



UNENE: An update on Nuclear Education & Research

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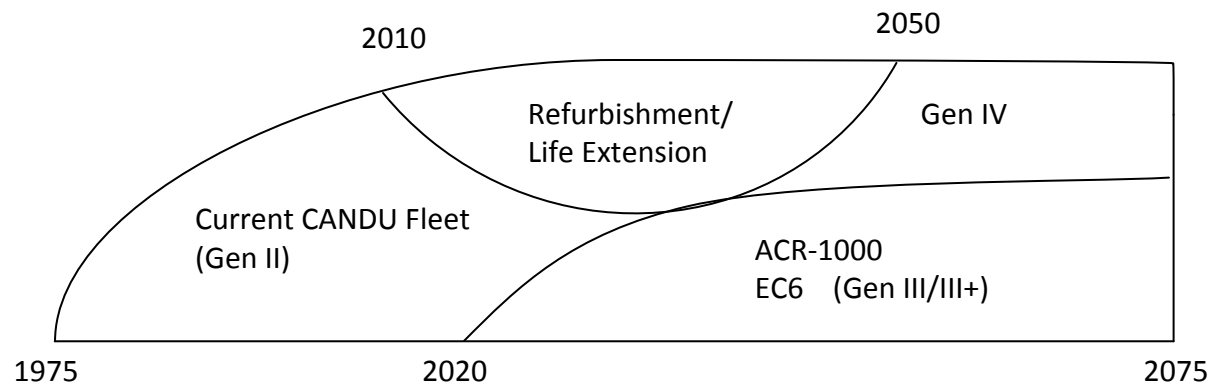
UNENE President



Outline

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

Canadian 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)



UNENE: A Partnership

- 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

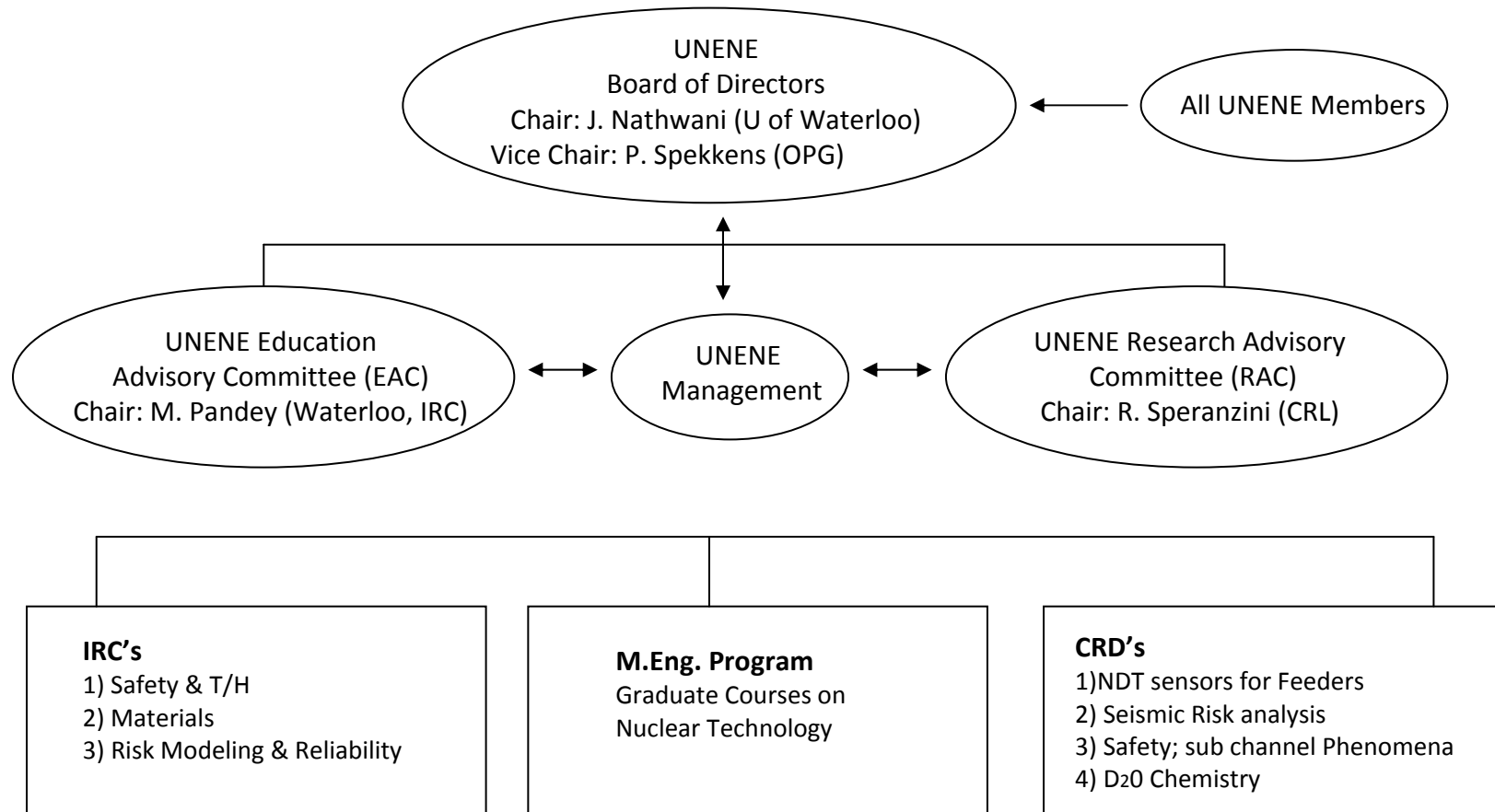


Members

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- Atomic Energy of Canada Limited
 - Bruce Power
 - Ontario Power Generation
 - Canadian Nuclear Safety Commission
 - CANDU Owners Group
 - AMEC-Nuclear Safety Solutions
 - CAMECO
 - 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



UNENE Structure





Education – UNENE M.Eng.

- Accredited course based:
 - 10 courses or
 - 8 courses plus a project
 - 3 of the 10 courses can be Business Courses from Advanced Design and Manufacturing Institute (ADMI)

- Geared to the working professional
 - Topics are relevant to work in industry
 - Scheduled outside working hours

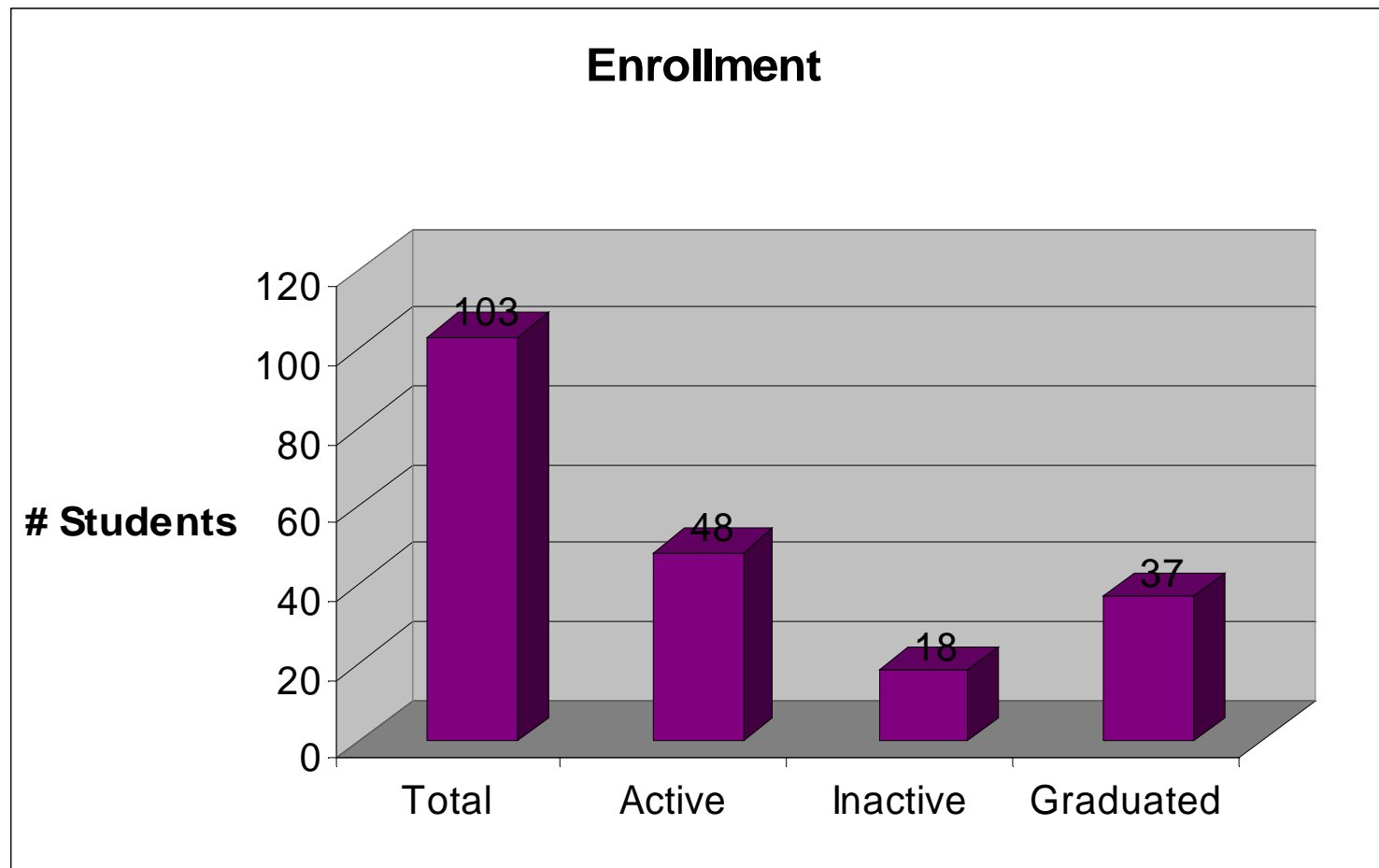


Typical Courses

- 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 in CANDU
- UN1001: Reactor chemistry and corrosion
- UN0902: Fuel management
- UN0602: Nuclear fuel waste management



Student Enrollment





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



Research

Support Industrial Research Chairs

- McMaster (Luxat / Novog) – Safety / T-H
- Queens (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)

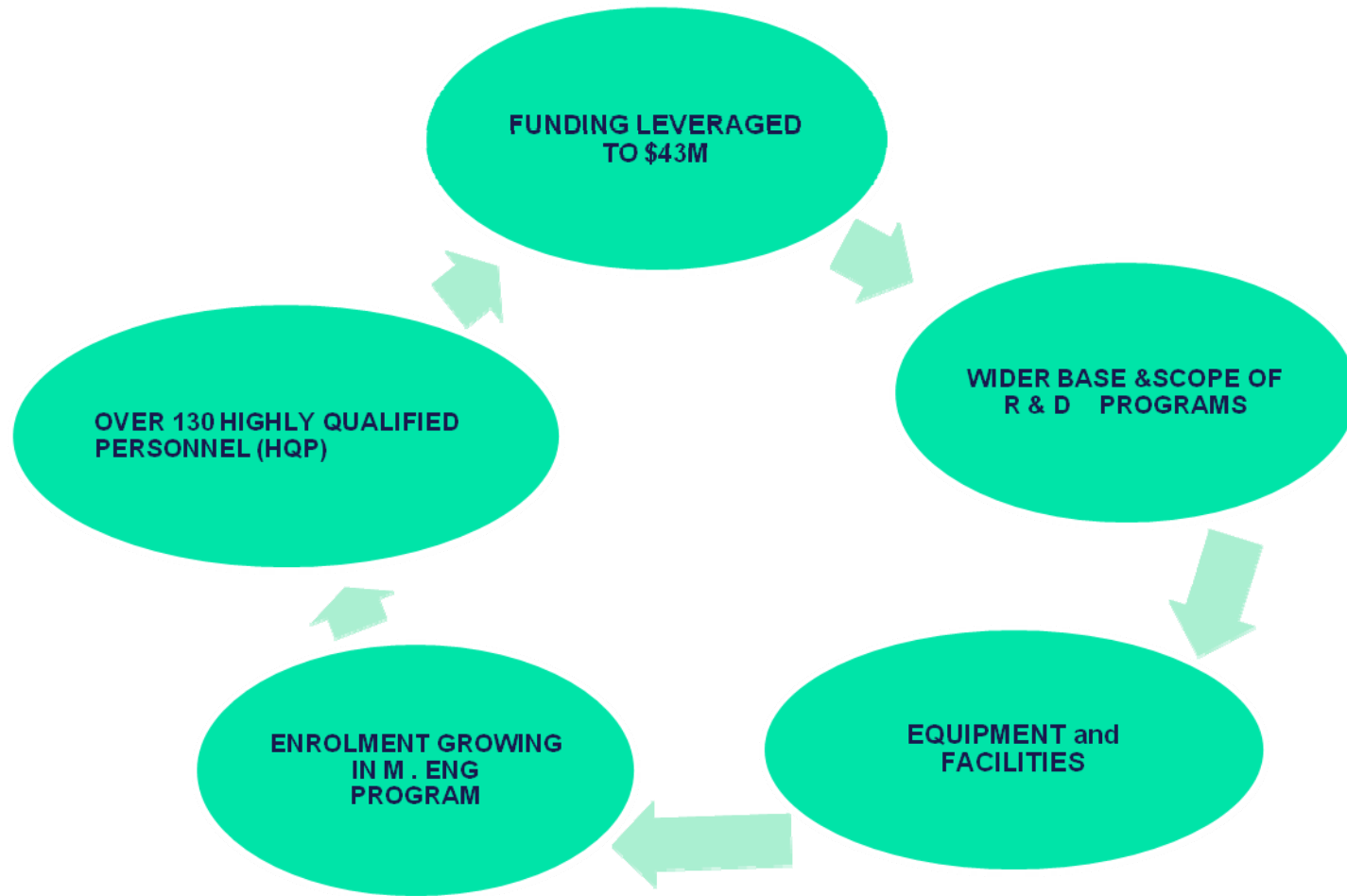


Research – cont'd

- Collaborative Research and Development Grants (with NSERC)
 - Waterloo (Xie) – Seismic Risk Analysis
 - McMaster (Lightstone) – subchannel mixing
 - Guelph (Tremaine) – D₂O chemistry
 - Western (Lau) – 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

UNENE Realized Outcomes





Additional Outcomes

- Collaborations national and international are established
- Consultation/technical exchanges with industry are regularly held
- Technology transfer of developed tools in support of life cycle management



In Summary

An effective, fully functional partnership with benefits to all members