ATMA Rural Water Supply System
South of Kpong, Ghana

GH / WM 07029 – Grant appraisal document

Document presented to the ORET Appraisal Committee for the Appraisal Committee meeting of 18 September 2007

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Ontwikkelingsrelevante exporttransacties
uitgevoerd door PricewaterhouseCoopers Advisory N.V
en Ecorys Nederland B.V.

Rotterdam, 10 September 2007

ORET Grant Appraisal

I. General Information	
1. Number and name of the application, country	
ATMA Rural Water Supply System South of Kpong, Ghana, ORET GH/ WM 07029	LDC-Country: No
2. Country of the applicant	
Netherlands	
3. Applicant	
TAHAL Group B.V	
4. Client	
Ministry of Works and Housing	
5. Local end user	
Ghana Water Company Ltd. (GWCL) – Accra, Ghana Note: GWCL is responsible for all construction works and will be the owner of all assets. For maintenance, billing and collection GWCL has a management contract with Aqua Vitens Rand Ltd (AVRL). After the plant is fully operational the new system will be handed over to AVRL.	

II. Project and Transaction
6. Project definition and time horizon
The project encompasses the rehabilitation and expansion of the Accra Tema Metropolitan Area (ATMA) Rural Water Supply Scheme, South of Kpong (or 'Old Kpong water works") and includes treatment, transmission and distribution of potable water to communities in five districts located around the cities of Accra and Tema. The works will take three years and the time horizon of the project is 20 years. The current system is lacking capacity to serve the growing population. Also the system is deteriorated since it was built almost 50 years ago: the leakage is high and the treatment capacity is weak. The current capacity is (10)(1c) m^3/day with an effective supply of (10)(1c) m^3 / per day. After implementation of the transaction, the total gross capacity of water works is (10)(1c) m^3 / day. When leakage of (10)(1c) percent is taken into account, the effective supply will be (10)(1c) m^3 /day serving at maximum capacity about (10)(1c) inhabitants from year 2022 onwards.

7. Project rationale
History The Kpong Water works were built in the early 1950s to supply water to the communities located in the Greater Accra Region. When later a separate water supply for Accra was constructed (called the 'New Kpong Water'), the water systems serving the Greater Accra region were incorporated in the ATMA Rural Water Supply System, then renamed the 'Old Kpong'. In the 1970s the 'Old Kpong' supply system was reconstructed with World Bank credit under the contract management and supervision of Tahal. Since then, apart from maintenance, no investments have taken place.

Current situation

Currently the Old Kpong system is in poor condition, causing the following problems:

- The distribution capacity of the system is limited in terms of piping, house connections and standpipes, resulting in insufficient and unreliable supply; and
- The quality of the water is at risk because of the deteriorated capacity of the treatment plant. Only due to the relatively good quality of the raw water, the plant is able to supply 'potable' water.

About 50 percent of the population of 355,000 inhabitants in the project area is connected to water, either through one of the 7,450 house connections or 450 standpipes. The other inhabitants have no access to potable water and –mostly women and children- fetch it from distant standpipes or from un-salubrious streams nearby carrying heavy buckets or jerry cans on their heads. The population is expected to grow three to five percent yearly. If the project is not implemented the water shortage will become more pronounced and for new inhabitants the walking distances to water are likely to be even longer. Alternatively, the lack of water supply may result in population migration to Accra, which already suffers from an insufficient and overstretched infrastructure.

Project objectives

The project has the objectives (1) to assure the water quality and supply and (2) to meet a growing demand due to the expected continued population growth to 592,000 in 2022.

Benefits

Direct benefits of the project are the prevention of morbidity and mortality, savings on health expenses, relief of women and children from water haulage and unburdening women from caring for the water-related sickness of their children. The saved time can be used by children to go to school. As women in urban areas are often involved in trading activities, the reliability in the supply of water will provide them with more time for their trades and thereby generating income.

Indirect benefits are the increase of the attractiveness of the area for both private persons and industry, thereby possibly reducing the population growth in nearby Accra.

8. Description of the transaction and duration

Procurement

In June 2000 GWCL issued an international tender for the design, build and finance of the rehabilitation and expansion of a number of selected water supply systems, including the 'Old Kpong'. Tahal, having valuable information and data on the ATMA Rural Water Supply System in-house, submitted the winning offer. A commercial contract with Tahal was signed in January 2001. Shortly after, a new Government decided to delay all signed contracts for which the works did not start yet. After a positive evaluation by Crown agents in July 2003, the project was revived. The original project covered all communities around Kpong and the budget surmounted the permissibility under ORET. To secure financing under ORET, the original project was therefore split in two separate projects: South of Kpong (Akosombo-Kpong Area, Accra Plains Area, Akwapin Ridge and Dodowa Areas) and North of Kpong (Actinpoka-Frankadua Area and Maya-Kribo-Yilo Area). The applicant asks for an ORET grant for the 'South of Kpong' project.

The transaction will start soon after the approval of the ORET grant and will be implemented over a period of three years. In the table the main project components are listed (all in USD million):

in USD * million	USD
Project Management	(10)(1c)
Engineering services	
Procurement	
Goods	
Packaging & Freight	
Execution of works	
Project administration	
Insurance	
Overhead expenses	
Profit	
Subtotal	
Contingencies	
Financing costs	
Total transaction	**55.801**

The application includes a detailed list of components and prices as well as drawings.

Total investments

Apart from the transaction, no additional investments are foreseen. The transaction encompasses (1) rehabilitation works and (2) expansions works.

Rehabilitation works:

- one of the existing treatment plant units will be rehabilitated for a capacity of approximately (10)(1c) m^3/day;
- the main transmission pipe will be replaced by a (10)(1c) km long pipe, followed by a (10)(1c) km long pipe (including the replacement of old corroded transmission mains, and broken sections of old AC pipes); and
- repair of the existing Tema Service Reservoir of (10)(1c) m^3.

Expansion works:

- a new treatment plant for a capacity of (10)(1c) m^3/day;
- construction of four concrete ground level reservoir one of (10)(1c) m^3 and three of (10)(1c) m^3 each;
- expansion of the distribution networks in the most densely populated communities, by laying (10)(1c) km of PVC pipes with diameters ranging between (10)(1c) mm;
- installation of additional (10)(1c) metered house connections, resulting in total of (10)(1c) connections; and
- installation of additional (10)(1c) standpipes, resulting in a total of (10)(1c) standpipes.

9. ORET grant

The grant part of the transaction amounts to USD 29.021 million or EUR 21.339 million[1]. The table below specifies the different components of the transaction and the grant percentages.

in USD - EUR * mio	Value	Grant	Grant	1,36
Components	**USD**		**USD**	**EUR**
Net production costs	(10)(1c)			
Financing costs				
TA costs				
Freight and packaging costs				
Contingencies				
Profit				
	55.801		**29.021**	**21.339**

1 Based on EU monthly accounting rate per 1/09/07 for USD EUR of 1,36: http://ec.europa.eu/budget/inforeuro/index.cfm?fuseaction=home&SearchField=&Period=2004-6&Delim=,&Language=en

III. Assessment of the transaction

10. Assessment of the applicant, financial and organisational soundness

The applicant is TAHAL Group B.V, further referred to as Tahal.

History

Tahal was founded in 1952 by the Israeli government for infrastructure works in the area of water and sewerage. In 1996 the company was privatised. In 2001 it became a 100 percent daughter company of Kardan NV, an international investment company. Mother and daughter company are both registered in the Netherlands, Kardan NV is listed on Euronext and the Tel-Aviv Stock Exchange.

Tahal was a pioneer in the fields of planning, development and management of water resources in Israel. To date, it has carried out numerous engineering and construction projects in over 50 countries. Examples of turnkey and BOT projects Tahal has delivered include: Water supply project in Romania, value USD 330 million; Improvement drinking water and sewerage system in Dominican Republic, value USD 50 million; Irrigation project in Turkey, value USD 222 million.
Tahal has no previous experience with ORET projects.

Tahal has been actively involved in development projects in Ghana since 1961 when it served as a water supply consultant to Ghana Water and Sewerage Corporation (GWSC) for the Accra-Tema Metropolitan Area (ATMA). Since, Tahal has provided technical assistance, consultancy services and supervision of rehabilitation and emergency works for GWSC (later renamed GWCL). Next to major waterworks for GWSC, Tahal has assumed an important role in works and technical assistance in the road and bridge sector in Ghana for the Ghana Highway Authority (GHA). Tahal carried out studies, designed roads and water crossings and provided technical assistance to local contractors for over 3,000 km of roads.

Key figures

Key figures for the Tahal Group B.V per December 2006 (between brackets for 2005): total assets USD 95 million (USD 69 mio), gross revenues USD 81 million (USD 47 mio), nett revenues USD 19 million (USD 14 mio), nett profit USD 1,7 million (USD 1,9 mio). (10)(1c)

(10)(1c)

(10)(1c)

Total assets of Kardan Group in 2006 amounted to USD 2.9 billion, revenues USD 700 million, and it employed almost 8,000 people.

Conclusion

Tahal has a long standing experience in conducting high value engineering and water works worldwide and in Ghana in particular. Next to this Tahal is familiar with the ATMA (Kpong) water works. The financial position of Tahal seems solid (10)(1c)

(10)(1c)

We consider the risk of non-completion to be limited, but nevertheless advise to demand a parent guarantee from Kardon NV.

11. Results of the technical verification

Design

The overall design of the piping and the water treatment plant is satisfactory and according to common Dutch practice and state-of-the-art.

Transaction

Approximately 70 percent of the transaction concerns new piping and rehabilitation and expansion of the distribution

network. The piping will include a new part of the distribution network and the replacement of old corroded transmission mains and broken section of old AC pipes. The remaining part of the transaction includes the design and installation of the water treatment plant. All details for the transaction and the activities have been provided by the applicant in the Bill of Quantities and the Particular and general conditions of the Contract. The level of detail of the Technical Specifications is sufficient for both seller and recipient and allows for a proper check of quality and quantity of the deliverables.

Dutch content

In its the application, Tahal states that no commitment has been made to any suppliers, but that the Dutch content will be secured if Dutch financing will come available. The table provides a preliminary overview of the Dutch part of the transaction. This is 62.5 percent, well above the required minimum of 50 percent.

Articles	**Supplier**	**USD * mio**	
Piping Fittings & accessories House connections & standpipes Water treatment plant Total procurement Financing cost Insurance Profit Overhead expenses Contingencies	(10)(1c)	(10)(1c)	
		34.878	62.5%

Conclusion

The technical lay-out of the project is satisfactory. The project is likely to fulfil the requirements with respect to Dutch content, but this will only be secured after the grant is made available. Therefore, we advise to include a condition that proof of the Dutch content is submitted before issuing the final grant agreement.

12. Appropriateness of the organisation of the transaction

Planning

The following major activities will be carried out during 36 months:

- Phase I: Preliminary and Final Engineering Design: review and assessment of all available data and information pertaining to the water supply system, the treatment plant, the pumping station resulting into a final design, technical specifications and working drawings (finalised in month eight);
- Phase II: Physical Implementation of Works: equipment and materials will be ordered as soon as Phase I is finalised. It is expected that shipping and clearing will be carried out latest in month sixteen. Transport and installation of equipment will begin immediately after clearance in the port.

Turnkey contract

The works will be executed under a turnkey contract following the standard conditions of FIDIC (Federation Internationale des Ingenieurs-Conseils). Management and quality control during and after construction and operation are the responsibility of Tahal. In the application Tahal states that the 'applicant will take full responsibility for the soundness and safety of the project in all respects', including building and completion of the project, full scale assistance to GWCL concerning operation and maintenance of the project, etc. A draft of the contract between GWCL and Tahal as well as the FIDIC conditions was enclosed in the application.

Spare parts

Under the draft contract between Tahal and GWCL (clause 73) Tahal will prepare a list and itemised cost breakdown of essential manufacture's spare parts to last at least two years. This list will be reviewed by GWCL and by the Ministry of Finance prior to the order of supply.

In the budget USD (10)(1c) has been allocated for spare parts for the (10)(1c). This is a rather limited budget for a contract value of USD (10)(1c) million for the water treatment equipment. The technical consultant notes that an amount of five percent, USD (10)(1c) would be appropriate.

Since lack of spares is usually the most important cause for tardy maintenance, we suggest for a review of the list of spare parts by Oret.nl after the final design (end of phase I). Funding for possible incompleteness of this list could be covered under the contingencies of almost USD (10)(1c).

Training

Training for personnel of GWCL is included in the transaction, immediately following the onsite inspection or installation. The main focus of the training will be the water treatment plant. According to the technical consultant the training is appropriate and sufficient. We note that technical assistance is not included in the transaction. According to the applicant, technical assistance is not required as this is the responsibility of AVRL as part of their management contract with GWCL.

Financing of non-grant part of the project

The non-grant part of the project (USD 26,800,000) will be financed by (10)(2g)

(10)(2g)

(10)(2g)

(10)(2g)

	Rate	USD
Commitment fee (p.a.)	(10)(2g)	(10)(2g)
(10)(2g) fee (flat)		
Bank's management fee (flat)		

Conclusion

The implementation of the transaction, including the responsibilities and tasks, is clearly defined and we have not encountered organisational issues potentially hampering the successful completion of the transaction. Also, the funding of the non-grant part of the transaction is considered to be appropriate and sustainable.

13. Results of the price verification

The technical consultant compared prices for about 92 percent of the hardware in the transaction against 'norm' prices. This norm list is a checklist used for own projects of (10)(2g) Next to this the consultant verified whether the prices were in line with three comparable other water projects is Ghana:

- ORET GH00147 Water supply Wa Ghana, Coman, 2007
- ORET LK00082 Negombo Sri Lanka, Biwater, 2007
- ORET 00/38 & 00/39 Sekondi Takoradi Ghana, Ballast, 2000

The comparison indicated that the prices in the transaction are on average (10)(1c) percent below the market price. It is likely that Tahal has included a reseller's discount in the prices.

Other cost items compared:

- Costs for commission / agents are nil;
- Total for contingencies is 4.4 percent, this is lower than the maximum of five percent;
- Technical assistance is not included in the project, therefore the costs are nil; and
- The profit level is (10)(1c) percent, which is reasonable compared to the other transactions.

Conclusion

The price of the compared components are on average below the norm price. Other cost items are reasonable compared to other works. Therefore, we conclude that the offered price for the transaction is reasonable and acceptable.

IV. Institutional embedding of the project

14. Compliance with national and sectoral priorities

Ghana became independent in 1957, has a population of about 20 million of which about 40 percent live in urban areas. An Economic Recovery Program (ERP) started in the early 1980s brought, despite some weaker years, positive GDP growth of up to 3-5 percent per year. Poverty continues to be a major issue. Inadequate infrastructure and weak institutional and human capacity in all sectors including water supply and sanitation sector is one of the major constraints in improving the quality of life of the population.

The water supply coverage in Ghana stood at 36 percent in 1990 and improved to 68 percent overall in 2002. However, the Accra- Tema region, which includes the project area, continues to be an area of concern due to the fast growing population. In the project area only 50 percent of the 355,000 inhabitants have access to clean (treated) water. The project was identified as one of the top priorities following a study financed by the World Bank for the Strategic Investment Program (SIP) of the Ghana Water Company Limited (GWCL). This is evidenced by (10)(2a)

(10)(2a)

We conclude that the project fits in recipients' economic and development plans and that it is considered to be a high priority project.

15. Assessment of the end user

Ghana Water Company Limited (GWCL) is the end user and owner of the assets. GWCL is the national drinking water company of Ghana and owner of water supply systems in the 100 largest cities, including over 80 water treatment systems. Most of the infrastructure dates from colonial times and needs urgent replacement. GWCL employs around 4,700 personnel. It used to be part of the Ministry of Works & Housing, but became autonomous in 1999. The political influence remains as the current Board members are representatives of various ministries.

The majority of the shares are still owned by the Ghanaian Government. Attempts to sell parts of the water supply to private businesses have not been successful. IMF and World Bank were involved in a process to improve the organisation of the drinking water industry. In January 2005, the World Bank and the Ghanaian Government signed an agreement in which the private sector would be involved in the management of the drinking water industry via a management contract.

(10)(2a)

(10)(2a)

(10)(2a) It is noted that the current financing package under ORET

includes the requirement that (10)(2a)

In June 2005, a strategic plan for GWCL for the period until 2010 was developed that would change GWCL into an asset holding company and shifts GWCL's role from operation and management of water systems to sector planning and monitoring, and assets management. Operations have been taken over by Vitens Rand from January 2006. Staff of GWCL is being transferred and the overall organisation is being made more efficient, especially by decreasing the Accra head office and administrative personnel. The activities to be outsourced to Aqua Vitens Rand Water under the Management Contract are the direct production and distribution of water, securing of supplies for production and distribution operations and plants, the building and maintenance of training schools, workshops and drilling of wells, and the actual maintenance of the plants and equipment.

GWCL will retain ultimate sector responsibility for water production under the management contract through performance monitoring of the management contracts on standards, targets and quality.

Conclusion

In conclusion, GWCL has a long standing experience with ORET projects. It has had difficult financial times that left its traces on the performance of the company. Partly driven by World Bank interventions, the company and the sector have been reorganised, a process that culminated in a new role of GWCL as asset holding and water sector planning and monitoring company. It is too early to judge its performance in its new role and developments in this respect will have to be followed closely.

16. Assessment of the institutional sustainability of the project

Finance needs

(10)(2a)

(10)(2a) In the years 1990 – 2003 major donors contributed appr. USD 500 million for water and sanitation projects. The World Bank, for example, contributed USD 120 million to the Water Sector Rehabilitation Project. The donor funding is not sufficient to cover the yearly requirements.

(10)(2a) With the establishment of a utility regulator, Public Utility Regulation Committee (PURC), tariffs were increased although they remain below cost recovery levels. For this project the full cost recovery level would be (10)(2a) m^3, while current domestic prices are USD 0.56 and non-domestic USD 0,91. Industrial and private clients with house connections usually have meters and pay for usage. Public clients have no meters and their usage is determined by negotiations. (10)(2a)

(10)(2a)

Government

The Ministry of Works and Housing is the overall overseeing Authority for all water sector issues, including Water Supply and Sanitation. Since the development of the National Water Master Plan in 1959, the water sector in Ghana has –slowly-made transformations in terms of policy, institutions and operations. One aspect of the institutional reform is the diminishing role of the public sector in the day to day management, thereby focussing its resources on regulatory, support and monitoring activities. The reform paved the way for Public Private Partnerships (PPP) of which the cooperation between GWCL and AVRL is an example.

Supply and demand

In order for the project to be sustainable over the foreseen project period of 20 years, the government should start planning new constructions soon after delivery of the transaction. Water will be available through (10)(1c) household connections and (10)(1c) standpipes. However, assuming that 75 percent of the domestic water is distributed through standpipes (300 persons per day per standpipe) and 25 percent through households (5.9 person per household), this supplied number of standpipes and household connections will not suffice to distribute the full capacity of the water treatment plant. Therefore we have assumed that the number of taps (household connections and standpipes) will continue to increase immediately after delivery of the waterworks and that the costs for installation of the tap will be borne by the newly connected households themselves or by the local communities (for the standpipes). Maximum capacity of the water treatment plant will be reached in year 2022 when supply is equal to demand. In that year, (10)(1c) people will have access to water through one of the (10)(1c) household's connections or one of the (10)(1c) standpipes. Assuming that the population will continue to grow, additional capacity should become available by year 2023.

Conclusion

Supported by the World Bank and other donors institutional improvements are becoming visible. We belief the project is institutionally sustainable.

17. Financial sustainability

The key assumptions for the project used in the financial, commercial and economic assessment are elaborated in the annex. The lifetime of the project is taken to be 20 years.

The $fIRR_{20}$ for the base case is 6.5 percent, well above the cut-off rate of 3.6 percent. The $ACCF_{20}$ amounts to USD 24.8 million. The financial sustainability is sensitive to a decrease of revenues. The sustainability would become critical if this decrease is more than 20 percent, which could be the case when AVRL is not successful in increasing the current billing rates of (10)(1c) percent to the assumed level of 90 percent for domestic and 85 percent for non-domestic.

We conclude that the project is financially sustainable. We consider a strong reduction in revenues of over 20 percent not very likely as the improvement of collection rates is **the** priority for AVRL.

V. Commercial viability of the project

18. OECD-Commercial viability of the project

The key assumptions for the project are elaborated in the annex.

As current prices for outputs are not considered appropriate, an appropriate price was established based on calculations of the full cost recovery price and the affordability to pay of consumers. The appropriate price for households was thus estimated to be (10)(1c) For industrial and public users the appropriate price was taken to be equal to the average full cost recovery price of (10)(1c), as these costs would occur if they would have to provide for their own clean water in absence of the project. Based on these appropriate prices the $ACCF_{10}$ amounts to minus USD 26.9 million and the cIRR amounts to minus 3.6 percent. The project is therefore not commercially viable. The sensitivity analyses carried out show that this result is robust.

VI. Impact of the project

19. Economic viability of the project

The economic viability of the project was assessed on the basis of the willingness to pay (WTP) principle. Thus the economic benefits are quantified by considering the price consumers are willing (and often have) to pay for clean water in

case there would be no supply by the project.
The average WTP for households was calculated to be USD (10)(1c) per m^3. The WTP for industry and public users is (10)(1c) (10)(1c) USD (10)(1c) per m^3. On the basis of these WTP figures, the eIRR was calculated to be 24 percent. The project can thus be considered economically viable. The sensitivity analysis confirms this result.

20. Environmental impact

Contract

The contract between Tahal and GWCL contains stipulations with respect to environmental protection. Tahal shall be fully responsible for any damage to the environment caused by execution of the works. Also, Tahal is bound to take adequate measures to prevent pollution of all water sources, land areas and should take particular care to prevent the leakage of oil or other pollutants from the constructional equipment.

Specific prevention measures will deal with:

- reduction of air pollution – using well-service vehicles;
- reduction of dust pollution – by regular watering, maintaining natural vegetation, minimising clearance areas;
- prevention of waste water discharge – by installing soak pits; and
- reduction of noise pollution – by using well-serviced equipment during construction.

Sludge

A residue of water treatment is sludge, containing alum-chemicals which is common practice in drinking water treatment. The sludge from the treatment plant will be disposed in landfills.

Conclusion

We conclude that minimal negative environmental impact is to be expected as a large part of the works carried out are rehabilitation or replacement. The water treatment plant itself is environment friendly, mostly utilising non-polluting chemicals.

21. Policy relevance of the project

The objectives of the ORET programme are to promote sustainable economic development and improve the business climate in developing countries by facilitating investment in their economic and social infrastructure. Access to water and sanitation is a prerequisite for increased productivity and improvement of the quality of life of people. The stress on water is implicit in life expectancy rates, child mortality rates, malnutrition levels, epidemic disease toils, poverty rates among women, employment migration and even school retention. The relevance of the project under the ORET programme is therefore obvious.

Furthermore, the project's contribution to achieving the Millennium Development goals is beyond doubt. The MDG target for water is to half the number of people without access to safe drinking water and basic sanitation by 2015.

VII. General conclusion and advice

22. Conclusion

Central to provision of water are quality, sufficiency and continuity of supply. With this project this will be ensured at least during the first twelve years of operation. By year twelve of operation full capacity will be reached and history may repeat itself if no additional capacity will become available by then.

We are confident that the project will be implemented successfully as the project will be delivered turnkey by Tahal and

AVRL will assume responsibility for the key operations of maintenance, billing and bill collection directly after final completion. End-user GWCL is financially weak, but as its role will be limited, we belief this will not negatively impact the project.
Tahal is a competent supplier, based on its long year track record in the building of water systems and their experience in Ghana. It is our belief that it will be able to successfully complete the project. Nevertheless, we recommend asking for a parent of Kardan N.V. to minimise the risks associated with guarantees provided by Tahal.

The other findings comply with ORET regulations.
In general:

- The project was found to be appropriate and the applied technology is state of the art; and
- The costs of the transaction were found to be appropriate.

On viability and sustainability:

- The project is regarded to be commercially not viable. The $ACCF_{10}$ amounts to USD -26.8 million;
- The project is regarded to be financially sustainable; and
- The project is regarded to be economically viable.

The sensitivity analyses indicate that all these results are robust.

23. Advice

On the basis of the above assessment of the application, we advise the Appraisal Committee to approve the ORET grant financing of the project under the following conditions:

- As parent company Kardan NV. Should provide a guarantee on the timely and successful implementation of the transaction;
- Prior to final grant award, the applicant should provide sufficient proof that the value of Dutch content complies with the ORET regulation.

For subsequent payment:

- After completion of phase 1 of the transaction, a final list of spare parts should be submitted for review and approval by Oret.nl. Possible additional spare parts to be delivered shall be financed from the budget available under contingencies.

The table provides an overview of the Grant amount. (Note: conversion rate USD/EUR based on EU monthly accounting rates. [2])

EUR * 1 mio	
Components	**EUR**
Net production costs	(10)(1c)
Financing costs	
TA costs	
Freight and packaging costs	
Contingencies	
Profit	
Total grant amount	**21.339**

2 Based on EU monthly accounting rate per 1/09/07 for USD EUR of 1,36:
http://ec.europa.eu/budget/inforeuro/index.cfm?fuseaction=home&SearchField=&Period=2004-6&Delim=,&Language=en

Annexes

The above ORET Grant Appraisal is intended to be read as an independent document, on the basis of which a decision on ORET-grant financing can be made.

The Annexes below follow the same structure of the Appraisal Document and provide additional reference information used in the appraisal process.

Table of contents of Annexes

1 Sources

- ORET application Tahal Group BV, 27 February 2007;
- Meeting with the applicant on 28 June 2007;
- Answers to questionnaire, 16 August 2007;

- WaterAid, National water sector assessment Ghana, May 2005;
- Minutes of meeting with (10)(2e) (AVRL) and (10)(2e) and (10)(2e) (ORET) on 12 July 2007;
- African Development Bank, Review of Bank assistance to the water sector, Memorandum to the Board of Directors, Review of Bank Assistance to Water Sector, December 2005; and
- Various websites.

2 Financial sustainability

2.1 Introduction

This section examines the financial soundness and sustainability of the project. A project is defined to be financially sustainable, if sufficient funds are available to service the repayment of principal and interest on the loans taken.

If the project generates revenues, this can be tested using a financial CBA. In this analysis, the financial cash flows of the project are examined in order to calculate the accumulated cash flow at the end of the project's lifetime ($ACCF_{20}$). In the financial CBA:

1. The amount of the grant is excluded from the investment and the financing (for this project this means that all investment costs can be excluded); and
2. The period of analysis is taken to be equal to the economic lifetime of the project.

If the $ACCF_{20}$ is positive, assuming that short-term cash deficits can be covered from a local loan, the project is supposedly financially sustainable. Also the fIRR can be used to illustrate the financial viability of the project: if the fIRR exceeds the project's opportunity cost (set equal to the real interest rate presently prevailing in the Euro-zone) the project is potentially financially viable. The latter does not take account of the actual mode-of-finance, so that the $ACCF_{20}$ test should be considered as decisive for the outcome.

2.1.1 Key assumptions of the project

Total project investments

The project investment is taken to be USD 55.8 million plus the book value of the current system of USD 5 million, in total amounting to USD 60.8 million. The implementation of the transaction will take three years.

Project operating costs

There are five categories of operating costs:

- **Salaries:** In the new situation the cost for staff will remain the same as in the current situation of (10)(1c) per month and (10)(1c) million per year. The new treatment plant will include a control system so the number of staff can be reduced from 58 to 46 staff. However, the staff for the new system requires better skills and education to operate the modern treatment plant. The current staff will receive training to enhance their skills.

- **Variable costs.** These costs include energy and chemicals per m^3 and amount to (10)(1c) per m^3. These costs are based on costs in the current system.
- **Repairs & Maintenance:** These costs have been estimated to be equal to 1.75 percent of the initial investment; and

Project operating revenues

In our analyses we distinguish between domestic and non-domestic demand. We have assumed that 90 percent of demand is domestic and 10 percent non-domestic (government and industry).

In the current situation water is supplied through 7,450 house connection and 450 standpipes. Part of the transaction is the installation of (10)(1c) household connections and (10)(1c) standpipes, resulting in a total of (10)(1c) household connections and (10)(1c) standpipes on delivery of the project. However, this number of 'taps' would limit the distribution capacity to connections installed before or during the transaction. Therefore we have assumed that the number of household connections and standpipes will continue to increase after the transaction has been completed, in the same proportion as in the past (75 percent supply through standpipes and 25 percent through household connections). This will result in (10)(1c) household connections and (10)(1c) stand pipes in 2022. The investment for the connection will be borne by the household (for a household connection) or by the community (for a standpipe).

Other assumptions related to revenues:

- In households with a connection an average of 80 litres per person per day is used. Furthermore, we have assumed that on average 300 persons are served using 35 liter per person per day.
- Full production capacity of (10)(1c) m^3 per year will be installed in 2012 and is expected to be utilised fully in 2022. Leakage will be at 20 percent in 2012 and then remain stable.
- Billing rate starts at (10)(1c) percent, both domestic and non-domestic in year 2011, further improve and stabilise at 90 percent for domestic and 85 percent for non-domestic.
- Prices per m^3 will be subject to endorsement by the regulatory authority. Currently the price is USD 0.56 for domestic users and USD 0.91 for non-domestic. This is below the theoretical full recovery price of (10)(1c)

Other assumptions

Water operators are exempt from taxes.

2.1.2 Results

In the baseline scenario, the fIRR20 amounts to 6.5 percent with an $ACCF_{20}$ of USD 24.8 million.

In order to test the robustness of this result, a sensitivity analysis has been carried out, the results of which are presented in the table below. The sensitivity analysis investigates the effect of fluctuations in revenues and operational costs.

Table 2.1 Sensitivity analysis on financial sustainability

Scenario	fIRR (ACCF20)
Base case	6.5% (USD 24.789 million)
Revenues shortfall by 20%	2.6% (USD 4.118 million)
Operational costs 20% higher	5.1% (USD 16.850 million)

Given the results of the CBA and taking into account the results of the sensitivity analysis, the project is considered financially sustainable.

3 Commercial viability of the project

3.1 Introduction

One of the conditions of the ORET programme is that the financing shall not be extended to public or private projects that would normally be commercially viable if financed on market terms.

The commercial viability of the project has been tested using a commercial cost-benefit analysis (CBA) based on the framework laid down in the OECD Consensus on Tied-Aid. The test suggests that a project is commercially viable if the accumulated cash flow in year 10 ($ACCF_{10}$) exceeds zero, i.e. becomes positive before the end of the ten-year period. A detailed theoretical background description of the Consensus is available at ECORYS.

3.1.1 Appropriate prices

The prices for input are specified in the earlier sections.

In order to assess the appropriateness of prices, we have calculated the 'affordability to pay' (ATP).

The prices for outputs specified in section 1.2 on financial sustainability are considered to be inappropriate, as they are set at a too low level and do not lead to full cost recovery over the economic lifetime of the project. The full cost recovery tariff for this project was therefore calculated by assuming that the project's operational revenues will cover the initial investment, operational costs and financial costs and leave a reasonable profit margin for (re)investments. The full cost recovery price was calculated based on the economic lifetime of the project (20 years) and on a Commercial Internal Rate of Return of at least 10 percent (instead of the local commercial interest rate normally used for this analysis). For full cost recovery the imposed tariffs would need to increase by (10)(1c) percent for domestic users and (10)(1c) percent for industrial users. The average tariff for full cost recovery is (10)(1c) (at this level the $cIRR_{20}$ is 10 percent and the $ACCF_{20}$ is USD 89.5 million).

For the calculation of non-commercial viability the tariff for full cost recovery is applied on non-domestic usage only as it is unlikely that household consumers would be able to afford such prices. Instead for household consumers we have calculated the 'affordability to pay' price (ATP). The affordability to pay was estimated by using the rule of thumb (World Bank, 2006), which states that the average share of household income consumers

are willing to spend on clean water is three percent. Average income per capita for Ghana is approximately USD 506 per year. It was further assumed that the average consumer would demand 50 litres per day. Based on these figures, households' average affordability to pay per m^3 of clean water is estimated to be USD 0.83.

3.1.2 Results

Based on appropriate prices of (10)(1c) for non-domestic users and USD 0,83 for domestic users, the cIRR10 is -3.6 percent, while the $ACCF_{10}$ is -26.872 million
The project is no commercially sustainable.

3.1.3 Sensitivity analysis

In order to test the robustness of this result, a sensitivity analysis has been carried out, the results of which are presented in the table below. The sensitivity analysis investigates the effect of fluctuations in the profit margin and investment costs.

Table 3.1 Sensitivity analysis on commercial viability

Scenario	cIRR10 ($ACCF_{10}$)
Base case	-3.6 % (-26.8 million)
Investment costs are 20% lower	-0.3 % (-11.9 million)

3.1.4 Conclusion on commercial viability

Taking into account the above mentioned results, it can be concluded that the project is commercially not viable.

4 Impact of the project

4.1 Economic viability of the project

This section is concerned with an economic analysis of the project. This analysis investigates the costs and benefits of the project from a broader, welfare economic perspective. This means that not only the direct costs and benefits of the project are taken into account, but also all possible indirect effects in other sectors of the economy or in the environment within the society concerned. The project is, in other words, judged from the perspective of the national economy rather than only from the narrow perspective of the few economic agents directly affected.

The economic viability of the project can be assessed in an economic CBA. This CBA deviates from the commercial and financial CBA, in that:

1. All taxes, subsidies and duties paid and received as a consequence of the project are excluded from the analysis;
2. All prices are corrected for distortions[3]; and
3. Wherever possible, external effects of the project are internalised by including the monetarised costs and benefits in the calculation.

The period of analysis is equal to the economic lifetime of the project.
From the economic cash flows thus generated, an internal rate of return can be computed called the economic internal rate of return (eIRR). Then, a project can be found to be economically viable, if the eIRR exceeds the opportunity cost of capital (OCC) for the receiving country. The OCC for Ghana is taken to be 10 percent.

4.1.1 Economic costs and benefits

The most important benefit in this respect is the value consumers assign to each m^3 of qualitatively adequate water becoming available to them. This value is equivalent to consumers' willingness to pay' (WTP) for every cubic metre of water. It is reported that currently the local population without access to water taps is willing to pay at the water truck a price 10 times higher than the price per cubic metre at the regular 'tap' price[4]. This would result in a price of USD 5.60 as a maximum WTP price. The average WTP price is USD 2.80. per cubic metre.

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3 Local prices, that are prices of non-tradable goods and services, are corrected for distortions using specific Conversion Factors or a Standard Conversion Factor (SCF). Multiplication of the local prices with Conversion Factors gives the so-called shadow prices of these products. The SCF for Ghana is taken to be 1.

4 Van Dalen, Privatisering waterbeheer in Ghana, in H2O, January 2006

For non-domestic users we have assumed that the economic value is represented by the full-recovery price of (10)(1c)

4.1.2 Results

On the basis of the above-mentioned assumptions, the eIRR20 can be calculated to be 24.1 percent. This exceeds the threshold of 10 percent and the project can be considered economically viable.

In order to test the robustness of this result, a sensitivity analysis has been carried out, the results of which are presented in Table 4.1 below. The sensitivity analysis investigates the effect of fluctuations in the willingness to pay and operating costs.

Table 4.1 Sensitivity analysis on economic viability

Scenario	eIRR20
Base case	24.1%
WTP: + 20% change	27.2%
WTP: - 20% change	20.8%

Given the results of the CBA and taking into account the results of the sensitivity analysis, the project is considered economically viable.

5 Assumptions, calculations, and results

Table 5.1 Assumptions

	ass. / indicators	-2 2008	-1 2009	0 2010	1 2011	2 2012	3 2013	4 2014	5 2015	6 2016	7 2017	8 2018	9 2019	10 2020
A Assumptions	connected people	178.955												
Demand	in %	50%												
Domestic														
Population in area		355.000	390.750	403.449	416.561	430.099	444.078	458.510	473.412	488.797	504.683	521.086	538.021	555.507
Number of house connections	(10)(1c)	7.450 old			(10)(1c)									
Number of standpipes		450 old												
Demand house conn. 1000 m3 /yr(5,9 p.h.h, 80 l)		1.283			2.834	2.933	3.035	3.140	3.249	3.361	3.477	3.597	3.721	3.848
Demand standpipes 1000 m3/yr 300 people, (per capita 35 l)	300	1.725			4.024	4.154	4.288	4.426	4.569	4.716	4.868	5.026	5.188	5.355
Total domestic		3.008			6.858	7.087	7.323	7.566	7.818	8.078	8.346	8.623	8.909	9.204
Domestic	90%	3.008			6.858	7.087	7.323	7.566	7.818	8.078	8.346	8.623	8.909	9.204
Non-domestic	10%	334			762	787	814	841	869	898	927	958	990	1.023
Total demand		3.342			7.620	7.874	8.136	8.407	8.686	8.975	9.273	9.581	9.898	10.226
Production and supply														
Annual demand (= supply)		3.342			7.620	7.874	8.136	8.407	8.686	8.975	9.273	9.581	9.898	10.226
Leakage		50%			25%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Annual producton		(10)(1c)			(10)(1c)									
Annual production capacity		(10)(1c)												
Domestic water sales m3/y	90%													
Non-domestic water sales m3/yr	10%				(10)(1c)									
Income and prices														
Price domestic Real price	0,56				0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56	0,56
Price domestic AFP	(10)(1c)				(10)(1c)									
Price domestic WTP														
Price non-domestic - real price	0,91				0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91	0,91
Prince non-domestic - full recovery price	(10)(1c)				(10)(1c)									
Billing domestic					70%	80%	90%	90%	90%	90%	90%	90%	90%	90%
Billing non-domestic					70%	80%	85%	85%	85%	85%	85%	85%	85%	85%

Table 5.2 Assumptions – continued

Costs														
Variable Costs energy+chemicals p/ m3	(10)(1c)													
Fixed costs - maintenance														
Fixed costs - manpower														
Fixed costs - marketing & sales														
Total costs														
Investment and grant														
Investments (+bookvalue old USD5mio)	60.801	4.464	16.740	39.597	0	0	0	0	0	0	0	0	0	0
Grant	29.021	2.232	8.370	18.418										
Investments minus grant	31.781	2.232	8.370	21.178										
Financial flows														
Full Financing (investment)	(10)(1c)													
Outstanding loan														
Interest (rate)														
Financing cash flow														
Financing minus grant														
Outstanding loan														
Interest (rate)														
Financing cash flow														

Table 5.3 Calculations for financial sustainability

		-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ass. / indicators		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
fIRR Calculations (based on real prices, investment minus grant)																								
Revenues domestic (price)	0,56																							
Revenues non-domestic	0,91																							
Total revenues																								
												(10)(1c)												
Income (revenues minus costs)																								
Cash flow																								
IRR10	-2,6%																							
IRR20	6,5%																							
		-85	-403	-1.208	-2.937	-2.224	-1.550	-1.306	-1.057	-804	-547	-285	-19	252	3.585	3.709	3.709	3.709	3.709	3.709	3.709	3.709	3.709	3.709
ACCF10	-12.173	-85	-488	-1.696	-4.633	-6.857	-8.407	-9.713	-10.770	-11.574	-12.121	-12.406	-12.425	-12.173	-8.588	-4.880	-1.171	2.538	6.246	9.955	13.663	17.372	21.081	24.789
ACCF20	24.789	-85	-488	-1.696	-4.633	-6.857	-8.407	-9.713	-10.770	-11.574	-12.121	-12.406	-12.425	-12.173	-8.588	-4.880	-1.171	2.538	6.246	9.955	13.663	17.372	21.081	24.789

Table 5.4 Calculations for commercial viability

		-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
ass. / indicators		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
cIRR Calculations (based on ATP and full recovery price)																								
Revenues domestic (price)	(10)(1c)	(10)(1c)																						
Revenues non-domestic																								
Total revenues																								
Income: Revenues minus costs																								
Cash flow (-Investments excl grant+income)																								
IRR10	-3,6%																							
IRR20	5,6%																							
		-170	-806	-2.311	-5.389	-4.304	-3.254	-2.833	-2.406	-1.973	-1.533	-1.087	-634	-173	6.144	6.333	6.333	6.333	6.333	6.333	6.333	6.333	6.333	6.333
ACCF10	-26.872	-170	-976	-3.287	-8.676	-12.979	-16.233	-19.066	-21.472	-23.445	-24.979	-26.066	-26.699	-26.872										
ACCF20	36.272	-170	-976	-3.287	-8.676	-12.979	-16.233	-19.066	-21.472	-23.445	-24.979	-26.066	-26.699	-26.872	-20.728	-14.395	-8.061	-1.728	4.605	10.939	17.272	23.605	29.939	36.272

Table 5.5 Calculations for economic commercial viability

		-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	ass. / indicators	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
eIRR Calculations (based on WTP, full recovery price)																								
100% new-build																								
Revenues domestic (price)	(10)(1c)																							
Revenues non-domestic																								
Total revenues																								
Net income																								
Cash flow																								
Existing situation																								
Investment & contingencies																								
Operation and maintenance																								
Total cash out																								
Water supply																								
Leakage																								
Annual production capacity																								
Domestic water sales m3/y																								
Non-domestic water sales m3/yr																								
Revenu domestic	(10)(1c)																							
Revenu non-domestic																								
Total cash-in																								
Cash flow																								
Additional benefits (new minus old)																								
Cash flow																								
IRR10	**19,2%**																							
IRR20	**24,1%**																							
ACCF10	**105.909**	-4.464	-21.204	-55.801	-47.077	-36.353	-23.595	-8.771	6.919	24.747	43.518	63.272	84.054	105.909										
ACCF20	**390.921**	-4.464	-21.204	-55.801	-47.077	-36.353	-23.595	-8.771	6.919	24.747	43.518	63.272	84.054	105.909	133.768	162.341	190.914	219.486	248.059	276.631	305.204	333.776	362.349	390.921

(10)(1c)

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Tahal Group B.V.

(10)(2e)

5 juli 2007

2007-0328/WM/nt

Beoordeling aanvraag GH/WM07029

Geachte heer (10)(2e),

Uw project "ATMA water supply system" met het projectnummer GH/WM07029 is door ons inhoudelijk beoordeeld. Naar aanleiding van de beoordeling hebben wij een vragenlijst opgesteld, welke bij deze brief is toegevoegd.

Wij stellen u tot en met 2 augustus 2007 in de gelegenheid de vragen te beantwoorden. Indien de ontbrekende gegevens niet binnen deze termijn ontvangen zijn, zal dit overeenkomstig artikel 4:5 lid 1 Algemene wet bestuursrecht en de ORET-regeling 2006 ertoe leiden dat uw aanvraag niet verder in behandeling wordt genomen.

Met vriendelijke groet,
Stichting ORET

(10)(2e)

Bijlage: Vragenlijsten

Het ORET-programma (OntwikkelingsRelevante ExportTransacties) is een programma van het Ministerie van Buitenlandse Zaken en ondersteunt duurzame investeringsprojecten in ontwikkelingslanden. Het programma wordt uitgevoerd door ORET.nl, een consortium van PricewaterhouseCoopers Advisory N.V. en Ecorys Nederland B.V.

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GH/WM07029 Tahal Group B.V.
ATMA water supply system

Introduction

This questionnaire is drawn up after a meeting on 28 June 2007 at the ECORYS premises in Rotterdam. Present at his meeting were:

- (10)(2e) (on behalf of TAHAL)
- (10)(2e) (on behalf of ORET.nl).

The questionnaire has two parts:

- Questions related to the evaluation of feasibility of the project in general and in detail
- Questions related to technical and pricing issues

Please answer the questions compact, though comprehensive. We prefer overviews with data (and if needed an elucidation) rather than prose. We have read the documents provided with the Application, so please do not refer to pages in the application form, feasibility study etc.

Questions re. feasibility of the project

A. Project Definition

Please clearly formulate the project definition.

B. Institutional background

1. Provide background information on Tahal in general, Tahal in Ghana, and the long relationship of Tahal with this project.
2. Provide the annual accounts for 2006 for the Tahal Group. If the approved accounts for 2006 are not yet available, we will accept the draft version.
3. Provide information for the cooperation between AVRL and GWCL. What will be their respective roles in general and specifically for this project?

C. Current situation

Provide a clear and factual overview of the current situation:

1. Demand (based on number of users in the service area, usage per person, size of household, etc). Please note that this should also include the households in the area's that are not yet served by the 'South of Kpong' system.
2. Supply and distribution (capacity of current system, number of household connections

(if any), stand pipes etc.)
3. Revenues (based on current prices)
4. Costs (costs of operations, number of personnel, etc)
5. What is the book value of the current system?
6. Please specify / describe what would happen if the project is **not** implemented? Would the current situation simply remain? Or would the situation worsen? Or…?

D. Projections for the project

1. Clearly indicate the scope of the project and what you have to do to get from the 'current situation' to the new situation, for example:
   - Newly build (pipes and (10)(1c) M3/day treatment plant, (10)(1c) taps, (10)(1c) household connections, reservoirs etc) and renovation (10)(1c) M3/day treatment plant)
   - Change in service / supply area (if any)
   - Change in product / services (treated / improved water quality)
   - Hire personnel, improve operations
   - Get new control systems etc.
2. Clearly indicate the assumptions for the project and the sources on which the assumptions are based, a.o. assumptions on: growth of inhabitants, usage per inhabitants and growth rate, pricing, operational costs (personnel, chemicals, etc), percentage of leakage, percentage of uncollected.
   If these assumptions deviate from the 'normal' situation in Ghana, i.e. 'leakage' or 'uncollected' are very low, please explain why.
3. Provide calculations for 15 years based on the assumptions for
   - Commercial viability based on appropriate prices (please include a note that due to IMF restrictions, it is not possible to obtain a commercial loan in Ghana)
   - Financial viability (based on current / realistic prices0
   - Economic viability

E. Context information

Provide information on the policy of the Government of Ghana regarding water that may influence the sustainability of the project, in specific the pricing policy and the organisation of the water sector.

F. Social aspects

- What are the direct effects of the envisaged project on employment? I.e. how many **new** employees are hired?
- What are the consequences for the water level/availability downstream?

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H. Other aspects

- Technical Assistance is **not** included in the project. Probably because AVRL has enough capable resources to operate the system sustainable. Please describe why AVRL will be able to operate the system successfully for at least 10 years.
- Please provide a break down of the financing cost.

Tauw

Note

Draft

Handled by (10)(2e)

Date July 3rd, 2007

Reference N002-4530669PPP-V01

Technical and financial evaluation of ATMA Rurals water supply Ghana

1. Although you stated the preliminary design has been checked by Tahal by a field survey we still like to have more design information on the water treatment plant. Can you give a full design report, including all starting points for dimensioning for the main equipment ?
2. The deliveries of Durch supplies are not per definition Dutch deliveries. Which percentage is of Dutch origin of the deliveries done by Dutch sub suppliers? Please split up per sub supplier its main components and the origin of these components. Use a table as the following:

Article	Supplier	Ammount
Piping (all)	(10)(1c)	(10)(1c)

3. How will Tahal guarantee the Dutch content will be above the required minimum.?

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Tahal Group B.V.

(10)(2e)

20 July 2007

2007-0386/WM/cvb

Request extension deadline questionnaire GH/WM07029

Dear (10)(2e),

On 18 July 2007 we received you letter in which you request for extension of the deadline of 2 August 2007 for responding to the questionnaire which was send to you on 5 July 2007.

We hereby inform you that we will extend the deadline up to 16 August 2007.

Yours sincerely,
Stichting ORET

(10)(2e)

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Tahal Group B.V.

(10)(2e)

19 September 2007

2007-0571/WM/bw

Approval application for ORET finance GH/WM07029

Dear (10)(2e)

With reference to your application for ORET finance for "ATMA Rural Water Supply System South of Kpong, Ghana" with project number GH/WM07029, I would like to inform you that the ORET Appraisal Committee has decided to approve your application.

Please be informed that your application, as a result of appraisal, may be modified. These possible modifications form the basis of the eventual subsidy, which is not inevitably equal to your initial subsidy application.

ORET.*nl* will execute a Decision ("Beschikking") for the applicant and a Preliminary Offer for the receiving country. Please note that, in general, it will take two weeks to send out the documents.

The "Beschikking" will be the only official decision; there are no rights to be obtained from this letter as this letter is for informational purposes only.

I trust to have informed you sufficiently. In case of any queries, you can contact ORET.nl by phone +31 (70) 342 62 33.

The minister for Development Cooperation,
On his behalf,

(10)(2e)