Feasibility Studies with the Aim of Developing Joint Crediting Mechanism FY2014

Improvement of Energy and Work Efficiency by Introducing Special LED Lighting Equipment to Fishing Boats in Vietnam

New Energy and Industrial Technology Development Organization (NEDO)
STANLEY ELECTRIC CO., LTD
**NEDO’s Feasibility Studies with the Aim of Developing a Joint Crediting Mechanism**

**Vietnam/Energy Efficiency**

**Improvement of Energy and Work Efficiency by Introducing Special LED Lighting Equipment to Fishing Boats in Vietnam**

Implementing Agency: STANLEY ELECTRIC CO., LTD.

Vietnamese fisheries industry accounts for 5% of Vietnamese GDP and has four million fishery workers. Improvement of the energy efficiency is requested in accordance with the government policy. Much of the fuel oil is consumed by lighting equipment. Introduction and dissemination of LED lamps will reduce the consumption of fuel oil by over 90%, and contribute to energy efficiency, improvement of safety and productivity.

### Summary

Study on technology, marketability and CO₂ emission reduction potential through the introduction of Stanley’s special LED lamps to Vietnamese fishing boats with potential plans for demonstration and commercialization.

### Survey Items

1) Actual condition survey of fishing boat operations  
2) Technology study  
3) Market research  
4) Developing MRV methodology  
5) Organizing a workshop

### Partner/Site

- Dept. of Science and Technology of Quang Tri Province  
- Eternity Technology Energy Stock Company (ETES)

### Estimated Reduction Amount

295.5 ktCO₂/year/20k boats (approx. 97% reduction)

### Reference Scenario

Reference scenario: GHG emissions from fuel oil combustion by generators on fishing boats with metal halide lamps

\[
\text{CO}_2 \text{ emissions} = \text{Amount of power consumed by boats with metal halide lamps} / \text{generator efficiency} \times \text{emission factor.}
\]

### Emission Reductions by Project

Project scenario: GHG emissions from fuel oil combustion by generators on fishing boats with LED lamps.

\[
\text{CO}_2 \text{ emission reductions} = \text{Amount of power consumed by boats with metal halide lamps} / \text{generator efficiency} \times \text{emission factor.}
\]
### LED Lighting Equipment

<table>
<thead>
<tr>
<th>Model</th>
<th>LLM0175A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Light volume</strong></td>
<td>10,000 lumen</td>
</tr>
<tr>
<td><strong>Emission color / color temperature</strong></td>
<td>Cool White / 5,000K</td>
</tr>
<tr>
<td><strong>Life expectancy</strong></td>
<td>40,000 hours</td>
</tr>
<tr>
<td><strong>Water-Dust Resistant Level</strong></td>
<td>IP65</td>
</tr>
<tr>
<td><strong>Size</strong></td>
<td>194mm × 169.8mm ×183.6mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>3.2kg</td>
</tr>
</tbody>
</table>

The proposed technology is the LED lighting equipment which has realized reduction in size and weight with a special water cooling system. Special optical lens enables it to have a light volume equivalent to a 400W conventional lamp. This technology is widely used for the commercial property lighting, and has been receiving attention for ship’s light due to its feature of narrow angle of projection with directionality. This technology has been adopted by Japanese small ships. Moreover, development of new technology for LED lighting equipment with water cooling system utilizing cooling water from engine is envisioned.

### LED floodlight fishing

- Lighting the dark sea water under the seawater gathers planktons, which then harvest fishes and squids who eat those planktons.
- The metal halide lamps which are commonly used have no directionality and illuminates 360-degrees. Additional disadvantage of metal halide lamps is the heat generation and the diffusion of ultraviolet ray. Moreover, it contaminates the seawater and marine products when the lamp is damaged because it includes mercury.
- **Stanley Electric’s floodlight LED with directionality can illuminate long distance immediately below the boat with surgical precision, gathering large amount of planktons, which brings effective fishing.**
- Replacement by energy efficient LED lamp will not only reduce the amount of fuel oil consumed by lighting, but also improve the mileage caused by the reduction of the displacement tonnage due to the reduction in the weight of battery and oil.
- Stanley Electric’s LED lamp will not be damaged by the splash of seawater because of the much less heat generation. This can prevent the dangerous operation of changing the lamp on the unstable weltering ship.
- Stanley Electric’s LED lamp can reduce the health risk caused by ultraviolet ray, improve the safety and productivity of fishery workers.