Strengthening Technical Specialist Training for an Expanding Nuclear Power Programme in the UK

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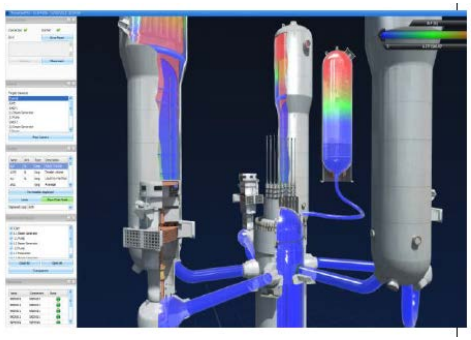

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IAEA, Vienna, May 2014

Outline of Presentation

- Introduction to Gen2
- The nuclear skills challenge in the UK
- The Nuclear Technical Specialist Training Scheme (NTSTS)
- Future plans

Introduction to Gen2

- A private training company, jointly owned by 5 large engineering employers.
- Providing engineering and technical training to the civil nuclear sector.
- Based in Cumbria, NW England

Sellafield Ltd · innovia FILMS · amec Earth & Environmental, Inc. · TATA · IGGESUND HOLMEN GROUP

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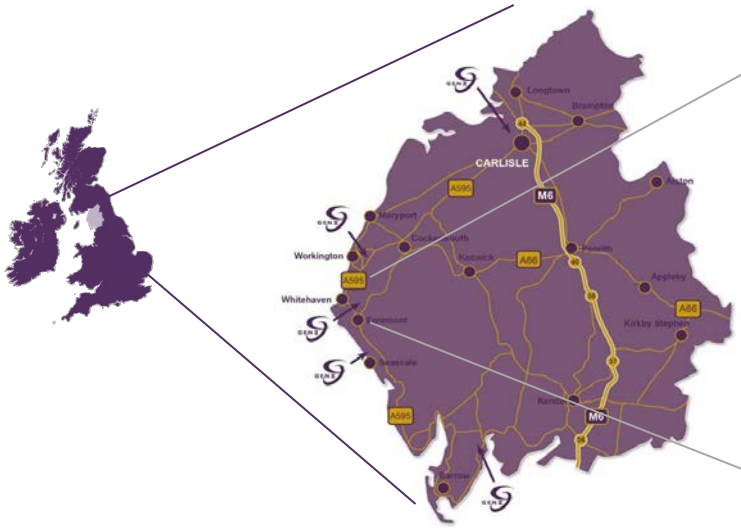

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Gen2 Client Base and Outputs

- Over 200 major clients mainly in nuclear sector.
- All courses designed with employer engagement.
- Growing portfolio of training to support nuclear new build in UK and internationally (eg UAE).

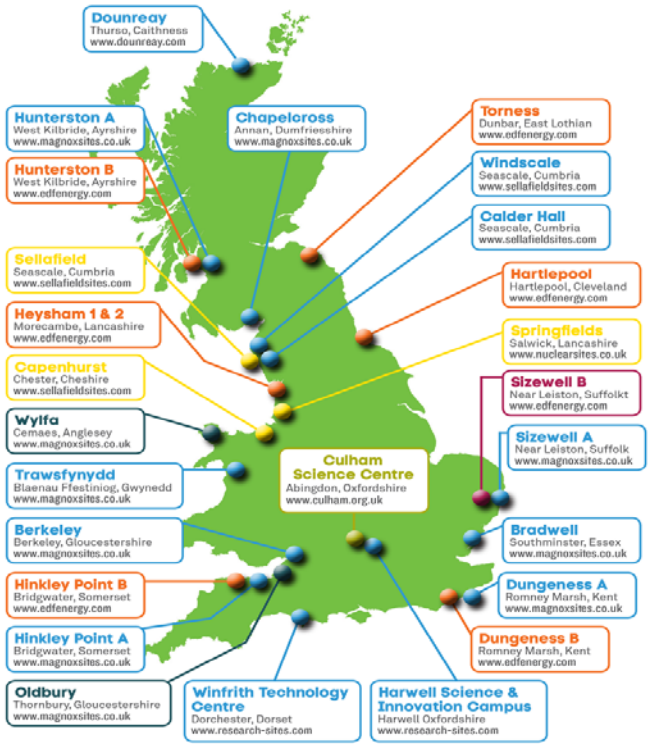
- Gen 2 provides all technical training in support of UK nuclear fuel reprocessing plant at Sellafield.
- Brings unique challenges – eg nuclear safety culture must be embedded.

- Training outputs include:
  - Engineering Apprenticeships (> 1000 learners)
  - Degree & Postgraduate Programmes (> 200 students)
  - Specialist courses (> 10,000 student-days per year)
- Degree courses validated by university partners.
- Advanced programmes accredited for professional engineer status.

Engineering Council accredited degree

UK Nuclear Skills Challenge - Drivers

- Operation of existing NPPs
- Nuclear New Build
  - 2 x EPRs at Hinkley (EdF)
  - 2 x ABWRs at Wylfa (Horizon Nuclear Power/Hitachi)
  - 3 x AP1000 at Sellafield (NuGen/Toshiba-Westinghouse)
- Decomm of legacy plants + Magnox + AGRs
- Fuel cycle activities, including reprocessing
- Plutonium disposition
- Radioactive waste management
- Geological Disposal Facility (GDF)
- Nuclear defence activities.



- To resource these projects with suitably-skilled and qualified personnel (SQEP) will require **a major expansion in engineering and technology training.**
- Much of this is **nuclear-specific,** specialist and at **advanced academic level**.

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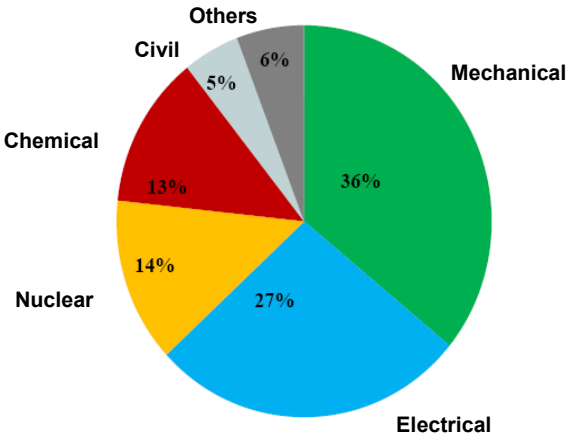
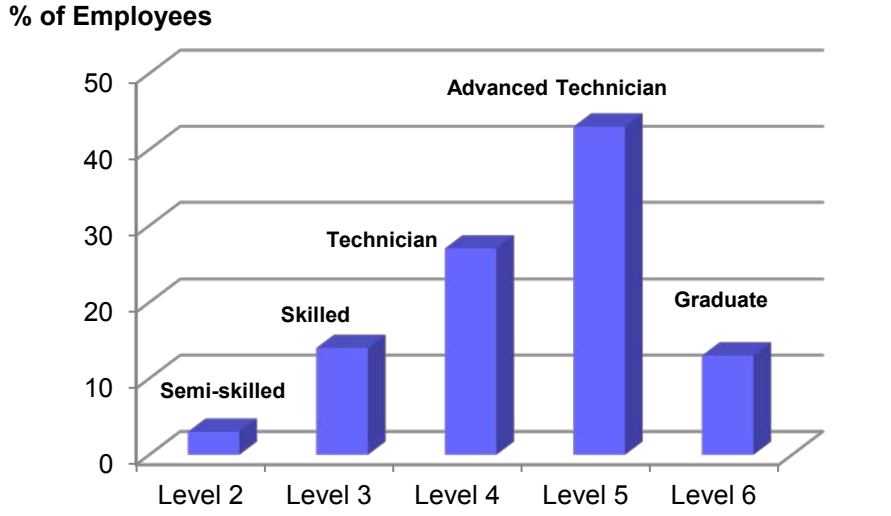
UK Nuclear Skills Challenge - Requirements

- Recruitment & training of >10,000 operational personnel to 2025 (excludes construction!)
- Equates to >1000 per year
- Engineers, Plant Operators, Maintainers, Technicians, Project Managers, Chemists, Health Physicists, etc.
- High proportion qualified at UK-QCF Level 4 & above.





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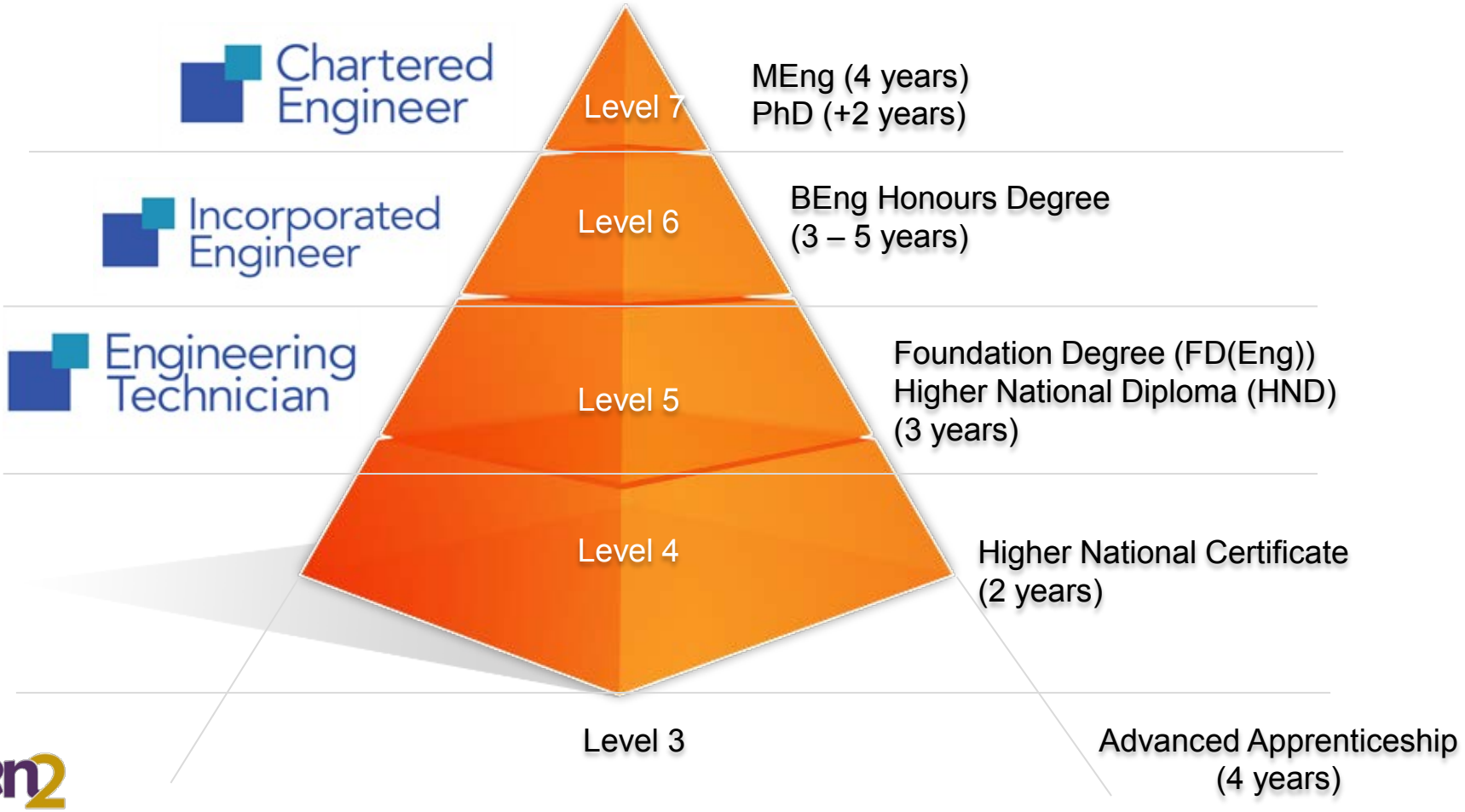
UK Qualification Levels and Professional Status

Engineer Council of UK (EC^{UK}) Professional Recognition	Level on UK Qualifications and Credit Framework (QCF)	Typical qualifications and duration of study.



What needs to be done?

- Attract high-calibre young people into the profession.
- Introduce accelerated training and development routes to EngTech, IEng and CEng for the next generation of nuclear technical specialists.
- Improve recruitment and career management pipelines to meet employer-led demand.
- Offer flexible training/development opportunities to promote transfer within the sub-sectors:
  - Nuclear decommissioning → nuclear reactor operations
  - Defence nuclear → Civil nuclear
- Promote multi-skilling:
  - Electronic Eng + Control Eng
  - Health Physics + Reactor Chemistry
- Introduce knowledge-management initiatives to ensure specialist skills are retained and transferred to the next generation.

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Nuclear Technical Specialist Training Scheme (NTSTS)

- Developed in partnership with Sellafield Ltd in response to skills shortage in operations support for nuclear fuel reprocessing, radioactive waste treatment and decommissioning.
- Designed to fill a perceived skills gap between apprentices and graduates.
- Intended to develop individuals with the following skills:
  - Deep experience in specific plant operations coupled and graduate-level engineering knowledge.
  - High level of expertise in performing a specialist job, task or function within the organisation
  - Understanding of unique safety issues associated with reprocessing plant, namely radiation, contamination and criticality.
  - Appreciation the nuclear regulatory framework, license conditions and compliance requirements .. and ability to engage directly with regulators.
  - An embedded nuclear safety culture.
- Key features of the NTSTS will now be discussed.

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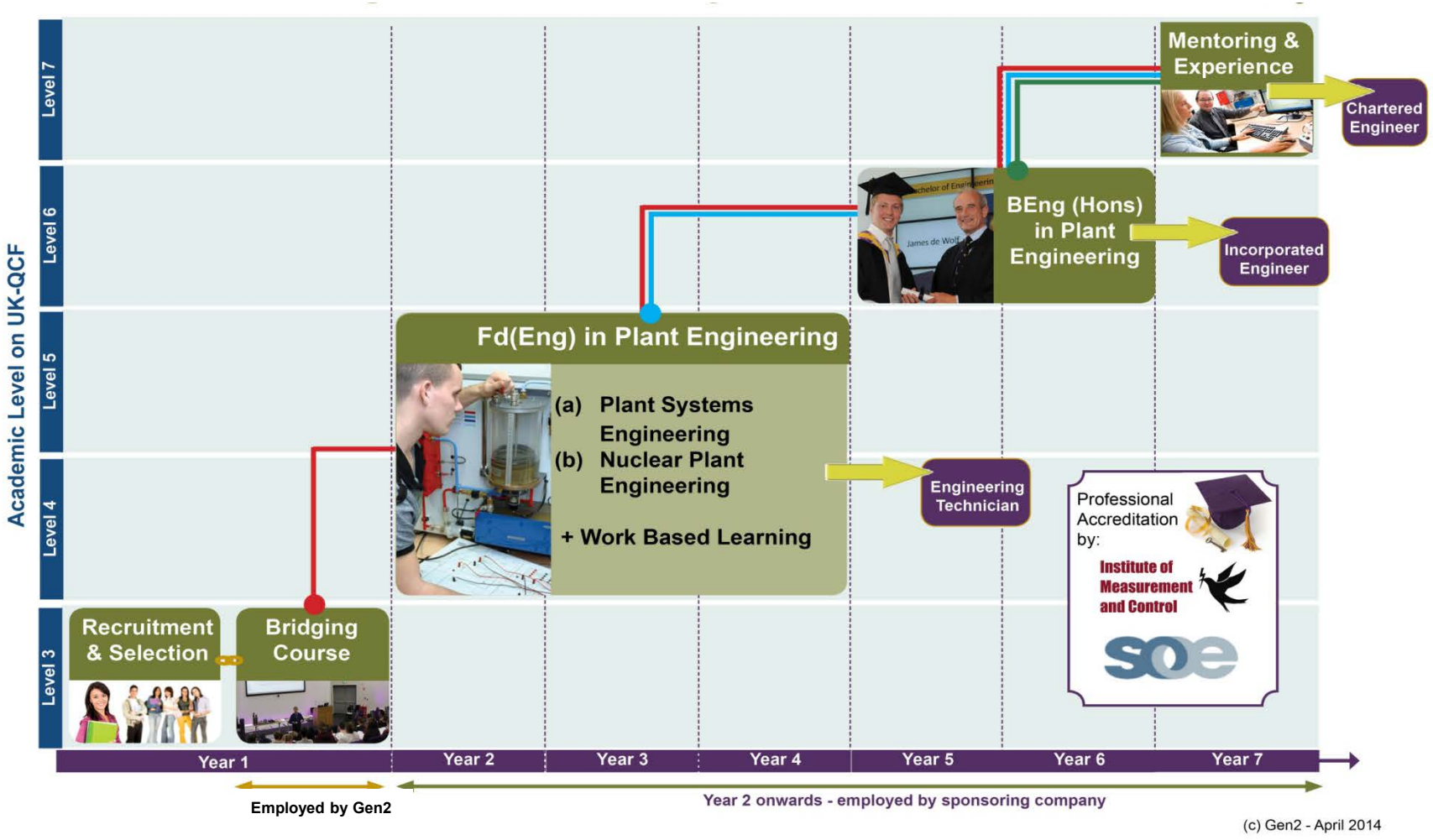
Key Features of NTSTS

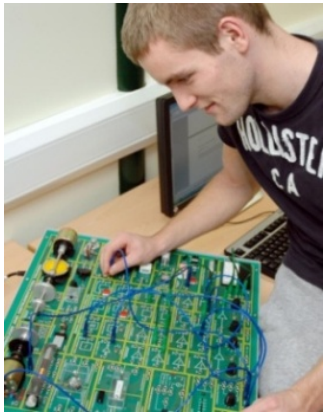


Recruitment and Selection

- Aimed at school leavers with good science, technology, engineering and/or mathematics qualifications.
  - Typically exceed minimum levels for university entrance.
- On-line aptitude test of numeracy, communication, and problem-solving skills.
- Assessment Centre (2-days) to evaluate team-working, attitude, presentational skills and industry awareness.
- Interview with Gen2 staff and employer representatives.
- Ratio of applicants to places ~ 6:1
- Process is **highly-competitive** and **selective**.

Bridging Course (4 months)

- Employed by Gen2 for initial 4-month period.
- Undertake a full-time training course covering mathematics, engineering, nuclear science and technology.
- Includes laboratory-based practical training in mechanics, electronics, control systems and radiation protection.
- Ensures a common baseline of knowledge.
- Identifies individuals with academic ability and personal qualities needed to progress through the programme.
- Provides further opportunity to sift candidates prior to employment by sponsoring company (**minimises risk to employer**).
- Successful candidates transfer to employment following post-course interview.



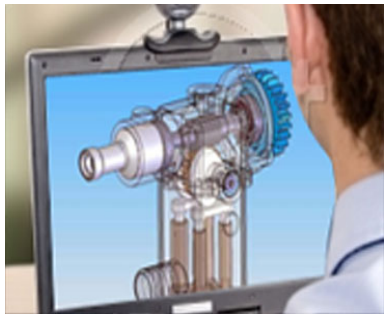
Employment + Foundation Degree (3 years)

- Individuals employed by sponsoring company.
- Undertake Foundation Degree in Plant Engineering (FDPE) on part-time basis over 3 years.
- Curriculum designed in close collaboration with employers.
- Includes pathways in:
  - **Nuclear Plant Engineering**
  - **Conventional Plant Engineering**
- Balance of theoretical and practical (laboratory-based) learning.
- Combines work-based learning with higher-level academic study (at Level 5 on QCF)
- Programme validated by partner university to ensure academic integrity.
- Programme accredited by Institute of Measurement and Control and Society of Plant Engineers for professional registration as EngTech.

Foundation Degree in Plant Engineering

Employment + BEng(Hons) (2 years)

- Progression route from FD to full BEng(Hons) in Plant Engineering requiring further 2 years of part-time study.
- Major project & dissertation in final year, addressing real plant-based problem.
- Academic validation as for FD
- Programme accredited for professional registration as IEng.
- and ....
- Currently developing Masters Programme in Professional Engineering to support progression to Level 7 and registration as CEng.



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uclan UNIVERSITY of Cumbria

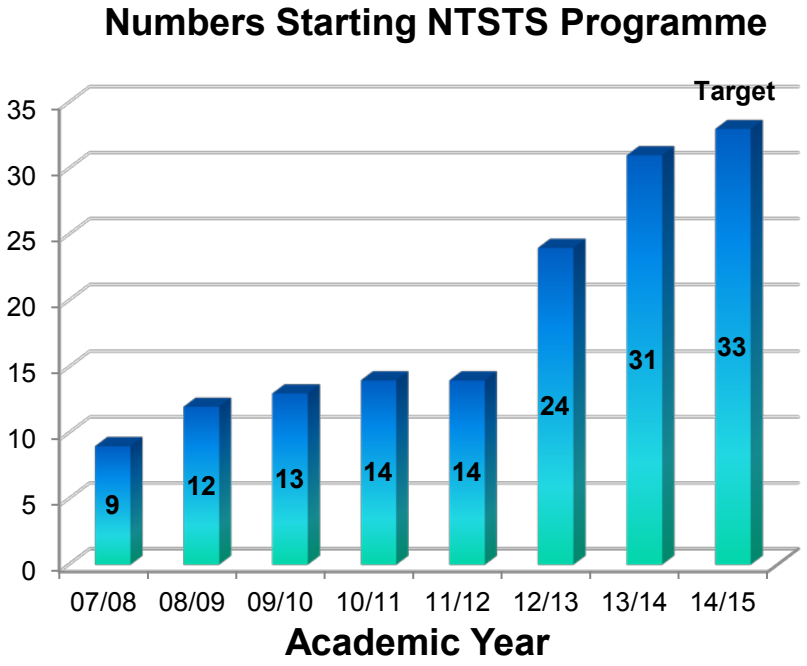
Institute of Measurement and Control

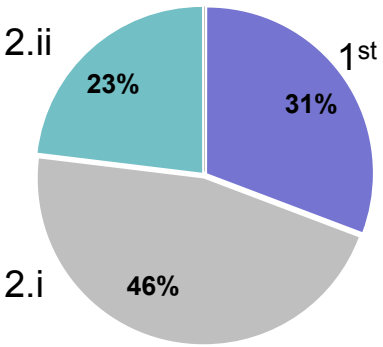
soe engineering success

BEng(Hons) in Plant Engineering

Numbers and Success Rates

- Significant volume growth since programme inception in AY 07/08
- More employers have joined programme as sponsors:
  - Sellafield + TATA Steel, Jacobs, AMEC, National Nuclear Laboratory, Morgan-Sindall
- 100% completion & pass rate for FD.
- 65% of students have progressed to BEng(Hons)
- 100% pass rate for BEng(Hons)
- 77% achieve 1st or 2i Class Degrees
- Gen2 learner awarded '*Foundation Degree Student of the Year*' in National Skills Academy for Nuclear (NSAN) Annual Awards

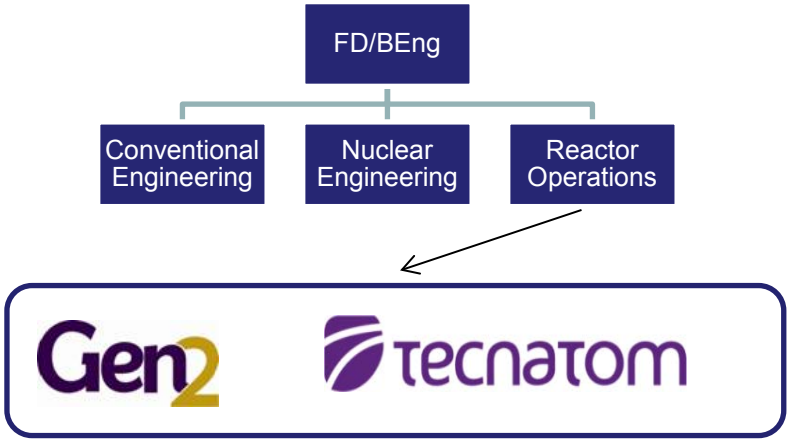


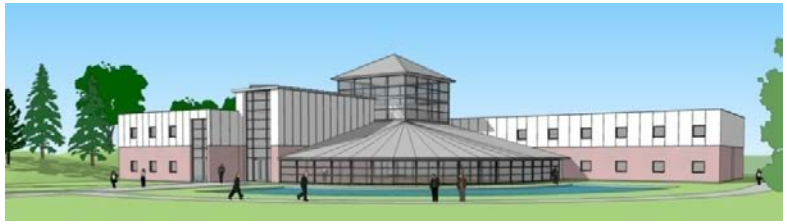


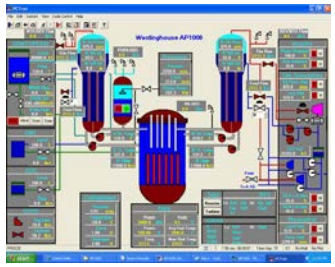
BEng(Hons) Degrees Awarded by Class

NTSTS: Future Plans

- Introduce new pathway in Nuclear Reactor Operations into FD/BEng (Plant Engineering) programmes.
- Outline curriculum based on INPOs Nuclear Uniform Curriculum for Power Plant Technician, Maintenance and Non-licensed Operations Personnel.
- Procurement of generic Pressurised Water Reactor Simulation Suite – due for delivery/commissioning by Sep 2014
- Gen 2 has established a partnership with Tecnatom SA of Spain – experienced in operator training for PWR and BWR.
- Proposals to establish a bespoke Reactor Operations Training Centre (ROTC) close to NuGen's planned AP1000 new build at Moorside, West Cumbria.
- In longer term, ROTC could house full scope AP1000 simulator for licensed operator training







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