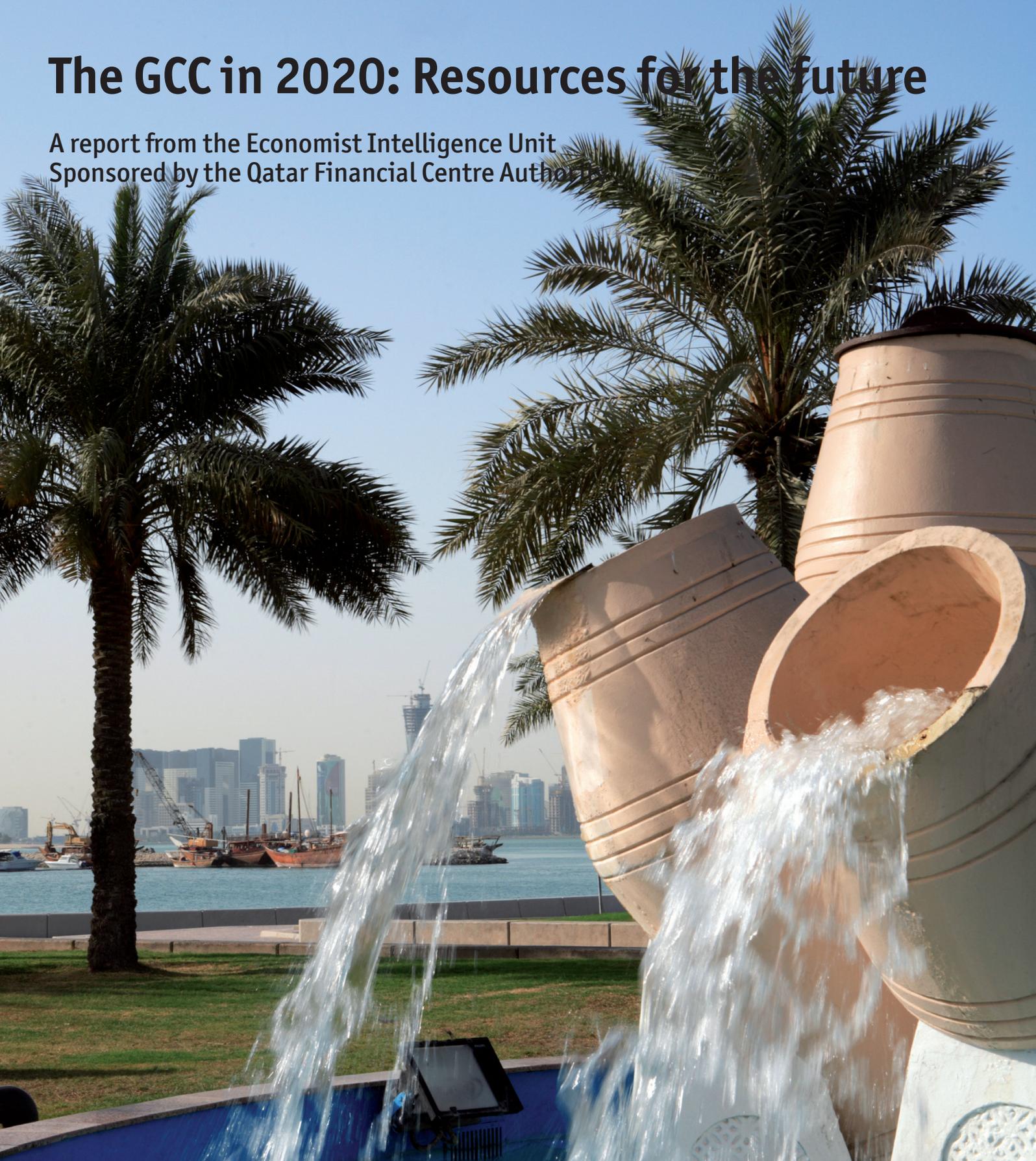


# **The GCC in 2020: Resources for the future**

A report from the Economist Intelligence Unit  
Sponsored by the Qatar Financial Centre Authority





## Foreword

Over the next decade, as the GCC population soars by 30% to over 50m people, the Gulf region will see an increasing strain on its supplies of electricity, food and water. The ways in which the region faces up to these challenges will have a major impact on its prosperity and quality of life, not only in 2020 but in the decades to come. This report addresses the outlook for these key resources in the next decade, and explores policy options to ensure that supply keeps up with demand. The report also addresses the challenges in carrying out such policies, including funding massive new infrastructure and shaping public attitudes to encourage conservation.

Many of these challenges are well known to the region's governments, which have already started to take the needed steps. While much remains to be done, the young populations and significant capital resources of the GCC states are key advantages.

*The GCC in 2020: Resources for the future* is a research paper written by the Economist Intelligence Unit. It was sponsored by the Qatar Financial Centre (QFC) Authority in the interest of promoting informed debate. The Economist Intelligence Unit bears sole responsibility for the content of this report. The author was Jane Kinninmont and the editor was Aviva Freudmann.

The findings are based on two strands of research:

- Analysis of resource requirements and supplies, drawing on Economist Intelligence Unit data and other data sources.
- A programme of in-depth interviews with economists, academics and other leading experts in the region's resource requirements. The participants in the in-depth interview programme are listed in the Appendix to this report. Our sincere thanks go to all interviewees for sharing their insights on this topic.



## Executive summary

The member countries of the Gulf Co-operation Council (GCC, consisting of Qatar, the UAE, Kuwait, Bahrain, Saudi Arabia and Oman) are expected to post robust growth over the next decade both in terms of population and GDP. By 2020 the GCC population is forecast to reach 53.5m, a 30% increase over the level in 2000. Over the same period, the region's real GDP is expected to grow by 56%. Nominal GDP, which was US\$341.6bn in 2000, is forecast to soar to over US\$1trn in 2010 and US\$2trn in 2020.

Although the economic forecast is positive, it carries a risk: that unmanaged growth will bring negative side-effects such as power shortages and soaring prices, in particular for food. Some GCC states are already experiencing sporadic shortages of electricity and gas, while water supplies are already strained and food shortages loom as risks for an import-dependent region. A key challenge for the Gulf in the next decade therefore will be to manage energy, water and food resources to ensure both high living standards and sustainable growth in the long term.

Aware of these challenges, Gulf Arab states are undertaking a variety of measures to ensure long-term sustainable growth. These include:

- introducing energy-efficiency measures;
- investing in clean fuel and renewable energy supplies;
- improving water efficiency;
- investing in new water desalination capacity; and
- buying or leasing agricultural land abroad.

Although governments have recognised the challenges involved in boosting resource supply security in the long term, much remains to be done to ensure the success of policy initiatives. For example, public attitudes towards energy and water conservation—including curtailment of subsidies—remain resistant to change. New infrastructure to produce water and electricity require massive additional investment. Political controversies arising from investment in farmland abroad require continued management. Despite these challenges, however, the GCC states have a positive outlook for long-term security of key resources, as their young populations and significant capital resources create good conditions for implementing the necessary changes.



## Part 1: Energy

### **GCC states look beyond their present-day fossil fuel riches**

Given the GCC's huge oil and gas deposits, energy conservation may look to be unnecessary. After all, global demand for oil and gas will continue to grow, as rising demand in emerging markets will offset stagnant demand in the OECD. At the same time, non-OPEC supply growth is likely to slow down, and the development of Iraqi and Iranian capacity is likely to be held back by political factors. The GCC countries, meanwhile, control 40% of the world's known oil reserves and 23% of proven natural gas reserves. World dependency on GCC energy exports will grow by 2020. In the circumstances, why should the GCC worry about conserving energy resources?

Yet conserve it must—not only because hydrocarbon resources are finite, but because conservation makes financial sense. Demand for electricity, which is typically generated by domestic gas, is already outstripping supply in the GCC. Fast population growth threatens to create acute shortages unless something is done. Moreover, using fossil fuels to generate electricity means having less available for export, which in turn means high opportunity costs.

With these factors in mind, the GCC governments are starting to overhaul the way they manage their oil and gas. In particular, most are trying to rein in wasteful domestic consumption of electricity and gas. They plan to continue exporting oil as crude, but to reserve a greater proportion of the crude to manufacture value-added refined products, such as petrochemicals and plastics, for export. With the exception of Qatar's plans to export liquefied natural gas (LNG), the region's governments will use natural gas mainly to fuel domestic power plants. They will also invest more in developing cleaner fuels, both in response to global concerns about carbon emissions and as a way to supplement fuel supplies for domestic markets.

All of this represents a forward-thinking approach to solving a problem that is only beginning to emerge. The GCC has substantial fossil fuel reserves, but it cannot be complacent about its long-term supply advantage. Other regions are investing heavily in alternative fuels and in fuel efficiency, as well as in developing previously untapped oil and gas reserves, thus creating potential competitors for GCC supplies.

For example, the Gorgon gasfield found in Australia in 2009, with an estimated 40 trn cu ft in reserves, added some 0.6% to the world's known natural gas reserves, and it is much closer to key



Asian markets than the GCC. Another example is the discovery of shale gas in the US in the past two years. “Before this discovery, the Gulf states had assumed that their cheap gas would not only give their national industries a push, but it would help to attract foreign direct investment from international companies and help them to obtain technology transfer,” notes Justin Dargin, research fellow at Harvard University’s Dubai Programme. “Three years ago, the cost of buying gas in the US was about US\$13 per million Btu compared with US\$1 per million Btu in the Gulf. But the shale gas that’s been found may stop the Gulf from being so competitive.”

GCC governments are aware that they must prepare for a world of increased competition in energy markets. This is blunting some of the traditional resistance in the region to developing alternative energy sources. Rather than perceiving such fuels as threats to their markets—measures that either reduce demand or offer substitutes for fossil fuel exports—many in the region are starting to see these technologies as part of an unstoppable global trend, and one from which they could actually benefit if they develop competitive technologies themselves.

### **Industrial diversification boosts demand for oil and gas as feedstock**

Despite their fossil fuel riches—or perhaps because of it—GCC states are trying to diversify away from dependence on oil and gas. The aims of diversification are to reduce the region’s long-term vulnerability to shifts in international demand, to create jobs for GCC nationals in more knowledge-intensive industries, and to prepare for the eventual transition to a post-hydrocarbons economy. Although oil and gas will remain the mainstay of the Gulf economies over the next decade, the region’s long-term development depends on investing in alternatives as well.

The GCC is hardly new to developing energy-intensive industries, such as aluminium and chemicals, but this process will gather pace over the next decade as part of efforts to diversify Gulf economies and create jobs. Owing to its abundant fossil fuel supplies, the GCC has a natural advantage in developing these industries. Nonetheless, some Gulf states face constraints in gas production capacity, in some cases even importing gas to meet current industrial demand, and will need to invest in new capacity.

## **The Gulf’s evolving energy policy**

Over the next decade, the GCC will...

- *Invest in adding value to exported fossil fuels*

An increasing proportion of oil and gas will be processed into refined fuels, petrochemicals and plastics. In addition, more gas will be channelled for use in energy-intensive local industries such as plastics, aluminium and copper production. More such projects will emerge in the coming years.

- *Invest in power production to meet soaring demand*

Electricity demand will rise by 7-8% per year on average; in the smallest and fastest-growing economies, demand will grow even faster. In the face of seasonal electricity shortages, GCC states will invest heavily in gas-fired generating capacity, and will try to rein

in demand for electricity. Tighter energy-efficiency regulations are more likely to be enforced than changes to the subsidy system.

- *Invest in renewable fuels*

To diversify their economies and benefit from increased global demand for renewable fuels, GCC states will invest in alternatives such as solar and nuclear power. These sources will help them to meet the shortfall in electricity supplies, and will free up oil and gas for processing and export.

- *Devote more resources to developing “cleaner” energy technologies*

There will be growing recognition that global climate change concerns are not merely a fad, and that they in fact present opportunities. To maintain their markets in countries that have set emission limits, GCC states will invest in technologies such as carbon capture and sequestration.



Jean-François Seznec, Visiting Associate Professor at Georgetown University’s Center for Contemporary Arab Studies, argues that the most attractive sectors for foreign investment in the GCC in the next decade will be “chemicals, metals and all the industries where low-cost feedstock matters, and all the related services industries.” Mr Seznec believes that, in the long term, the GCC will increasingly leave Iran and Iraq to focus on crude oil exports and will concentrate on higher value-added exports. Mr Dargin of Harvard comments: “The development of petrochemicals is seen as important for the national interest. There will be significant new demand in this sector, particularly in India and China.” Increasingly, the GCC will find itself in competition for these markets with established petrochemicals exporters such as Germany and the UK.

Clearly, the availability of low-cost feedstock energy is an important attraction for foreign investors. Energy feedstock for industry is typically sold at a break-even price or a small profit, owing to low production and transport costs. “Supplying gas at the wellhead price rather than the international market price has a significant opportunity cost, but is an important part of Gulf industrialisation strategy,” says Mr Dargin.

That said, the cost of gas in the GCC is likely to rise in the medium to long term. One reason is that some producing countries will shift from their traditional use of associated gas—produced as a by-product of oil extraction—to greater production of non-associated gas. The non-associated gas likely to be brought on stream in the next decade will tend to be more expensive than the non-associated gas used in the past. Some GCC states (Kuwait, Bahrain and the UAE) will start or increase gas imports, while they try to boost their own production.

**Table 1: Growing Fast**  
Total energy use in GCC and other economies, millions of tonnes of oil equivalent, 2005-14

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
	<i>actual</i>	<i>actual</i>	<i>actual</i>	<i>estimate</i>	<i>estimate</i>	<i>estimate</i>	<i>forecast</i>	<i>forecast</i>	<i>forecast</i>	<i>forecast</i>
<b>Region/Country</b>										
GCC	275.8	289.6	307.6	329.6	343.9	365.8	389.3	412.0	435.4	460.5
% change year on year		8.0	6.3	8.4	2.8	5.4	5.9	5.4	5.9	5.5
China	1,567.0	1,718.0	1,853.0	1,988.0	2,096.0	2,265.0	2,394.0	2,531.0	2,671.0	2,817.0
% change year on year		9.6	7.9	7.3	5.4	8.1	5.7	5.7	5.5	5.5
US	2,357.0	2,342.0	2,381.0	2,329.0	2,267.0	2,272.0	2,270.0	2,272.0	2,299.0	2,326.0
% change year on year		-0.6	1.7	-2.2	-2.7	0.2	-0.1	0.1	1.2	1.2
Japan	531.0	532.0	526.0	514.0	482.0	488.0	491.0	494.0	498.0	501.0
% change year on year		0.2	-1.1	-2.3	-6.2	1.2	0.6	0.6	0.8	0.6
India	378.0	409.0	434.0	460.0	488.0	519.0	551.0	586.0	625.0	665.0
% change year on year		8.2	6.1	6.0	6.1	6.4	6.2	6.4	6.7	6.4
Germany	343.0	349.0	355.0	359.0	337.0	336.0	339.0	343.0	347.0	355.0
% change year on year		1.7	1.7	1.1	-6.1	-0.3	0.9	1.2	1.2	2.3

Source: Economist Intelligence Unit



### Energy-guzzlers

(energy consumption per head in GCC and other economies; kg of oil equivalent)



(a) Estimates. (b) Forecasts.

Source: Economist Intelligence Unit.

### Managing domestic demand remains a key challenge

All of this strengthens the argument in favour of domestic conservation of fossil fuel resources. Consumption per head of fuel and electricity is high in the GCC relative to some other energy-intensive economies, such as Germany. Blackouts and brownouts are already common during peak demand times, and it is increasingly difficult for supply to keep pace with demand as the population grows and the economy expands. Energy subsidies represent an increasing cost for GCC governments as populations grow, and governments realise that current consumption patterns are not sustainable. “To prove you are serious about energy efficiency, you have to start in your own country,” comments Najib Saab, secretary-general of the Arab Fund for Environmental Development (AFED), and editor of *Al-Bia Wal-Tanmia*, a Lebanon-based environment and development magazine. “This is still in its infancy in the GCC.”

Yet managing domestic demand for both fossil fuels and electricity remains a key challenge in a region accustomed to plentiful and cheap supplies. An energy-wasteful culture has grown up around subsidised fuel and electricity prices. For example, it is common for people to leave air-conditioning, lighting and music running when they leave their homes. Foreign firms send their least energy-efficient air-conditioners and cars to the Gulf. Many consumers see energy subsidies as part of an implicit social contract with GCC rulers, an essential part of wealth redistribution.

“Subsidies are politically very difficult to change. Energy is the national wealth and people feel they have a right to consume part of those resources. If there were alternative sources of energy, it would be politically easier,” comments Kostas Nikolopoulos, Head of Middle East and North Africa for Climate Change Capital, an investment management and advisory firm. Professor Giacomo Luciani of the Gulf Research Centre in Switzerland says that subsidies should be reduced, but that other measures—such as tightening the regulations on fuel efficiency—are likely to come first.

As Mr Saab of the AFED says, “GCC nationals could save around 40% on their energy bills by adopting



energy-efficient products. Regulations are needed because producers won't change by themselves. Car firms still export models to the Gulf that were discontinued everywhere else years ago."

Glada Lahn, Research Fellow in Energy and Development at the UK's Chatham House (Royal Institute of International Affairs) thinktank, acknowledges that cheap energy is considered a right of citizenship in the GCC. But she notes that subsidies tend to be "regressive": the wealthiest people benefit most, as they have larger houses and bigger cars and engage in more energy intensive activities. "The issue has to be addressed on several levels," she says. "Governments can generate public understanding of how much is being wasted and how people could benefit from conservation. There should also be a thorough assessment of which groups would lose out when energy prices go up and how they could be compensated in the most efficient way. Meanwhile, the private sector can add pressure for change by demonstrating a commitment to invest in efficiency and alternative energy projects given the right policy incentives".

Aside from cutting subsidies, the GCC states could foster more energy-efficient practices in building design and transport infrastructure. Mr Saab notes that there is a pressing need to reduce emissions from transport and industry because of worsening air pollution in many Gulf cities. "Regardless of climate change, these sectors need to become more energy efficient over the next decade because the air pollution affects people directly," he says.

Some of these changes are already under way, according to Ronald McCaffer, professor of construction management at Loughborough University in the UK. He says officials are recognising the need for green buildings, and are addressing environmental issues through engineering as well as architecture. "The design of buildings in the Middle East has been predicated on the availability of cheap oil. The result has been heavily air-conditioned buildings absorbing vast amounts of energy. Slowly, however, opinion leaders are realising that the value of oil to the source country is much more important than the cost of buying it at subsidised prices. This is causing a radical examination of the ways that buildings are designed."

**Table 2: High-powered Energy consumption totals, millions tonnes of oil equivalent, GCC countries, 2000-20**

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
						(a)	(a)	(a)	(b)	(b)	(b)	(c)									
<b>Country</b>																					
Bahrain	8.6	8.9	9.3	9.6	9.8	10.7	11.4	12.0	12.7	13.2	13.8	14.3	14.9	15.4	16.2	16.8	17.5	18.3	19.0	19.9	20.7
Kuwait	21.6	20.9	21.0	22.8	23.9	27.5	26.9	28.1	29.8	30.5	31.7	33.0	34.3	35.6	36.9	38.4	39.9	41.4	43.0	44.6	46.4
Oman	8.6	8.7	9.1	9.0	9.6	12.3	14.1	14.5	15.3	16.1	17.1	18.1	19.2	20.3	21.5	22.8	24.2	25.7	27.2	28.8	30.6
Qatar	14.6	11.3	11.9	13.2	15.9	19.7	21.1	23.5	26.4	29.2	35.2	41.4	45.3	48.9	52.5	59.2	65.7	72.0	79.1	87.1	96.3
Saudi Arabia	114.6	121.3	127.1	133.9	144.2	153.2	160.1	169.0	179.1	187.8	198.0	208.8	220.5	233.0	246.2	260.0	274.5	289.9	306.2	323.4	341.6
UAE	42.5	43.1	46.8	47.7	50.3	52.4	55.9	60.5	66.3	67.0	70.1	73.7	77.8	82.2	87.0	91.7	96.7	102.2	107.9	113.9	120.2
<b>GCC Total</b>	<b>210.4</b>	<b>214.3</b>	<b>225.3</b>	<b>236.1</b>	<b>253.8</b>	<b>275.8</b>	<b>289.6</b>	<b>307.6</b>	<b>329.6</b>	<b>343.9</b>	<b>365.8</b>	<b>389.3</b>	<b>412.0</b>	<b>435.4</b>	<b>460.5</b>	<b>488.9</b>	<b>518.5</b>	<b>549.5</b>	<b>582.4</b>	<b>617.7</b>	<b>655.7</b>

(a) actual (b) estimate (c) forecast  
Source: Economist Intelligence Unit



**Table 3: Growth over time**  
GCC electricity consumption, 2000-20

	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020
				(a)	(b)	(b)	(c)	(c)	(c)	(c)	(c)
Electricity consumption total (Gwh)	207,292.5	234,564.2	264,440.3	307,133.9	353,647.6	383,181.8	427,519.2	478,047.7	529,102.5	589,732.7	661,859.4
% change year on year		5.9	3.5	8.0	8.4	5.4	5.4	5.5	5.3	5.7	6.0
Electricity consumption per head, Kwh	6,999.2	7,414.4	7,854.5	8,424.8	8,967.9	9,307.2	9,771.2	10,242.1	10,771.7	11,418.2	12,201.4
% change year on year		2.4	-0.1	3.9	4.5	2.5	2.2	2.1	2.6	3.1	3.4

(a) actual (b) estimate (c) forecast

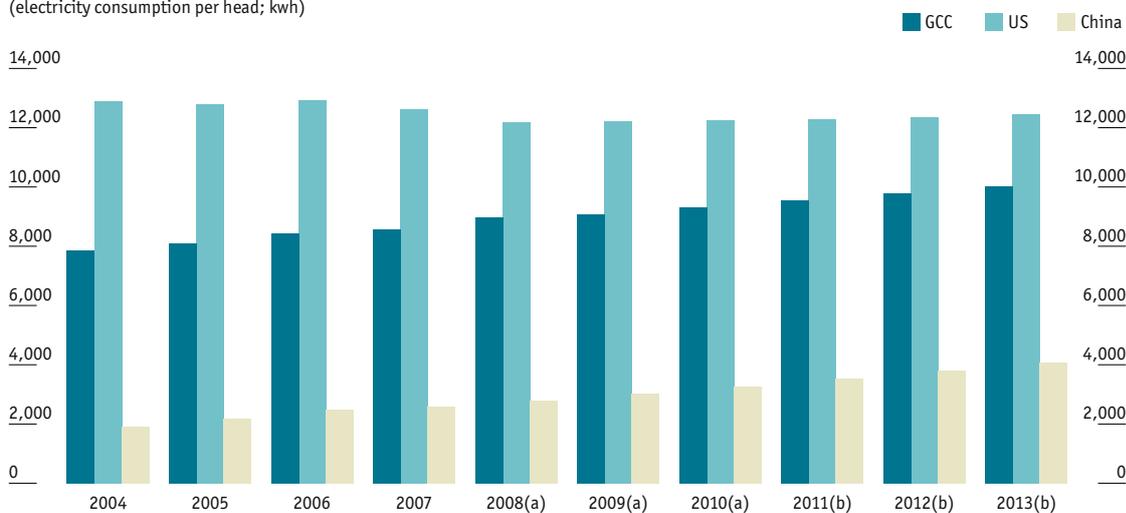
Source: Economist Intelligence Unit

To some extent, this represents a return to the region’s architectural roots. In the era before discovery of oil, Gulf Arab countries developed architecture that naturally protected buildings from excess heat. For example, wind towers, which disperse heat by moving air around a building, were used as an early form of air conditioning.

In addition, some states are using “smart demand” technology in their electricity grids. There are also smaller-scale changes, such as hotels that supply a key card to switch on lighting. The GCC states will follow global best practices to increase the energy efficiency of buildings, including introducing (voluntary) sustainable building codes, predicts Mari Luomi, a researcher specialising in the GCC and climate change at the Finnish Institute of International Affairs. “Nonetheless there are questions about how well these would be implemented,” she adds.

**In perspective**

(electricity consumption per head; kwh)



(a) Estimates. (b) Forecasts.

Source: Economist Intelligence Unit.



### **Significant investment in solar and nuclear technology is planned**

The main drivers of growth in oil demand are likely to be in Asia, especially China and India, particularly if these countries continue to subsidise fuel. Yet efforts to reduce carbon emissions and improve energy efficiency are no longer the preserve of the West. Significant changes in regulation are under way in China, as well as in Brazil, South Africa and India, among others, in response to the worldwide drive to curb greenhouse gas emissions.

These shifts are encouraging GCC governments to develop renewable energy sources alongside their traditional fossil fuel exports. Although GCC states will remain concerned about the impact of the global climate change agenda on oil and gas, they will also seek more pro-active approaches to address climate change by adapting the energy mix that they offer. This strategy is similar to that taken by some oil majors, which are seeking to reposition themselves as providers of clean fuels even if their core business is still in hydrocarbons. There will also be a marketing push to emphasise to Western customers in particular that the GCC is responding to their concerns, and some commentators are concerned that more attention could be paid to perceptions than to realities.

According to Mr Saab, Gulf oil producers should invest hundreds of millions of dollars in cleaner fuels. "If they can make oil cleaner, there will be more demand for it," he says, noting that China and the US both invest heavily in clean coal technology.

There is significant potential for new investment in cleaner fuel technologies in the GCC, including investments in desulphurisation. Professor Luciani of the Gulf Research Center believes that GCC producers are in a good position to develop carbon capture and sequestration (CCS) technology, as they have the land and the capital resources required for this type of investment. Such investments would be likely to pick up significantly if the UN were to put more incentives for CCS in place after the Kyoto Protocol expires in 2012.

However, the main focus of investment in alternative fuels is likely to be solar and nuclear energy. Mr Nikolopoulos of Climate Change Capital believes that the Gulf is ideally suited to developing solar power. "With hydrocarbons prices still very high, it makes more sense to finance solar power; using solar power for domestic economies frees up oil and gas for export," he explains. He predicts that clean technology will attract increasing investment in the coming years, mainly from North American and European sources. "Quite a few funds have been set up in the region to invest in clean technologies and renewable fuels. Arab money will increasingly be chasing these opportunities."

A GCC-wide nuclear project has been proposed, but recent developments suggest that it is more likely to be pursued individually in one or two countries. Given the significant initial capital cost and the different pre-existing energy endowments, nuclear is not equally attractive to all GCC states. However, individual nuclear projects could eventually contribute electricity to a pan-GCC power grid.

Beyond that, there is a nascent effort to develop biofuel sources, particularly for the aviation industry. The International Air Transport Association says that 10% of airline fuel should come from alternative energy sources, chiefly biofuels, by 2017; as the GCC seeks to develop its aviation industry and its role as a tourist hub, its airlines may find it worthwhile to be seen addressing these concerns. So, for example, the UAE-based Etihad Airlines is working with Boeing (UK) to research whether plants that can be grown in seawater mangroves around Abu Dhabi could be used as biofuel feedstock.



Similarly, Qatar Airways has announced plans to partner with Airbus (owned by Netherlands-based EADS), the Qatar Science and Technology Park and Qatar Petroleum to develop biofuels.

Despite such intriguing experiments, the long lead times and high start-up costs of renewable energy projects suggest that these fuels are unlikely to make more than a marginal contribution to the GCC's energy mix by 2020. Investments will pick up speed during this period, depending largely on the outcome of negotiations over the post-Kyoto emissions framework. The aviation experience indicates that international regulations and norms will be important drivers of innovation and investment.

Such investment will also contribute to economic diversification and job creation. Given their desire to diversify economies and create jobs, GCC governments will also be keen to develop local production of the equipment and, eventually, the technology for renewable energy production. Several research institutes, including the Masdar Institute of Science and Technology and the King Abdullah University of Science and Technology, have launched research and development (R&D) projects on clean energy and alternative energy.

The GCC countries have significant funds for such projects, saved from the recent oil boom. "Overall, these plans rely on government and sovereign wealth fund investments, and on intervention to change the price structure, which will be politically sensitive," notes Ms Lahn of the Royal Institute of International Affairs. "They don't seem to be self-generating at this time." Nonetheless, she sees a political will to promote such projects: "The new generation of GCC policymakers is coming up with very different ideas about how the economy should be oriented. There is a combination of a booming young population being educated in a different way and more experienced leaders who are now looking to leave a clear legacy."



## Minerals: The new frontier

Alongside investments in energy, there will be more investment in exploiting non-oil minerals in the coming years—a potentially lucrative, albeit water-intensive, industry. Minerals found in the GCC include gold, silver, iron ore, copper and bauxite. Some of the mineral deposits left after desalinating seawater, such as magnesium, are also recycled. Historically, the region's mineral wealth has been under-exploited, as the region focused more on developing oil and gas resources. But this is changing as a result of the drive to diversify economically and create jobs. Investment in minerals development is rising, with foreign companies also playing a role.

"The GCC has huge untapped mineral deposits of all types, and with investment these could grow to be a substantial industry," says Nick Carter, president and CEO of American Arabian Development Company, a mineral and petrochemicals firm with projects in the US and Saudi Arabia. According to Ines Scotland, CEO of Citadel Resources, a mining firm based in Australia, growth would be faster if governments were to build on new laws allowing foreign investment in mining by actively granting exploration and mining licences. "The major risks are around the ability to attract foreign investment," says Ms Scotland. "Investment in exploration is risky, and you need companies that are prepared to take those risks and manage them with technical abilities." Ms Scotland also notes that the legal framework for investing in mining is largely untested, which makes foreign firms cautious about committing resources.

At least initially, most minerals will be exported in raw form. However, the GCC will continue to develop existing metallurgical

industries such as aluminium and copper smelting. It is also investing in other mineral-based industries as part of diversification efforts. For example, a "mineral railway" will be built in Saudi Arabia to link mineral mines to processing facilities. "Most minerals will be used for export and there is not a great deal of infrastructure allowing the processing of minerals within the region," explains Mr Carter. He adds that over time, new industries will undertake more mineral production locally, "similar to the development of the petrochemicals industry". Smelters will be developed first, he believes, followed by finishing mills and, later, manufacturing plants that use the finished materials.

Like the hydrocarbons sector, the mining sector is vulnerable to shifts in international prices. On the plus side, however, is the sector's relative labour intensity compared to oil and gas extraction. "For every job created in mining, another seven are created indirectly," confirms Ms Scotland of Citadel Resources. Mr Carter of American Arabian agrees: Mr Carter agrees that "Modern mining processes have the capability to provide very good long term employment opportunities for the local population," both in production and in management.

He notes that the availability of local management for mining firms is limited because the industry is new and most of the experienced staff are employed by governments. "[Government experience] doesn't necessarily lend itself very well to private-sector operations, where capital and support might be limited and there are defined time constraints," he says. "On the other hand, local management is important to navigate the political and cultural landscape." It will take some years to build up local expertise and attract international experts to the GCC's underdeveloped minerals sector, but the rewards are likely to be substantial.



## Part 2: Water

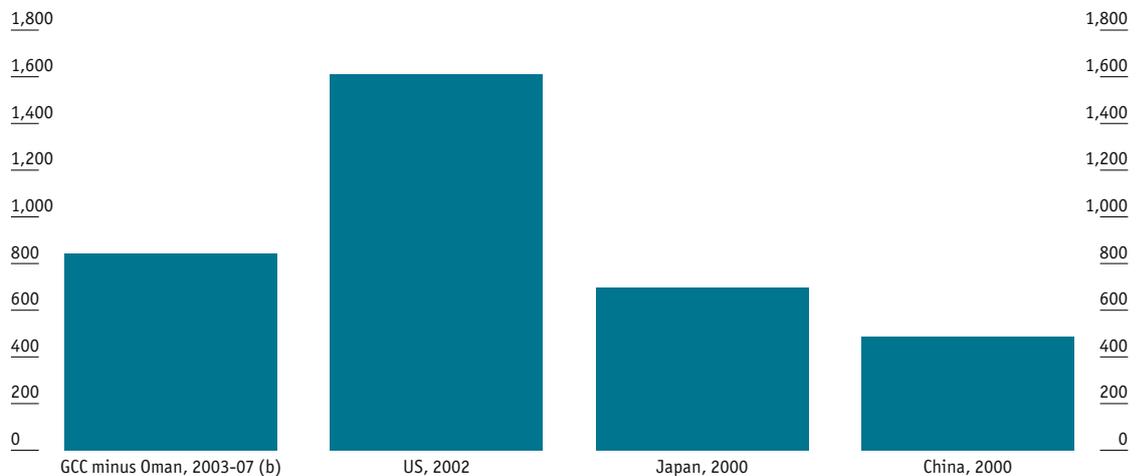
### Water demand is outstripping supply

In stark contrast to energy, water is an extremely scarce resource in the GCC, which is one of the world's most arid regions. With only limited groundwater resources, and amid growing signs that groundwater is being depleted by over-use, the GCC is facing potential water shortages. After a temporary respite in 2009-10 as a result of the economic slowdown, the risk of water shortages is likely to rise again. The next ten years will see rising water demand, as the GCC's expanding middle class adopts an increasingly water-intensive lifestyle, featuring private swimming pools, gardens requiring big sprinkler systems, and even a growing interest in golf. Over the next decade, these countries will be among the world's highest per-capita users of water

One of the main issues is that the bulk of the region's water is directed into agriculture, a sector that provides less than 5% of GDP. Artificially cheap water has enabled the development of water-intensive crops in a region that has no natural advantage in producing these, but where governments provide generous subsidies to ensure future food supplies. A few GCC countries are beginning to change this

#### Thirsty

(average water consumption per head in GCC and other regions; cu metres/year) (a)



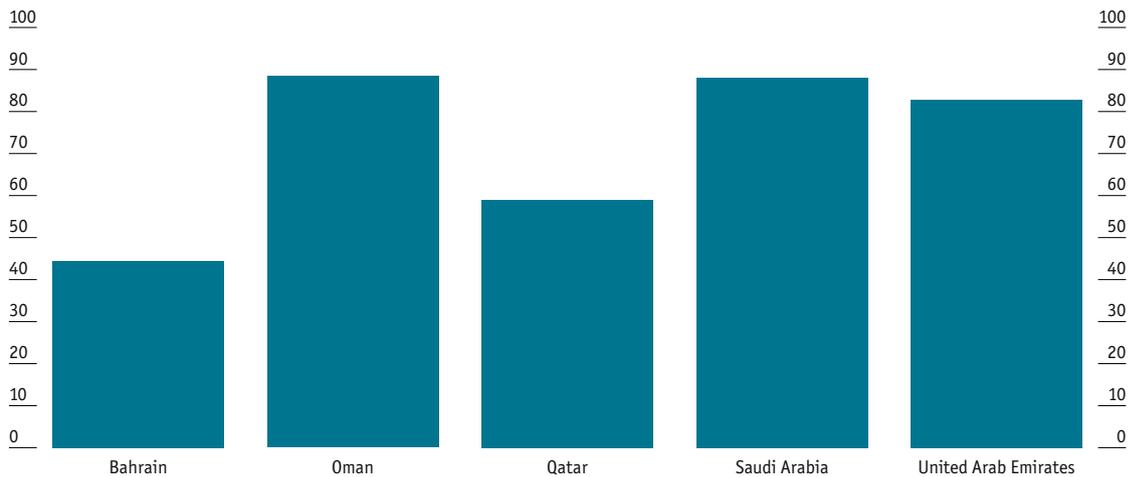
(a) Data for Oman are not available. (b) Water data are very scarce. Figures are sourced from different time periods, as stated.

Source: Food and Agriculture Organisations, Aquastat.



**Cultivated**

(agricultural use of water in GCC countries as % of total consumption, 2003-07)



Source: Food and Agriculture Organisations, Aquastat.

policy, for instance by phasing out energy-intensive crops or limiting the use of land for farming, but there will be pressure to do much more over the next decade.

Industrial demand for water is likely to rise faster than overall economic growth would suggest. “Before the world’s fossil fuels are finally exhausted, it is likely that their extraction will require an unimaginable amount of water,” says Gérard Velter, general manager of Veolia Water for Africa, Middle East and India, noting that the ratio of water required per barrel of oil or cubic foot of gas is rising. “Besides being criticised for creating greenhouse gases, the oil sector is likely to encounter more complaints about its use of water. That is, unless it can figure out a collaborative way forward.” The energy-intensive processing and mineral-mining industries being developed as part of diversification efforts also tend to be water-intensive.

Regionally, a combination of rising temperatures and expanding populations suggests that water will become increasingly scarce in the Middle East, and raises concerns about the long-term possibility of conflicts over water. Some of the less wealthy countries in the region are already looking more seriously at strategies to manage water demand, particularly in agriculture, with the use of drip

**Table 4: Drinking it in**  
Projected water demand in selected GCC countries, millions of imperial gallons, 2000-20

Country	2000	2002	2004	2006	2008	2010	2012	2014	2016	2018	2020
Saudi Arabia	170,476	188,604	216,205	225,479	240,206	246,065	266,656	290,081	315,564	343,286	373,444
Bahrain	27,930	30,387	33,877	36,664	43,181	43,181	43,181	43,181	43,181	43,181	43,181
Qatar	32,303	34,843	34,918	36,116	48,643	56,222	65,111	75,406	84,206	94,116	104,780
Dubai	41,354	49,081	58,357	72,588	91,653	98,178	108,964	123,355	133,361	143,970	155,109

Sources: Saline Water Conversion Corp (Saudi Arabia); Electricity and Water Authority (Bahrain); Qatar Statistics Authority; Dubai Water and Electricity Authority, EIU estimates and forecasts



irrigation. In the longer term, there are concerns that the increasing salinity of Gulf water will make desalination more difficult and more expensive. Gulf water is already highly saline, as the hot climate causes a high evaporation rate. There are also concerns about water pollution from coastal industries and sewage.

### Conservation is politically difficult but offers development opportunities

To meet the growing demand, the region will rely increasingly on desalinated water, which is expensive and energy-intensive. There is huge scope to make economies more water-efficient. At present, there are considerable inefficiencies all along the production, distribution and consumption chain, starting with energy-inefficient production and ending with water-inefficient consumption.

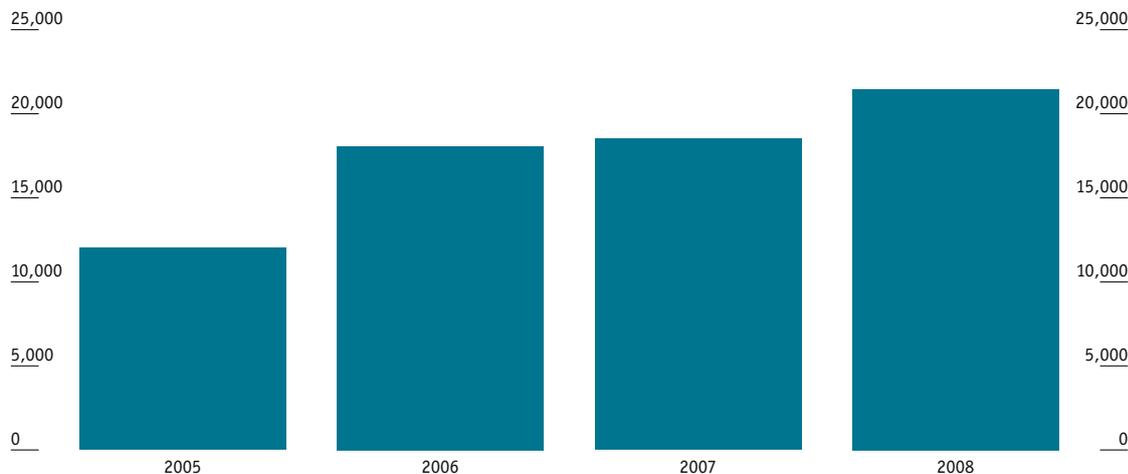
Consumers, however, have little incentive to conserve water, as governments bear most of the cost of desalination. Rami Ghandour, executive director of Metito, which supplies water and wastewater treatment systems, says “the GCC population can predominantly afford to pay the market rate,” but adds that this is a matter of policy. Public awareness campaigns are likely to have limited impact unless accompanied by changes to regulations or pricing. But the subsidies, widely seen as an economic right, will be difficult to tackle. Some argue that it is harder to charge market prices for water than for electricity, since water is a basic human need.

However, water shortages create opportunities to develop new water-producing technologies and industries. Mr Ghandour sees an urgent need to speed up investments in water projects, which have not been seen as “glamorous” compared to high-profile mega-projects and dramatic real estate developments in the Gulf in recent years. From a foreign investor’s point of view, the impact of the global recession on some of the higher-return markets—notably real estate—may highlight the attractiveness of investments in water and power, where future demand is assured.

Mr Saab of the AFED argues that a region that overwhelmingly depends on desalinated water should be producing the tools, and, eventually, the technology locally. He believes that there is considerable

#### Salt-free in Oman

(millions of imperial gallons purchased by Oman Power and Water Procurement from desalination plants)



Note. No data are available for freshwater use in Oman.

Source: Oman Power and Water Procurement, Annual Reports.



scope to develop new desalination technology in the Gulf, given that solar energy and seawater are both abundant. It would be possible to pump seawater into underground storage in the desert, and start the desalination process by filtering the water through the sand to remove much of the salt before taking it to a desalination plant. Ultimately, he hopes, “the economic downturn may encourage the Gulf region to take part in long-term investments that will make them partners in technology and create jobs in areas such as green buildings, renewable energy, water technology and biodiversity.”

### **Energy policy will affect desalination capacity expansion**

The GCC economies account for more than 40% of the world’s water desalination capacity, and much of that capacity is energy-intensive. To meet demand, governments continue to build new desalination plants. Since these plants run on fossil fuels, efforts to boost the supply of energy, diversify fuel sources and improve energy efficiency will have a strong impact on the provision of water.

“It’s not only that desalination is energy-intensive, but that a lot of energy is wasted,” says Mr Nikolopoulos of Climate Change Capital. Most of the GCC’s desalination plants use thermal sources, mainly natural gas. There is significant and ongoing investment in dual-purpose co-generation plants, which produce both electricity and desalinated water through a combined thermodynamic cycle, that is more efficient than separate production processes. These are encouraging initiatives, but there is still a lot of room for further energy savings in the desalination process.



## Part 3: Food

### The food price spike of 2008 has had strong policy reverberations

As a food-importing region, the GCC is vulnerable to spikes in global food commodity prices, such as the one that occurred in 2008. That price increase has had a strong impact on the region’s food and agriculture policy, and will continue to have an impact over the next decade. A growing GCC population points towards increased dependence on imported food staples. Food imports are projected to grow to US\$53.1bn by 2020, or 8% of all imports in value terms. Ensuring that food imports remain available at an affordable price is a key strategic priority for the GCC.

The region’s dependence on desalinated water means that meeting more of its food needs through domestic production is not an option in the long term—although some GCC states continue to subsidise domestic agriculture as part of their food security strategy and to protect livelihoods in the remaining rural communities. GCC countries are likely to maintain domestic production of fish, dairy and crops that are not water-intensive, such as dates. There is also scope for growth in agro-processing industries—already a relatively strong sector—with potential to increase exports to growing nearby markets such as Iraq and Turkey. This, in turn, could draw in rising imports of raw materials such as sugar and cocoa to be used for production of processed foods such as sweets.

**Table 5: Hungry**  
GCC food imports, US\$bn, 2007-20

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Bahrain	0.5	0.7	0.7	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6
Kuwait	1.7	2.3	2.2	2.3	2.5	2.7	3.0	3.4	3.6	3.9	4.2	4.6	4.9	5.3
Oman	1.3	2.1	1.7	2.1	2.1	2.3	2.4	2.9	3.3	3.1	3.5	3.9	4.3	4.8
Qatar	0.9	1.4	1.2	1.3	1.3	1.4	1.6	1.9	2.1	2.3	2.5	2.8	3.1	3.3
Saudi Arabia	12.0	16.7	15.9	16.8	17.9	19.0	20.3	21.7	24.5	27.2	29.0	30.9	33.0	35.2
UAE	2.6	3.8	3.4	3.6	3.8	4.1	4.4	5.1	5.5	6.1	6.6	7.2	7.8	8.4
GCC Total	18.1	25.7	24.1	25.8	27.5	27.2	29.5	33.7	36.3	39.6	42.6	45.9	49.3	53.1

Source: Economist Intelligence Unit



The food price spike of 2008 was a shock that caused food importers to question the functioning of the international food market. When food prices soared owing to supply-demand mismatches and speculative investment, the fear of shortages prompted some producing countries to ban food exports. "A number of Gulf countries were on the market for food at a time when prices had gone up, and some exporting countries had put up export bans, especially for rice—creating a nervousness that even if they could afford it, they couldn't get it," reports Ruth Meinzen-Dick, senior research fellow at the International Food Policy Research Institute. This nervousness is likely to affect the GCC's food policy in the years ahead.

In the aftermath of the food price crisis, both GCC governments and private investors in the region are studying alternative ways of ensuring food imports by controlling the source of supply. The main strategies are buying or long-term leasing land in developing countries to use for export-oriented farming. If oil prices average US\$70/barrel per year over the next decade, the GCC's cumulative current-account surplus would reach some US\$240bn by 2020. If just 5% of this total were to be invested in agricultural projects each year, this would provide an average investment fund of US\$10.6bn per year—twice the annual GDP of Rwanda—or a cumulative total of US\$106.1bn. Sub-Saharan Africa has 18 countries that have an annual GDP of less than US\$10.6bn apiece.

A variety of GCC investment vehicles will be used to finance agricultural investments, including sovereign wealth funds, public funds that have been set up specifically to invest in agriculture, and private equity funds, while state-owned agriculture or food firms may also invest directly. Gulf-owned farming projects are already being considered or negotiated in North Africa, Sub-Saharan Africa, central Asia, southern Asia and eastern Europe, including Sudan, Kenya, Pakistan, Indonesia and others. State-owned enterprises operating or intending to operate in this area include the Saudi Company for Agricultural Investment and Animal Production, set up by the Saudi government's Public Investment Fund in 2009; Qatar's Hassad Food and Qatari Diar Real Estate Company; the Kuwaiti government's Kuwait China Investment Company; and the UAE's 50% state-owned Minerals Energy Commodities Holding. In the private sector, several Saudi firms have formed a consortium, Jenat, for overseas agriculture investment. Saudi firms including the Hail Agricultural Development Company and National Agricultural Development Company have announced projects in Sudan.

The GCC will not be alone in planning such investments. It will face competition from private agricultural investors from the OECD countries, as well as an increasing presence from India, China and South Korea. "European investors are mainly focusing on biofuels, but that also creates competition as the land or crops involved could be used for food," says Ms Meinzen-Dick.

### **Political controversy follows decisions to invest in agriculture abroad**

The policies of GCC governments focus on ensuring food security for the Gulf, implying that investments will be tailored to the dietary requirements of the GCC states (including feedstock for the local livestock industry). However, some private firms and even some sovereign wealth funds may focus instead on agricultural investments designed to maximise profits in global markets. These investments require quite different strategies. For food security, the main goal is stable supply of imports to



the Gulf at reasonable prices. For profit maximisation, the goal is high prices where the choice of end-market is less important. There are considerable political risks attached to both approaches, depending on how they are managed.

Many of the projects being planned may not be signed or implemented, as a result of political risks. Some contracts may be terminated, particularly where GCC investors try to export all of the output of a farming investment at a time when the host country faces a serious food shortage. There is significant scope for investment to increase total agricultural yield, by providing finance, equipment, training, technology seeds and fertilisers—and the GCC region has several major fertiliser producers. But the risks could trump such advantages, especially where questions arise about the enforceability of land lease contracts and export agreements in times of shortage.

Experts interviewed for this report generally agree that GCC agricultural investments overseas will not last in the long term unless these risks are managed carefully. Key issues raised include ensuring a transparent land valuation and transfer process, ensuring a broader range of stakeholders than just governments, providing clear and visible benefits for local communities, and respecting the country's trade rules, export regulations and obligations to international trade organisations.

A complicating factor is that in some developing countries land ownership is not always transparent and the very idea of land ownership may be poorly accepted. "If there appears to be large tracts of unused land, the first step is to ask if it is really unused or if it is being used by pastoralists or by farmers with traditional claims on the land rather than full title," says Ms Meitzen-Dick. "If you displace people, this is likely to cause protests, and this is the first risk for investors." She also highlights the risk that land may have been left unused for good environmental reasons.

Dr Hania Farhan, director of research at the Mo Ibrahim Foundation, a non-governmental organisation (NGO) that supports African leadership, agrees that Gulf investors should investigate carefully who owns the land. "Assuming legal compliance and transparency are in place, the investors need to engage with every level of civil society, not just officials," she says. "They should be able to get buy-in from the states, but it's the buy-in from locals that will make all the difference to whether these investments are sustainable."

Neil Crowder, managing director of Chayton Capital, which specialises in agricultural

### Prebisch versus Malthus: Contrasting views on food security

The food price spike of 2008 gave a new lease of life to the theory propagated by Thomas Malthus, a political economist, that the world's population would eventually run up against finite land resources and would be unable to sustain its growth.

This contrasts with the ideas of Raul Prebisch, an Argentinian economist, who argued during the 1970s that Third World

producers of commodities were being dragged into a state of dependency on developed countries, by supplying raw materials, while the savings are retained in the developed countries processing those materials. He thought that market forces would push commodity prices down, while the price of manufactured goods would increase.

Most likely, both sets of dire predictions are exaggerated. But the nervousness such theories promulgate have prompted defensive measures on the side of both suppliers and buyers, introducing distortions into global food commodity markets.



investments, cautions Gulf investors to “look carefully at who they are negotiating with. Investments need to be well structured, involving negotiations with local landowners as well as the government and, possibly, with local tribes, to make sure all the parties are signed up. If Gulf investors take a long-term view—for example, accepting lower returns to ensure that local communities receive a percentage of the output—then there is potential to meet food security requirements.”

### Sharing the gains with food-producing countries

There are considerable potential gains for both sides, if agricultural investments are structured correctly. Dr Akin Adesina, vice-president of the Kenya-based Alliance for a Green Revolution in Africa, notes that in some areas of Africa it is possible to increase agricultural output tenfold by using the right seed varieties, irrigation equipment, investment and other technology. Based on estimates by the International Food Policy Research Institute, Africa needs US\$37bn per year in agricultural investment, he adds. Based on a 2003 pan-African treaty,<sup>1</sup> African governments should be directing 10% of their spending towards agriculture. “If all African governments did that, they’d provide some US\$20bn per year,” he says, leaving US\$17bn to be sourced from elsewhere. “As the Gulf states look elsewhere for food, naturally they will come to Africa. Africa needs investments, but these need to be done in a transparent way.”

“You don’t have full legal transparency, and in some cases state land is being sold below market price by someone who is part of a political patronage system,” says Iggy Bassi, co-founder of GADCO (Global Agri-Development Company), which focuses on African solutions for food security, based in the Netherlands, Ghana and the UK. He notes that deals made with governments may not last in countries that have a high food import requirement: “One minister may be in power for five years, but food security is not a five-year issue. Food security requires a long-term synthesis between the public and private sectors.”

“Gulf states have already had some negative PR around this issue. We’re likely to see a move towards deals that are more win-win for both parties, rather than the large-scale purchases of thousands of hectares,” Mr Bassi adds. He suggests that the Gulf states could align their foreign aid spending more closely with food security aims, “helping countries create a food surplus, and then exporting the off-take”. Gulf countries could also think about sponsoring R&D: “If they set up a research institute, for instance doing research into drought-resistant seed varieties, they could go into bilateral partnerships with food-producing countries from a real position of strength.”

As Devlin Kuyek, a researcher at GRAIN, an NGO that casts a critical eye on foreign investment in developing-country agriculture, argues: “Gulf states should consider consulting and negotiating with local farmers. One of the problems is that farmers are often left out. Of the bottom billion poorest people in the world, 80% are food producers.”

“In the long run, investing in improved agricultural productivity in developing countries, combined with greater stability in world markets, is probably in the long-term interests of the Gulf countries,” says Ms Meinzen-Dick. “Following the emerging guidelines for foreign investments would help. These include respect for existing land and resource rights, transparency, consultation with all affected, economic viability, environmental and social sustainability, and strengthening,

<sup>1</sup> The Comprehensive African Agriculture Development Assistance Programme (CAADP) Africa, signed by African governments in 2003 as part of the African Union’s New Partnership for Africa’s Development (NEPAD).



## The GCC in 2020: Resources for the future

not undermining, local food security.” As with other issues of dealing with increasingly strained resources, including electricity and water, the approaches to dealing with potential food shortfalls are likely to remain a source of controversy over the next decade.



## Conclusion

The GCC region has a long history as a trading centre, given its abundance of certain key natural resources and its shortfall of others. The region currently enjoys a robust trade surplus, but there is a risk of this being eroded, as a rapidly growing population draws in more imports while also consuming more of the region's key export—its energy resources—domestically. The region thus has clear incentives to improve the management of its natural resources, extracting more benefit from its energy endowments, improving the efficiency of its energy and (energy-intensive) water usage, and ensuring it has a plentiful supply of imported food.

In the coming decade, the GCC countries will face pressure to use their energy resources more efficiently, in order to supply their rapidly growing populations, free up resources for export, and address concerns about climate change and pollution.

The countries of the region will seek to manage energy in new ways, focusing not just on the export of oil and gas, but on increasing the proportion of downstream value-added products. The focus on high-value-added energy exports will also add to the opportunity cost of wasting energy through inefficient domestic uses. Although the GCC economies will remain energy-intensive, they have a broad scope for making energy use more efficient, whether by changing consumer behaviour, reforming subsidies, and/or by introducing new ideas in building and transport design. The fact that some parts of the region are now running short of gas supplies illustrates the importance of changing the management of energy resources. Improving energy efficiency will require social and cultural changes, although it remains an open question whether Gulf governments will be able to cut household energy subsidies.

The region will also need to focus more intensively on conserving its scarce supplies of water, as growing populations and wasteful uses of water increasingly strain supplies. As with electricity, reforms of the tariff subsidy system present formidable political obstacles. However, water shortages create opportunities to develop new water-producing technologies and industries, including new and more energy-efficient desalination technologies.

The GCC's traditional dependence on imported food is also giving rise to new approaches to supply security. Current strategy in this area focuses on buying or long-term leasing of farming land abroad, mainly in Africa. Although the resources endowments of the investing countries of the GCC and the



agricultural producing countries of Africa are complementary, the investments tend to be controversial and require careful risk management. Most experts agree that the key to successful agricultural investment—providing the best opportunities for food security in the long term—lies in sharing the gains among the food-producing and food-importing countries.



## Participants in in-depth interview programme

*The Economist Intelligence Unit would like to thank the following participants in our in-depth interview programme for their contributions to this study:*

- Dr Akin Adesina, vice-president, Alliance for a Green Revolution in Africa, Kenya
- Iggy Bassi, co-founder of Global Agri-Development Company, Netherlands, Ghana and the UK
- Nick Carter, president and CEO, American Arabian Development Company, US and Saudi Arabia
- Neil Crowder, managing director, Chayton Capital, UK
- Justin Dargin, research fellow, Dubai Programme, Harvard University, US
- Dr Hania Farhan, director of research, Mo Ibrahim Foundation, UK
- Rami Ghandour, executive director, Metito, UAE
- Devlin Kuyek, global programme officer, GRAIN International
- Glada Lahn, Research Fellow in Energy and Development at the UK's Chatham House (Royal Institute of International Affairs), UK
- Professor Giacomo Luciani, senior adviser, Gulf Research Center, and director, The Gulf Research Center Foundation, Switzerland
- Mari Luomi, researcher specialising in the GCC and climate change, Finnish Institute of International Affairs, Finland
- Ronald McCaffer, professor of construction management, Loughborough University, UK
- Ruth Meinen-Dick, senior research fellow, International Food Policy Research Institute, US
- Kostas Nikolopoulos, Head of Middle East and North Africa for Climate Change Capital
- Najib Saab, secretary-general, Arab Fund for Environmental Development, and editor of *Al-Bia Wal-Tanmia*, an environment and development magazine, Lebanon



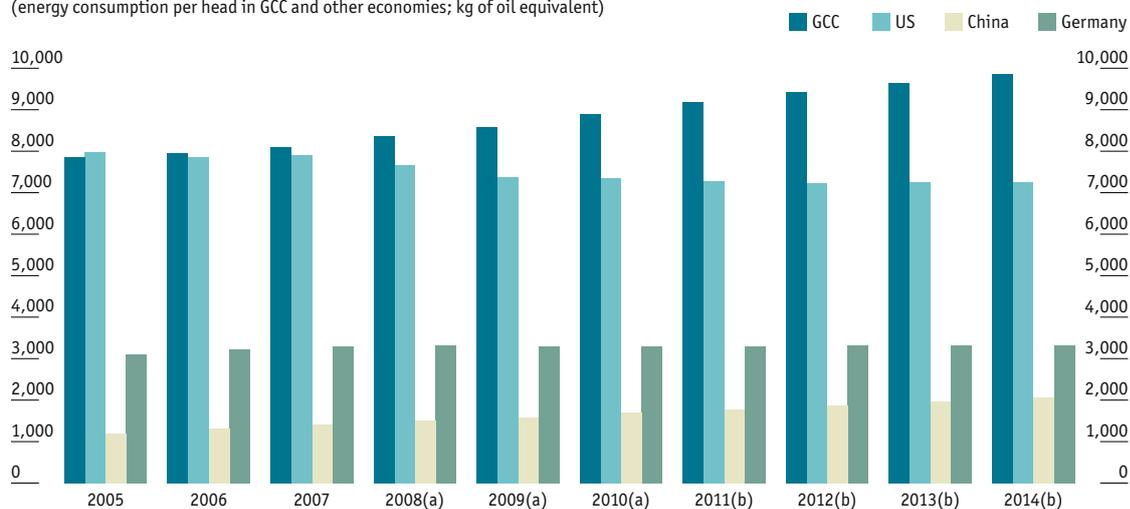
## The 2009-2020 Resource for the future

- Ines Scotland, CEO, Citadel Resources, Australia
- Jean-Francois Sez nec, visiting associate professor, Center for Contemporary Arab Studies, Georgetown University, US
- Gérard Velter, general manager, Africa, Middle East and India, Veolia Water, France

## Appendix: Resources data

### Energy-guzzlers

(energy consumption per head in GCC and other economies; kg of oil equivalent)

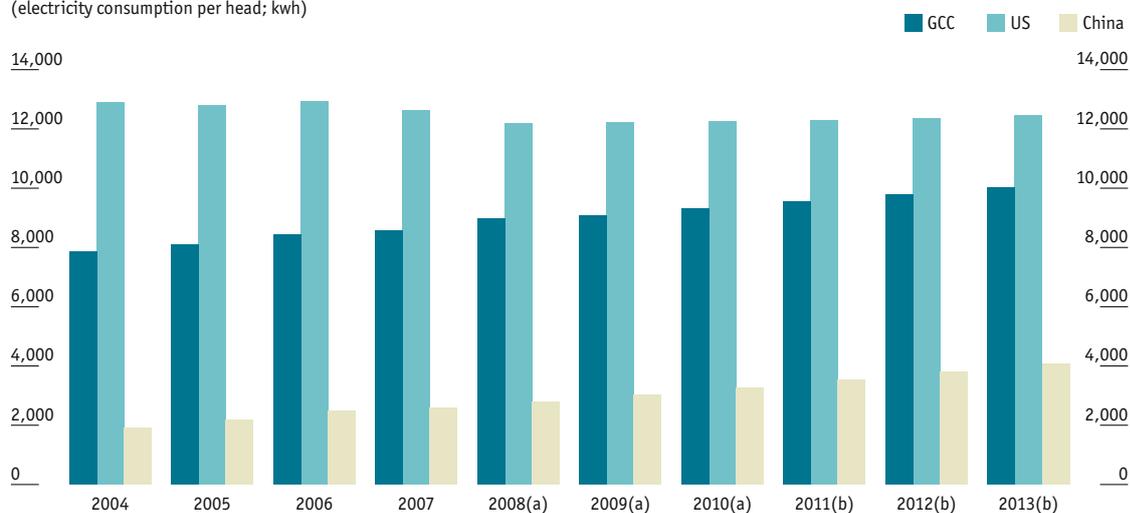


(a) Estimates. (b) Forecasts.

Source: Economist Intelligence Unit.

### In perspective

(electricity consumption per head; kwh)

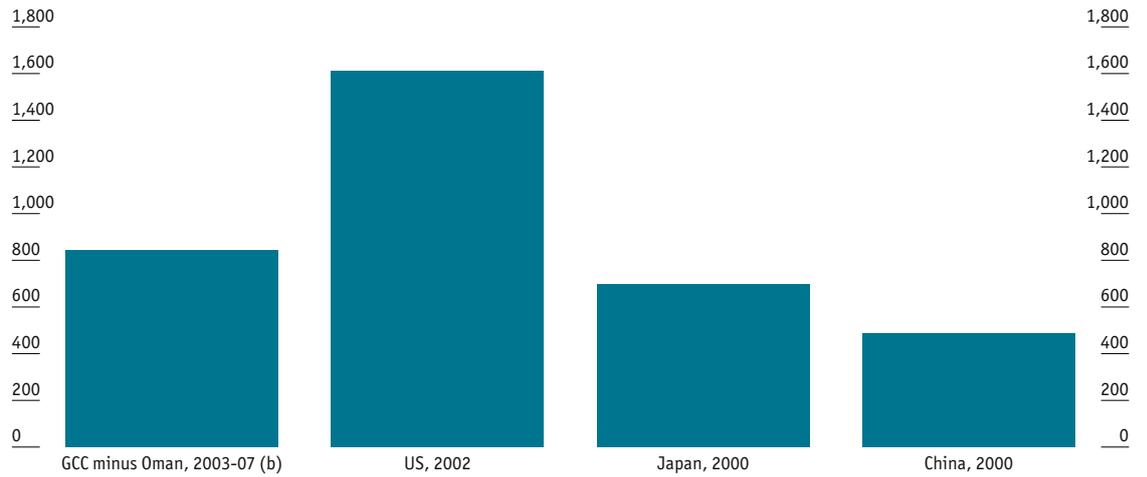


(a) Estimates. (b) Forecasts.

Source: Economist Intelligence Unit.

**Thirsty**

(average water consumption per head in GCC and other regions; cu metres/year) (a)

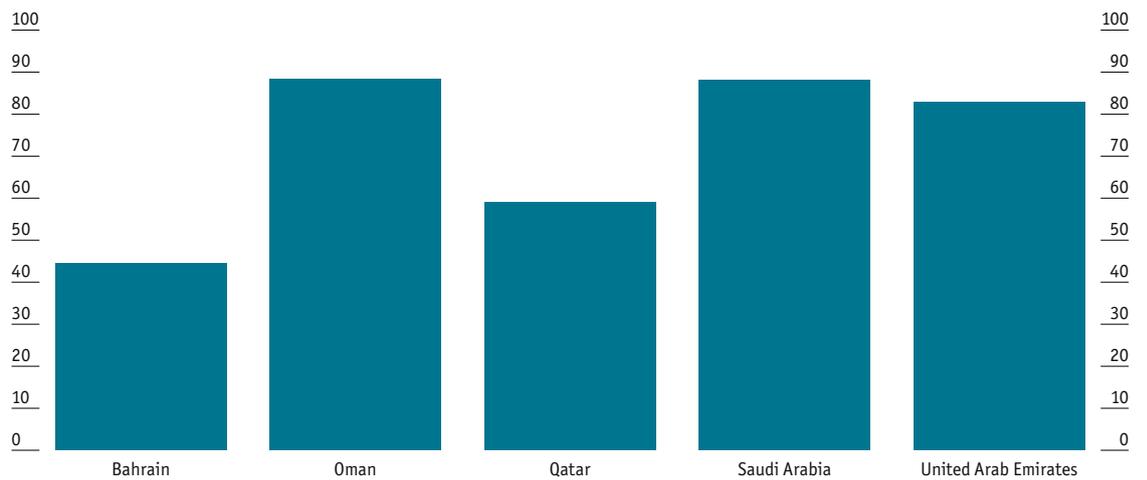


(a) Data for Oman are not available. (b) Water data are very scarce. Figures are sourced from different time periods, as stated.

Source: Food and Agriculture Organisations, Aquastat.

**Cultivated**

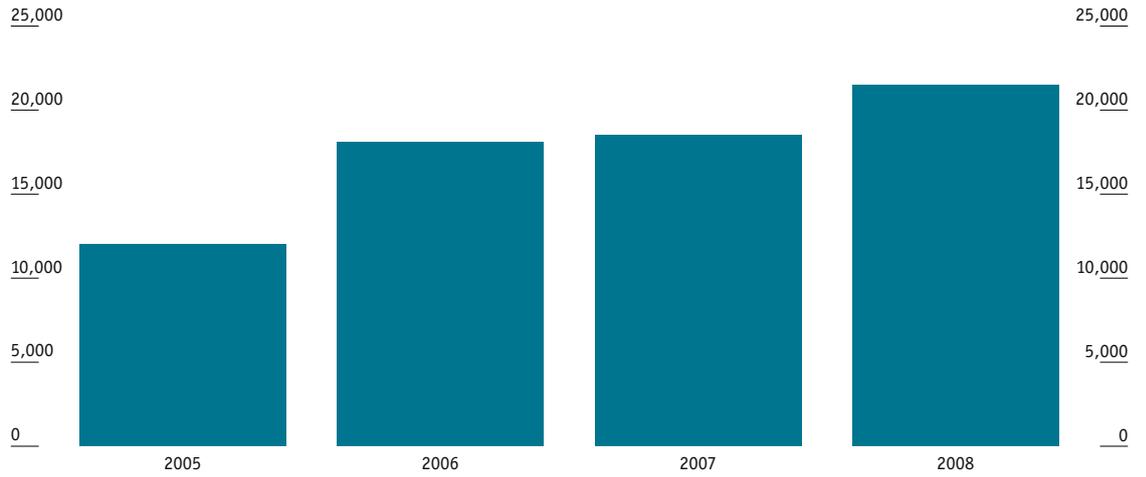
(agricultural use of water in GCC countries as % of total consumption, 2003-07)



Source: Food and Agriculture Organisations, Aquastat.

**Salt-free in Oman**

(millions of imperial gallons purchased by Oman Power and Water Procurement from desalination plants)



Note. No data are available for freshwater use in Oman.

Source: Oman Power and Water Procurement, Annual Reports.

While every effort has been taken to verify the accuracy of this information, neither The Economist Intelligence Unit Ltd. nor the sponsor of this report can accept any responsibility or liability for reliance by any person on this white paper or any of the information, opinions or conclusions set out in this white paper.

GENEVA

Boulevard des Tranchees 16  
1206 Geneva  
Switzerland  
Tel: +41 22 566 24 70  
E-mail: [geneva@eiu.com](mailto:geneva@eiu.com)

LONDON

25 St James's Street  
London, SW1A 1HG  
United Kingdom  
Tel: +44 20 7830 7000  
E-mail: [london@eiu.com](mailto:london@eiu.com)

FRANKFURT

Bockenheimer Landstrasse 51-53  
60325 Frankfurt am Main  
Germany  
Tel: +49 69 7171 880  
E-mail: [frankfurt@eiu.com](mailto:frankfurt@eiu.com)

PARIS

6 rue Paul Baudry  
Paris, 75008  
France  
Tel: +33 1 5393 6600  
E-mail: [paris@eiu.com](mailto:paris@eiu.com)

DUBAI

PO Box 450056  
Office No 1301A  
Thuraya Tower 2  
Dubai Media City  
United Arab Emirates  
Tel: +971 4 433 4202  
E-mail: [dubai@eiu.com](mailto:dubai@eiu.com)