Nuclear energy currently provides approximately 11% of the world's electricity needs. In South Africa, Eskom uses various technologies to generate electricity, the combination of which is called the "plant mix." The utility is constantly investigating other forms of energy and renewable energy sources that could be used to expand its current energy mix (GIX001Rev(2014)).

Nuclear is one of the sources of energy used in South Africa. While the country can benefit from having more capacity through nuclear generation, there are currently issues that have delayed the project. Current Steam Generators are old, and the technology is being phased out by 2020 and consideration of possible thermal power uprates.

The long term strategy is the possible extension of the life of Koeberg Nuclear Power Station. The utility has been engaging with the IAEA and the Regulator concerning putting in place programs and processes to enable possible Long Term Operation. As part of this long term strategy, Eskom has embarked on the steam generators project. The project involves the specification, design, manufacturing, removal and installation of the 6 Inconel 600 steam generators (3 per unit).

The current generators are reaching the end of life and are susceptible to primary water stress corrosion cracking (PWSCC). The percentage of cracked tubes per SG varies from 0% to 14% of the total number of tubes. Inconel 600 steam generators are also prone to attack of the tube material due to the chemical conditions of the Secondary Side feedwater leading to inter-granular stress corrosion cracking (IGSCC). Most reactors similar to KNPS has already replaced their steam generators of similar design to the latest technology. KNPS was, however, able to extend the life of the existing generators by implementing an operating regime at a reduced temperature. The latest international experience has demonstrated that SG replacement presents an opportunity to both extend the operating life of the units, and increase their power output through improved heat transfer capabilities.

**Women involved!**

The team, consisting of experienced physicists/engineers, will be involved in diverse assignments in the fields of neutronics, core design, mechanical analysis, thermal hydraulics, Probabilistic Safety Analysis (PSA), etc. This is an opportunity of a lifetime for some of the women involved. Thando Kana, is part of the first team off to the AREVA offices in Lyon, France, during March 2015. She is integrated in the AREVA Neutronics team, focusing on reactor core design. The dynamic duo, consisting of Shirley Movalo will be integrated in the AREVA Neutronics team in Paris. The team departed recently to start their much-anticipated 12-month assignment.

Last but not least, Linda Jacobs (PSA) and Judith Ncapayi are part of the team getting ready to break new ground during August and September 2015. The team will be integrated in the AREVA offices in Lyon, France, during March 2015. She is integrated in the AREVA Neutronics team, focusing on reactor core design. The dynamic duo, consisting of Shirley Movalo will be integrated in the AREVA Neutronics team in Paris. The team departed recently to start their much-anticipated 12-month assignment.

**Project Milestones**

1. **Milestone 1 Start of critical materials procurement at AREVA in Lyon:** 30th May 2015.
2. **Milestone 2 Start of steam generators manufacturing at AREVA in Japan:** July 2015.
3. **Milestone 3 Safety Case activities at the NNR:** March 2016.

**Benefits**

- The main benefit will be improved safety of the Koeberg Nuclear Power Station (KNPS).
- Indirectly, it will lead to:
  - Consistent power supply and less need for maintenance.
  - Allow for possible future life extension of the plant to 60 years.
  - Opportunity for power uprate of up to 10% of additional clean, low carbon power.
  - Less dose to workers.
  - More personal time for workers and their family.

**Strategy for the Future**

- "Projet Simunye" is planned for 2018-2019. Eskom signed the contract with AREVA NP in 13 February 2015 and involves:
  1. Design and manufacturing of individual components, assembly of the steam generators, including the shop hydro testing and transportation to the Koeberg site.
  2. Removal of the old steam generators and the installation and commissioning of the new steam generators. Also includes the disposal of the old steam generators.
  3. All engineering and safety studies associated with the installation of the new steam generators.

**Opportunities!!**

Through the Supplier Development and localization (SDL) Programme, Eskom wants to enhance the awareness and sustainable local development impact through leveraging its procurement spend to accommodate government's local development policies and practices.