

Energy and Environment in the GCC

By Cinzia Bianco

2015 was one of the hottest and driest years in recorded history. It is increasingly clear that environmental challenges have rapidly grown and require the immediate attention of policy-makers. Last December world leaders gathered in Paris at the COP21 and, in an attempt to develop solutions to these challenges, they reached an historic and ambitious agreement under the United Nations Framework Convention on Climate Change (UNFCCC). The Paris agreement is meant to commit *all* countries to cut emissions, combat climate change and initiate actions toward low carbon economies. For the countries of the Gulf region, where fossil fuels constitute the backbone of the economy, this could be a watershed agreement.

The Gulf is estimated to hold between 40% and 56% of the world's conventional oil and gas reserves. An incredible wealth of resources as, according to the International Energy Agency, oil and gas still represent around 53% percent of the total global primary energy supply. However, fossil fuels are an unstable as a source of energy and as a source of revenue. Not only is oil highly polluting, but its price is subject to fluctuations, as evidenced by the 70% decline that energy prices experienced over the past year. And, oil reserves are finite: new fields tend to be of smaller quantities and less quality, more expensive to produce and more difficult to get at. The situation is further complicated when considering the pace of rising electricity demand throughout the Gulf region. Some GCC countries have even become net energy importers due to population growth and the increasing industrialisation, while an ever increasing quantity of electricity is consumed by water desalination, which is basically the only source of water to the region. All of the above elements are sufficient reasons to push Gulf leaders to explore the realm of alternative energy sources and developing renewable technology.

As a region that receives the greatest portion of solar radiation per year globally, solar and photovoltaic seems one of the most promising source of renewable energy. Saudi Arabia has been at the forefront of research and development in the field, having gone as far as setting the goal of generating some 33% of its domestic power needs via solar within 20 years. A number of pilot activities have been implemented and major institutes and companies that support these efforts. In the Solar Village for example, located northwest of Riyadh, all power is generated by a Photovoltaic Power System operating in the desert environment. King Abdulaziz City for Science & Technology has introduced Solar Water Heating System for domestic water heating and the photovoltaic system to power highway devices in various remote locations within the Kingdom.

Renewable energy development seems a priority also for the UAE. Dubai and Abu Dhabi launched a green building initiative and a sustainable building code already in 2008. The Dubai Electricity and Water Authority is encouraging greater electricity and water conservation, especially through campaigns at public spaces. Additionally, it has recently decided to supply 2000 homes with LED light bulbs and photovoltaic panels. Abu Dhabi has instead developed the Shams 1 plant. With a capacity of 100 megawatts, Shams 1 was the largest concentrating solar power farm in the world when it opened in 2013.

Other countries such as Bahrain, Oman, Qatar and Kuwait are still catching up with technological development. Bahrain has some experience with solar-powered reverse osmosis units for desalination and photovoltaic systems or wind power for water pumping and electricity generation. In Oman, the government is investing in the expansion of solar power: in 2012 the Swiss investment fund Terra Nex and its German counterpart Middle East Best Select decided to invest US\$2 billion in building solar arrays capable of generating 400 megawatts of electricity in the country. Qatar and Kuwait have slowly decided to move towards the development of renewable energy projects. Qatar's Science and Technology Park and Germany's Fraunhofer Institute signed a joint research deal (the Solar Carbon Black Project) that involves the solar thermal production of hydrogen from methane. In mid-June, Kuwait announced the intention to develop an integrated solar project, Al Abdaliyah. The plant will have a total generation capacity of 280 megawatts, of which 60 MW will be solar, with the balance coming from gas and steam turbines. However, the project is still very much an idea.

Despite some solid achievements, many renewable energy projects in the Gulf have suffered from significant setbacks or delays and remain incomplete like the case of Masdar city, located in the UAE and designed to be the world's first zero-emission city. The crux of the issue is that investments in these technologies can be expensive and, being that such technologies are still under development, sometimes the outcomes can be disappointing. However, environmental challenges demand that leaders continue to make efforts to develop new solutions. International cooperation, like that established via the EU-GCC Clean Energy Network, seems to be a valid instrument to exchange know-how and new technologies, disseminate information, design policies, support projects. After all, environmental challenges are international challenges and are definitely best tackled at the international level.