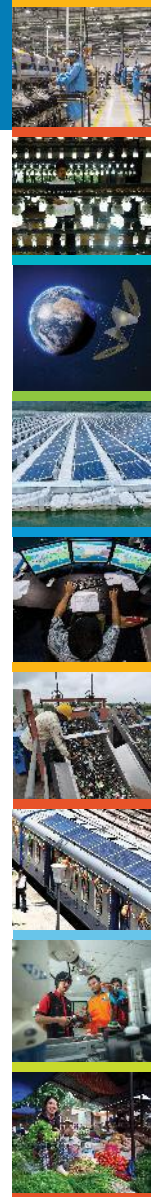
EMERGING AREAS | ENERGY SECTOR

# Cross-Sector Holistic Development Workshop

25 September 2025
13:00 – 15:00

# Workshop Agenda

| Time | Session / Activity |
|---|---|
| 13:00 – 13:15 | **Opening and Context**<br>• Opening Remarks<br>• Background, Rationale, Scene Setting |
| 13:15 – 13:30 | **Cross-Sector Solutions in Action**<br>• Informative presentation about what cross-sector solutions are - brought to life via a series of case studies of such solutions from around the world. |
| 13:30 – 14:00 | **Breakout 1 – Design a Cross-Sector Solution**<br>• Participants will work together to develop a high-level design of a cross-sector solution that they think would benefit their home country. |
| 14:00 – 14:15 | **Introduction to Azul Rubik**<br>• Azul Rubik is the ADB's forthcoming suite of tools focused on supporting ADB teams and developing member countries in identifying, designing and building more cross-sector solutions. Part of the suite of tools is Hub-X. |
| 14:20 – 14.50 | **Breakout 2 – Design Hub-X**<br>• Hub-X will be a cross-sector solutions focused knowledge hub. Attendees will learn about the ambition for the hub and work together to brainstorm and share ideas on what functionality they would like to see in the final version. |
| 14:50 – 15:00 | **Wrap up and thanks** |



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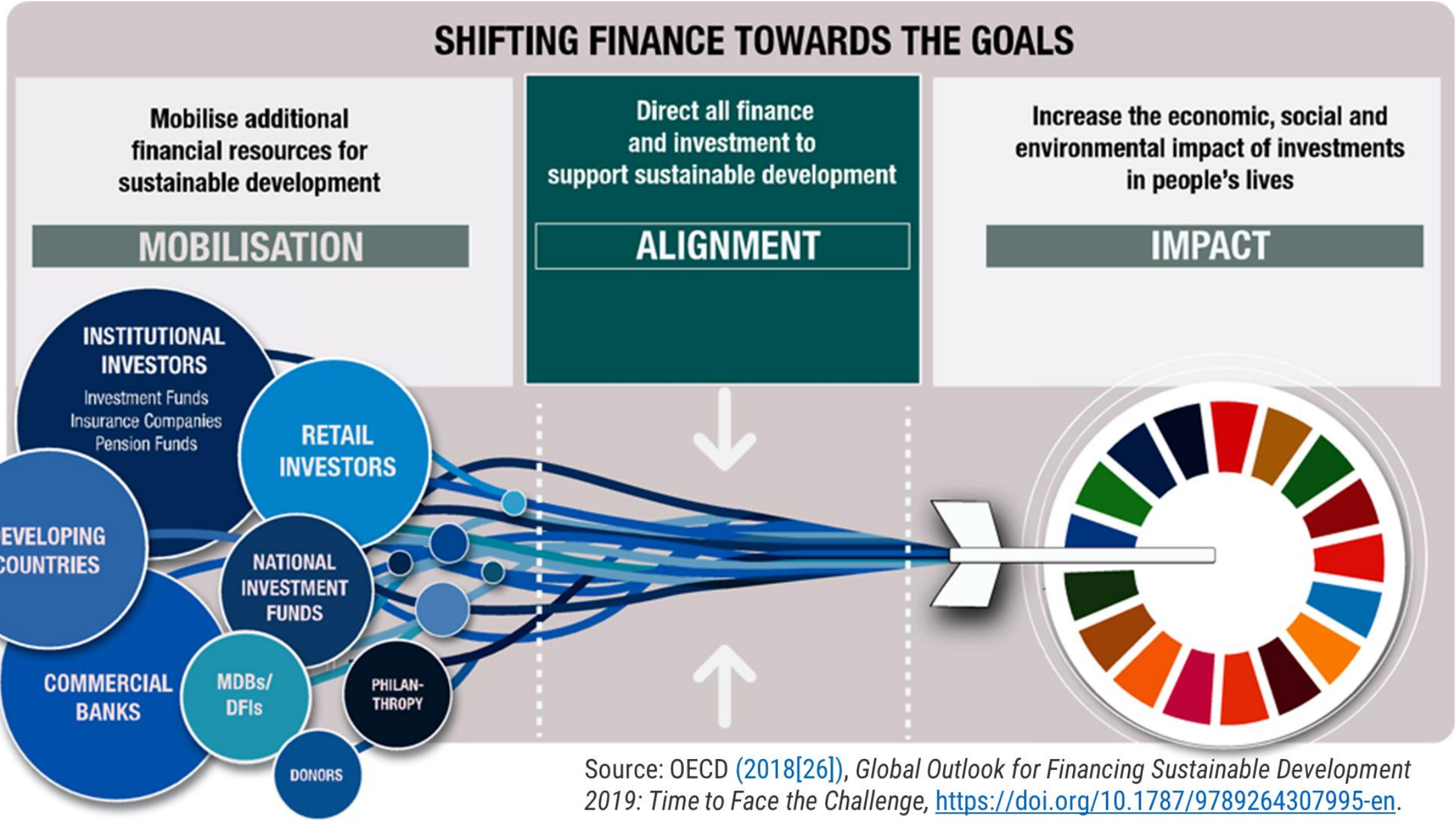
Section 1

# Welcome & Context

# Trend: Increased Impact of Investments




Source: OECD (2018[26]), *Global Outlook for Financing Sustainable Development 2019: Time to Face the Challenge*, https://doi.org/10.1787/9789264307995-en.

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# Streamlining Cross-Sectoral Interventions with ***an Integrated Approach***

Funding

**Sustainable Solutions**

- Strategic Alignment
- Technologies (Suitable)
- Business Model (Viable)
- Project Design (Inclusive)

*Appropriate Multi/Cross-Sectoral Interventions*

Food, Energy, ICT

Transportation, Energy, ICT

Water, Energy, ICT

Food, Water, Environment, Energy, ICT

Food, Water, Transportation, Health, Waste, Environment, Energy, ICT

Health, Environment, Energy, ICT

Waste, Energy, ICT

Environment, Energy, ICT

Transportation, Environment, Energy, ICT

Address the Right Vulnerabilities


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# What is an integrated, cross-sector solution?

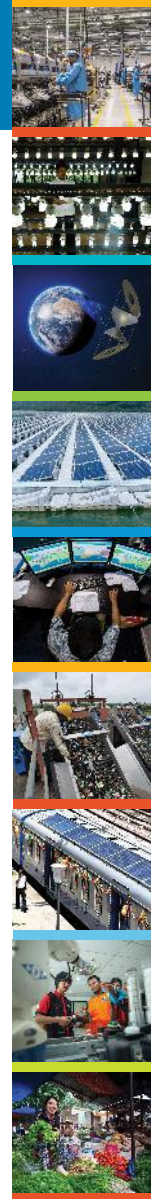
## Definition

The **intentional** design of a project which brings together **two or more** sectors in the development **and/or** utilization of a solution.

## Two Primary Forms

1. A core solution which cuts across more than two sectors e.g. electric vehicle/vessel projects (combining Energy + Transport)

2. A solution which is used to achieve development impact beyond the energy sector e.g. renewable energy project developed with health, agri, water etc. impact in mind



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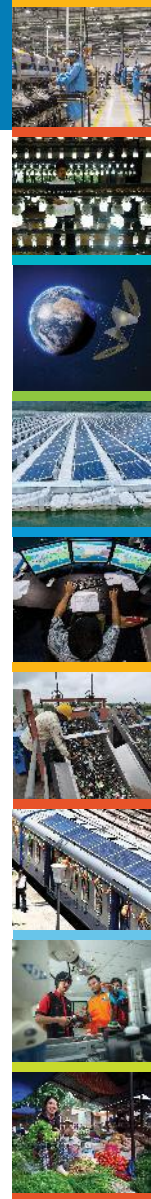
# Understanding Productive Uses of Energy

**Examples in the context of Pacific Islands**

| Productive Use | Key Benefits |
|---|---|
| Agri-processing (e.g. copra, drying, milling) | Increases local value addition, supports rural incomes |
| Cold storage & refrigeration (food/fish) | Reduces post-harvest losses, improves food security and market access |
| Water pumping and irrigation | Enhances agricultural productivity, supports climate resilience |
| Renewable-powered transport (electric boats/vehicles) | Cuts fuel costs, reduces emissions, boosts mobility |
| Small-scale manufacturing | Expands business and job opportunities, supports economic diversification |
| Healthcare (lighting, refrigeration for medicine) | Improves healthcare delivery, strengthens disaster resilience |
| Community electrification | Enables new business, education, and IT services, improves quality of life |



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# Potential Pilot Projects (Cross-Sector Integrated Solutions)

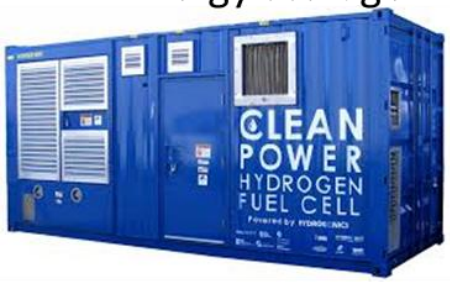




Ocean/Marine Renewable Energy: Marine Solar, Offshore Wind, Tidal In-Stream, Wave

Systems and Eco-Systems' Integration

Energy Storage




Testbedding
Other Innovations
Technologies
Business Models
"Learn by Doing"

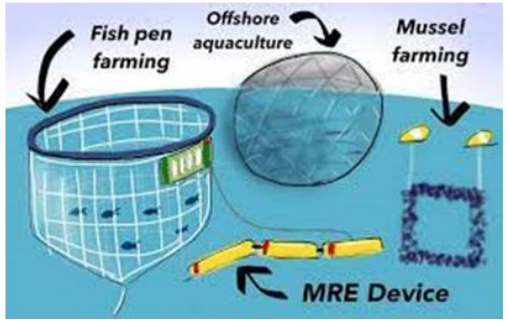
Transportation

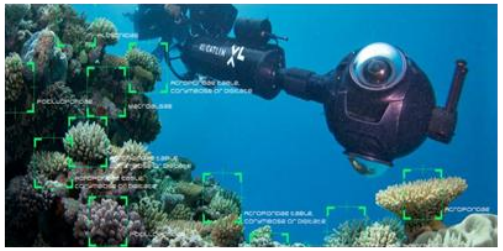
Ports/Marinas/Bays

Ice

Water Production

Aquaculture



Reef Restoration,
Marine Area Monitoring

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Section 2

# Cross-Sector Solutions in Action

# Examples of cross-sector solutions

## Smart Microgrids Integrating Health Infrastructure

- Deploy renewable-powered microgrids that provide reliable electricity to hospitals and clinics, enabling continuous health care, vaccine refrigeration, and telemedicine.
- This resilience improves health outcomes and reduces costly diesel dependence.

## Integrated Water-Energy-Food Systems

- Use renewable energy to power small-scale desalination or efficient irrigation for local agriculture and aquaculture.
- This increases water security and food production while reducing reliance on imported fuel.

## Nature-Based Coastal Protection Linked with Livelihoods

- Combine mangrove restoration or coastal reef regeneration with eco-tourism and sustainable fishing programs.
- Communities gain enhanced climate resilience and new revenue streams, supporting local jobs and biodiversity.

## Waste-to-Energy for Circular Island Economies

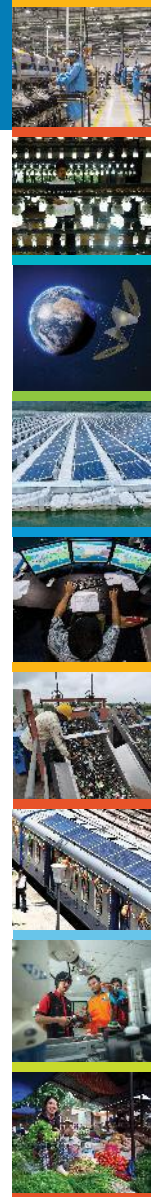
- Convert municipal or agricultural waste into biogas or electricity
- This reduces landfill needs while generating local power and creating jobs in the waste management and clean energy sectors.

## Sustainable Transport Linked to Community Health

- Promote electric land and sea vehicle networks which help connect key community zones (clinics, schools, markets).
- This helps to lower emissions and improve air quality.

## Rainwater Harvesting Coupled with Community Gardens

- Establish systems that collect rainwater for irrigating communal crops.
- This reduces potable water demand and fosters nutrition and food security through community gardens.



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# Orkney Islands, Scotland, UK – Blue Economy, Hydrogen Economy

## Orkney – Centre of Excellence in the Blue Economy


**Total = > 5,000 MW deliverable capacity**

| Key | | |
|---|---|---|
| Onshore wind | 40 MW existing/planned | |
| New onshore wind | 100-200 MW | |
| Wave | 500-1000 MW | |
| Tidal | 500-2,500 MW | |
| Offshore wind | 1000 MW | |
| Wave leases | 550 MW | |
| Tidal leases | 500 MW | |
| Mirco & other | 2.5 MW | |
| Gas & other | 20 MW | Dispersed |
| EMEC sites | 5 + 7 MW | Dispersed and |

**107%** of electrical demand in Orkney met by renewables in 2014

## Building and operating a hydrogen economy

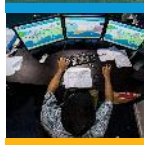

## Orkney 100% + renewable electricity output since 2013

| Year | Average Demand | Average Output | MWh demand total | MWh Output total | Orkney demand met from wind MWh | Orkney demand met from imported grid mix | Orkney export from wind MWh | Carbon density (kg CO2/MWh) | MWh exported from Microwind (estimate) | Output as a percentage of demand (Ex < 50kW) | Output as a percentage of demand (Inc < 50kW) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2012 | 18 | 11 | 152906 | 97869 | 85104 | 67801 | 12765 | 121 | 7317 | 64% | 69% |
| 2013 | 16 | 16 | 121589 | 118608 | 82865 | 38724 | 35743 | 79 | 7822 | 98% | 104% |
| 2014 | 16 | 16 | 132500 | 131654 | 92712 | 39787 | 38942 | 69 | 8976 | 99% | 106% |
| 2015 | 16 | 17 | 100864 | 104805 | 72964 | 27900 | 31841 | 53 | 9415 | 104% | 113% |
| 2016 | 14 | 16 | 113407 | 128062 | 80614 | 32792 | 47447 | 27 | 9752 | 113% | 122% |
| 2017 | 16 | 18 | 132823 | 153343 | 99188 | 33635 | 54155 | 17 | 9811 | 115% | 123% |
| 2018 | 16 | 17 | 138609 | 144736 | 97282 | 41327 | 47454 | 18 | 9821 | 104% | 112% |
| 2019 | 16 | 17 | 133575 | 143093 | 93216 | 40359 | 49877 | 18 | 9851 | 107% | 115% |
| 2020 | 15 | 18 | 119575 | 143524 | 87869 | 31705 | 55655 | 17 | 9851 | 120% | 128% |











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# Maldives – Progressive Development with Momentum Gain

## Manadhoo Island – Hybrid Microgrid (Diesel + Solar + ESS + Wind (Future) )

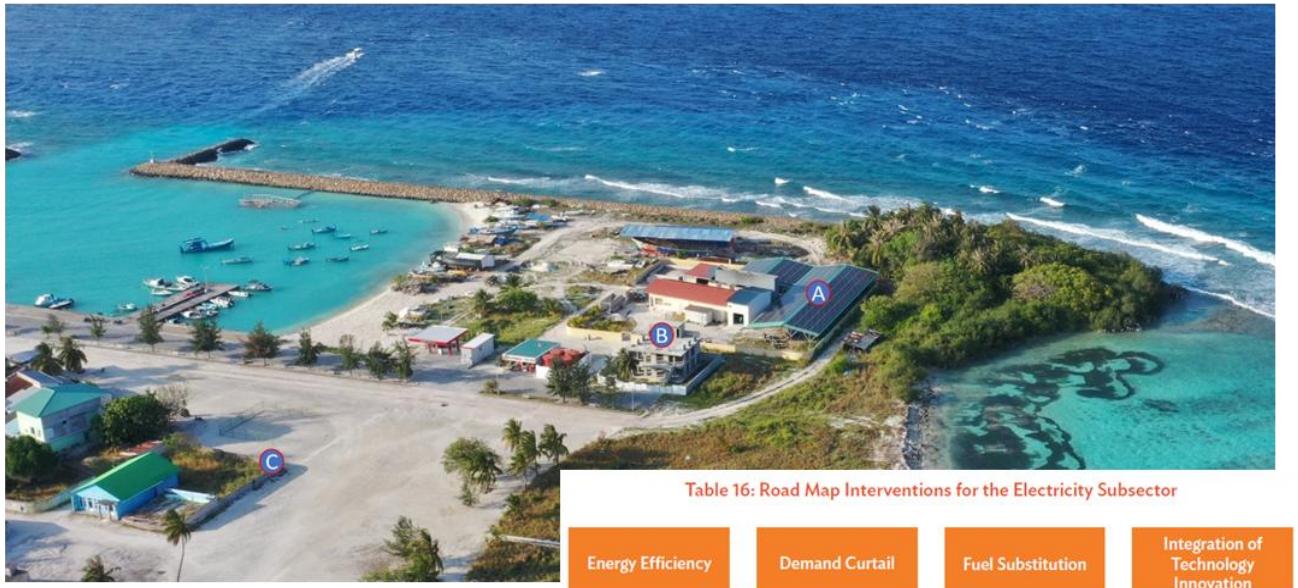


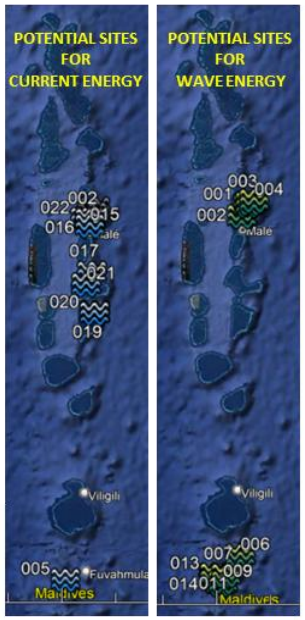

Figure 1: Vision of Maldives' Energy Sector

**VISION**
Provision of sufficient, reliable, sustainable, secure, and affordable energy for a prosperous Maldives

| Pillar 1 | Pillar 2 | Pillar 3 |
|---|---|---|
| Energy efficiency first | Investments in renewables | Integration of technology innovation |

Table 16: Road Map Interventions for the Electricity Subsector

| Energy Efficiency | Demand Curtail | Fuel Substitution | Integration of Technology Innovation |
|---|---|---|---|
| Replacement of inefficient vessels and boats | Reduction of vehicle registration and promotion of public transportation | Promotion of electric buses, vehicles, and bikes | Introduction of hybrid solar boats |
| Replacement of inefficient vessels and boats | | Natural gas as alternative fuel for large vessels, buses, and vehicles | Feasibility and piloting of hydrogen fueled vessels |
| | | Replacement of LPG stoves with electric induction stoves | |







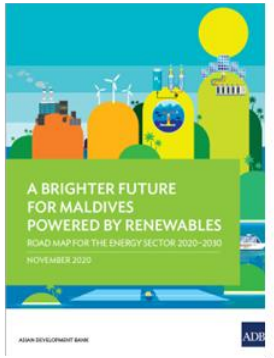
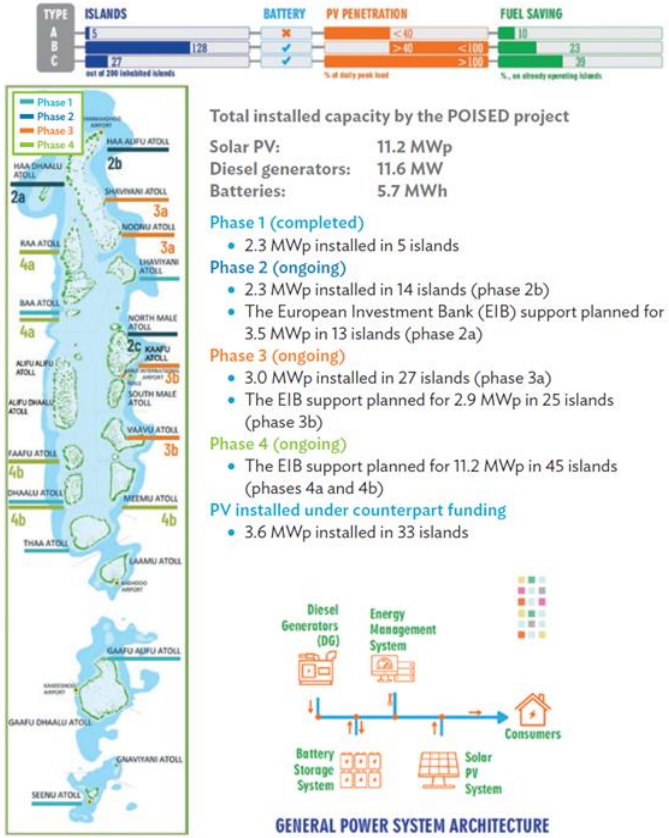



Figure 9: Installation of Hybrid Systems in Maldives by the POISED Project




**Total installed capacity by the POISED project**

| | |
|---|---|
| Solar PV: | 11.2 MWp |
| Diesel generators: | 11.6 MW |
| Batteries: | 5.7 MWh |

**Phase 1 (completed)**
- 2.3 MWp installed in 5 islands

**Phase 2 (ongoing)**
- 2.3 MWp installed in 14 islands (phase 2b)
- The European Investment Bank (EIB) support planned for 3.5 MWp in 13 islands (phase 2a)

**Phase 3 (ongoing)**
- 3.0 MWp installed in 27 islands (phase 3a)
- The EIB support planned for 2.9 MWp in 25 islands (phase 3b)

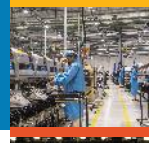
**Phase 4 (ongoing)**
- The EIB support planned for 11.2 MWp in 45 islands (phases 4a and 4b)

**PV installed under counterpart funding**
- 3.6 MWp installed in 33 islands

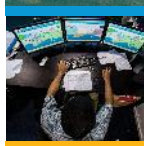
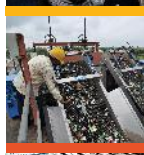



**GENERAL POWER SYSTEM ARCHITECTURE**

EIB = European Investment Bank, MWh = megawatt-hour, MWp = megawatt-peak, POISED = Preparing Outer Islands for Sustainable Energy Development, PV = photovoltaic.
Source: Information provided by the POISED project and the Ministry of Environment. March 2020.



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# Singapore – RE Integration + Productive Use: Water, Food – e.g. Aquaculture (Fish Farm), Transportation, Eco-Tourism, Reefs, etc

Renewable Energy Integration Demonstrator – Singapore (REIDS)

Eco-Ark Floating Fish Farm (ACE)

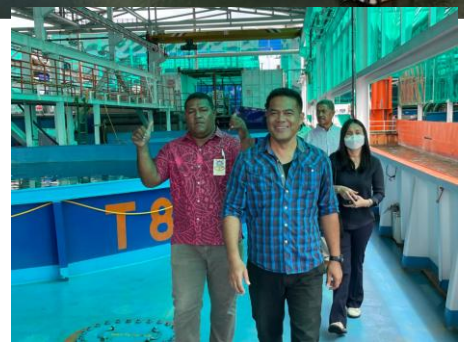
Desalination (Keppel)

Electric Ferry (Shell)


Artificial Reef (JTC, HSL)

Marine Floating PV [5 MWp] (Sunseap)

Singapore River Electric Bumboat



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# I-PURE: Integration of Productive Uses of Renewable Energy Mindanao, Philippines

The inextricable linkage between water, energy, and food

Funded by the European Union

MinDA

I-PURE MINDANAO

Integration of Productive Uses of Renewable Energy for Inclusive and Sustainable Energization in Mindanao

**PURE PICONG**
Picong, Landao Del Sur
Solar Powered Water Pump

**PURE TULUNAN**
Tulunan, North Cotabato
Solar Powered Corn Sheller and Miller

**PURE ARAKAN**
Arakan, North Cotabato
Solar Powered Corn Sheller and Miller

**PURE KIDAPAWAN**
Solar-powered rice miller

**PURE GLAN**
Glan, Sarangani Province
Solar-Powered Ice Maker

**COTELCO PVM**
1500 Households
Locations TBD

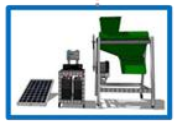
**PURE NINOY AQUINO**
Ninoy Aquino, Sultan Kudarat
Solar-Powered Water Pump

**PURE TAWI-TAWI**
Sitangkai and Sibutu, Tawi-Tawi
Solar Powered Seaweeds Dryer

**TAWELCO Barangay Line Extension Project**
2184 Households
Sibutu and Sitangkai, Tawi-Tawi

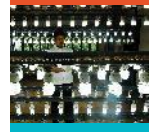
**PURE KALAMANSIG**
Kalamansig, Sultan Kudarat
Solar Powered Coffee Dryer and Miller

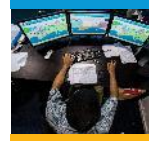
**PURE LEBAK**
Lebak, Sultan Kudarat
Solar Powered Water

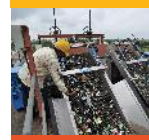


**PURE BAGUMBAYAN**
Bagumbayan, Sultan Kudarat
Solar-powered Corn Sheller and Miller

**SOCOTECO II PVM**
1577 Households
Glan, Sarangani Province







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# Case Example – Haiti (multiple projects)

1-2 kW solar systems powering cold rooms for fishing cooperatives, helping to reduce post-catch loss while improving income.


11 kW solar pumping solution, providing ~520 cubic meters of irrigation water supply, helping to enhance the productivity of banana fields.


16.2 kWp/77 kWh solar and storage system to help local community healthcare center and nearby telco operations.

Source: NREL

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# Case Example – Fernando de Noronha


Population of 3,000, plus 100,000 tourists annually. ~350KM off the coast of Brazil. 70% of the land is protected (UNESCO World Heritage Site), so onshore RE must be complemented with offshore (floating PV).

Used to power electric vehicles for tourists and government administration (100% by 2030). Battery storage installations expected to help significantly reduce diesel imports, in turn supporting protecting the coral reefs and sea wildlife in the Marine National Park.

Source: Iberdrola

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# Case Examples – Pacific Islands

**Samoa** - solar energy system to power a hydroponics farm

**PNG** – solar powered ice maker

**Vanuatu** – solar powered water pumping systems used for various community initiatives

Source: REnewPacific, PREO, Black Stump

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# Cross-sector solutions in island communities


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Section 3

# Breakout 1: Design a cross-sector solution

# Design a cross-sector solution (30 mins)

**Breakout Activity**

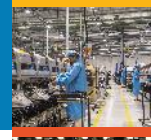
Break into small groups (max 5 people)

Ideally based on nationality, but ok if not

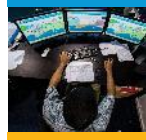
Discuss what cross-sector solution could work in the location of your choice

Complete the sheet

Be prepared to briefly share your thoughts afterwards









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# Work sheet for reference

**Design a Cross-Sector Solution: Breakout Session**

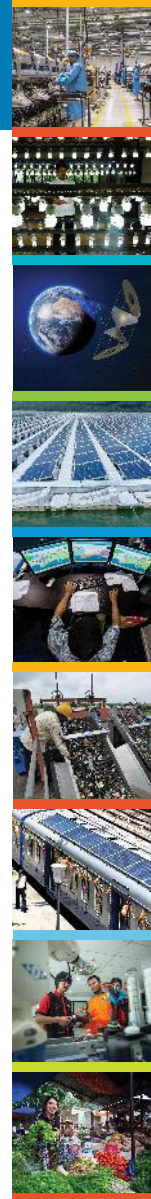
Cross-Sector Holistic Development Workshop - 32nd PPA Annual Conference

| Names and Roles of group members | State country/location this solution is for | Describe the high-level development need being addressed |
|---|---|---|
| | | |

**Describe the proposed solution?**

Can be cross sector in definition (such as electric vehicles which combine energy and transport) and/or in the impact (such as using renewable energy to help decarbonize local transport, industry and housing).

List key stakeholders (individuals or organisations) that would need to be involved in design and approval.



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Section 4

# Introduction to Azul Rubik

# Azul Rubik – what's in a name?

**A Rubik's Cube has one right answer.**

**How many other combinations does it have?**

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# Azul Rubik – what's in a name?

**Option A**
**4,325**

**Option B**
**200,327**

**Option C**
**4,489,856,000**

**Option D** **43,252,003,274,489,856,000**

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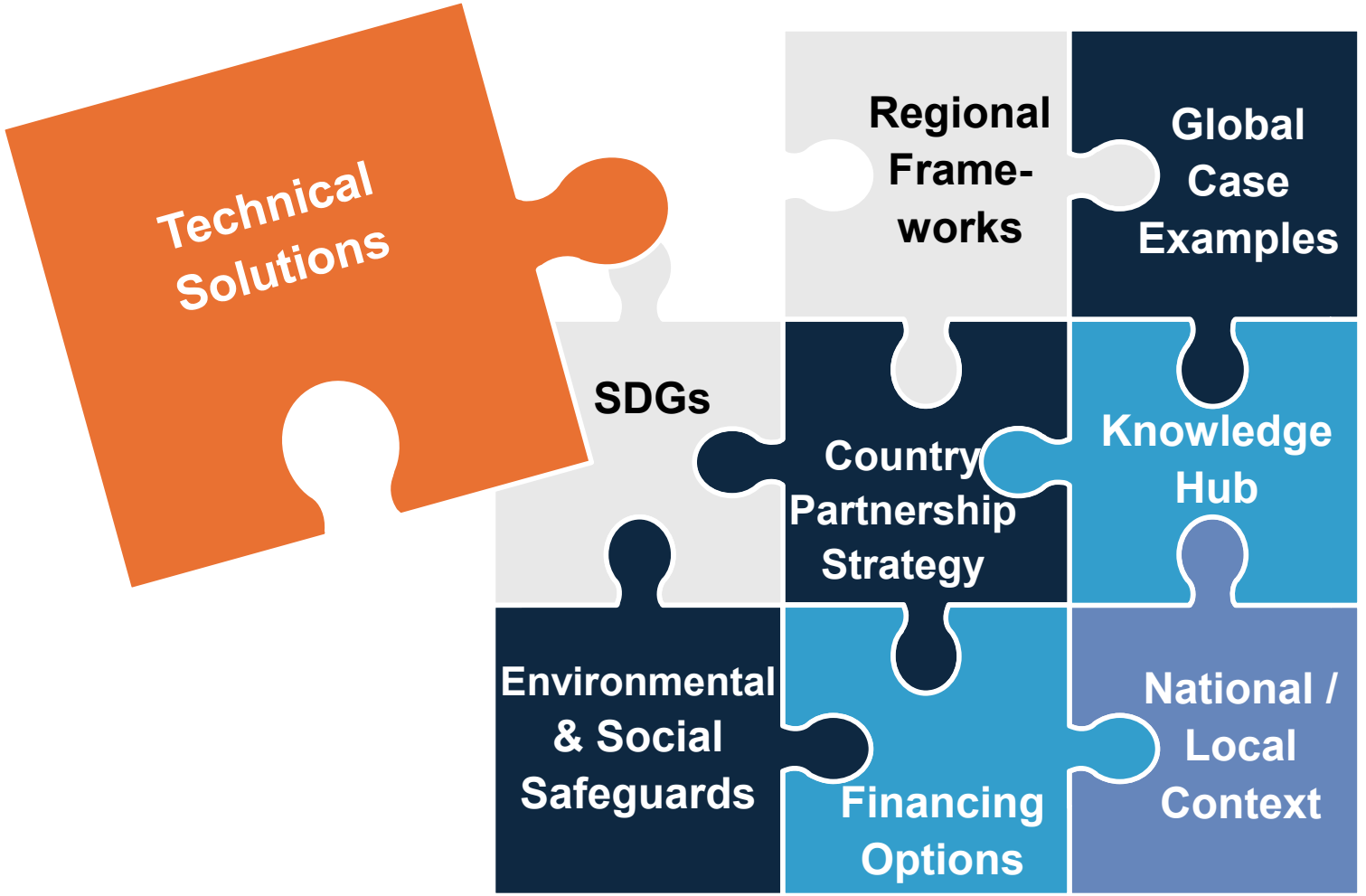
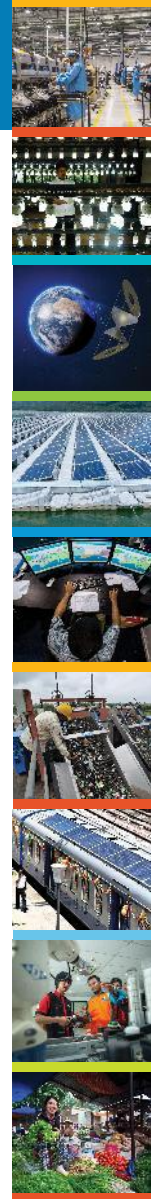
# Azul Rubik will help simplify complex challenges

**Integrated, cross sector solutions require many different inputs to be stitched together to arrive at the optimal combination.**

**Azul Rubik captures all the inputs and then uses AI-supported logic to propose prioritised combinations for defined vulnerabilities.**



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# Azul Rubik Video

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Section 5

# Breakout 2: Design Hub-X

# Design Hub-X (30 mins)

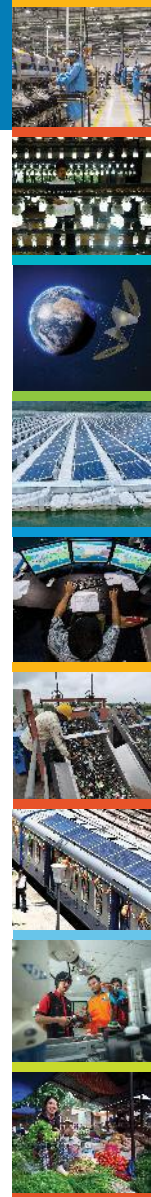
**Breakout Activity**

Take one worksheet per person

Think about how you would like to access more information on cross-sector solutions

Complete the sheet

Be prepared to briefly share your thoughts afterwards



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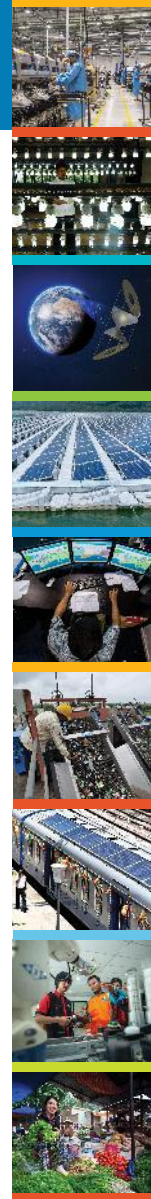
# Work sheet for reference

**Design Hub-X: Breakout Session**

Cross-Sector Holistic Development Workshop - 32nd PPA Annual Conference

| **Names and Roles of group members** | | |
|---|---|---|
| **What would you want to know?**<br>What information about cross-sector solutions would help you in promoting such solutions for your country?<br>Suggestions might include, but are not limited to:<br>research findings proving economic and development impact, business cases summaries, emerging and best practice examples worldwide, templates for project prep tailored to cross-sector | **How should the content be structured?**<br>What would make the content feel engaging and accesible?<br>Suggestions might include, but are not limited to: written case studies, online training, academic research, podcasts, videos which showcase the project lifecycle and impact of cross-sector solutions? | **What else would make a difference?**<br>Beyond the Knowledge Hub, what else would help your country develop more cross-sector solutions?<br>Suggestions might include, but are not limited to: more in-person training, specific funding, technology breakthroughs |



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# Knowledge Sharing Series Survey

Please take a moment to complete the Emerging Areas Knowledge Sharing Series Feedback Survey


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## Closing

# Wrap Up

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# Thank you!

Presented by: