

ELECTROCHEMICAL REMEDIATION OF POLLUTED HARBOUR SEDIMENTS IN THE ARCTIC

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Background

Environmental Focus

- Increasing industrial activities in the High North (off-shore and on-shore)
- Increasing international focus on the impact of human activities on the Arctic environment, e.g. 'Resolution on sustainable EU policy for the High North' (INI/2009/2214)
- Increasing need for developing and improving environmental management of industrial waste, including polluted sediments

National Action Plan

- A national action plan for cleaning polluted seabed was adopted by the Norwegian Parliament in 2006 (St.meld. 14).
- The action plan indicates that remedial actions should be undertaken when polluted sediments pose a hazardous risk for human health or the environment
- The action plan is managed by the Norwegian EPA, KLIF
- KLIF has identified 17 harbours for immediate remedial actions, 4 of these situated in Northern Norway

Remedial Actions of polluted harbour sediments

- Currently a limited number of remediation methods in the Arctic are used/exist:
 - Dredging and subsequent disposal
 - Dredging and subsequent stabilisation
- Need for developing site appropriate and cost-efficient remediation methods for cleaning polluted Arctic harbours

Increasing need for remediation of polluted harbour sediments in the Arctic

Project objectives

- Develop and strengthen knowledge within on-site remediation technologies
- Develop and optimise electrochemical remediation method(s) of multi-polluted material in the High North
- Develop mobile remediation test unit for on-site use in the High North

Electrochemical remediation

- Applies low current technology to mobilise and remove pollutants from soil, sediments, construction material, wood, fly ash, sewage water
- Adaptable to Arctic challenges in the High North, such as climate, infrastructure and logistics
- Potential for both in-situ and ex-situ use
- Commercially comparable to existing remediation methods of polluted sediments

Remedial Test Strategy

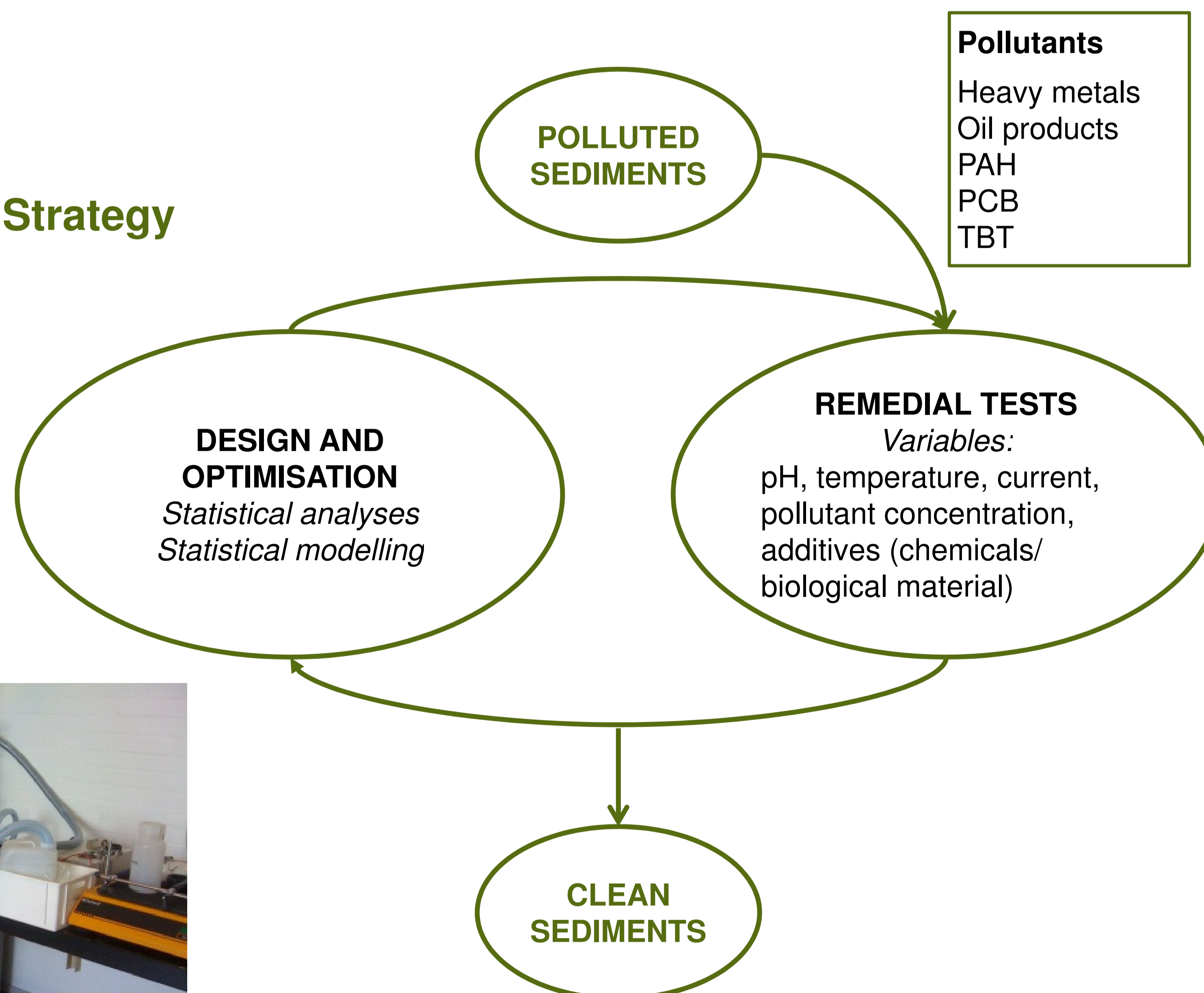


Figure 2: Electrochemical stack for pilot scale testing

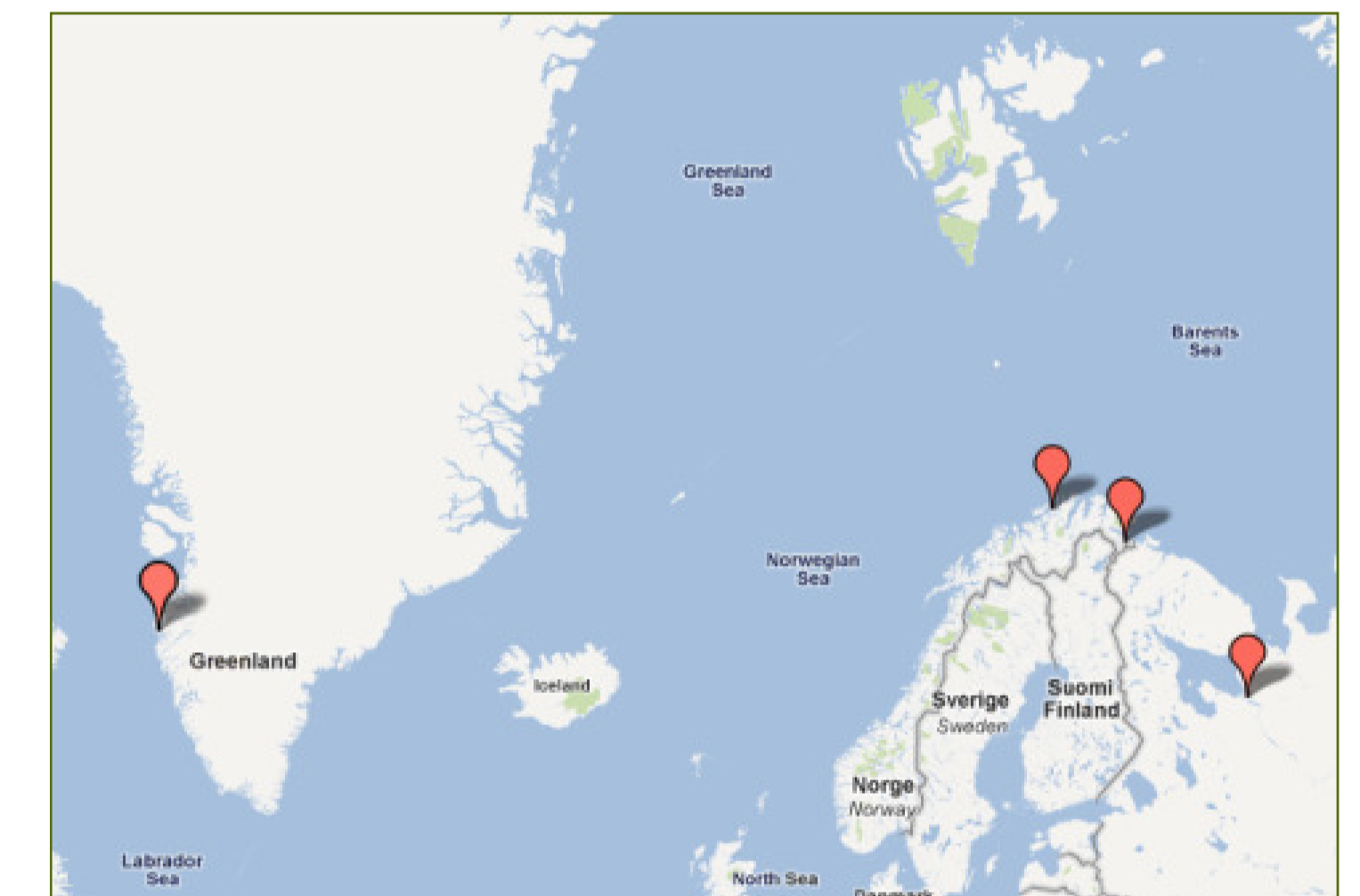


Figure 1: Sampled sediment sites for subsequent electrochemical testing

Collaboration partners

- Department of Chemistry, University of Tromsø, Norway
- ARTEK, Technical University of Denmark

Financing

The project is part of the programme EWMA (Environmental Industrial Waste Management in the High North) at the University of Tromsø financed by the Norwegian Research Council and ENI Norway AS

Mobile remediation test unit

- Trailer with electrochemical remediation test unit(s) with the possibility of adding remediation test units in the future
- To be used in the project for full scale remediation testing
- Future use: provide a mobile solution for undertaking different remedial tests laying the foundation for designing site specific and cost-efficient remediation solutions
- Renewable energy sources produce electricity for the test unit

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