	13.22	13.51	13.80	14.11	14.42	14.76
Hydropower Generation, Growth % y-o-y	2.13	1.96	1.69	2.23	2.15	2.16	2.23	2.25	2.33
Hydropower Generation, KWh per capita	164.62	165.79	166.58	168.34	169.95	171.69	173.66	175.78	178.16
Hydropower Generation, % of Total Electricity Generation	6.12	6.11	6.13	6.12	6.10	6.05	6.00	5.96	5.92
Non-Hydropower Renewables Generation, TWh	0.25	0.26	0.27	0.29	0.30	0.32	0.33	0.35	0.37
Non-Hydropower Renewables Generation, Growth % y-o-y	5.47	4.86	4.07	5.27	4.93	4.82	4.86	4.77	4.82
Non-Hydropower Renewables Generation, KWh per capita	3.31	3.43	3.53	3.67	3.81	3.95	4.09	4.25	4.41
Non-Hydropower Renewables Generation, % of Total Electricity	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.15

Table: Iran Total Generation Data

	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Generation									
Wind Generation, TWh	0.25	0.26	0.27	0.29	0.30	0.32	0.33	0.35	0.37
Wind Generation, Growth % y-o-y	5.47	4.86	4.07	5.27	4.93	4.82	4.86	4.77	4.82
Wind Generation, KWh per capita	3.31	3.43	3.53	3.67	3.81	3.95	4.09	4.25	4.41
Wind Generation, % of Total Electricity Generation	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.14	0.15

f = BMI forecast. Sources: EIA/World Bank/BMI Calculation.

Table: Iran Electricity Generation Capacity Data

	2007	2008e	2009e	2010e	2011f	2012f	2013f	2014f	2015f
Net Capacity, MW	50,791.00	60,635.00	56,210.12	57,258.29	57,783.25	65,269.54	66,672.39	67,922.32	69,625.39
Net Capacity, Growth % y-o-y	7.18	19.38	-7.30	1.86	0.92	12.96	2.15	1.87	2.51
Conventional Thermal Capacity, MW	43,717.00	52,963.00	48,562.03	49,435.95	49,899.10	51,261.98	52,539.55	53,662.28	55,175.31
Conventional Thermal Capacity, Growth % y-o-y	6.31	21.15	-8.31	1.80	0.94	2.73	2.49	2.14	2.82
Conventional Thermal Capacity, % of Total Capacity	86.07	87.35	86.39	86.34	86.36	78.54	78.80	79.01	79.25
Nuclear Capacity, MW	0.00	0.00	0.00	0.00	0.00	6,000.00	6,000.00	6,000.00	6,000.00
Nuclear Capacity, Growth % y-o-y	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nuclear Capacity, % of Total Capacity	0.00	0.00	0.00	0.00	0.00	9.19	9.00	8.83	8.62
Hydropower Capacity, MW	7,074.00	7,672.00	7,556.09	7,730.34	7,792.15	7,913.16	8,036.01	8,160.73	8,347.08

Table: Iran Electricity Generation Capacity Data

	2007	2008e	2009e	2010e	2011f	2012f	2013f	2014f	2015f
Hydropower Capacity, Growth % y-o-y	12.84	8.45	-1.51	2.31	0.80	1.55	1.55	1.55	2.28
Hydropower Capacity, % of Total Capacity	13.93	12.65	13.44	13.50	13.49	12.12	12.05	12.01	11.99
Non-Hydroelectric Renewables Capacity, MW	74.00	84.00	92.00	92.00	92.00	94.40	96.83	99.31	103.00
Non-Hydroelectric Renewables Capacity, Growth % y-o-y	54.17	13.51	9.52	0.00	0.00	2.61	2.58	2.55	3.72
Non-Hydroelectric Renewables Capacity, % of Total Capacity	0.15	0.14	0.16	0.16	0.16	0.14	0.15	0.15	0.15
Wind Capacity, MW	74.00	84.00	92.00	92.00	92.00	94.40	96.83	99.31	103.00
Wind Capacity, Growth % y-o-y	54.17	13.51	9.52	0.00	0.00	2.61	2.58	2.55	3.72
Wind Capacity, % of Total Capacity	0.15	0.14	0.16	0.16	0.16	0.14	0.15	0.15	0.15

e = BMI estimate, f = BMI forecast. Sources: UN Data.

Table: Iran Electricity Generation Capacity Data

	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Net Capacity, MW	65,269.54	66,672.39	67,922.32	69,625.39	71,339.45	73,096.56	74,945.56	76,922.19	79,004.31
Net Capacity, Growth % y-o-y	12.96	2.15	1.87	2.51	2.46	2.46	2.53	2.64	2.71
Conventional Thermal Capacity, MW	51,261.98	52,539.55	53,662.28	55,175.31	56,664.46	58,191.40	59,804.82	61,466.49	63,223.56

Table: Iran Electricity Generation Capacity Data

	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Conventional Thermal Capacity, Growth % y-o-y	2.73	2.49	2.14	2.82	2.70	2.69	2.77	2.78	2.86
Conventional Thermal Capacity, % of Total Capacity	78.54	78.80	79.01	79.25	79.43	79.61	79.80	79.91	80.03
Nuclear Capacity, MW	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00	6,000.00
Nuclear Capacity, Growth % y-o-y	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Nuclear Capacity, % of Total Capacity	9.19	9.00	8.83	8.62	8.41	8.21	8.01	7.80	7.59
Hydropower Capacity, MW	7,913.16	8,036.01	8,160.73	8,347.08	8,567.61	8,793.31	9,024.31	9,333.15	9,651.88
Hydropower Capacity, Growth % y-o-y	1.55	1.55	1.55	2.28	2.64	2.63	2.63	3.42	3.42
Hydropower Capacity, % of Total Capacity	12.12	12.05	12.01	11.99	12.01	12.03	12.04	12.13	12.22
Non-Hydroelectric Renewables Capacity, MW	94.40	96.83	99.31	103.00	107.37	111.85	116.43	122.55	128.87
Non-Hydroelectric Renewables Capacity, Growth % y-o-y	2.61	2.58	2.55	3.72	4.24	4.17	4.09	5.26	5.16
Non-Hydroelectric Renewables Capacity, % of Total Capacity	0.14	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16
Wind Capacity, MW	94.40	96.83	99.31	103.00	107.37	111.85	116.43	122.55	128.87
Wind Capacity, Growth % y-o-y	2.61	2.58	2.55	3.72	4.24	4.17	4.09	5.26	5.16

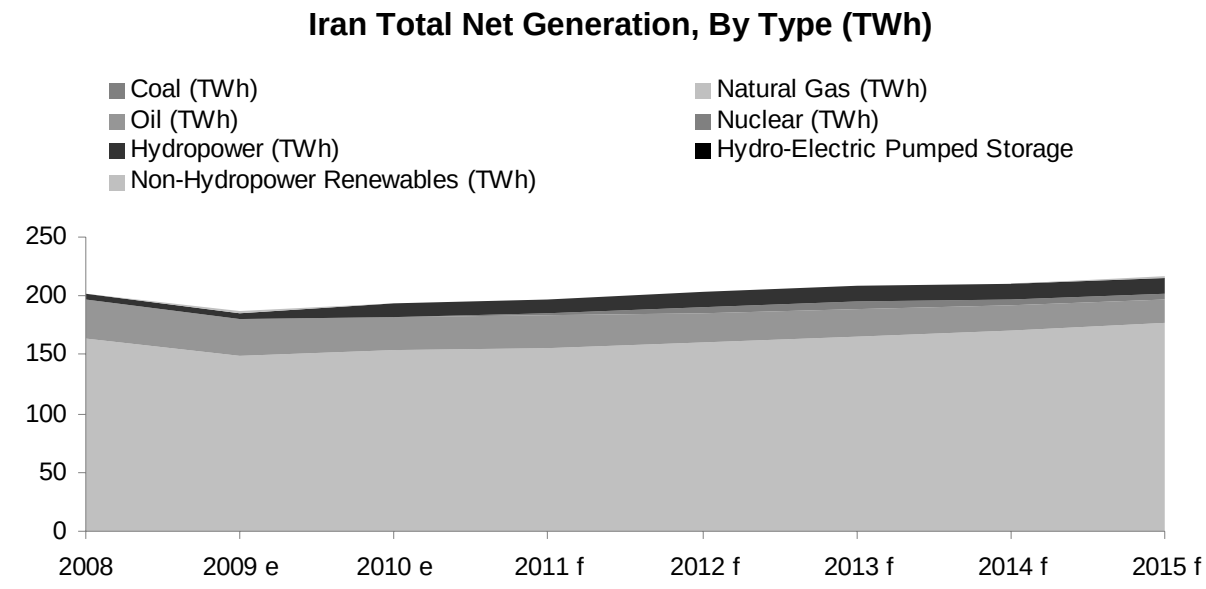
Table: Iran Electricity Generation Capacity Data

	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Wind Capacity, % of Total Capacity	0.14	0.15	0.15	0.15	0.15	0.15	0.16	0.16	0.16

f = BMI forecast. Sources: UN Data.

Iranian power generation in 2011 is put by **BMI** at 198TWh, up an estimated 1.8% on the previous year. Overall thermal generation looks to have risen by around 0.7%, in spite of oil-fired power generation falling by 2.0%. The slack appears to have been taken up by gas, with its contribution to power generation increasing by an estimated 1.2%. Nuclear power should have formed part of the power mix for the first time in 2011, with grid connection taking place in September.

During the period 2011-2015, Iran's overall power generation is expected to increase by an annual average of 2.14%, reaching 216TWh. Driving this growth is an annual 2.9% gain in gas-fired and a 1.8% rise in hydro supply, accompanied by the build-up of output from the first nuclear power station. Non-hydro renewables are expected to deliver average annual supply growth of 4.3%.



e/f = BMI estimate/forecast. Sources: EIA/World Bank/BMI Calculation.

As a result of significant state investment in the generation sector, a number of new power plants (mainly hydro-electric and combined-cycle) have come online in recent years. Conventional thermal sources are

expected to remain the dominant fuel for electricity generation, with many power projects under construction or planned that will utilise gas.

New gas-fired projects include two 1.04GW combined-cycle plants in the south, a 1.3GW combined-cycle plant at Arak, a 1GW facility in Bandar Abbas, and a 1GW combined-cycle plant being built by the **Tehran Regional Electricity Company** in Qom.

India is assessing plans to build a 6GW gas-fired power plant in Iran. This will be connected to India via a 1,500km high-voltage transmission line. According to August 2009 reports in the Hindustan Times, Indian power company **NTPC** and Indian transmission company **PGCIL** are assessing the project, which is estimated to cost US$10bn. The power plant would be located in Iran, and the majority of electricity generated may then be exported to India.

In November 2010, Iran opened a new gas power plant in Aliabad Katoul, IRNAreported. The 1GW Aliabad Katoul gas power plant was officially opened on November 17 2010, according to Mehdi Motevallian, the managing director of **Iran Power Plant Investment Company**. The gas power plant, near the northern Iranian city of Gorgan, Golestan province, is equipped with six 162MW units and will generate a total of 972MW.

In September 2011, Iran connected its Bushehr nuclear power plant to the national electricity grid, according to the Atomic Energy Organization of Iran (AEOI). The plant will be operated by Iranian and Russian technicians for several years.

Iran's current effort includes several research sites, a uranium mine, a nuclear reactor and uranium processing facilities that include a uranium enrichment plant. The Iranian government asserts that the programme's goal is to develop nuclear power plants, and that it will have 6GW of capacity by the end of 2011.

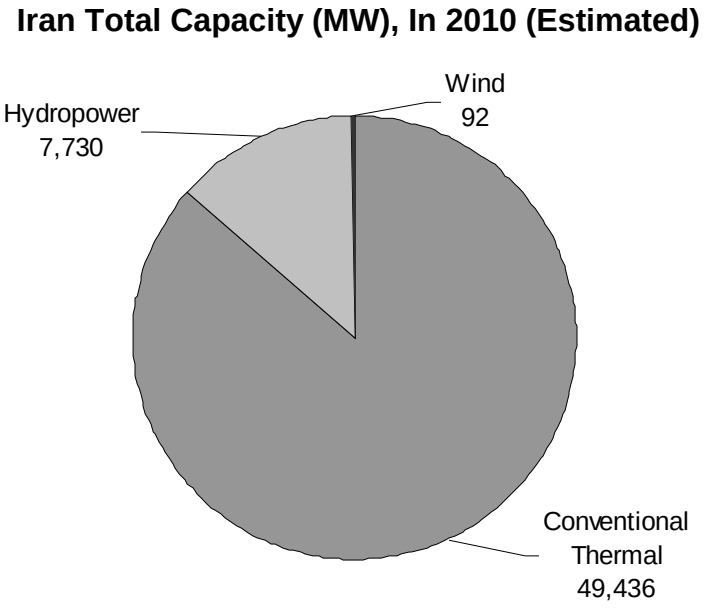
Given the international community's hostile reaction to Iran's nuclear ambitions, and the strong possibility of fresh and tougher sanctions, there is a question mark over the timing and scale of Iran's decision to intorduce nuclear capacity.

The largest hydro-power projects are the 2GW Karun 3 plant, the 2GW Godar-e Landar facility, and a 1GW station in Upper Gorvand. In July 2006, Abbas Aliabadi, director of **Iran Power and Water Resources Development Company** (IWPCO), announced that Iran planned to add 6.4GW of hydro-electric power generating capacity over five years.

Chinese hydro-power firm **Sinohydro** and Iranian contractor **Farabare** are finalising a US$2bn deal for the construction of a 315m-high concrete dam in Lorestan, Iran, reports Zawya. The Bakhtiari dam will be the highest of its kind in the world and will support a 1.5GW hydro-electric power station. Construction is planned to begin in March 2012

The Karoun-4 Roller-Compacted Concrete (RCC) dam, which sits across the Karoun River in Chaharmahal-Bakhtiari province in Iran, was inaugurated by President Mahmoud Ahmadinejad on July 6 2011. The IRR12.8bn (US$1.19mn) dam will generate power and provide water for industrial and agricultural purposes in the province. The completion of the dam marks the fact that the country's dam-building industry has become self-sufficient.

[Production]



Sources: UN Data.

Iran is believed to have the potential to produce some 6.5GW of electricity with wind energy. It also has solar power potential, but non-hydro renewables do not currently form a major part of Iranian energy policy.

In January 2009 the director of the solar energy division at the Iranian Renewable Energies Organization (IREO) stated that Iran's first solar power plant was inaugurated in Shiraz on January 10 2009. The plant has a capacity of 250kilowatts (KW), which can be extended to 500KW by building larger solar panels.

Iran has launched commercial operations at its biggest solar power plant in Mashhad, reports IRNA. The plant, likely to produce 72,000 kilowatt hours (kWh) of electricity annually, will produce enough power to meet the requirements of Razavi Khorasan province, according to the plant's CEO Gholam Reza Karamian. The plant, which has 216 solar panels, has been designed and constructed by native experts. Moreover, the plant has been fitted with solar trackers to improve efficiency.

Electricity Consumption

Table: Iran Total Consumption Data

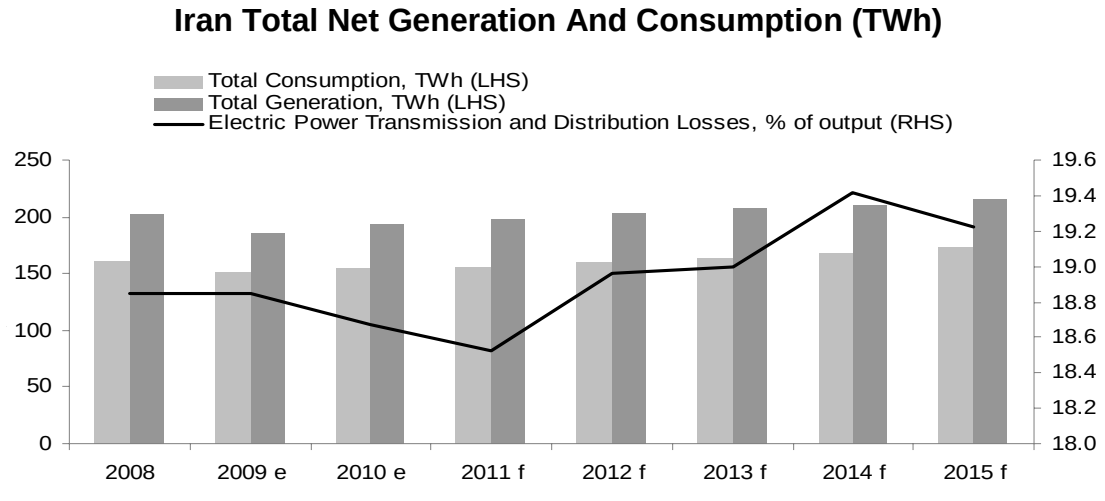
	2007	2008e	2009e	2010e	2011f	2012f	2013f	2014f	2015f
Net Consumption, TWh	153.26	161.47	151.78	154.88	156.37	159.64	164.12	168.07	173.38
Net Consumption, Growth % y-o-y	0.45	5.36	-6.00	2.04	0.96	2.09	2.81	2.40	3.16
Net Consumption, KWh per capita	2,158.53	2,242.57	2,081.70	2,096.84	2,089.56	2,106.39	2,139.15	2,164.55	2,207.25

e = BMI estimate, f = BMI forecast. Sources: EIA/BMI Calculation.

Table: Iran Total Consumption Data

	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Net Consumption, TWh	159.64	164.12	168.07	173.38	178.62	183.98	189.65	195.49	201.66
Net Consumption, Growth % y-o-y	2.09	2.81	2.40	3.16	3.02	3.00	3.08	3.08	3.16
Net Consumption, KWh per capita	2,106.39	2,139.15	2,164.55	2,207.25	2,247.27	2,289.01	2,334.57	2,382.26	2,434.08

f = BMI forecast. Sources: EIA/BMI Calculation.



e/f = BMI estimate/forecast. Sources: EIA/World Bank/BMI Calculation.

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With Iran's 2011 real GDP estimated to increase by 0.84%, **BMI** forecasts average annual growth of 2.25% between 2011 and 2020. The population is expected to rise from the current level of 74.8mn to 78.6mn during the period 2011-2020, and net power consumption looks set to increase from 156TWh to 173TWh by 2015, rising further to 202TWh by 2020.

During the period 2011-2015, the average annual growth rate for electricity demand is forecast at 2.29%, but this will accelerate later in the decade to average 3.07% in 2016-2020.

Transmission & Distribution, Imports & Exports

Table: Iran Electric Power Transmission And Distribution Losses Data

	2007	2008e	2009e	2010e	2011f	2012f	2013f	2014f	2015f
Electric Power Transmission And Distribution Losses, TWh	38.71	38.01	35.11	36.30	36.64	38.63	39.55	40.97	41.53
Electric Power Transmission And Distribution Losses, % of Output	20.10	18.85	18.85	18.68	18.53	18.96	19.00	19.42	19.22

e = BMI estimate, f = BMI forecast. Sources: BMI Calculation.

Table: Iran Electric Power Transmission And Distribution Losses Data

	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Electric Power Transmission And Distribution Losses, TWh	38.63	39.55	40.97	41.53	42.21	44.35	45.36	46.44	47.63
Electric Power Transmission And Distribution Losses, % of Output	18.96	19.00	19.42	19.22	19.05	19.45	19.31	19.19	19.10

f = BMI forecast. Sources: BMI Calculation.

Table: Iran Trade Data

	2007	2008e	2009e	2010e	2011f	2012f	2013f	2014f	2015f
Total Net Imports, TWh	-0.68	-2.19	0.59	-3.15	-4.73	-5.49	-4.52	-1.97	-1.15

e = BMI estimate, f = BMI forecast. Sources: EIA/BMI Calculation.

Table: Iran Trade Data

	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Total Net Import, TWh	-5.49	-4.52	-1.97	-1.15	-0.77	0.25	0.08	-0.05	-0.14

f = BMI forecast. Sources: EIA/BMI Calculation.

Thanks partly to the projected rise in net generation, growth of which only slightly exceeds the underlying demand trend, Iran's power supply surplus is unlikely to increase over the near term, and could fall appreciably later in the decade as demand picks up. A slight rise in the percentage of transmission and distribution losses from around 18.5% will do little to help balance the market. The theoretical net export capability by 2015 is put at 1.2TWh, and could be no more than 0.1TWh by 2020.

Tavanir is responsible for electricity transmission. Iran has three main power distribution networks: the interconnected network, which serves all of Iran, apart from remote eastern and southern areas, using 440 kilovolt (kV) and 230kV transmission lines; the Khorassan network, which serves the eastern Khorossan province; and the Sistan and Baluchistan network, which serves the remote south-eastern provinces of Sistan and Baluchistan. The government's goal is to join these three networks to establish one national grid.

In December 2004, a protocol was reached on synchronising the power grids of Iran, Azerbaijan and Russia, with 500MW being exchanged at the beginning of 2006. In August 2004 Turkmenistan had started power exports to Iran via a new transmission line (Sarahs). This line added to previous power export capacity from Turkmenistan to Iran via the Balkanat-Gonbad line, which was started in June 2006. Another line is to be constructed.

The government's current five-year investment plan for the power sector sees US$9.8bn spent on the transmission system and a further US$7.1bn ploughed into distribution. Iran has three main power distribution networks and the government's goal is to join these to form one national grid. Additional links to the power grids of neighbouring states are likely in order to facilitate greater regional supply flexibility and accommodate Iranian power exports.

Further extending their energy cooperation, Iran and Russia have signed a letter of intent to accelerate the construction of shared power grids, both between them and regionally, according to a report from the Iranian News Agency.

The Iranian energy minister is quoted as saying that Iran is ready to connect to Russia's electricity grid and extend exchanges with Turkmenistan, Azerbaijan and Armenia.

Key Policies/Market Structure

Regulation and Competition

Although the government is said to be planning privatisation, at present Iran's power sector is controlled by state-owned utility Tavanir. Power plant construction is handled by the **Iran Power Development Company** (IPDC), a wholly owned subsidiary of Tavanir. Eventually, Tavanir may be broken up as part of a privatisation package. In addition to power generation, Tavanir is also responsible for electrical transmission. Iran has three main power distribution networks and the government aims to connect these to establish one national grid. Currently, around 95% of Iran's rural population has access to electricity.

Iran had earlier received several offers for investment in the form of loans and build-operate-transfer (BOT) contracts, but progress has been relatively slow – not aided by the challenging political climate that acts as a deterrent for foreign investors. BOT contracts allow the investors to build and operate the generating facility for a period of 15-20 years, after which time the plant is turned over to the Energy Ministry. Negotiations have taken place with international energy firms on expansion plans for power plants at Bandar Abbas, Shaid Rajai, Alborz, Ramin and Kerman.

In June 2009, Iran's first BOT power plant became fully operational, when the last of six 159MW open-cycle gas turbine generating sets comprising the Chehelsotun power plant in South Isfahan were brought online. The 950MW gas-fired plant was developed by a 50:50 JV between the Iranian investment house **IHAG** and local power contractor **Mapna**. The first unit at the Chehelsotun plant was brought on line in 2005.

In addition to BOT plants, Iran has attempted to promote a build-own-operate (BOO) model for the 2GW Zanjan 1-4 independent power project (IPP). In September 2004, the BOO plan was dealt a setback due to a lack of bidders. Overall, Iran is planning 5.8GW of BOT projects and 7GW of BOO projects.

In June 2005, the World Bank was invited by the government of Iran to engage in a dialogue on reform of the power sector, as well as to identify areas of cooperation. In January 2006, a workshop was held in Tehran to discuss private sector participation in the power sector and the development of a power exchange. During this workshop, the World Bank presented international lessons learned and was further informed of the government's plans for power sector reform.

In February 2010, Iran's deputy energy minister, Mohammad Behzad, announced plans to privatise 20 power plants in the first half of the 2010/11 Iranian calendar year. Behzad stated that a proposal for privatising six new power plants had been submitted to the Iranian Privatisation Organisation (IPO), and that a further four were to have been proposed by the end of 2010, according to the Mehr News Agency. These 10 will join 10 power plants already approved for privatisation.

Two of the power plants – Khalij-e-Fars and Sahand – were due to have been offered up by the end of the 2009/2010 calendar year. The government is hoping to raise US$1bn from stakes in the plants. According to the initial public offering (IPO) website, the two plants have been ready for privatisation since April 2009, illustrating the slow progress which generally defines the country's privatisation efforts.

The power plants will be privatised via an IPO. This is the method which has been used to privatise stakes in other state-owned companies over the past few years. Iran has the financial infrastructure in place to successfully carry out the IPO, but there is concern as to the identities of potential subscribers.

An amendment to Article 44 of the Iranian Constitution, in 2004, allowed for the privatisation of state-owned companies and in 2007, Supreme Leader Ayatollah Ali Khamenei called for the process to be sped up. In spite of this constitutional mandate, privatisation has historically proceeded very slowly, perhaps in large part due to resistance among elements of the regime to ceding control of the state-dominated economy to the private sector.

Construction of 10 power plants has been transferred to the private sector, state-utility Tavanir stated in June 2010, according to a report in Iran Daily, although no further details were disclosed. The country needs 5GW of new electrical power every year, which requires private participation, according to Tavanir's deputy head, Gholam Reza Khoshkholq.

Business Environment

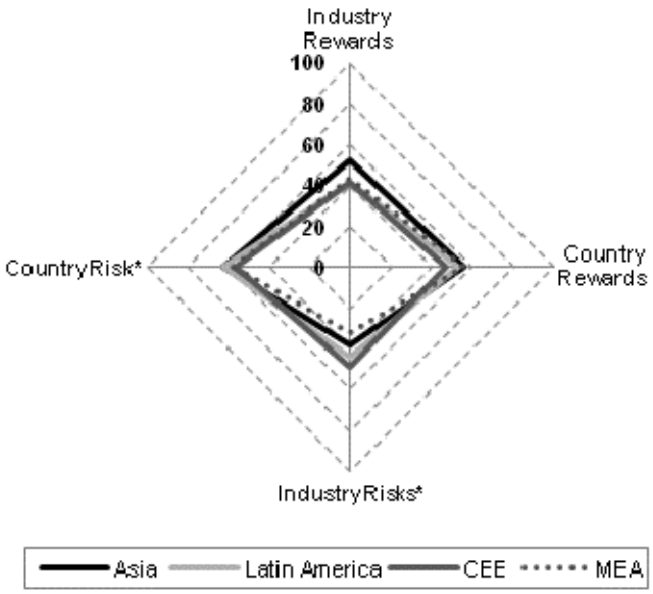
Regional Risk/Reward Ratings

Power Risk/Reward Ratings: Middle East And Africa Outlook

BMI View: *The Middle East And Africa (MEA) region exhibits substantial divergence between Risks and Rewards among countries in* ***BMI****'s new Power Risk/Rewards (R/R) Ratings. Although potential strong growth prospects are a common theme,* ***BMI****'s average regional Reward Ratings for the region are the lowest among emerging markets (with a score of 46.5 out of 100), and at the moment we see an opaque picture over the short-to-medium term. Comparatively low electrification rates (especially in Africa) and fast-growing power demand represent upside potential for rewards throughout the MEA region over the long term, with many countries launching massive electrification and generating capacity programmes. Yet, we stress that the region is marked by comparatively elevated Industry and Country Risks, with potential in various countries hampered by low levels of liberalisation and difficulties in accessing finance, as well as by infrastructure deficiencies and difficulties related to the low level of diversification in the energy mix.*

Underperforming In Both Industry and Country Risks

BMI Regional Power Risk/Reward Ratings



**Higher score = Lower risks. Source: BMI.*

This quarter **BMI** has introduced new Risk/Reward Ratings for the Power service. The overhauled methodology behind the Power R/R Ratings considers a thorough and all-encompassing range of factors

that affect the investment climate in the electricity sector in different ways. Combined, they provide fully comparable results between all the markets in **BMI**'s Power service portfolio.

Industry specific factors have been expanded to include, *inter alia*, the size and growth potential of the power industry (Industry Rewards), while the interplay of factors such as inflation, electricity imports dependence and economic growth are part of the jigsaw that make up the broader market picture (Country Rewards). In terms of risks, the matrix of indicators is a combination of broader country risks (ranging from political to institutional risks) and very esoteric factors such as the independence and effectiveness of electricity market regulators, sophistication of renewable energy policies and the level of liberalisation in the market. Given that these metrics are created to gauge industry-specific risks, our final rating score is weighted more heavily towards Industry Rewards than Country Rewards.

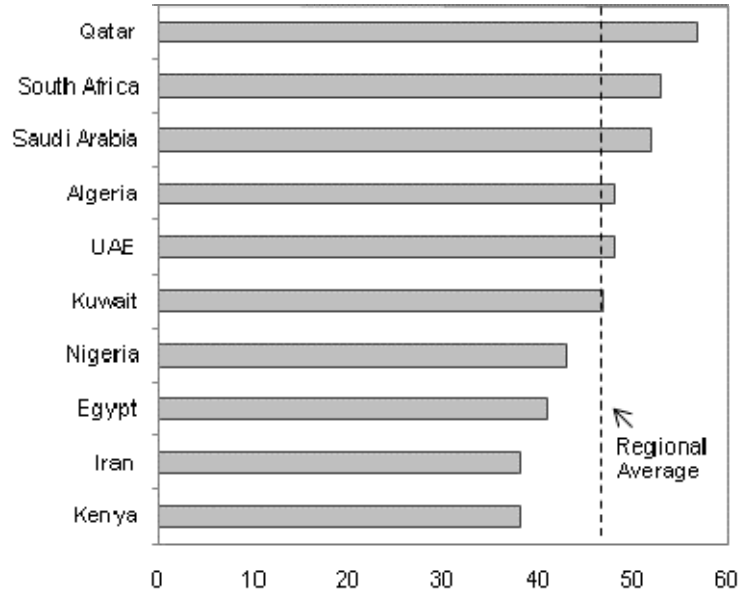
Middle East and Africa Power Risk/Reward Ratings

	Industry Rewards	Country Rewards	Rewards	Industry Risks*	Country Risk*	Risks*	Power R/R Rating	Rank
Qatar	47	80	59	38	73	53	57	1
South Africa	49	56	52	48	65	55	53	2
Saudi Arabia	60	50	56	33	61	45	52	3
Algeria	38	66	49	38	55	45	48	4
UAE	41	60	48	32	66	47	48	5
Kuwait	39	64	48	27	71	46	47	6
Nigeria	39	64	49	18	49	31	43	7
Egypt	46	42	45	25	45	34	41	8
Iran	**51**	**36**	**45**	**16**	**40**	**26**	**38**	**9**
Kenya	30	42	34	42	48	44	38	10
Regional Average	44	56	49	32	57	43	47	

**Higher score = Lower risks; Scores Out Of 100. Source: BMI.*

Qatar, Surprisingly Ahead

Middle East and Africa Power Risk/Reward Ratings, Scores Out Of 100



Source: BMI.

The countries which make up **BMI**'s MEA region present a substantial disparity between market sizes (especially installed capacity) and electrification rates, with Middle East and North African (MENA) countries generally outperforming their peers in sub-Saharan Africa (SSA). Owing to the higher level of economic development and level of maturity of its power market, South Africa is the outstanding exception, as illustrated by our Industry Rewards. Variations in Country Risk indicators are also pronounced across the region.

We note, however, that in spite of these differences, strong commonalities can also be found in the region, and the key themes and trends identified through our MEA Power R/R Ratings can be summarised as follows:

- High growth rates in electricity consumption and ambitious capacity expansion programmes are a distinctive feature of MEA power markets, with countries in the region planning to invest billions of dollars in their blackout-prone power sectors, in order to meet rising demand.
- Levels of liberalisation and competition in the power sector are comparatively low across the region, translating into high levels of Industry Risk. Transparency in the tendering process receives disappointing scores and only a few countries such as South Africa and Kenya have feed-in-tariffs (FiTs) and other policy tools to facilitate mix diversification through renewables.

- Poorly diversified energy mixes leave the countries in the MEA Region substantially exposed to fluctuation in fuel price and weather conditions. In particular, we stress that the severe drought which has hit East Africa represents clear downside risks for the power sectors of the countries involved. Similarly, rising coal prices, due to growing global demand, poor infrastructure and more recently a strike in the county's mining industry, represent a threat for South Africa.

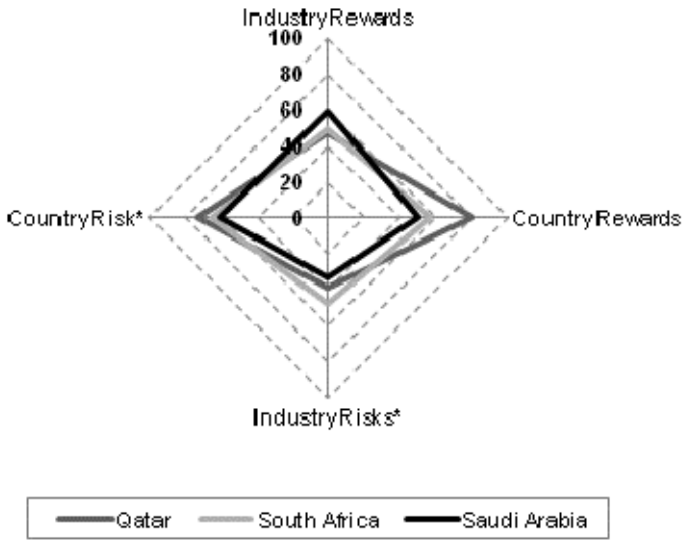
- Capital constraints constitute an additional downside risk for our MEA Ratings. In SSA, governments have not always been able to put in place their ambitious capacity expansion plans due to lack of capital. The situation is more nuanced in the Middle East where, especially following the uprising early in 2011, oil monarchies have pledged great expansion plans with a view to gaining public support. Yet, private investment in the region remains low.

Balanced R/R For Outperformers, But Great Disparity In The Region

With relatively well balanced Risks and Rewards compared to their peers, Qatar, South Africa and Saudi Arabia are the regional outperformers. While Qatar's somewhat expected strong performance is supported by very positive country indicators (with country Rewards and Risks scoring respectively 80 and 73 out of 100), South Africa and Saudi Arabia owe their position to relatively high Industry Rewards, due to industry size, fast growing consumption and high electrification rates.

Qatar: Scoring High In Country Risks and Rewards

Middle East and Africa Power Risk/Reward Ratings



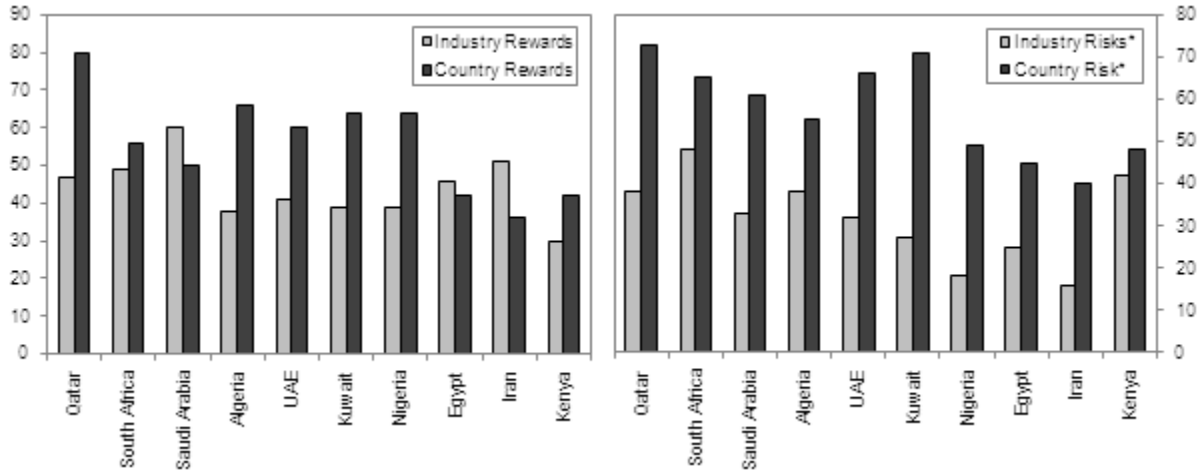
**Higher score = Lower risks. Source: BMI.*

Overall, we highlight that high growth rates of electricity consumption and ambitious capacity expansion programmes are a distinctive feature of MEA power markets, and their contribution is paramount in

placing the MEA region just behind Asia in terms of Industry Rewards. Similarly, positive fundamentals and strong demographic performance sustain the region score in the Country Reward section of our matrix. Conversely, Industry Risk is region's Achilles' heel; the liberalisation and opening up of the market is often stagnant and few incentives for renewables and mix diversification have been approved by governments. As a consequence, MEA is our regional underperformer in this section.

Substantial Divergence Between Risks and Rewards

Middle East and Africa Power Risk/Reward Ratings, Scores Out Of 100



**Higher score = Lower risks. Source: BMI.*

Exposure To Price Fluctuations And Weather Conditions, Downside Risks

Although strong demographic and positive economic performances present upside potential for our ratings for the region, various elements combine to blur the picture, presenting substantial downside risks. In particular, poorly diversified energy mixes leave the countries in the MEA Region significantly exposed to fluctuations in fuels price and weather conditions.

The widespread and prolonged drought which has hit East Africa offers a clear example of how badly the power output in the region can be affected by weather conditions, with drought-stricken countries forced to introduce emergency measures, as the rising costs of power generation contributes to weaken overall economic performance, fuelling soaring inflation, and thus, indirectly, currency weakness. Similarly, rising costs of coal, sustained by a strike in the coal sector, threaten South Africa's energy value chain, with **Eskom** likely to fail to guarantee the availability of power if the situation persists.

Iran Power Risk/Reward Ratings

The Rewards side of the equation favours Iran rather more than the Risks. Its overall score and ranking reflects poor growth prospects and the significant market size. Risks are generally high in terms of Industry, and not any better in terms of Country Risk.

Rewards

Industry Rewards

Iran's strongest suit in the Industry Rewards segment is good market coverage, with almost all of the population having access to electricity. It fares less well in terms of overall power consumption, generation and capacity. The country has a below-average score for five-year growth in power generation, generating capacity and demand.

Country Rewards

Boosting the score for Country Rewards is the low level of electricity import dependency. There is above-average growth in population, but low scores are awarded for the low level of growth in five-year GDP per capita and in real GDP. There is also a poor showing in terms of the inflation outlook.

Risks

Industry Risks

The Industry Risk profile is generally unattractive. Iran scores badly for liberalisation, its tax climate/access to finance, the transparency of the tendering process and in terms of subsidies/FiTs.

Country Risks

External risk and policy continuity help support the country's score for Country Risks, but it fares poorly in terms of short-term political stability, institutions and corruption.

Competitive Landscape

Iran’s power sector is controlled by Tavanir. Eventually, Tavanir may be broken up as part of a privatisation package. In addition to power generation, Tavanir is also responsible for electrical transmission.

In June 2009, Iran’s first build, operate, transfer (BOT) power plant became fully operational, when the last of six 159MW open-cycle gas turbine generating sets in the Chehelsotun power plant in South Isfahan were brought online. The 950MW gas-fired plant, the first to be completed in Iran under a BOT agreement, was developed by a 50:50 JV between Iranian investment house IHAG and local power contractor Mapna. The first unit at the Chehelsotun plant was brought online in 2005.

In addition to BOT plants, Iran has attempted to promote a build, own, operate (BOO) model for the 2GW Zanjan 1-4 independent power project (IPP). In September 2004, the BOO plan was dealt a blow due to a lack of bidders. Overall, Iran is planning 5.8GW of BOT projects and 7GW of BOO projects.

In February 2010, Iran’s deputy energy minister, Mohammad Behzad, announced plans to privatise 20 power plants by September 2010, the end of the first half of the 2010/11 Iranian calendar year. Behzad stated that a proposal for privatising six new power plants had been submitted to the Iranian Privatisation Organisation (IPO), and that a further four would be proposed by the end of the year, according to the Mehr News Agency. These 10 will join 10 power plants already approved for privatisation.

Two of the power plants – Khalij-e-Fars and Sahand – were due to have been offered up by the end of the 2009/2010 calendar year. The government is hoping to raise US$1bn from the sale of stakes in the plants. According to the IPO website, the two plants have been ready for privatisation since April 2009, illustrating the slow progress which generally defines the country's privatisation efforts.

The power plants will be privatised via an IPO. This is the method which has been used to privatise stakes in other state-owned companies over the past few years. Iran has the financial infrastructure in place to successfully carry out the IPO; however, there are concerns over the identities of the subscribers.

An amendment to Article 44 of the Iranian Constitution, in 2004, allowed for the privatisation of state-owned companies and in 2007, Supreme Leader Ayatollah Ali Khamenei called for the process to be sped up. In spite of this constitutional mandate, privatisation has historically proceeded very slowly, perhaps in large part due to resistance among regime elements to ceding control of the state-dominated economy to the private sector.

Construction of 10 power plants has been transferred to the private sector, state-utility Tavanir stated in June 2010, according to a report in Iran Daily, although no further details were disclosed. The country needs 5GW of new electrical power every year, which requires private participation, according to Tavanir's deputy head, Gholam Reza Khoshkholq.

Glossary of Terms

Table: Glossary of Terms	
Bn: billion	Capex: capital expenditure
CEE: Central and Eastern Europe	CHP: Combined heat and power plants
DoE: US Department of Energy	e/f: estimate/forecast
EBRD: European Bank for Reconstruction and Development	EIA: US Energy Information Administration
EM: emerging markets	EU ETS: European Union Emissions Trading System
EU: European Union	EWEA: European Wind Energy Association
FDI: foreign direct investment	FIT: Feed-In Tariff
FTA: free trade agreement	GDP: gross domestic product
GHG: Greenhouse gas	GW: Gigawatt (10^9 watts)
GWh: Gigawatt hour (1 GWh = 3.6 TJ)	GWEC: Global Wind Energy Council
IAEA: International Atomic Energy Agency	IEA: International Energy Agency
IMF: International Monetary Fund	IPO: initial public offering
IPP: independent power producer	Km: kilometres:
kW: kilowatt (10^3 watts)	kWh: kilowatt hour
LNG: liquefied natural gas	MEA: Middle East and Africa
Mn: million	MoU: memorandum of understanding
MW: Megawatt (electric) (10^6 watts)	MWh: Megawatt hour
na not available/applicable	NGL natural gas liquids
OECD: Organisation for Economic Co-operation and Development:	OPEC: Organization of the Petroleum Exporting Countries
PV: Solar Photovoltaics	RES: Renewable energy sources
R&D research and development	T: metric ton = tonne (1 t = 1000 kg)
TPES: Total primary energy supply	Trn: trillion
TW: Terawatt (1012 watts)	TWh: Terawatt hour (1 TWh = 3.6 PJ)

Methodology And Sources

Industry Forecasts

BMI's industry forecasts are generated using the best-practice techniques of time-series modelling and causal/econometric modelling. The precise form of model we use varies from industry to industry, in each case being determined, as per standard practice, by the prevailing features of the industry data being examined. **BMI** mainly uses ordinary least squares (OLS) estimators and in order to avoid relying on subjective views and encourage the use of objective views, uses a 'general-to-specific' method. **BMI** mainly uses a linear model, but simple non-linear models, such as the log-linear model, are used when necessary. During periods of 'industry shock', for example a deep industry recession, dummy variables are used to determine the level of impact. Effective forecasting depends on appropriately selected regression models. **BMI** selects the best model according to various different criteria and tests, including, but not exclusive to:

- R^2 tests explanatory power; Adjusted R^2 takes degree of freedom into account;
- Testing the directional movement and magnitude of coefficients;
- Hypothesis testing to ensure coefficients are significant (normally t-test and/or P-value);
- All results are assessed to alleviate issues related to auto-correlation and multi-co linearity.

BMI uses the selected best model to perform forecasting.

It must be remembered that human intervention plays a necessary and desirable role in all of **BMI**'s industry forecasting. Experience, expertise and knowledge of industry data and trends ensures that analysts spot structural breaks, anomalous data, turning points and seasonal features where a purely mechanical forecasting process would not. Within the power industry, this intervention might include, but is not exclusive to, national policy, new investments or cancelled projects; plant utilisation; general investment climate and business environment changes; changing domestic or regional trends; macroeconomic indicators; and regulatory changes.

Example Of Generation Model

$$Generation = \alpha + \beta 1\ Real\ GDP + \beta 2\ \%Industrial\ Production + \beta 3\ Fixed\ Capital\ Formation + \beta 4\ Population + \beta 5\ Fiscal\ Expenditure + u$$

Note: Consumption and generation capacity are forecast using a similar regression model.

Power Industry - Data Methodology

Generation and Consumption Data

A number of principal criteria drive our forecasts for each generation and consumption variable, with the following identity forming the basis of our forecast model:

Total Consumption = Total Generation + Total Net Imports - Transmission And Distribution Losses

Total Generation

Total generation is defined as the process of producing electric energy or the amount of electric energy produced by transforming other forms of energy, commonly expressed in kilowatthours (kWh) or related units. While ***gross electricity production*** is measured at the terminals of all alternator sets in a station, and thus includes the energy taken by station auxiliaries and losses in transformers that are considered integral parts of the station, ***net electricity production*** is defined as gross production less own use of power plants. According to the IEA, the difference between gross and net production is generally observed to be about 7% for conventional: thermal stations, 1% for hydro stations and 6% for nuclear.

Historical figures for electricity generation are based on data published by the EIA and the World Bank, and consider net electricity production. Whenever possible, we compare these data with accounts published by government/ministry sources and official data of the companies operating in each country.

BMI's electricity generation forecasts examine the sector with a bottom-up approach, forecasting electricity production for each resource in order to calculate the value of total generation. The regression model used to calculate generation consider real GDP, industrial production, fixed capital formation, population and fiscal expenditure.

Total Consumption

Total consumption is commonly expressed in kilowatt hours (kWh) or related units.

Historical figures for electricity consumption are based on data published by the EIA. Whenever possible, we compare these data with accounts published by government/ministry sources and official data of the companies operating in each country. **BMI**'s electricity consumption forecasts are based on a regression similar to the model illustrated above for electricity generation.

Total Net Imports

Historical figures for net imports are computed by **BMI** as total imports, minus total exports, based on data from the EIA. Total net imports forecasts are calculated by **BMI** as total consumptions, minus total generation, plus transmission and distribution losses.

Transmission And Distribution Losses

Transmission and distribution losses include electric energy lost due to the transmission and distribution of electricity. Much of the loss is thermal in nature.

Historical figures for electricity transmission and distribution losses are computed by **BMI** as generation, plus net imports, minus consumptions. However, transmission and distribution losses are calculated using a regression model in the forecasts.

Electricity Generation Capacity Data

Electricity generation capacity is defined as the maximum output, commonly expressed in megawatts (MW) or related units, that generating equipment can supply to system load, adjusted for ambient conditions.

Historical figures for electricity generation capacity are based on data published in the UN statistical databases. Whenever possible, we compare these data with accounts published by government/ministry sources and official data of the companies operating in each country.

BMI's electricity generation capacity forecasts examine the sector with a bottom-up approach, forecasting capacity for each resource in order to calculate the total value of capacity in each country. **BMI**'s electricity generation capacity forecasts are based on a regression similar to the model illustrated above for electricity generation.

Power Risk/Reward Ratings Methodology

BMI's new Risk/Reward (R/R) Ratings for the Power service considers a thorough and all-encompassing range of factors that affect the investment climate in the electricity sector in different ways.

BMI's approach in assessing the risk/reward balance for power industry investors globally is fourfold:

First, we identify factors (in terms of current industry/country trends and forecast industry/country growth) that represent opportunities to would-be investors.

Second, we identify country and industry-specific traits that pose or could pose operational risks to would-be investors.

Third, we attempt, where possible, to identify objective indicators that may serve as proxies for issues/trends to avoid subjectivity.

Finally, we use BMI's proprietary Country Risk Ratings (CRR) in a nuanced manner to ensure that only the aspects most relevant to the infrastructure industry are incorporated. Overall, the system offers an industry-leading, comparative insight into the opportunities/risks for companies across the globe.

Ratings System

Rewards: Evaluation of sector's size and growth potential in each state, and also broader industry/state characteristics that may favour or inhibit its development.

- *Industry Rewards*: Examines rewards specifically related to the industry i.e. headline industry growth rate.
- *Country Rewards*: Examines rewards more generally related to the country i.e. population size and growth.

Risks: Evaluation of industry-specific dangers and those emanating from the state's political/economic profile that call into question the likelihood of anticipated returns being realised over the assessed time period.

- *Industry Risks*: Examines risks specifically related to the industry i.e. regulatory issues.
- *Country Risks*: Examines risks more generally related to the country i.e. corruption or FX volatility.

Each state is scored out of 100 (100 being the best), with the overall risk/reward rating a weighted average of the total score (See table below). Given that these metrics are created to gauge Industry-specific risks, our final rating score is weighted more on Industry Rewards than Country Rewards. Importantly, as most of the countries and territories evaluated are considered by **BMI** to be 'emerging markets', our rating is revised on a quarterly basis. This ensures that the rating draws on the latest information and data across our broad range of sources, and the expertise of our analysts.

Power Risk/Reward Ratings - Matrix of Indicators Methodology				
		Indicator Weighting (%)	Sub-category Weighting (%)	Category Weighting (%)
Rewards				
Industry Rewards	Electricity Capacity (MW) - 5 Year Average	16	40	65
	Electricity Generation (GWh) - 5 Year Average	3		
	Electricity Generation (%) - 5 Year Average	7		
	Electricity Consumption (GWh) - 5 Year Average	3		
	Electricity Consumption (%) - 5Year Average	7		
	Access to Electricity, % population	4		
Country Rewards	Real GDP Growth (%) - 5 Year Average	5	25	
	GDP per Capita (%) - 5 Year Average	5		
	Population, % change y-o-y	5		
	Electricity Import Dependence	5		
	Inflation - 5 Year Average	5		
Risks				
Industry Risks	Liberalisation Level	4	20	35
	Tax Climate/Access to Finance	4		
	Subsidies/FIT	8		
	Transparency of tendering process	4		
Country Risks	Short Term Political Stability	4	15	
	Policy Continuity	2		
	External risk	3		
	Institutions	3		
	Corruption	3		

Table: Power Risk/Reward Indicators

Indicator	Rationale
Rewards	
Industry rewards	
Electricity Capacity (MW) - 5 Year Average	Objective measure of size of sector, based on BMI's Power Sector forecasts. The larger the sector, the greater the opportunities available.
Electricity Generation (GWh) - 5 Year Average	Objective measure of size of sector, based on BMI's Power Sector forecasts. The larger the sector, the greater the opportunities available.
Electricity Generation (%) - 5 Year Average	Objective measure of growth potential, based on BMI's Power Sector forecasts. Rapid growth results in increased opportunities.
Electricity Consumption (GWh) - 5 Year Average	Objective measure of size of sector, based on BMI's Power Sector forecasts. The larger the sector, the greater the opportunities available
Electricity Consumption (%) - 5Year Average	Objective measure of growth potential, based on BMI's Power Sector forecasts. Rapid growth results in increased opportunities.
Access to Electricity, % population	Objective measure of size of sector. The larger the sector, the greater the opportunities available; Low electricity coverage is proxy for pre-existing limits to infrastructure coverage.
Country rewards	
Real GDP Growth (%) - 5 Year Average	Proxy for the extent to which structure of economy is favourable to the power sector. The more substantial the growth rate, the greater the demand and the need for additional generation.
GDP per Capita (%) - 5 Year Average	Proxy for the extent to which structure of economy is favourable to the power sector. The more substantial the growth rate, the greater the demand and the need for additional generation.
Population, % change y-o-y	Proxy for extent to which demographic dynamics are favourable to power sector. The more substantial the growth rate, the greater the demand and the need for additional generation
Electricity Import Dependence	Objective measure of sector Denotes underlying risks to the security of power sector. The lower the imports, the greater the energy security.
Inflation - 5 Year Average	Proxy for the extent to which structure of economy is favourable to the power sector. The lower the inflation, the better the financial outlook of power projects.
Risks	
Industry risks	
Liberalisation Level	Subjective evaluation against BMI-defined criteria. This indicator evaluates barriers to entry.
Tax Climate/Access to Finance	Subjective evaluation against BMI-defined criteria. This indicator denotes ease of obtaining investment finance and evaluates barriers created by regulations (E.g. carbon reduction programmes).
Subsidies/FiT	Subjective evaluation against BMI-defined criteria. This indicator evaluates presence, predictability and scope of subsidies for renewable projects.
Transparency of tendering process	Subjective evaluation against BMI-defined criteria. This indicator evaluates predictability of operating environment.
Country risks	

Table: Power Risk/Reward Indicators

Short Term Political Stability	From CRR. Denotes health of political structure, including various indicators such as policy making-process, social stability and security/external threats and policy continuity.
Policy Continuity	Subjective rating from CRR. Denote predictability of policy over successive governments.
External risk	From CRR. Denotes vulnerability to external shock – principal cause of economic crises.
Institutions	From CRR. Denotes strength of legal institutions in each state. Security of investment can be a key risk in some emerging markets.
Corruption	From CRR. Denotes risk of additional illegal costs/possibility of opacity in tendering/business operations affecting companies' ability to compete.

Source: BMI.

Sources

BMI uses publicly available information to compile the country reports and collate historical data.

Sources used in power industry reports include those from international bodies mentioned above, such as the EIA, the World Bank and the UN as well as local energy ministries, officially released company figures, national and international bodies and associations and news agencies.