Modernizing Marine Transportation using Renewable Energy (RE) Technology

Presented by:

KAISER MERZ C. MARCELINO
Lead, Senior Utility Advisor
USAID Energy Secure Philippines (ESP) Activity
kmarcelino@energysecure.ph
Goal:
Enhance energy reliability & security given a unified power system

Objectives:
- Improving electric utility performance
- Increasing deployment of advanced energy sources and systems
- Enhancing competition in the power sector

Key Achievements:
- Local development of RE-powered boat
- Power source during emergencies and disasters
- Marine transport with cold storage
- Alternative mode of transportation
**Key Achievements**

- Local Development of RE-powered boats
  - Trained and develop local boat builders
  - Local sourcing of materials and equipment
  - Introduced e-boats to local stakeholders

- Power Source during Emergencies and Disasters
  - Vehicle-to-X capability
  - 6x540 Wp Solar Panels
  - 19.2 kWh Battery capacity

- Marine Transport with Cold Storage
  - Can store temperature sensitive goods (i.e., vaccines and fresh produce)

- Alternative Mode of Transportation
  - Does not rely on expensive and imported fuels
  - Reduces carbon emissions and foul fumes
  - Can be used both as fisherman’s and tourist boat
Key Achievements

Local Development of RE-powered boats
- Trained and develop local boat builders
- Local sourcing of materials equipment
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Key Achievements

- Vehicle-to-X capability
- 6x540 Wp Solar Panels
- 19.2 kWh Battery capacity
Key Achievements

Marine Transport with Cold Storage

- Can store temperature sensitive goods (i.e., vaccines and fresh produce)
Key Achievements

PARAMETERS

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>9-Oct-23</td>
</tr>
<tr>
<td>Time Period</td>
<td>11:00AM to 11:30AM</td>
</tr>
<tr>
<td>Time Duration (h)</td>
<td>0.5</td>
</tr>
<tr>
<td>Total Distance Travelled (km)</td>
<td>48</td>
</tr>
<tr>
<td>Sample Distance (km)</td>
<td>7.8</td>
</tr>
<tr>
<td>Averaged Speed (kph)</td>
<td>18.03</td>
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STATISTICS

<table>
<thead>
<tr>
<th>STATISTICS</th>
<th>VALUES</th>
<th>REMARKS</th>
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</thead>
<tbody>
<tr>
<td>Ave. Fuel Consumption Rate (L/km)</td>
<td>0.375</td>
<td>For 45 hp diesel engine equivalent</td>
</tr>
<tr>
<td>Eq. Fuel Consumption for ~8 km or 30 minutes travel (L)</td>
<td>2.93625</td>
<td>Diesel</td>
</tr>
<tr>
<td>Diesel Price (PHP/L)</td>
<td>61.55</td>
<td>as of 11/24/2023</td>
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</tbody>
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ECONOMIC AND ENVIRONMENTAL IMPACT

<table>
<thead>
<tr>
<th>ECONOMIC AND ENVIRONMENTAL IMPACT</th>
<th>VALUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Savings for ~8 km Distance (PHP)</td>
<td>180.73</td>
</tr>
<tr>
<td>Projected Savings for 50 km Trip (PHP)</td>
<td>1,154.06</td>
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<tr>
<td>Greenhouse Gas Equivalent (metric tons CO₂)</td>
<td>10.947</td>
</tr>
<tr>
<td>Equivalent Trees per Metric Tons of CO₂</td>
<td>66</td>
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</tbody>
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Annual Savings: PhP 421,241.70

Alternative Mode of Transportation
- Does not rely on expensive and imported fuels
- Reduces carbon emissions and foul fumes
- Can be used both as fisherman’s and tourist boat
**Technical Description**

- **PV Generation Capacity**: 6x540 Wp
- **Electric Motor**: 15 kW DC in-board engine
- **Battery Capacity**: 19.2 kWh
- **Passenger Capacity**: Six (6) excluding boatmen
- **Run Time**: More than five (5) hours
- **Hull Type**: Fiberglass hull
- **Cold Storage Facility**: 2-50 L cold storage
Lessons Learned

Enabling Environment

Technology Innovations

Stakeholder Engagement
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