A new approach to utilize associated gas in the upstream business*

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Abstract: Japan Vietnam Petroleum Company Limited (JVPC), an affiliate of Nippon Oil Exploration Limited, began its operations in Block 15-2 Offshore Vietnam in 1992, with crude oil production starting in the Rang Dong Field in the same block in August 1998. During initial oil production, the Rang Dong Field’s associated gas (Rang Dong Associated Gas) was being flared due to economic reason. With environmental concerns in mind, the economic utilization of the Rang Dong Associated Gas had been a long standing issue for JVPC and its partners. In 2001, JVPC began its Rang Dong Gas Utilization Project (Project) under the Clean Development Mechanism (CDM) framework. The Project was led by JVPC and conducted jointly by JVPC, ConocoPhillips, Petrovietnam and Petrovietnam Exploration and Production (CDM Project Participants). The Project activities included the construction of compressor facilities and a 46 km gas pipeline connecting Rang Dong Field to the nearby Bach Ho Field where a gas transportation pipeline had been installed to connect the Bach Ho Field to the onshore gas processing plant at Dinh Co (GPP). Thereafter, Rang Dong Associated Gas could be sent to GPP via Bach Ho Field for effective utilization. Rang Dong Associated Gas is processed into dry gas, LPG and condensate at GPP and is supplied to the power plants, or to the local market for cooking fuel, and is also used for producing gasoline. As a direct result of this project, there has been a significant reduction in CO₂ emissions through the elimination of gas flaring offshore and the changes in energy sources onshore. On the 4th February, 2006 this Project was registered as a CDM project with an estimated reduction in Green House Gases (GHG) emissions of about 6.8 million tons of CO₂ (equivalent) for the 10-year Project credit period from 2001 to 2011. This paper outlines the Rang Dong Gas Utilization Project under the Clean Development Mechanism and outlines the challenges experienced by JVPC during the preparation and implementation of the Project.

Key words: Vietnam, Clean Development Mechanism (CDM), Kyoto Protocol, Green House Gas, First registration as CDM project

1. Introduction

Currently, in excess of one hundred and fifty billion (150,000,000,000) cubic metres of natural associated gas is flared annually worldwide1). The reason behind this is that the utilization of the gas produced in association with crude oil production is not always economical for the oil producers. In many developing or under-developed countries, national economic growth takes precedents over environmental concerns. Therefore, to secure crude oil production it is not uncommon for such countries to allow the flaring of unprofitable associated gas.

Rang Dong Field was one such field flaring natural associated gas at the beginning of its crude oil production. This field is located in Block 15-2 which lies on the continental shelf offshore of the Socialist Republic of Vietnam, about 140 km from Vung Tau City. JVPC, together with its partners, has been conducting exploration and development activities in Block 15-2 since 1992. In August 1998,
after the achievement of first oil, JVPC entered into the production phase at Rang Dong Field. Similarly with other projects in Southeast Asia, natural gas associated with the crude oil production was being flared due to it being economically unviable to transport such gas onshore for its utilization. However, JVPC and its partners, in the first phase development plan, showed a strong intention to make use of such valuable gas in the future for energy conservation purposes. Such plans rested on whether certain investment criteria could be met.

In the mean time, GHG emissions became a significant and urgent global concern. At the third meeting held in Kyoto in 1997, the participants in the United Nations Framework Convention on Climate Change (UNFCCC) agreed to set the reduction target for GHG emissions for developed countries (Annex I Countries). At this meeting, the Clean Development Mechanism was one of the three market mechanisms introduced as a means to achieving the emissions reduction target in a practical and cost effective way.

Under the CDM scheme a company from one of the Annex I Countries provides financial and technical support for a joint project to be carried out with a company from a host developing country, such host developing country having no obligation to reduce GHG emissions under the UNFCCC (Non-Annex I Countries). If the project is eligible under the CDM criteria UNFCCC shall register it as a CDM project and issue a Certified Emission Reduction (CER) certificate to the project participants which reflects the actual measured reduction in GHG from the project. The CER can be used to meet the GHG emissions reduction target, or can be traded in the market with parties who need such CER for meeting their GHG emissions reduction target.

The further development of the CDM regulations in the subsequent years created a new opportunity for the utilization of Rang Dong Associated Gas in an economical manner. The concept envisaged in lines with the CDM regulation was to install compression facilities at Rang Dong Field and a pipeline to transport the Rang Dong Associated Gas to the nearby Bach Ho Field and then onto the existing Dinh Co GPP for processing and distribution.

JVPC and its partners commenced discussions with Petrovietnam, the state owned entity with a monopoly in the gas downstream business, on the commercial terms for the sales of Rang Dong Associated Gas. However, Petrovietnam was not authorized to make final decision on the commercial terms for the purchase of the gas because the Government has a strict control on gas price in accordance with national energy security policy. Therefore, Petrovietnam could not get the approval from the Government to accept a gas purchase price which was other than in accordance with the predetermined scheme to subsidize the premature energy and fertilizing industries in the local area. Although the gas commercial terms as determined by the Vietnamese Government (via Petrovietnam) were not economically viable from an investment point of view, JVPC and its partners accepted the terms considering that the application of the CDM to the Project would make the Project feasible through the CER trading scheme.

However, despite JVPC's and its partners' interest in implementing the project, the viability of the project was jeopardized due to the uncertainty of Kyoto Protocol. Without the application CDM scheme it was unlikely that the Project would be economically feasible. It was questionable whether the Project should be postponed until the official registration of CDM project or at least until the ratification of Kyoto Protocol. However, the more delay in the implementation the less revenue from the sales of gas would be expected. In addition, as the economic value of the Project was influenced greatly by the CER value, any delays which resulted in further GHG emissions and therefore eroded the CER value, had the potential to jeopardize the Project as well. Finally, despite the uncertainty of Kyoto Protocol at the time, JVPC and its partners decided to bear the risk and implement the Project without waiting for either the ratification of Kyoto Protocol or the registration of the Project. In late 2001, after the installation and commissioning of the gas transportation facilities, Rang Dong Associated Gas started to be sent to Dinh Co GPP through Bach Ho Field for processing and distribution.

After implementing the Project, JVPC faced the task of registering the Project as a CDM project. The registration process was complicated by the
fact that this was JVPC’s first such registration, and furthermore, the CDM Executive Board (the EB) responsible for granting registration had not been involved in the registration of such a project previously. As such there was a lack of suitably approved methodologies by which the Project could be assessed. After five years of relentless efforts on the part of JVPC and its partners, on the 4th of February 2006, the Rang Dong Gas Utilization Project was approved by the EB as a CDM scheme and officially registered as CDM project.

This was the first ever successful CDM registration as a project in Vietnam and the first ever in the upstream business. The Project was also the largest global reduction in GHG emissions for any single CDM project at the time of registration. The Project makes the change in the attitude of some upstream participants and the success of the Project will hopefully be an incentive for other oil producers to consider the utilization of the associated gas which would normally be flared.

In this paper, after a brief explanation of the Project activities, explanations on the following key issues will be presented:

- Baseline Methodology (method of defining expected GHG emissions reduction from the Project);
- General Description of Monitoring;
- GHG Emissions Reduction Calculation; and
- Challenges Encountered.

2. Project Activities

The Project activities were comprised of the installation of gas compression facilities on a newly installed platform and a gas transportation pipeline to transport the Rang Dong Associated Gas to the Dinh Co GPP for its effective utilization (Fig.1). As a result of the almost complete elimination of offshore flaring activities GHG emissions are reduced significantly at the offshore site. At the onshore GPP, the Rang Dong Associated Gas is processed into dry gas (mostly methane), LPG (butane and propane) and condensate (hydrocarbon molecules containing five or more carbons). The dry gas is supplied to nearby power plants (Phu My and Ba-Ria), the LPG is supplied domestically as cooking fuel, and the condensate is used to produce gasoline. This dry gas, LPG, and condensate have replaced fuel products which were imported before the Project implementation. As such, the utilization of such products onshore shall not cause any net increase in GHGs emissions. The GHGs emissions from the Project activities, if any, should be due to the fugitive emissions at the transportation and processing systems or the Project’s energy consumption from the Project operation. Therefore, not only the reduction in GHGs emissions reduction but also the increase of GHGs emissions from the Project are taken into account for when calculating the calculation of the net reduction in GHGs emissions reduction of the project. It is obvious that the amount of GHG emissions reduction at the offshore site outweighs the GHG emitting from the Project operation. As a result, the Project shall generate a significant amount of net GHG emissions reduction and that meet the fundamental principles of CDM project.

3. Baseline Methodology (Method of defining expected reduction in CO₂ emissions)

Since this type of CDM scheme had not previously been the subject of CDM approval, JVPC had to develop its own methodology to calculate the reduction in GHG emissions (“Baseline Methodology”). The methodology was based on the operating conditions of gas exporting, transporting and processing system. The methodology was submitted to the EB through its functionally advisory Methodology Panel.
Methodology should ensure that the reduction in GHG emissions and also any increases in emissions due to the project activities are monitored and measured with high accuracy. As mentioned above, Rang Dong Gas Utilization Project’s related facilities are not only owned by JVPC and its partners, but are also owned by the other companies. Therefore, the data collection process for the purpose of developing the methodology needed to involve several third parties, such as Bach Ho Field Operator and Dinh Co GPP Operator.

The Methodology Panel initially requested highly accurate monitoring methodologies which could only be complied with by a perfect and ideal monitoring system. However from a technical and commercial point of view, the implementation of such a system was impractical for JVPC. Special endeavors were made to find alternative monitoring methods which were in accordance with good industry standard practice. Various technical data, environmental protection guidelines, and international petroleum practice information was collected, analyzed and submitted to the Methodology Panel for their review. An appropriate monitoring practice was selected and incorporated in the revised Baseline Methodology for submission. Finally, the Methodology Panel approved the revised Baseline Methodology naming it “AM009 Ver. 02”. This Baseline Methodology can now be used globally in any project of a similar nature.

4. General Description of Monitoring

In accordance with the Baseline Methodology there are three major monitoring points (Fig. 2). At first, the gas volume and compositions are monitored at the outlet of Rang Dong Field (Point A as shown in Fig. 2). The data at Point A represents the baseline reduction in emissions. Due to the nature of the project activities, some GHG emissions at onshore processing facilities or fugitive emissions are expected. In order to calculate the emissions caused by the Project activities or the leakage of gas during the transportation, the volume and compositions of gas products at outlet of the GPP (Point B as shown in Fig. 2) are also monitored. The gas leakage in processing and transportation are also monitored in accordance with US Environment Protection Agency Guidance (US EPA-453/R-95-017). Before being transported to the GPP, Rang Dong Associated Gas is sent to the Bach Ho Field, and is commingled with Bach Ho gas. Therefore, the volume and compositions at the outlet of Bach Ho Field (Point X as shown in Fig. 2) are also required to be monitored so that gas leakage or emissions as a result of the Project activities can be proportionally allocated accordingly to Rang Dong Associated Gas and Bach Ho gas.

At each Monitoring Point, all volume and composition data should be measured and monitored in an accurate manner. The type of data required and the monitoring frequency are shown in Table 1.
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JVPC as a Project leader is responsible for calculating the net reduction in GHG emissions based on the collected data. The calculation result is reviewed and approved among the CDM Project Participants. The flow of this approval process is shown in Fig. 3.

### Table 1 Monitoring Parameters of the Rang Dong Associated Gas Utilization Project

<table>
<thead>
<tr>
<th>Data Name</th>
<th>Data type</th>
<th>Explanation</th>
<th>Data unit</th>
<th>Recording Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ( V_{A,y} )</td>
<td>Volume</td>
<td>Quantity of recovered gas at point A</td>
<td>m³</td>
<td>continuously</td>
</tr>
<tr>
<td>2. ( W_{\text{carbon}, A, y} )</td>
<td>Composition</td>
<td>Composition of recovered gas at point A</td>
<td>% and kg/m³</td>
<td>monthly</td>
</tr>
<tr>
<td>3. ( V_{X,y} )</td>
<td>Volume</td>
<td>Quantity of recovered gas at point X</td>
<td>m³</td>
<td>continuously</td>
</tr>
<tr>
<td>4. ( W_{\text{carbon}, x, y} )</td>
<td>Composition</td>
<td>Gas composition of associated gas produced at point X</td>
<td>% and kg/m³</td>
<td>monthly</td>
</tr>
<tr>
<td>5. ( V_{B, \text{dry gas}, y} )</td>
<td>Volume</td>
<td>Volume of dry gas produced at GPP (Point B)</td>
<td>m³</td>
<td>continuously</td>
</tr>
<tr>
<td>6. ( W_{\text{carbon, dry gas, B, y}} )</td>
<td>Composition</td>
<td>Composition of dry gas produced at GPP (Point B)</td>
<td>% and kg/m³</td>
<td>monthly</td>
</tr>
<tr>
<td>7. ( M_{\text{LPG, A, x}} )</td>
<td>Mass</td>
<td>Quantity of LPG produced at GPP (Point B)</td>
<td>Ton</td>
<td>continuously</td>
</tr>
<tr>
<td>8. ( W_{\text{carbon, LPG, B, y}} )</td>
<td>Composition</td>
<td>Composition of LPG produced at GPP (Point B)</td>
<td>% and kg/m³</td>
<td>monthly</td>
</tr>
<tr>
<td>9. ( M_{\text{condensate, B, y}} )</td>
<td>Mass</td>
<td>Quantity of condensate produced at GPP (Point B)</td>
<td>Ton</td>
<td>continuously</td>
</tr>
<tr>
<td>10. ( W_{\text{carbon, condensate, B, y}} )</td>
<td>Composition</td>
<td>Composition of condensate produced at GPP (Point B)</td>
<td>% and kg/m³</td>
<td>monthly</td>
</tr>
<tr>
<td>11. ( M_{\text{oil, y}} )</td>
<td>Mass</td>
<td>Quantity of other fossil fuel used due to the project activity</td>
<td>Ton</td>
<td>annually</td>
</tr>
<tr>
<td>12. ( W_{\text{CH4, stream, processing}} )</td>
<td>Mass content</td>
<td>CH4 content of streams in the GPP</td>
<td>Kg CH4/kg</td>
<td>annually</td>
</tr>
<tr>
<td>13. ( T_{\text{equipment, processing}} )</td>
<td>Time</td>
<td>Operation time of each equipment in the gas processing plant</td>
<td>Hours</td>
<td>annually</td>
</tr>
</tbody>
</table>

**Fig. 3** Data Approval Process Flow Chart

5. Calculation of Reduction in GHG Emissions

Before the implementation of the Project, all or most of the produced gas was used as a fuel or flared on site at Rang Dong Field. After the Project started, most of
the associated gas was utilized at Dinh Co GPP while some part of the gas had been and will continue to be used as a fuel for the field operation. Therefore, the net reduction in GHG Emissions shall be calculated with the following equation:

\[
\text{Actual Emissions Reduction} = \text{Baseline Emissions Reduction} - \text{Emissions by Project Activity}
\]

The estimation of Actual GHG Emissions Reduction in each year as provided in the Project Design Document (PDD) is shown in Table 2. Please note that figures in Table 2 include the base line emission during the period from Jan to Nov 2001 which is before the Project implementation.

6. Challenges Encountered

JVPC encountered and overcame various difficulties during the implementation and registration of the Project. This paper provides details of some of the experiences and lessons learnt which JVPC considers the most valuable in the process of implementation and registration the Rang Dong Gas Utilization Project as CDM project.

6.1 Project Design Document and Additionality

The PDD is an important component in the CDM project cycle, and its preparation is a complex task. The success in steering a project through the CDM process hinges largely on developing a clear, accurate and comprehensive PDD. This is the key document that the host country, investors, stakeholders (local, national and international) and designated operational entities will use to evaluate the project’s potential and merits. A project cannot earn CERs without the development, validation and the EB’s acceptance of a PDD. The PDD needs to clearly demonstrate that the project will create additional reductions in greenhouse gas emissions beyond what would have occurred in its absence, and that the project will support the host country’s sustainable development path. All aspects of the PDD are important. However, the most technically challenging aspects have to do with establishing a baseline and assessing the project’s additionality. Because completion of the PDD is a substantial and expensive undertaking, project developers are recommended to stay in close contact with appropriate authorities to ensure that the project supports the host country’s sustainable development criteria and that the document meets their standards. The concept of additionality is critical to CER determination. CDM projects have to generate emissions reductions that are additional to any that would have occurred in the absence of the project activity. Additionality directly refers to whether the project activity results in a lower volume of greenhouse gas emissions in comparison with where no project exists. The issue of additionality is particularly important to prevent benefits from the CDM process being attributed to projects that would have happened anyhow or have already been undertaken. However, the general description of additionality does not provide clear guidance on financial additionality.
JVPCC’s experience in the successful development of PDD can be summarized as follows:

1. Financial criteria are often used by Designated Operating Entities (DOE)\(^\ddagger\) and EB as a tool to evaluate additionality. Projects which can be economically developed without consideration of CDM scheme (additional revenue from CERs trading) are unlikely to be eligible to be registered as CDM project.

2. Requirements for consolidated methodology and associated data collection are often huge and onerous. Therefore, this is a challenging and costly process.

3. Transparent and conservative calculations of GHGs emission reductions should be applied for the assurance of accuracy.

6.2 Communication and Adequate Training

CDM was quite a new concept to everyone in the year of 2001, especially in Vietnam where, at the time, the Designated National Authority (DNA) who is the CDM national authority had not been created and nominated yet. Even Petrovietnam which joined the Project as the representative of a Non-Annex I Country did not have adequate information or knowledge on the Kyoto Protocol and its CDM. Therefore, during the initial phase, Petrovietnam, while indicating its interest, said that they would need more time to research the CDM and Kyoto Protocol before they could seriously commit to work with foreign parties to apply this scheme to this potential gas project. Matters were further complicated by the fact that the effectiveness of the Kyoto Protocol was in doubt due to political uncertainties regarding the ratifications of the protocol. However, as mentioned above, delays of the Project could lead to reduced value of any issued CER. If JVPC had waited until the ratifications of the Kyoto Protocol in 2005, approximately three (3) million tonnes of CO\(_2\) equivalent would have been released into the atmosphere (see Table 2). In this case, and despite registration as a CDM project, the Project would not have been viable considering the poor economic return. Therefore, JVPC had to make an aggressive implementation plan under which the Project implementation and the administration procedure for CDM registration at the national and international level were carried out in parallel. In order to obtain the consensus among the CDM Project Participants, JVPC and its parent Company, Nippon Oil Corporation organized numerous workshops and seminars on the CDM concept in the context of Rang Dong Gas Utilization Project. These seminars and workshops were used to provide sufficient information to Petrovietnam to assist in obtaining their support. Furthermore, in-depth training was also provided to relevant experts of Petrovietnam to equip them with relevant and adequate CDM knowledge, including international movement on CDM regulations. Such communication and information also helped Petrovietnam understand the benefits that the CDM project would bring to Vietnam as one of the Non-Annex I Countries. With such aggressive and persistent activities on the part of JVPC and its partners, Petrovietnam management came to realize the merits and importance of CDM projects as well as the projects contribution to the sustainable development of Vietnam. Thereafter, Petrovietnam committed to provide JVPC with full cooperation by sanctioning the Project and putting aside the political uncertainties.

6.3 Close Observation of CDM Related Regulations

The legislative structure and regulations on CDM project was premature in 2001. Therefore, from time to time new regulations were issued by the EB. This caused a lot a difficulty for JVPC due to the necessity to adapt and comply with such changes. The new requirement of the “additionality tool”\(^\ddagger\ddagger\) for CDM project validation was one matter that JVPC spent a lot of time and effort on to ensure compliance. Without close observation, the PDD of JVPC might not have met the standard requirement for an eligible CDM project. For instance, the economic and commercial terms for the gas project were commercially confidential and JVPC didn’t include such information.

\(^\ddagger\) A Designated Operational Entity under the CDM is either a domestic legal entity or an international organization accredited and designated, on a provisional basis until confirmed by the COP/MOP, by the EB. It validates and subsequently requests registration of a proposed CDM project activity. It verifies emission reduction of a registered CDM project activity, certifies as appropriate and requests the Board to issue Certified Emission Reductions accordingly.

\(^\ddagger\ddagger\) Tool used for assessment of additionality of CDM project approved by EB.
in the PDD. With a close watch of CDM legislation, JVPC realized that such commercial information should be given to DOE as evidence for consolidated additionality tool test and immediately talked with Partners and Petrovietnam for releasing such data to DOE on time. Otherwise, the delay in Project validation process would have been occurred.

At the same time, the Vietnamese regulations on CDM projects were under development. The Rang Dong Gas Utilization Project was the first CDM project endorsed by the Vietnamese government. Therefore, the government itself had difficulty in evaluating the eligibility of the Project. JVPC took the initiative by providing sufficient information on the Project to the relevant government offices, even before the submission of Project Idea Note which later on became the core concept for developing the PDD. Various seminars had been organized to introduce the Project to the Ministry of Industry and the Ministry of Natural Resources and Environment who were the respective national departments responsible for the oil and gas business and environmental issues. Such contacts made the relevant authorities accustomed with the Project as well as CDM activities so as to give positive input in the process of creating and developing local CDM legislation. Such communication also built a bridge and established two way communication between the business sector (JVPC) and the authorities. Such close monitoring of regulations and communications with the local and international authorities helped JVPC keep up to date and in compliance with changes and movements on CDM related matters in Vietnam. Through the effective support of Nippon Oil Corporation who had a keen interest in developing the CDM project and who closely monitored international regulations, JVPC also could provide the Vietnam DNA with information to assist them in the process of establishing the local CDM legislation. For instance, the first approval letter by the Vietnamese government for Rang Dong CDM project did not cover the CDM required conditions. Having realized the issue, JVPC advised Vietnam DNA accordingly and provided the necessary information to the Vietnam DNA so they could reissue the approval letter in compliance with the CDM regulations for timely submission of the PDD to DOE for validation.

6.4 Sharing of Information and Responsibilities, Flexibilities and Well Preparation

At early stage, JVPC made repeated visits and requested to collect information and data from third party operators for the development of methodology without clear explanation or introduction on the purpose and the importance of such process to the working site specialists. As the information and data was collected from third parties on a piece by piece basis rather than all at once, some third parties, due to concerns with interruptions during busy periods, and safety, raised issues with ongoing information and data requests causing tension between the parties. As a result cooperation was not always fully provided. When such tension became apparent not only at the third party sites but also JVPC’s operating site, JVPC realized the miscommunication at the lower level and understood that some changes were necessary to communication approach. JVPC found out that the miscommunication was due to lack of information and improper arrangement of responsibilities. JVPC talked with other CDM Project Participants and decided to invite relevant experts from third party operators to the CDM team of Petrovietnam. This enabled comprehensive information in relation to CDM project to be provided to them to help them understand and become accustomed with the Project nature. Thereafter, being a member to the Project team, the third party operators’ specialists understood the contribution made by the Project and the importance of collecting data for the Project as well as the difficulties that JVPC had been facing on identifying the adequate data required for methodology development. The third party operators began to give full cooperation and even actively contributed to process of data collection by giving suggestion or idea on certain data that might help to overcome the technical problems in developing the methodology.

Normally, when conduct the auditing activities third party specialist consultants are engaged. Such specialists are expected to know what information is needed, as well as to have a well developed and pre-defined checklist for the actual audit. However,
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which required significant manpower as well as costs should proceed further with registration procedures concerns with whether CDM Project Participants. In such unclear circumstances, there were always the long and drawn out process, there were many goal of registration under the CDM scheme. During years for CDM Project Participants to achieve the final implement the Project before registration. It took five Participants had no choice but to take the risk to status of Kyoto Protocol until before its implementation. However, due to the fragile transporting and processing systems. any interruption to the operation of gas exporting, auditing process could be implemented without schedules of on-site auditing to ensure a smooth accuracy of monitoring systems without detailed information and explanations to the DOE. Together were mobilized so as to give sufficient and relevant explanations by the relevant specialists. Therefore, at the audit, a majority of relevant technical experts were mobilized so as to give sufficient and relevant information and explanations to the DOE. Together with third party operators JVPC developed detailed schedules of on-site auditing to ensure a smooth auditing process could be implemented without any interruption to the operation of gas exporting, transporting and processing systems.

6.5 Patience and Persistence

Normally, a CDM project should be registered before its implementation. However, due to the fragile status of Kyoto Protocol until 2005, CDM Project Participants had no choice but to take the risk to implement the Project before registration. It took five years for CDM Project Participants to achieve the final goal of registration under the CDM scheme. During the long and drawn out process, there were many doubts about the ratification of the Kyoto Protocol. In such unclear circumstances, there were always concerns with whether CDM Project Participants should proceed further with registration procedures which required significant manpower as well as costs for data collection and research. It was not easy to introduce a concept which was so fragile, uncertain and changeable and which was even new to those who developed it in a developing country where there was still a big gap between the environment policy and the real application of such policy. Repeated trial and endeavours with patience had been made in communication with the Project stake-holders and related parties in the process of CDM registration work. As the Project leader, JVPC always showed its strong belief and kept updating other CDM Project Participants with relevant information on international CDM movement so as to keep their and other related parties constant support. JVPC’s consistent intentions to develop not only the Rang Dong CDM project but also other potential CDM projects assisted in securing the full assistance of all parties involved, especially Petrovietnam and the Vietnam DNA.

References

2) List of registered CDM projects, United Nations Framework Convention on Climate Change (UNFCC) website http://cdm.unfccc.int/Projects/registered.html.  
活用することは、環境保護とエネルギー保護の観点から懸案であった。2001年、我々は将来Clean Development Mechanism (CDM)として認定されることを想定し、近隣油田であるバクホー油田までパイプラインを引くことにより、随伴ガスの大半を陸上へ輸送し、発電用燃料やベトナム国内の家庭用燃料として使用するプロジェクトを開始した。2006年、本プロジェクトは正式にCDMプロジェクトとして登録されたが、これには5年の歳月を要した。本文では、プロジェクト概要と登録までの道のりを通して学んだ経験・教訓を述べる。

CDMプロジェクトの登録完了までの5年間は、前例がないことから、温室効果ガス削減量算定の方法論の確立、ラジオ失油田・バクホー油田・ディンコーガス処理工場と3箇所でのガス量の測定方法の確認、2011年までの温室効果ガス削減予想量の確定に関する認証機関との折衝に費やされた。プロジェクトを進めるにあたって、当社およびそのパートナーのみならず、ベトナム政府、国営石油会社、バクホー油田、ディンコーガス処理工場へのこれ新しいプロジェクトの意義の説明、データ提出およびガス量検証作業への協力が不可欠であった。一方で、CDM関連の規則がたびたび変更になり、そのつど、関係組織に変更点を説明し理解を得ることも必要であった。

これらの努力、折衝を通じて、2006年2月4日に正式にCDMプロジェクトとして登録された。プロジェクト期間は2001～2011年までの10年間として定められ、温室効果ガスの総削減量はCO₂換算で680万トンと認定され、本スキームにおける世界最初で最大削減量のプロジェクトとなった。