

Establishment of the NNR Centre for Nuclear Safety and Security (CNSS)- Project Overview



*For the protection of persons, property
and the environment against nuclear damage.*

Dr S Nhleko
05 October 2016



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Background

South Africa currently does not have a dedicated Centre for nuclear safety and security.



Background: Examples....

IRSN
INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

France



Background: Examples....



**Nuclear and Radiation Safety Centre
(NSC) NNSA - China**



Background: Examples.....



한국원자력안전기술원

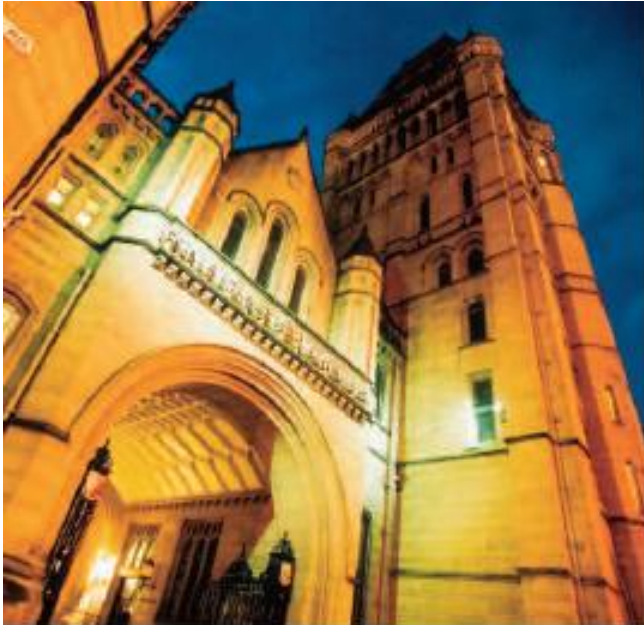
KINS

KOREA INSTITUTE OF NUCLEAR SAFETY

South Korea



Background: Examples....



Dalton Nuclear Institute

UK



Background...

The absence of a dedicated Centre for nuclear safety and security makes it both challenging and difficult for the National Nuclear Regulator (NNR) to fulfil its regulatory objective of protecting the public, property and the environment against nuclear damage as mandated by the NNR Act No. 47 of 1999.



Current challenges

- 1. Ageing workforce**
- 2. Ageing plants and design life extension – SGR**
- 3. New Build Programme – Site Licence Application**
- 4. Understanding new nuclear technologies**
- 5. Addressing of lessons learnt (Fukushima)**
- 6. Dealing with nuclear waste (interim and long term)**
- 7. Harmonization of nuclear regulation (medical and industrial)**



Current challenges.....

8. Public Reputation



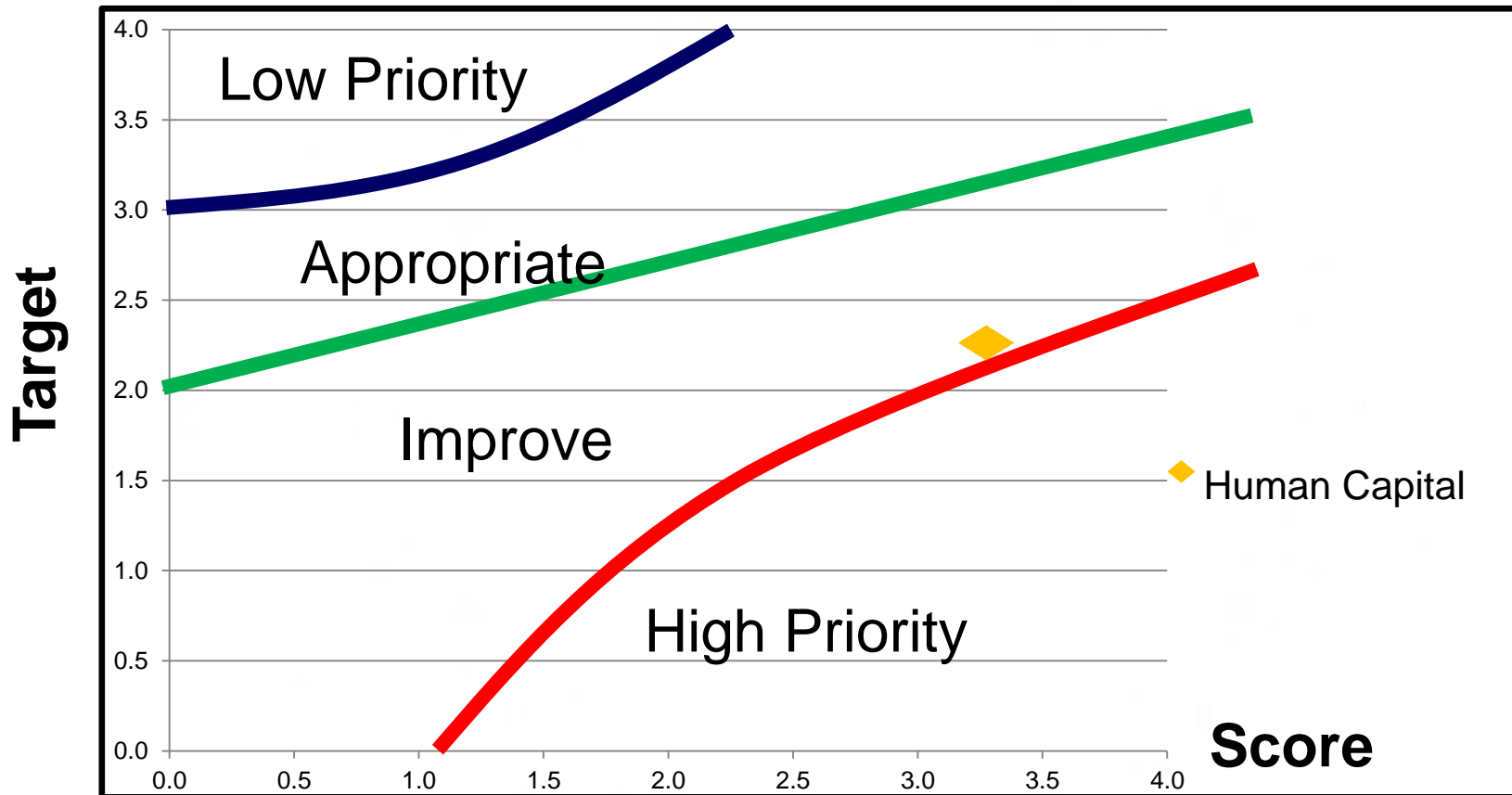
Regulator

“South Africa’s **National Nuclear Regulator (NNR)**, unlike its counterpart NERSA, is **toothless, lowly-skilled and open to political manipulation**. The **NNR** lacks the necessary vigour to play the required meaningful role required of it in any robust **nuclear procurement process**.”

Morning Media Alert news 2015-07-06



Current challenges.....



Results from ECAP Workshops (courtesy of North West University) showed that the Human Capital Development score for the nuclear sector needs to improve



Alternative view of the challenges

The lack of a Centre for Nuclear Safety in the country is a major opportunity for economic growth!



NNR CNSS Strategy

To address the challenges, the NNR embarked on an initiative to establish a Centre for Nuclear Safety and Security by entering into memoranda of agreements with local and international academic institutions in accordance with the NNR Act.

NNR CNSS Strategy



Eleven options were explored to address challenges (or opportunities):

- 1) Do **Nothing**; (leads to exposure to intolerable risk or missed opportunity)
- 2) Establish a centre as a **separate government agency or state-owned entity**; (outside NNR mandate)
- 3) Establish a centre as a **unit within the NNR**; (failed in the past)
- 4) Establish a centre in **collaboration with CSIR**; (CSIR lack nuclear safety expertise)
- 5) Establish a centre in **collaboration with NECSA**; (regulatory independence)
- 6) Establish a centre in **collaboration with ESKOM**; (regulatory independence)
- 7) Establish a centre in **collaboration with the vendor of choice for the new-build projects**; (regulatory independence)
- 8) Establish a centre in **collaboration with a overseas partner(s) independent from the vendor of choice for the new-build project**; (does not fully address localization needs)
- 9) Establish a centre based on the **EU CBRN CoE** prescribed methodology; (process needs to be driven by DoE as a lead department)
- 10) Establish a centre based on the **DST-NRF CoE** prescribed methodology; (DST lack nuclear safety expertise)
- 11) Develop a business case to establish an **NNR owned centre that takes into account circumstances unique to the nuclear industry** in collaboration with local universities and international partners . (selected as the preferred option)

eliminated

NNR CNSS Strategy....



1) Project Charter Development with a mandate:

To address identified challenges



2) Project sponsorship directly by:

Office of the CEO



3) Appointment of Steering Committee and the Project Team to develop:

a) **Business Case** – to evaluate various options

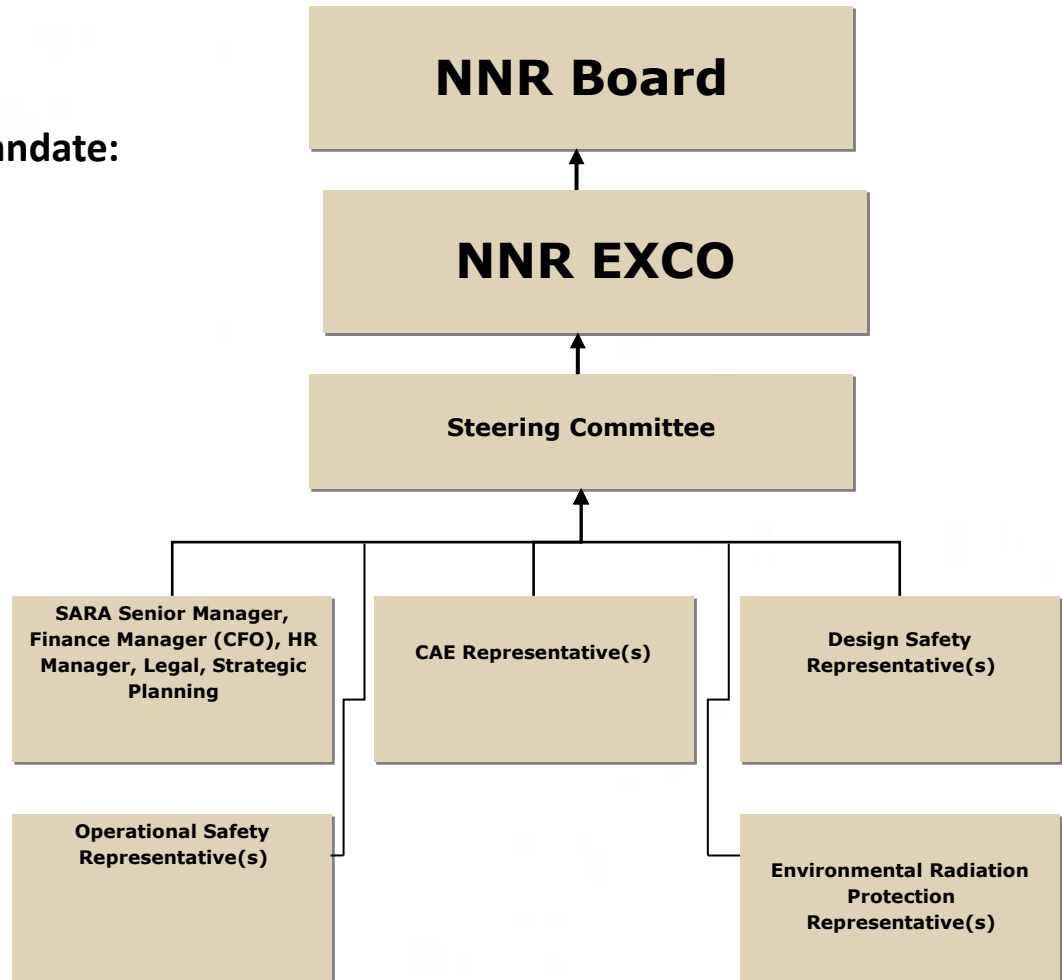
b) **Strategy** – to implement best option

c) **Project Plan** – to implement strategy



4) Request for project approval from:

EXCO & NNR Board of Directors





NNR CNSS Strategy

Section 7 of the NNR Act gives the NNR powers to engage in the following activities for the purpose of achieving its mandate:

- ❖ Collaborate with any institution in connection with any matter falling within the objectives of the NNR;**
- ❖ Collaborate with any educational scientific or government or institution;**
- ❖ Provide on such conditions as the NNR thinks fit, financial or other assistance in connection with the training of NNR staff.**



NNR CNSS Strategy

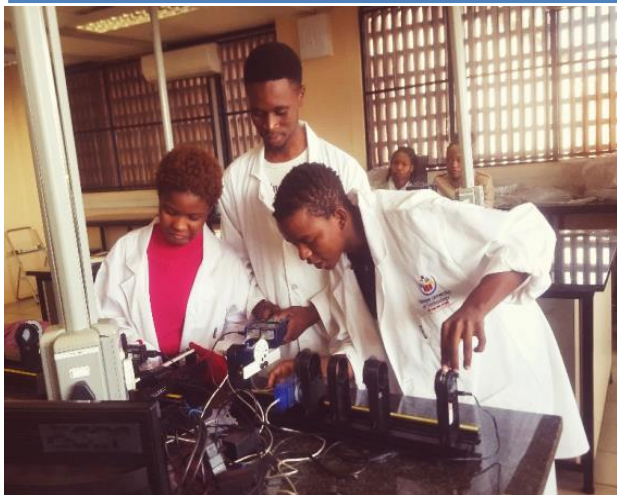
Centre for Nuclear Safety and Security



Key Programmes – Three Pillars



Nuclear Education
and Training



Regulatory
R&D



Technical Support

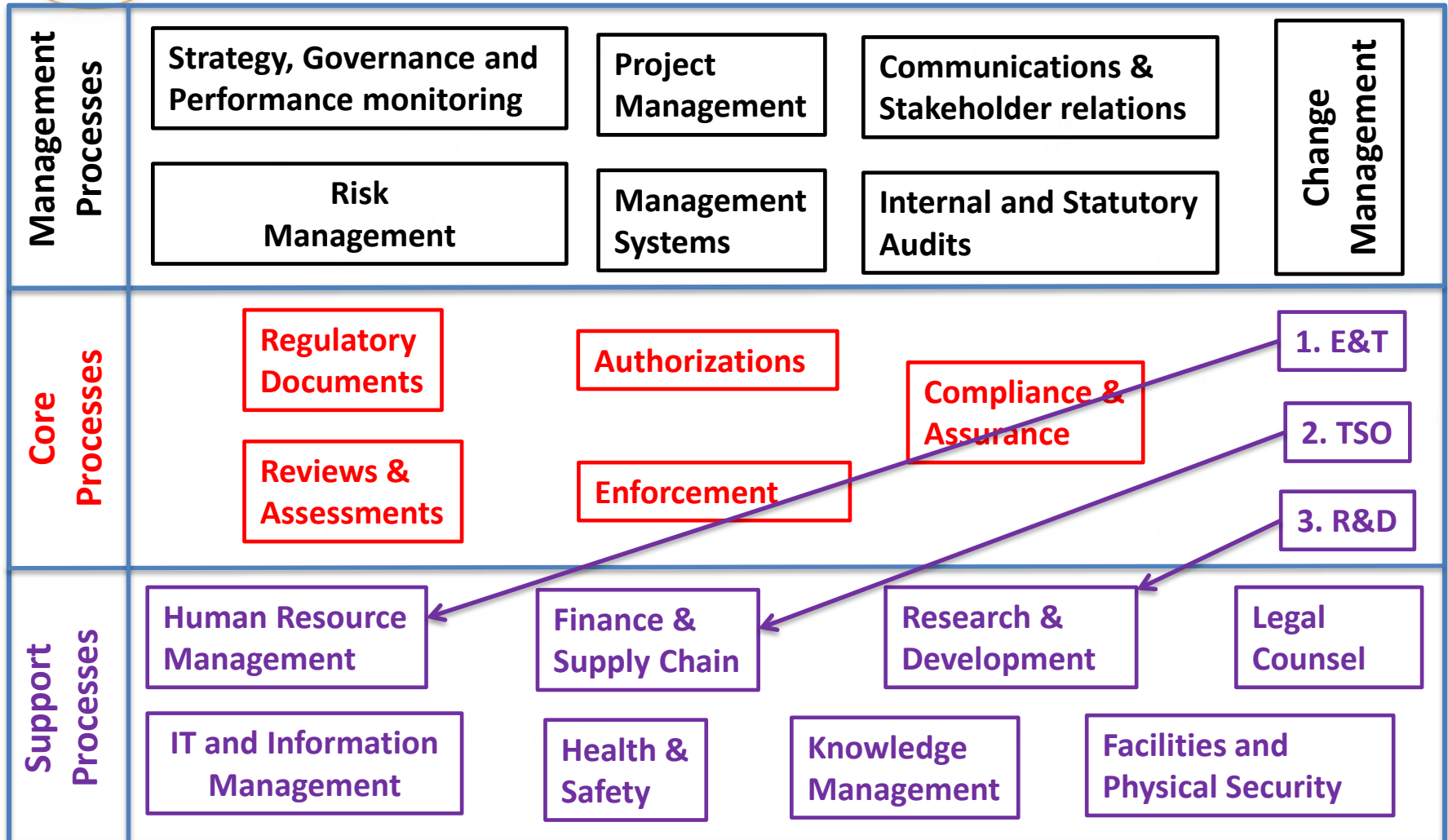




CNSS Strategy...

Why Focus on three pillars – i.e. E&T, R&D and TSO?


NNR Process Model





CNSS Strategy....

Step 1: Call for Expression of Interest and Requests for Information (RFIs) sent to DVCs



NATIONAL NUCLEAR REGULATOR
For the protection of persons, property and the environment against nuclear damage

**REQUEST FOR INFORMATION
TERMS OF REFERENCE (TOR)**


For General Enquiries: Contact : Ms J Legobe E-mail: J.Legobe@nnr.oo.za Tel: 012 001 8441 or 012 874 7100	For Technical Enquiries: Contact : Dr S Nhlleko E-mail: snhlleko@nnr.oo.za Tel: 012 874 7143
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RFI No.	Title	Closing Date
NNRSCM06/15	EXPRESSION OF INTEREST AND REQUEST FOR INFORMATION FOR COLLABORATION IN THE ESTABLISHMENT OF THE NNR CENTRE FOR NUCLEAR SAFETY AND SECURITY	03 July 2015



Offered by:

Registered Name:

Address:





professionalism integrity value our people excellence teamwork openness & transparency



- Institution Name
- University of Michigan
- University of Pennsylvania
- Tshwane University of Technology
- University of Pretoria
- Wits University
- University of Johannesburg
- University of Cape Town
- University of KwaZulu Natal
- Durban University of Technology
- Mangosuthu University of Technology
- University of Zululand
- Free state University
- Western Cape University
- Cape Peninsula University of Technology
- Rhodes University
- Nelson Mandela Metropolitan University
- North West University
- University of Stellenbosch



CNSS Strategy....

Step 2: Workshops with Universities and Site Visits





CNSS Strategy....

Step 3: Request for Proposals (RFPs) issued to DVCs of universities

NATIONAL NUCLEAR REGULATOR
For the protection of persons, property and the environment against nuclear damage

REQUEST FOR PROPOSALS
TERMS OF REFERENCE (RFP TOR)

<p>For General Enquiries: Contact : Ms J Legoabe E-mail: JLegosabe@nnr.co.za Tel: 012 001 8441 or 012 674 7100</p>	<p>For Technical Enquiries: Contact : Dr S Nhleko E-mail: snhleko@nnr.co.za Tel: 012 674 7145</p>
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RFP No.	Title	Closing Date
NNRSCM09/15	REQUEST FOR PROPOSALS FOR COLLABORATION IN THE ESTABLISHMENT OF THE NNR CENTRE FOR NUCLEAR SAFETY AND SECURITY	31 OCTOBER 2015

Offered by:

Registered Name:	
Address:	

professionalism

integrity

value our people

excellence

teamwork

openness & transparency



CNSS ENABLERS (enabler ID)	DESCRIPTION
(HPI)	Host partner institution with a suitable Programme Office building
(LPI)	Local partner institutions including local academic institutions with relevant infrastructure, and expertise in nuclear safety E&T, R&D and TSO
(IPI)	International partner institution including academic institutions with relevant infrastructure and expertise in nuclear safety E&T, R&D and TSO



CNSS Strategy....

Envisaged scope of activities

E&T Activities	R&D Activities	TSO Activities
42 Undergraduate courses	104 Research topics	31 Technical support areas
28 Postgraduate courses		
89 Continuing Professional Development Courses		



CNSS Strategy....

Envisaged numbers of new staff to be trained

Country	No. of regulatory staff	Installed Nuclear Power Capacity (GWe)	Staff capacity ratio (no. of staff per Gwe)	No of staff required for 9.6 Gwe programme
South Africa	130	1.8	72	693
Vietnam	250	4	63	600
Belarus	82	2.4	34	328
UAE	200	5.6	36	343
Belgium	220	5.8	38	364
Canada	800	14.6	55	526
Finland	290	4.3	67	647
Switzerland	70	3.2	22	210
South Korea	660	20.5	32	309
United Kingdom	240	9.5	25	243
Unites States of America	3600	100.35	36	344
		Mean	44	419
		STD dev.	17	168

Mean = 419

STD dev. = 168

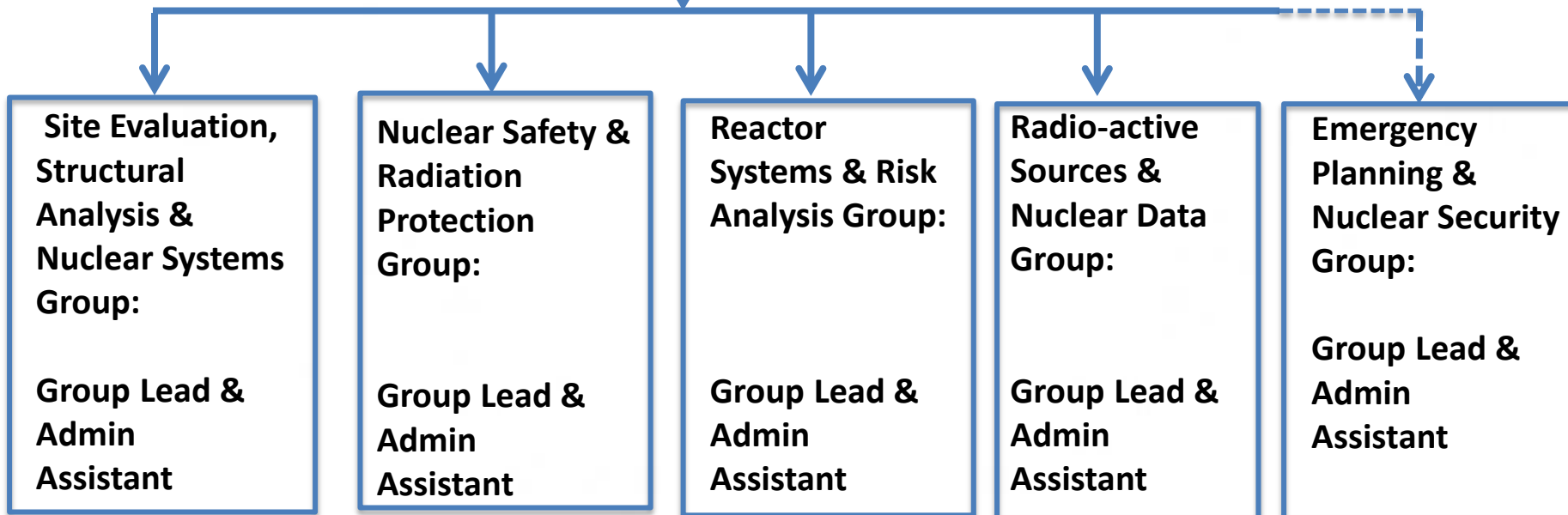
For a 68% confidence level NNR must be prepared to accommodate training of staff numbers somewhere between **419+/-168** i.e. between **251 and 587 new staff**

The strategy assumes the **Belgian model** and makes a proposal for the training of about **+/-300 new staff starting with about +/-70 initially** i.e. assuming new build the size of Koeberg



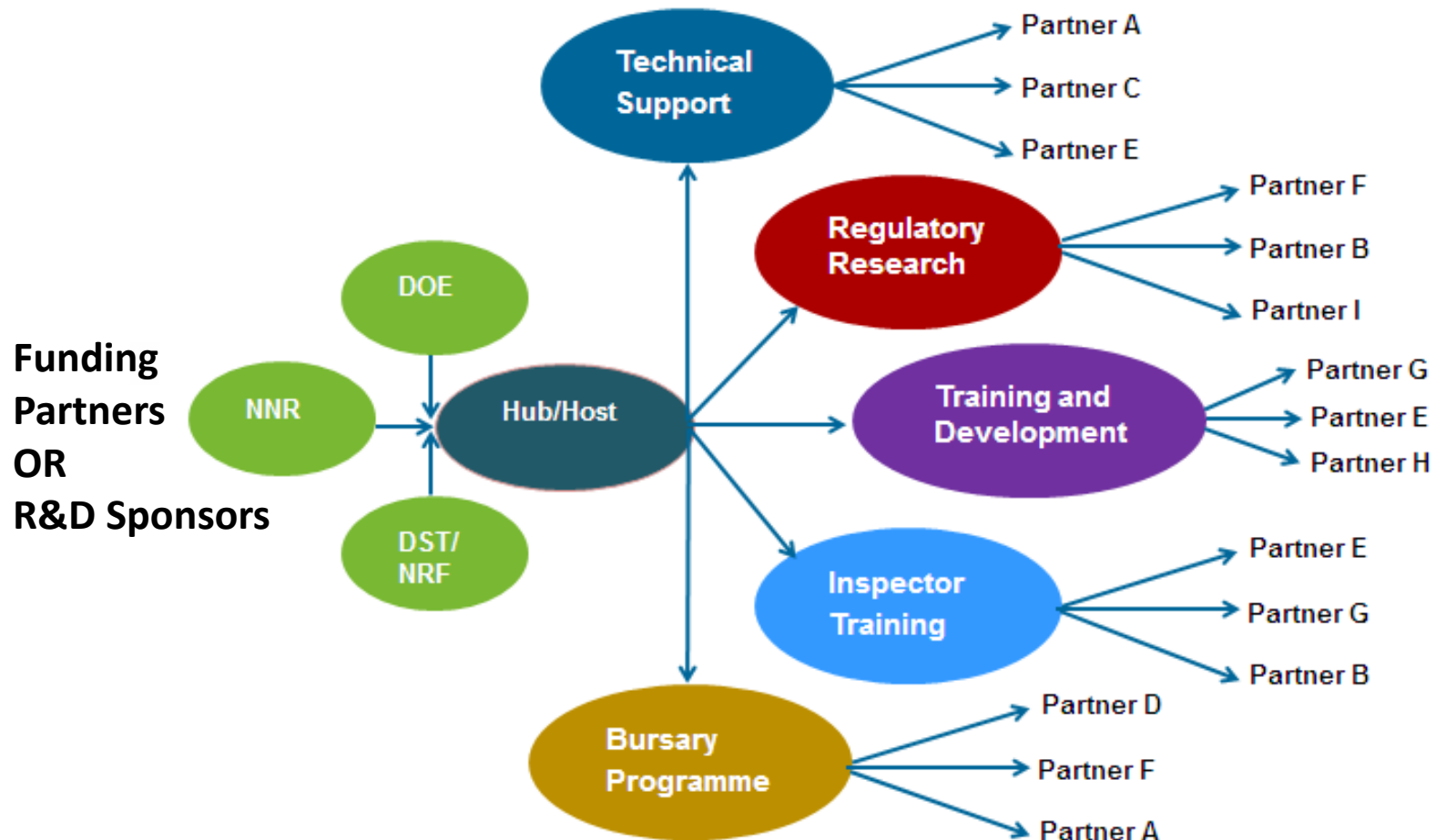
CNSS Strategy....

TSO Division



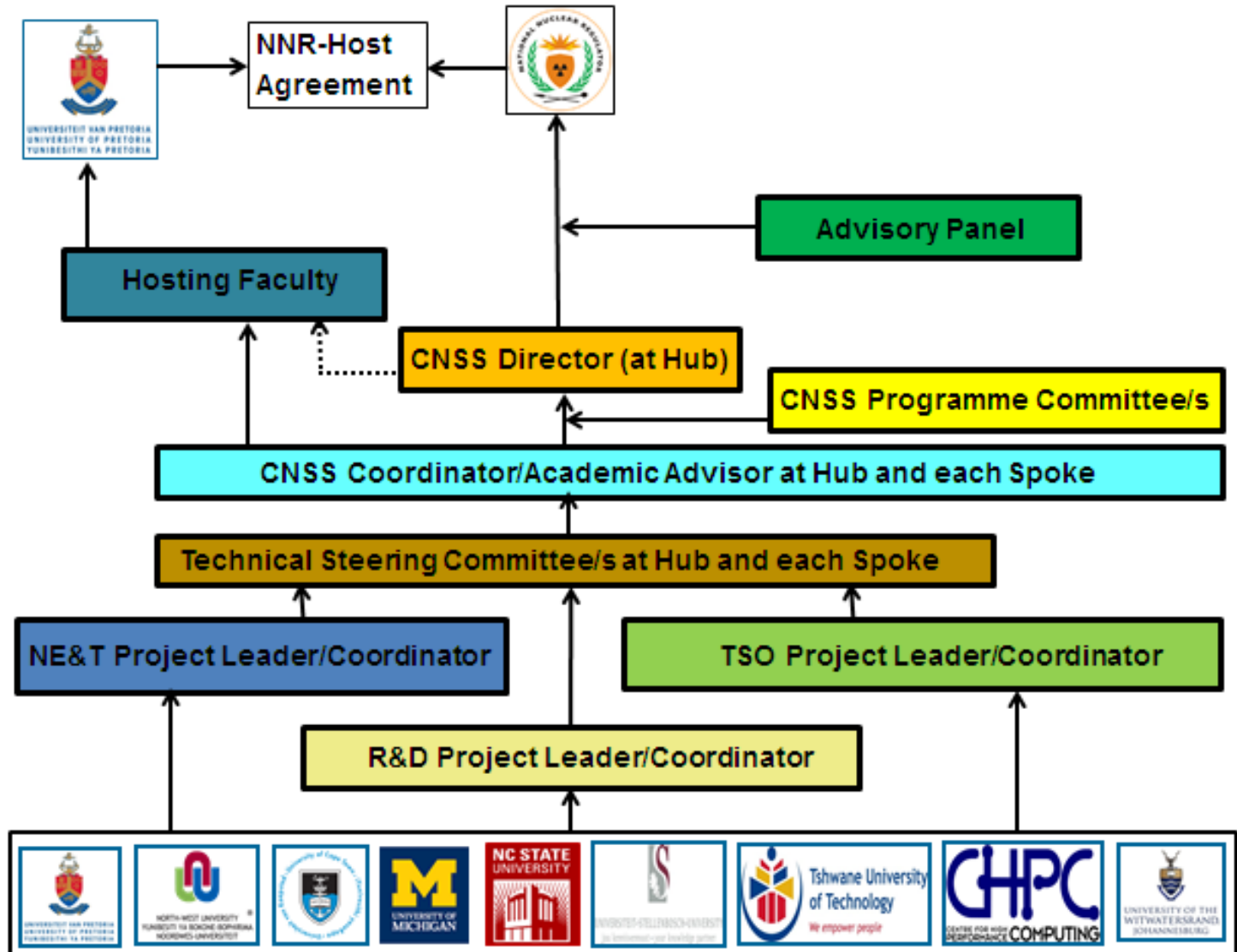


Operational Model (Hub and Spoke Model)





Governance Structure



Founding Partners



Overview of Project Activities completed to date

Project Kick-off Meeting	July 2014
Site visits and workshops with universities	February-March 2015
Approval of project documents by EXCO and the NNR Board: - NNR CNSS Strategy	July 2015
Appointment of partner Institutions and Establishment of Memoranda of Understanding between the NNR and partner institutions	April 2016
Launch of the NNR Centre	30 August 2016 16 September 2016
Appointment of Centre Programme Coordinator/Director/Manager	In progress



Expected Benefits

COMPLIANCE WITH INTERNATIONAL INSTRUMENTS

- ❖ **Compliance with IAEA Requirements (11, 18 and 20 of IAEA GSR Part 1).**

COMPLIANCE WITH NATIONAL REQUIREMENTS

- ❖ **Maintaining and improving the nuclear safety and security record of the country.**



Expected Benefits.....

SOCIO-ECONOMIC BENEFITS

- ❖ **Contribution to reduction of unemployment and poverty;**
- ❖ **Transition to knowledge economy;**
- ❖ **Contribution to Social Equity (i.e. increasing number of youths and women employed in nuclear science and engineering);**
- ❖ **Reduction of climate change effects.**



Expected Benefits.....

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- ❖ **Reduction of climate change effects.**



Expected Benefits.....

CROSS-CUTTING BENEFITS

- ❖ Increasing the number of graduates in nuclear science & engineering students, including Post Doc level researchers;
- ❖ Increasing research output (publications and patents) in nuclear science and engineering;
- ❖ Networking (attraction of top international talent) leading to international recognition of South Africa;
- ❖ Development of training and learnership programmes that lead to recognized occupational qualifications.



Conclusions

Nuclear Safety & Security = f(National infrastructure, Technology, Competency, International Instruments, Public Perception,....)

National Infrastructure = f(Regulatory Framework, Nuclear Education and Training, Research and Development, Capacity of Technical Support Organizations,....)

The CNSS Strategy addresses the three main pillars.



Launch of Centre

16 September 2016



Prof Cheryl De la Rey, Vice-Chancellor and Principal and Minister of Energy, The Honourable Ms T Joematt-Petterson



Dr G Pillay: Deputy CEO- NRF, Prof C De la Rey: Vice-Chancellor and Principal- UP, Dr B Tyobeka: CEO- NNR, Mr D Nicholls: Chief Nuclear Officer- ESKOM, Prof S Maharaj: EBIT Dean

Thank You



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and the environment against nuclear damage.*