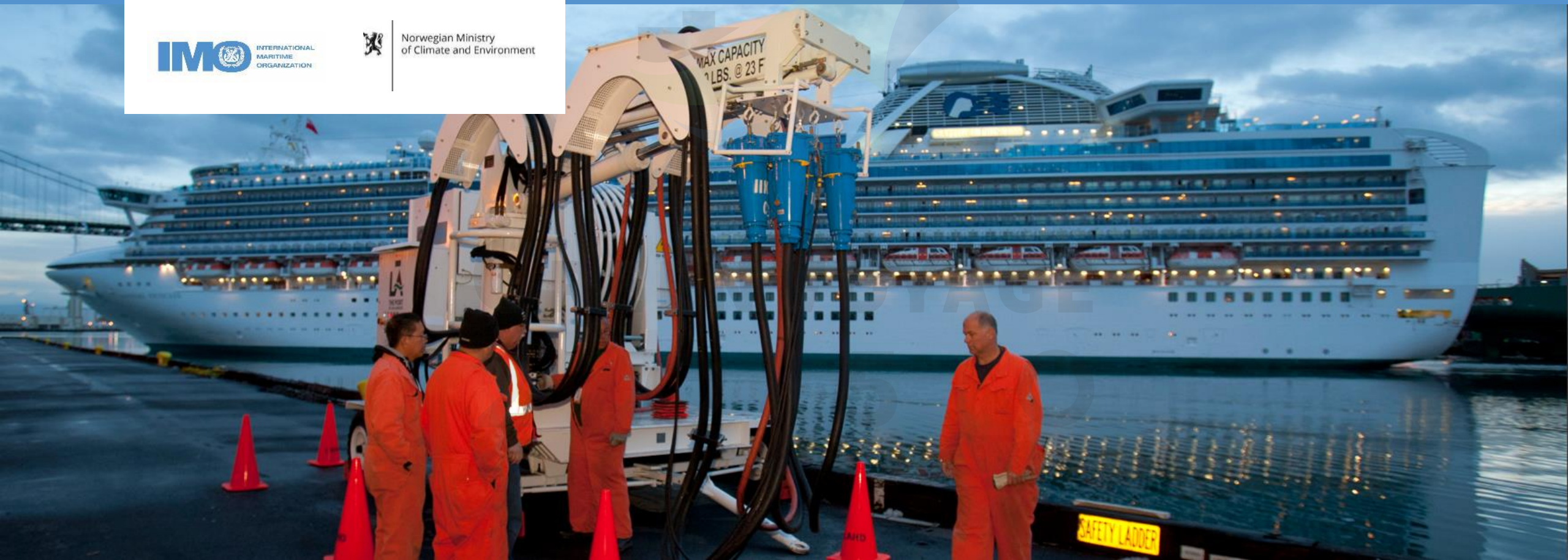
GreenVoyage 2050

IMO International Maritime Organization

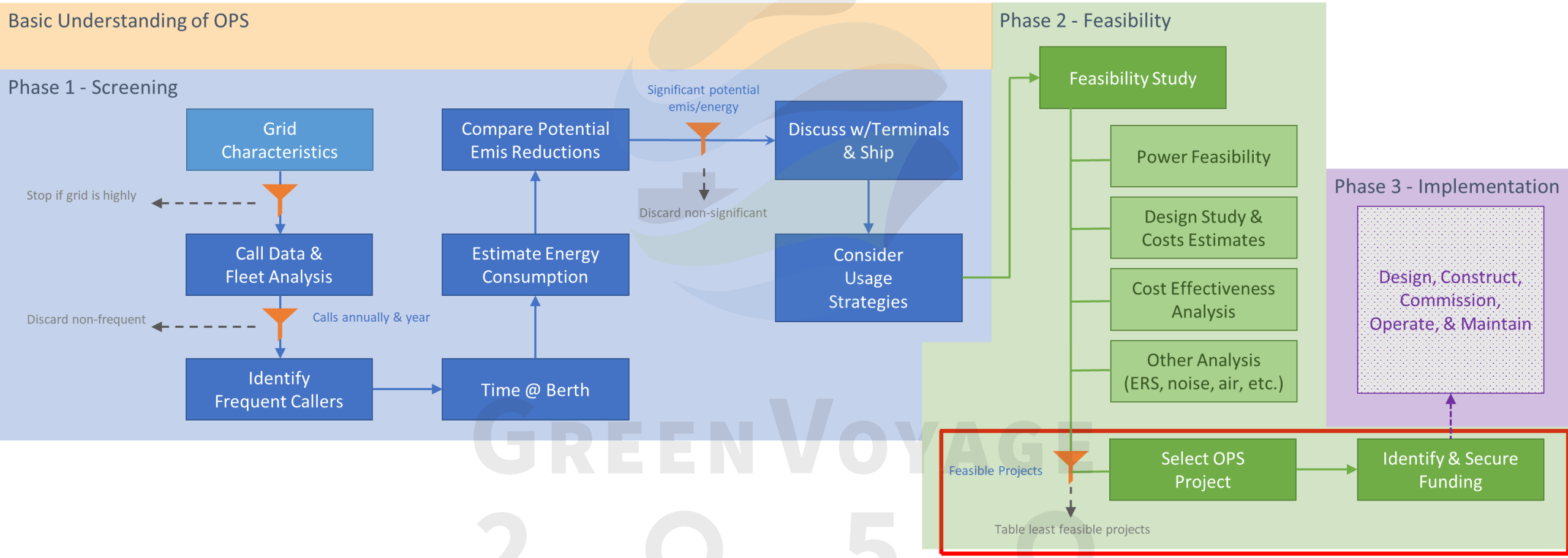
Norwegian Ministry of Climate and Environment

Onshore Power Supply Workshop

Session 5 – Phase 2 Feasibility - Selecting, Financing, Future, & Case Study



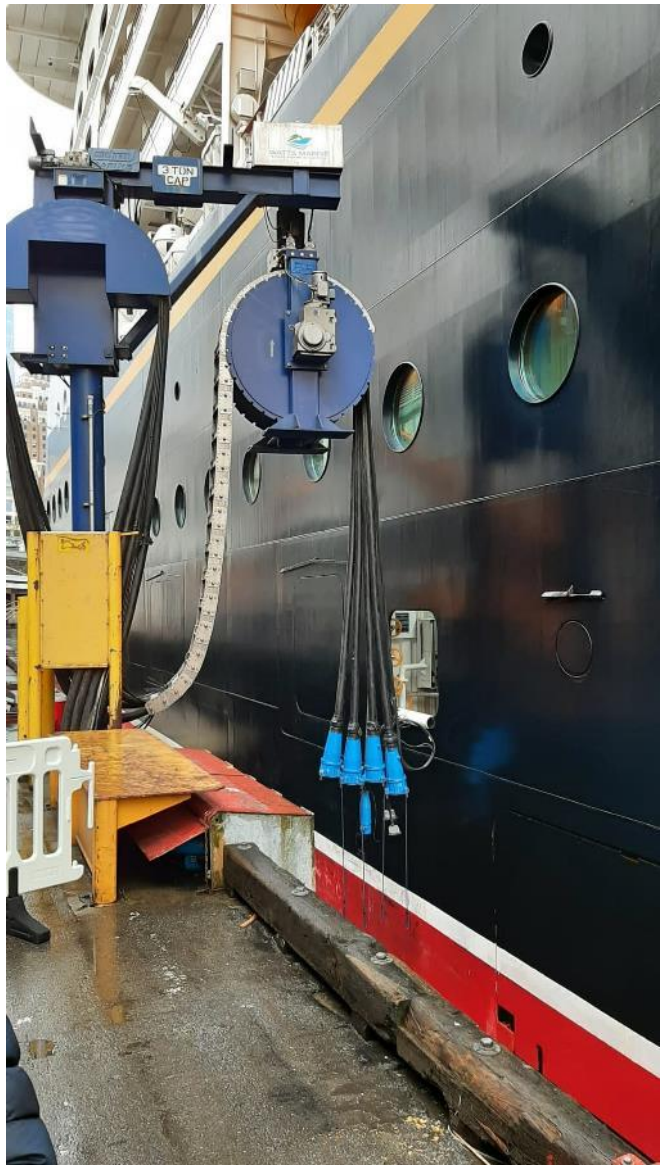
Decision pathway



Session 3 – Selecting, Financing, Future, & Case Study

Learning Objectives

- Understand how to select an OPS project
- Understand how to identify and secure funding for OPS projects
- Be familiar with the future of OPS
- Apply workshop knowledge to a hypothetical Port feasibility analysis



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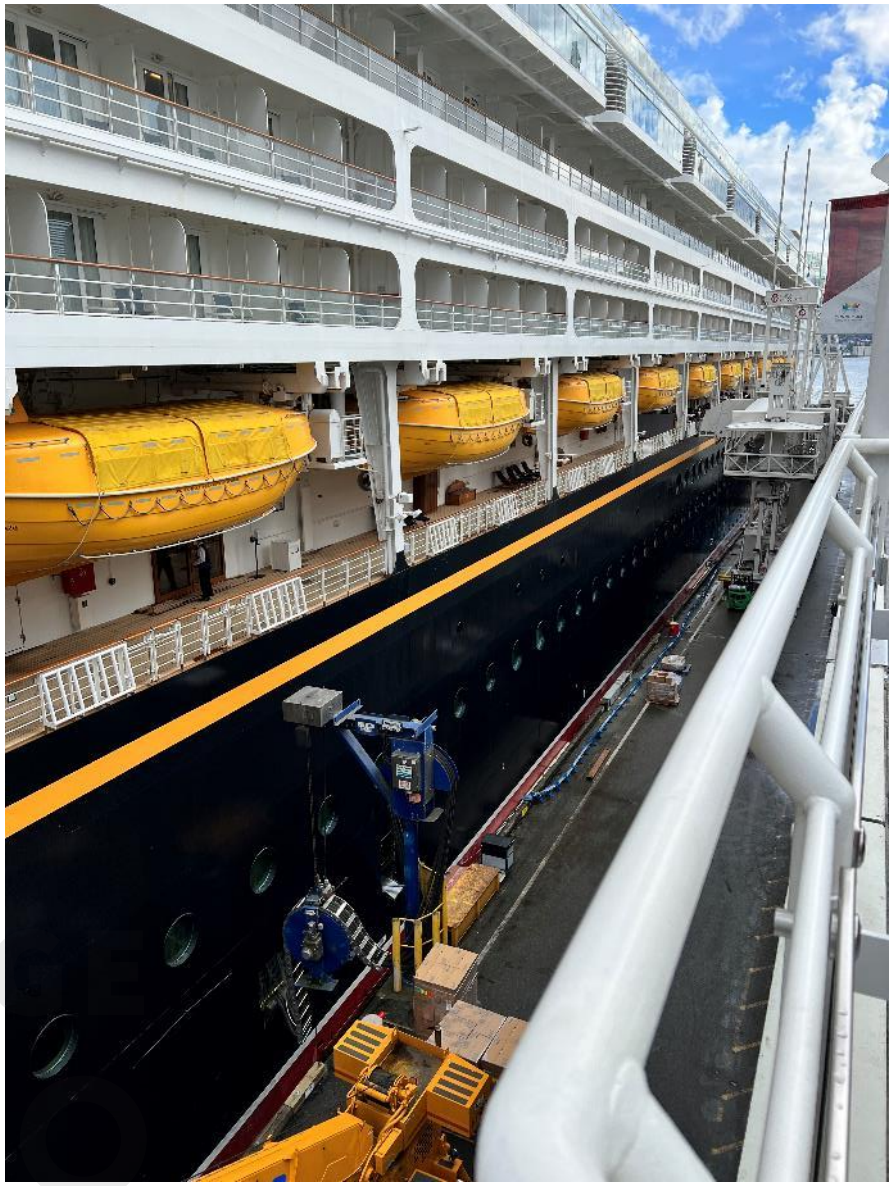
Selecting an OPS project

- Using emissions reductions, costs, timelines, & cost effectiveness and informed by the drivers for the project:
  - OPS & alternative ERS can be ranked using the most important criteria

- Other comparisons
  - Costs of health impacts avoided is sometimes used when there is an associated heath impact costs per tonne PM (or other pollutant) reduced



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			2015/16 Season Emissions Reductions					
Comparison	Condition		PM_{10}	$PM_{2.5}$	SOx	NOx	VOC	CO_2
Scenario 2 v 1	0.1% S		82.7%	80.0%	95.93%	6.1%	0.0%	5.0%
Scenario 2 v 1	0.001% S		85.0%	83.0%	99.96%	6.1%	0.0%	5.0%
Scenario 2a v 1	0.1% S/1.35%S		71.2%	69.1%	87.42%	5.0%	0.0%	4.1%
Scenario 2a v 1	0.001% S/1.35%S		73.1%	71.5%	90.70%	5.0%	0.0%	4.1%
Scenario 3 v 1	EGCS & 2.7% S		80.0%	80.0%	98.00%	10.0%	0.0%	-2.0%
Scenario 4 v 1	EGCS & 0.1% S		96.5%	96.0%	99.92%	15.5%	0.0%	3.1%
Scenario 4 v 1	EGCS & 0.001% S		97.0%	96.6%	99.999%	15.5%	0.0%	3.1%
Scenario 5 v 1	0.1%, 1.35%, 2.7% S fuels	Local	80.1%	79.5%	87.18%	64.3%	62.5%	na
	& Shore Power	Regional	77.0%	77.3%	74.52%	56.7%	57.7%	-12.1%
Scenario 5 v 1	0.1%, 1.35%, 2.7% S fuels	Local	80.6%	80.1%	88.33%	64.3%	62.5%	na
	& Shore Power	Regional	77.5%	78.0%	75.66%	56.7%	57.7%	-12.1%

Note: a negative reduction represents an increase in emissions

			Annual Reductions, tonnes				On-shore	On-shore	Ship		Incremental Cost Eff.
Comparison	Condition		PM_{10}	$PM_{2.5}$	NOx	CO_2	Infrastructure	O&M	Infrastructure	Total	$/wgt tonne
Low - 10 year											
Scenario 5 w/2a	0.1% S & Shore power	Local	1.1	1.1	73.1	na	$20,700,000	$9,315,000	$7,000,000	$37,015,000	$48,924
		Regional	0.7	0.8	63.8	-990					$59,565
Scenario 5 w/2a	0.001% S & Shore power	Local	0.9	0.9	73.1	na	$20,700,000	$9,315,000	$7,000,000	$37,015,000	$50,794
		Regional	0.6	0.7	63.8	-990					$62,361
High - 10 year											
Scenario 5 w/2a	0.1% S & Shore power	Local	1.1	1.1	73.1	na	$36,400,000	$16,380,000	$27,500,000	$80,280,000	$125,126
		Regional	0.7	0.8	63.8	-990					$152,343
Scenario 5 w/2a	0.001% S & Shore power	Local	0.9	0.9	73.1	na	$36,400,000	$16,380,000	$27,500,000	$80,280,000	$129,910
		Regional	0.6	0.7	63.8	-990					$159,492
Low - 20 year											
Scenario 5 w/2a	0.1% S & Shore power	Local	1.1	1.1	73.1	na	$20,700,000	$18,630,000	$14,000,000	$53,330,000	$42,878
		Regional	0.7	0.8	63.8	-990					$52,204
Scenario 5 w/2a	0.001% S & Shore power	Local	1.1	1.1	73.1	na	$20,700,000	$18,630,000	$14,000,000	$53,330,000	$44,517
		Regional	0.7	0.8	63.8	-990					$54,654
High - 20 year											
Scenario 5 w/2a	0.1% S & Shore power	Local	1.1	1.1	73.1	na	$36,400,000	$32,760,000	$55,000,000	$124,160,000	$132,258
		Regional	0.7	0.8	63.8	-990					$161,025
Scenario 5 w/2a	0.001% S & Shore power	Local	1.1	1.1	73.1	na	$36,400,000	$32,760,000	$55,000,000	$124,160,000	$137,314
		Regional	0.7	0.8	63.8	-990					$168,582

PANSW Feasibility Report, cost-effectiveness & emission reduction examples, 2017

Funding an OPS Project

- As noted before, OPS is one of the most expensive emissions reduction strategies
- Funding of OPS includes a broad range of sources
  - Port authorities
  - Shipping lines
  - Government – regional, national, subnational, local
    - Grants
    - Competitive grants
    - Direct legislative set asides/programs, etc.
  - Financing for development institutions
  - Development banks
  - United Nations instruments (GEF)
  - Other funding sources/partners

United Nations, https://www.un.org/sustainabledevelopment/wp-content/uploads/2022/03/2021-Report.pdf

Future of OPS

- Do you see OPS as a near, mid, and/or long term strategy?

Strengths looking forward

- As OPS is taken up & becomes more available at more ports, the number of ships that will be OPS ready will increase.
- If the new emerging fuels to reduce GHGs are highly more expensive than grid power, the business case for OPS could be strengthened.
- OPS tied to progressive grids that achieves a high degree of blue, green, & renewable generation in their portfolios have the best chance to remain effective in the face of the coming energy transition for ships.

Limitations looking forward

- OPS will still retain its place among the most expensive ERS because of the landside challenges with power & infrastructure works needed.
- As ships go through the energy transition to cleaner & cleaner fuels, & depending on how clean the grid supplying OPS is - the benefits of & the business case for OPS could be reduced or negated.

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Funding Opportunity
Mauritius Ports Authority

- Technical assistance opportunity
  - World Bank's Second South West Indian Ocean Fisheries Governance and Shared Growth Project (SWIOFish2 Project)
  - SWIOFish2 has three subcomponents:
    - Indian Ocean Tuna Commissions (IOTC)
    - African and Indian Ocean Developing States (AIODIS)
    - Federation of Artisanal Fishermen of the Indian Ocean (FPAOI)
  - One of the primary objectives of AIODIS is support beneficiary countries with innovation and development of their blue economy in the context of climate change
  - Indian Ocean Commission (IOC) implemented the regional component of the SWIOFish2 Project
  - IOC wished to provide technical support of initiating an innovative pilot project with ***replication potential*** in other AIODIS States
  - Funding was not meant to cover infrastructure costs, just technical expertise including experts traveling to Mauritius
  - IOC put out a notice for such projects to AIODIS States

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SWIOFISH 2

IOTC AIODIS FPAOI

Funding Opportunity
Mauritius Ports Authority

- Technical assistance funding for pilot study for OPS
  - Mauritian Ministry of Foreign Affairs reached out to local institutions for support for supply of renewable energy to berthed vessels
  - Mauritius Ports Authority is a major player in the regional projects undertaken by the IOC
  - Mauritius Ports Authority responded to the Ministry's call with the development of a "Greenport" at Port Louis Harbor which included OPS
    - Based on a *Port Energy Efficiency and Renewable Energy Strategic Planning* study conducted under the EU Technical Cooperation Facility in 2012/3, with the objective of transforming Port Louis Harbor into a Greenport
    - The focus of the study was landside operations
    - Vessel side was not given priority
    - This was an opportunity to close this gap
  - Due to IOC funding capacity limitations, the terms of reference were trimmed to just including the OPS pilot study at the cruise terminal
  - AIODIS funded technical assistance to the Mauritius Ports Authority for the pilot OPS feasibility study

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Funding Opportunity
Mauritius Ports Authority

- Current update
  - OPS funding for $11.5 million USD has not been secured at this time
  - Solar panel funding for $3.5 million USD has not been secured at this time
  - Continued outreach on the pilot feasibility study continues
    - UNCTAD – Multi-Year Expert Meeting (July 2022)
    - FAO – Blue Ports Initiative (July 2022)
    - IAPH – Climate & Energy Committee Meeting (May 2022)
  - Regional impact of the project
    - Cape Verde has already completed a similar feasibility study
    - Seychelles is currently implementing too for its port
    - Both ports are in the process of constructing a new cruise facility.

Project Partners

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