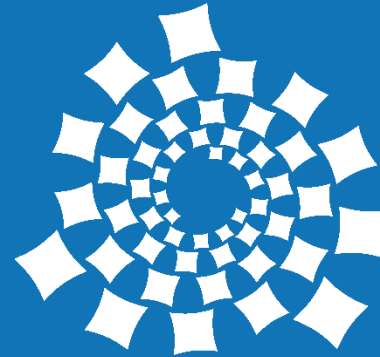




GLOBAL COOLING PLEDGE ASSEMBLY

SINGAPORE 15 - 18 SEPTEMBER 2026

Parallel Session: Implementation Roundtables and Beat the Heat Training

Sustainable Cooling, Clean Energy and Demand Flexibility

11:00-12:30, 16 September 2026



Ministry of Sustainability
and the Environment
— SINGAPORE —

Opening remarks



Graeme Maidment

Professor, Heating and Cooling,
London South Bank University; Executive
Committee Member, UNEP Cool Coalition

Thematic Spotlight: Sustainable cooling and energy integration



Dimitris Karamitsos

Senior Sustainable Finance Specialist,
BASE



GLOBAL COOLING PLEDGE ASSEMBLY

SINGAPORE 15 - 18 SEPTEMBER 2026

MARKET TRANSFORMATION: SUSTAINABLE COOLING, CLEAN ENERGY AND
DEMAND FLEXIBILITY

Scaling Sustainable Cooling Services through Cooling-as-a- Service and Clean Energy

Thematic Spotlight • Dimitris Karamitsos, Senior
Sustainable Finance Specialist, BASE



**Cool
Coalition**
a UNEP-convened initiative



Ministry of Sustainability
and the Environment
— SINGAPORE —



Cooling demand is rising — investment in efficient systems is not



A widening gap between rising cooling needs and capital flowing into efficient systems creates both a climate risk and a USD-trillion opportunity.

THE CHALLENGE

Cooling demand will triple by 2050

10 → 30%

of global electricity used by cooling — equal to China's total demand today

- Driven by rising incomes, heat stress & globalisation
- Concentrated in emerging economies
- Locks in long-lived energy assets

THE OPPORTUNITY

A USD 6.9 trillion 30-year market

\$230B/yr

investable in clean, efficient cooling globally over the next three decades

- 90%+ of life-cycle cost is operations (utility, maintenance)
- Large savings, short paybacks
- Efficient = cheaper over 12-yr life

THE BARRIER

Buyers stay sensitive to upfront price

CAPEX

first-cost lock-in keeps owners with cheaper, less efficient equipment

- Lack of trust in performance claims
- Cooling is non-core, deprioritised
- Maintenance & spares overlooked, TCO inaccurate

Sources: IEA, *The Future of Cooling* (2018); BASE / SET Alliance life-cycle cost analysis (2020).

Cooling-as-a-Service: pay-per-use cooling that aligns incentives



CaaS shifts cooling from a capital purchase to a service subscription — providers own & operate efficient equipment; customers pay for the cooling they consume based on agreed tariff structures.

FOUR FOUNDING PRINCIPLES

1

Pay-per-use · provider owns the equipment

Customer pays a per-unit fee (e.g., per RT-hour, per crate-day) instead of buying assets — converts CAPEX into OPEX.

2

Aligned incentives for efficiency

Provider integrates the electricity bill into the fee structure — the more efficient the system, the higher the provider's margin.

3

Capitalisation built-in

Sale-leaseback or SPV structures let providers recycle capital and scale across many customers.

4

Circularity

Asset life-cycle management throughout the system's existence for an optimised TCO & performance.

KEY ACTORS



Cooling
Users



Technology
Providers



Banks &
Investors

HOW CAAS DIFFERS FROM SIMILAR MODELS

vs. ESCO / EPC

ESCO payments depend on energy savings achieved. Under CaaS, payment is agreed upfront as a function of actual cooling delivered.

vs. District Cooling

District Cooling aggregates demand into large-scale plants. CaaS can apply to a single building or asset — flexible across scales.

vs. Equipment Lease

Lessee still operates and bears performance risk. CaaS is outcome-based — cooling delivered, not equipment leased.

ESCO vs. CaaS – CAPEX, duration, tariff & performance commitments



Four service models compared on the parameters that drive bankability: who funds CAPEX, how long the contract runs, how the customer pays (tariff model), and what the provider commits to deliver (performance commitment).

ESCO

Guaranteed Savings

CAPEX SHARE

User · 100%

CONTRACT DURATION

5 – 8 yr

TARIFF MODEL

Fixed fee + savings-linked bonus

PERFORMANCE COMMITMENT

Guaranteed kWh / cost savings vs. baseline

ESCO

Shared Savings

CAPEX SHARE

ESCO · 100%

CONTRACT DURATION

7 – 10 yr

TARIFF MODEL

Share of monetised savings (e.g., 70 / 30)

PERFORMANCE COMMITMENT

Targeted savings – both parties share upside & downside

CaaS

Full-Capex (Provider)

CAPEX SHARE

Provider · 100%

CONTRACT DURATION

10 – 30 yr (often 20 yr)

TARIFF MODEL

Variable per-unit fee + fixed capital recovery

PERFORMANCE COMMITMENT

Outcome-based SLAs – temperature, humidity & uptime

CaaS

Part-Capex (Hybrid)

CAPEX SHARE

Provider 60–80% · User 20–40%

CONTRACT DURATION

8 – 15 yr

TARIFF MODEL

Lower per-unit fee + capital recovery on user's share

PERFORMANCE COMMITMENT

Outcome SLAs + retrofit-specific savings targets



Aligned incentives — every stakeholder wins

CaaS & ESCO models are structured so cooling users, technology / CaaS providers and investors each capture a clear, distinct upside — turning a fragmented market into a scalable services ecosystem.



FOR COOLING USERS

Asset-light, risk-light cooling

- Zero (minimal) CAPEX — no capital tied up in non-core assets
- Off-balance-sheet under CaaS Full-Capex
- Lower OPEX through provider efficiency
- No performance risk — outcome-based SLAs
- Predictable monthly cost replaces lumpy capex cycles



FOR TECHNOLOGY / CAAS PROVIDERS

Recurring, high-value revenue

- Efficiency = profit margin — deploy best-in-class tech
- Predictable contracted cashflows over 10–20 yr
- Sell outcomes, not equipment — capture O&M & upgrades
- Customer lock-in via long contracts & operational data
- Build asset portfolio sold / leased back to investors



FOR BANKS & INVESTORS

A new green asset class

- Cashflow-based debt against contracted revenues
- Front-runner advantage in servitisation finance
- Diversified offtake — multiple end-customers per SPV
- Reportable GHG & energy savings per dollar
- Risk mitigated by insurance & DFI guarantees

Result: aligned incentives across the value chain — efficiency becomes the source of value for every party.



CaaS in South Africa – Energy Partners Refrigeration

Combining cooling, solar and storage – deployed at industrial scale



Aspen Pharmacare

\$22 million investment

Heating: 6,6 MWR
Cooling: 16,5MWR



Clover, Queensburgh

\$18 million investment

Power: 1500 kWp
Steam: 75 T/hr (3 x 25 T/hr boilers)
Refrigeration: 9500 kWR

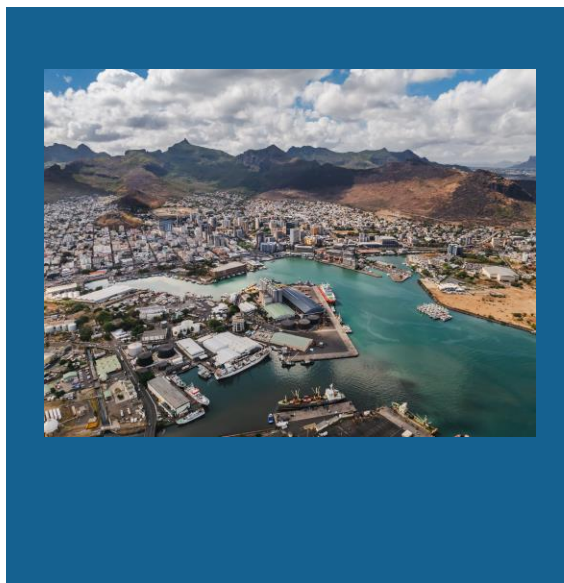


Thanks

For Your Attention

Dimitris Karamitsos • Senior Sustainable Finance Specialist, BASE •
dimitris.karamitsos@energy-base.org • set-alliance.org • energy-base.org

Country perspectives: Mauritius



Mrs. Nawsheen Sooruth,

Engineer/Senior Engineer, Energy
Efficiency Management Office,
Mauritius



Partner Panel: Scaling sustainable cooling and energy integration solutions (1)



Andrea Voigt

Vice-President,
Public & Industry Affairs,
Sustainability, Communications;
Interim Head of Corporate Public
Affairs
Dansfoss



Coenrad Ehlers

General Manager,
Energy Partners



Deepak Sakaria

Energy Transition Advisor,
Director of Global Energy Efficiency
Alliance



Jonathan Coony

Global Lead
Green Competitiveness,
Finance, Competitiveness &
Innovation,
IFC, WBG



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Servitisation: \$20m investment

24/7/365 solar-assisted
cooling & integrated steam
supply

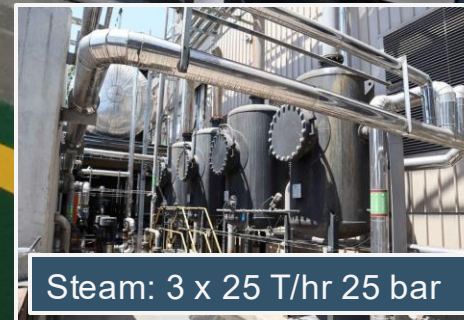
"This removal of upfront investment, together with the fact that we have access to a modern, automated plant that EP has committed to guaranteed uptime and efficiency in line with industry standards, has resulted in lower operational costs and ensures that Clover is at the forefront of efficient and sustainable technology."

Anton Pretorius
Clover Group Manager:
Product Technology and Technical
Services

Refrigeration: 10 MWR



Solar: 1.6 MWp



Steam: 3 x 25 T/hr 25 bar

EP ENERGY
PARTNERS
POWERED BY RESULTS

Steam: 3 x 25 T/hr 25 bar



Servitisation: \$20m investment

24/7/365 solar-assisted
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Solar: 1.6 MWp



Refrigeration: 10 MWR

EP ENERGY
PARTNERS
POWERED BY RESULTS



CaaS can be deployed at industrial scale.



Aspen Pharmacare

Overview

Consolidation of aged, inefficient and distributed cooling/heating into a central cooling/heating plant through CaaS

- Efficient
- Natural Refrigerant (Ammonia)
- Cost effective (total lifecycle cost)

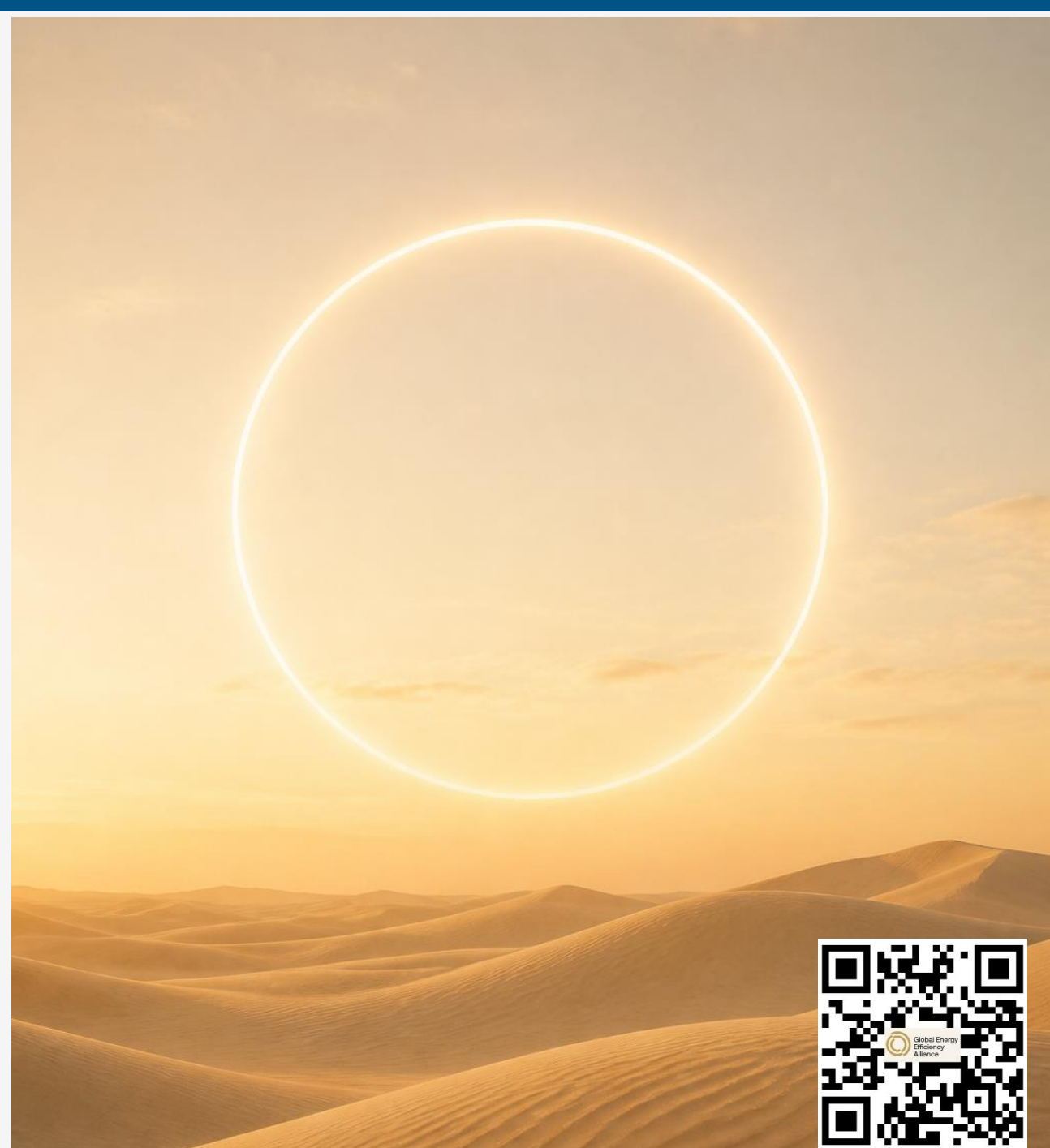
\$22 million investment

Heating: 6,6 MWR

Cooling: 16,5MWR

EXECUTIVE BRIEFING FOR GOVERNMENT LEADERS AND PARTNERS

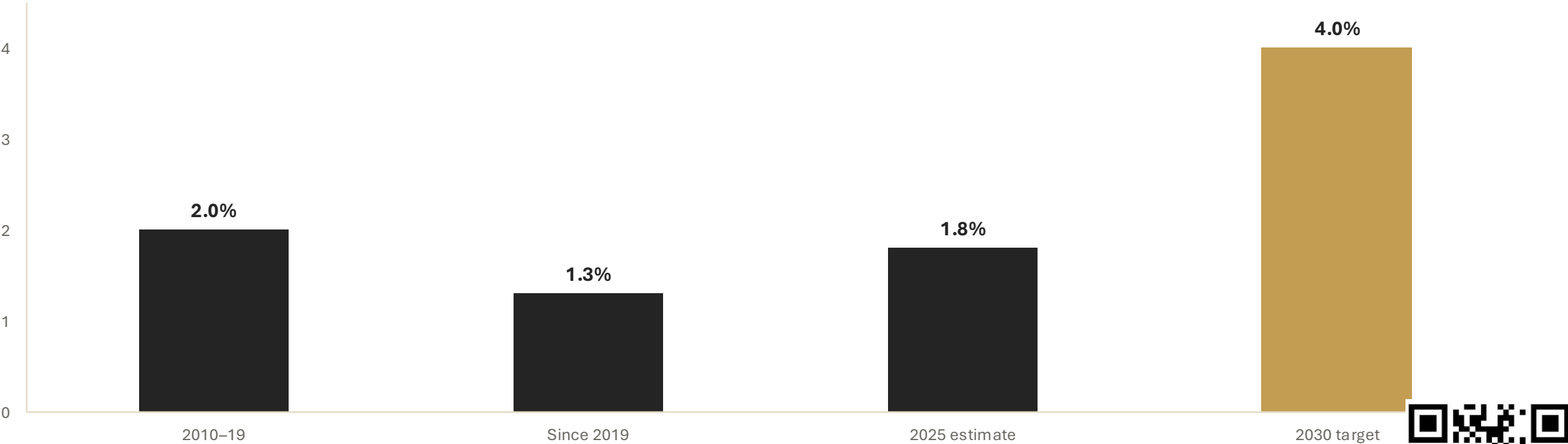
The Global Energy Efficiency Alliance





A shared global ambition to accelerate progress

Nearly 200 governments endorsed doubling progress by 2030; the IEA estimates this means moving towards about 4% each year.



Sources: UNFCCC decision 1/CMA.5, para. 28(a); IEA, Energy Efficiency 2025. The COP28 text says “double”; the IEA quantifies this as about 4% a year.



What is GEEA?



Global Energy Efficiency Alliance (GEEA) is a pragmatic, government-backed initiative focused on delivering results through targeted policy support, cross-sectoral collaboration, and innovative public-private partnerships.

GEEA was established to close the implementation gap between global energy-efficiency ambition and national or sectoral delivery.

From commitment → implementation → measurable outcomes

How GEEA delivers

Connecting policy, expertise, finance and implementation in one delivery-focused platform: geea.ae

Targeted Policy
Support

Technical &
Financial
Matchmaking

Working Groups &
Practical Projects

Tracking,
Measurement &
Knowledge Sharing



GEEA: key updates



Momentum has moved from launch and outreach into a wider membership and implementation phase.

15

Countries Joined

Officially joined GEEA.

5

Countries Signed

Declaration signatories.

EC

Institutional Participant

European Commission
joined.

37

Countries Interested

Additional country pipeline.

9

Companies Joined

Official corporate members.

6

Corporate Signatories

Declaration signing
momentum.

28

Companies interested

Corporate outreach pipeline.



Countries participation



GEEA now connects a diverse group of members across regions, with further expansion under way.

Europe

Germany · Ukraine · Montenegro

Asia

Azerbaijan · Philippines · Kazakhstan

Africa

Egypt · Morocco · Ethiopia · Kenya

Americas & Atlantic

Canada · Costa Rica · Bermuda

Pacific / SIDS

Fiji · Maldives



Corporate and partner momentum

The Alliance is building an ecosystem that combines technology, finance, data and implementation capability.

Energy Technology & Efficiency Solutions

SIEMENS

SIEMENS
energy

HITACHI

Schneider
Electric

Honeywell



Sustainable Cooling

تبريد
tabreed

Sustainable Finance

بنك أبوظبي الأول
FAB
First Abu Dhabi Bank

AI Solutions

 **Net0**



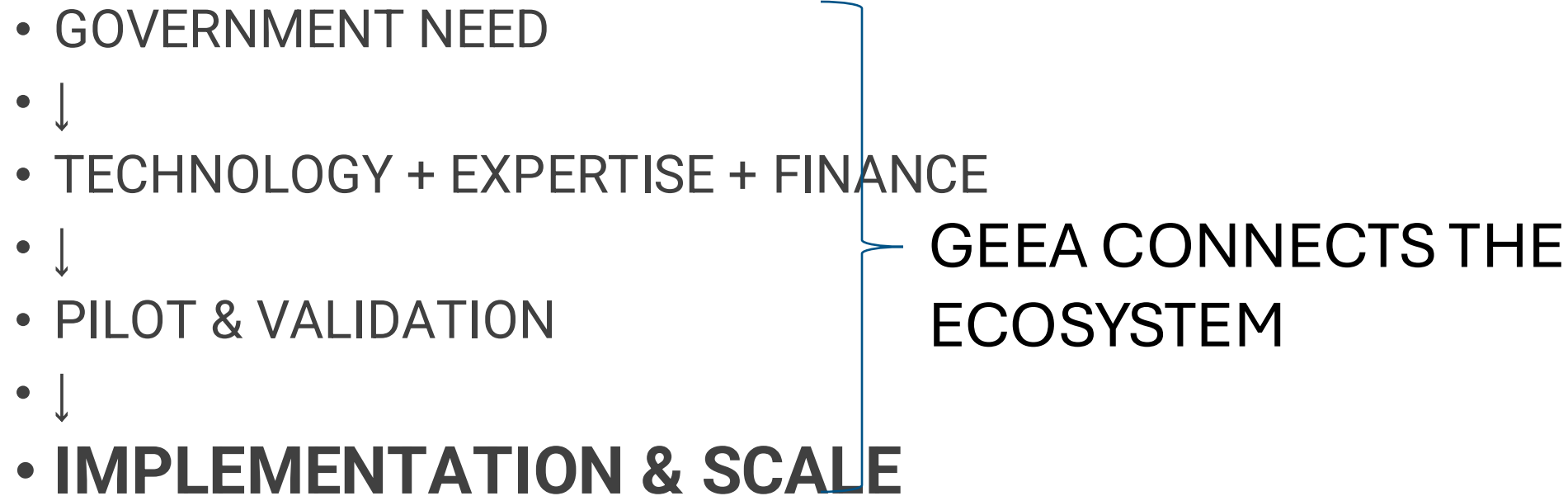


The Challenge is Implementation

- Government ambition exists
 - Technology exists
 - Capital exists
-
- **But they do not always connect.**



The GEEA Model





Governments: Bring us your Implementation Needs

- 01 - What energy-efficiency challenge do you need to solve?
 - 02 - What is preventing implementation or scale?
 - 03 - What technology, expertise, finance or partnership do you need?
-
- **COUNTRY NEED → SOLUTION → IMPLEMENTATION → SCALE**

SEAWATER AIR CONDITIONING (SWAC)

ULTRA HIGH EFFICIENCY COOLING FOR SIDS

August 2026

Sustainable, cost-effective air-conditioning using
the natural power of the Caribbean Sea



THE WORLD BANK



THE COOLING CHALLENGE FOR SIDS

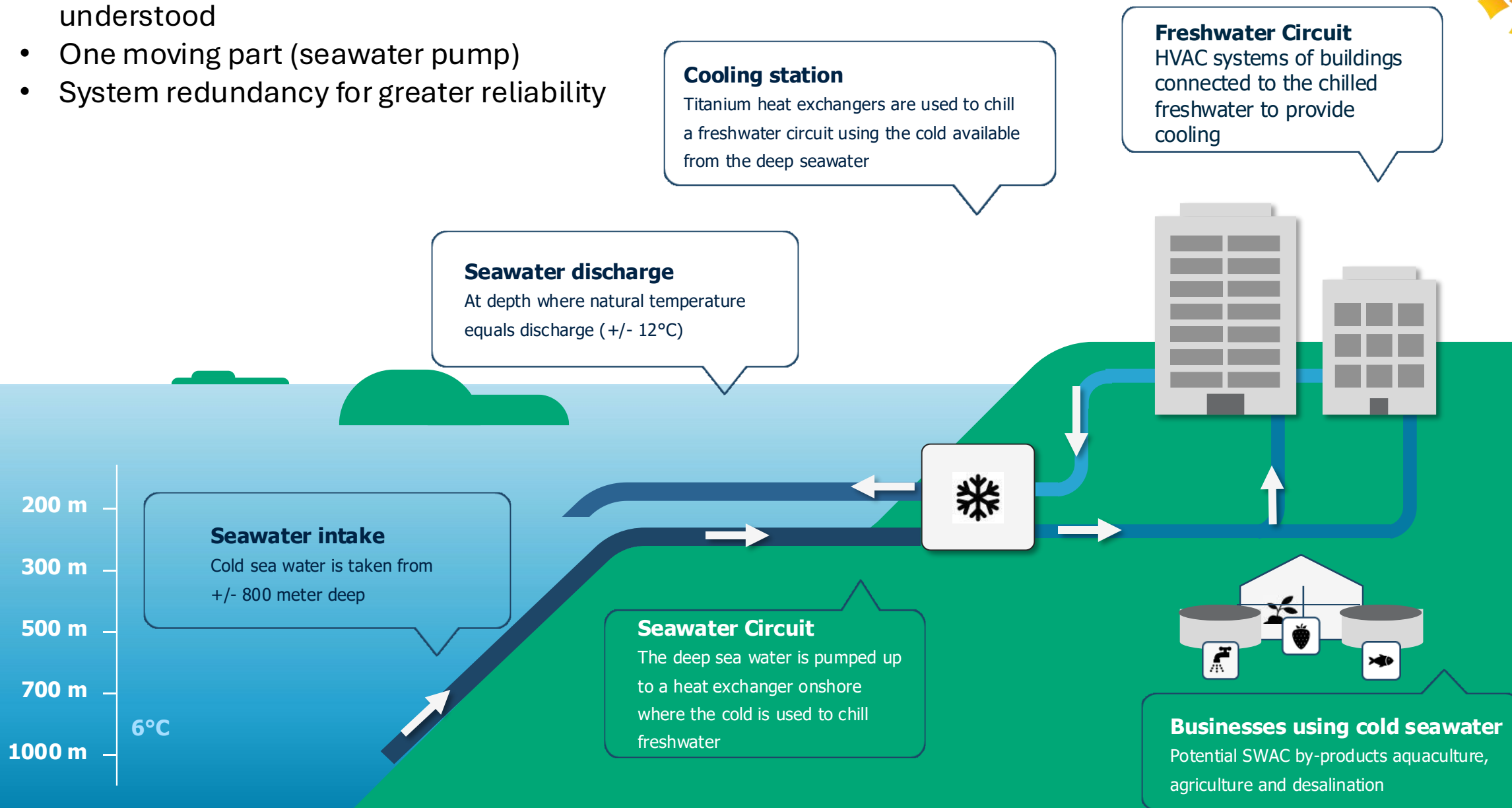
- **Expensive:** major drain for businesses
- **Energy-intensive:** more than 50% of electricity use in buildings
- **Polluting:** High CO2 and HFC emissions
- **Imported parts and materials:** Must rely on foreign tech
- **Growing Demand:** Tourism, climate change, and development

THE SWAC OPPORTUNITY

- **Lower Cost:** less expensive than conventional A/C
- **Energy efficient:** up to 90% reduction in power use
- **Green, reliable energy:** replaces volatile fossil imports with predictable green source
- **Contributes to NCAP and NDC:** Supports national goals
- **Blue Economy:** With SWAC and by-products, Grenada leads in blue economy

SWAC Design

- Technology off-the-shelf and well-understood
- One moving part (seawater pump)
- System redundancy for greater reliability



SWAC facility Grenada – *Technical*



Marine pipeline

- Depth: 900 m
- Length: 7,500 m
- OD: 0.9 m
- SDR: approx 13
- Seawater flow: 1,400 m³/hr

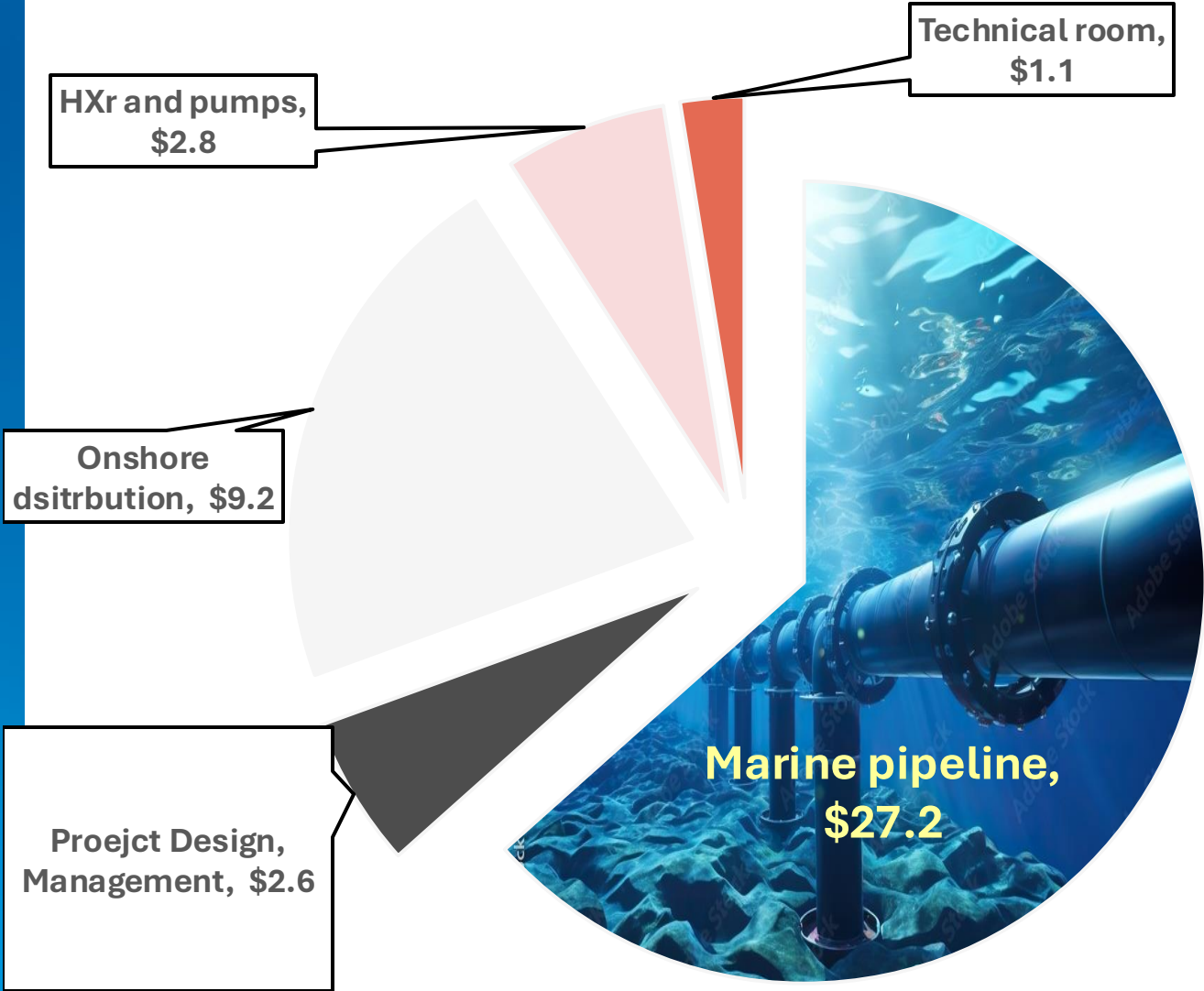
Process Equipment

- Hxers: Two
- Surface area: 1,315 m²/HXer
- Marine pump: 190 kW
- Pumps for onshore: 200 kW

Customers (2,365 RT)

- St. Georges U: 1,400 RT
- MBIA Airport: 665 RT
- Sandals: 200 RT
- Royalton: 100 RT

SWAC facility Grenada – Capital Costs



Project Management	1,200,000
Design and site prep	1,400,000
Pipeline and onshoring	27,200,000
Technical Room Construction	1,100,000
Process equipment	2,800,000
Distribution Network - Branch 1	2,000,000
Distribution Network - Branch 2	5,400,000
Customer interface(s)	1,800,000

Total CapEx of \$42.9 mn

SWAC facility Grenada – *Benefits to Main Parties*



SWAC CUSTOMERS

- Access to cooling services at a cost approximately **15–30% below the operating cost** of conventional cooling systems, with **avoided chiller capital costs**
- **Stable, predictable cooling costs** with reduced exposure to electricity price volatility
- **Enhanced sustainability credentials and green branding** through low-carbon cooling
- **Long-term Cooling Sales Agreement required**

PRIVATE DEVELOPER AND INVESTORS

- Commercial investments **leveraged by concessional public funds**
- **Investment-friendly**, stable country with little/no currency risk
- 20% after-tax IIR for equity; 9.5% interest rate for debt
- Government **participation and support**

SWAC facility Grenada – *Benefits to Government and Country*



- **Lower Cooling Costs** for major businesses, **increasing competitiveness** and foster new local business opportunities
- Decreases power demand and **avoid costly new generation equipment**
- Help achieve **Grenada's National Cooling Action Plan (HFC phase out)** and **NDC commitments**
- Position Grenada as a **regional and global leader in Blue Economy solutions**
- Catalyze approx **\$20 mn in private (foreign) investment**
- Reduces **annual 28,000 BBL of oil imports** worth approximately **USD 3.8 million** per year
- Repayments of loans come from the SPV with **nothing paid from GoG budget**
- Share project economic upside: **excess USD 28 million generated over 15 years**
- **However**, will likely need to guarantee some of the public loans



Partner Panel: Scaling sustainable cooling and energy integration solutions (2)



Simon Benmarraze

Head of Energy Planning and Modelling
IRENA



Luis Munuera

Programme Lead on Energy,
UNEP



Violet Chen

Director, Industry Development, Energy
Market Authority (EMA), Singapore



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Open Discussion

Moderated by **Dimitris Karamitsos**, Senior
Sustainable Finance Specialist, BASE



Ministry of Sustainability
and the Environment
— SINGAPORE —





Closing Remarks and announcements



Sofia Martinez

Technical Officer,
International Department,
Institute for Energy Diversification
and Saving (IDEA),
Spain