

Renewable and Nuclear Energy

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Overview

An ever-increasing population and a demand for energy resources combined with a depleting source of carbon fuels which also pollute the environment has made it more and more necessary to create alternative sources of energy that are not only renewable but also clean with almost no impact on the environment.

The [Sustainable Development Goal 7](#) aims to ensure access to affordable, reliable, sustainable and modern energy for all. With only [17.5% of total final energy consumption coming from renewable energy](#), this is still a vast area that requires improvements and developments.

The UAE has been building sustainable innovative solutions and creating smooth transitions from traditional sources to alternative sources of energy. This will help meet the rising demands for water and energy across the region. UAE is at the forefront of a global energy revolution that focuses on realigning the way we think about energy generation. The country addresses the issues of climate change that affect global environment by creating economic, environmental and societal shifts. This will ensure a positive outcome for the long-term vision of the leaders.

Diversification of the energy portfolio will see regular investments being made in sectors that focus on innovation in renewable energy. Initiatives need to be taken not just to increase production but also to manage demand as conservation of energy plays a vital role.

Issues

UAE is one of the [world's largest hydro-carbon reserve holders](#) and exporters. The [Organization of Petroleum Exporting countries](#) (OPEC) cites that UAE's oil reserves are the seventh largest in the world for 2013. This endowment has led to a high level of dependency on oil and gas. Historic low production costs and domestic pricing of oil and gas have previously resulted in very high per capita energy consumption.

Initiatives and Impact

The [UAE Energy Strategy 2050](#) was announced with the aim to:

- Create an energy equation of: 44% clean energy, 38% gas, 12% clean coal and 6% nuclear energy
- Increase the contribution of clean energy in the energy mix to 50% from the current 25%
- Save around AED 700 billion by 2050 in energy
- Increase the efficiency of consumption by individuals and corporates by 40%
- Invest around AED 600 billion by 2050 to meet the rising demands of energy
- Create a balance between supply and demand
- Slash carbon footprint in power generation by 70%.

The 24th [World Energy Congress](#) took place in Abu Dhabi in September 2019 under the theme Energy for Prosperity. It was held under the patronage of H. H. Sheikh Khalifa Bin Zayed Al Nahyan, President of The United Arab Emirates.

With an announcement of [deregulation of fuel prices](#) since August 2015, UAE has taken a major step to ensure that domestic pricing of oil does not lead to abuse of the resource.

Solar Energy

According to [International Energy Agency](#), solar power can alone satisfy up to a third of the global power requirements in future. With an abundance in solar resources in the country, UAE has been making strides in the sector.

[Masdar City](#) develops renewable energy projects that assure sustainable urban development. Wholly owned by the Mubadala Investment Company, Abu Dhabi, Masdar has been acting as a catalyst that catapults UAE to a pioneering position in renewable energy in the Arab world.

Clean energy is one of the primary mandates of Masdar. Since 2006, Masdar has invested more than \$4 billion mainly in solar and wind power projects. The Clean Energy division of Masdar uses innovative technologies to use solar power plants for electricity generation and replace traditional thermal use technologies for energy generation and distribution.

With 11 projects in UAE, Masdar is helping UAE become a pioneer in renewable energy. The projects are:

- Ghantoot Desalination Power Plant- Solar Powered
- Sharjah Waste-To-Energy Plant
- Sea Palace Abu Dhabi- 200-kilowatt photovoltaic (PV) solar farm
- Um Al Zomul Off-Grid desert PV solar farm
- Abu Dhabi PV Solar Rooftop Programme
- Murawah Island Solar Farm
- Masdar City Solar Photovoltaic Plant
- Al Jaranin Island PV Plant
- Omran Hospital Rooftop PV
- Shams 1 Concentrated Solar Plant
- Mohammed Bin Rashid Al Maktoum Solar Park Phase 3.

A snapshot of all Masdar projects worldwide is given below:



Source: [Masdar Clean Energy Factsheet](#)

The [Department of Energy](#) (DoE) launched a campaign named “Powering the Olympics” and used the Special Olympics World Games Abu Dhabi 2019 which had more than 7,000 athletes from over 170 countries participating to showcase how energy resources can be conserved and renewable sources of energy be used efficiently through awareness programs and workshops.

Nuclear Energy

Though Nuclear Energy is not traditionally considered a source of renewable energy, it is a powerful source of energy that helps to combat current availability issues of energy. [Emirates Nuclear Energy Corporation](#) (ENEC) was established in 2009 to create a safe and sustainable nuclear energy program that will help build the sectoral capability in UAE. They adhere to the highest level of international standards in safety and security ensuring that clean energy helps power the UAE. ENEC aims to deliver safe, reliable

and efficient nuclear energy to the UAE grid by 2020. On completion it will contribute to nearly 25% of the UAE's electricity needs.

The [UAE Nuclear Energy Policy](#) released in 2008 emphasizes and sets the most exacting standards in maintaining operational transparency, non-proliferation, safety and security. Working directly with the [International Atomic Energy Agency](#), it conforms to highest standards and creates effective partnerships that drive growth of sustainability.

The [Federal authority of Nuclear Energy](#) (FANR) is the regulatory body that governs nuclear programmes in the country ensuring safety, security, radiation protection and safeguards the nation with best international practices. It regularly inspects nuclear facilities in UAE to ensure that all the requirements for safety and regulation are met.

The [Nawah Energy Company](#) was established in 2016 and it is the newest nuclear operator, a result of a public-private partnership between Nawah's Shareholders, the Emirates Nuclear Energy Corporation (ENEC) (82%) and the Korea Electric Power Corporation (KEPCO) (18%). When operational it can supply around 5600 megawatts and reduce UAE's carbon dioxide emissions by 21 million tons annually.

[Compressed Natural Gas](#)

With Compressed Natural Gas (CNG) proving its viability for usage in commercial sectors, UAE has been promoting this alternative source of fuel. CNG produces 20-30% fewer greenhouse gas emissions and is considered one of the safest and cleanest fuel types especially for transportation.

[Emirates Gas](#) (EMGAS) is the leading supplier of Liquid Petroleum Gas (LPG) in the UAE. It is a subsidiary of the [Emirates National Oil Company](#) (ENOC).

The Clean Coal Project

[Hassyan Energy](#) is one of the primary projects of the Dubai's Clean Energy Strategy 2050. It is a joint venture between [ACWA Power Harbin Holding Company](#) (49%) and [Dubai Electricity & Water Authority](#) (DEWA) (51%) to create one of the world's most cost competitive coal fired power projects. With a project cost of \$3,237 million, phase one of the project is set to deliver 2,400 megawatts of clean coal power which is in line with the target of creating a 7% contribution of clean coal in the energy mix.

Wind Energy

Wind farms are a cost-effective and a sustainable solution of producing carbon free electricity. UAE has been actively investing in off-shore wind farms such as the London Array and the Dudgeon Offshore Wind Farm in the United Kingdom through Masdar's initiatives for developing clean energy. Masdar is also a partner in the world's first floating offshore wind farm, Hywind Scotland, which became operational in October 2017. Masdar's on-shore wind farms include:

- Port Victoria Wind Farm - the first large-scale energy renewable project in Seychelles producing nearly 7 MW
- Tafilah Wind Farm - the first commercial utility-scale wind power project in the Middle East region in Jordan producing 117 MW
- Cibuk 1 Wind Farm - the largest utility-scale commercial wind project in Serbia and the Western Balkans
- Dhofar Wind Project - the first large-scale wind farm in the Gulf Cooperation Council (GCC) region in Oman producing 50 MW.

Waste-to-Energy

The process of generating energy from waste (municipal solid waste or rubbish) is one of the most sustainable ways to utilize renewable energy. In 2017, Masdar signed a joint agreement with [Bee'ah](#) an environmental management company in UAE to create the UAE's first waste-to-energy power plant in Sharjah. This plant has a capacity to utilize more than 300,000 tonnes of solid waste from landfill each year to produce 240,000

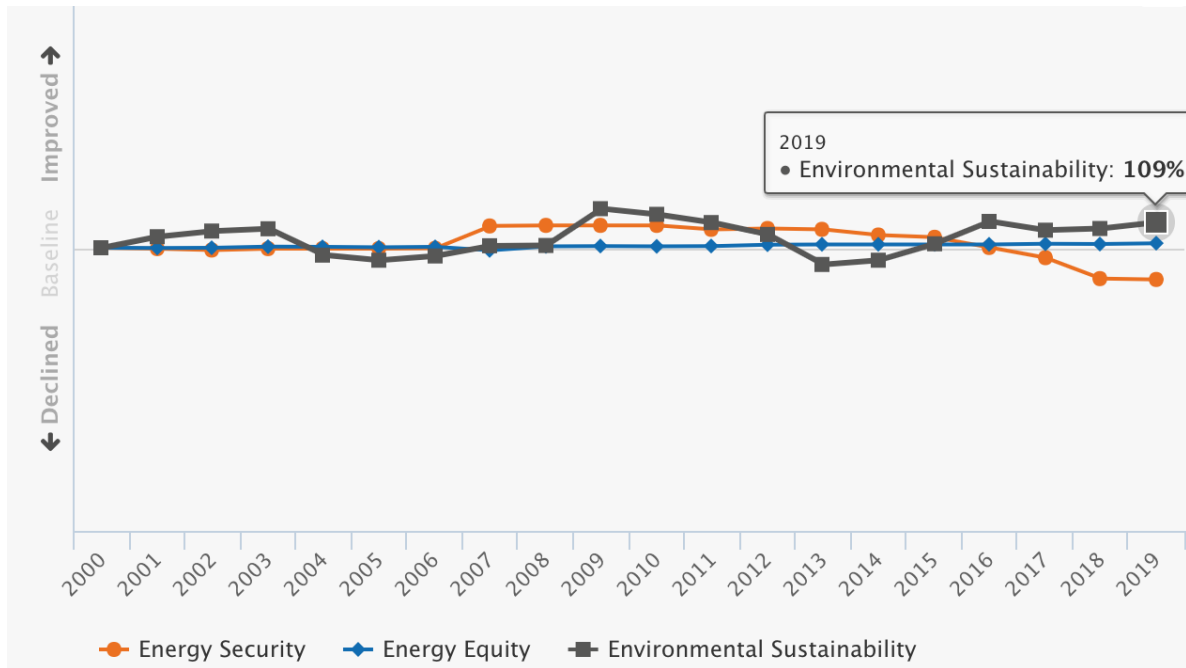
megawatt-hours of clean energy. This will help UAE to achieve the target of the Vision 2021, which aims to divert 75% of the solid waste from landfills.

The Sharjah Waste-to-Energy plant was recently awarded the Best Clean Deal of the Year in the MENA region by the [Project Finance International](#) Awards honoring global leaders in the capital market.

There are [various other plants](#) in conception, under construction or operational in the UAE such as:

- A 100 megawatt (MW) plant is being built on the outskirts of Abu Dhabi near the Mussafah Sea Port. It is touted to be one of the biggest waste-to-energy facilities in the world. This alternative power project will help Abu Dhabi shrink its carbon footprint.
- The largest waste-to-energy plant is being constructed in Dubai. It will be able to process 2,000 metric tonnes every day during the first phase of operations, contributing to 60 megawatts of energy.
- In addition to the existing plants, there is another Waste-to-Energy (WtE) plant being constructed in the Sajja area that will eventually convert 400,000 tonnes of waste per year into 80 megawatts (MW) of electricity. This project will help convert 99% of organic waste into energy.
- An existing facility in Ras Al Khaimah produces around 2 MW of electricity.

UAE has championed major projects proving its commitment to innovate and develop in the renewable energy sector. The UAE was ranked third in the world in the production of concentrated solar power (CSP) in 2013. UAE has achieved 109% in environmental Sustainability in the Energy Trilemma scores by the World Energy Council. It is one of the strongest countries managing both access and affordability for energy.



Conclusion

As the world marches towards utilizing the power of renewable energy, UAE has been making strides in incorporating renewable energy to create an efficient energy mix and reduce dependency on fossil fuels. Various regulations and investments in renewable energy all over the world have proved UAE's commitment to create a sustainable model for producing clean energy.