

DEVELOPING THE REGULATORY INFRASTRUCTURE FOR NUCLEAR POWER



TM on Topical Issues in the Development of Nuclear Power Infrastructure
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OUTLINES

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BACKGROUND



- Area: 1,886,068 km²
- Population: 38,435,252



INTRODUCTION

- ❑ The need for electricity in Sudan is increasing rapidly for industrial, agricultural and domestic sectors.
- ❑ Current installed capacity is 3175 MW (50% hydro and 50% thermal).
- ❑ The energy mix consist of; hydro power, steam turbines, gas turbines, combined cycle and diesel engines.
- ❑ Demand for electricity is expected to reach ~ 8500 MW by 2031.
- ❑ Sudan plans to introduce nuclear power in 2029.

ACCOMPLISHMENTS

- ❑ Sudan's NEPIO is headed by the Undersecretary of MWRIE.
- ❑ The NEPIO includes national teams for handling various nuclear power infrastructure issues.
- ❑ The NEPIO teams include different stakeholders such as SAEC, **Sudanese Nuclear & Radiological Regulatory Authority (SNRRA)** , Geological Research Authority of Sudan (GRAS), Sudan Meteorological Authority (SMA), Ministry of Justice, Ministry of Finance, Universities, MWRIE,.....etc .

ACCOMPLISHMENTS

- ❑ Signing of the agreement concerning “Peaceful Uses of nuclear Energy” between the Government of the People's Republic of China and the Government of the Republic of Sudan. Sudan’s president has endorsed the agreement.
- ❑ Signing a number of MoUs and agreements between Ministry of Water resources, Irrigation & Electricity (MWRIE) and China National Nuclear Corporation (CNNC) (2010 – 2016) concerning the Nuclear Power Plant project.

NEPIO Chairman

Foreign Ministry
Representative

Highly Environment
Council President

SAEC Director
General

**SNRRA Secretary
General**

Owner representative
(MWRIE)

State representative
(where Site will be)

Highly Civil Defense
Council President

Ministry of Justice
Representative

Ministry of Finance
Representative

NEPIO chart

ACCOMPLISHMENTS

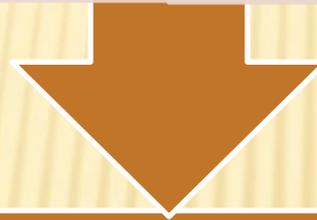
- ❑ Pre-feasibility Study for Sudan first NPP has been carried out by a national team supported by an overseas consultant.
- ❑ The main outcome of the Pre-feasibility Study is that introduction of nuclear power plant in Sudan's electricity production and respectively construction of the first NPP in the country is feasible and possible.

ACCOMPLISHMENTS

Site Selection – Phase 1

Three regions

Nine potential sites



Site Selection – Phase 2 (Pre-feasibility Study)

to fill the gaps of the site survey stage and to determine candidate sites. Technical and financial proposals under discussion between WRIE & CZEC.

ACCOMPLISHMENTS

- National teams currently working on; siting, Human Resources development, Planning, Public consultation and stakeholders involvement, Electrical grid, nuclear safety, emergency preparedness, nuclear security, treaties and conventions, Regulatory framework, NPP Finance, higher steering committee for self- evaluation of NPP.

ACCOMPLISHMENTS

- ❑ A national team supported by an international consultant hired in May 2012 finalized HRD master plan including the regulatory body.
- ❑ The plan covers the 1st, 2nd and third NPPs as well as the needs of the RA and supporting organizations.
- ❑ Two experts from IAEA participated in the workshop for reviewing Sudan's human resources development plan (HRDP) which was conducted in Khartoum, February 2015.

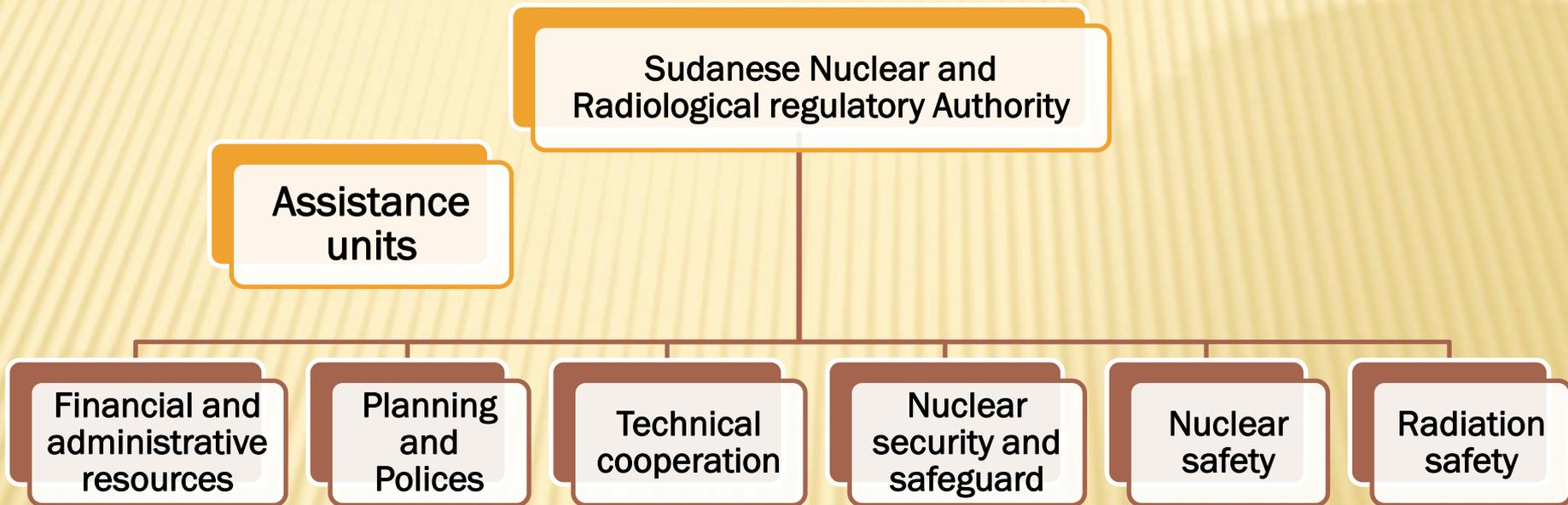
ACCOMPLISHMENTS

- ❑ International consultant was hired in May 2012 to finalize stakeholders involvement, public consultation strategies for Sudan Nuclear Power Program.
- ❑ These strategies have been reviewed by national team supported by international experts.

ACCOMPLISHMENTS

- ❑ In February 2010 Sudanese Nuclear and Radiological Regulatory Authority (SNRRA) has been established according to the ministerial decree, and derived its powers from Sudan Atomic Energy Commission 1996 Act and its related regulations.
- ❑ 11 January 2017 the Sudan national assembly (Parliament) approve the new nuclear and radiological activities control law.
- ❑ The new law established an effective and independent regulatory body under the name “ Sudanese Nuclear and Radiological Regulatory Authority”.

SNRRA CHART



ACCOMPLISHMENTS

- Staffing of the Technical Office now (2016) is 43 (29 professionals + 14 supporting) performing regulatory functions duties.

ACCOMPLISHMENTS

- ❑ National teams are working on developing and /or upgrading the nuclear and radiological regulations.
- ❑ Drafting of Regulations for radioactive waste management , safe transport and the rest of radiological regulations are on going.
- ❑ The NEPIO chairman in 2013 formed an Independent Review Committee to draft regulations for nuclear applications.

ACCOMPLISHMENTS

- ❑ in June 2015 the committee has been reformed by a decree from the Director General of Sudanese Nuclear and Radiological Regulatory Authority (SNRRA) under the Name of “Technical committee for drafting regulatory Documents”.
- ❑ Six regulations on siting, design, construction, commissioning and operation, quality management, authorization process and authorization procedure have been drafted.

ACCOMPLISHMENTS

- ❑ The D.G of SNRRA forming a national committee to draft the national policy for safety, this committee expect to finish their work next month.
- ❑ A national enforcement policy for nuclear applications have been drafted by a national committee formed by the D. G. of SNRRA.
- ❑ A national team supported by an international consultant developed the quality assurance plan for Sudan NPP , the plan addressed the requirements of QA for the owner, operator and the regulatory body.

ACCOMPLISHMENTS

- ❑ Formation of a National Committee for Studying International Treaties and Conventions related to Nuclear Power in 2010.
- ❑ Conducted national workshop in 24 January 2017 including the relevant stakeholders to address the final report of the International conventions relevant to nuclear and radiological applications achieved by a national committee under auspices of the National Nuclear and Radiological Regulatory Authority.

Multilateral Agreements

	Title	In Force	Status
CPPNM	Convention on the Physical Protection of Nuclear Material	2000-06-17	accession: 2000-05-18
NOT	Convention on Early Notification of a Nuclear Accident		Signature: 1986-09-26
ASSIST	Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency		Signature: 1986-09-26
NS	Convention on Nuclear Safety		Signature: 1994-09-20
RSA	Revised Supplementary Agreement Concerning the Provision of Technical Assistance by the IAEA (RSA)	1989-02-23	Signature: 1989-02-23

Safeguards Agreements

Reg. No	Title	In Force	Status
1231	Application of safeguards in connection with the Treaty on Non-Proliferation of Nuclear Weapons (with Protocol)	1977-01-07	Signature: 1975-02-26

SELF- EVALUATION FOR SUDAN NPP PHASE1

- ❑ With the IAEA the NEPIO start drafting the SERs for phase1 since Feb 2016
- ❑ Higher steering committee headed by the NEPIO chairman has been formed to supervise the self-evaluation processes.
- ❑ The SERs were completed and dispatched to the IAEA last year.
- ❑ The evaluation has revealed that majority of conditions need significant actions and the rest of them require minor actions or even no actions at all.

LOCAL CONSTRAINTS

- ❑ Lack of competent regulatory staff in nuclear Power.
- ❑ Need more effort to complete the regulatory infrastructure concerning the Nuclear power.
- ❑ Brain drain of trained persons to countries with better infrastructure in Nuclear power.
- ❑ Investigating various financing mechanisms (EPC, BOT, BOOT...) for 1st NPP.

LOCAL CONSTRAINTS

- ❑ Lack of input data needed for preparing the BIS documents.
- ❑ Uncertainty in the results of conducted studies, stemming from the poor national databases, necessitates conducting further confirmatory studies before starting detailed Site Characterization stage.

FUTURE ACTION PLAN 2017

- ❑ Enhancement of the country's regulatory authority and set the national regulations , codes , standards and licensing procedures.
- ❑ Completing Site Selection stage and conducting the site characterization.
- ❑ Secure and finalize nuclear power plant financing .
- ❑ Implementation of the HRD master plan.
- ❑ Holding an INIR mission for phase 1

Thank you

