UNENE: An update on Nuclear Education& Research

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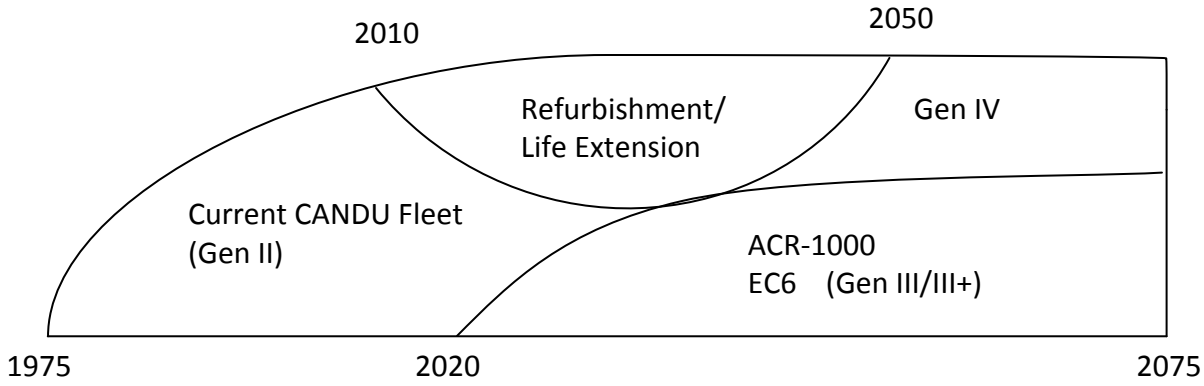
UNENE President

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

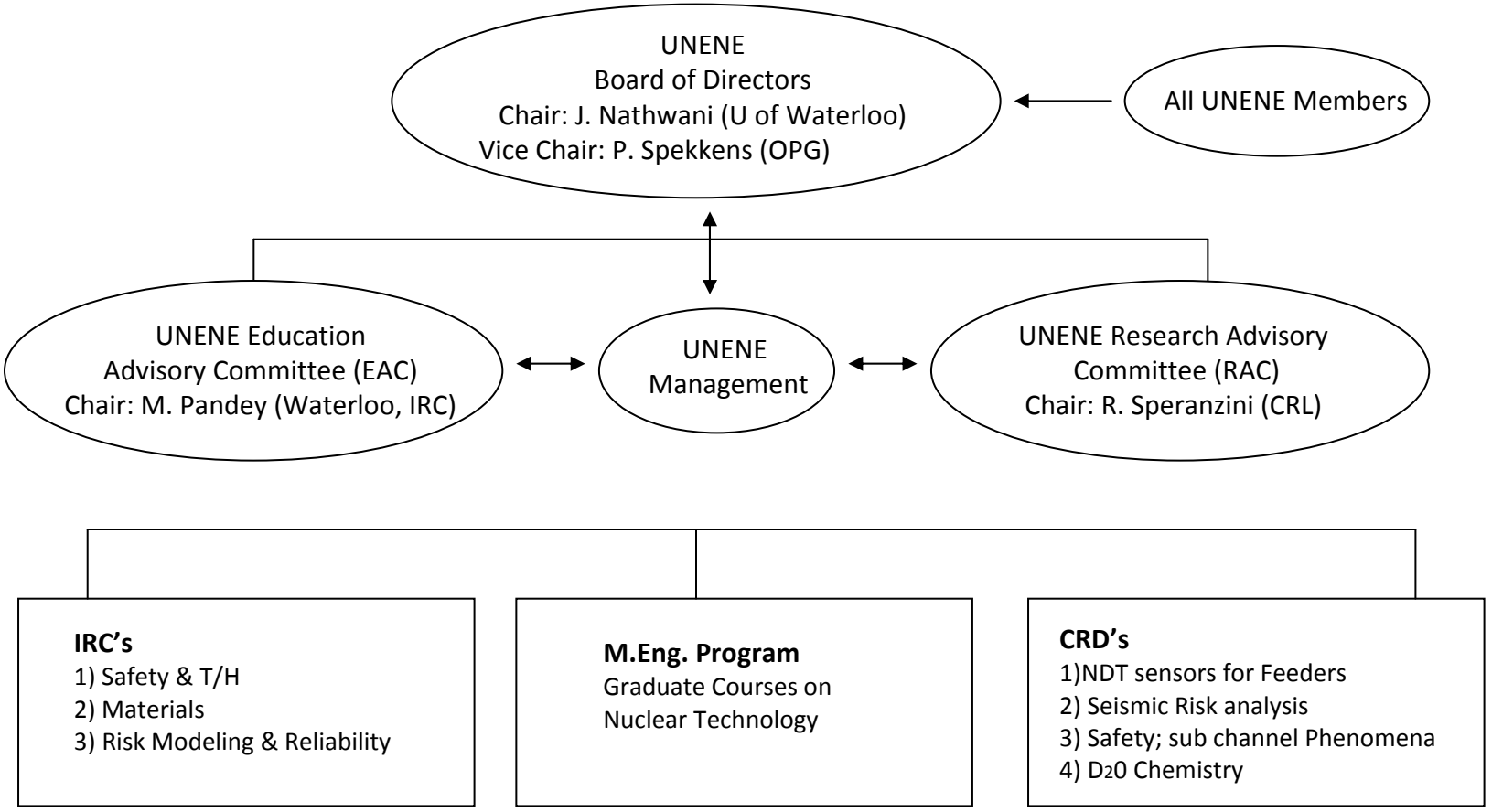
- Established in 2002 between the industry-universities with the following objectives:
  - Supply of Highly Qualified Personnel (HQP)
  - Support and fund nuclear research in universities
  - Create a respected pool of university-based expertise for independent industry and public consultation

- Main focus: Education and Research

Members

- 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.

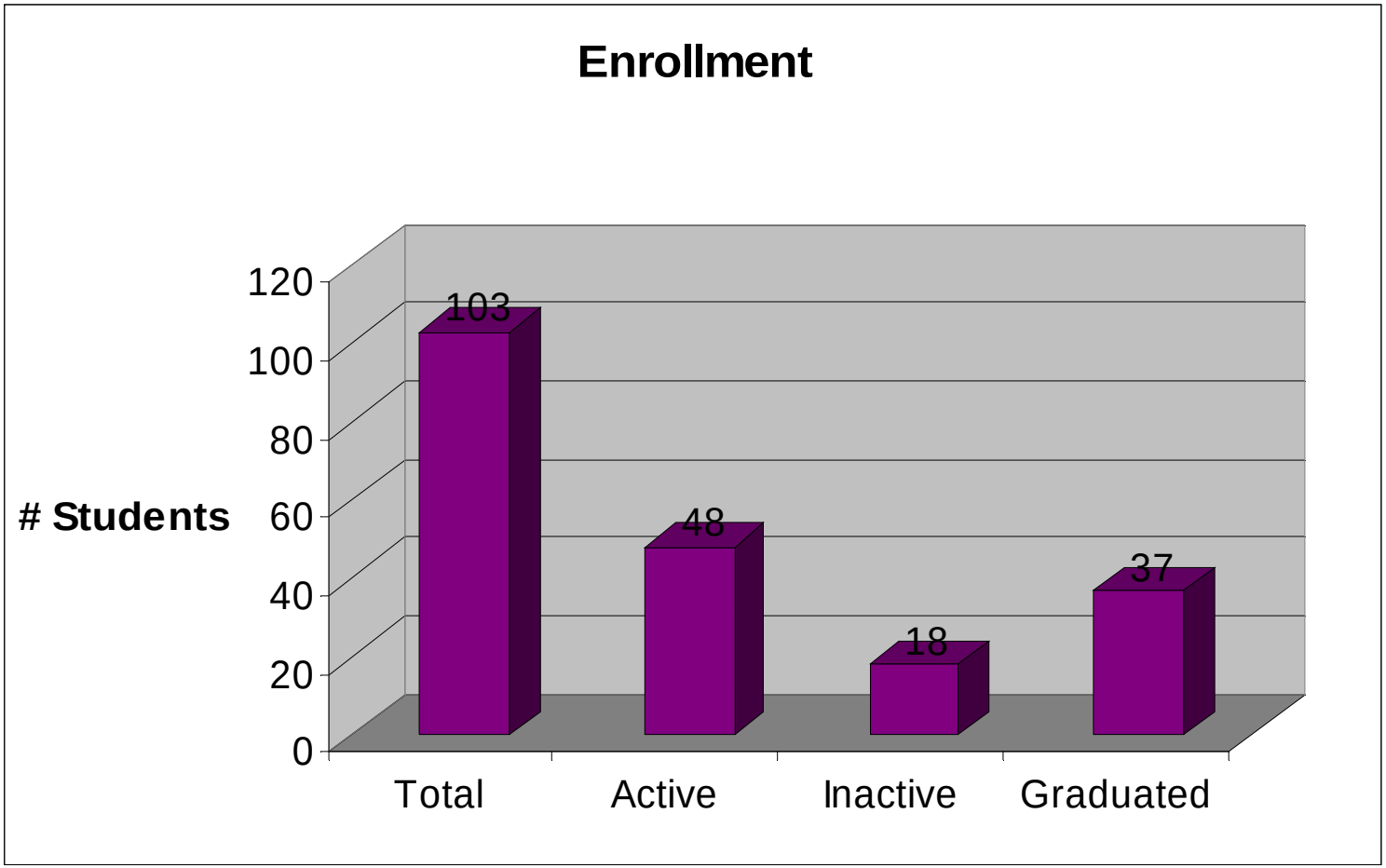
- Accredited course based:
  - 10 courses or
  - 8 courses plus a project
  - 3 of the 10 courses can be Business Courses from Advanced Design and Manufacturing Institute (ADMI)

- 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

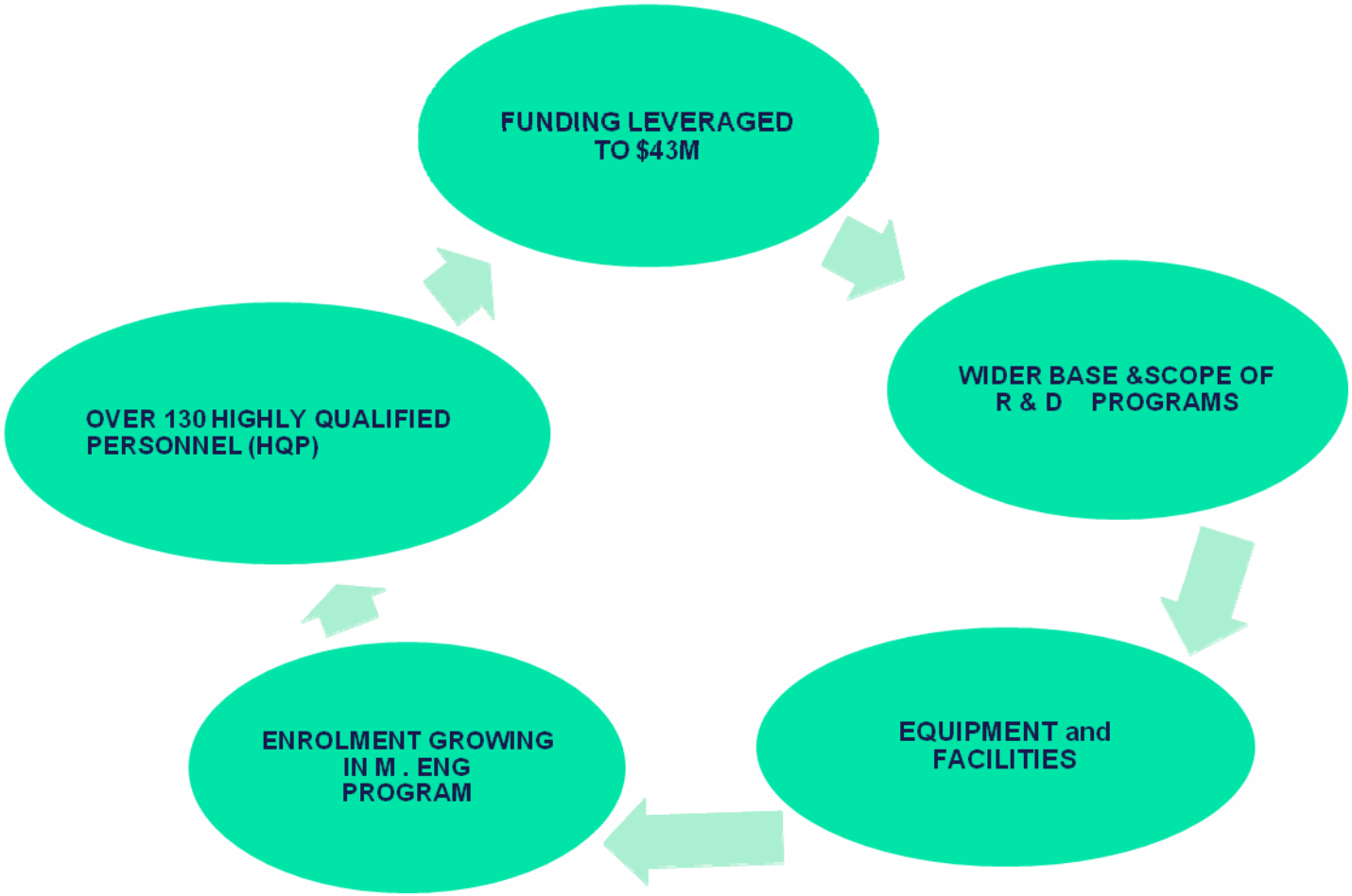
Typically $200 K/ year (matched by NSERC)

Research – cont'd

- Collaborative Research and Development Grants (with NSERC)
  - Waterloo (Xie) – Seismic Risk Analysis
  - McMaster (Lightstone) – subchannel mixing
  - Guelph (Tremaine) – D_2O 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