

Staffing of nuclear power plant- Estonian perspective

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Is it possible to staff Estonian NPP?

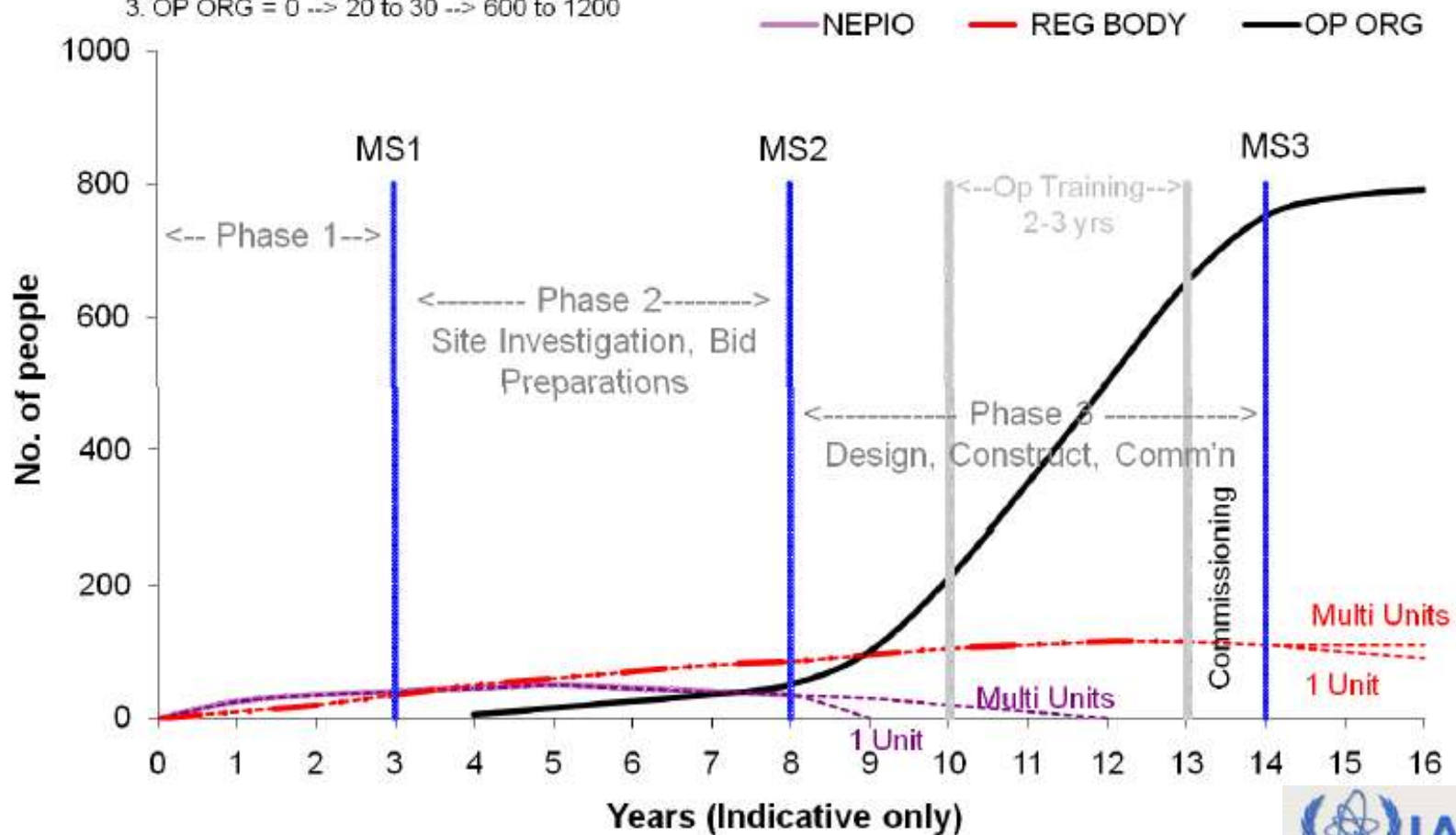
- What kind of personell we need?
- How much personell we need?
- When do we need the personell?
- How will this personell be educated and trained?

First things first

- 1. There has to be definite, serious national commitment with nuclear programme organisation (NEPIO) and funding for nuclear energy.**
2. Public commitment - signal for educational demand
3. Full international cooperation in early stages– IAEA country technical cooperation program; regulator and NEPIO buildup. (“Workforce Planning for New Nuclear Power Programs”)
4. Estonian NPP only credible from staffing, financing etc perspective as international project involving major European utilities.

3 organisations

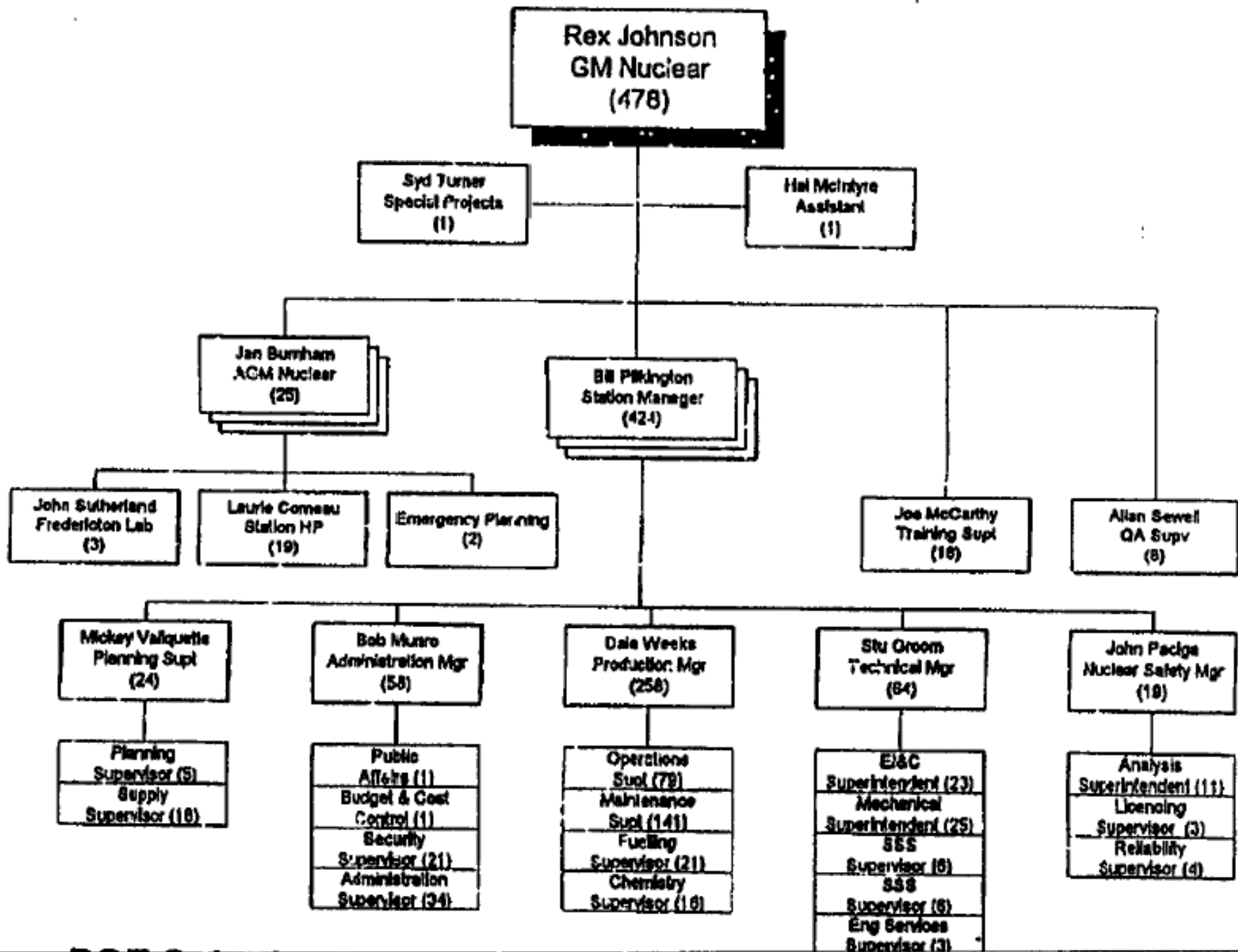
1. NEPIO = 10 --> 50 (Depending on Expert Group Support) --> 0 (close to)
2. REG BODY = 10 --> 50+Tech Support
3. OP ORG = 0 --> 20 to 30 --> 600 to 1200



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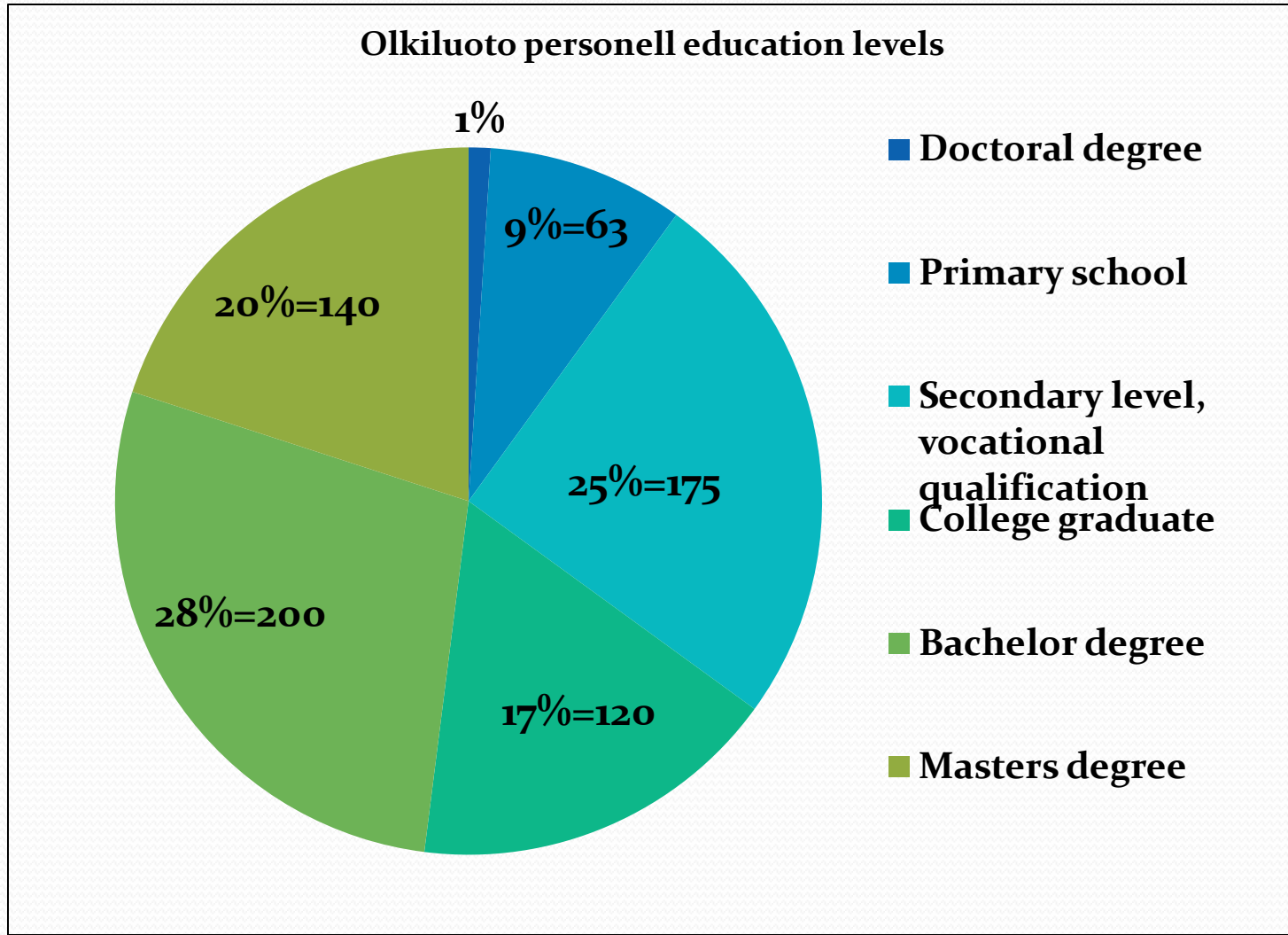
ca 500 employees; 5 shifts

1. Planning dep.(24) – NPP development and supply
2. Administrative dep. (58) – accounting, IT, security and fire safety
3. Production (258)- operations(80), maintenance(150), fuelling (20), chemistry (16)
4. Technical (64) – electricity, control, safety shutdown, mechanical systems
5. Nuclear Safety (19)
6. Training and Quality Assurance (26)



What kind of staff? TVO example

Olkiluoto has 2 reactors, 700 employees



Nuclear inspection

- Current staff of Radiological protection department 19 employees
- Finnish STUK – ca 360 employees (4 reactors, 1 under construction); 45 in reactor regulation
- OL 3 monitoring – 10 persons; 2 annual unannounced inspections with 3 people.
- Probably necessary staff levels in 2015 – 40
2020 – 60-70.

IAEA-TECDOC-1254 “Training the staff of the Regulatory Body for Nuclear Facilities: A Competency Framework”

Necessary staffing levels of nuclear new build project

- Preparation of bid for lead technical partner selection 2012 – 10 people
- EIA and DIP application 2014 – 30-40 people
- Beginning of construction 2015/2016 – 60
- Completion of reactor building 2018/2019 – 300
- Fuel load, testing, criticality 2021/23 - 500

General training

- TTU/UT mechanics, energy, physics, chemistry B.Sc. - 25/70/35+55/30+50
- TTU mechanics, energy, physics M.Sc. – ca 50 people per annum
- Since 2012 nuclear engineering(TTU), nuclear safety (UT) M.Sc. – à 15 per annum= 180 people until 2020.
- Future attention on retraining of current energy, chemistry, physics staff on nuclear energy fields.
- These levels can be considered sufficient
- Detailed Human Resource plan necessary!

Specific training

based on Ontario Hydro

1. Initial training
2. Qualification training
3. Autohorization Training Program – Shift Supervisors, Shift Operating Supervisors, Authorized Nuclear Operators, Major Panel Operators
4. Non-Licenced Operator Training Program
5. Control Maintainance Training Program
6. Mechanical Maintainance Training Program
7. Civil Maintainance Training Program
8. Technical Skills Training Program
9. Safety Training Program

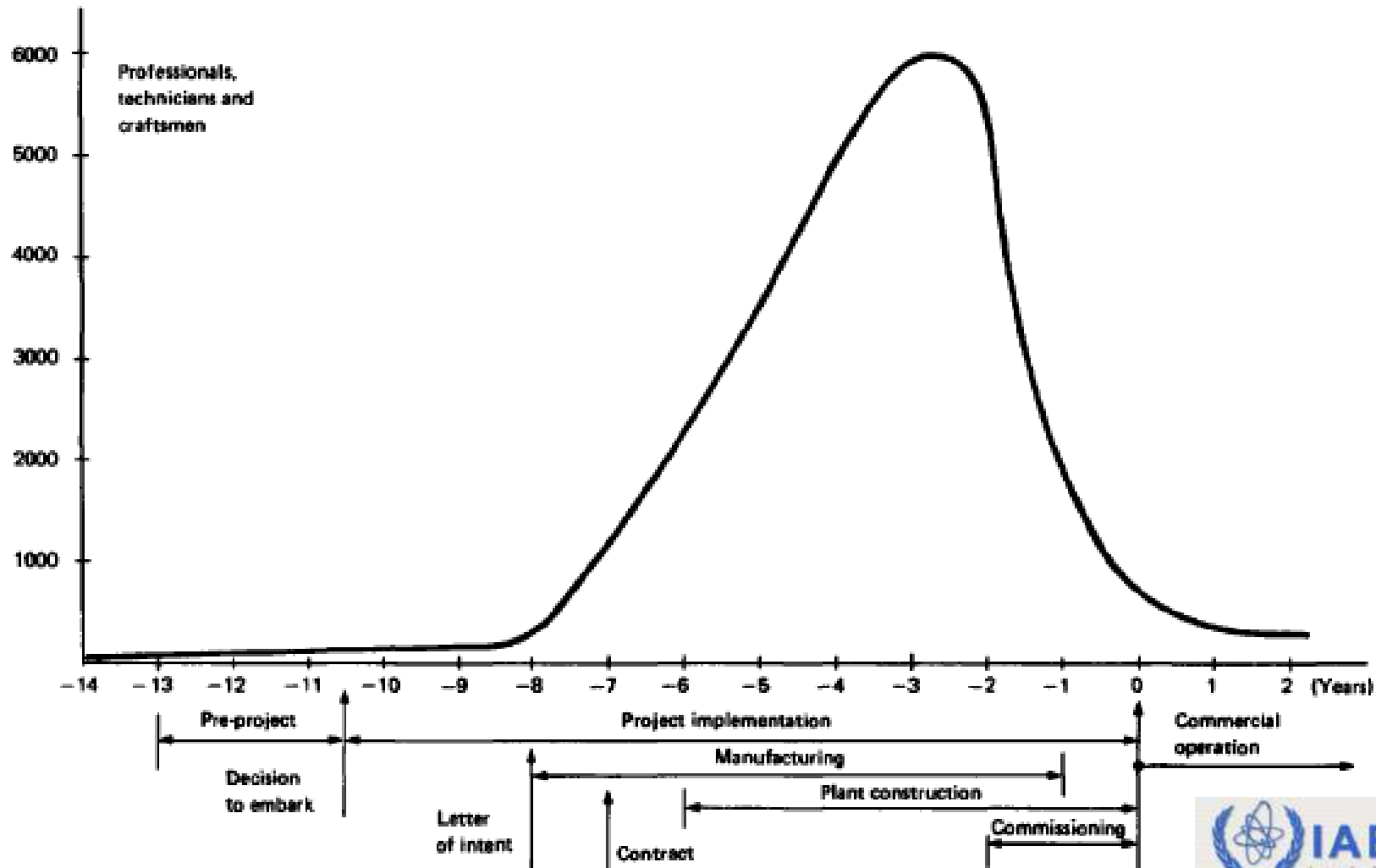
Specific training 2

10. Conventional Training Program
 11. Emergency Response Training Program
 12. Radiation Protection Training Program
 13. Leadership Development Training Program
- In Germany 70% of NPP staff is trained annually off-site.
 - All German nuclear operators have to pass 2 week training on simulator (in Essen).

External support

- Reactor supplier assists fully with initial fuel loading, startup, testing, synchronisation and initial operation.
- External services on engineering and maintenance good practice in all NPPs.
- Supplier support especially in turbine/generator; boiler, pumps, inverters, computers, electrical distribution and diesel generators.
- Peer evaluation very helpful
- IAEA; WANO

Construction



General perspectives

- European demand for additional staff very substantial.
- Risk(*opportunity*) of loss of people with general nuclear education.
- Wage levels have to be comparable with European utilities.
- Major need for Estonian NPP to be closely associated major European utility for access to operational experience and experience based training.
- Need to start IAEA country technical cooperation programme.

Thank you!

- Estonian NPP Youth Club – 2 B.Sc, 7 M.Sc and 2 Ph.D. students.
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