Measures for the reduction of fuel consumption and CO_2 emissions in inland navigation

		Line-Shaft type Contra Rotating Propeller ("CRP") - An innovative Propeller configuration of better propulsion efficiency
1.	Keywords	contra rotating propeller ("CRP"), propeller configuration, propulsion efficiency
2.	Short description	CRP is an energy-saving device whereby two tandem propellers, to rotate in opposite directions. With this technology, rotational energy loss of the fore propeller is recovered by the aft propeller, changing it into propulsive power, thereby improving the propulsive performance. Our system is placed on the same center line of the both shafts, which are derived from the engine room. Therefore, it is also available to be applied to the conventional hull form. Both CRP systems for diesel electric and conventional diesel engine directly driven propulsion systems are avilable.
3.	Objective & target	Less fuel consumption and emission (CO_2, NO_x, SO_x, PM)
4.	Key success factors	CRP efficiency enables the vessel smaller capacity of propulsion systems. In case of diesel electric propulsion systems, the installed power capacity on board becomes much smaller than the conventional by integrating the power systems.
5.	Innovative aspects	Recovery of rotational stream energy losses by CRP
6.	Benefits for users	10% less fuel consumption & Emission
7.	Geographic area	No geographic restrictions
8.	Status	First CRP application was on 37,000DWT Bulk Carrier in 1988(Mechanical solution). During the year 2007 to 2010, total (14) numbers of Diesel Electric CRP vessels had been delivered, namely "SUPER ECO SHIP", and now under the service for Japanese coastal trading. For the study of practical application to inland vessels, tank test for CRP performance under the shallow draft & with nozzle had been executed and confirmed its efficiency.
9.	Difficulties met	Increase of initial cost
10.	Year(s)	More than 20 years. (Since 1988, CRP is being in use for ocean going vessels)
11.	Users, stakeholders	Line-shaft CRP is unique technology developed by IHI Marine United Inc.
12.	Contact person	Mr. Hideki Shuto, Manager of Ecology Engineering, IHI Marine United Inc.
13.	Costs & financing	Installation cost will be covered by fuel saving in 5 years No special maintenance is required

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14.	Website / links	http://www.ihi.co.jp/ihimu/
15.	Available data, publications	N/A
16.	Added value: possibility for application elsewhere	By conbination with Diesel Electric Propulsion System, the vessel could achieve higher redundancy and integration of power generation system.
17.	Further information	N/A
18.	Filled in by	Hideki Shuto, Manager of Ecology Engineering
19.	Date	22nd March, 2011