

# Comparative Analysis on the Nuclear Policy between the GCC States

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## 1. Introduction

Due to incomes of oil and natural gases, the Gulf Cooperation Council (hereinafter referred to as the “GCC”) States have experienced remarkable economic development compared to its neighboring States in the Middle East and Northern Africa. Accordingly, the average of Gross National Income per capita in GCC States is \$75,000, while the average for non-GCC Arab States is only \$8818 [1].

Nevertheless, due to unstable oil price, limitation of resources, further demand for desalination and high growth in domestic energy consumption, the GCC States started to feel the need to decrease their reliance on natural resources and to develop sustainable and reliable source of energy. Consequently, the GCC States have turned their interests to new renewable energy.

Back in 2006, the Council of the GCC has announced that a study on the peaceful use of nuclear energy was being done. Also, in 2007, GCC States agreed to cooperate with the IAEA on a feasibility study for developing nuclear power programme.

As for the individual efforts, the United Arab Emirates (UAE) has started the first run towards nuclear energy by releasing its “Policy on the Evaluation and Potential Development of Peaceful Nuclear Energy” in 2008 and is most likely to be the first State to generate nuclear power among the GCC States [3]. Additionally, Saudi Arabia has started off as the second runner by announcing its interest in developing nuclear power programme in 2009. Furthermore, according to the Saudi Atomic Energy Program Roadmap, which has been delivered in the IAEA, the Saudi government has set its objectives to produce 17 GWe of nuclear capacity by 2040.

On the other hand, other GCC States such as Bahrain, Kuwait, Oman and Qatar, is far behind UAE and Saudi Arabia in developing nuclear power programme.

In 2007, the IAEA has published “Considerations to Launch a Nuclear Power Programme” to act as a guide for newcomers. This publication includes three phases of developing a nuclear power programme [2]. This paper aims to use this IAEA publication to analyze the GCC States’ current status.

## 2. Considerations to Launch a Nuclear Power Programme

In 2007, the IAEA has published “Considerations to Launch a Nuclear Power Programme”. This publication, which is intended to act as a guide for newcomers,

explains the phases for developing a nuclear power programme and factors to consider [2].

### 2.1. Three phases towards the Implementation of a Nuclear Power Programme

According to the IAEA, it takes around 15 years for a technically non-developed State to implement their first NPP from the time of the initial policy decision. This period is consisted of the following three phases. Each phase has its own different tasks and considerations. [2]:

- (1) First Phase : Considerations before a decision to launch a nuclear power programme is taken;
- (2) Second Phase : Preparatory work for the construction of an NPP after a policy decision has been taken; and
- (3) Third Phase : Activities to implement a first NPP.

State is expected to implement the following items at each phases:

#### 2.1.1. First Phase

- Develop a comprehensive nuclear legal framework
- Establish and maintain an effective regulatory system
- Develop human resources for State and operating organizations
- Ensure adequate financial resources
- Develop a programme for all aspects of operation, decommissioning and radioactive waste management
- Manage nuclear materials for the long term
- Communicate in an open and transparent manner with the public and neighboring States

#### 2.1.2. Second Phase

- Enact all the elements of the comprehensive legal framework
- Establish and ensure the competence of the regulatory body
- Decide upon the financial and operational modalities for the ownership and implementation of an NPP
- Establish the long term financial arrangements for decommissioning and radioactive waste management

- Ensure involvement and support for a nuclear programme of all relevant stakeholders
- Define the degree of national technical and industrial participation
- Assess where national technical capability needs to be enhanced and develop a policy for national participation
- Identify requirements and make arrangements for emergency preparedness, security measures and environmental protection
- Perform a feasibility study
- Identify and justify a site
- Establish a long term policy for fuel procurement and spent fuel and nuclear waste management
- Identify the human resources for the NPP
- Establish a competent purchaser organization

### 2.1.3. Third Phase

- Ensure the project is implemented by the owner/operator in accordance with the agreed engineering and quality requirements, safety standards and security guides
- Achieve the competence necessary to operate, maintain and establish full responsibility for the NPP

## 3. Current Status of GCC States

Although none of the States have ever experienced commercial operation of a nuclear power plant, all six GCC States are signatories of the NPT and Member States to the IAEA. The following status has been reviewed from the GCC States' National Report of the Seventh Review Meeting of the Convention on Nuclear Safety (CNS).

### 3.1. United Arab Emirates

As the first runner, the UAE is well-known to be the first State to ever construct a nuclear power plant in the Middle East. Since the UAE Nuclear Policy has been adopted by the UAE Cabinet of Ministers in 2008, the UAE established a legal and governmental framework to develop their nuclear power programme. The Emirates Nuclear Energy Corporation (ENEC), operator of the nuclear power plant, was established in 2009. Likewise, Federal Authority for Nuclear Regulation, the regulatory body, was also established in 2009 [3].

To implement UAE's ambitions to generate nuclear powers, ENEC has signed the Prime Contract with Korea Electric Power Corporation (KEPCO) in 2009 for construction of four APR1400 nuclear power plants. Barakah, the name of the first UAE's nuclear power plant, has begun its construction in 2012 and the first unit is expected to be operated within the year 2018.

UAE, consequently, has implemented all the three phases for launching a nuclear power programme and thus can be considered to be in the Third Phase.

### 3.2. Saudi Arabia

Saudi Arabia, the second runner, seems optimistic in becoming the owner of the second nuclear power plant among the GCC States.

In 2010, by Royal Order, the Nuclear Policy has been adopted and King Abdullah City for Renewable and Atomic Energy (K.A.CARE) has been appointed to implement nuclear projects in the Saudi Arabia. Currently, Saudi Arabia has no nuclear facilities as defined in the CNS, nevertheless, they have conducted Self-Assessment in the early planning phases of nuclear programme through IAEA's milestone approach.

K.A.CARE is currently focusing on developing and strengthening the Saudi Nuclear Law, human resources and capabilities for emergency response and preparedness. They have been cooperating with many international organizations such as the Radiation and Nuclear Safety Authority (STUK) of Finland to complete the mentioned tasks. Moreover, a regulatory body is expected to be created by K.A.CARE by the end of 2017 [4].

Not only developing their infrastructure, but Saudi Arabia is also working towards operating an actual reactor. To implement their plan to provide 20% of country's electricity through nuclear power by 2040, the Saudi government signed an MOU with the Korean government in importing the SMART reactor. SMART, a 330 MWt pressurized water reactor, is expected to generate up to 100 MWe of electricity. Currently, many K.A.CARE employees have been dispatched to Korea Atomic Energy Research Institute (KAERI) to cooperate for the SMART reactor.

To sum up, although Saudi Arabia does not yet own a nuclear facility defined in the CNS, they have been working towards operating one in the near future. Accordingly, they can be considered to be in the First Phase.

### 3.3. Bahrain

Bahrain, slightly bigger than the Seoul city, is the smallest State in the GCC. Currently, they do not own nuclear facilities defined in the CNS. Previously in 2010, Minister Fahmi Al Jowder has expressed Bahrain's plans to develop nuclear energy by 2017, however, this plan has been indefinitely postponed in 2012. To act as the regulatory body, the Supreme Council for Environment (SCE) was established in 2012 to give authority to all licensing and authorization, control and inspection activities related to the usage of radiation sources. On the other hand, the Civil Defense is legally responsible for all radiological emergencies in Bahrain [5]

Thus, Bahrain can be considered to be in the First Phase.

### 3.4. Kuwait

In 2010, the Kuwaiti government has expressed their wishes to operate four nuclear power plants by 2022. However, such plan has been retracted after the Fukushima accident in 2011. From the introduction of the National Report, Kuwait confirms that there are no plans to implement any nuclear power programme. Yet, due to significant developments of nuclear energy in the region, Kuwait acknowledges the importance of radiation protection in their land. Ministry of Health was assigned as the regulatory authority in 1977 and is currently fulfilling its duties to protect the land and people. The Radiation Protection Department (RPD) and Radiation Protection Committee (RPC) have the authority within the Ministry of Health to carry out the related tasks. Like the case of Bahrain, the Civil Defense is to carry out the radiological emergencies [6].

As a result, Kuwait, with no developments of nuclear power programme, can be considered to be in the First Phase.

### 3.5. Oman

Oman also emphasizes the point that there is no nuclear law and has no intentions to embark on a nuclear power programme. The role of the regulatory body is assigned to the Ministry of Environment and Climate Affairs and all nuclear and radiation matters are dealt within the Law of the Conservation of the Environment and Prevention of Pollution. However, they do have the Department of Radiation Protection to deal with matters of inspecting radioactive sources within Oman. The National Committee for Civil Defense is responsible for development and implementing emergency preparedness tasks and is currently on the way of training the respond team members and acquiring necessary equipment and instruments [7].

Accordingly, Oman can be considered to be in the First Phase.

### 3.6. Qatar

Qatar is not a Contracting Party to the CNS and thus do not have an official National Report. They have recently constructed and operated the Ras Laffan C thermal power plant which has the capacity of 2730 MWe. Moreover, Qatar is currently facing the worst diplomatic crisis in the region. GCC States such as Saudi Arabia, UAE and Bahrain have accused Qatar for supporting terrorism and accordingly, cut their diplomatic ties with Qatar. Considering that Qatar has recently built a power plant and their relationship with neighbors are in a rupture, it seems unlikely that Qatar will develop nuclear power programme anytime in the near future.

Hence, Qatar, with the least developed nuclear infrastructure among the GCC States, can be considered to be in the First Phase.

## 5. Conclusion

Due to high investment cost in building a nuclear power plant, GCC States are likely to be the potential newcomers of nuclear energy in the Middle East. This paper used the IAEA's "Considerations to Launch a Nuclear Power Programme", which has provided the three phases milestone to the embarking States, as the framework to analyze the current GCC States' nuclear energy policy and status as mentioned in the CNS National Report.

Currently, UAE is the leading State in nuclear energy among the GCC. They are in the construction of four nuclear power plants and is likely to start commercial operation in the year 2018. Thus, they could be defined to be in the Third Phase. Saudi Arabia is at the second lead by implementing plans to construct the SMART reactor and establishing a fully devoted regulatory body to nuclear energy. Accordingly, they could be assessed to be in the First Phase. Bahrain and Kuwait had previously announced their plans to develop nuclear energy, but the plans have been withdrawn after the Fukushima accident due to rise of concerns regarding safety. Oman has no nuclear law and has no intention on developing nuclear energy. Furthermore, Qatar is not a Contracting Party to the CNS and is facing diplomatic crisis, thus, is not likely to develop nuclear energy in the predictable future.

## REFERENCES

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