

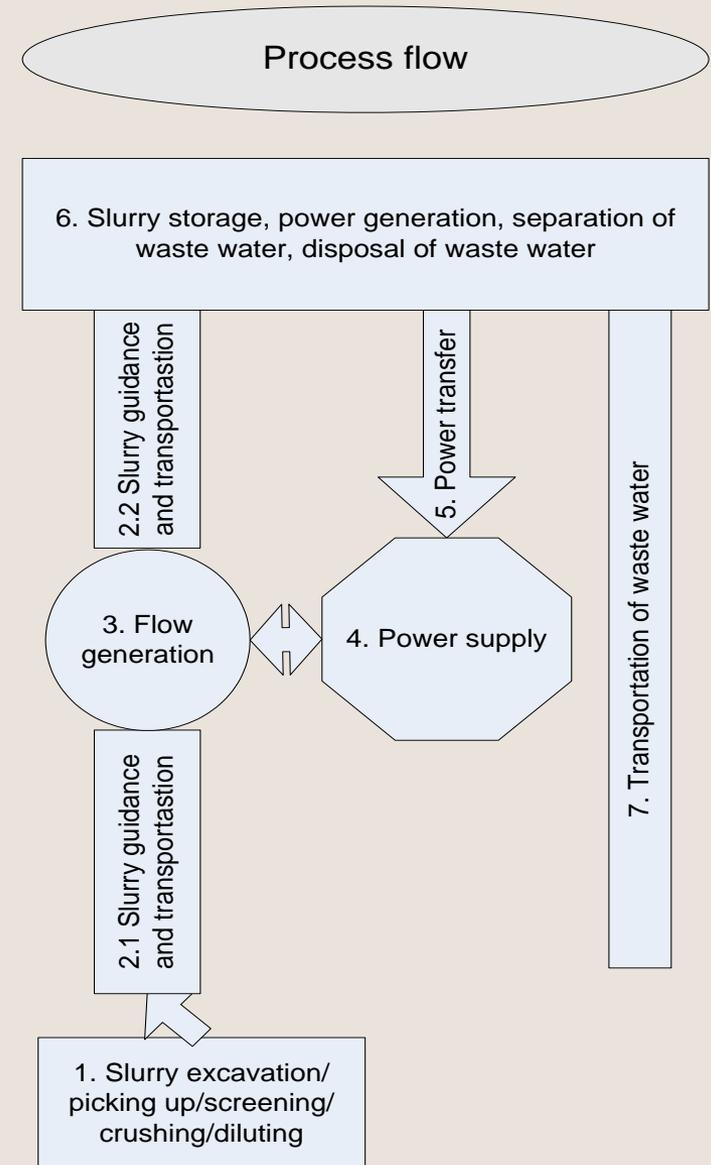


Deep-sea mining What next from science

... technology

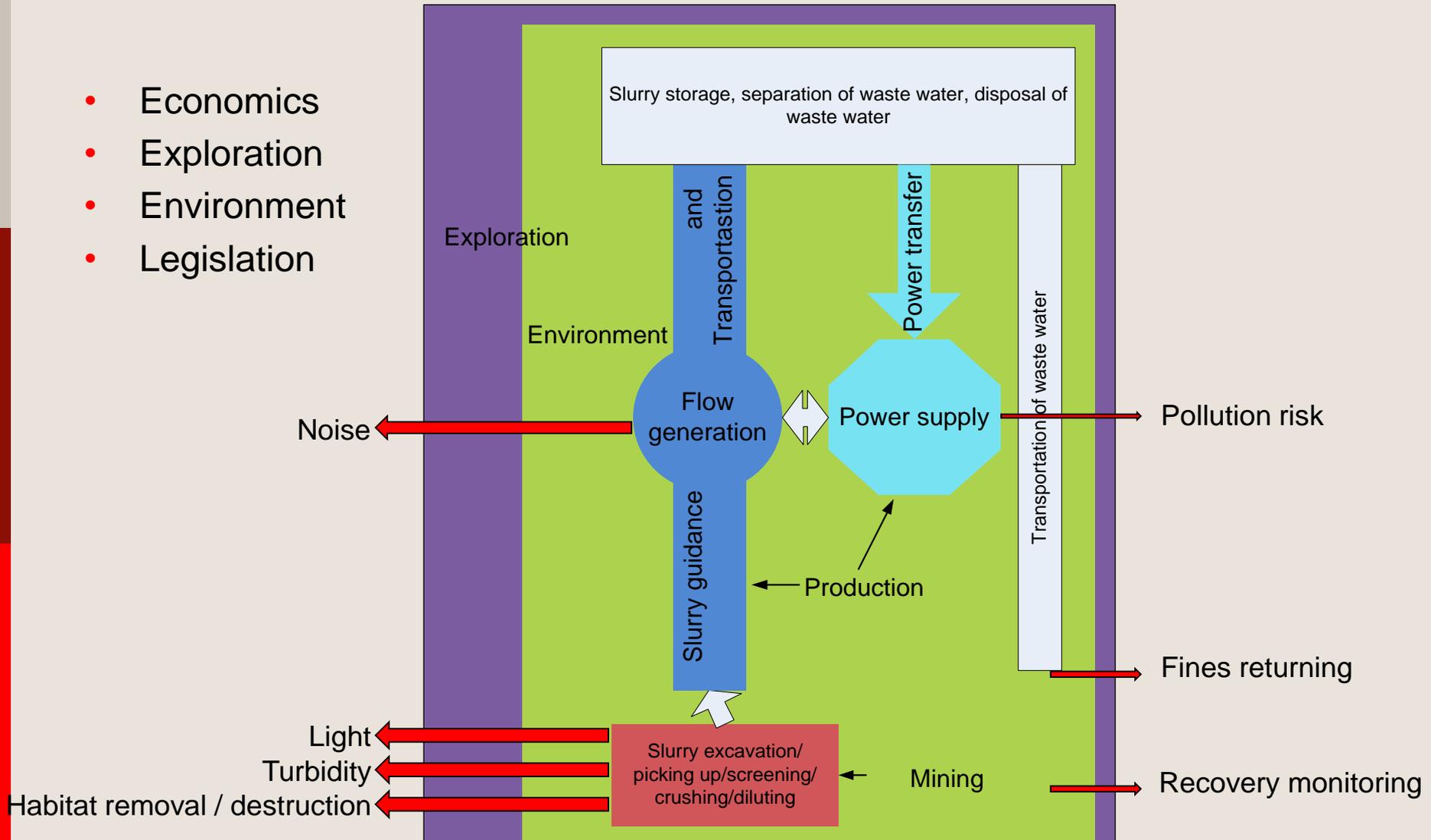
Robert van de Ketterij
17 – 11 - 2016

Life is easy for a technician...



Gradually we found there were other issues....

- Economics
- Exploration
- Environment
- Legislation



Lay-out of

Mining vessel

Riser handling

a mining system

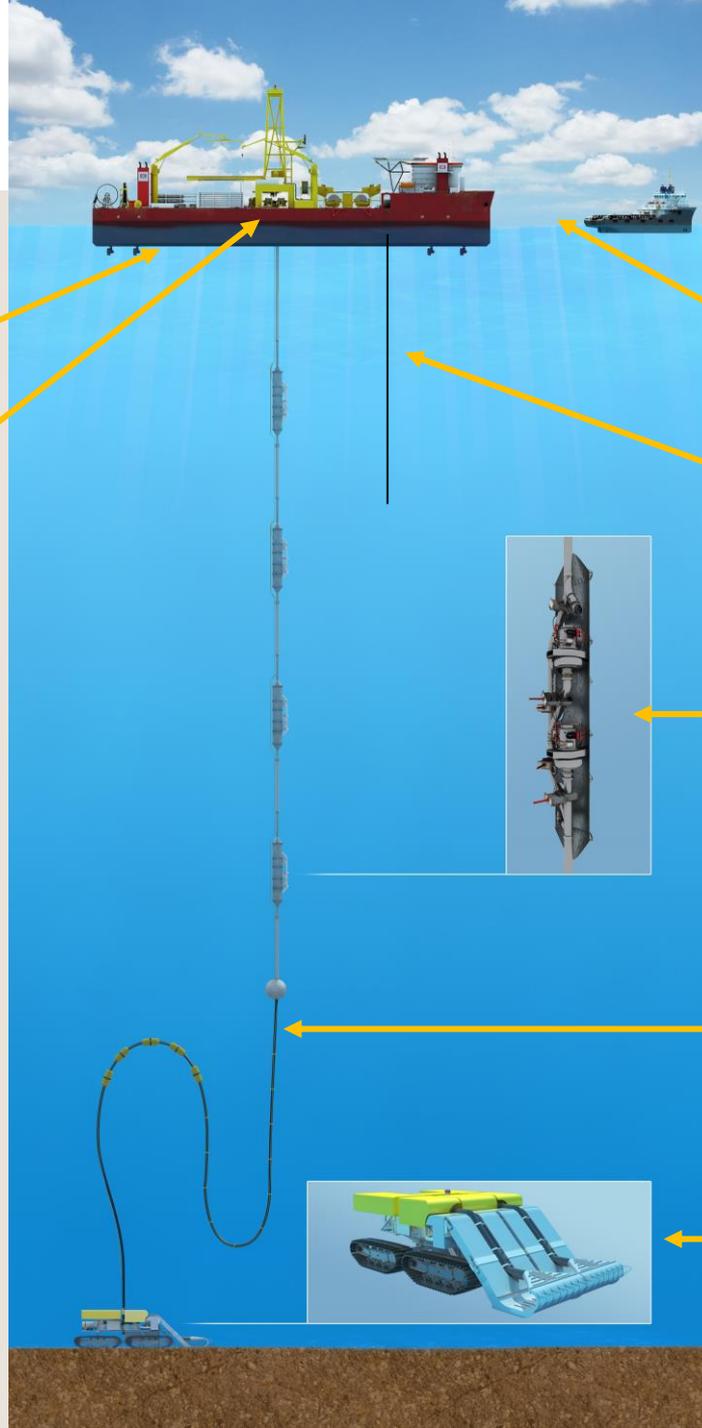
Ship-to-ship transfer

Return water

Booster station

Riser

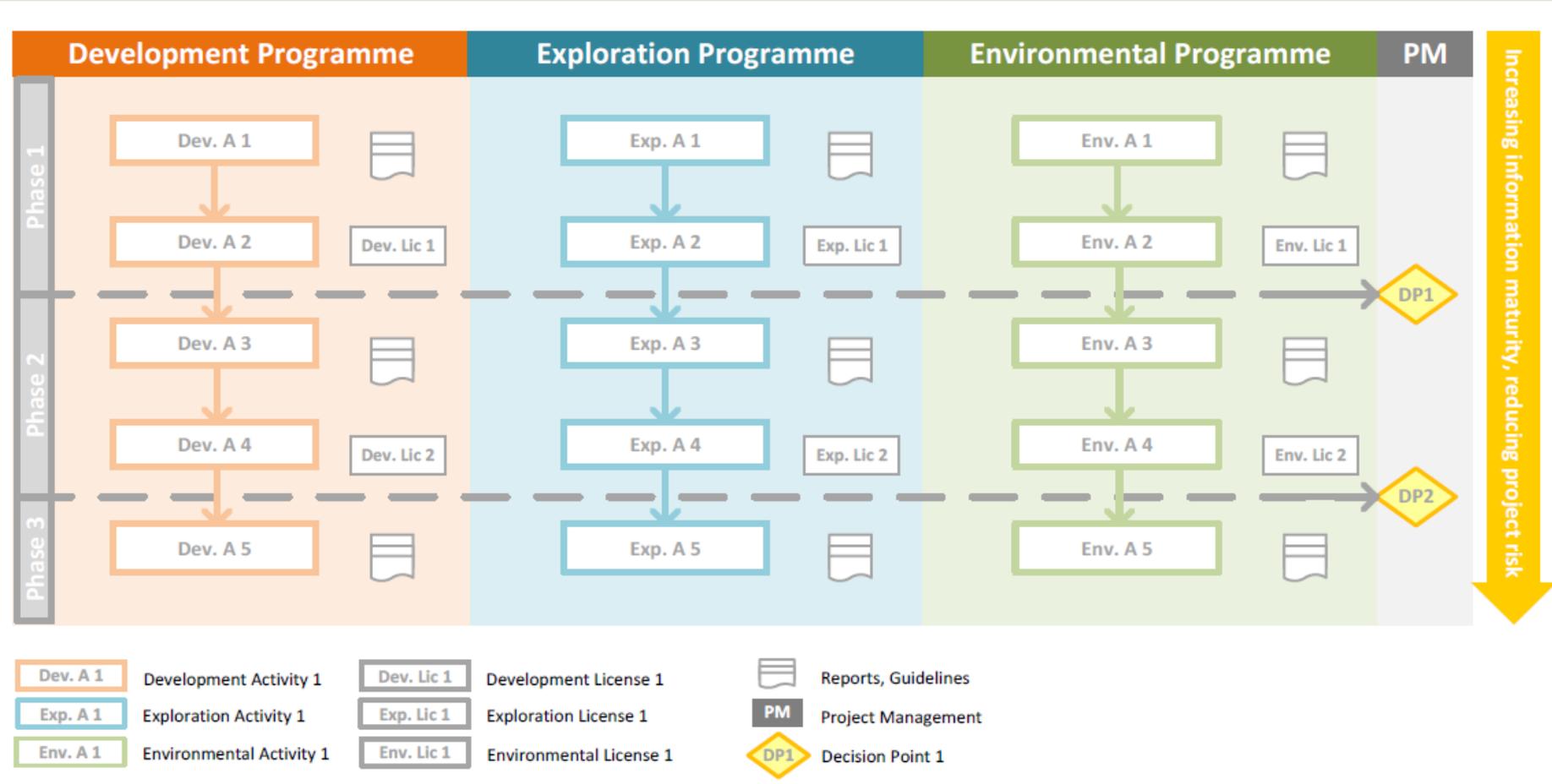
Nodule collector



Where are we now

- National subsidy programs
- Company investments
- EU
 - Blue Mining (EU grant 604500)
 - Blue Nodules (EU grant 688975)
 - MIDAS (EU grant 603418)
- Technology will be around TRL 5 - 6 (technology / prototype validated in relevant environment) within 2 years from now)
- Economically it looks feasible at moderate commodity price level
- Commodity demand is rising (batteries)
- Legislation for Exploitation not ready yet...
 - Norms for ecosystem assessment
 - Limits for limitation of pressure on the eco system
 - Guarantees for funding restorative actions
 - Extent and options for restorative actions
 - Norms form monitoring recovery
 - etc

Development, Exploration, Environment Decision (DEED)



What next...?

- A test mining program following DEED principles
 - Harmoniously combined Technological / Economical / Ecological development of a test site
 - Best practice technological solutions
 - Test mining
 - Various restorative actions
 - Extensive monitoring