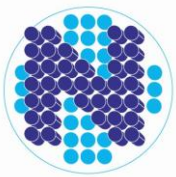


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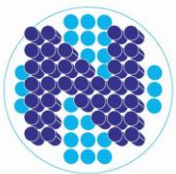
UNENE: A Research & Education network supporting the Nuclear Industry



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Purpose

- To introduce UNENE to CANDU Energy and learn of its current & future expectations of UNENE
- Invite CANDU Energy to join as the industry Design organization replacing AECL on the Board of Directors

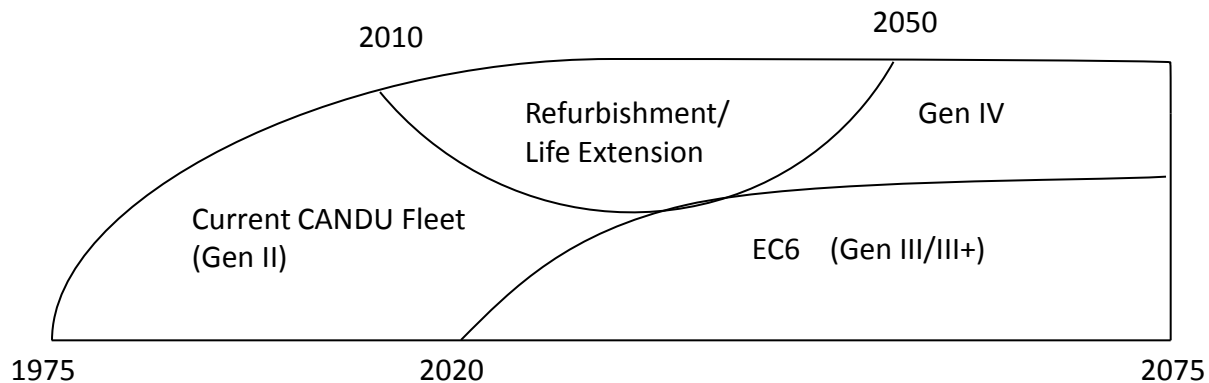


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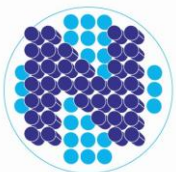
Outline

- Current Scene
- What is UNENE
- UNENE Focus;
 - Education
 - Research
- UNENE Outcomes
- Summary

Current Scene: Nuclear Knowledge and Industry Priorities



- Maintain knowledge in design/licensing basis of current fleet of Nuclear Plants
- Support safe Long Term Operations & Competitiveness of Nuclear Plants
- Enable, through innovations, a future generation of reactors (Gen III, Gen IV)



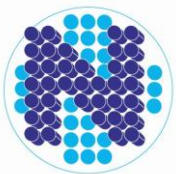
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UNENE Objectives

- Established in 2002 between the industry-universities with the following objectives:
 - Supply of Highly Qualified Personnel (HQP)
 - Support and fund nuclear research in universities
 - Create a respected pool of university-based expertise for independent industry and public consultation
- Main focus: Education and Research

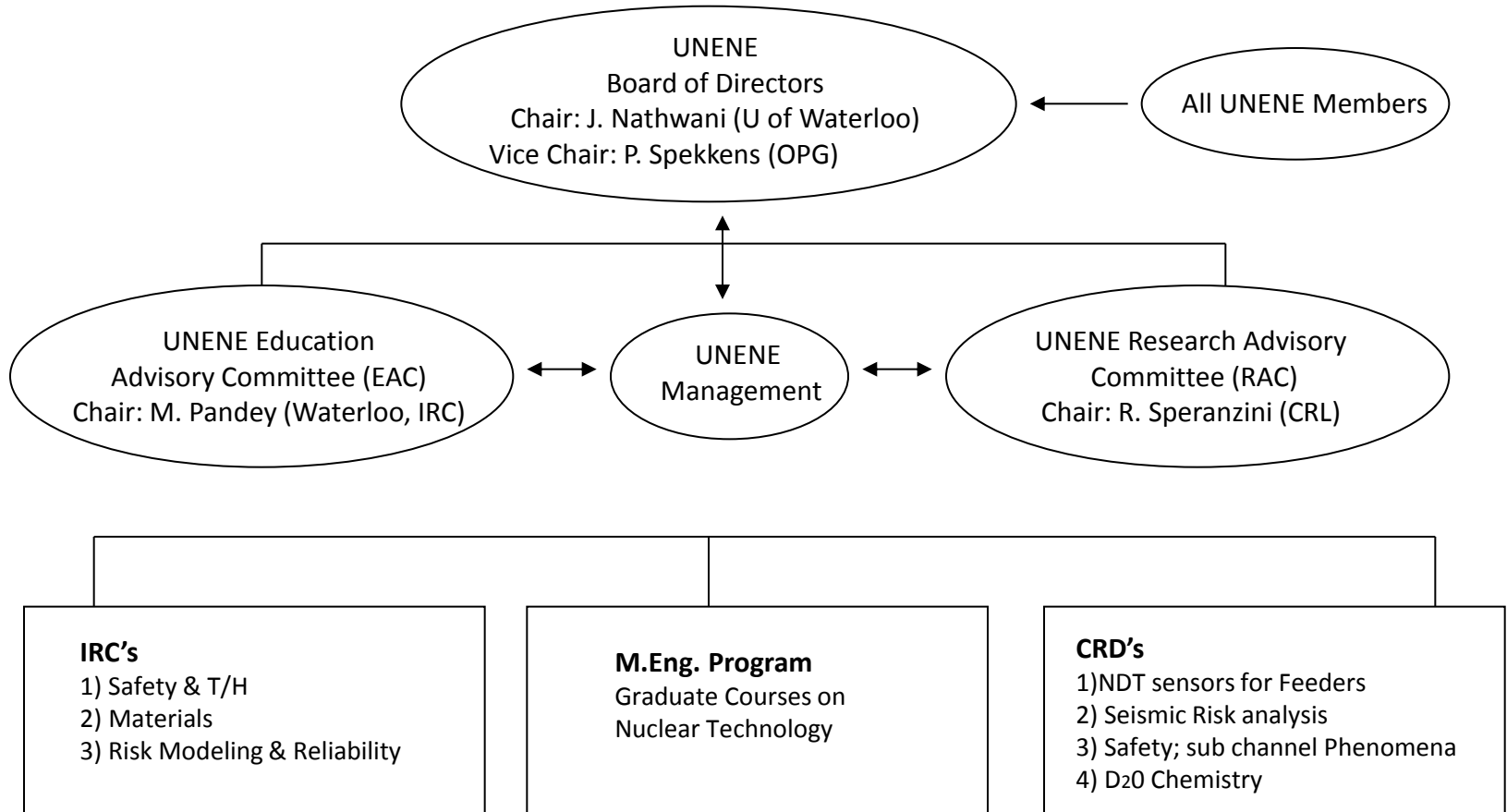
Members

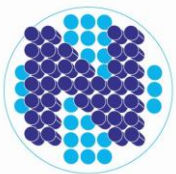
- AECL(*to be revised upon confirmation of membership by Candu Energy Inc & CRL*)
- Bruce Power
- Ontario Power Generation
- Canadian Nuclear Safety Commission
- CANDU Owners Group
- AMEC-Nuclear Safety Solutions
- CAMECO
- NWMO (Nuclear Waste Management Organization)
- McMaster University
- Queen's University
- University of Ontario Institute of Technology
- University of Saskatchewan
- University of Toronto
- University of Waterloo
- University of Western Ontario
- Ecole Polytechnique
- University of New Brunswick
- Royal Military College
- University of Guelph
- University of Windsor



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UNENE Structure



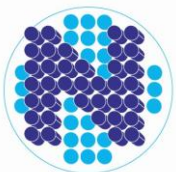


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UNENE Education



- Offers a course based M. Eng in Nuclear Engineering
 - 10 courses OR
 - 8 courses plus a project
 - 3 of the 10 courses can be Business Courses from Advanced Design and Manufacturing Institute (ADMI)
- Accredited by Ontario Council on Graduate Studies
- Offered by McMaster, Waterloo, UOIT, Western and Queen's
- Geared to the working professional
 - Topics are relevant to industry work
 - Scheduling recognizes full-time employees



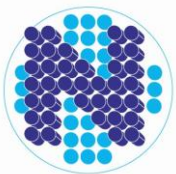
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Typical Courses

- UN0802: Nuclear reactor analysis
- UN0801: Nuclear plant systems and operations
- UN0804: Nuclear reactor heat transport system design
- UN0803: Nuclear reactor safety design
- UN0603: Project management for nuclear engineering
- UN0901: Nuclear materials
- UN0805: Radiation health risks and benefits
- UN0702: Power plant thermodynamics
- UN0701: Engineering risk and reliability
- UN0601: Control, instrumentation and electrical systems
- UN1001: Reactor chemistry and corrosion
- UN0902: Fuel management
- UN0602: Nuclear fuel waste management
- UN08xx: Nuclear fuel design

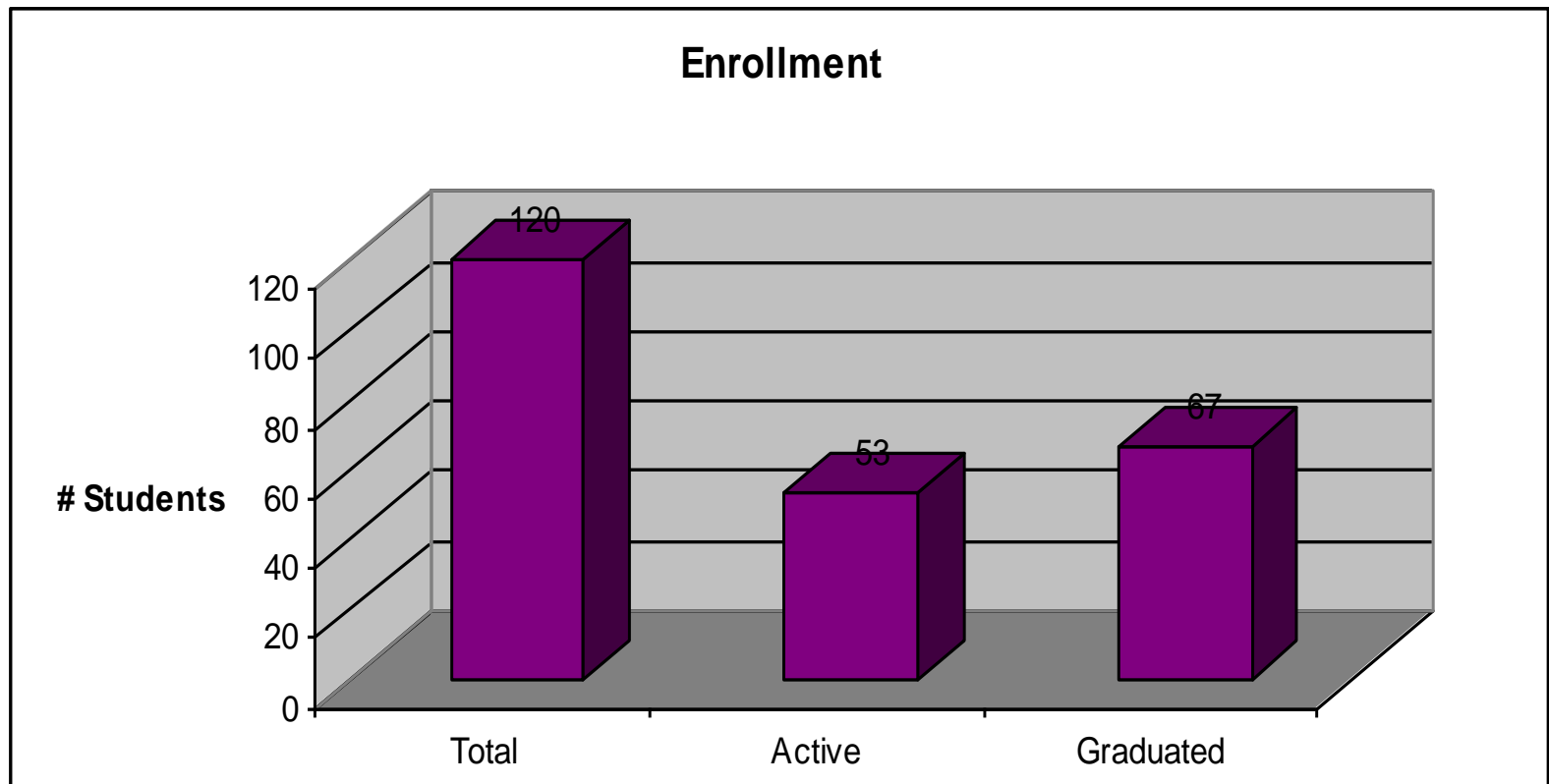


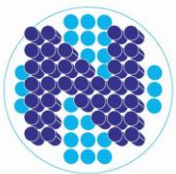
**Core courses
(required)**



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Cumulative Enrollment





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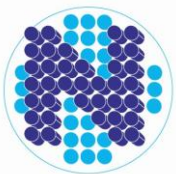
Current activities

- Working with COG and industry to harmonize training into a set of standard ones with various industry organizations under the COG umbrella (H.Chan)
- Some of current courses in M.Eng can be of benefit to industry if customized to organizational needs

UNENE briefing to CANDU Energy

UNENE Research

- Created Industrial Research Chairs (IRCs) in universities as ‘anchors’ for establishing R&D and strong research teams in key nuclear technology areas
- Sponsors Collaborative Research Projects (CRDs) on technology topics complementary to R&D programs industry wide



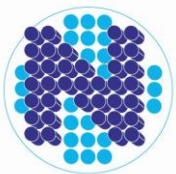
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Research

Support Industrial Research Chairs

- McMaster (Luxat / Novog) – Safety / T-H
- Queen`s (Holt / Daymond) – Nuclear Materials
- Toronto (Newman) – Corrosion of Alloys
- Waterloo (Pandey) – Risk & Reliability
- Western (Jiang) – I&C, Electrical
- RMC (Lewis) – Fuel Technology
- UOIT (Waker / Waller) – Health Physics

Typically \$200 K/ year (matched by NSERC)

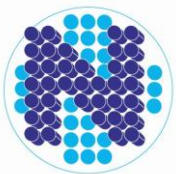


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Research – cont'd

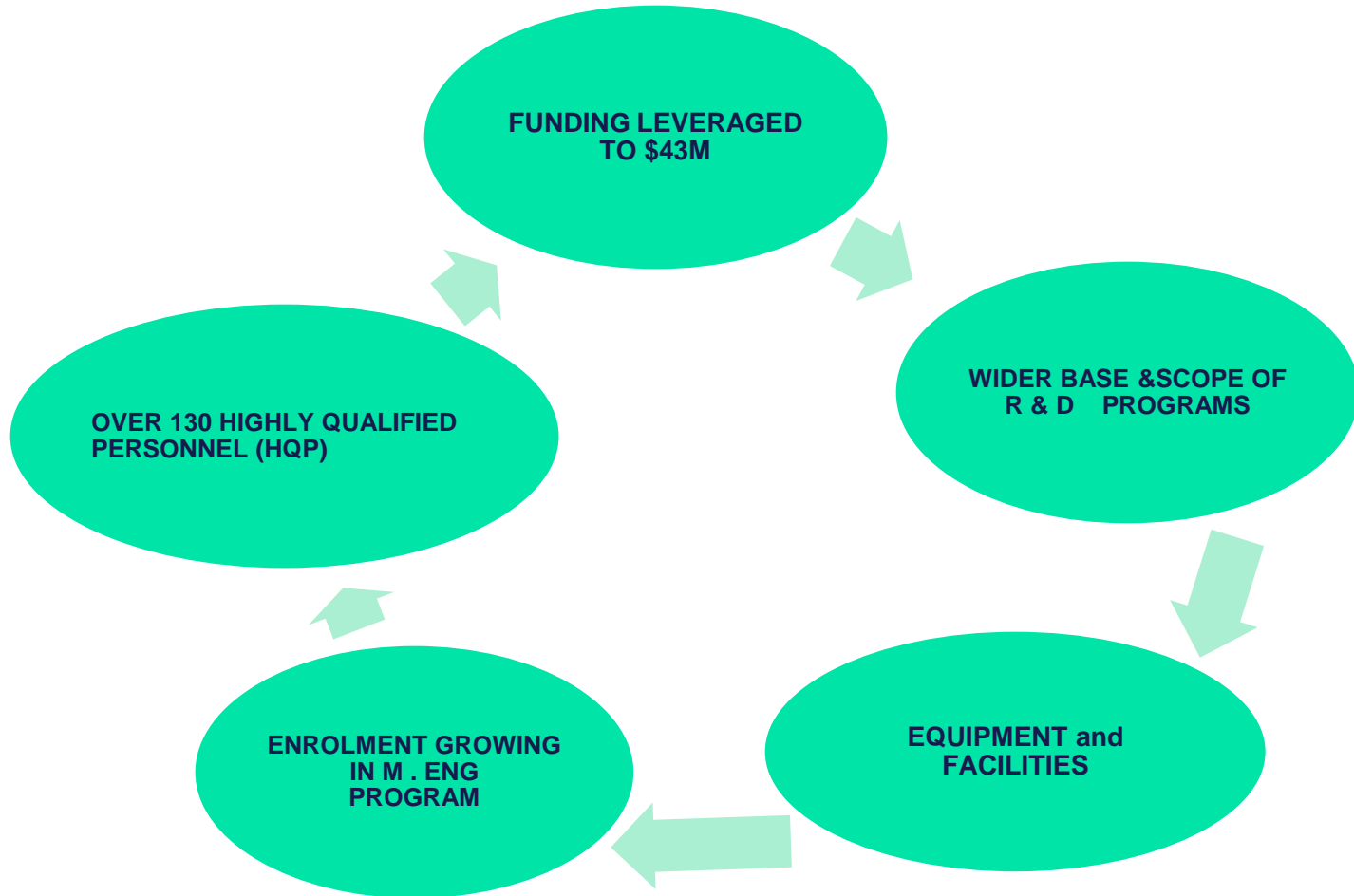
- Collaborative Research and Development Grants (CRDs)
(with NSERC)
 - Waterloo (Xie) – Seismic Risk Analysis
 - McMaster (Lightstone) – subchannel mixing
 - Guelph (Tremaine) – D₂O chemistry
 - Western (Shoesmith/ Ramamurthy) –SCC in Alloy 800
 - UOIT (Shahbazpanahi)– NDT Sensors (Feeders)
 - Ottawa (Tavoularis) – Thermalhydraulics
 - Queens (Daymond) – DHC

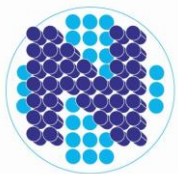
- Small projects ~\$30,000/year for 3 years from 2005/6



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UNENE-today





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Discussion
