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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

Independent Evaluation

Promotion and Transfer of Marine Current Exploitation Technology in China and South East Asia

UNIDO project: UE/RAS/05/004 and TE/RAS/12/005

SAP ID: 106049

UNITED NATIONS
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UNIDO OFFICE FOR INDEPENDENT EVALUATION

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Contents

Glossary of evaluation-related terms

Term	Definition
Baseline	The situation, prior to an intervention, against which progress can be assessed.
Effect	Intended or unintended change due directly or indirectly to an intervention.
Effectiveness	The extent to which the development intervention's objectives were achieved, or are expected to be achieved.
Efficiency	A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.
Impact	Positive and negative, intended and non-intended, directly and indirectly, long term effects produced by a development intervention.
Indicator	Quantitative or qualitative factors that provide a means to measure the changes caused by an intervention.
Lessons learned	Generalizations based on evaluation experiences that abstract from the specific circumstances to broader situations.
Logframe (logical framework approach)	Management tool used to facilitate the planning, implementation and evaluation of an intervention. It involves identifying strategic elements (activities, outputs, outcome, impact) and their causal relationships, indicators, and assumptions that may affect success or failure. Based on RBM (results based management) principles.
Outcome	The likely or achieved (short-term and/or medium-term) effects of an intervention's outputs.
Outputs	The products, capital goods and services which result from an intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Relevance	The extent to which the objectives of an intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donor's policies.
Risks	Factors, normally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.
Sustainability	The continuation of benefits from an intervention, after the development assistance has been completed.
Target groups	The specific individuals or organizations for whose benefit an intervention is undertaken.

Acronyms and abbreviations

AMC – Approval and Management Committee
BAPPEDA - Badan Perencana Pembangunan Daerah (Indonesian: Regional body for planning and development)
BPPT - Badan Pengkajian Dan Penerapan Teknologi
BTO – Back-to-office report, Mission report
B2B – Business-to-business
CSR – Corporate Social Responsibility
EEC Branch - Energy and Climate Change Branch
EPC - Engineer, Procure, Construct
GEF – Global Environment Facility
GHG (emissions) - Green House Gas (emissions)
GoI – Government of Indonesia
GW – gigawatt
HQs – Headquarters
IAEA – International Atomic Energy Agency
IEA – International Energy Agency
INOCEAN – Indonesian Ocean Energy Association
IOM – Inter-office Memorandumg
IPR – Intellectual Property Rights
IRENA – International Renewable Energy Agency
ISET - Instiute for Sustainable Energy Technology
ITB – Institut Teknologi Bandung
JV – Joint Venture
KN – Joint Venture PT Kobold Nusa
KPM - PT Kutilang Paksi Mas
kW – kilowatt
LHI - Indonesian Hydrodynamic Laboratory
MARCEE – GEF Program on Marine Current Energy Conversion
MC –Marine Current
MCT – Marine Current Turbines
MD – Managing Director
MEMR – Ministry of Energy and Mineral Resources
MOD - Miscellaneous obligation document
MoFA – Ministry of Foreign Affairs
MoMAF – Ministry of Marine Affairs and Fisheries
MoU - Memorandum of Understanding
m/s - meter per second
MW - megawatt
NEC – National Energy Council
NEP – National Energy Policy
NPO – National Program Officer
ODA – Official Development Assistance
OES – Ocean Energy Systems
OIC – Officer-in-Charge
OTEC – Ocean Thermal Energy Conversion

O&M – Operation and Maintenance
PdA – Ponte di Archimede International S.p.A.
PEN – Blueprint of National Energy Management
PIF – Project Information Form
PLN – Perusahaan Listrik Negara (National Utility)
PM - Project Manager
PRODOC – project document
PTC/ECC – Programme Development and Technical Cooperation Division/Energy and Climate Change Branch
PV - Photovoltaic
RE – Renewable Energy
RETF – Renewable Energy Trust Fund
RFP – Request for Proposal
RISTEK – Indonesian State Ministry of Research and Technology
RRE – Renewable and Rural Energy Unit (at UNIDO)
R&D/TT – Research and Development/Technology Transfer
SETNEG – Kementerian Sekretatiat Negara Republik Indonesia (Indonesian: Ministry of State Secretariat of the Republic of Indonesia)
SOP – Standard Operating Procedure
TC – Technical Cooperation
ToR – Terms of Reference
TTD - Time to Delivery
TTGC - Time to Government Clearance
TTP - Time to Procure
UB - Unutilized Balance
UNDP – United Nations Development Program
UNIDO – United Nations Industrial Development Organization
UNIDO PM – UNIDO Program Manager
UR – UNIDO Representative

Executive Summary

Project background

Ocean energy provides significant opportunities to produce low carbon renewable energy and is pursued in a number of ocean-bordering countries around the world. Once the technologies are commercially available, the utilization of ocean energy resources is expected to contribute to the World's sustainable energy supply. In addition to generating electricity and other products, ocean energy can create jobs, and reduce dependence on fossil fuels.

The project “Promotion and Transfer of Marine Current Exploitation Technology in China and South East Asia (Pilot Plants)” (SAP ID 106049, UE/RAS/05/004, promotes a vertical axis marine current turbine technology. The specific turbine design (“Kobold”) was developed in Italy and a small prototype has been operating in the Strait of Messina since 2004. The project started out in 2005 as a regional project in China, the Philippines and Indonesia with the objective of promoting this technology with grant support of the Italian government through partnerships, pilot projects and the preparation of a larger follow-up GEF project. The cost of the regional project were budgeted at 700,000 €, of which 442,478 € were cash contributions through UNIDO and 200,000 € were expected as a contribution from local partners.

Findings

The current activities focus on the deployment of the second prototype in the Alas Strait in Indonesia as well as the development of the GEF project MARCEE with the objective of more systematic research and promotion of marine current turbine technology in Indonesia. The project is technically challenging and fraught with a large number of risks, but no risk analysis or risk mitigation measures were undertaken at any point in time. It has been under implementation for almost 10 year, experiencing significant delays. In contrast to the regional project document, the project was almost exclusively implemented as a national project. But no national project document for the Indonesia implementation was developed or approved. Due to the lack of a revised project document that would have been adjusted to the national character of the project, no agreed-upon logframe or implementation plan exist. In addition, no full and agreed-upon project budget was developed, nor was there any formal agreement on national contributions.

The lack of a project document and formal planning can be considered the root of many issues with this project. This includes a lack of funding, misalignment and misunderstandings between the stakeholders leading to significant delays, and a confusion about the actual objectives of this project: While the original project idea is

limited to the promotion of the technology, its implementation issues are dominated by a perceived additional objective of rural electrification.

This added co-objective was never formally introduced but added significant logistical and cost challenges which make successful project completion and promotion of the technology very difficult. For example, the lack of infrastructure (e.g. for construction, installation, towing and grid connection) at this location can be seen as one of the main reasons for the current stagnation in implementation and has already added significant costs for bringing the tools and materials to the site.

Current status and open questions

Currently, most components are in place at a harbor close to the project site. In discussions with the evaluation team the government representatives insisted that the project be completed. For that, a significant number of questions would need to be resolved:

- Installing the turbine is a distinct technical challenge and can fail even with the best planning and highest-level service providers. The costs for the installation most certainly exceed the currently available project funds. Between different technical experts, there are different opinions on the exact installation process and the required resources. According to the estimate of the evaluation team, at least 700,000 USD should be assumed for the installation costs.
- The project objectives also require the operation of the turbine for a certain time, in order to conduct research and continue the technological development. The costs and technical effort necessary to operate the turbine cannot be assessed by the evaluation team at this point in time. At the least, they consist of the supervision of the operations, including any maintenance and repair work. If the same rules would apply to the turbine as for boats, it would need to be put into dry dock and repainted every two years.
- The legal and strategic stakes of the license-holding Indonesian company and the Italian technology owner in the prototype have not been fully declared. These parties are the owners of the Intellectual Property Rights to the Kobold and therefore the main potential beneficiaries of the project, which should lead to an adaptation of the turbine to Indonesian circumstances and commercialization of the technology.

Key Recommendation

The evaluation gives detailed recommendations on how to proceed. In particular

- The project should only be continued if a sustainability strategy for the Kobold II prototype is developed and agreed upon.

- Once the sustainability strategy is developed, a project document to ensure its implementation should be signed and the necessary funds should be secured between UNIDO and the government. On that basis, project implementation can then proceed and lead to successful implementation if all partners agree that there are still significant technical risks to be expected.
- If they confirm their commitment, a legal arrangement for the installation process should be found in which the license holder can be included sharing some or bearing all of the technical risk

This sustainability strategy needs to consist of two parts: firstly, a strategy for installing and operating the pilot plant. Secondly, a strategy for the exploitation of the monitoring results of the pilot plant for technological development and for commercialization of the technology, i.e. commercial exploitation of the technical knowledge by building and installing further marine current turbines. For that, it is necessary to have the IPR holders reconfirm their commitment to a commercialization of the technology in Indonesia. The only partner that is currently in a legal position to do that is the Kobold Nusa Company as the holder of the national license. They have expressed interest in completing this project to the evaluation team. If they are not interested in exploiting the license commercially, and no other partner can be found, the project should not be further implemented. Other potential partners could be local research institutions, but for them, as well, the same requirements for a sustainability strategy should be adhered to. Any other benefit of this project (e.g. the electricity produced from the turbine) does not seem to warrant the added costs and risks – in particular as the evaluation team has not been able to assess the potential costs for operation and maintenance.

. The recommended arrangement for installing the pilot power plant – the parts of which are formally UNIDO's property - is a turnkey contract with the license holder that obliges the license holder to install the project for a lump sum payment. This limits UNIDO's exposure to the installation risk. It is recommended to negotiate a cost sharing agreement with the license holder who will be the major beneficiary of this project, as they will be using the pilot for further developing their technology, adapting it to the local situation and installing it in more sites in Indonesia.

National laws forbid the transfer to the government in the current state. Discontinuation at this point in time would also entail certain costs – on the one hand the costs for scrapping the turbine components in the Port of Labuhan Haji, and on the other the potential political costs of reputational damages to UNIDO, as the government clearly expects the project to come to commissioning.

This evaluation was conducted by Christine Wörlen, arepo consult, Berlin, Germany and Erwandi, IHL Surabaya, Indonesia, between September and December 2014.

1.Introduction and background

1.1. Introduction

The project “Promotion and Transfer of Marine Current Exploitation Technology in China and South East Asia (Pilot Plants)” (SAP ID 106049, UE/RAS/05/004, TE/RAS/12/005, XP 4000307) promotes a vertical axis marine current turbine technology. The specific turbine design called Kobold was developed in Italy and a small prototype of 28 kW at 2 m/s marine current speed and 23% efficiency has been operating in the Strait of Messina since 2004. The project started out as a regional project in China, the Philippines and Indonesia at estimated costs of 700,000 €, of which 442,478 € were contributed by UNIDO on the basis of an Italian grant.

The project document for the regional project motivates the relevance of the project as well as the technology, and describes the end-of-project situation in the following way:

> “Local manufacturing and setting in place of a pilot Kobold turbine in China. The pilot plant is intended to test and prove the efficiency and the viability of exploiting MC in China and other countries in the Asian region.
>
> “A comprehensive assessment and overview of the most promising locations and sites of the Asian region where the Kobold technology could be used with the most cost effective advantages for energy production.
>
> “A follow-up project proposal, aiming at securing GEF co-funding that will address the issue to further support promotion and diffusion in the whole South East Asia of the manufacturing and the application of Kobold solutions. The scope and size of the GEF project much will depend on the results that the pilot plant will deliver.” (sic)

The following project components should lead to this result:

1. “To promote and establish an operational partnership with the Guangzhou Institute of Energy Conversion of the Chinese Academy of Science and the university of Naples and Ponte die Archimede SpA, Italy in order to transfer, adapt and apply the Kobold turbine for energy production,
2. “To develop, produce locally and test in the Zhoushan Archipelagos, China and a site in the Philippines two pilot applications of the Kobold turbine, in order to adapt and customise the proposed technology to the local conditions, and
3. “to finalise a full fledged project for launching the use and application of the Kobold turbin in large scale through the support of GEF and other international donors.”

The stakeholders in the Indonesian part of the project were the research ministry RISTEK, the company PT Kobold Nusa and UNIDO. The local government of the district of East Lombok and the provincial government were also prepared to cofinance. PT Kobold Nusa is a Joint Venture of an Italian technology developer Ponte di Archimede

SpA (PdA SpA) and an Indonesian energy company PT Walinusa. At this point, the understanding had developed that a larger scale prototype should be installed in Indonesia and it should serve the electrification of a remote coastal community in Eastern Lombok. Logistical challenges have brought the project implementation to a halt and raised fundamental questions about the merits of the project and the technology. This (formative) evaluation was contracted to clarify the options for progress on this project.

This evaluation was conducted by Christine Wörlen, arepo consult, Berlin, Germany, and Erwandi, IHL Surabaya, Indonesia, between September and December 2014.

1.2. Background on the technology

Ocean energy provides significant opportunities to contribute to the production of low carbon renewable energy around the world. The utilization of ocean energy resources can contribute to the world's future sustainable energy supply. In addition to generating electricity and other products, ocean energy can create jobs, and reduce dependence on fossil fuels.

There are several different ocean energy forms: wave energy, marine current energy, tidal barrages, and ocean thermal energy conversion (OTEC). Among these ocean renewable energy resources, marine current energy and wave energy are emerging as the most promising options for electricity generation. Exploitable marine currents are caused mainly by the rise and fall of the tide, resulting from the gravitational interactions between earth, moon, and sun. Tidal flows cause marine currents typically in regular local diurnal (24 hours) or semi-diurnal (12 hours) flows caused by the tidal cycle. The kinetic energy of marine currents can be converted analogous to how a wind turbine extracts energy from the wind, by using various types of open-flow turbines. It can be harnessed, usually near shore and particularly where there are constrictions, such as straits, islands, and canals. The velocities in good tidal stream areas are a fraction of typical wind speeds used for energy conversion. On the other hand, they are steadier and accurately predictable. Since the density of marine water is 830 times greater than the density of the air and the power of the flow is proportional to the third power of the fluid, the power of ocean current of 2 knots is equal to the wind flow of 9 m/s.

Marine current power turbine converters capture the kinetic energy of the current flow of the tide. Two different marine current energy converter device technology concepts have been proposed and developed in recent years. The first is called axial-flow horizontal axis turbines. They are similar to conventional wind turbines. The device has two or three blades mounted horizontally to form a rotor. The kinetic flow of the water current creates lift on the blades causing the rotor to turn driving an electrical generator. In June 2003, a consortium led by Marine Current Turbines (MCT) Ltd and IT Power successfully installed the world's first horizontal axis marine-current turbine 1.1 km off the coast of North Devon, UK. With an 11 meter rotor diameter, it produced 300 kW rated power. A second commercial scale application of a marine current turbine is aimed at testing the prototype

turbine, and demonstrating the technology. The 2 x 600 kW SeaGen commercial demonstrator of MCT turbine consists of twin-axial flow rotor with 16 meter diameter.

The other design that has been tested is a turbine in which the direction of flow is perpendicular to the axis of rotation. This design is commonly referred to as "vertical axis" turbines, since their axis is usually vertical. However, they are more accurately described as "cross flow turbines" since their distinguishing feature is the fact that the direction of flow is across the axis of rotation, which may be horizontal. Similar to the horizontal axis turbine, these devices generally have two or three blades mounted along a vertical shaft to form a rotor. In 2004, a 6 meter diameter vertical axis turbine was installed in the Strait of Messina, between Sicily and the Italian mainland. It can produce about 24 kW electrical in a 2.4 m/s current. This project was called the Enermar project, and the turbine design was called Kobold.

2. Evaluation purpose, scope and methodology

2.1 Purpose of the evaluation

The project has now been under implementation for 10 years. Project implementation has been slow and has come to a complete halt over the last couple of years.

The main *purpose* of the evaluation of this project is to assess the current situation and the options for possible steps out of the stalemate. A third party opinion was deemed necessary to identify the crucial issues and asses the options, and the scale of the resources needed for a completion of the project. The evaluation should also identify lessons to be learned with a forward looking approach. This entails an evaluation of the project's achievements to date and the appropriateness of the technology.

2.2 Methodology

For the evaluation, the following steps were taken:

- An initial mission to UNIDO Headquarters in Vienna by the international evaluation consultant was used for discussion with the evaluation stakeholders, preliminary interviews and collection of background documents.
- The inception report was drafted, submitted for comments to the program management and the UNIDO Office for Independent Evaluation and comments were incorporated.
- A field trip of the evaluation team to Jakarta, Labuhan Haji and Pringgabaya helped assess the situation on the ground. Intensive stakeholder discussions with the staff of the UNIDO country office, private companies and involved Ministries as well as with the local government and the village energy association were conducted. Additional documents were collected from the UNIDO Field Office in Indonesia.
- Emails to the Italian project sponsor remained unanswered.
- A debriefing mission by the international evaluation consultant to Vienna was used for further interviews with the current and previous project management, staff of the UNIDO Office for Independent Evaluation, the procurement unit and the financial administration unit. A presentation was delivered by the international and national evaluation consultant, based on the evidence collected.
- The project history was reconstructed and circulated to the UNIDO internal stakeholders for comments in October but no comments were received. The Draft Report was shared with the current and previous project management, staff of the

UNIDO Office for Independent Evaluation for comments and factual validation on 23 October 2014. The comments led to some revisions in the final version.

The consulted stakeholders are listed in Annex B. The collected documents (listed in Annex C) was compiled into a documentation of the project history (cf. Annex A). The travel schedule can be found in Annex B.

2.3 Limitations of the evaluation

This evaluation is based on the evidence that was collected by the evaluation team. It is not clear to the evaluation team if the evidence-base is complete. Records and project files were provided by UNIDO but they did not cover all aspects of the project. For example, no signed project document was provided, not even for the regional project. Selected records were received from the national counterpart ministry and the private counterpart upon specific request. Therefore, the completeness of the records cannot be assessed. The circulation of the reconstruction of the project history was an attempt by the evaluation team to share their assessment of the history, and to get feedback on whether there are any factual errors in this reconstruction. As no comments were received it is assumed that the understanding as formulated in this document is correct.

Secondly, a number of counterparts did not answer to interview requests or questions. The UNIDO National Program Officer (NPO) based at Jakarta, Johannes Verhelst, declined a request for an interview. Emails to Mr L. Matacena, former President of PdA, remained unanswered. This might lead to a gap in the coverage of factual information. However, as this evaluation is more targetted towards giving recommendations on the way forward than with attributing past mistakes, the gaps in documentation and the missing discussion with Mr Verhelst will probably not infringe on the validity of the findings and recommendations. The open questions with PdA will need to be resolved by program management.

3. Country context

3.1 Ocean energy resources in Indonesia

Indonesia has an abundance of renewable sources of energy, among others: geothermal, solar, water, wind and ocean. However, the ocean is the least exploited. As the biggest archipelagic country, the potential of ocean renewable energy in Indonesia is exceeding the potential of other sources. According to an 2011 Indonesian Ocean Energy Association (INOCEAN) assessment of Indonesia's ocean energy potential (cf. Table 1) this energy is provided in the form of tidal currents but also wave energy as well as ocean thermal energy. The potential of tidal and wave energy in this assessment was based on 15 straits only.

Table 1 Indonesian Ocean Energy Resources

	Theoretical Resources	Technical Resources	Practical Resources
Ocean Thermal	57 GW	52 GW *	43 GW *
Tidal Current	160 GW	22.5 GW	4.8 GW
Ocean Wave	510 GW	2 GW	1.2 GW

*depending on the technological maturity and market development, including availability of successful project in grid connection.

Source: INOCEAN 2011

Even if the potential resources are known, estimating the exploitable resources is still difficult. Further analysis is necessary in order to assess these resources and calculate accessible and (commercially) viable resources. This would include taking into account ocean zoning regulations and the possibility to connect to infrastructure (e.g. power grids) on the coast.

Among ocean renewable energy resources, marine current energy is particularly attractive. In Indonesia, there are many locations where the flows of the sea currents are concentrated. More than 15 straits have been identified as potential locations for tidal current energy systems. Figure 1 shows the tidal current energy potential map in Indonesia.

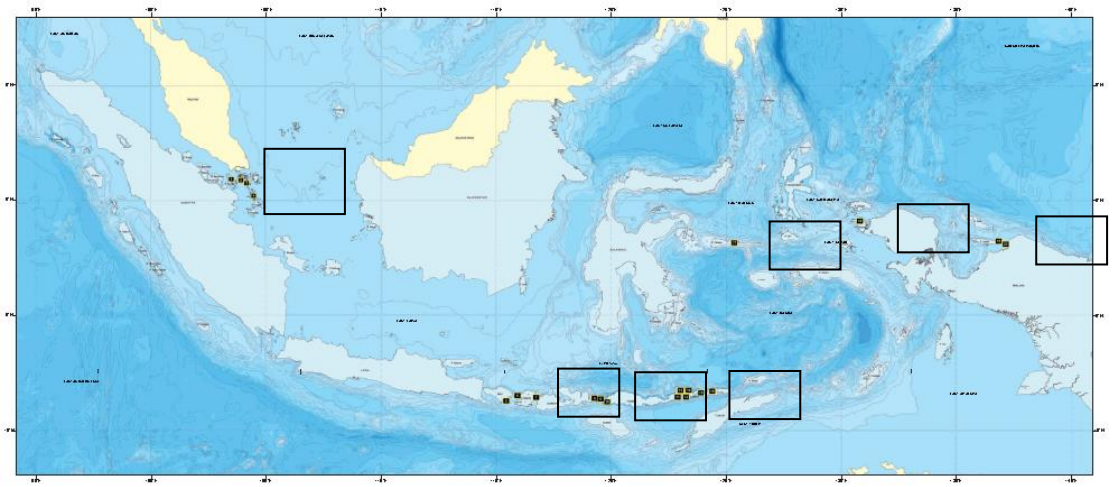

Figure 1.Tidal Current Energy Potential Map

3.2 Efforts to develop ocean energy resources in Indonesia

Besides starting to map its ocean energy potential, Indonesia is putting significant effort into developing the technologies for ocean energy conversion. A number of prototypes exist and several governmental research and development institutions have activities in ocean energy technology development. Examples are – among others – the Marine Current Turbine – Darrieus-type model developed by Indonesian Hydrodynamic Laboratory of BPPT (Badan Pengkajian Dan Penerapan Teknologi). This turbine is currently in the field research stage. Another technology is the T-Files Ocean Current Turbine. This turbine was developed by ITB (Institut Teknologi Bandung) and is already implemented in Sekotong in Lombok Island. A third option is the drag type turbine with blade release that has been developed by the Research and Development Agency of the Ministry of Ocean Affair and Fisheries. Moreover, the Research and Development Agency of the Ministry of Energy and Mineral Resources is conducting the Detail Engineering Design of a 1 MW marine current turbine. Even though up to now these turbines are still in a research and development stage, this list shows that Indonesia is active in the development of tidal current energy conversion technologies. Besides own research and development, international collaboration has also been initiated, e.g. in a wave energy plant (tapered channel, Norway) in Yogyakarta.

The research enthusiasm about ocean renewable energy in Indonesia was also transmitted to neighboring countries such as Malaysia and Philippines. Malaysia started the research on 1 kW tidal current turbine and 1 kW Oscillating Water Column in 2011. The Philippines targets a first ocean energy facility to start commercial operations by 2018.

3.3 Government strategies and policies for renewable and ocean energy

Renewable energy has been on the agenda in Indonesia for a few years. Currently, the main focus for deployment is on geothermal and hydro energy, while the potential of the world's largest archipelagic country in ocean energy remains untapped. The current National Energy Policy (Presidential Regulation No. 05/2006) requires that the Minister of Energy develops a Blueprint of National Energy Management (PEN), which contains terms on supplying and utilizing energy. As displayed in Figure 2, the currently projected Indonesian energy mix for the year of 2025 does not include a quantifiable share of ocean energy as one of Indonesian abundant renewable energy sources.

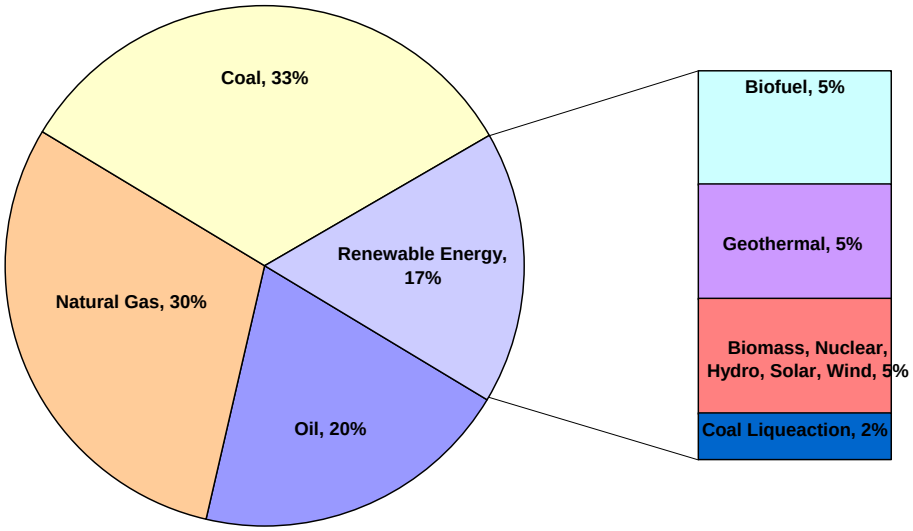

Figure 2 Presidential Decree No.5/2006 on National Primary Energy Sources by 2025

However, according to the newer Act No. 30/2007, ocean energy sources including the sources of energy that result from movement and layers of different temperature as well as other ocean systems should be managed in earnest as mandated by the legislation. Furthermore, Act No. 17/2007 concerning the long-term national development plan (Appendix, Chapter IV, Section IV.1.6, number 2) also mandates the development of the ocean energy potential in Indonesia.

Challenges in energy security and sustainable development have forced the Indonesian Government to increase efforts for diversifying into renewable energy resources. The National Energy Council (NEC) has been established. The NEC was tasked to produce a National Energy Policy (NEP). In this NEP, ocean energy is mentioned as one of the renewable energy sources as mandated by the Energy Act. In 2013, NEC revised the National Energy Policy. In the article 3 section (7) the new draft says "the utilization of marine energy resources are driven by installing a pilot plant as a first step that is connected to the national grid".

In October 2014, a new president took on government responsibilities in Indonesia. As maritime nation, he has expressed a vision for Indonesia as a global maritime nexus, emphasizing the role of the ocean for nation building in Indonesia.

3.4 International Frameworks

Internationally, the development of ocean energy technology has also progressed since the project started. In particular in the UK but also in the US, Japan and Korea, technologies are being tested and developed. A large marine testing center in Scotland is open for industrial and research stakeholders from across the globe.

The International Energy Agency (IEA) is offering a platform for international cooperation on ocean energy in the form of an IEA Technology Initiative on Ocean Energy Systems (OES). In this forum, 20 countries and their national stakeholders exchange experiences and work on joint projects for promoting a variety of ocean energy technologies. Indonesia has, so far, not been part of this initiative.

4. Project description

4.1 Project history

The project went through several phases. The project history is documented in detail in Annex A. During the initiation phase a regional promotion and awareness creation effort of UNIDO and the Italian technology owner Ponte di Archimede SpA (PdA) gathered interested stakeholders from the research and technology ministries of China, the Philippines and Indonesia. In this phase, a number of international conferences were held in South East Asia and Italy. When enough stakeholders indicated interests, in 2005, a project document for a regional project that included two pilot plants and further promotional activities was developed. This project document formed the basis for the project evaluated here. The project was expected to be completed within 18 months. The estimated costs were 700,000 €, of which 57,522€ were support costs. 442,478 € were contributed from UNIDO in cash, and 200,000 € were expected as in-kind contribution from the project partners, mainly from China.

In the implementation phase of this project the activities focused on Indonesia. Upon recommendation of the research ministry (RISTEK) which is the Government of Indonesia (GoI) counterpart, the Joint Venture company PT Kobold Nusa (KN) was formed between PdA and PT Walinusa, in December 2006. KN was granted a license by PdA for the production and marketing of the Kobold turbine in Indonesia. A tender process of September 2006 led to the conclusion of a contract, in December 2007, between UNIDO and PT Kobold Nusa for delivering and commissioning the turbine and a payment of 180,000 Euros (240,000 USD).

The project site was chosen on the basis of criteria that included that the turbine should provide electricity for an unserved community. At least two options were screened before the current spot in Alas Strait on the Eastern side of Lombok Island was selected. According to a presentation of RISTEK, RISTEK spent Rp. 500.000.000,- (42.000 USD) to conduct a survey at Alas Strait and select the potential site. The local and provincial governments and the local community were included in the project from that point onwards.

In 2009, the production of the platform and turbine started with KN contracting Javasea. Over the following year, a 30t platform and shaft was produced in Jakarta. When it was found impractical to deliver it by sea to Lombok it was cut in three pieces and delivered by truck in 2010. Several parts of the turbine were manufactured in Italy.

However, in Lombok, the work on the infrastructure that would be used channel power from the Kobold turbine had not progressed to the point where the turbine could have been connected. The local government had budgeted funds (around 30.000 USD) for an underwater cable in 2009, but without further external support, was not able to conduct the tender for its procurement and installation it. Therefore, the money was reallocated to

other uses. In 2009, the ministry RISTEK was able to allocate some funds that were spent on a mini-grid in the host community but the turbine was not installed. Therefore the mini-grid was equipped with solar panels, a small wind turbine and a Diesel genset. RISTEK spent Rp 1.345.594.000,- (112.300 USD) on these facilities, including the solar panel, wind turbine, and diesel genset. In later years, the national utility company connected the village to the national grid. Today, the mini-grid is not in operation as the village energy association cannot afford the fuel and repair of the battery system.

In 2010, the platform was put on the shore at the nearest harbor to Pringgabaya, Labuhan Haji Port. In 2011, the last components of the turbine were delivered and a meeting of the various partners decided on the services necessary for the installation. Until today was not possible until today to conclude a contract with barge and crane operators whose services would be necessary to launch the platform into the waters of the harbor, and tow the installed platform-cum-turbine to the site of final installation.

In 2012 the project entered its final phase. At this point, project management at UNIDO changes hands in both locations: At Headquarters, project management migrated from the Investment and Technology Promotion Unit to the Agribusiness Unit and then to the Renewable and Rural Energy Unit (RRE), when it becomes clear that the project requires some technical competence in the energy field. At the Field office, the UNIDO Representative (UR) changed. The contracts for the delivery of the services that had been concluded in 2011, were not delivered. After a field mission by the Project Manager in November 2012, it was decided that the financial means available for procuring the barge and crane services were insufficient. Therefore, new financial resources were requested from UNIDO internal funds, and an official global tender invited bidders, following standard UNIDO procurement processes (compare Annex E). This tender was also advertised in local Indonesian daily newspaper. Only national bidders replied, with prices significantly higher than the available budget and also higher than the previous bid.[1] Negotiations were conducted with the intention to reduce the costs of these services. During these negotiations, an email exchange between the UR and the Project Manager led to the understanding that the Government of Indonesia wanted to stop the project, even though there is no written or approved communication from the government to that effect. Project implementation was halted in January 2014 and an evaluation of the project was requested.

[1] This discussion relies on the communications of the Project Manager. Triangulation with the country office and the procurement unit was attempted but the original files were not transmitted to the evaluators but only to the Project Manager. The exact information transmitted can be seen in Annex E.

4.2 The GEF project

One of the planned outputs of the original regional project was a larger GEF project. This project was called “Demonstration and Deployment of Marine Current Energy for Electricity Production (MARCEE)”. It was expected to have the following components:

- The capacity building component should build local technical expertise and conduct environmental, technical and socio-economic studies to understand marine current energy resourcesi n Indonesia. A documented assessment and roll-out strategy would be one of the outputs of this component.
- Blueprints for state-of-the-art marine current power plants would be developed. Pilot projects would lead to GHG emission reductions.
- National policy and institutional support would be developed, including a national roll-out strategy.
- Technical workshops and trainings would provide support to local developers, government institutions, banks and financial institutions.

The proposed GEF funding volume for this was 5.9 million USD, to be cofinanced by ca. 11 million USD from the Indonesian side.

Starting mid-2009, UNIDO made several attempts to receive an endorsement letter for this GEF project from the GoI counterpart for the Kobold project, the research ministry RISTEK. In August 2010, UNIDO received a letter of interest from the Ministry of Energy and Mineral Resources (MEMR) for the GEF project. However, no allocation from the GEF country allocation has been made available for the MARCEE project. RISTEK has repeatedly made its endorsement contingent on a success of the Kobold pilot project.

5. Assessment of the project

In the following, the project is assessed using the evaluation questions and criteria formulated in the inception report and in the ToR. The answers are color-coded according to the following scheme:

- green – positive assessment, no issues arising from that aspect.
- yellow – the assessment is not fully satisfactory. Major challenges did not arise.
- orange – the assessment is unsatisfactory and posed significant challenges for the project.
- red – the assessment is unfavorable and resulted in significant challenges for the project.

5.1 Project Design and Formulation

Table 2 gives a detailed assessment on the evaluation questions regarding project design and formulation. The biggest challenge for the evaluation as well as for the implementation of this project is that no project document for the national project exists. The document for the regional project (China, Indonesia, Philippines) served throughout project implementation as the point of reference within UNIDO even though no signed version could be located. The regional project document had no Indonesia-specific elements, and focused purely on the technology promotion aspect. The lack of a project document for the national project led to a number of complications.

For once, the national counterpart did not and could not acknowledge the regional document as the project document for the Indonesian project. In that light, it is surprising that the national counterpart was able to provide as much support as it did. This was done on the basis of an Implementing Agreement between UNIDO and RISTEK of 2009 which described the distribution of roles between the GoI and UNIDO for a duration of 1 year, with a possible extension of 1 year. Still, this document could not serve as a project planning document as it did not specify any outputs or outcomes. No logframe or comparable means-end-relationship-documentation nor milestone planning or output-oriented budget has been found for the national project and prototype.

Table 2 Assessment on evaluation questions regarding project design and formulation

	(i) Project design and formulation	Assessment	Supporting argumentation / evidence
	(b) The project had a clear thematically focused development objective and immediate objective and/or outcomes, the attainment of which can be determined by a set of verifiable indicators.	While the project had formulated objectives, the combination of objectives led to significant challenges. Immediate objectives and outcomes were not in line with project execution and not monitorable.	The regional project had three objectives. Output indicators and expected state at the end of the project are formulated. However, these were not broken down for Indonesia, and the project itself did not comply to these objectives. The national project has no project document. It pursues a dual objective of rural electrification and technology prototyping which was never fully formulated.
	(c) The project/programme was formulated based on the logical framework approach and included appropriate output and outcome indicators within a realistic timeframe.	The project has no formal logframe.	Project document
	(d) A logically valid means-end relationship has been established between the project objective(s) and outcomes and the higher-level programme-wide or country level objectives.	No.	1. There are two different objectives implicit in the project: rural energy supply and energy technology development. Only one of them (technology) is included in the project document. 2. A means-end relationship for the technology part is formulated in the project document, but does not lead to a fully commercial technology, i.e. further stages are necessary even for that part. 3. The rural development objective is not formulated in the project as an objective, but played an important role for project implementation, complicating matters to the degree of un-implementability.
	(g) The outputs as formulated in the project document are relevant and sufficient to achieve the expected outcomes.	The outputs are relevant, but insufficient.	Added complication of rural electrification (cf. question d). The outputs are not adapted to Indonesia. Exact formulation of outputs and activities leaves room for interpretation, e.g. "output indicator 2.2 A pilot plant of the Kobold turbine set in place" - does it mean it should be producing power?

	(i) Project design and formulation	Assessment	Supporting argumentation / evidence
	(h') the project budget was sized appropriately for the components and the project risks.	No. Even though the project document is not consistent regarding the number of pilot plants, and therefore the financing needs cannot be fully assessed, it is clear that the project budget was too small from the start.	Counterpart financing was not included. A large number of aspects were completely missing, like the infrastructure for launching the pilots or the costs for operation and maintenance. No bottom-up financial planning is evident from the project documentation.
	(h'') the financing and cofinancing (cash) was secured at project start.	No.	The available evidence contains no figures on cofinancing. No project document for the Indonesia case.
	(h''') the local contributions were secured at project start.	No.	The available evidence contains no figures on cofinancing. No project document for the Indonesia case.
	(i) the project fits into UNIDO's institutional mandate.	If there is an international agency that could do such a project, it would be UNIDO (or maybe now IRENA, but IRENA did not exist at the outset of the project).	
	(k) the project approach was sound and appropriate for the development status of the technology and the R&D/TT (Technology Transfer) nature of the project?	No.	The project approach was neither appropriate for a technology-related nor for the rural development objective. The project did not acknowledge the local situation in Indonesia, in terms of the necessary adjustments of the technology, the extent of the capacity building needs, supporting facilities including further R&D /TT and infrastructure for erection and operation of the turbine. The original document does not envision sufficient training and infrastructure preparation for functioning prototypes. This resulted in difficulties in - transportation of platform to project site, - storage of material on site, - lack of infrastructure on site, - lack of sustainability strategy related to further technology development and adaptation, - lack of roll-out strategy.
	(l) the risks and assumptions have been appropriately assessed and fully described in the project document?	The risk assessment in the document is generic, incomplete and superficial, negating all country, political, monetary and administrative risks. No specific risk mitigation	Project document, risk management section.

	(i) Project design and formulation	Assessment	Supporting argumentation / evidence
		measures and too little contingencies have been proposed.	

The lack of a project document results in a lack of common understanding of the project design and purpose. It also prohibited well documented planning. This had major repercussions for the implementation of the project and the collaboration between the project partners. The project found itself in a persistent needs to find new financial resources – on the side of the government and the private partner as well as on the side of UNIDO, and a lack of bottom-up and realistic planning and budgeting is an important reason for that. In addition, the regional project contained no consideration with respect to the technical and capacity-related risks and challenges of installing a second prototype of a technology that is in an early stage of technical development, and consequently also no activities and strategies on how to overcome them, or budgetary resources to implement them.

In addition, this lack of explicit definition of the project also allowed for a situation in which the dual objective of technological development and rural electrification was allowed to gain importance. The initial project document mentions rural electrification as a potential benefit of marine current technology but does not imply that a coastal village should depend on the prototype for power supply during this project. However, coastal energy supply from the pilot plant was part of the local implementation process, including promises that were made to the coastal community. Adding the second objective was decisive for the choice of a very remote location and thus added significant logistical challenges to the project, for example the need to cut the platform into three pieces, transport it by three trucks across three islands and two straits and weld it back together without a workshop and crane on the sides of a harbor access road in East Lombok. It is possible that without this locational choice, the pilot plant would be in operation today.

Therefore, the lack of formal planning can be considered the root of many issues with this project, including the lack of sufficient funds, several delaying incidents and misalignments, and – through an overly strong emphasis on rural electrification - the current stalemate.

5.2 Ownership and Relevance

Table 3 illustrates the assessment of the evaluators in relation to the questions relating to Ownership and Relevance as formulated in the inception report.

Table 3 Assessment on Ownership and Relevance

	(ii) Ownership and Relevance	Assessment	Supporting argumentation / evidence
	(a) The project is aligned with Indonesia's development priorities and technology needs.	As a pure R&D project, it would be aligned with the government priorities. Rural electrification was also a government priority so that it was aligned to both priorities. But the technology is not appropriate to serve both priorities at this point.	cf. Section on government strategies and policies
	(b) The concept and the objectives of the project were and are still valid.	Valid for an R&D project, but incomplete.	- lack of linkage to R&D/TT facilities and institutions, - lack of linkage to technology companies that might adapt the prototype to the Indonesian situation, - very limited capacity building activities, - lack of exit strategy / roll-out strategy
	(c') The counterpart(s) has (have) been appropriately involved and were participating in the identification of critical problem areas and in the development of technical cooperation strategies.	Three-way communication was the exception rather than the rule, leading to significant project delays and a lack of synchronicity of the activities of the partners.	- Stakeholder discussions in Indonesia (e.g. inconsistent views over whether this is a "B2B" project or not) - scheduling difficulties e.g. in harmonizing the budget allocations and procurement of the submarine cables, power bank, inverters, village electrification, mooring lines etc. with the manufacturing of platform and turbine
	(c'') The counterpart(s) are actively supporting the implementation of the project including through in-kind and cash contributions.	All parties have been supporting the project above and beyond what was initially programmed and / or agreed upon.	- budget allocations on various government levels even without a project document - budget allocation by private parties (PdA, Newmont) - increases in UNIDO budget through Approval and Management Committee (AMC)

	(ii) Ownership and Relevance	Assessment	Supporting argumentation / evidence
	(e) There are competent stakeholders in the country, i.e. businesses and research institutions that can drive the further development of this technology?	Yes, there are competent stakeholders in Indonesia, who could drive forward the development.	- research institutions (e.g. Center for Marine Geology, Hydrodynamics Laboratory) - private companies (e.g. energy companies, shipping companies). When properly coordinated, these partners could drive the further development of this and other marine energy technologies.
	(f) The project is linked to the development in the international community?	The project seems completely independent of international efforts to further marine energy technologies.	- lack of linkage to the other marine energy efforts in Indonesia - lack of integration into international research networks like the IEA Ocean Energy Systems Implementing Agreement - With PdA leaving the project / ceasing to exist, this disconnect became even stronger.

The project is aligned with the technology priorities of Indonesia, and even more with the rural electrification priorities. Project stakeholders were overall actively supportive of the project. In particular, they collaborated with an impressive ability of leveraging resources once they got together and harmonized their actions. For example, UNIDO was able to mobilize another 200,000 USD from internal resources in 2012 and 2013. PdA often filled gaps with smaller and larger amounts. And RISTEK has compensated for procurement that did not take place on the local level. While the financial resources were scarce and the financing need was grossly underestimated, the partners collectively demonstrated great ability at finding and leveraging funds. The technical competence of the local stakeholders was sufficient for a pilot project for marine current technology.

However, more consistent inclusion of the stakeholders and a connection to the international community working in the area of marine current turbines could have offered an opportunity to make project implementation easier. This is discussed in more detail in the section on project coordination (0).

5.3 Efficiency of Implementation

Efficiency normally is a relative measure, either relative to the plan or relative as compared to other ways of executing the same activity. None of these measures can be applied in this project, due to the lack of project planning and due to the incomplete accounting for external resources. Therefore, the evaluation questions have been rephrased slightly differently in the inception report. Table 4 contains the assessment details.

Table 4 Assessment on Efficiency of Implementation

	(iii) Efficiency of implementation	Assessment	Supporting argumentation / evidence
	(a) UNIDO and other counterparts' inputs and services were delivered as planned, in a timely manner and led to the production of foreseen outputs.	No, the inputs and services were not delivered as planned.	Due to a lack of clear milestone planning, it was also unclear when each deliverable should have been delivered. But there are examples and indications for delays in most inputs: - the project was expected to close in 2007 at the latest. - the production of the platform started in 2009 and took around a year, components of the turbine, generator, gearboxes etc. took until 2012. - In Mid 2010, UNIDO agreed to procure four service contracts. Until today only one of them has been executed.
	(b1) Government/counterpart inputs have been planned	Yes, even in the absence of a project document, government inputs have been planned on all levels.	As the evaluation team has no access to the government files, the longer term planning on the side of the GoI cannot be evaluated. From the UNIDO files, it seems that the government has included budgets at least in the years 2008, 2010 and 2011 which implies that the government has planned inputs from year to year. However, the planning horizons were year by year and little coordination with other stakeholders / levels of government / the project took place.
	(b2) Government/counterpart inputs have been provided	The records indicate that it was difficult for the governments at the lower levels to spend their budgets on time due to a lack of overall project coordination and communication. However, with enough time and reallocation between levels of government, the counterpart inputs have been provided.	The local government had budget to support the infrastructure build-up, but as the schedule was missed, there was pressure from local society. RISTEK has made promises to villagers on Kobold. The RISTEK budget which had been thought of as cofinancing of Kobold installation was then revised in one year to fulfil the demand of electricity from village society. Partially, the budgets were used for other purposes. This includes the solar/wind/Diesel hybrid minigrid in the village. In other cases (e.g. MEMR), funds were used for completely different purposes when coordination to use them for this project failed.

	(iii) Efficiency of implementation	Assessment	Supporting argumentation / evidence
	(b3) Government/counterpart inputs were adequate to meet requirements.	It seems that government funds would have been adequate to cover the tasks. The challenge seems to have been in the timing of the spending of the budget rather than the amount of resources available.	
	(e) A strategy to overcome possible budget constraints was implemented e.g. mobilization of extra-budgetary resources, co-financing of activities from the Technical Cooperation (TC) programmes' budget.	Yes.	Yes, in addition to repeated transfer of funds to subsequent years, efforts have been made to leverage additional funds, e.g. through the Corporate Social Responsibility (CSR) funds of the mining company Newmont (a promised total sum of USD 70.000) or from internal UNIDO resources (150.000 Euros).
	(f) UNIDO procurement services are provided as planned and were adequate in terms of timing, value, process issues, responsibilities, etc.	No.	None of the contracted goods or services, for equipment, hardware or installation services, were provided on time, or are completed at this point (with the exception of consulting services); cf. Annexes E and F

The assessment on the first question relates again to a lack of planning which leads to a significant lack of efficiency.

In addition, procurement has been troubled by challenges (cf. also section 0). This relates on one side to the large contract for the turbine, and on the other to the contract for barge and crane operations.

5.4 Project effectiveness

The effectiveness of the project in achieving its objectives is hard to assess as it is still possible that the project achieves its outcomes, which are, according to the commonly accepted understanding, an installed and functioning prototype and the follow-up GEF project. For that, significant difficulties still need to be overcome. Until now, the effectiveness is limited as the technology has not been adapted to Indonesian circumstances. Table 5 contains findings for the project effectiveness dimension.

Table 5 Assessment of project effectiveness

	(iv) Effectiveness	Assessment	Supporting argumentation / evidence
	(a) The outputs and outcomes were achieved or are likely to be achieved.	Cannot be assessed yet.	Some of the outputs were achieved, but completion is still outstanding. To assess the probability of project completion is difficult but it is still possible to commission the platform.
	(b) The technology was tested, found to be appropriate or not and/or suitably adapted and applied.	The technology was tested in Messina, but no measures have been taken to adapt it to the Indonesian situation.	- Request in the procurement, that all components of the Kobold turbine and platform need to be adapted to tropical climate conditions. - Blade design was scaled up without modification. - Project ends with the installation of the turbine, so that necessary modifications cannot take place during the project. Whether or not they will happen after the project is left to chance.
	(c) Was UNIDO able to leverage its strengths and comparative advantages in this project?	Not fully.	UNIDO was able to leverage **convening power** in 2005. Later on and in particular on the national level, the convening power was significantly reduced, for example when the UR does not get responses from ministries. On the other hand, it is probably safe to say that without UNIDO the project would have been abandoned much earlier, as UNIDO also served as the focal point for complaints and trouble shooting. On the other hand, UNIDO did not **assess the technology risk**s properly, which could be considered one of its strengths, as one of the few UN organizations staffed with engineers

	(iv) Effectiveness	Assessment	Supporting argumentation / evidence
			and dealing with technology transfer. UNIDO did not exhibit particular finesse in **project planning and implementation**, in particular on the coordination between stakeholders and of the procurement process.

Of the outcomes specified in the regional project document, which are a pilot turbine in China, a comprehensive site assessment (in one version), or two pilot projects and a partnership with the Guangzhou Institute of Energy Conversion (in the other section of the project document) and the GEF project, none of these outcomes have been achieved, and several have been completely abandoned at an early stage in the project implementation. In that sense project effectiveness is unsatisfactory.

An interesting aspect is the question whether or not UNIDO has been able to leverage its strengths and comparative advantages. At least three such points could be identified: UNIDO as an international organization has convening power, and can bring expertise from the outside and rally stakeholders around a project. While this has been effective in the initial phase of the project, this influence has decreased to the point that letters and meeting requests from the UR remain unanswered by local ministries.

5.5 Impact and Sustainability

As the pilot plant is not commissioned yet, the impacts on electricity generation as well as on technology development cannot be assessed at this point. The sustainability aspects need to be discussed separately for the operation of the pilot plant and for the commercialization of the technology in Indonesia. The detailed assessment is contained in Table 6.

Table 6 Error! Reference source not found.**Assessment on Impact and Sustainability**

	(v) Impact and sustainability	**Assessment**	**Supporting argumentation / evidence**
	(a) Which long term developmental changes (economic, environmental, and social) have occurred or are likely to occur as a result of the intervention and are these sustainable?	No long-term developmental changes have been observed that would not have occurred in the baseline. Whether or not marine current technology will eventually lead to developmental changes and whether there will be a causal link to this project, cannot be assessed at this point.	N/A due to implementation stage
	(c) Was any sustainability strategy formulated?	Not at this point.	No evidence or documents were found that indicate that a sustainability strategy was formulated. In particular, the costs of operation are unclear. The village energy association said in the interviews that they are prepared to take on the responsibility of monitoring the Kobold, but they have no financial means or management skills. In the stakeholder interviews with the Ministries and the company, there was no evidence that even at this point, any of the stakeholders are concerned with the time after the project, with the exception of an unconfirmed pointer to the University of Mataram that might be interested in doing some research on the Kobold facility.
	(e) Was a plan for national ownership developed, especially in terms of institutional and management arrangements?	No specific arrangements documented in the records.	No evidence of such a plan was found. But the village energy association is prepared for the technical aspects, and the government demands the hand-over.

	(v) Impact and sustainability	Assessment	Supporting argumentation / evidence
	(f) Is the project likely to be scaled up?	Not at this point.	Conflicting evidence: - The company claimed in an interview that they would like to commercialize the Kobold. - But scaling up the 150 kW model is put into question by lack of infrastructure (in particular barges and cranes) and human resources. - Scaling up in the sense of making large numbers of small turbines seems more useful. - But before the plant is commissioned, nobody, and in particular not the government, will support a scale-up.
	(g) Is there a formulation of a clear exit strategy, sustainability plan and handover plan to national partners, including the local community?	No specific arrangements documented in the records.	No evidence of such a plan was found. But the village energy association is prepared for the technical aspects, and the government demands the hand-over.
	(h) Is there a provision for a sustainable transition towards national ownership of the facility and the associated know-how?	No specific arrangements documented in the records.	- No evidence of such a plan was found. - The village energy association is prepared for the technical aspects, and the government demands the hand-over. - To what degree this will lead to a (technically and financially) sustainable operation is unclear.
	(a2) The outcomes - if achieved - led to the intended impacts	No. of outcomes of partnerships and pilot plant are not fully attained. Awareness for ocean energy has increased, but causal link to the project is unclear.	-The pilot plant does not yet exist. -The partnerships forged during the project (cf. project document) have been difficult - there do not seem to be three-way partnerships between UNIDO, the GoI and the private sector, but most of the time, only two parties engage. - Commercial applications of ocean energy are still far in the future, even if the pilot plant would be installed, but looking at the original project document, this was not the intention of that project which was clearly conceived as one stage in a longer-term program.

	(v) Impact and sustainability	Assessment	Supporting argumentation / evidence
	d) Social development impact that were not intended by the project were triggered by the project	No social development impact has been triggered by the project.	1. It was claimed by interview partners but not documented in the records that electrification of the village might have taken longer than without the pilot plant, due to the unfortunate and misplace linkage of the Kobold to rural electrification. 2. Potentially, therefore, the stakeholders in the village as well as at the various levels of government have an unfavorable impression about this project. However, in the interviews, the Bupati, BAPPEDA and the village energy association voiced their support for the project.

The social development impacts of this project are also unclear. It has been flagged to the evaluation team in interviews in Jakarta that the connection of the village to the PLN grid was delayed because the plan was to satisfy the energy needs of the village from the Kobold and that the local community had been disappointed not to receive electricity from the Kobold pilot project. However, this does not seem fully plausible. For once, there are no documents in the project files that point to this. Secondly, the village energy association is well aware that the Kobold turbine will not produce permanent power supply but operates only about 8 hours per day. Therefore, they are also aware that a grid connection provides better power supply. By now the village is receiving power from the national grid. Thirdly, the "substitution" of the Kobold with a PV/wind/Diesel hybrid minigrid has taken place between 2010 and 2012, which is the same time frame at which the Kobold might have been functioning. The grid connection has been provided in 2012, and it is unclear whether or not this connection really has been delayed by the willingness to "wait" for the Kobold project.

Regarding the operation of the power plant, there seems to be a general agreement among stakeholders that the Kobold turbine will be operated by the local Village Energy Association. While the Village Energy Association confirmed this in the discussion, no written agreements have been made available to the evaluation team. However, it is unclear how the Village Energy Association staff would be compensated and who would be responsible and able to conduct any significant repair work. Judging from the connection of the powerhouse to the PLN grid, it would be expected that the turbine will be connected to the national grid – in which case there should be a connection agreement with PLN. This would allow for some small revenues. Whether these will be sufficient for the continued operation of the Kobold turbine is highly questionable. In particular, repainting of the platform will be associated with high costs. It is unclear if the stakeholders have been sensitized on these issues,

For the continued development of the technology, the operation of the pilot plant should be accompanied by scientific monitoring that analyzes suboptimal operations situations and the reasons for failures, should any take place, and optimizes the turbine. This requires considerable engineering competence and an interest for longer term and strategic engagement. The District government has highlighted an interest of researchers at the University of Mataram on Lombok Island. The evaluation team has tried to confirm this interest but has not been able to. It is not known, to what degree the license-holding company would like to engage in this process.[2] Regarding the commercialization/dissemination and scale-up of the Kobold technology in Indonesia, no plans have been presented to the evaluation team. A number of research institutions and other private companies are interested in the development of marine current technologies generally, and are working on similar as well as other potential turbine designs.

5.6 Project Coordination and Management (include details of arrangements and conducting an assessment)

The lack of a project document and project implementation plan infringed on project coordination and management. In addition, over long stretches the records imply long response times. While the records seem incomplete, they document that deadlines were agreed upon and not adhered to in a number of instances. Detailed assessments are given to the degree possible in Table 7.

Table 7 Assessment of project coordination and management

	(vi) Project coordination and management	Assessment	Supporting argumentation / evidence
	(a) The national management and overall field coordination mechanisms of the project have been efficient and effective.	Not always. Most of the issues of the project relate to a lack of coordination of the activities of the various stakeholders.	Examples: - overall dissatisfaction with UNIDO performance voiced by the ministerial counterparts in Indonesia. - communication streams almost never include all three parties (KN, RISTEK, UNIDO) after initial period. A lack of communication between the village/district, the national government and PdA led to the situation where the platform was ready but no electric infrastructure was available. This in turn led to disappointment and disengagement of the stakeholders.

[2]During the fact finding mission of the evaluation team to Indonesia, this company was in the process of structuring its management and business processes, and was not able to give binding commitments.

	(vi) Project coordination and management	Assessment	Supporting argumentation / evidence
			- an email exchange with obvious misunderstandings between the field office and the HQs in recent times led to the complete stop of project implementation. Together, these factors were co-responsible for long periods of stagnation.
	(b) The UNIDO management, coordination, quality control and technical inputs have been efficient and effective.	Not really.	- UNIDO HQs management seems not to have devoted significant attention to this project, in particular when the program manager was on a different assignment. Their activities were mainly limited to discussions with PdA. - UNIDO field office management seemed to have lacked access to PdA. - There is a distinct difference in the level and type of activity of the field office between the tenures of different URs. - Technical as well as project management capabilities were not fully employed. Together, these factors were co-responsible for long periods of stagnation.
	(c) There was cooperation with other TC branches.	No evidence to that effect.	The project was transferred between branches. But during development, no energy experts were involved. Similarly, now, no technology transfer experts are involved. If that had been the case, potentially, the project design would have been much better.
	(d) Monitoring and reporting were carried out, based on indicators for outputs, outcomes and objectives and using that information for project steering and adaptive management.	No.	There are notes to the files from the field office at regular intervals. But there was no milestone planning, no monitoring framework and no indicators. However, as the project was stagnating for lengthy periods, more consistent monitoring would not have been delivering any new information, which limited the damage of this shortcoming.
	(e) Changes in planning documents during implementation have been approved and documented.	No.	No project document exists. The status of the original (regional) project document is unclear as it has not been signed. No project document for the national project has been written.

	(vi) Project coordination and management	Assessment	Supporting argumentation / evidence
	(f) Synergy benefits can be found in relation to other UNIDO activities in the country or elsewhere.	No.	The original multi-country project fell apart at an early stage. PdA has continued activities in the Philippines, but with little or no UNIDO involvement. No relation or synergies between this project and another project of the Indonesia country portfolio could be identified.

An omission was the lack of technical project expertise and coordination between the stakeholders' activities in the years 2008 through 2010. During this period, it would have been necessary to assess what infrastructural conditions were in place locally in Lombok and what needed to be added for installing the pilot plant, and then to take coordinating action with and between the various levels of government involved, so that the District, Provincial and national government can provide the appropriate technical infrastructure and logistics (e.g. grid connection, permits, power bank) in a timely fashion. This was already recognized by UNIDO in a mission of the UR and the National Project Officer to Lombok in 2008. The Back-to-the-Office report explicitly states for the records that the local government does not know what to do. Still, no action to endow the project with more technical competence was taken.

This highlights the second significant problem of this project, which was the insufficient three-way communication between the private technology provider PdA/KN, the GoI and UNIDO. For long periods, there is only two-way communication taking place, either between PdA/KN and UNIDO (e.g. in the regular reports in the period 2009/2010) or between RISTEK and PdA/KN (in the early phases until 2011) or between GoI and UNIDO (in the later phases, since 2011). As there was no project document, no appropriate project governance structure or steering committee was in place. Coordination with the District and Provincial governments in Lombok is documented in the files almost exclusively in the context of mission reports, and no regular mechanisms for coordination with the local levels of government or the Village Energy Association is documented. This lack of inclusive communication led not only to misunderstandings in details. In fact, this lack of four-way coordination has resulted in a severe bottleneck in years 2009 and 2010, when government budgets were allocated but not spent on the infrastructure necessary for the project, and on the other hand, after 2010, the platform could not be installed due to a lack of infrastructure. If project coordination had taken place in regular communications, the governments could have been provided with the necessary technical knowledge, e.g. for putting out the tenders, on time. This lack of harmonizations of actions between the project stakeholders could have been avoided. As it did not take place, the scheduling difficulties ultimately led to the standstill of the project that can be observed currently.

In 2012, the project management responsibility within UNIDO Headquarters moved from the Technology Promotion Unit to the Agro-industrial unit and then to the Renewable and Rural Energy Unit. At the same time the UR in Indonesia changed. The responsible NPO has changed twice since. Additional resources were leveraged at UNIDO Headquarters, but no implementation progress was made, as further attempts to procure the barge and crane services failed. A striking incident led to a stop of project implementation, when the UR gave a recommendation to the Project Manager which was understood as a government decision. The immediate stop led to a stalemate of the project since January 2014 and triggered this evaluation.

5.7 Thematic and Energy-Related Questions

Apart from the project planning and coordination, major challenges of this project are related to the technical aspects. In this area, one major issue is the lack of feasibility studies. The second is the location decision. The attempt to reconcile rural electrification with technology development and provide electricity from non-tested technologies to rural remote communities is negating 20 years of failed attempts for rural electrification with immature renewable energy.[3] On the other hand, the formation and education of the village energy association seems to have worked quite well.

Secondly, a dire lack of attention to economic issues, in the feasibility and planning stage, as well as in the operational phase is found. To date, no assessment of the operations and maintenance (O&M) costs exists. Even if the pilot might be installed, this lack of understanding of the O&M costs can still develop into a significant challenge to the sustainability and impact of the project.

[3] For example, solar photovoltaic (PV) technology today is a mature and robust technology but rural electricity provision with PV attempts were plagued for a long time with reliability issues and insufficient product quality.

Table 8 Assessment on thematic and energy-related questions

	(vii) Thematic and energy-related questions	Assessment	Supporting argumentation / evidence
	(a) Has the selection of the renewable energy (RE) source and the technology been based on thorough needs assessments, including social, economic, technical and environmental aspects?	No, the choice of the technology was not taken on the basis of the needs of the local population.	-There is a global need to bring new renewable energy technologies to maturity. Such a facility was (and still is also the next step in the innovation process for the Kobold technology). - The village that was chosen for the demonstration facility was non-electrified and close to a place with a relatively strong current and relatively shallow water depth. - The project files mention a socio-economic survey to be done by RISTEK but its status and results are not documented in the files. - However, linking the challenges of a remote community with the challenges of a new technology has hampered progress on many occasions.
	(e) Has the entrepreneurial base and potential for industrial production been assessed?	Probably not,	There is no evidence to be found in the file. However, the choice of Walinusa Energy was not based on their experiences in maritime/ocean related field or their experience in manufacturing. The project relied on RISTEK for this assessment which was probably a valid strategy.
	(f) Have techno-economic feasibility studies been carried out and do they indicate the viability of the specific RE solution?	Probably not.	- The project files contain some "feasibility studies" of no more than 4 pages of length each. - PdA submitted to the files some statements on environmental and health safety. On environment these state that the environmental risks needed to be studied. - It is unknown if Walinusa and RISTEK conducted any feasibility studies of sufficient depth.
	(g') Were the criteria that were used in site selection describing all relevant aspects and matching the project objectives?	No, the criteria were incomplete and inappropriate.	According to PM E. Vento, the locational criteria were: the village / users' need for electricity; the water depth; the strength of the current; a lack of ship traffic and taifuns. The criteria should instead have included the proximity to infrastructure in terms of research as well as installation and maintenance. The village's need for electricity does not seem to be a useful criterion to the evaluators, as there is typically a contradiction with the proximity criterion and the Kobold will only be able to provide power a maximum of 8 hours each day so that reliable power supply is only possible with an expensive battery bank. Grid connection would have been (and still is) the more economical solution.

	(vii) Thematic and energy-related questions	Assessment	Supporting argumentation / evidence
	(h) Did the feasibility studies consider different possible business and ownership models of the established RE facility (who will own and manage the system: public or private energy facility, private investor, community? Who pays and how much for the energy? Who maintains the infrastructure? If subsidies are required, who pays? Etc.)	No, see (f)	The so-called feasibility studies are overall very cursory and superficial. None of them focuses on economic aspects, in particular not during the operation phase. In fact, during the course of the project the plans seem to switch back and forth as to whether or not the power from the Kobold would be fed into the grid or provide a village grid. Still, these considerations remain in the technical realm and are not concerned with ownership or management structures.
	(i) In the case of community based projects, is the community ownership of the project ensured?	Yes.	The local community has formed a village energy association called Cahaya Baru ("New Light") consisting of a total of 7 trained technicians. They are organized around a management team, including a treasurer. They are in charge of managing the existing village grid (solar, wind, Diesel hybrid). However, it seems that they would need further support for managing incomes and revenues as well as investment plans.
	(j) Are energy-related and other policies in place that will ensure the sustainability of the intervention or do existing strategies and plans pose a threat to sustainability (e.g. feed-in arrangements, expansion of national or regional grids, subsidies for RE, RE financing schemes etc.)?	National policies are in place but so far no legal / administrative provisions have been made to ensure that the Kobold can be connected to the grid.	cf. Chapter on national background
	(k') Have there been proper provisions for scientific and technical analysis for the assessments of the performance and improvement of the pilot facilities?	Not yet.	So far, no firm provisions have been made. A loose expression of interest of the University of Mataram exists but could not be confirmed until now.

	(vii) Thematic and energy-related questions	Assessment	Supporting argumentation / evidence
	(b) Can the project be replicated/have a multiplying effect?	Not yet.	As long as it is unclear whether the pilot plant performs well and how high the maintenance requirements (and costs) will be, the evaluation team is very skeptical as to the multiplication effect of the plant.
	c) To what degree did the project have other impacts that support the development of Ocean Technology in Indonesia?	Significantly.	The UNIDO project, even in the preliminary stage, had triggered the research and development of marine current technology in BPPT and MoMAF.
	(d) What is the prospect for technical, organizational and financial viability and sustainability of the project?	Unclear, see chapter on future steps.	Currently, the evaluation team is skeptical on all counts. The one point that is positive is that a new joint venture of Walinusa and KPM defines itself as the legal successor of the PT Kobold Nusa JV, and declared during the evaluation mission that they intend to exploit the license commercially.

5.8 Crosscutting Issues (gender, South/South cooperation)

No gender-specific aspects surfaced during the evaluation. The project seems gender-neutral.

Table 9 Assessment on Gender Issues

(viii) Gender	Assessment
(a) To what extent were gender aspects taken into account within the project?	No gender-specific aspects surfaced during the evaluation. The project seems gender-neutral.

5.9 Procurement

In this project, centralized and decentralized procurement processes have been applied. Table 10 contains the evaluation questions.

Table 10 Assessment of evaluation questions on procurement

(ix) Procurement issues	Assessment	Supporting argumentation / evidence
Was the procurement timely? How long the procurement process takes (e.g. by value, by category, by exception…)	Procurement processes generally took rather long.	From tender to contract signature: Tender for Kobold contract: September 2006 - November 2007 four contracts of 2011 (mooring blocks, scuba divers, barge and crane): TORs were established in October 2009; MODs were signed between May 5 and July 27; contract signature from then on took between 1 and three months.
Who was responsible for the customs clearance? UNIDO FO? UNDP? Government? Other?	Clearance: the private partner. The facilities were acquired from SETNEG upon request by UNIDO.	Letters from UR to SETNEG.
Was the customs clearance handled professionally and in a timely manner? How many days did it take?	Inconclusive due to incomplete documentation.	The main parts of Kobold were manufactured in Indonesia. Only small parts passed through customs (blades, generator, gearbox, hydraulic brake pump, inverter, and electric controller). There are complaints in the records by the private partner that getting things from customs took a month or more. However, the reason for that might have been that UNIDO was not always fully informed on the necessity of a facility.
How long time did it take to get approval from the government on import duty exemption?	Inconclusive due to incomplete documentation.	No data
Which were the main bottlenecks / issues in the procurement process?	For contracts / components procured by UNIDO: lack of funds long unexplained lag times.	At least one of the major bottlenecks was the lack of funds. In 2008, there were renegotiations so of the UNIDO-KN contract for the Kobold Turbine, as KN claimed that the steel prices had gone up to far so that the Kobold could not be manufactured at the predetermined price. In 2011, the contracts for barge and crane services failed for the same reasons. A second bottleneck seemed to be the processes within UNIDO. For both, centralized and decentralized procedures, long periods without activity are observed. Why these processes take so long could not be found out by the evaluators.

(ix) Procurement issues	Assessment	Supporting argumentation / evidence
To what extent roles and responsibilities of the different stakeholders in the different procurement stages are established, adequate and clear?	Inadequate planning led to redefinition of roles.	Generally it seems that once the procurement stages were reached, these roles seemed to have been clear. However, the timing of the delivery of the services had not been well planned. In addition, throughout the project there were permanent redefinitions of who should be responsible for procuring which part (e.g. of the local infrastructure). The basic reason for that is the lack of a project document and overall project plan.
To what extent there is an adequate segregation of duties across the procurement process and between the different roles and stakeholders?	No assessment possible.	Within UNIDO, contracts over a certain amount are procured by the central procurement unit. This was the case for the turbine contract and the last barge/crane tender. Smaller contracts are procured by project management or field office. This is not very straightforward, and in both cases, procurement was slow or failed. In addition, no records of the decentralized procurement were handed to the evaluation which points to a low degree of transparency in particular for the decentralized procedures. Whether or not this allows for judgment of the adequacy of the segregation of tasks cannot be generalized by the evaluation team.

Procurement has been challenging on several ends in this project. The stalemate in the project implementation is originally caused by a lack of coordination of the schedules between the manufacturing of the turbine and its components on one side and the on shore infrastructure on the other side. Significant challenges in this respect were the budgeting cycles and the coordination between the various levels of government in Indonesia. The local government levels did not have sufficient technical capacity to provide tenders for technical equipment. As no help was given to them, by August 2009 it was too late to conduct these tenders during the current budget year, and the components could not be procured as envisioned. Where possible, RISTEK filled the gaps but could only do so in the next budget cycle. This led to delays.

On the other hand, a number of attempts to procure services have failed. The barge and crane contracts play a particularly unlucky role in that respect. One of the counterparts (the owner of PT Ralemar Cargo and PT Sekaya Nekita Waya Lines) has not delivered according to his contract. However, these two contracts were so crucial that they led to stagnation of the project since 2011 and to significant damage of the reputation of UNIDO. The information that was made available to the evaluators is contained in Annexes D through F.

6. Findings, recommendations and lessons learned

6.1 Findings

Certainly, a technically challenging project like this can only be successful, if good practice in project planning and execution is adhered to. This project is not an example for such a practice. In addition, there were other challenges, including ineffective communication and coordination, as well as an informal introduction of an additional objective of rural electrification. The following findings can be put forward:

6.1.1 A small number of crucial decisions and omissions have made this project more difficult than necessary and appropriate

Piloting a new technology is a challenging endeavor, but there are three very distinct decisions that have made this project particularly difficult:

- The decision to combine the technology development objective with the rural electrification objective;
- The omission of national project document with separate logframe, bottom-up budget and milestone planning; and
- the omission of determined and strict project management including due communication between private sector, UNIDO and the three levels of government involved.

The site of the installation was chosen not only on the basis of the characteristics of the marine currents but also on the basis of the perceived needs of the local population. Many of the delays since 2010 were related to the choice of site. This starts with the difficulties of bringing the platform to the harbor,[4] continues with the stalling due to a lack of shore-side infrastructure for power connection, and persists until today with the difficulties in finding and contracting a crane and barge service. The decision to use an untested technology — for rural energy supply added complexity in the installation process and will keep adding complexity during operation and further technology development. The neglect to establish an implementation plan and design and agree on a logframe with a bottom-up budget, clear (financial and operational) responsibilities based on a thorough stakeholder discussion has led to project management challenges like

[4] For bringing the platform to the site, it was necessary to cut it in three pieces and transport them by truck across the islands of Java, Bali and Lombok, and weld it back together there.

asynchronicities between different stakeholders' actions, budget shortfalls but ultimately, to the failure to complete the project within 10 years.

The failure to consistently manage stakeholder discussions and actions has had two consequences. On one hand, it has allowed the different strands and locations of activity (Pringgabaya, Jakarta, Italy and Vienna) to develop (or stagnate) at their own speed instead of harmonizing and coordinating the actions. The project timing fell apart, worsening all the challenges that come along with not having a well-planned foundation for the project. If that coordination had taken place, there would have been a chance to have the local infrastructure already in 2010, and maybe the project would have been able to keep up its momentum and be completed in 2011.

With the divergence in the implementation speed, UNIDO's role as a coordinator was diminished further. The passive role adopted by UNIDO does not match its responsibility as the owner of the project and exposes it to significant criticism from all sides.

6.1.2 Even if it seemed that the private and government partners were taking control of the project and this led UNIDO to take a step back from project management, UNIDO had a clear responsibility

Over a long period of the project, planning and supervision was left to the private partner and partially to the GoI's research ministry RISTEK. This seemed to work well. As the private partner in Italy was very interested in driving the project, significant financial and other resources were invested. However, the distance to Indonesia and the project site made it ultimately impossible to keep up the interest. In addition, the technology developer PdA was dissolved by the owning family in 2013.

At the point, when things did not work out so well anymore, UNIDO was not in a position anymore to take over and manage the project in a way that brought it back on course, as it had given up the coordination function at this point. The loss of trust with RISTEK at this point was so strong that they were not willing to endorse the GEF project anymore. The fact that UNIDO then turned to the energy ministry for that endorsement has been criticized for further damaging the relationship.

6.1.3 The project has piqued interest in marine current turbine technology in Indonesia

Today, economically competitive renewable energy solutions exist. But as their suitability, economic viability and local impact of renewable energy solutions are diverse and depend on local circumstances, there is a need for additional technical solutions. Ocean energy has been looked at for a long time as a natural resource but so far no viable solutions exist. Countries like Indonesia are well placed to play a leadership role in these technologies.

In the domestic discourse on this topic, the project has served as a trigger for several ministries and institutions to start their own explorations in the topic. Many of the developments described in section **Error! Reference source not found.** can be traced back to the Kobold project explicitly or implicitly.

6.1.4 Government voices unequivocal support for completion of the project

In all discussions with GoI stakeholders it was emphasized that the GoI wishes to see this project completed. This evaluation's TOR described the internal view of UNIDO for the further development of the project in three options (cf. Box 1).

Box 1: Description of possible ways forwad from the TOR of the evaluation:

"However, in December 2013, the Indonesian UR met with MOFA representatives. During this meeting, the following three options were proposed as possible exit strategies under the project (see "Points of Discussion" of meeting of 1 December 2013, attached to the email dated 24 January 2014 of UR Ms. Hajarabi, contained under Key Documents as listed in Annex V):

(1) "Option 1: GOI and UNIDO continue to implement the project. This option has a big risk for failure given the facts that the project facility is very old with damages already occurred due to unattended facilities for a long period of time (more than 5 years)."

(2) "Option 2: To hand over the project to GOI [Government of Indonesia]. GOI will facilitate the implementation. This means to close the project at its current stage, uncompleted, and do hand over to GOI."

(3) "Option 3: To change plan of the project. To complete the project implementation with available funds and use the research result of the first phase of this project and develop a new project document to implement the project taking into consideration the current developments."

Confronted with these options, the GoI representatives consistently denied that any other option apart from option 1 would be legally possibly within the Indonesian frameworks as the only option for hand-over and assetization of the power plant would be after its completion. According the Indonesian government law, it cannot accept goods from grant etc. that are: a. incomplete, b. not well functioning or c. not well documented.[5]

These three options had been formulated in the minutes of the meeting of December 18, 2013 that were transmitted to Headquarters by the UR in January 2014, with the remark that no "cleared / signed minutes" were intended by the MoFA, and that "there was no

[5] http://otda.kemendagri.go.id/otdaiii/pmk.pdf, especially BAB V (section V) pasal 15.

intention for decision making" at this meeting. "It was rather to exchange info and knowledge on the status of this project to facilitate UNIDO decision and direction on this project. In contrast to the previous understanding, thus, these three options have not been formulated by the GoI. According to GoI statements expressed in conversation with the evaluation team as well as the evaluation's team own interpretation of the Ministerial Regulation quoted above, the only legally conforming option is the finalization of the project through UNIDO.[6]

6.1.5 Many technical and financial and legal aspects are still unclear. This is not only true for the installation but also for the period of operations, maintenance and adaptation to Indonesia

With the grant, UNIDO has taken on the responsibility for installing a Kobold power plant prototype in South East Asia. To that end, it has contracted the PT Kobold Nusa Joint Venture (KN) to install this. The plan was to hand it over to the GoI after the installation. KN has been compensated according to the implementation progress. In February 2013, the Bank Warranty provided by PdA in April 2009 has been released by UNIDO when KN confirmed that they will not request UNIDO for further payment of the outstanding balance but remain committed to the project.

While the GoI has voiced support for installing and commissioning the turbine, there is still significant uncertainty regarding the actual process of the installation as well as the associated costs. While a written description of the process exists, it is not clear to the evaluation team that it is complete in that all necessary steps are fully considered. It does not fully describe what physical resources (cranes, trailers, divers, tug boats etc.) and services are necessary. So far, there are also no estimates possible at what costs these services could be procured. Lastly, it is not clear who should be supervising the installation process, and who should be responsible for possible errors or damages on the Kobold or third parties during the installation.

The same is true for the operation and maintenance period. Until today it has not been clarified what resources are necessary for daily operations, and whether for example, regular maintenance work is to be done and which spare parts are needed. Boats in Indonesia need to be towed to dry dock every two years for antifouling treatment. It is unclear whether this rule also applies to the Kobold platform, but if it does it will have significant cost implications. Power evacuation is unclear – the power house on the coast seems to be connected to the grid but no connection agreement seems to be negotiated with PLN. It is also unclear whose responsibility this should be. RISTEK has agreed to provide all permits.

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[6] If the power plant cannot be installed and handed over, a termination of the project that includes the removal of the components would probably be also accepted although that has not been expressed towards the evaluation team.

The Kobold turbine is a prototype, and its purpose is to adapt the technology to Indonesian circumstances, rather than to produce power. This would require that somebody has an interest as well as the technical capability and financial means to do technical monitoring of the operation, and apply improvements where possible. Typically, this would be an energy technology company like KN, which has originally been founded for this purpose of adapting the Kobold to Indonesia and replicating it in the country. An agreement regarding the Intellectual Property Rights (IPRs) between the KN Joint Venture and PdA, the patent holder has been concluded. At this point, it is unclear (but likely) that KN is still a recognized license holder of the Kobold patent. It is further unclear if KN an interest in the commercial exploitation of the license. KN representatives have confirmed to the project team that they are committed to completing the project but as the company was in the process of reestablishment during the time of the evaluation, they were not able to express this in writing.

6.2 Recommendations for the further project implementation

6.2.1 Project Management should clarify legal status of the license and the prototype

a) Legal status of the license

As the emails from the evaluation team to the former president of PdA remained unanswered, the legal status of the project could also not be fully clarified during the evaluation. It was confirmed to the evaluation team by the legal successor of PdA through the Project Management that the current national company PT Kobold Nusa, co-owned by Walinusa and PKM, two Indonesian energy companies, is considered the legal successor of the Kobold Nusa Joint Venture company. The following legal questions remain open and require confirmation:

- Does the termination of the contract between UNIDO and KN mean that the current project components need to be considered UNIDO's property?

The evaluation team (and the GoI) assume that it is. In that case, UNIDO will be responsible for the clean-up. If not, there might be an option of holding KN responsible for completing the project.

- Is the current PT Kobold Nusa company to be considered the legal successor in terms of the licensing agreement?

b) Again, the evaluation team and the parent companies of KN, PKM and Walinusa, assume that it is but the request to the current patent holder has not been received. Before UNIDO moves on any of the further steps, this issue needs to be

resolved, as the main beneficiary of the Kobold turbine prototype and the consequent development of the technology is the license holder.[7]Legal operating conditions of the prototype

In addition, there are significant uncertainties as to the legal operating conditions of the prototype. These should be clarified in cooperation with the GoI counterpart RISTEK. Among them are:

- What regulation with respect to repainting does the prototype need to comply with? Are any exceptions possible? If exceptions need to be made, what are the implications for repeater projects / dissemination of the technology?
- What regulations with respect to zoning and ship traffic apply to the Pringgabaya location? Are any exceptions possible? If exceptions need to be made, what are the implications for repeater projects / dissemination of the technology?
- Is an interconnection agreement with PLN in place? Is a power purchase agreement with PLN in place? What revenues can be expected? Who will be the recipient of these revenues?

On the basis of the answers to these questions, project management needs to provide a financial sustainability assessment of the prototype. If the prototype will not be able to cover its operations and maintenance costs through the power sales, an additional sustainable source of financing needs to be identified.

6.2.2 Project Management should clarify commitment of (Indonesian) license holder to develop the technology and disseminate in Indonesia. Terminate project if not committed.

The promotion of this technology in Indonesia will mainly benefit the license holder of the technology. If the Company does not intend to exploit this license commercially, i.e. adapt the technology to the Indonesian situation, and make it commercially available, but will hold on to the license, any other party that would like to produce and sell technology based on the Kobold patents would have to pay license fees to it. It is unlikely under the current circumstances that this type of exploitation will take place. Therefore, the project should only be implemented if the Company is committed to making the Kobold a commercial success in Indonesia.

If this is the case, the Company will have a strong interest in making the prototype operational. It will also have interest in gaining the experience of installing the turbine. None of the further implementation steps should be taken without their strong involvement. A sustainability strategy for the operation of the prototype should be put in an MoU between UNIDO and the Company.

[7] And, depending on how the license agreement is interpreted, also the patent holder.

If the Company is not interested in promoting the technology further in Indonesia, the project should be dismantled in cooperation with a local (research) entity that is actively involved in promoting marine current turbine technology. Due to patent laws, none of them will be able to build on the Kobold patent, but they should be able to advise on potential further uses of some of the components. The remaining project funds should be devoted to removing the project's remainders, and then to fund further research on (Indonesian-borne) marine current turbine technology development.

6.2.3 Project Management should conduct detailed feasibility studies and clarify applicable regulations for operation. (in case project continues)

If the Company is still interested in the promotion of the Kobold technology in Indonesia, UNIDO should strive to support it to the extent possible. The evaluation team recommends at this stage to have an independent expert assess the (physical) situations in Labuhan Haji port and Pringgabaya and amend the existing installation protocol as needed. Annex G, sections 1 through 4, list the recommended steps and the estimated costs. They are around 50.000 USD, and include a review of the existing installation manual, as well as an inventory of the components and parts that already exist in Labuhan Haji and Pringgabaya. It is very important to survey the environments and infrastructures in both locations. The beach, the harbor, the water depth of the pathway for launching and towing the platform, the calm water area with minimum 10 m water depth to install the turbine components, supporting facilities, etc. have to be identified carefully. Less than excellent knowledge on these aspects will lead to unnecessary interruptions during installation and create additional costs. The study should give a recommendation whether the mooring blocks should be transported directly from Labuhan Haji to the installation location by boat or transported by truck to Pringgabaya first and then by boat to the installation location. The estimated cost for this feasibility study is at least 35,000 € (low estimate). The output of the study covers the detailed SOP ("Standard Operating Procedure"), a detailed schedule, detailed and total costs for the installation, and individual tests of each component to check their performance after more than 2 years not being used, especially the performance of the electrical components.

The outcome of this assessment could be that the installation at this location is impossible. At this point, the project stakeholders – KN, GoI and UNIDO, jointly and based on expert advice – should decide between two options: 1. to find a different location for the Kobold II and how to move the platform there, or 2. dismantle the project.

6.2.4 Project Management should establish costs estimate, new budget and new project document that includes sustainability strategy

Recommendation 6.2.3 will result in a clear installation plan ("Standard Operating Procedure"). At this point, a reassessment of the budget will be necessary. Together with KN, UNIDO should compile a new budget based on the various quotes that have been submitted for the various services necessary for the installation. The evaluation team estimates that without the barge and crane services, the costs of installing and commissioning the turbine would be at least 150,000 USD. The feasibility study for the two sites is estimated at around 50,000 USD. In addition, quotes for the barge-and-crane services have spread widely, between between 80,000 USD and more than 500,000 USD, with the international tenders coming in at more than 500,000 USD. Additionally, further supporting services might be required for the installation process, like scuba divers, trailers, cranes etc.. Overall, thus, the evaluation team estimates that this budget will not be under 850,000 USD. This budget should be discussed between the three stakeholders, and if the funds can be raised, a new project document should be drawn up and signed by all parties. This document should include a detailed sustainability strategy for the Kobold II prototype as well as a written statement of KN that confirms their commitment to the commercialization of the Kobold. The sustainability strategy needs to comply to the sustainability assessment of the prototype, developed by project management according to recommendation 6.2.1. If the prototype will not be able to cover its operations and maintenance costs through the power sales, financing from an additional sustainable source of financing needs to be confirmed and included in the project document.

6.2.5 Project Management should hire a turnkey contractor for the installation and commissioning process (in case project continues)

The installation is highly technologically and logistically challenging. UNIDO does not have the technical capacity to supervise the installation process. In addition, even if UNIDO staff would be technically capable to supervise the installation process, potential liability implications in several dimensions are rather difficult and impractical to solve. An engineering company should be hired in a turnkey contract that includes the management of the installation process with the necessary technical competence and all technical risks of the installation.

It is important to point out in that respect that the company PT KPM is already active in the energy business, including as an EPC[8] contractor. This means that the company has access to the necessary engineering skills to manage that process. The recommended contractual setup is that UNIDO contracts Kobold Nusa or KPM as the liable installer for the Kobold turbine. This would limit UNIDO's risk exposure, and enhance KN's operational experience.

[8] Engineer, Procure, Construct

After a successful installation, the next step is the commissioning and test of the functionality of the system, after all components have been integrated. A period of 1 month of operation should be allowed for that. The last step is installing the underwater cable and connecting it to the power house.

6.3 Recommendations beyond this project for UNIDO

6.3.1 Improved document and knowledge management

As a general recommendation for UNIDO as an Organization, stronger quality and better records management would help avoid situations like this one in question. UNIDO Management has assured the evaluation team that significant steps have been taken already to improve project approval and quality at entry.

Project management as implemented at UNIDO requires a high degree of coordination and communication. The enforcement of record keeping standards and the availability of the associated infrastructure would help improve transparency for all internal stakeholders to a project. Currently, neither the factual information nor the legal information can be found at any one place, and financial records of projects that are older than 2012 cannot be obtained easily. In the age of modern telecommunication, an automated knowledge management system should be able to provide access to all relevant project information in a matter of minutes.

6.3.2 Define whether or not a potential role as a promoter of new technologies conforms with the organizational mandate

UNIDO is one of the few International Organizations that avails of significant technical and management skills, and is mandated to put these to work in industrial development. This would put it into a good position for promoting new technologies. UNIDO could offer to countries international networks for technology development, international market aggregation for new technologies as well as support for national technology introduction and innovation programs. Potentially, good practices already exist in the Energy and Climate Change (ECC) Branch and also other branches of the Organization. So far, the only other Organization that is active in international technology-specific networking is IEA with its Implementing Agreements. IRENA has not yet built up this kind of skill set. IAEA might have comparable modalities and could serve as a role model in this respect. This is a real gap in the landscape of international organizations.

From an outsider’s perspective, therefore, UNIDO could well be considered an agency that helps countries adapt and adopt new technologies. Whether or not UNIDO would like

to take on this role is a strategic decision. If it will, there is scope to further enhance the competences and capacities with UNIDO on these issues.

6.4 Lessons learned

The findings and recommendations serve for the formulation of a number of lessons learned.

6.4.1 For projects in general

Project objectives should be kept simple. Either technological challenges or rural electrification challenges should be solved, not both. The focus on that objective should be maintained throughout the project.

Sustainability and exit strategies need to be supported not only by capacity building but also by sound financial plans.

6.4.2 For projects with innovative technologies

Projects for new technologies require much more planning and potentially also more supervision than other projects as well as special rewards for the stakeholders. The complexity that arises from the “newness” of the technology is caused – among other things – by the fact that all partners need to constantly learn and adapt to new findings. This constant challenge for all stakeholders that are actively involved needs to be acknowledged and requires a specific type of motivation and incentive for stakeholders to stay engaged. Potentially, the linkage with the rural community was actually meant to be part of that incentive – a special reward of rural upliftment. However, other stakeholders might have been equally involved, in particular those that have a self-motivated interest, e.g. because of their own research agenda.

Projects with new technologies need more supervision and are riskier than “repeater projects”. In addition, new technologies require learning which can only be achieved through trial and error. This means that errors are to be expected. Error tolerance needs to be exhibited by all stakeholders. These errors will have costs associated to them, but these costs should be converted into joint learning experiences, when these errors can be openly discussed and joint learning ensues. Willingness to learn should be exhibited by all parties. If necessary, appropriate outside moderators or coaches can be considered.

This means that projects with new technologies will be more expensive (for example per kW installed or per kWh produced) than research projects, for all partners involved. It is very unusual that a private company keeps up a loss-making endeavor for such a long time in the first place. Also, RISTEK was willing and able to put in resources for a long period of time.

Infrastructure-availability risks and continued support in the context of a research infrastructure need to be assessed and avoided in research-oriented projects. Where a country-driven technology development initiative is to be implemented by UNIDO, an assessment of the available infrastructure should be done before developing the project.

Infrastructure that needs to be built up for the technology project can be budgeted and planned within the project framework. If the infrastructure does not exist, and cannot be built within the project's logframe, the project should not be approved.

Annex A: Project history

Project preparation

2004

A project document for a preparatory phase for a regional program on Marine Current Exploitation in China, Philippines and Indonesia is signed on 10/03/04 by Mr Rwendeire, then Managing Director of UNIDO, but not by counterparts. Its objectives are to promote and establish an operational partnership with the above mentioned institutions and the University of Naples, Italy in order to transfer, adapt and apply the Kobold turbine for the energy needs of the coastal population in the region, and to "start to prepare a full-fledged project for launching the use and application of the Kobold turbine in large scale through the support of GEF and other potential international donors". The estimated costs of the preparatory phase are USD 240,000.

Various meetings and conferences in the region and Italy took place, including the International Conference in Messina Italy (21 – 22 June 2005) with a visit to the Kobold I turbine.

The Project document and design

During the preparatory phase a project document for a regional program on Marine Current Exploitation was developed. The version that was located in the files bears no signatures. Unlike for the preparatory phase, no formal logframe exists to the knowledge of the evaluators. The regional project assumes that China and focuses on the Guangdong Institute for Energy Conversion as the scientific partner. The project's objectives are formulated as

- "*To promote and establish an operational partnership with the Guangzhou Institute of Energy Conversion of the Chinese Academy of Science and the University of Naples and Ponte di Archimede SpA, Italy in order to transfer, adapt and apply the Kobold turbine for energy production.*
- *To develop, produce locally and test in the Zhoushan Archipelagos, China and a site in the Philippines, tow pilot applications of the Kobold turbine, in order to adapt and customise the proposed technology to the local conditions.*
- *To finalize a full-fledged project for launching the use and application of the Kobold turbine in large scale through the support of GEF and other international donors."*

One of the expected results at the end of the project is "*Local manufacturing and setting in places of a pilot Kobold turbine in China. The pilot plant is intended to test and prove the efficiency and the viability of exploiting MC in China and other countries in the Asian region*." In the project summary (p. 14), under output 2.1.2, two pilot plants are expected to be installed in this project.

The project is expected to be completed within 18 months. The estimated costs are 700,000 €, of which 57,522€ are support costs. 442,478 € are contributed from UNIDO in cash, and 200,000 € are expected as in-kind contribution from the project partners.

The project activities of PdA began with the search for a Joint Venture (JV) partner. In Indonesia, the Joint Venture partner PT Walinusa was proposed by RISTEK and a JV contract for the JV PT Kobold Nusa was signed in December 2006.

Contracting phase

Central UNIDO procurement in Vienna put out RFP (No. 16001183/AO) on 26 September 2006, containing detailed TOR "for contractual services to; design, build and commission a pilot demonstration plant for production of electricity from exploitation of marine current in Indonesia" including among other things technical specifications, and requirements for technical training of staff.

In its offer that is sent in as a response to the RFP by the newly formed PT Kobold Nusa specifies that the "*indicated site of Selayar Island is not the correct location where the prototype will be installed*", and that RISTEK has suggested to locate the turbine close to Lombok "where the current seems to be stronger". The contract obliges KN to build the Kobold according to the TORs. It specifies that the power plant should be operated by KN for an initial period of three months. It also includes clauses regarding potential delays and a penalty for delayed delivery of 0.25% per week. The value of the contract is 180,000 Euros, to be paid in five tranches upon completion of work steps that are described in detail in the contract (section 5.05).

The signatures on the contract between UNIDO and KN bear the date of Sept 25 2007 for the UNIDO Procurement unit in Vienna and November 14 for the Indonesian counterpart represented by its President Lorenzo Matacena. This means that the evaluation of the offer (submitted to UNIDO in December 2006) and negotiation of contract took 9 months, and the counterpart signature another 2 months.

Key decisions on location and people in 2007

RISTEK) proposed specialists for training and project development and mentions that BPPT "have made survey and recommend us to place KOBOLD in Alas Strait (between east of Lombok Island and West of Sumbawa Island (…)).In 2007, Mr Yohanes Ampuh Trapsilo was trained for one month in Messina at the Kobold 1 facility.

2008

The state of the project on Oct 20, 2008, one year after contract conclusion, summarized in a BTO and note to the file by the country office:

- Some activities have taken place, for example a seminar in Messina, Italy from 2 to 5 July 2008 and a project manager, Mr Nurwasis Masduki had been recruited.
- The contractor has calculated that due to "price escalation" the original contract amount of USD 235,840 is insufficient to cover the costs to the contractor which are now estimated to be USD 903,262.
- The BTO assesses the government contributions in 2008 by RISTEK to the tune 1,388,000,000 IDR (USD 154,223) for a survey, community development and

"coordination line items". It reports that RISTEK will allocate another 1,365,000,000 (USD 151,667) in FY2009.

- The Provincial Government of West Nusa Tenggara has allocated counterpart funds of 800,000,000 IDR (USD 89,000) for FY 2008, to be used for the bank storage building and distribution lines to 200 houses as well as seminars and meetings and monitoring. Of that, USD 21,000 had been spent by the time of the mission and the rest needed to be spent by the end of the year.
- The Regency / District Government has also allocated counterpart funds of 800,000,000 IDR (USD 89,000) for FY 2008, supposed to be used for 4 mooring blocks of 55t each, construction of a project office in the site, meetings, seminars and monitoring. Up to the mission, the Regency had spent USD 16,000. These funds would have to be spent by the end of 2009.
- In the discussion with the Regency, the cost of the floating crane was assessed to be 2 bn IDR (USD 223,000). "It was agreed that PT Kobold Nusa and the provincial and district governments will find the solution for this matter."

The fact sheet associated to the BTO states explicitly that there were no significant project activities under implementation at the point of writing, even as further budget was available to be spent during the remainder of the year. It states a general feeling that the project counterparts "do not seem to know how they should go about in project implementation." Already at that point "it was felt that UNIDO's reputation and good will is as at stake. The mission felt very strongly and recommends that way forward needs to be determined soon before further damage is done to UNIDO's image."

At a follow-up meeting with RISTEK on Oct 24 2008, a lack of communication between RISTEK and Kobold Nusa was discussed. The memo states that "it was mentioned that the Minister of RISTEK strongly conveyed that the construction / manufacturing and installation of the floating platform and the turbine should be completed in 2008. However, Kobold Nusa is unable to do this unless additional funds are made available." The BTO resolved that UNIDO HQ should be requested "their support in providing additional fund of US$667,442 in order to make the project running as soon as possible".

2009

UNIDO concluded the Implementation Agreement with RISTEK for the project on Feb 3, 2009. This document spells out responsibilities of RISTEK and UNIDO. UNIDO's responsibilities comprise the funding of "the estimated costs for the full implementation of this project is €280.000 (EURO one hundred and eighty thousand);" the monitoring of the progress and implementation of the project and to "hand over the prototype and technical documentation of the project to the government of Indonesia represented by RISTEK". RISTEK's commitments comprise coordination, surveys for site identification and assistance in permitting processes, but no funding. The Implementation Agreement is signed by the UR Imran Farooque and by Hary Purwanto, Assistant Deputy for Priority and Strategic Research of RISTEK.

On June 5 the PIF for the MARCEE project under GEF-4 is sent to RISTEK and UNIDO Jakarta suggesting RISTEK to contact the MEMR to discuss the project.

In 2009, Javasea was contracted to weld the platform. Regular mission reports by Helena Erikson of PdA document the progress and various meetings with the government. On August 10, the UNIDO country office sends a request for duty free importation of some Kobold components to Dr. Rahardjo, the Deputy Minister at RISTEK. "*The materials sent from Italy arrived on the 20th of December 2009 but even though all custom papers had been prepared and were in order it was not possible to get the materials out from the customs until the 23rd of January 2010. Hence the work for the turbine was delayed 1 month due to the Indonesian custom procedure. RISTEK and the Lombok local government still have to start the tendering process for the submarine cable and moorings*."[9]

2010

The Kobold platform was completed and transported to Lombok in three pieces by truck. In March, "*RISTEK started a tendering process for the submarine cable, with a larger allocated budget*."[10] The turbine is being manufactured at the workshop while the platform is sitting in three pieces in the harbor of Labuhan Haji, painted with a preliminary coating. A large meeting is held in May between KN (5 participants), various Indonesian Ministries, other officials, but without UNIDO. Thombi Layukallo is hired to become project coordinator. According to his own statements, he had this position for only three months.

May 5: Note for the File by UNIDO Country Office on discussions on the GEF MARCEE PIF, which has not been endorsed by RISTEK. "*It was agreed that the PIF will be submitted in July 2010 for endorsement to be funded under GEF-5.*"

Discussions between UNIDO, RISTEK and PdA state that the "*pilot project in Lombok is progressing well. (…) It is expected that the project will be completed in September 2010 (…), reasons why the PIF has not been submitted to the GEF Focal Point for endorsement have been discussed. It was agreed that the PIF will be revised and be submitted to GEF Focal Point for endorsement under GEF V in July 2010. Ponte di Archimede will revise the PIF and sent it to UNIDO and RISTEK for further submission to GEF Secretariat."*[11]

In July Alberto Moroso, the senior naval engineer, travels to Indonesia. In discussion with the Regency he found out that a budget for USD 45,000 for the mooring blocks and USD 50,000 for the power storage bank had been allocated. He mentions that there was no budget for transporting the blocks to Pringgabaya and installing them. He also notes that there is no budget for the transport of the platform to Pringgabaya. There are

[9] From Progress Report PdA

[10] From Progress Report PdA

[11] Note to the file by UNIDO country office May 5

disagreements between the Local government and Moroso on whether to implemented decentralized storage on every house or central storage point with batteries, in order to better facilitate a later expansion (KN preference). In discussion with RISTEK later in the mission, he raises this point and agrees with RISTEK that KN in September should send the specifications for a "*lower rated installation including current European prices for single pieces of equipment, in order to fit the Lombok Local Government's budget, just to have the turbine operating in the shortest possible time even if it implies a lower automation and some more periods in which the turbine must be stopped for plant safety reasons*." RISTEK did not have budget in 2010 but would prepare a tender for 2011 for the "*mooring lines components (chains, ropes, etc)*." Moroso highlighted to RISTEK that the platform should only be installed once the mooring lines and submarine cables are completed, "*in order to avoid as much as possible, any problem due to a long non-working stay at sea.*" On the other hand, he also notes that the best procedure for the launch of the platform and the installation of the turbine underwater is still being studied between KN and Javasea.[12]

The PdA report of August 2010 states that "*P.T. Kobold Nusa is ready to launch the plant as soon as the mooring system is in place. The time of installation depends on when RISTEK Lombok local government will allocate the money for their part of the Kobold project. P.T. Kobold Nusa has involved the UNIDO project manager and are working on persuading the local and central government to complete their part in 2010.*"

August 10: Note for the File by UNIDO Country Office on discussions on the GEF MARCEE PIF with the GEF Focal point and RISTEK expresses the concern that "*RISTEK did not clearly state whether they are still interested in the project, but mentioned that the Agency of Marine and Fishery Research within the Ministry of Marine Affairs and Fisheries (MMAF) is also interested in the subject project.*" Several suggestions to the UNIDO PM at HQ are formulated, including the suggestion that the counterpart for the MARCEE project should be the MEMR which was found more supportive.

August 23: Note for the File by UNIDO Country Office on meeting with Kobold Nusa's Ampuh Trapsiloh on the state of the pilot project discusses the budgetary allocations of the different ministries (contradicting the representation of Mr Moroso), and the various tenders that have been placed. According to this description, the District government did not tender the mooring blocks as they were not sure who would install them and their budget would not have been sufficient for procurement and installation. RISTEK has completed the tender and appointed the winner for the supply of the mooring lines and submarine cable. No funds are available for the under-water construction. The cost

[12] From today's perspective it is important to emphasize that at this point in time, the gearbox and generator were not at the site. A launch would therefore have led to an extended period of non-operation in the water which was to cause damages to the mechanical parts (shafts, bearings, etc) and the faired immersed parts (blades, bracings). It is unclear that the subsea cable would be necessary for launching the platform if the generator and the gearbox can be disconnected.

estimate for that is 135,000 USD at this point. The note concludes that the project will not be completed as envisioned in September of that year, and that the MARCEE will then also be difficult to justify. The note also mentions internal differences within Kobold Nusa.

September 3: Note for the File by UNIDO Country Office on meeting with MEMR, deciding that MEMR is willing to support the PIF even without the pilot plant completed. MEMR commits to organizing a coordination meeting with RISTEK, MoMAF and the national utility PLN and send a letter of request to UNIDO to enable UNIDO to proceed with project development.

September: The PdA progress report for this month describes RISTEK's efforts to allocate a budget for 2011. This now includes the power bank which previously was considered part of the responsibility of the local government. "*It appears that the provincial government is having difficulties allocating more than the initial estimated budget of Rp.800 million. That much budget was allocated back in 2008 but due to subsequent delays in the project, the Lombok people's assembly (sort of a local parliament) reduced the budget in the following years. Due to this trend, Ristek has taken the initiative to take over the budgetary responsibility for the power banks in fiscal year 2011*." This means a delay of the investments in the power bank, submarine cable and mooring block by one year. The report describes that L. Matacena informed the UNIDO Project Manager Emilio Vento in August about this, and that Dr. Vento expressed "*his strong concerns and discussions started with the project coordinator and RISTEK regarding the possibilities to complete the project in 2010.*" The September report ends with "P.T. Kobold Nusa have involved the UNIDO project manager and are working on persuading the local and central government to complete their part in 2010."

The next PdA report (also titled September) starts with an "*urgent meeting in early September between the coordinator* (NB at this point Thombi Layu Kallo) *and Mr Gunawan of Ristek to discuss the government budget*" at the RISTEK offices. It reads:

- "*Mr Gunawan would like to have all UNIDO concerns addressed to Ristek in an official way.*"
- "*Steps for extending the project in 2011 (…) were already going through the official procedures of proposing and defending the budget proposal. It was learned at this point that the Lombok local governments (both provincial and regional) have cancelled the Kobold budget for this year. They have re-allocated the budget for other programs, which could be completed this year. The budget for the kobold project will be proposed again for fiscal year 2011. This all information simply led to the conclusion that the launching of the Kobold power plant this year is impossible, unless some other party is willing to pay for the costs this year.*

"The above points were delivered and discussed with Emilio Vento and it was agreed that a trip to Indonesia was necessary to solve the budget issues. P.T. Kobold Nusa agreed with Emilio Vento to leave as soon as he could find some time for the trip. (..) It is of utmost importance to arrange for a mission to Jakarta together with the UNIDO project manager Emilio Vento, without this the project most likely will not be completed in 2010."

In October, PdA Technical Manager Helena Erikson, reports from her trip to Jakarta. She meets with RISTEK and finds that RISTEK and UNIDO do not have close coordination regarding the GEF project. Her understanding is that UNIDO "*has changed the partners involved without discussing with the involved partners (RISTEK, Ministry of Marine Affairs and Fisheries, Bluewater, Ponte di Archimede).*" In another discussion during the meeting she notes that RISTEK "*said that this 'UNIDO project' lacks UNIDO involvement*". The report concludes with a statement of urgent need for a mission by E.Vento and A. Moroso to Jakarta on 15-16th November 2010.

This trip to Jakarta by A. Moroso (PdA) and E.Vento (UNIDO) in November 2010 did not take place. A note from the Country Office of November 15 reports from a meeting between G. Wybiesana (RISTEK), Johannes Verhelst (UNIDO Country office) and Thombi Layu Kallo (Java Sea Transnautic) on November 12, which included clearance of generator and gearbox from the customs warehouse (at the cost of PT Kobold Nusa / PdA of 5500 USD). For the first time in the files the four services needed for installation are mentioned as procurement task of UNIDO. These are "*It was noted that the following services will be procured locally by UNIDO Jakarta at total cost of €80,000 (approximately): (i) Towing of platform and installation works, (ii) Manufacturing of mooring blocks, (iii) Crane operations, and (iv) Submarine and installation works. It was also understood that these funds have to be spent before 31 December 2010. However, during the meeting it was found out that the towing service and the manufacturing of mooring blocks (items 1 and 2 above) will cost more than €20,000 each. In this regard, it was also concluded that the above mentioned four project activities cannot be completed by 31 December 2010. A detailed work-plan will have to be prepared considering the necessary administrative processed involved and to ensure proper coordination of the related activities.*

"4. Mission of Mr Alberto Moroso to Indonesia. It was indicated that Mr Alberto Moroso of Ponte di Archimede, Italy, is planning to come to Indonesia during the third week of November 2010 to meet with the suppliers of services above in order to clarify all the technical details of the installation works mentioned in point 3 above. However, given the above mentioned situation, actual reality on the ground and for practical reasons it was decided that Mr. Moroso's mission be postponed until a more clear image appears of the planned four activities."

In August, MEMR agrees to support the MARCEE project.

The UNIDO Progress report for the year 2010 (written in January 2011) refers back to the **regional project**. It claims that the Indonesian component is completed to 85% while for the Chinese component, "20% of the expected actions foreseen" are completed. This alone points to confusion as to whether or not this is still a regional or a national project at this point.

In this report, the PM describes that in October he prepared the **terms of reference for four contracts** (including the construction of mooring blocks) that should support PdA/KN in installing the turbine. It is expected that the remaining work can be done in four

months. The overall funding required for these four contracts is estimated to be 80.000 Euro. The "*lack of funding from the local project counterpart in dealing with logistic services and supports expenditures for the installation of the prototype has been delaying the completion of the project beyond the expected timeframe envisaged one year ago.*"

2011

The first note to the file of 2011, documents the values of the four bids for the four different contracts. With the exception of the scuba diving, all are above 20,000 Euros, i.e. above the decentralized procurement levels. For these cases costs are split between UNIDO and PdA. The note also mentions a socio-economic survey?

In 2011, the responsibility at RISTEK moves from Mr Goenawan Wybiesana to Dr Hoetmatau Daulay

On February 14, 2011, the Ministry for Energy and Mineral Resources sends an endorsement letter to UNIDO for 6 GEF projects, including the MARCEE.

On February 15, 2011, Ponte die Archimede submits a clarification letter to UNIDO on their bill for the third tranche of December 2010, regarding the project delays. In this letter he specifies that PdA has already spent 600,000 Euros to finalize the project. The PM releases the third tranche of the payment.

End of March 2011, the UNIDO PM Emilio Vento and Dr. Ludovico Fulci and A. Moroso from PdA went on mission to Indonesia. The purpose of the mission is among other things a trip to Lombok for "field visit for commissioning of prototype". The responsible officer on the side of RISTEK seems to be Ms Nada Marsudi. RISTEK has proposed an agenda for this trip.

The delegation meets with the proposed contractors for the four types of services required for the launch

- mooring block production – PT Carita Boat, (not present at all meetings during this mission)
- towing and installation works - PT Segara Nekita Waya Lines,
- crane operations – PT Ralemar Cargo
- submarine and installation works – PT Asia Diving

Where these contractors were found, or upon whose recommendation, cannot be reconstructed from the files. The "Work Programme 2011" refers to a bidding process in December 2010. No documentation on this bidding process has been provided to the evaluators.

A meeting with RISTEK (without the presence of the local government) results in the following agreements regarding the division of responsibility for the further steps:

- RISTEK will facilitate all necessary permits.
- UNIDO will contract the production of the mooring blocks.

- RISTEK will take responsibility for positioning the submarine cable. The District Government has allocated a budget of 350 m IDR for this. (This was later confirmed in a meeting with the District Government.)
- Kobold Nusa will provide the turbine blades and arms fairings from Italy.

It is expected that these steps are completed by May 2011. Then

- Javasea will "finish the platform".
- The East Lombok District Government will facilitate the identification of a local crane company.
- UNIDO will issue a contract to a shipping company for the towing of the platform and mooring blocks to the installation site. The costs are expected to be 60,000 Euros, 35,000 of which will come from Kobold Nusa.
- UNIDO will issue a contract for the rent of a 125t crane. The costs are expected to be 22,000 Euros.
- UNIDO will issue a contract for scuba diving services, "including positioning of the moorings and chains, support for the assembling of the turbine to the platform", with expected costs of 17,000 Euros.

These steps should lead to the commissioning of the platform by the end of July 2011. In parallel, work on the electrical components is scheduled to start immediately, as follows:

- The inverter (provided by Kobold Nusa) and the battery bank (to be provided by funding from the District Government, 40,000 USD) should be tested at ISET in Germany for 2,5 months at a total cost of 60,000 Euros.
- The District Government has allocated 42,000 Euros for inverter and battery bank.

This is to be completed at the end of August 2011, at the latest. After a testing phase, the handover to the local community can then take place in December 2011. RISTEK will ensure proper monitoring of the system for at least 6 months after the handing over.

Regarding the MARCEE project, RISTEK indicates that they do not see themselves in the lead anymore and "*do not want to be part of the process because in the latest version of the project proposal the indicated Leading Agent was not RISTEK but the Ministry of Energy and Mineral Resources (MEMR). RISTEK mentioned that they would not be against the initiative but since the UNIDO office in Jakarta already processed the proposal giving a leading role to the Ministry of Energy, without consultation with RISTEK, for the time being RISTEK would prefer to stay out of this initiative. It appeared that there is an administrative procedure which will need to be addressed. The GEF project is directly covering the energy sector, it is only logical that the MEMR should be the lead national agent. The UNIDO Jakarta Office will follow up on this matter.*"

During the ensuing field trip, meetings with the District government confirm their commitment of funds for installation of the submarine cable. For the tender process, they are assured of the support from RISTEK and UNIDO. A project team with fixed responsibilities is promised. The submarine cable is expected to be installed in August at the latest.

In meetings with the Local and Provincial governments, then, the local government mentions that it had not allocated any budget for this project in 2011, as the allocation for 2010 had not been spent, but would look towards the mining company Newmont for

contributions in the context of their CSR project. These funds are expected to be used for the procurement and testing of the battery bank. With respect to the monitoring of the Kobold operation, the Provincial Government sees this as a responsibility of the Local government, with the potential involvement of the University of Mataram.

A meeting with Newmont then reveals that Newmont has indeed allocated 576 mIDR (64,000 USD) to the project in support of the Provincial Government and is willing to purchase equipment to the specifications of the project.

April: An email by the local UNIDO Project Officer J. Verhelst of April 11 2011 summarizes the status of the four contracts agreed upon by the planning meeting with RISTEK and requests the HQ PM E. Vento to sign three of the four contracts under the decentralized procurement modality. The contract with the scuba divers will be signed by the UR I. Farooque, once E.Vento provides the MOD.

However, none of this has taken place at the time of the next meeting, May 12 2011, at RISTEK. In addition to the procurement status, the meeting identifies new confusion over the cost sharing for the power bank and transportation costs for mooring lines and submarine cables. PdA does not seem to have provided the specifications for the power bank, and the status of the blades is also unclear. It is proposed that a construction manager is recruited by PdA (although there is no mention in the minutes that this again has cost implications) and RISTEK offers to identify a suited person.

A "final report" by local UNIDO Project Officer J. Verhelst of August 20, 2011, reports that

- another mission has taken place in July together with M. Vecchio of PdA to follow up with the local government and Newmont.
- A tax-free facility for the turbine blades and other equipment from Italy has been attained.
- The four contracts have been signed.

The four contracts were initially conceived of in April 2010, and tendered in December 2010. It took 8 months from tender to contract.

On September 27, E. Vento meets L.Fulci and A. Moroso of PdA in Rome, with phone calls to Imran Farooque and Thombi Layukallo. At this time, the generator and gearbox are at the platform, painting is in progress but the equipment needs to be assembled. 16 of the 20 mooring blocks are completed, and the rest is scheduled to be cast within 2 weeks. The crane provided by the Local government was not large enough for the assembly of the platform. But the bottleneck at this point is considered to be the clearing of the equipment from the harbor in Jakarta. "*Mr Thomby confirmed that if the blades will be in Lombok by (24 October 2011) he could finalize the assembling work with the use of the crane on the barge contracted by UNIDO and within the 36 days of contract for the marine intervention all the commissioning work of the Kobold Platform (positioning of the mooring blocks, positioning of the chains, anchoring of the platform, positioning of the submarine cable) could be brought to completion).*"

According to emails of early October 2011, J. Verhelst and E. Vento plan for a mission in October 15. By then, equipment has been transported to Labuhan Haji Port (probably the

blades and arms fairing), and Newmont has procured components from IBC Solar, a German solar company.

After that, there are no more records in the files on what happened in 2011

2012

A UNIDO-internal extension beyond the standard 5 year implementation period is granted in February 2012 by the UNIDO AMC.[13]

A Note for the File of May 10, 2012, reflects on the situation. The platform is not commissioned and also not fully assembled, as no crane was available. The "local contractors" have not fulfilled "their obligation to deliver the services for the provision of barge and crane" – indicating that both PR Ralemar Cargo and PT Segara Nekita Waya Line have not fulfilled their side of the contracts. "*In this regard, it was agreed that RISTEK will lend support to UNIDO is solving the problems in work implementation with the local contractors. It was agreed that RISTEK will assist UNIDO in preparing a 'contract amendment' for the contractors to sign in front of a Notary in order to 'force' the contractors to undertake the planned works as indicated in the contracts. It was also agree that UNIDO will invite the contractors to attend a joint meeting with UNIDO and RISTEK which will be held in 16 May 2012 at RISTEK Office.*"

There is mention that an "*advance down payment of more than 50% has been made to the contractors*."

It is proposed that UNIDO hire Dr. Aries Sulisetyono as a National Construction Manager.

Regarding the electrical components, too, uncertainties prevail. The inverter is still not shipped, and the responsibility for the procurement of the power bank is still not clear with respect to "*who should purchase and from where the equipment will be purchased*". Balloons and a tug boat are discussed as an alternative to a crane and barge.

On UNIDO's side, the note mentions that the Country Office does not know who is the replacement of Emilio Vento as a Program Manager after his retirement. At Headquarters, the responsibility for this project is transferred in June to Cristina Pitassi.

The National Construction Manager Dr. Aries Sulisetyono is hired in June and the contract expired in July.[14] In November the management responsibility is transferred to Rana P. Singh.

In search of a possibility to complement the financial resources of the project with the unutilized balance (UB) of the country's UNIDO programming resources. These are

[13] Source: AMC records of later decisions

[14] Acc. To the project status note of June 2007

administered by the Ministry of Foreign Affairs which is why the UR reverts to this ministry (comm. I. Farooque).

An internal note summarizes the project status of September 7 2012. In addition to the factoids already described, the note mentions that due "*to the long delay of project completion and lack of fund in 2012, the official counterpart of the project – the State Ministry of Research and Technology (RISTEK) is now experiencing difficulties to be fully on board in project implementation. The project was rescheduled to be completed in December 2011. However, due to the fact that the contractors for the provision of barge and cranes could not fulfill their promise to deliver the barge and cranes, the commissioning and inauguration of the project has been postponed. As the project could not be completed in 2011, the counterpart budget from the Provincial Government and District Government of East Lombok has been returned to the Ministry of Finance. The implication is that the government is now unable to fund the installation of the sub-marine cable (US$ 42,500) or IDR 425,000,000.*"

An estimated 100,000 USD are missing to complete the project. This is based on a new quote for the services of PT Hacienda (Mr Harry Putra Yosef) instead of the existing crane and barge contractors for transferring the platform and the turbine and the mooring blocks from Labuhan Haji Port to the project site, installing the sub-marine cable and connecting it to the power house on shore (200,000 USD), as well as the procurement or battery packs from China (20,000 USD) and the commissioning of the electrical system by ISET (40,000 USD).

A note of the same day summarizes the outcome of a "Consolidated Meeting" between MOFA, RISTEK, UNIDO and the Provincial Government on the project, stating that

- the Ministry of Foreign Affairs will now coordinate the completion of the project.
- The government will support the project with UB funds,
- The implementing agreement will remain valid.
- A detailed work plan should be prepared by all parties once the necessary funds are available.
- The project should be completed by the end of the year, alternatively by April 2013.
- Project implementation activities in the field will be on hold until all required funds are made available.
- "*PdA technicians should be available on the ground for the full duration during the installation of the project*."

A letter from PdA to UNIDO's Managing Director of 23 October 2012 on the basis of a meeting between PdA and UNIDO in Vienna on October 18, 2012 states that PdA remains fully committed to the project, including own contributions of 125,000 USD (although the figures for the various positions that PdA commit to sum up to 265,000 USD).

This facilitates the UNIDO-internal search for further financial resources. On 9 November 2012, an Interoffice Memorandum from the RRE Unit to the AMC seeks approval for USD 50,000 from the Renewable Energy Trust Fund RETF. This request is approved at the AMC meeting on November 14, 2012.

A further request for additional funds of USD 150,000 from UNIDO AMC Funds is submitted by the Director PTC / ECC to the AMC on 20 December 2012. This addition is specifically justified with the unexpected high costs of hiring a suitable barge and crane. The total budget needed is estimated to be 525,000 USD, 90,000 of which are still remaining from the original project, 90,000 USD fresh funds from UNIDO RETF and DO/GEF funds, 125,000 USD committed from PdA. This request is supported by new commitment letters from PdA and Kobold Nusa of December 18, respectively.

Further explanation is provided by a second IOM of 21 December 2012, requesting RETF funds of 50,000 USD from the MD.

2013

The AMC Meeting on 16 January 2013 approves 150,000 USD from RPTC resources.

Another request for 50,000 USD from the RETF is submitted to the AMC on 11 February 2013. This unusual request is not met with a decision at the AMC meeting of 27 February 2013, but postponed until the Director and PM can provide more detailed explanations. The AMC Meeting on 13 March 2013 approves the grant on some conditions. Overall, thus, UNIDO was able to mobilize another 200,000 USD from internal sources.

On 22 March 2013, the coordinating ministry MOFA directs a request for information on the project status, reminding the agreement of September 2012 that the project was to be completed by December 2012, April 2013 at the latest. A meeting between the UR and Mr Ade Petranto from MOFA takes place.[15]

In April 2013, the UR requests a meeting with the Ministry of State Owned Enterprises. In July she answers to MOFA pointing out that she would still like to meet with this Ministry as well as the Ministry of Public Works. A meeting with MOFA takes place in August, which is documented in a follow-up letter on 22 August 2013, formally requesting MOFA to facilitate a meeting with these two ministries ahead of the publication of the tender in the national newspaper KOMPAS in order to "*explore with the Government of Indonesia the possibilities of these two Ministries to facilitate implementation of this project since UNIDO foresees strong capabilities of these two Ministries in*" shipping and mooring during the installation process. She adds "*I would like to reiterate that it is necessary for the Government of Indonesia to provide fund under the Indonesia Unutilized Balance (UB) for training and maintenance of the Kobold II facility after the facility is installed, commissioned and handed over by UNIDO to the Government of Indonesia.*"

On 18 December 2013, there is another meeting between the UR and MOFA, upon the request of the UR, conveyed per letter of 13 December 2013 where she indicates that

[15] No minutes of that meeting exist in the files but the meeting is referred to in the letter from the UR to MOFA in July.

she would like to update the Ministry on the "*process of finalizing the selection of the wining contractor for the installation and commissioning of the subject project.*"

2014

On 15 January 2014, feedback from that meeting is given by the UR to HQ, with the following wording: "*Please note that, I recently conducted a meeting with MOFA upon their request to brief them on the status of the bidding and selection of local contractor for the marine current project.*
"It worth mentioning that, based on the observations from MOFA, this project should not be implemented the way currently planned. There are a lot of issue that obviously will lead to the failure of this project. Therefore, I strongly recommend that the local contractor process should be stopped. A new project document should be developed base on the current facts that the kobold technology is not to be promoted due to technical issues. Therefore it is not recommended to implement any further action on kobold technology.

"I hope you can give this issue more time to avoid any future problems."

Project management at HQ immediately stops all action in the project, indicating to the UR that this is a significant step, in particular as so many internal mechanisms have been used to leverage additional funds. But as the UR seems to convey strong feelings from the government of Indonesia, the project will be stopped, requesting minutes of the meeting or a letter from the Ministry to support this step. The UR adds in response: "*Please note that marine current project should be implemented with a new vision. As you know, the present marine current project does not have a project document. This was expected to be done, where the potential marine current power utilization in Indonesia can be well defined rather than just implementing activities for the kobold technology. The facilities and the set up on this kobold technology are now very old and corrosion already damaged these facilities being laying there on the shore for more than 5 years. Therefore, any movement of the platform could easily cause it to wrack.*

"Therefore, I expect that a proper PRODOC to be prepared first to identify proper way forward including all activities and selection of appropriate technology. New proper marine current project will maintain UNIDO's credibility vis-à-vis Indonesian government."

In response to this, the PM informs the UR on Friday 17 January 2014 that internal discussions have been held, and the situation will be discussed with the MD. For a status update he requests the minutes of the meeting with MOFA and "*any correspondence and notes received from the ministry*". The UR responds on Friday 24 January 2014: "*Please find attached a copy of points discussed during MOFA meeting held on 18 Dec 2013, as requested for inputs to your assessment.*

"Please note MOFA informed that, this meeting was for exchange of views that will help to facilitate the process. However, there was no intention for decision making nor agreement on cleared/signed minutes, it was rather to exchange info and knowledge on the status of this project to facilitate UNIDO decision and direction on this project. Please

take it as I'm conveying to you're the feeling of GOI on this project to help you on your further decisions."

The National Project Officer (NPO) Abdul Syukur Sialana took part in a mission to Lombok organized by MOFA and together with representatives from RISTEK, SETNEG and BPPT, to meet the Provincial and District Government and inspect the condition of the Kobold Platform. The mission overall takes note of the challenges to this point but voices generally positive attitudes towards this project, although BPPT and SETNEG seem slightly more positive than RISTEK. An email of the UR, Ms Bakhait, interprets the overall feedback thus: "*I would like to mention the following points:*

"*1. GoI is putting a lot of emphasis on marine current technologies and would like to see a good result out of this project.*

"2. UNIDO should secure that the new contractor is possessing the required facilities to do the work and not to depend on hiring them from other entities. These facilities should include heavy duty cranes and barge."

However, although this reverts the URs earlier reflections on the viewpoint of the GoI, HQ point to the agreed upon path of action, i.e. the evaluation to provide guidance.

Annex B: Stakeholders consulted

Monday, Sept 8, 2014

8:00 Meeting with program staff at UNIDO Country Office

8:30 Meeting with RISTEK at the RISTEK offices

10:00 Meeting with SETNEG at the SETNEG offices

15:00 Meeting with MoFA at the MoFA offices

Tuesday, Sept 9, 2014, Jakarta

10:00 Meeting with Kobold Nusa at the UNIDO offices

11:00 Meeting with Mr. Thombi Layu Kallo at the Hotel Sari San Pacific

13:00 Meeting with Mr. Alihuddin Sitompul at the Ministry of Energy and Mineral Resources

18:00 Departure to Lombok (accompanied by UNIDP National Program Officer)

Wednesday, Sept 10, 2014

8:00 Drive to Selong

10:00 Meeting with the Regent of East Lombok region

12:00 Site visit in Labuhan Haji Harbor

15:00 Visit to the Village of Ketapang, Pringgabaya

Return to Mataram

Thursday, Sept 11, 2014

6:00 Return to Jakarta

10:00 Meeting with Walinusa and KPM

Afternoon: preparation for wrap-up meeting

Friday, Sept 12, 2014

10:00 Wrap-up Meeting with Ministries and UNIDO, incl. UR

11:30 Meeting with UNIDO UR

During mission to Indonesia:

UNIDO country office:

- Ms. Shadia Bakhait Hajarabi, UR
- Mr. Abdul Syukur Sialana, NPO
- Mr. Nahruddin Alie, NPO

RISTEK:

- Dr. Agus Hoetman, Deputy Minister for Science and Technology Network
- Dr. Hotmatua Daulay Assistant Deputy of Central and Regional of Science & Technology Network (RISTEK's Kobold Project OIC)
- Ruben Silitonga, Deputy Director for International S&T Network Development
- Sehat Sujarwo, Head of Empowerment Division of Assistant Deputy for Central and Regional Science and Technology Networking

SETNEG:

- Mr. Ardianto Soemardjono (Toto), Head of Division for Multilateral Technical Cooperation, Bureau for Foreign Technical Cooperation

MOFA:

- Ms Rina P Soemarno, Secretary of the Directorate General for Multilateral Affairs, acting as the Director for Trade, Industry, Investment and IPR.
- Mr Otto Riadi, Division for Trade, Industry, Investment and IPR
- Ms Yati Marlinawati, Division for Trade, Industry, Investment and IPR

MEMR:

- Mr. Alihuddin Sitompul,
- Mr. Ezrom

Ministry of Industries:

- Mr. Hamzah, OIC of South-South Cooperation, Ministry of Industry
- Ms. Yulia Ariyani Putri
- Mr. Medino Dian Putra

Center for Marine Geology

- Dr. Effi

Regency of East Lombok:

- The Regent Mr Ali bin Dachlan
- Dewanto (Secretary of BAPPEDA)

Village of Ketapang, Village Energy Association Cahaya Baru

- Pak Rohadi
- Pak Suparman

Mr. Thombi Layu Kallo (contractor for welding platform, former owner of Javasea)

PT KPM (company that bought the PdA-shares of Kobold Nusa):

- Mr. Ampuh Trapsilo
- Mr. Arfian Rahmat Putra

PT Walinusa

- Mr Rinaldi Utomo, Walinusa

Consulted in person in Vienna:

- R.P. Singh, Project Manager
- E. Vento, former Project Manager
- D. Masera, Unit Chief RRE
- P. Monga, Director Energy and Enviroment
- A. Killmeyer Oleche, Unit Chief Quality Management
- I. Farooque, Unit Chief Asia, former UR
- Procurement Unit
- V. Pleskatch, Financial management
- J. Guernizo and I. Bernhardt, UNIDO Office for Independent Evaluation

Consulted by phone:

- C. Pitassi, project manager between April and October 2012, on activities taking place during that time
- I. Andersson and J. Rohe, Investment Promotion Unit, on current practices in the investment promotion unit

Consulted per email without response:

- J. Verhelst, UNIDO National Programm Officer in Jakarta, 2007 – 2013
- L. Matacena, President of Ponte di Archimede

Annex C: Documents reviewed

Document Title	Type	Author	Date
UNIDO project document US/RAS/04/069 Investment and Technology Promotion for Marine Current Exploitation in South East Asian Countries - Preparatory Phase	Project document	UNIDO	10.3.04
Project of People's Republic of China, Indonesia and Philippines: Promtion and Transfer of Marine Current Exploitation Technology in China and South East Asia (Pilot Plants)	Project document	UNIDO	5.10.05
Joint Venture Agreement between Ponte di Archimede and PT Wali Nusa Energy	contract	PdA and Wali Nusa	31.5.06
Contract No 16001183 UNIDO - Kobold Nusa	contract	UNIDO and KN	28.6.05
technical specifications of platform, turbine, energy conversion plant, spare parts	technical specifications		
Terms of Reference for Contractual Services - Sep 2006 (Appendix 1)	TOR	UNIDO	21.9.06
BTO from Lombok	Mission Report	J. Verhelst, I. Farooque, UNIDO	28.10.08
Fact Sheet Pilot Demonstration Facility for the Conversion of Marine Current Energy into Electricity in Lombok Island Nusa Tenggara Barat Province Indonesia	Fact Sheet	J. Verhelst, UNIDO	28.10.08
Implementing Agreement between The State Ministry of Research and Technology (RISTEK) and The United Nations Industrial Development Organization (UNIDO) On Marine Current Exploitation in Indonesia	Implementing Agreement	UNIDO and RISTEK	3.2.09
Letter to Dr. Teguh Rahardjo, asking for endorsement for GEF PIF MARCEE from RISTEK to MEMR	Letter	UNIDO Country Office	5.6.09
Note for the File on Marine Current Exploitation in Lombok Island / Facility on duty free import	Note	UNIDO Country Office	19.6.09
Note for the File on MARCEE	Note	UNIDO Country Office	19.6.09
Letter to Dr. Teguh Rahardjo, asking for Meeting	Letter	UNIDO Country Office	15.7.09
Letter to Dr. Teguh Rahardjo, asking for Tax Free Facility	Letter	UNIDO Country Office	10.8.09
Mission Report PdA May 2009	Mission Report	H. Eriksson, PdA / Kobold Nusa	1.5.09
Mission Report PdA September 2009	Mission Report	H. Eriksson, PdA / Kobold Nusa	1.9.09
Mission Report PdA December 2009	Mission	H. Eriksson,	1.12.0

Document Title	Type	Author	Date
	Report	PdA / Kobold Nusa	9
Mission Report PdA Jan 2010	Mission Report	H. Eriksson, PdA / Kobold Nusa	1.1.10
Note for the File on discussion with RISTEK on MARCEE PIF Endorsement	Note	UNIDO Country Office	25.1.10
Note for the File on GEF Focal Point Meeting regarding GEF Work Program for Indonesia	Note	UNIDO Country Office	1.2.10
Note for the File on Meeting with GEF Focal Point regarding MARCEE and Meeting with RISTEK and PdA regarding pilot project and MARCEE	Note	UNIDO Country Office	1.2.10
Mission Report PdA May 2010	Mission Report	H. Eriksson, PdA / Kobold Nusa	1.5.10
Mission Report PdA August 2010	Mission Report	H. Eriksson, PdA / Kobold Nusa	1.8.10
Mission Report August 2010	Mission Report	A. Moroso, Studio Tecnico Navale e Meccanico	1.8.10
Memo for the File on discussions with RISTEK on MARCEE	Note	UNIDO Country Office	10.8.10
Memo for the File on discussions with PdA on Pilot Project	Note	UNIDO Country Office	10.8.10
Note for the File on discussion with MEMR on MARCEE PIF Endorsement	Note	UNIDO Country Office	3.9.10
Mission Report PdA September 2010	Mission Report	H. Eriksson, PdA / Kobold Nusa	1.9.10
Mission Report PdA October 2010	Mission Report	H. Eriksson, PdA / Kobold Nusa	1.10.10
Memo for the File on discussions with RISTEK on Pilot project	Note	UNIDO Country Office	15.11.10
Bill	Bill	L. Matacena, Kobold Nusa	21.12.10
Note for the File on discussion with MEMR on GEF-5 energy pipeline and MARCEE PIF Endorsement	Note	UNIDO Country Office	22.12.10
Programme Progress Report - Dec 2010	Progress Report 2010	E. Vento, UNIDO	31.1.11
Work Plan 2011	Note	E. Vento, UNIDO	N.D.
Letter to Mr Piskounov: Endorsement for GEF-5 Pipeline projects, including the MARCEE	Letter	Dr. Ir Djadjang	14.2.11

Document Title	Type	Author	Date
		Sukarna, Directorate General, Minstry of Energy and Mineral Resources, GoI	
Letter to Mrs Natalie Maabdir, Contracts Officer, UNIDO	Letter	L. Matacena, Kobold Nusa	15.2.11
IOM to Mr A. Orlov, Procurement Officer, UNIDO		E. Vento, UNIDO	23.3.11
Back-to-Office Report	Mission Report	E. Vento, UNIDO	12.4.11
Letter to Prof. Dr. M. Syamsa Ardisasmita, RISTEK, asking for tax free facility for blades, arms fairings and blades	Letter	UNIDO Country Office	18.7.11
Letter to Dr Suroto Adi, SETNEG, asking for tax free facility for blades, arms fairings and blades	Letter	UNIDO Country Office	21.7.11
Email and "final" status report	Email, Status Report	J. Verhelst	15.8.11
Email to PdA; request for payment of harbor storage fees	Email	J. Verhelst to M Vecchio	25.8.11
Back-to-Office Report from meeting in Rome between E. Vento, and L.Fulci / A. Moroso of PdA	Mission Report	E. Vento, UNIDO	12.4.11
Email exchange regarding equipment and mission	Emails	J. Verhelst and E Vento	October 2011
Memo for the File on discussions with RISTEK on Pilot project	Note	UNIDO Country Office	10.5.12
Note on Consolidated Meeting MOFA, UNIDO, RISTEK and NTB	Note	MOFA	7.9.12
Letter to Mr Piskounov, MD, UNIDO	Letter	L. Matacena, Kobold Nusa	23.10.12
IOM to AMC, Request for Funds from RETF 9 Nov 2012		P. Monga, UNIDO	9.11.12
AMC Decision		AMC, UNIDO	14.11.12
IOM to AMC, Request for additional funds from AMC funds 20 Dec 2012		P. Monga, UNIDO	20.12.12
IOM to MD; further explanations for request of additional funds		P. Monga, UNIDO	21.12.12
Project Progress Jan 2013		R.P. Singh, UNIDO	Jan 2013
Minutes (AMC Meeting_16-01-2013)		AMC, UNIDO	16.1.13
IOM to AMC, Request for additional funds from the RETF 11 Feb 2013		P. Monga, UNIDO	11.2.13
IOM to PSM, Request to recover unobligated funds, 19 Feb 2013		P. Monga, UNIDO	19.2.13
Minutes AMC Meeting 27.2 .2013		AMC, UNIDO	27.2.1

Document Title	Type	Author	Date
			3
Minutes AMC Meeting 13. 3 .2013		AMC, UNIDO	13.3.13
Letter From MOFA to UNIDO country office 22 Mar 2013		MOFA	22.3.13
IOM to AMC		R.P. Singh, UNIDO	17.6.13
Letter from UR to MOFA of 22 Aug 2013 with attachments		S. Bakhait, UNIDO	22.8.13
Minutes 18 Dec 2013 - INDO UR-MOFA meeting		AMC, UNIDO	18.12.13
Email Indonesia UR to HQ Jan 2014		S. Bakhait, UNIDO	14.1.14
Mission Report to project site April 2014		Abdul Syukur Sialana, UNIDO	15.4.14
Email Indonesia UR to HQ 8 April 2014		S. Bakhait, UNIDO	8.4.14
Minutes Meeting 19 May 2014 INDO UR-RISTEK-MOFA-MoI-SETNEG		Gadis Rantih, UNIDO	19.5.14

Annex D: Timeline of contracting for Kobold turbine – Contract No. 1600 1183 (as provided by project management)

Prepared by JP Schwarz

- May 31, 2006: Joint Venture Agreement between Ponte di Archimede and Pt. Walinusa Energi and Technology License Agreement Ponte di Archimede and Pt. Kobold Nusa
- June 19, 2006: Waiver for Kobold Nusa has been approved internally for design build and commission for pilot demonstration plant (Kobold) Cost of service EUR 180,000.00.
- December 18, 2006: Deed of Establishment of Limited Liability "PT. Kobold Nusa"
- December 22, 2006: Kobold Nusa sends offer via DHL to UNIDO Procurement
- January 23, 2007: Opening of Bids – Total Cost Proposal of Kobold Nusa US$ 241,840.00
- March 19, 2007: Technical Evaluation of Proposal completed and Kobold Nusa agreed on negotiated price of EUR 180,000.00.
- April 12, 2007: Award approved by Procurement Committee
- May, 20-23, 2007: Emilio Vento Mission to Indonesia
- September, 25, 2007: Contract signed by UNIDO
- November 14, 2007: Contract counter signed by Kobold Nusa
- October 31, 2008: Request from PM Emilio Vento to increase original contract to EUR 260,000.00 due to steel prices.
- November 13, 2008: Request from PM Vento to increase the amount to EUR 260,000.00 has been rejected from Procurement.
- March, 2009: Ponte di Archimede renegotiated with Kobold Nusa the additional costs successfully.
- May 18, 2009: Payment upon countersigned Contract EUR 18,000.00
- July 30, 2009: Payment upon First Progress Report EUR 18,000.00
- October 7, 2009: Payment upon Second Progress Report EUR 72,000.00
- December 21, 2010: Payment upon August-October Progress Report EUR 18,000.00
- February 14, 2013: Release of Bank Warranty provided by PdA in April 2009 and confirmation by Kobold Nusa that they will not request UNIDO for further payment of remaining EUR 54,000.00.

Annex E: Timeline of Procurement for Crane, Towing and Submarine – Rfx 7 000 000 376 (as provided by project management)

Prepared by JP Schwarz

- December, 2012: Mission of Rana Singh – Status of Work verification
- February-May, 2013: Funding generation
- June-September, 2013: TOR development (Crane, Towing and Submarine)
- October, 2013: Local Advertisement in Newspaper
- October 8, 2013: TOR published in SAP under Requisition No. 7 000 000 376 with Target Value of US$ 383,000.00
- November 19, 2013: Closing date of Requisition
- November 21, 2013: Opening of 2 received offers (PT Hacienda offer US$ 534,000.00 and PT Sura Putra offer US$ 457,000.00)
- November 24 – December 4, 2013: Mission to Indonesia – (Technical Evaluation/Negotiation)
- January 15, 2013: Email from UR Indonesia suggesting to stop ongoing procurement process

Annex F: Terms and payments of the four contracts in 2011 – Rfx 7 000 000 376 (as provided by project management)

Prepared by JP Schwarz

Terms of the contracts:

Vendor	**TOR**	**Contract/ Obligation Number**	**MOD signed**	**Contract signed by UNIDO**	**Contract signed by Vendor**	**Total Amount in US$**	**1st Payment Amount in US$**	**2nd Payment Amount in US$**
Carita Boat	mooring blocks	18 05 90 13	May 5-9, 2011	May 30, 2011	June 23, 2011	37,088.74	18,544.37	16,044.07
Segara Nekita Waya Lines	towing and installation works	18 06 05 39	July 4-6, 2011	July 11, 2011	August 02, 2011	35,758.52	17,879.26	8,569,83
Ralemar Cargo	crane operation	18 06 10 41	July 11-27, 2011	Sept. 21, 2011	Oct. 13, 2011	34,308.42	17,154.21	8,662.18
Asia Divers	submarine installation works / scuba diving	18 06 04 63	July 1-4, 2011	Aug. 8, 2011	Aug. 8, 2011	17,636.68	8,818.34	4,226.78

Annex F: Terms and payments of the four contracts in 2011 – Rfx 7 000 000 376 (as provided by project management)

Payments in detail:

Vendor	Total Amount in US$	Total Amount in IDR	1st Payment 50% Amount in US$	1st Payment 50% Amount in IDR	Date of 1st Payment	2nd Payment Amount in US$	2nd Payment Amount in IDR	Date of 2nd Payment	Remaining Balance Oct. 2014 in US$	Remaining Balance Oct. 2014 in EUR
Carita Boat	37,088.74	318,777,777.78	18,544.37	159,388,888.89	July 2011	16,044.07	159,388,889.00	December 2012	793.41	624.44
Segara Nekita Waya Lines	35,758.52	304,126,240.00	17,879.26	152,063,120.00	August 2011	8,569,83	76,031,531.76	November 2011	7,951.17	6,257.81
Ralemar Cargo	34,308.42	307,403,433.47	17,154.21	153,701,716.74	October 2011	8,662.18	76,850,860.96	November 2011	8,036.85	6,325.24
Asia Divers	17,636.68	150,000,000.00	8,818.34	75,000,000.00	August 2011	4,226.78	37,500,000.00	November 2011	3,921.64	3,086.45

Annex G: Risk assessment of installation steps

The risk levels refer to the likelihood that the outcomes of this step will result in the abortion of the project without installation.

No.	Step	Risk level				Estimate Budget
		Insignificant	Minor	Moderate	Major	
1	Find the complete technical documents of Kobold including the SOP of installation					Rp10.000.000,00
2	List detailed existing component inventories (including the damage components e.g. rope, etc)					Rp40.000.000,00
3	Make detailed feasibility study for installation in Labuhan Haji				Total	Rp252.000.000,00
	- environment (beach, harbour/calm water location, bathimetry,platform towing path way for lauching the platform etc)					Rp200.000.000,00
	- infrastructure					Rp7.000.000,00
	- external supporting facilities (cranes, airbag, floater, tug boat/boat, etc)					Rp25.000.000,00
	- internal supporting facilities (portable cranes, mechanical tools, etc)					Rp10.000.000,00
	- floater for mooring concrete block or the boat that can be loaded by concrete block					Rp10.000.000,00
	- funding					-
4	Make detailed feasibility study for installation in Pringgabaya				Total	Rp215.000.000,00
	- environment (mooring block position, bathimetry,underwater cable path way, rest area for platform if the water not calm enough for installation, distance from platform to power house etc)					Rp150.000.000,00
	- infrastructure					Rp10.000.000,00
	- supporting facilities (cranes, airbag, floater, tug boat/boat, etc)					Rp10.000.000,00
	- funding					
5	Take decisions for launching and installing the Kobold					Rp40.000.000,00
6	Estime the budget and schedule for lauching and installation (owner estimate)					Rp5.000.000,00
7	Procure for launching and installation service and make coordination for scheduling including diver (procurement at once)					Depend on the feasibility study no 1 - 6
8	Give briefing for installation techniques especially for the divers (need drawings, documents, etc)					
9	Launch the platform					
10	Tow the platform to calm water / restricted water (harbour?)					
11	Transport turbine components (shaft, blade, etc) to place close to platform					
12	Install the upper and lower shaft using crane and divers					
13	Install the shaft components (gear box, brake, generator etc)					
14	Install the electrical equipments (controller, inverter, current sensor, etc)					
15	Install the turbine components using divers (blades, radial arms, etc)					
16	Test the all install components independently					
17	Take decision for the exact location of 4 mooring blocks					
18	Take decision for the installation date of 4 mooring blocks (neap tide is the best moment)					
19	Transport the mooring blocks from current location to the beach and loaded to boat using crane or float the piece of concrete block using floater / airbag and tow it using boat to Pringgabaya (take a long time). If possible transport them by truck to the beach of Pringgabaya.					
20	Transport the mooring components (buoys, floater, chain, ropes, underwater cable, cable trenching/sinker, etc) to Pringgabaya by truck					
21	Transport (from Pringgabaya beach) and install the mooring blocks using crane, floater etc at exact location using GPS					Conducted by supplier who win the procurement
22	Install the 4 marking buoys for the location of mooring blocks using polypropylene ropes (need divers)					
23	Transport the chains and ropes (using floater) from pringgabaya beach and attach them to mooring block. The 4 chains and ropes have to be connected to floater					
24	Test and check the connection of mooring blocks --> chains --> ropes					
24	Tow the platform to Pringgabaya to final location					
25	At final location, attach the 4 ropes tied at floater to 4 pit eyes in platform					
26	Tighten the 4 ropes					
27	Test and check the performance of the mechanical parts of the turbine when the turbine rotates.					
28	if 27 OK, connect generator to electrical parts and check the performance of electrical parts					
29	if 28 OK, connect the electricity to the electrical loads					
30	Make the combine performance test for 1 months (1 spring tide - neap tide cycle)					
31	Install the underwater cable together with sinker					
32	Test and check the electrical supply from platform to power house					
33	Test the electrical supply to the user					

Annex H: Glossary of Evaluation related terms

Baseline: The situation, prior to an intervention, against which progress can be assessed.

Conclusions: Conclusions point out the factors of success and failure of the evaluated intervention, with special attention paid to the intended and unintended results and impacts, and more generally to any other strength or weakness. A conclusion draws on data collection and analyses undertaken, through a transparent chain of arguments.

Effect: Intended or unintended change due directly or indirectly to an intervention.

Effectiveness: The extent to which the development intervention's objectives were achieved, or are expected to be achieved.

Efficiency: A measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results.

Impact: Positive and negative, intended and non-intended, directly and indirectly, long term effects produced by a development intervention.

Indicator: Quantitative or qualitative factors that provide a means to measure the changes caused by an intervention.

Intervention: An external action to assist a national effort to achieve specific development goals.

Lessons learned: Generalizations based on evaluation experiences that abstract from the specific circumstances to broader situations.

Logframe (logical framework approach): Management tool used to facilitate the planning, implementation and evaluation of an intervention. It involves identifying strategic elements (activities, outputs, outcome, impact) and their causal relationships, indicators, and assumptions that may affect success or failure. Based on RBM (results based management) principles.

Outcome: The likely or achieved (short-term and/or medium-term) effects of an intervention's outputs.

Outputs: The products, capital goods and services which result from an intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.

Recommendations: Proposals aimed at enhancing the effectiveness, quality, or efficiency of a development intervention; at redesigning the objectives; and/or at the reallocation of resources. Recommendations are linked to conclusions

Relevance: The extent to which the objectives of an intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donor's policies.

Results: The output, outcome or impact) of a development intervention. Related terms: outcome, effect, impacts.

Risks: Factors, normally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.

Sustainability: The continuation of benefits from an intervention, after the development assistance has been completed.

Annex I: Terms of Reference

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

Terms of Reference

Independent Evaluation of UNIDO Project:

"Promotion and Transfer of Marine Current Exploitation Technology in China and South East Asia (Pilot Plants)"

SAP ID 106049
(UE/RAS/05/004)

JUNE 2014

PROJECT BACKGROUND

This project, entitled “Promotion and Transfer of Marine Current Exploitation Technology in China and South East Asia (Pilot Plants)” (SAP ID 106049, UE/RAS/05/004) was initiated in 2005 as a component of the UNIDO initiative aiming to promote innovative technologies for marine current exploitation (MCE) in South East Asia, within PTC/ITP/TPU. Following a preparatory and promotional phase in January 2005, during which an initial contribution of €200,000 of the Italian Foreign Ministry was provided, a site in Indonesia was selected to host a first pilot plant intended to provide the operational justification of the viability of a certain type of marine current technology, known as Kobold technology, for the wider South East Asia region. The Kobold technology was provided by the Italian technology provider, Ponte di Archimede (PDA), following its successful development and testing in the “ENERMAR (Kobold Turbine)” project carried out in cooperation between PDA and the University of Naples in Italy. The national project counterparts in Indonesia were the Ministry of Research and Technology (RISTEK) and the Ministry of Foreign Affairs (MOFA). In order to complete all activities under the project, PDA entered into an agreement with a local counterpart company PT Walinusa Energi to create the joint venture PT Kobold Nusa. It is important to note that all available project-related documentation as well as subsequent contractual documentation and correspondence make reference to the project by its original project ID, UE/RAS/05/00, and the original (unsigned) draft project document dated 10 May 2005. This document, containing the project components and activity breakdown, is included in the list of key documents supporting this evaluation (see Annex V).

The key objectives of the project were as follows[16]:

- To promote and establish an operational partnership between an Indonesian counterpart and the technology supplier in order to transform, adapt and apply in Indonesia the Kobold turbine solution for marine current energy production;
- To customize, manufacture, assemble, set in place and test in Indonesia, a pilot application of the Kobold turbine, in order to adapt and test the proposed technology in the local environment.

The precise chronology of the project history is not fully clear. The project was transferred from the original unit PTC/ITP/TPU to PTC/AGR. From a first review of the available documents, it is unclear when this transfer occurred. The project was later, in November 2012, transferred from PTC/AGR to PTC/ECC/RRE.

The project was initiated in 2005, and is still under implementation. The project budget/PAD was initially EUR 700,000 (please see below, Section II Budget Information). Requests for additional funding from the Renewable Energy Trust Fund and other sources totaling approx. €450,000 were approved (see e.g. AMC decision of 13 March 2013) and were intended to enable conclusive project completion, covering mainly outstanding logistical and transport activities; all project components were otherwise fully designed and constructed.

An inspection of the project site, in January 2013, by the newly assigned Project Manager revealed that all required materials and equipment were fully available and the majority

[16] See Terms of Reference dated 21 September 2006, Appendix 2.1 to UNIDO – “Kobold Technology, Innovation and Research, Technical Papers”.

thereof was in storage close to the installation site awaiting final assembly and commissioning.

Project completion has been pending for a long time and prior to the project's transfer to PTC/ECC/RRE. In November 2012, a meeting was held between PTC/ECC/RRE, Managing Director PTC, UNIDO Representative (UR) in Indonesia, PDA and the former Project Manager, to discuss the project's risks and causes of delays. It was decided to develop a new completion strategy and to undertake two separate missions, to visit the local counterparts at the project site in Indonesia. Based on the findings of the missions, an action plan was developed to ensure successful completion of all remaining project components. Subcontractors were selected and contracts were concluded to enable completion of the remaining activities, with project funds being accordingly committed.

The contractual services were intended to cover the following final activities which were to render the project operational:

- Construction of four mooring blocks;
- Transportation from the shore to the final identified location and positioning of the mooring blocks;
- Transportation of the Kobold turbine prototype and platform from shore to the final site;
- Anchoring of the platform/turbine to the mooring.

However, in December 2013, the Indonesian UR met with MOFA representatives. During this meeting, the following three options were proposed as possible exit strategies under the project (see "Points of Discussion" of meeting of 1 December 2013, attached to the email dated 24 January 2014 of UR Ms. Hajarabi, contained under Key Documents as listed in Annex V):

(1) "Option 1: GOI and UNIDO continue to implement the project. This option has a big risk for failure given the facts that the project facility is very old with damages already occurred due to unattended facilities for a long period of time (more than 5 years)."

(2) "Option 2: To hand over the project to GOI [Government of Indonesia]. GOI will facilitate the implementation. This means to close the project at its current stage, uncompleted, and do hand over to GOI."

(3) "Option 3: To change plan of the project. To complete the project implementation with available funds and use the research result of the first phase of this project and develop a new project document to implement the project taking into consideration the current developments."

In January 2014, the Indonesia UR emailed the current Project Manager (e-mail attached under Key Documents) which summarized the conclusions reached during the meeting of 1 December 2013. One such conclusion stipulated that: "Based on observation of MOFA, the project should not be implemented the way currently planned, since a lot of issues occur [sic] that obviously lead to the failure of the project. Hence the national contractor

process should be stopped." Following the receipt of this communication, the Project Manager has halted all project activity including subcontracting and procurement.

Based on the above, the present evaluation is expected to assess the implementation of the project and provide systematic and objective assessment of the project design, implementation and results and recommendations on the best possible course of action for the future, including but not necessarily limited to the options mentioned.

BUDGET INFORMATION

The PAD for this project is currently recorded as totaling EUR 442,478. However, the (draft) project document makes reference to a grand total of EUR 700,000. The reason for this inconsistency is unclear from a first reading of the available documents. Since it was transferred to PTC/ECC/REE, increases in budget were approved by the AMC and procurement in the amount of USD 385,000 was initiated and committed in December 2013 (for subcontracts covering transportation, assembly and commissioning). Due to the communication received from the Indonesian UR in January 2014 and subsequent halting of all activities by the Project Manager, these funds have not yet been expended.

The current funds available in 2014 amount to EUR 293,396.78. More detailed budget information is attached hereto as Annex V.

BL	**Description**	**Amount €**
1150	International consultants	36,000
1500	Mission travel for international experts	31,000
1600	Mission travel for UNIDO	13,000
1700	National consultants	54,000
2100	Subcontracting activities for turbine production	283,000
3500	Meeting cost	35,478
	13% Support costs	57,522
	Subcontracting activities for turbine installation (in-kind from China)	200,000
	GRAND TOTAL*	700,000

** Actual total is EUR 710,000. Presumed clerical error in original project document.*

EVALUATION PURPOSE AND KEY OBJECTIVES OF THE EVALUATION

The overall purpose of this evaluation is to assess the project performance in terms of relevance, efficiency, effectiveness as well as the likelihood for sustainability and impact, in order to enable UNIDO to make an informed decision as to the continuation, phase-out or a possible reorientation of the project.

It is envisaged that the evaluation will assess the prospects for financial and technical sustainability of the project, including an appraisal of the business model and its potential and prospect for sustainability and national ownership.

The evaluation will also examine to what extent the activities were carried out and the expected outputs were produced and outcomes achieved, and the reason for the encountered delays in implementation.

The evaluation will also serve to identify best practices, bottlenecks and problem areas and make recommendations for possible future projects based on MCE technology in the country and region. The evaluation will thus also seek to draw lessons of wider application for potential future UNIDO projects based on this innovative technology.

The evaluation will also provide recommendations on the next steps to be followed in the project based on the existing institutional arrangements and financial resources.

The key question of the evaluation is therefore to what extent the project is achieving or has achieved the expected results at the time of the evaluation, i.e. to what extent the project has promoted and established an operational partnership between the Indonesian counterpart and the technology supplier in order to transform, adapt and apply in Indonesia the Kobold turbine solution for marine current energy production. Furthermore, the evaluation should assess to what extent the project has customized, manufactured, assembled, set in place and tested a pilot application of the Kobold turbine in Indonesia, and the proposed technology has been tested, and the results thereof, in the local environment.

EVALUATION METHODOLOGY

The independent evaluation is to be conducted in compliance with UNIDO Evaluation Policy and the Technical Cooperation Guidelines and will attempt to determine, as systematically and objectively as possible, *inter alia*, the relevance, efficiency, effectiveness, impact and sustainability of the project. The evaluation will assess the achievements of the project against its objectives, including re-examination of the relevance of the objectives and of the design. It will also try to identify factors that have facilitated or impeded the achievement of the outputs and outcomes.

The evaluation will be carried out through analyses of various sources of information including desk analysis, and interviews with HQ and Indonesian Field Office staff and consultants, staff of PDA (the technology provider) and national stakeholders, including a visit to the pilot site on Lombok Island in Indonesia.

The in-depth analysis of relevant information shall include a review of the activities carried out, management mechanisms applied (in particular planning, implementation and monitoring) and project specific framework conditions (in particular cooperation with local authorities, private suppliers [i.e. PDA Italy which supplied equipment and accessories for local assembly through local counterpart PT Kobold Nusa], and related initiatives of the Government. In this regard, the analysis will also encompass the summary reports outlining results of the operations and the successive follow-up work plans prepared by Project Managers and the technology provider.

The evaluation team will provide further information on the evaluation approach and methodology to be used in the inception report. The inception report may also provide a list of additional questions and issues to be covered by the evaluation. The present TOR provides limited but non-exhaustive instructions for the overall evaluation methodology. The task of further developing of an appropriate methodology needed in order to fully fulfil the purpose of the present evaluation is left to the evaluation team.

The steps of the evaluation will be as follows:

1. Desk study (analysis of the project document, technical papers, progress reports and other project-related documentation and correspondence between HQ, the Field Office, Indonesian counterparts and other external stakeholders and partners).
2. Development of inception report
3. Field visits and examination of project site(s).
4. Interviews with project's stakeholders such as staff at UNIDO HQ, Indonesian Field Office, national stakeholders including RISTEK and MOFA, and the technology provider. The evaluation team will receive briefings from the former and current Project Manager, ECC/RRE Unit Chief, and ECC Branch Director and other UNIDO staff members with insight into the project.
5. Preparation of the draft evaluation report to be circulated for comments and factual validation.
6. Preparation of the final report using the ODG/EVA format.

While maintaining independence, the evaluation will be carried out based on a participatory approach, which seeks the views and assessments of all those involved. These include government counterparts, involved private sector representatives, beneficiaries as well as UNIDO regular and project staff at HQs and in the field.

KEY EVALUATION QUESTIONS

The evaluation will assess the following issues and attempt to answer the following questions:

(i) Project design and formulation

The extent to which:

(a) A participatory project formulation process was followed including the main stakeholders and counterparts, and was used for identifying potential problem areas.
(b) The project had a clear thematically focused development objective and immediate objective and/or outcomes, the attainment of which can be determined by a set of verifiable indicators.
(c) The project/programme was formulated based on the logical framework approach and included appropriate output and outcome indicators within a realistic timeframe.
(d) A logically valid means-end relationship has been established between the project objective(s) and outcomes and the higher-level programme-wide or country level objectives.
(e) Lessons learned from earlier UNIDO projects were taken on board in the formulation process including lessons and recommendations given in existing evaluation reports at the time.
(f) The project design was based on a needs assessment. The project was formulated with participation of the national counterpart and/or target beneficiaries.
(g) The outputs as formulated in the project document are relevant and sufficient to achieve the expected outcomes.
(h) The indicative financial requisites for project completion can be assessed.

(ii) Ownership and relevance

The extent to which:

(a) The project is aligned to the Indonesia's development priorities and technology needs.
(b) The concept and the objectives of the project were and are still valid.
(c) The counterpart(s) has (have) been appropriately involved and were participating in the identification of critical problem areas and in the development of technical cooperation strategies and are actively supporting the implementation of the project including through in-kind and cash contributions.

(iii) Efficiency of implementation

The extent to which:

(a) UNIDO and other counterparts' inputs and services were delivered as planned, in a timely manner and led to the production of foreseen outputs.
(b) Government/counterpart inputs have been provided as planned and were adequate to meet requirements.
(c) The least costly resources and processes/technology were used in order to achieve the objectives.
(d) The technology used was appropriate.
(e) A strategy to overcome possible budget constraints was implemented e.g. mobilization of extra-budgetary resources, co-financing of activities from the Technical Cooperation (TC) programmes' budget.
(f) UNIDO procurement services are provided as planned and were adequate in terms of timing, value, process issues, responsibilities, etc.

(iv) Effectiveness

The extent to which:

(a) The outputs and outcomes were achieved or are likely to be achieved.
(b) The technology was tested, found to be appropriate or not and/or suitably adapted and applied.

(v) Impact and sustainability

(a) Which long term developmental changes (economic, environmental, and social) have occurred or are likely to occur as a result of the intervention and are these sustainable?
(b) Can the project be replicated/have a multiplying effect?
(c) Was any sustainability strategy formulated?
(d) What is the prospect for technical, organizational and financial viability and sustainability of the project?
(e) Was a plan for national ownership developed, especially in terms of institutional and management arrangements?
(f) Is the project likely to be scaled up?
(g) Is there a formulation of a clear exit strategy, sustainability plan and handover plan to national partners, including the local community?
(h) Is there a provision for a sustainable transition towards national ownership of the facility and the associated know-how?

(vi) Project coordination and management

The extent to which:

(a) The national management and overall field coordination mechanisms of the project have been efficient and effective.
(b) The UNIDO management, coordination, quality control and technical inputs have been efficient and effective.
(c) There was cooperation between other TC branches.

(d) Monitoring and reporting were carried out, based on indicators for outputs, outcomes and objectives and using that information for project steering and adaptive management.
(e) Changes in planning documents during implementation have been approved and documented.
(f) Synergy benefits can be found in relation to other UNIDO activities in the country or elsewhere.

(vii) Thematic and energy-related questions

(a) Has the selection of the renewable energy (RE) source and the technology been based on thorough needs assessments, including social, economic, technical and environmental aspects?
(b) Was the RE in question appropriate?
(c) Is the RE source sufficient for the intended use in terms of quantity and quality?
(d) Is the generated energy expected to promote or enhance productive uses, and has the demand for energy been analyzed in terms of quantity and quality?
(e) Has the entrepreneurial base and potential for industrial production been assessed?
(f) Have techno-economic feasibility studies been carried out and do they indicate the viability of the specific RE solution?
(g) Is the RE solution in question technically suited to the project site?
(h) Did the feasibility studies consider different possible business and ownership models of the established RE facility (who will own and manage the system: public or private energy facility, private investor, community? Who pays and how much for the energy? Who maintains the infrastructure? If subsidies are required, who pays? Etc.)
(i) In the case of community based projects, is the community ownership of the project ensured?
(j) Are energy-related and other policies in place that will ensure the sustainability of the intervention or do existing strategies and plans pose a threat to sustainability (e.g. feed-in arrangements, expansion of national or regional grids, subsidies for RE, RE financing schemes etc.)?
(k) Have there been proper assessments of pilot facilities?

(viii) Gender

(a) To what extent were gender aspects taken into account within the project?

(ix) Procurement issues

The following evaluation questions that will feed in the Thematic Evaluation on Procurement have been developed and would be included as applicable in all projects (for reference, please see Annex 7 of the ToR: UNIDO Procurement Process):

- To what extent does the process provide adequate treatment to different types of procurement (e.g. by value, by category, by exception…)

- Was the procurement timely? How long the procurement process takes (e.g. by value, by category, by exception…)

- Did the good/item(s) arrive as planned or scheduled? If no, how long were the times gained or delays. If delay, what was the reason(s)?
- Were the procured good(s) acquired at a reasonable price?
- To what extent were the procured goods of the expected/needed quality and quantity?
- Were the transportation costs reasonable and within budget. If no, pleased elaborate.
- Was the freight forwarding timely and within budget?. If no, pleased elaborate.
- Who was responsible for the customs clearance? UNIDO FO? UNDP? Government? Other?
- Was the customs clearance handled professionally and in a timely manner? How many days did it take?
- How long time did it take to get approval from the government on import duty exemption?
- Which were the main bottlenecks / issues in the procurement process?
- Which good practices have been identified?
- To what extent roles and responsibilities of the different stakeholders in the different procurement stages are established, adequate and clear?
- To what extent there is an adequate segregation of duties across the procurement process and between the different roles and stakeholders?

EVALUATION TIME SCHEDULE, WORK PLAN AND DELIVERABLES

The following deliverables are expected:

Inception Report: to be delivered at the end of the initial phase and to follow the ODG/EVA Inception Report format.

Presentation of preliminary findings: the consultant(s) will provide a presentation of their preliminary findings to UNIDO

Draft Evaluation Report: to be shared with the key stakeholders in order to enable feedback on any factual errors. This consultation also seeks agreement on the findings and recommendations. The evaluators will take comments into consideration when preparing the **final** version of the **evaluation report**.

Final Evaluation Report: to be delivered upon successful consideration and appropriate incorporation of comments into the Draft Evaluation Report.

Main evaluation milestones will include:

(a) Contract signed with evaluators
(b) Desk review
(c) Briefing of evaluators at HQ and over the phone
(d) Interviews at HQ
(e) Prepared inception report containing a work plan, key findings of desk review, evaluation schedule and mission plan, methodology, evaluation tools such as questionnaires and interview guidelines
(f) Evaluation mission (briefing of evaluators in the field, , field visits, field research, interviews, observation, questionnaires, etc.)
(g) Presentation of preliminary findings in the field and at UNIDO HQ
(h) Data analysis and preparation of draft evaluation report
(i) Delivery of draft evaluation report
(j) Collection of comments and review of draft evaluation report
(k) Revision of draft evaluation report
(l) Approval of final evaluation report
(m) Dissemination (Management Response Sheet, Evaluation Report)

The evaluation is expected to commence in August 2014 and to be completed within three months i.e. by October 201

2014

	Task	Jun	Jun	Jul	Jul	Aug	Aug	Sep	Sep	Oct	Oct
1.1	ToR Preparation										
1.2	Consultant search and recruitment										
2.1	Desk research carried out & inception report submitted by Consultant										
2.2	Field analysis/program approved by UNIDO										
2.3	Field mission (10 days)										
2.4	Submission of results and draft report										

3.1	Approval and dissemination of final report										

EVALUATION MANAGEMENT AND EVALUATION TEAM COMPOSITION

The evaluation team will be composed of:

- One senior international evaluation consultant with strong experience in renewable energy technology, and in evaluation UN projects;
- One national evaluation consultant with experience in evaluating technology-transfer international cooperation projects and concrete experience in renewable energy technology, in particular knowledge of marine current technology / tidal energy.

The evaluation team members will have complementary competencies and experience in the evaluation of technical cooperation projects, , technology transfer and RE/marine current technologies.

The UNIDO Evaluation Group will be responsible for the selection of evaluators, quality control of the evaluation process and of the various outputs (see above). It will provide inputs regarding findings, lessons learned and recommendations. The consultants will be contracted by the Project Manager. The tasks of the team members are specified in the Job Descriptions (JDs) attached hereto under Annex II.

The Indonesian Field Office as well as staff at UNIDO HQ will provide support to the evaluation team. All members of the evaluation team must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the project under evaluation. This principle is underlined in the UNIDO Evaluation Policy:

"*For independent evaluations, the members of an evaluation team must not have been directly responsible for the policy-setting, design or overall management of the subject of evaluation (nor expect to be so in the near future)*".

QUALITY ASSURANCE

All UNIDO evaluations are subject to quality assurance by UNIDO Evaluation Group. These applied evaluation quality assessment criteria are used as a tool for providing a structured feedback. The quality of the evaluation report will be assessed and rated

against the criteria set forth in the Checklist on evaluation report quality, attached as Annex III.

ANNEX I of Terms of Reference: TEMPLATE OF EVALUATION REPORTS

Table of Contents

4.6 Project Coordination and Management (include details of arrangements and conducting an assessment)
4.7 Thematic and Energy-Related Questions
4.8 Crosscutting Issues (gender, South/South cooperation)
4.9 Procurement issues

5. Conclusions, recommendations and lessons learned
5.1 Conclusions
5.2 Recommendations
5.3 Lessons learned

Annex A. Terms of Reference

Annex B. Organizations visited and persons met

Annex C. Bibliography

Annex D. Logframe

Annex E. Evaluation Matrix

Annex F. Interview Guidelines etc.

ANNEX II of Terms of Reference: JOB DESCRIPTIONS

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

Title:	**International Evaluation Consultant (Team leader)**
Main Duty Station and Location:	**Home-based**
Mission/s to:	**Vienna, Austria and Indonesia**
Start of Contract (EOD):	**August 2014**
End of Contract (COB):	
Number of Working Days:	**28 working days within 3 months**

ORGANIZATIONAL CONTEXT *The Office for Independent Evaluation is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. The Office for Independent Evaluation is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.*

PROJECT CONTEXT *The consultant will evaluate the projects according to the Terms of Reference. S/he will act as leader of the evaluation team and will be responsible for preparing the draft and final evaluation report. S/he will perform the following tasks:*

Main duties	Duration/ location	Deliverables
Review project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data…); determine key data to collect in the field and prepare key instruments (questionnaires, logic models…) to collect these data through interviews and/or surveys during and prior to the field missions. Preparation of inception report.	5 days Home Based	List of detailed evaluation questions to be clarified; questionnaires/ interview guide; logic models; list of key data to collect, draft list of stakeholders to interview during the field missions
Briefing with the UNIDO Evaluation Group, project managers and other key stakeholders.	3 days (at UNIDO HQ, including travel)	Interview notes, detailed evaluation schedule and list of stakeholders to interview during the field missions Division of evaluation tasks with the other (Inter/national) Evaluation Consultant
Conduct field mission to in August 2014.	8 days (including travel)	Presentations of the evaluation's initial findings, draft conclusions and recommendations to main stakeholders at the end of the missions. Agreement with the National Consultant on the structure and content of the evaluation report and the distribution of writing tasks
Present overall findings and recommendations to the stakeholders Further discuss findings and validate them	3 days (at UNIDO HQ, including travel	Presentation slides
Prepare the evaluation report according to TOR and template provided by UNIDO ODG/EVA Coordinate the inputs from the National Consultant and combine with her/his own inputs into the draft evaluation report	6 days Home based	Draft evaluation report Brief input report to country evaluation
Revise the draft project evaluation report based on comments from UNIDO Evaluation Group and stakeholders and	3 days Home based	Final evaluation report

Main duties	Duration/ location	Deliverables
edit the language and form of the final version according to UNIDO standards		
TOTAL	**28 days**	

Qualifications and skills:

- ✓ *Advanced degree in environmental science, renewable energy, development studies or related areas*
- ✓ *Knowledge of and experience in the field of renewable energies*
- ✓ *Knowledge and experience in the field of evaluation (of development projects)*
- ✓ *Knowledge of UNIDO procedures and activities an asset*
- ✓ *Working experience in South East Asia an asset*

Language: English

Absence of Conflict of Interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultants will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the Evaluation Group.

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TERMS OF REFERENCE FOR PERSONNEL UNDER INDIVIDUAL SERVICE AGREEMENT (ISA)

Title:	**National Evaluation Consultant (Team leader)**
Main Duty Station and Location:	**Home-based**
Mission/s to:	**In country travel**
Start of Contract (EOD):	**August 2014**
End of Contract (COB):	
Number of Working Days:	**21 working days within 3 months**

ORGANIZATIONAL CONTEXT *The Office for Independent Evaluation is responsible for the independent evaluation function of UNIDO. It supports learning, continuous improvement and accountability, and provides factual information about result and practices that feed into the programmatic and strategic decision-making processes. Evaluation is an assessment, as systematic and impartial as possible, of a programme, a project or a theme. Independent evaluations provide evidence-based information that is credible, reliable and useful, enabling the timely incorporation of findings, recommendations and lessons learned into the decision-making processes at organization-wide, programme and project level. The Office for Independent Evaluation is guided by the UNIDO Evaluation Policy, which is aligned to the norms and standards for evaluation in the UN system.*

PROJECT CONTEXT *The consultant will evaluate the projects according to the Terms of Reference. S/he will act as leader of the evaluation team and will be responsible for preparing the draft and final evaluation report. S/he will perform the following tasks:*

Main duties	Duration/ location	Deliverables
Review project documentation and relevant country background information (national policies and strategies, UN strategies and general economic data…); assist the Team Leader in determining the key data to collect in the field and prepare key instruments (questionnaires, logic models…) to collect these data through interviews and/or surveys during and prior to the field missions. Coordinate with Team Leader in the planning of the evaluation field mission and contacting concerned counterparts and stakeholders to prepare the evaluation programme. Provide inputs to inception report.	5 days Home based	List of detailed evaluation questions to be clarified; questionnaires/ interview guide; logic models; list of key data to collect, draft list of stakeholders to interview during the field missions
Briefing with the UNIDO Field Office Finalise mission plan and appointments and ensure logistical support in place in the field.		Briefing notes, detailed evaluation schedule and list of stakeholders to interview during the field missions Coordinate logistics and meeting schedules with national counterparts and relevant stakeholders.
Conduct field mission to in August 2014.	5 days (including travel in country)	Presentations of the evaluation's initial findings, draft conclusions and recommendations to main stakeholders at the end of the missions. Agreement with the Evaluation Team Leader on the structure and content of the evaluation report and the distribution of writing tasks
Prepare the evaluation report according to TOR and template provided by UNIDO ODG/EVA Coordinate the inputs from the National	11 days	Draft evaluation report Brief input report to country evaluation

Main duties	Duration/ location	Deliverables
Consultant and combine with her/his own inputs into the draft evaluation report	Home based	
Revise the draft project evaluation report based on comments from UNIDO Evaluation Group and stakeholders and edit the language and form of the final version according to UNIDO standards		Final evaluation report
TOTAL	**21 days**	

Qualifications and skills:

- ✓ *Advanced degree in environmental science, renewable energy, development studies or related areas*
- ✓ *Knowledge of and experience in the field of renewable energies, with expertise in tidal energy and marine current exploitation*
- ✓ *Knowledge and experience in the field of evaluation (of development projects)*
- ✓ *Knowledge of UNIDO procedures and activities an asset*
- ✓ *Working experience in South East Asia an asset*

Language: English and Indonesian

Absence of Conflict of Interest:

According to UNIDO rules, the consultant must not have been involved in the design and/or implementation, supervision and coordination of and/or have benefited from the programme/project (or theme) under evaluation. The consultant will be requested to sign a declaration that none of the above situations exists and that the consultant will not seek assignments with the manager/s in charge of the project before the completion of her/his contract with the Evaluation Group.

ANNEX III of Terms of Reference: CHECKLIST ON EVALUATION REPORT QUALITY

Report Quality Criteria	UNIDO Evaluation Group Assessment Notes	Rating
Report structure and quality of writing		
The report is written in clear language, correct grammar and use of evaluation terminology. The report is logically structured with clarity and coherence. It contains a concise executive summary and all other necessary elements as per the TOR.		
Evaluation objective, scope and methodology		
The evaluation objective is explained and the scope defined. The methods employed are explained and appropriate for answering the evaluation questions. The evaluation report gives a complete description of stakeholder's consultation process in the evaluation. The report describes the data sources and collection methods and their limitations. The evaluation report was delivered in a timely manner so that the evaluation objective (e.g. important deadlines for presentations) was not affected.		
Evaluation object		
The logic model and/or the expected results chain (inputs, outputs and outcomes) of the object is clearly described. The key social, political, economic, demographic, and institutional factors that have a direct bearing on the object are described. The key stakeholders involved in the object implementation, including the implementing agency(s) and partners, other key stakeholders and their roles are described. The report identifies the implementation status of the object, including its phase of implementation and any significant changes (e.g. plans, strategies, logical frameworks) that have occurred over time and explains the implications of those changes for the evaluation.		

Report Quality Criteria	UNIDO Evaluation Group Assessment Notes	Rating
Findings and conclusions		
The report is consistent and the evidence is complete (covering all aspects defined in the TOR) and convincing. The report presents an assessment of relevant outcomes and achievement of project objectives. The report presents an assessment of relevant external factors (assumptions, risks, impact drivers) and how they influenced the evaluation object and the achievement of results. The report presents a sound assessment of sustainability of outcomes or it explains why this is not (yet) possible. The report analyses the budget and actual project costs. Findings respond directly to the evaluation criteria and questions detailed in the scope and objectives section of the report and are based on evidence derived from data collection and analysis methods described in the methodology section of the report. Reasons for accomplishments and failures, especially continuing constraints, are identified as much as possible. Conclusions are well substantiated by the evidence presented and are logically connected to evaluation findings. Relevant cross-cutting issues, such as gender, human rights, and the environment are appropriately covered.		
Recommendations and lessons learned		
The lessons and recommendations are based on the findings and conclusions presented in the report. The recommendations specify the actions necessary to correct existing conditions or improve operations (‘who?’ ‘what?’ ‘where?’ ‘when?)’. Recommendations are implementable and take resource implications into account.		

Report Quality Criteria	UNIDO Evaluation Group Assessment Notes	Rating
Lessons are readily applicable in other contexts and suggest prescriptive action.		

Rating system for quality of evaluation reports

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1, and unable to assess = 0.

ANNEX V of Terms of Reference: KEY SUPPORTING DOCUMENTS

Document	Year of Publication
Project Document	**2005**
Joint Venture Agreement by and between Ponte di Archimede and PT. Walinusa Energi	**2006**
Terms of Reference, Appendix 2.1 to UNIDO – "Kobold Technology, Innovation and Research, Technical Papers"	**2006**
Contract No 16001183 between UNIDO and PT Kobold Nusa	**2006**
Updated Work Plan	**2011**
AMC Request for Funds	**2013**
Project Progress Report submitted to AMC	**2013**
Summary Project Progress Report	**2014**
Email exchange between UR Indonesia and ECC and UR/MOFA meeting minutes	**2013**

ANNEX VI – UNIDO PROCUREMENT PROCESS

UNIDO Procurement Process

-- Generic Approach and Assessment Framework –

1. Introduction

This document outlines an approach and encompasses a framework for the assessment of UNIDO procurement processes, to be included as part of country evaluations as well as in technical cooperation (TC) projects/programmes evaluations.

The procurement process assessment will review in a systematic manner the various aspects and stages of the procurement process being a key aspect of the technical cooperation (TC) delivery. These reviews aim to diagnose and identify areas of strength as well as where there is a need for improvement and lessons.

The framework will also serve as the basis for the "thematic evaluation of the procurement process efficiency" to be conducted in 2015 as part of the ODG/EVA work programme for 2014-15.

2. Background

Procurement is defined as the overall process of acquiring goods, works, and services, and includes all related functions such as planning, forecasting, supply chain management, identification of needs, sourcing and solicitation of offers, preparation and award of contract, as well as contract administration until the final discharge of all obligations as defined in the relevant contract(s). The procurement process covers activities necessary for the purchase, rental, lease or sale of goods, services, and other requirements such as works and property.

Past project and country evaluations commissioned by ODG/EVA raised several issues related to procurement and often efficiency related issues. It also became obvious that there is a shared responsibility in the different stages of the procurement process which includes UNIDO staff, such as project managers, and staff of the procurement unit, government counterparts, suppliers, local partner agencies (i.e. UNDP), customs and transport agencies etc..

In July 2013, a new “UNIDO Procurement Manual” was introduced. This Procurement Manual provides principles, guidance and procedures for the Organization to attain specified standards in the procurement process. The Procurement Manual also establishes that “The principles of fairness, transparency, integrity, economy, efficiency and effectiveness must be applied for all procurement transactions, to be delivered with a high level of professionalism thus justifying UNIDO’s involvement in and adding value to the implementation process”.

To reduce the risk of error, waste or wrongful acts and the risk of not detecting such problems, no single individual or team controls shall control all key stages of a transaction. Duties and responsibilities shall be assigned systemically to a number of individuals to ensure that effective checks and balances are in place.

In UNIDO, authorities, responsibilities and duties are segregated where incompatible. Related duties shall be subject to regular review and monitoring. Discrepancies, deviations and exceptions are properly regulated in the Financial Regulations and Rules and the Staff Regulations and Rules. Clear segregation of duties is maintained between programme/project management, procurement and supply chain management, risk management, financial management and accounting as well as auditing and internal oversight. Therefore, segregation of duties is an important basic principle of internal control and must be observed throughout the procurement process.

The different stages of the procurement process should be carried out, to the extent possible, by separate officials with the relevant competencies. As a minimum, two officials shall be involved in carrying out the procurement process. The functions are segregated among the officials belonging to the following functions:

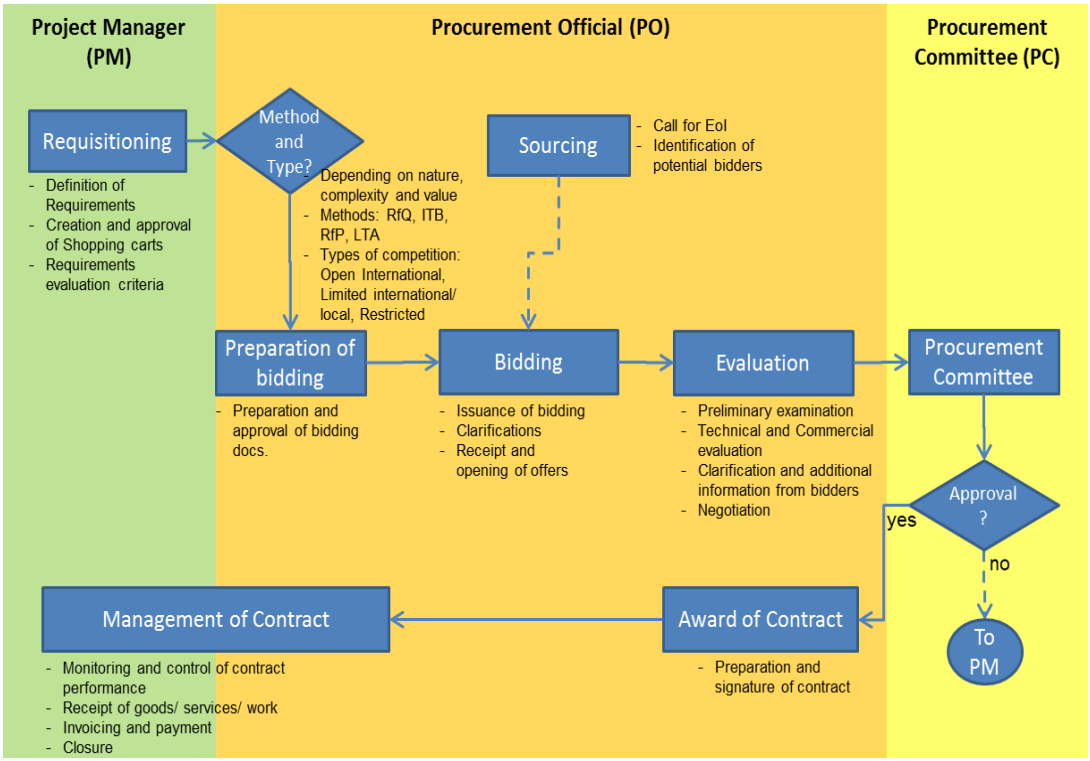
- Procurement Services: For carrying out centralized procurement, including review of technical specifications, terms of reference, and scope of works, market research/surveys, sourcing/solicitation, commercial evaluation of offers, contract award, contract management;
- Substantive Office: For initiating procurement requests on the basis of well formulated technical specifications, terms of reference, scope of works, ensuring

availability of funds, technical evaluation of offers; award recommendation; receipt of goods/services; supplier performance evaluation. In respect of decentralized procurement, the segregation of roles occur between the Project Manager/Allotment Holder and his/her respective Line Manager. For Fast Track procurement, the segregate on occurs between the Project Manager/Allotment Holder and Financial Services;

- Financial Services: For processing payments.

Figure 1 presents a preliminary "Procurement Process Map", showing the main stages, stakeholders and their respective roles and responsibilities. During 2014/2015, in preparation for the thematic evaluation of the procurement process in 2015, this process map/ workflow will be further refined and reviewed.

Figure 1: UNIDO Procurement Process Map



3. Purpose

The purpose of the procurement process assessments is to diagnose and identify areas for possible improvement and to increase UNIDO's learning about strengths and weaknesses in the procurement process. It will also include an assessment of the adequacy of the 'Procurement Manual" as a guiding document.

The review is intended to be useful to managers and staff at UNIDO headquarters and in the field offices (project managers, procurement officers), who are the direct involved in procurement and to UNIDO management.

4. Scope and focus

Procurement process assessments will focus on the efficiency aspects of the procurement process, and hence it will mainly fall under the efficiency evaluation criterion. However, other criteria such as effectiveness will also be considered as needed.

These assessments are expected to be mainstreamed in all UNIDO country and project evaluations to the extent of its applicability in terms of inclusion of relevant procurement related budgets and activities.

A generic evaluation matrix has been developed and is found in Annex B. However questions should be customized for individual projects when needed.

5. Key Issues and Evaluation Questions

Past evaluations and preliminary consultations have highlighted the following aspects or identified the following issues:

- Timeliness. Delays in the delivery of items to end-users.
- Bottlenecks. Points in the process where the process stops or considerably slows down.
- Procurement manual introduced, but still missing subsidiary templates and tools for its proper implementation and full use.
- Heavy workload of the procurement unit and limited resources and increasing "procurement demand"
- Lack of resources for initiating improvement and innovative approaches to procurement (such as Value for Money instead of lowest price only, Sustainable product lifecycle, environmental friendly procurement, etc.)
- The absence of efficiency parameters (procurement KPIs)

On this basis, the following evaluation questions have been developed and would be included as applicable in all project and country evaluations in 2014-2015

- To what extent does the process provide adequate treatment to different types of procurement (e.g. by value, by category, by exception…)
- Was the procurement timely? How long the procurement process takes (e.g. by value, by category, by exception…)
- Did the good/item(s) arrive as planned or scheduled? If no, how long were the times gained or delays. If delay, what was the reason(s)?
- Were the procured good(s) acquired at a reasonable price?
- To what extent were the procured goods of the expected/needed quality and quantity?
- Were the transportation costs reasonable and within budget. If no, pleased elaborate.
- Was the freight forwarding timely and within budget?. If no, pleased elaborate.
- Who was responsible for the customs clearance? UNIDO FO? UNDP? Government? Other?
- Was the customs clearance handled professionally and in a timely manner? How many days did it take?
- How long time did it take to get approval from the government on import duty exemption?
- Which were the main bottlenecks / issues in the procurement process?
- Which good practices have been identified?

- To what extent roles and responsibilities of the different stakeholders in the different procurement stages are established, adequate and clear?
- To what extent there is an adequate segregation of duties across the procurement process and between the different roles and stakeholders?

6. Evaluation Method and Tools

These assessments will be based on a participatory approach, involving all relevant stakeholders (e.g. process owners, process users and clients).

The evaluation tools to be considered for use during the reviews are:

- **Desk Review**: Policy, Manuals and procedures related to the procurement process. Identification of new approaches being implemented in other UN or international organizations. Findings, recommendations and lessons from UNIDO Evaluation reports.
- **Interviews**: to analyze and discuss specific issues/topics with key process stakeholders
- **Survey to stakeholders**: To measure the satisfaction level and collect expectations, issues from process owners, user and clients
- **Process and Stakeholders Mapping**: To understand and identify the main phases the procurement process and sub-processes; and to identify the perspectives and expectations from the different stakeholders, as well as their respective roles and responsibilities
- **Historical Data analysis from IT procurement systems**: To collect empirical data and identify and measure to the extent possible different performance dimensions of the process, such as timeliness, re-works, complaints, ..)

An evaluation matrix is presented in Annex A, presenting the main questions and data sources to be used in the project and country evaluations, as well as the preliminary questions and data sources for the forthcoming thematic evaluation on Procurement process in 2015.

ANNEX VII of Terms of Reference: Evaluation Matrix for the Procurement Process

No.	Area	Evaluation Question	Indicators [17]	Data Source(s) For Country / Project Evaluations	Additional data Source(s) For Thematic Evaluation of procurement process in 2015.
	Timeliness	- Was the procurement timely? How long the procurement process takes (e.g. by value, by category, by exception…)	(Overall) Time to Procure (TTP)	• Interviews with PMs, Government counterparts and beneficiaries	• Procurement related documents review • SAP/Infobase (queries related to procurement volumes, categories, timing, issues) • Evaluation Reports • Survey to PMs, procurement officers, beneficiaries, field local partners. • Interviews with Procurement officers
		- Did the good/item(s) arrive as planned or scheduled? If no, how long were the times gained or delays. If delay, what was the reason(s)?	Time to Delivery (TTD)	• Interviews with PM, procurement officers and Beneficiaries	
		- Was the freight forwarding timely and within budget? If no, pleased elaborate.			

[17] These indicators are preliminary proposed here. They will be further defined and piloted during the Thematic Evaluation of UNIDO procurement process planned for 2015.

No.	Area	Evaluation Question	Indicators [17]	Data Source(s) For Country / Project Evaluations	Additional data Source(s) For Thematic Evaluation of procurement process in 2015.
		- Was the customs clearance timely? How many days did it take?		• Interviews with PMs, Government counterparts and beneficiaries	
		- How long time did it take to get approval from the government on import duty exemption	Time to Government Clearance (TTGC)	• Interviews with beneficiaries	
	Roles and Responsibilities	- To what extent roles and responsibilities of the different stakeholders in the different procurement stages are established, adequate and clear?	Level of clarity of roles and responsibilities	• Procurement Manual • Interview with PMs	• Procurement related documents review • Evaluation Reports • Survey to PMs, procurement officers, beneficiaries, field local partners. • Interviews with Procurement officers
		- To what extent there is an adequate segregation of duties across the procurement process and		• Procurement Manual • Interview with PMs	

No.	Area	Evaluation Question	Indicators [17]	Data Source(s) For Country / Project Evaluations	Additional data Source(s) For Thematic Evaluation of procurement process in 2015.
		between the different roles and stakeholders ?			
		- How was responsibility for the customs clearance arranged? UNIDO FO? UNDP? Government ? Other?		• Procurement Manual • Interview to PMs • Interviews with local partners	
		- To what extent were suppliers delivering products/ services as required?	Level of satisfaction with Suppliers	• Interviews with PMs	
	Costs	- Were the transportation costs reasonable and within budget. If no, pleased elaborate.		• Interviews with PMs	• Evaluation Reports • Survey to PMs, procurement officers, beneficiaries, field local partners. • Interviews with Procurement officers
		- Were the procured goods/services within the expected/planned costs? If no, please elaborate	Costs vs budget	• Interview with PMs	

No.	Area	Evaluation Question	Indicators [17]	Data Source(s) For Country / Project Evaluations	Additional data Source(s) For Thematic Evaluation of procurement process in 2015.
	Quality of Products	- To what extent the process provides adequate treatment to different types of procurement (e.g. by value, by category, by exception…)		• Interview with PMs	• Evaluation Reports • Survey to PMs, procurement officers, beneficiaries, field local partners. • Interviews with Procurement officers
		- To what extent were the procured goods of the expected/needed quality and quantity?.	Level of satisfaction with products/services	• Survey to PMs and beneficiaries • Observation in project site	
	Process/ workflow	- To what extent the procurement process if fit for purpose?	Level of satisfaction with the procurement process	• Interviews with PMs, Government counterparts and beneficiaries	• Procurement related documents review • Evaluation Reports • Survey to PMs, procurement officers, beneficiaries, field local partners. • Procurement related documents review • Evaluation Reports • Survey to PMs, procurement officers, beneficiaries, field local partners. • Interviews with Procurement officers
		- Which are the main bottlenecks / issues in the procurement process?		• Interviews with PMs, Government counterparts and beneficiaries	
		- Which part(s) of the procurement process can		• Interview with PMs	

No.	Area	Evaluation Question	Indicators [17]	Data Source(s) For Country / Project Evaluations	Additional data Source(s) For Thematic Evaluation of procurement process in 2015.
		be streamlined or simplified?			

ANNEX J: Pictures

All pictures were taken on Lombok during the field visit of the evaluation team on September 10, 2014

Picture 1: The platform in front of one of the harbor entrances to Labuhan Haji Port

Pictureset 2: Hydraulic pump, hydraulic break, generator, gears (stored inside platform)




Pictureset 3: Blade farings, arms, 14 mooring blocks, 2 more mooring blocks (sitting next to platform)



Pictureset 4: Some of the smaller components sitting in Labuhan Haji Port



Pictureset 5: Village energy system in Ketapang, Pringgabaya (solar PV panels and micro wind turbine on top of hut, meters, battery bank and Diesel genset inside hut)




Picture 6: Electronic components in Ketapang village, Pringgabaya

Picture 7: Hut for grid connection of subsea cable on the beach of Ketapang village, Pringgabaya

Picture 8: Alas Strait, expected installation site for Kobold turbine