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The deep sea energy park:

Harvesting Hydrothermal Energy For Seabed Exploration





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Outline

Xiangbo
- Energy Demands and Energy Potentials in Seabed

Jorge
- Energy Extracting Concept from Hydrothermal Vents

Suzuki
- Risk and Cost Assessments

Elena
- Environment, Legislation and Future Scenarios

Usman
- Conclusions and Discussions

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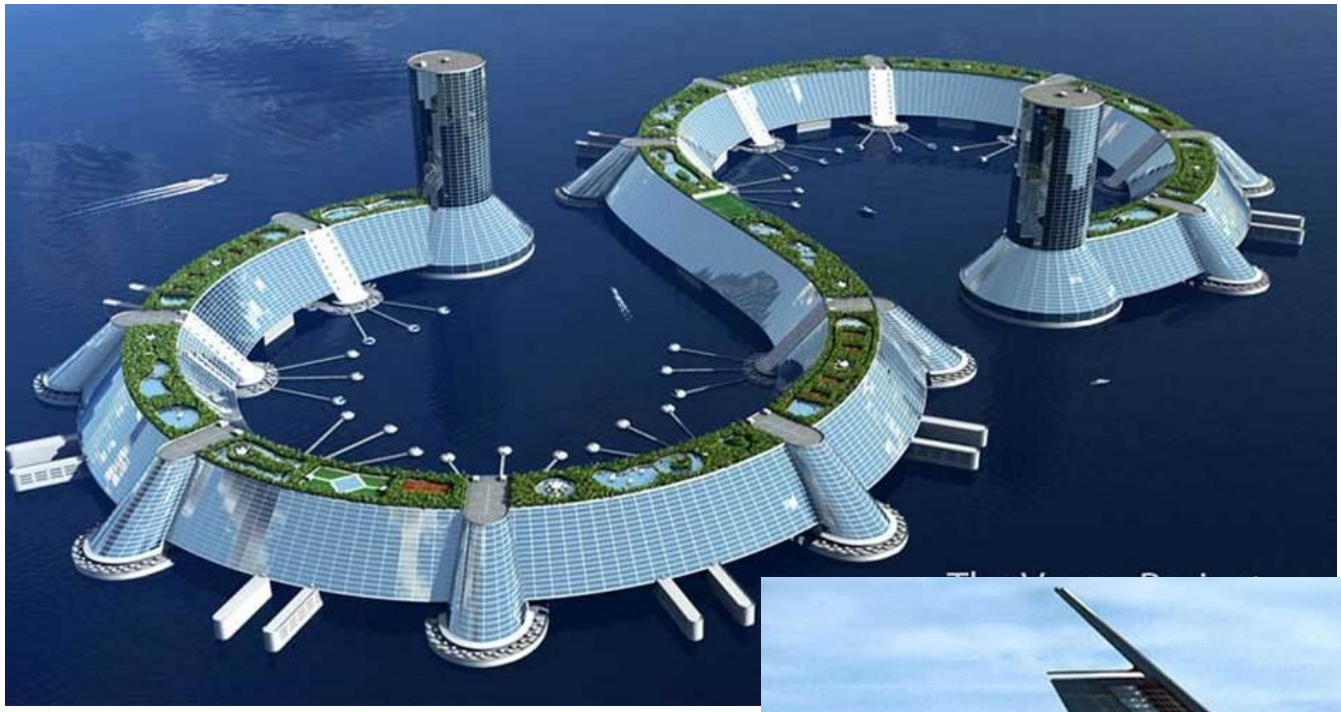
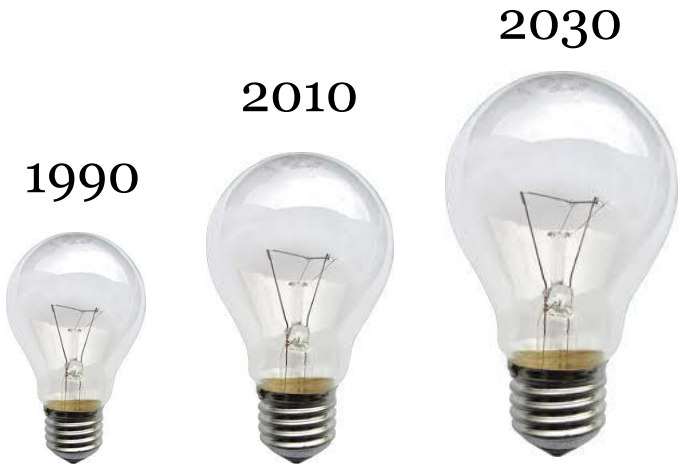
Motivation



Needs of Energy

- Energy Demand Scenario

Population
Living standards



Ton of Oil Equivalent

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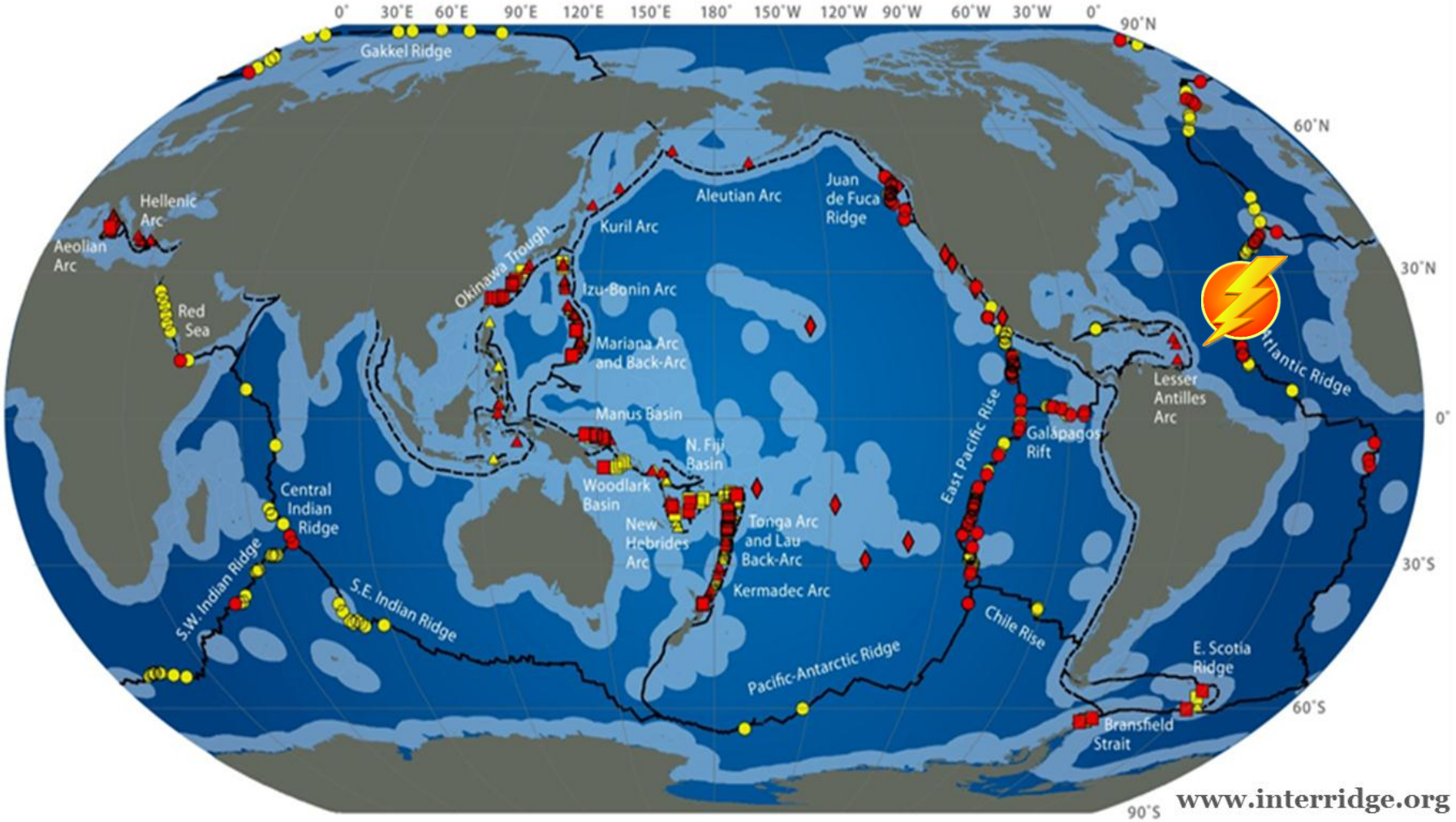
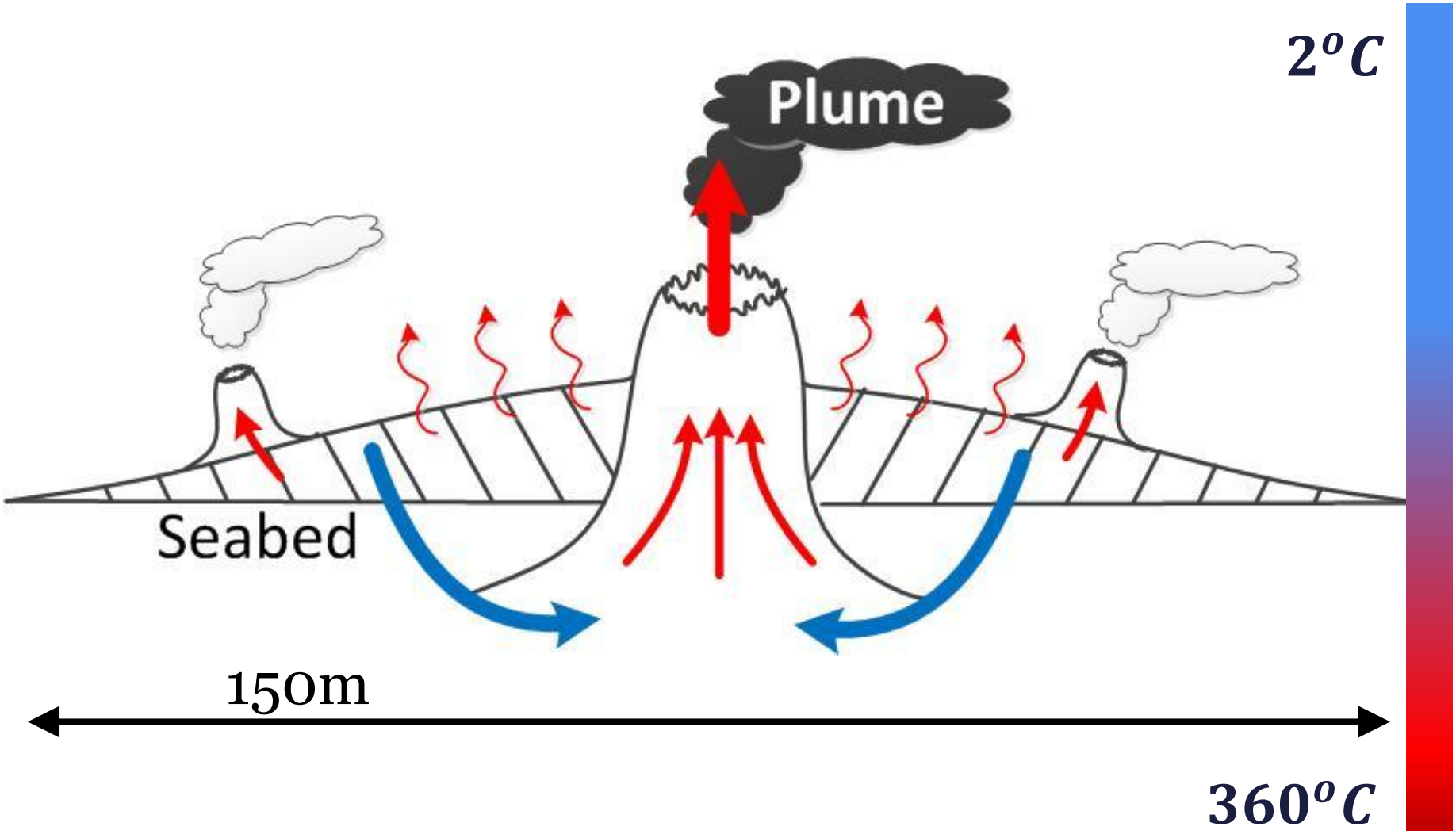
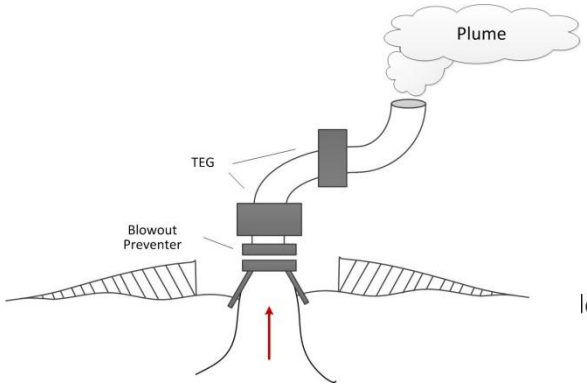
Energy Potential: 2 TW

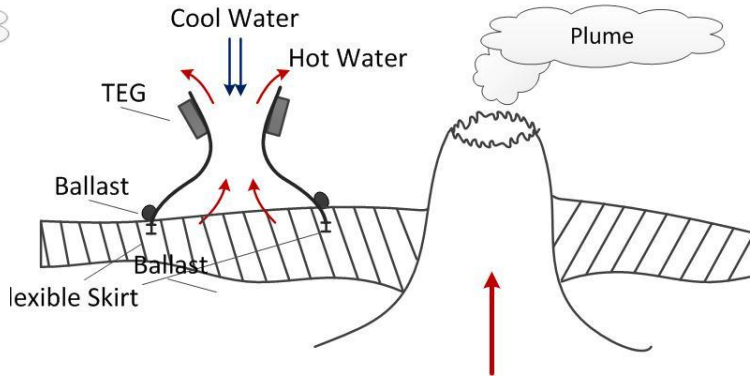


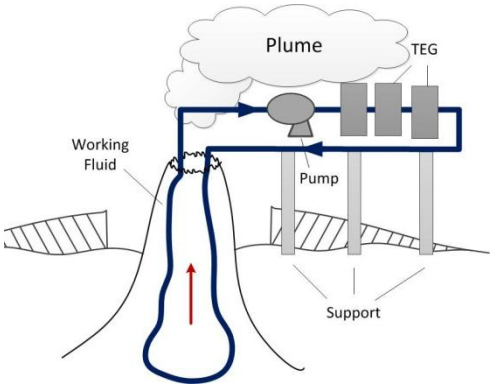
Energy in Trans-Atlantic Geotraverse (TAG)

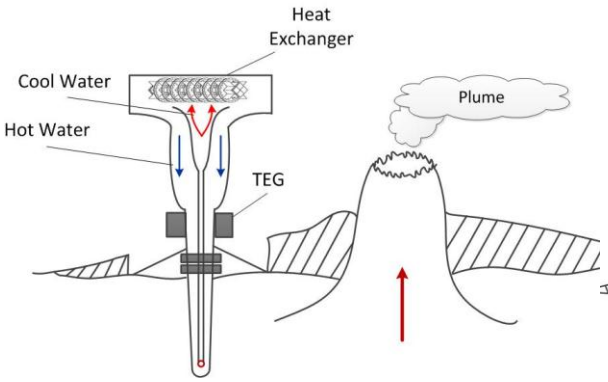


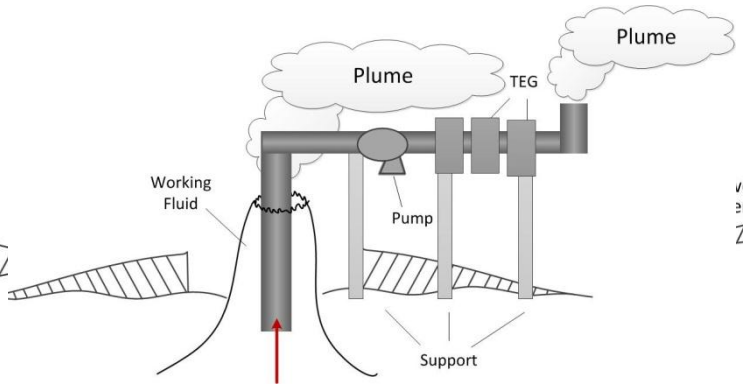
Energy Collection Concepts

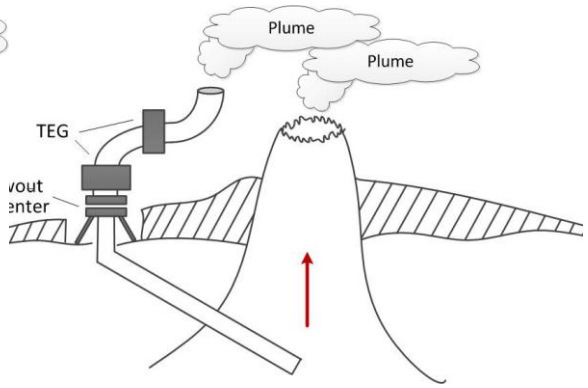




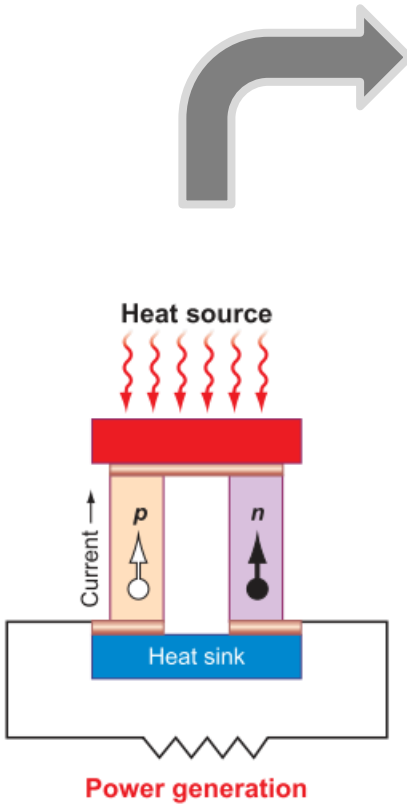




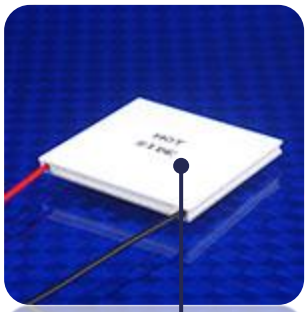




Thermoelectric Generator (TEG)

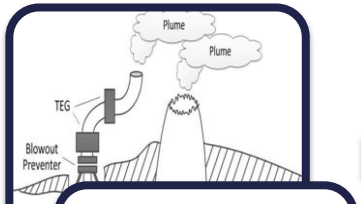


Seebeck Effect



TEG +
Tubular Heat Exchanger

TEG on TAG



Collect
- Drill
- Vent

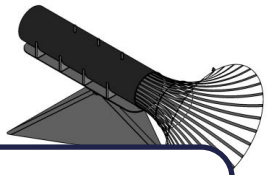
Convert
- TEG

Store
- Battery Rack

Convert
- DC/DC

Channel
- Sub-sea Cable

Convert
- DC/DC



Charge
- Docking

Explore
- AUV

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Concept

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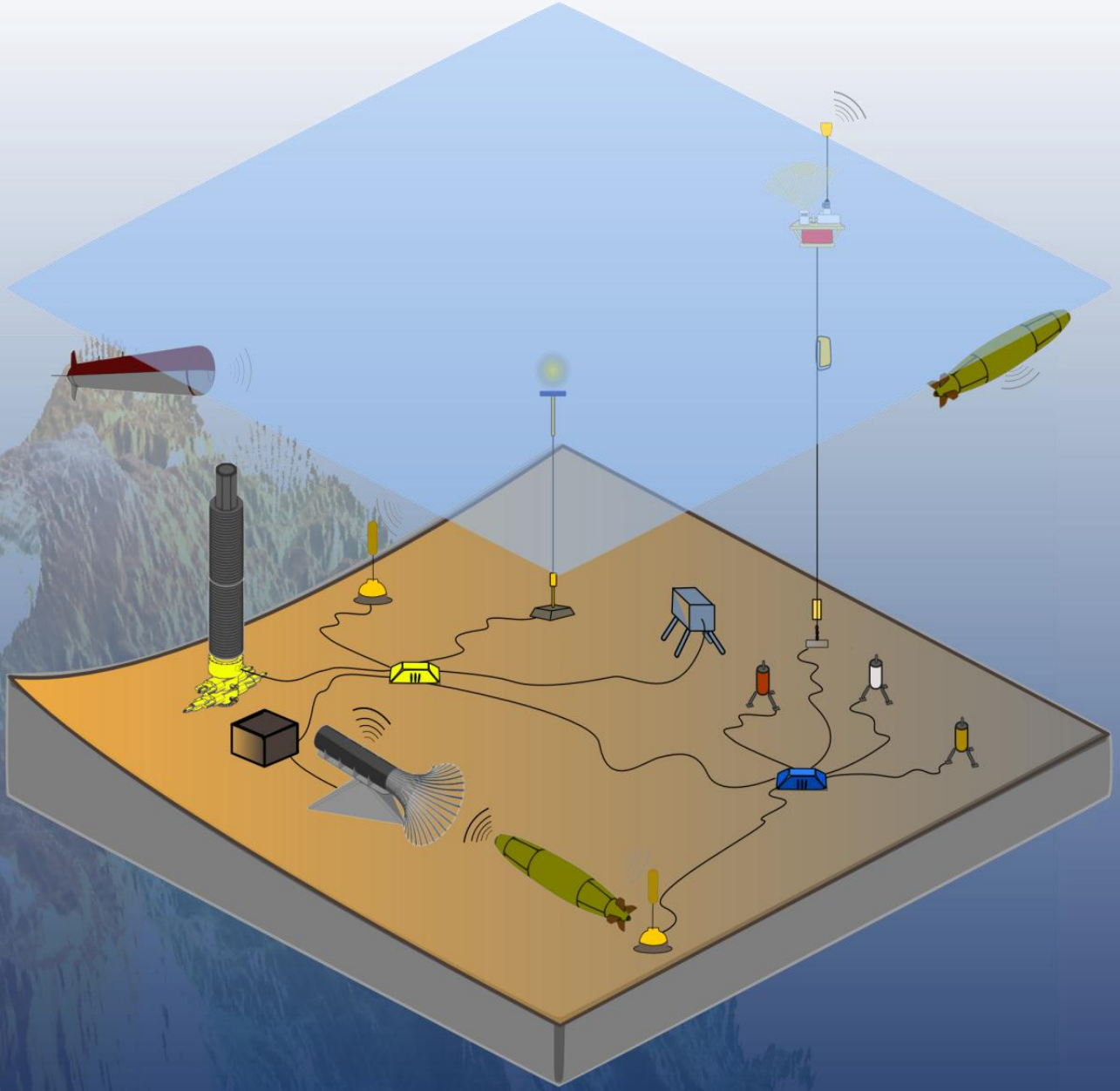
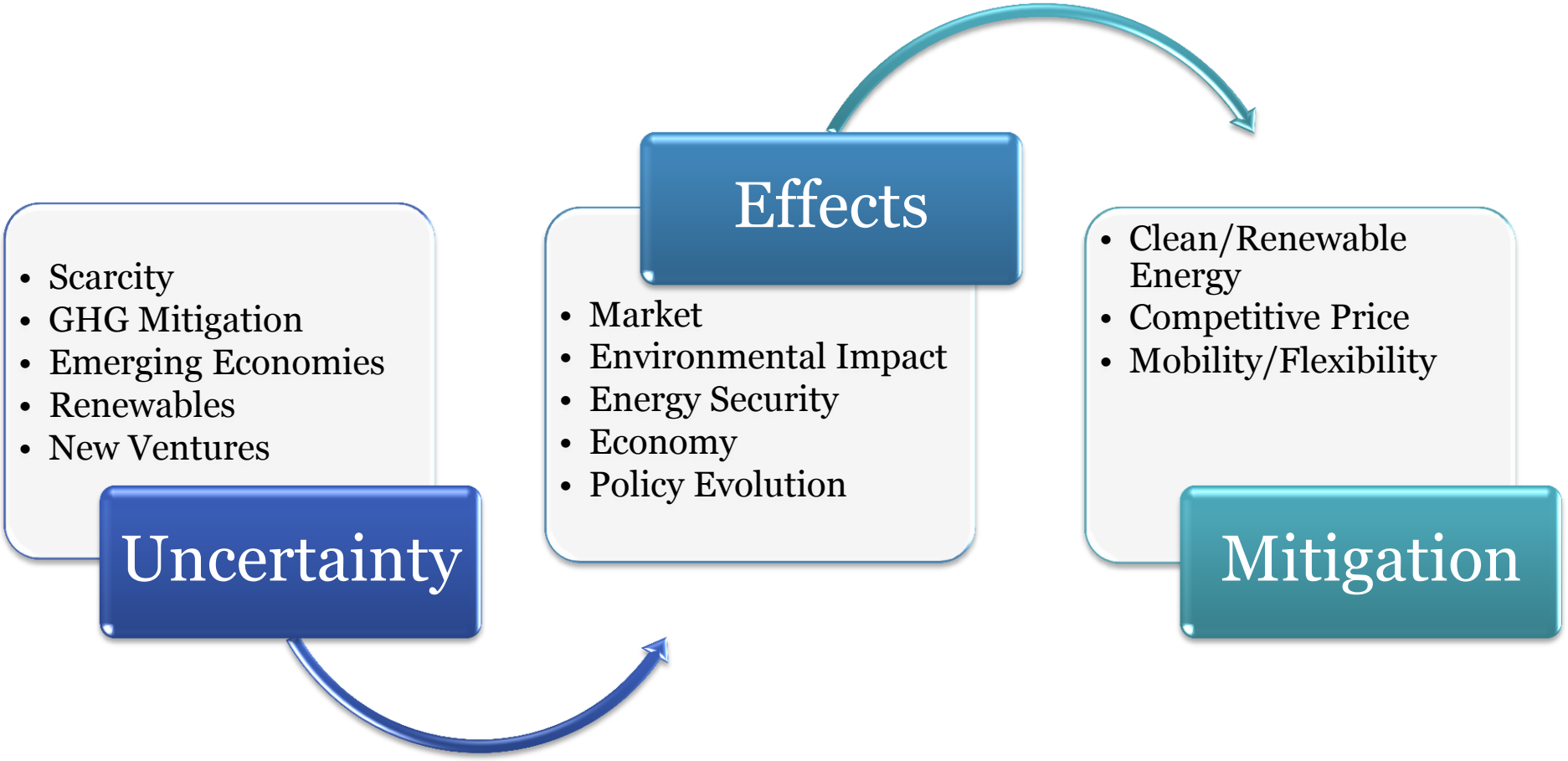
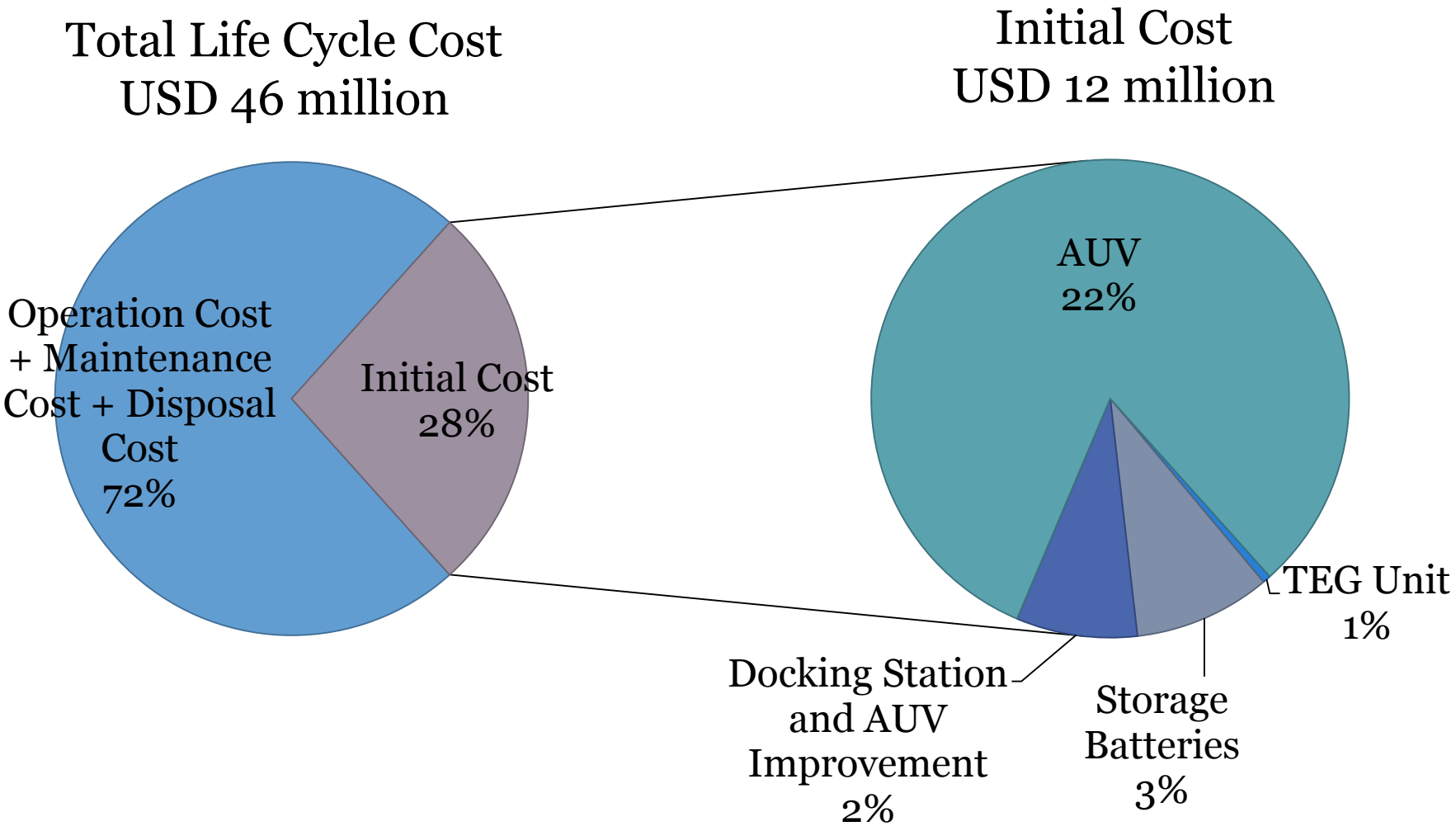


Risk Consideration



Project Cost Assessment



Environmental Assessment

Hazards

- Drilling
- Venturi Unit
- Closed System
- Open System
- Covering the Chimney

Effects

- Physical Damage
- Destruction of the Vent Water Circuit
- Water Demineralization
- Waste Fluid
- Food Source

Impact

- Dying of Hydrothermal Vent
- Decrease in Biodiversity

Mitigation

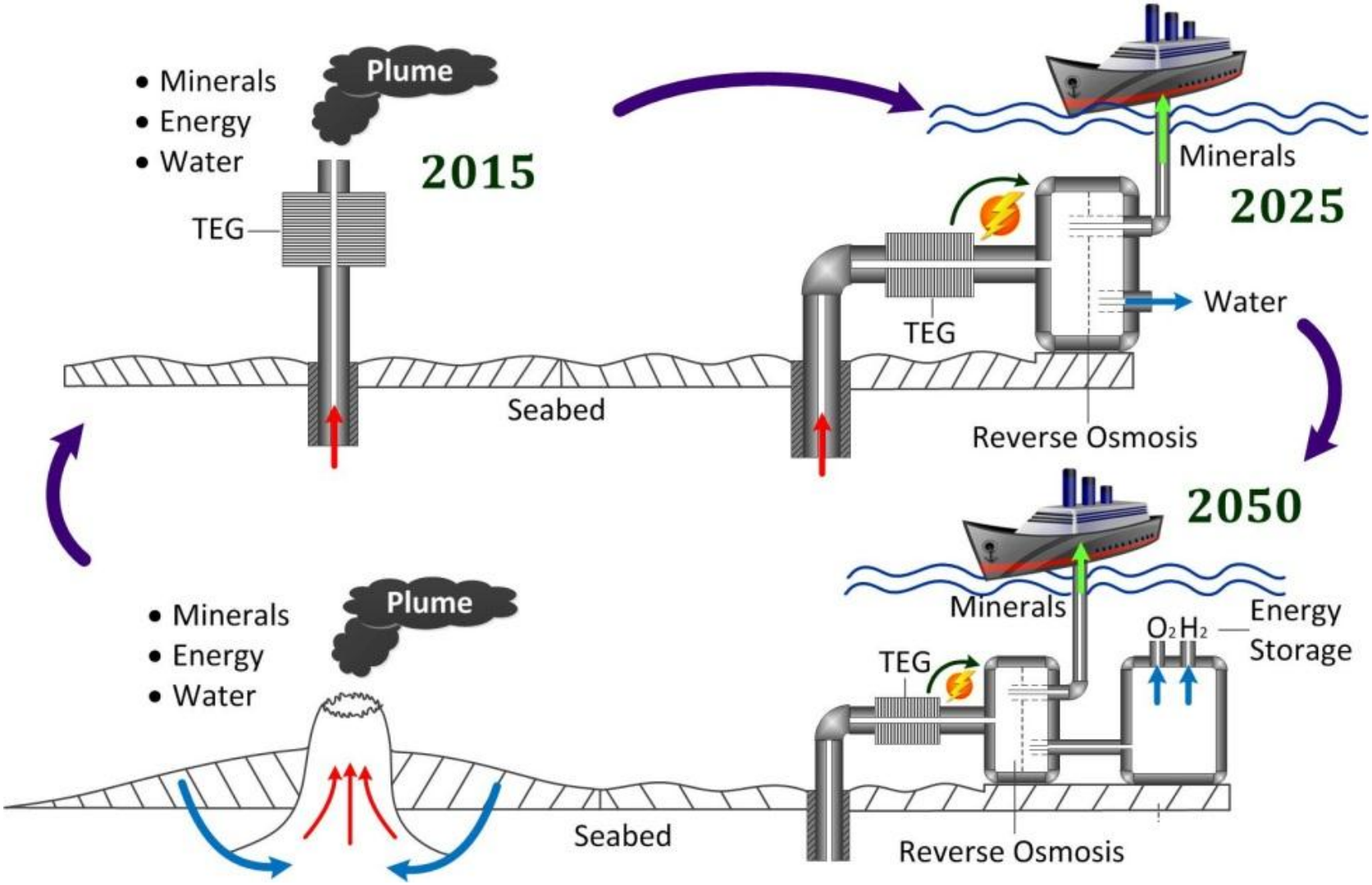
Installation as far as possible from chimney

System Mobility

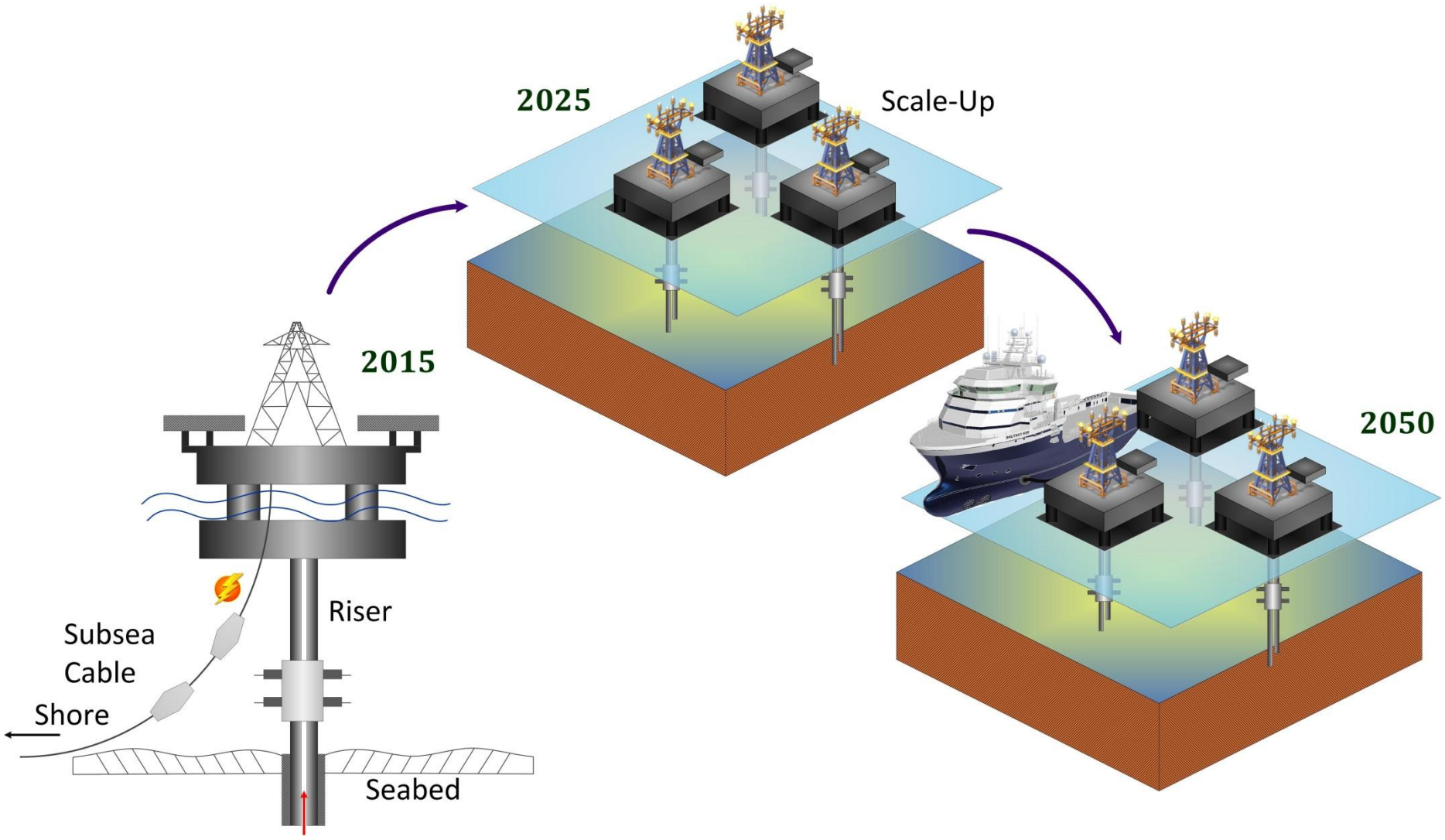
Legal Assessment

	High Sea	Territorial Water (Papua New Guinea)
Exploitation License	No Policy No Regulations	Use of onshore regulations
Exploration License		

First Scenario 2050



Second Scenario 2050



Conclusions

- The energy must not be produced at the expense of the environment
- Hence the need for more alternative energy sources
- Seabed holds vast and diverse energy sources

Conclusions

- Technical, environmental, legal and economic considerations were used as criteria for shaping the proposed concept.
- The technical challenges arise from: Thermal energy collection, converting the thermal energy to electrical energy and channelling the energy to a given client.
- Future:
    - Short term- Energy demands for submarines
    - Long term- Energy demand in the cities

Thank You for Listening