

A sustainable future for Curaçao

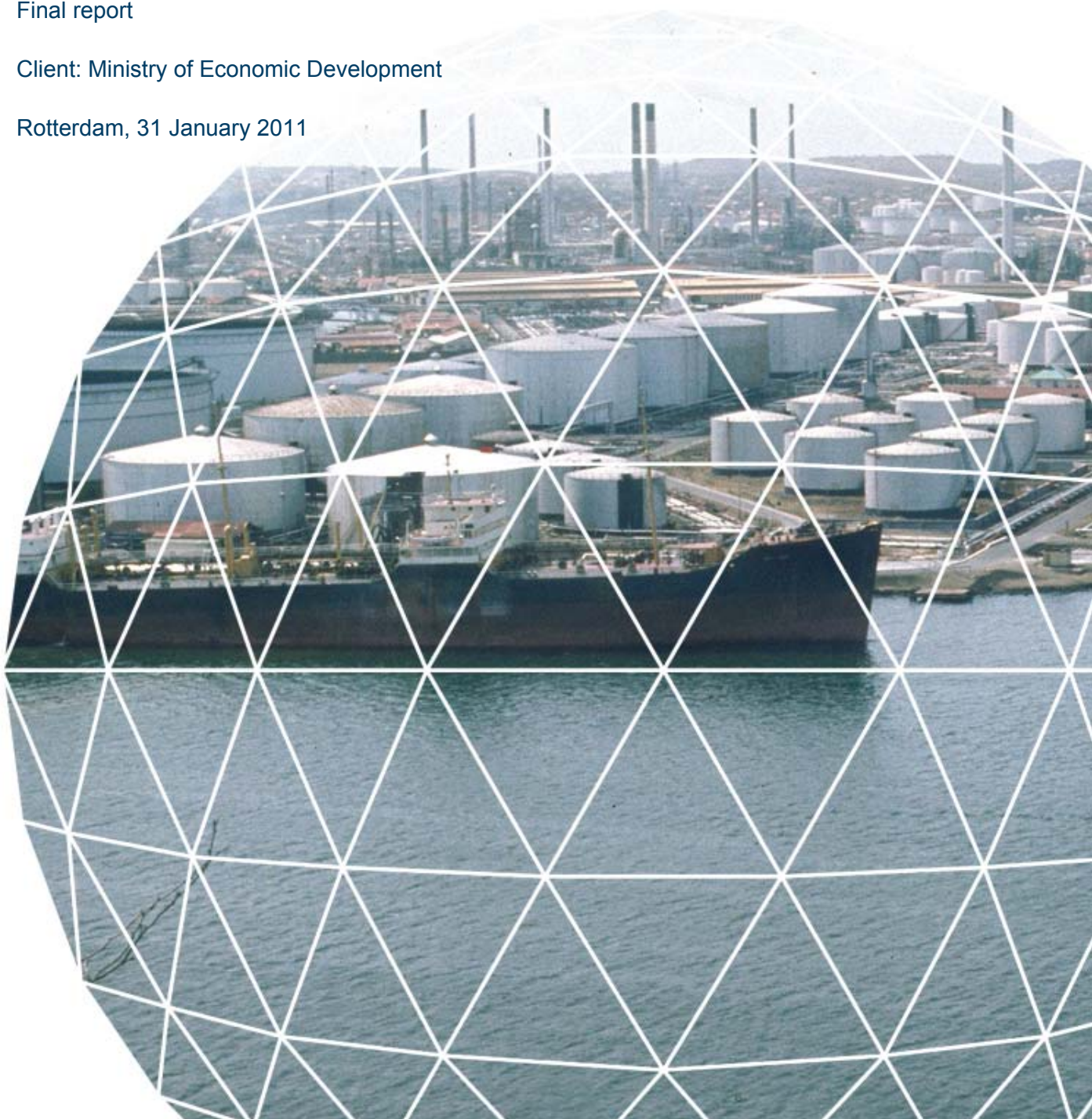
Strategic options for ISLA and the ISLA site

Phase 1, part 1

Final report

Client: Ministry of Economic Development

Rotterdam, 31 January 2011



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Preface

On behalf of the Ministry of Economic Development of Curaçao, in this report ECORYS presents the results of phase 1, part 1 dealing with the strategic options for ISLA and the ISLA site and focussed on providing information to the Ministry of Economic Development of Curaçao to be used as a basis for answering questions concerning strategic long term economic development specifically the potential of oil refining on Curaçao.

ECORYS is grateful for the pleasant and productive cooperation and useful discussions with the core team of the principal, the Ministry of Economic Development of Curaçao during the short period in which this assignment had to be carried out.

Furthermore, we wish to particularly thank all our interview partners and the institutions they represent for the highly useful and practical information that added significant value to this report.

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Rotterdam/Curaçao, 31TH of January 2011

Summary

Vision and ambition

The Government of Curaçao wants to formulate a political vision, showing its realistic ambition to realise an economically, socially and ecologically sustainable development of the island. Obviously, two well-known dossiers will play an important role in this process, the ISLA refinery and the site on which it is located for more than a century. Which is the role the national Government should play on this field? How far should the ambitions of the Government reach, and how do they relate to possible initiatives of private parties?

From the problem, stated in the ToR, it becomes clear in what direction the ambition for both elements points. We indicate them hereafter as track A and track B.

- Track A: development of a clear, well underpinned and socio-economic motivated viewpoint of the Government of Curaçao regarding continuation, or closure and relocation of refinery activities on the island after 2019 (or earlier).
- Track B: recovering the ISLA area, an industrial site, which – given its prime location – would be extremely suitable for a number of useful and value generating economic applications if only it is no longer protractedly and heavily polluted by former and present petrochemical processes.

What will – seen from a welfare economic point of view – be the involvement of the Government if one or both tracks will be followed? And will the tasks the Government should play be different for both tracks?

- Investment and operation of a refinery is first of all a private matter. It is therefore the task of private parties to take initiatives. Governments may try to stimulate their decisions by facilitating private initiatives and giving incentives, but it is not their role to start investing in or to operate this type of business.
- However, if after termination of the refinery-activities a heavily polluted site remains, and the costs of cleaning and clearance can not be recovered from (former) users, the Government has a different responsibility. It is then legitimate for the Government to make the first move, and – within acceptable limits - to take financial risks on behalf of the community, if and as far as removal and cleaning are commercially not (sufficiently) profitable for private parties (for instance by recycling and selling recovered petrochemical products), and if the site shows considerable potential for a sustainable welfare increase on the long term.

Objective of the project

The Ministry of Economic Development of Curaçao asked Ecorys to carry out a financial and economic (or social) cost-benefit analysis for three scenarios and formulating concrete recommendations that may assist in the process of making a strategic choice for the future of the ISLA area, including the oil refinery on Curaçao.

The three scenarios (or hereafter called “strategic options”) are linked to track A and B and are the following¹:

- *A1 Keeping the ISLA refinery at its current location and “upgrading” it*

The upgraded refinery will be in operation from 2019 onwards (or, if possible starting its operations earlier), fully using the same extensive area of 600 ha;

- *A2 Building a new refinery at a different location in Curaçao*

The new (modernized) refinery will be built at Bullenbaai and will be in operation from 2019 onwards (or, if possible starting its operations earlier), using a much smaller area (currently unknown) compared to the ISLA site.

- *B ‘corner’ solutions for re-development of the ISLA area (after closure of ISLA in 2019 or earlier)*

Three possibilities for using the clean area are: industry (B1), residential area (B2), tourism/offices (B3). It is assumed for the time being that the entire ISLA area is destined for one of these corner solutions. It is obvious that a mix of these three uses is more realistic. In later stages a mix of uses has to be discussed explicitly.

Elaboration of questions addressed

To realize the objective mentioned above much data and information is needed and many additional studies have to be carried out for updating old information and/or filling in the remaining gaps. This will take much time and effort.

Therefore, to speed up the process the project is divided into two phases, which are defined as follows:

- Phase 1: providing information to the Ministry of Economic Development of Curaçao to be used as a basis for answering questions concerning strategic long term economic development specifically the potential of oil refining on Curaçao as well as setting up a work plan for Phase 2;
- Phase 2: carrying out the financial and economic cost-benefit analysis for the three strategic options, based on the activities described in the work plan and to be started after its approval.

In this report the focus is on part 1 of phase 1, dealing with information to be provided to Ministry of Economic Development of Curaçao. Part 2, the work plan to be set up for phase 2, is not described in this report but will be reported separately.

Comparison of the effects and feasibility of the strategic options

For each of the strategic options the following determining factors have been investigated: economic effects, opportunities, limitations and risks. In accordance with the methodology of the cost-benefit analysis a marginal approach has been followed meaning that the options have been compared to the base case. The base case is defined as the closure of the ISLA refinery in 2019, dismantling, removal and minimal containment and cleaning (according to the basic guidelines for a healthy and safety environment) and no possibility for re-development of the ISLA site up to 2045.

Strategic option A1 compared to the base case

- Main economic effect: Significant contribution to the diversity of the island economy due to the continued presence of the refinery. The upgraded refinery warrants structural and temporary employment.
- Main limitation: Upgrading of the refinery leads to some more contamination of the site and activities to clean the site has to be postponed to 2040/45².

¹ These scenarios are deviating significantly from the original ones mentioned in the Terms of Reference (ToR) and are based on advanced insight and open discussions with the client. The main change is the additional option(s) of restructuring and development of the ISLA area after ISLA's closure, dismantling and cleaning of the area.

- Main opportunities:
 - Possibility to create a fund for cleaning the ISLA site in the long run.
 - Possibility to negotiate new favourable contractual provisions regarding inter alia financial and fiscal arrangements.
 - Possibility to attract additional refinery related activities to Curaçao.
 - Ability to comply with the (inter)national environmental standards.
 - Possibility to acquire other potential investor(s)/operators.
- Main risks, which can be considered as a precondition for the feasibility of this strategic option:
 - Uncertainty about the commercial/financial rate of return of the upgraded refinery.
 - Strong dependence on the government of Venezuela and the crude oil production from Venezuela.

Strategic option A2 compared to the base case

- Main economic effect: Significant contribution to the diversity of the island economy due to the continued presence of the refinery. The new refinery warrants structural and temporary employment.
- Main limitation: Land zoning and preparation costs at the Bullenbaai site, costs for extension of infrastructure and environmental pressure.
- Main opportunities:
 - New favourable financial and fiscal arrangements.
 - Possibility to attract additional refinery related activities to Curaçao.
 - Ability to comply with the (inter)national environmental standards.
 - Possibility to acquire other potential investor(s)/operators.
- Main risks, which can be considered as a precondition for the feasibility of this strategic option:
 - Uncertainty about the commercial/financial rate of return of the upgraded refinery.
 - Moderate dependence on the government of Venezuela and the crude oil production from Venezuela.

Strategic option B compared to the base case

- Main economic effect: Generation of employment and income resulting from dismantling and cleaning activities and from the development and establishment of new activities. However, the generated employment will be negatively influenced due to the lay off of the specialist personnel of the refinery.
- Main limitation: Investments in dismantling and cleaning the ISLA site and preparing the site for construction of infrastructure.
- Main opportunity: The development of sustainable and prosperity generating activities on the ISLA site after dismantling the refinery and cleaning the site.
- Main risks, which can be considered as a precondition for the feasibility of this strategic option:
 - Longstanding lack of demand for activities to be developed on the ISLA site.
 - Delay in dismantling, cleaning and re-development which will reduce the interest of stakeholders and the economic impact.

Actors involved/affected

The strategic options have an impact on a wide variety of actors on Curaçao. The following actors are involved in the upgrading or construction of a new refinery: RdK (financing), PdVSA (initiating, managing and financing), contractors and suppliers (employment). The operation of the refinery has an impact on employees of the refinery, contractors and suppliers (employment). Upgrading the refinery or a new refinery gives the Government of Curaçao the opportunity to enter into new and

² The year 2040/45 is taken as the final year in the period of the analysis. This is based on the fact that both for upgrading the refinery and for building a new refinery, the economic lifetime is about 25 years (see also section 3.5)

more favourable financial and fiscal arrangements. Finally, the general health of the population will improve.

Dismantling and cleaning of the ISLA site will generate employment for contractors. It will enable a share of the technical workers employed at ISLA during its operation, to find a job that fits well with their education/profession. This is due to the assumption that the refinery at the ISLA site will be closed in 2019 and no new refinery will be built at Bullenbaai resulting in a decrease of direct and indirect employment of about 2,000 people in total. In case a new refinery is established at Bullenbaai, dismantling and cleaning activities create additional jobs.

The cleaned area will be redeveloped with support of property developers and the government of Curaçao which has to change zoning plans depending on the chosen new activities. The investments in new economic activities and the operation of these activities result in respectively temporary and structural jobs and income for the population of Curaçao.

Information gaps to be elaborated in Phase 2

The information gaps relate to:

- The refinery. The following studies have to be carried out:
 - Study into the international oil market
 - Feasibility study for upgrading the existing ISLA refinery at Curaçao
 - Feasibility study for building a new (modernized) refinery at a different location in Curaçao
 - Appraisal of the current and future market value of the ISLA refinery
- Dismantling the refinery and cleaning the refinery area. The following studies have to be carried out:
 - Dismantling and removal of the ISLA refinery
 - Cleaning of the total site of ISLA (soil and bottom) taking into account the redevelopment of the area
- Preparation activities concerning location Bullenbaai and ISLA site after cleaning
- Redevelopment of the ISLA site after cleaning

1 Introduction

1.1 Background

In 1915, the Royal Dutch Shell started the construction of the oil refinery in Curaçao. Refining operations began in 1918. During more than 70 years Shell was responsible for the management and operations of the refinery and thousands of people were employed, attracted from all over the world. In 1985, the Shell left the island, bringing the Shell Curaçao N.V.'s activities to a complete stop. Then, in 1986, at the request of the local governments, Petroleos de Venezuela S.A. (PdVSA) – the Venezuelan state-owned oil company – took over the refinery on a lease contract that expires towards the end of 2019. The shares in the refinery (locally known as ISLA) are administered on behalf of the Government of Curaçao by Refineria di Korsou N.V. (RdK). In 1986 about 1,800 people were employed at the refinery and in the year 2010 employment has been decreased to about 1,000 employees.

PdVSA has the refinery on lease from the island government for approximately NAf 33 million a year. This lease amount does not include the necessary investments that need to be made in the refinery, mainly to make it more efficient and environmentally friendly. As per existing agreements, any such investments shall be for the account of PdVSA and RdK (on a 50-50 base). Since the takeover in 1985 to date, PdVSA's total realized investments in the ISLA refinery amount to USD 641 million³. In 2002 and 2003, the RdK and ISLA jointly implemented the investment project "Build Own and Operate" (BOO) and the investment project "Integrated Refinery Upgrading Program" (IRUP). IRUP was mainly (61%) aimed at improving the ISLA refinery's efficiency.

Studies carried out since 2004 have shown the latter investments to be insufficient if the refinery is to comply with applicable (international) environmental and safety standards and be able to adjust its production processes to market developments. It was also established that, in particular, the use of high-sulphur fuels and outdated facilities, as well as delays in the full implementation of IRUP's environment-and-safety module are both contributing to pollution of the environment. For this and other reasons, the Clean Environment on Curaçao Foundation (Schoon Milieu op Curaçao, or SMOC) initiated legal proceedings against ISLA in 2005. In January 2010, the Court ruled that ISLA has to pay NAf 75 million (approximately USD 41.5 million) a year in penalties if the maximum allowed environmental standard output of 80 µg/m³ of sulphur-dioxide (SO₂) per year as provided in the pollution permit⁴ is exceeded.

Partly as a result of the fact that PdVSA's lease contract will be expiring in 2019, and with the aim to comply with and further reinforce the applicable environmental standards as provided in the pollution permit and the Court's judgement, a vision of the ISLA refinery's future is being developed within the framework of Curaçao's Social-Economic-Initiative (SEI) program and as part of an effort to develop a long-term economic vision for the new country of Curaçao. This vision of the future is based on three possible scenarios that need to be developed and substantiated.

³ Source: PdVSA, August 2010 (through the ToR)

⁴ Exec. Council Decree 1997 No 96/7305/97/5421 (Refineria ISLA (Curazao) S.A. Pollution-Permit Provisions).

1.2 Objective

The objective of this project, according to the ToR is to carry out a financial and economic (or social) cost-benefit analysis for three given scenarios and formulating concrete recommendations that may assist in the process of making a strategic choice for the future of the ISLA area, including the oil refinery on Curaçao.

In developing the cost-benefit analysis for these three scenarios, special attention should be given to the financial, socio-economic and social aspects of the subject matter, taking into account the applicable international environmental and safety standards.

The three scenarios (or from the point of view of Ecorys hereafter called “strategic options” or “policy interventions”) are the following⁵:

- a. Shutting down the refinery, dismantling and clearing the facilities, and cleaning up the area, including option(s) for restructuring and development of the recovered area;
- b. Shutting down the refinery, dismantling and clearing the facilities, and cleaning up the area and building a new (modernized) oil refinery at a different location, including option(s) for restructuring and development of the recovered area; and
- c. Upgrading the refinery at its present location. The development of this scenario should include an exposition of future alternatives for the refinery regarding inter alia its lease or possible sale.

1.3 Elaboration of the questions addressed

To realize the objective mentioned above, i.e. carrying out a financial and economic cost-benefit analysis for the three strategic options and to formulate concrete recommendations on behalf of the strategic choices to be made for the refinery’s future and the ISLA area, much data and information is needed and many additional studies have to be carried out for updating old information and/or filling in the remaining gaps. This will take much time and effort.

Therefore, to speed up the process the project is divided into two phases, which are defined as follows:

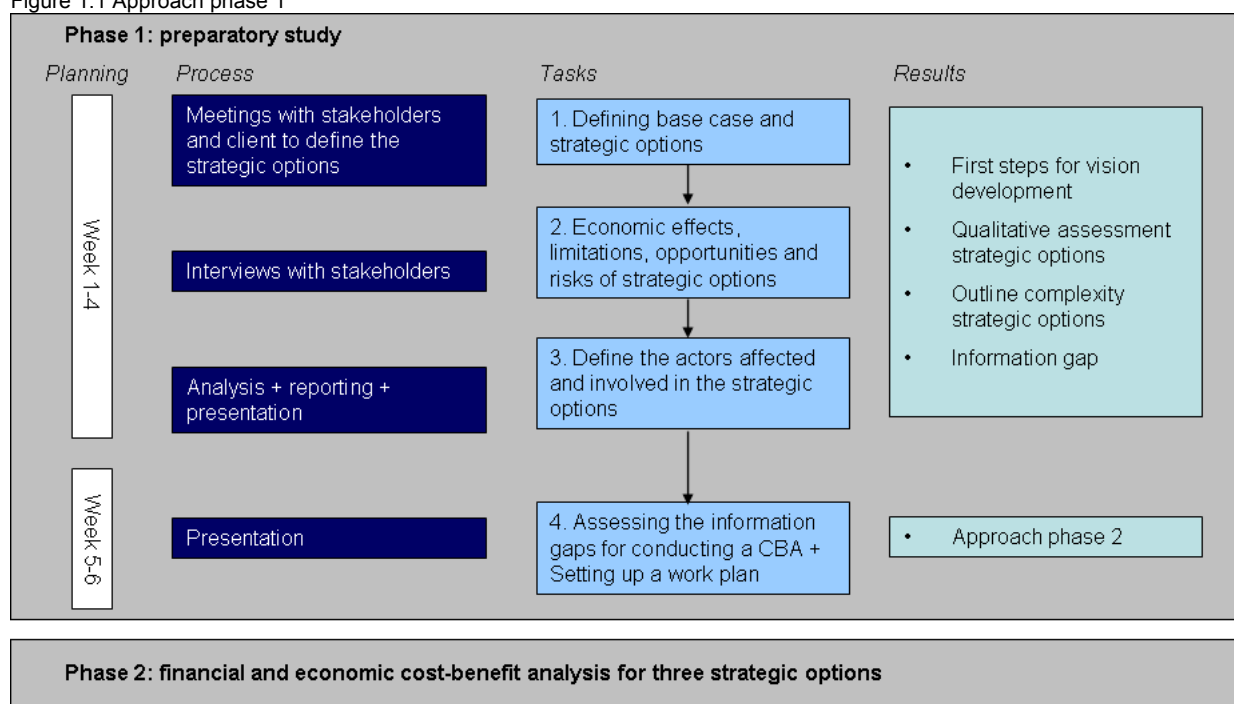
- Phase 1: providing information to the Ministry of Economic Development of Curaçao to be used as a basis for answering questions concerning strategic long term economic development specifically the potential of oil refining on Curaçao as well as setting up a work plan for Phase 2;
- Phase 2: carrying out the financial and economic cost-benefit analysis for the three strategic options, based on the activities described in the work plan and to be started after its approval.

Phase 1 contains the following four tasks:

1. Defining base case and strategic options for the refinery’s future and the ISLA site;
2. Evaluation of the economic effect, limitations, opportunities and risks;
3. Defining the actors affected or involved in the strategic options;
4. Preparation for phase 2: assessing the information gaps for conducting a cost-benefit analysis including setting up a work plan.

⁵ These scenarios are deviating significantly from the original ones mentioned in the Terms of Reference (ToR) and are based on advanced insight and open discussions with the client. The main change is the additional option(s) of restructuring and development of the ISLA area after ISLA’s closure, dismantling and cleaning of the area.

Figure 1.1 Approach phase 1



In order to define the strategic options (task 1), the elements that have a positive or negative impact on the strategic options (task 2) and the actors involved and affected (task 3), several discussions with the client have taken place. Furthermore, all relevant stakeholders have been interviewed in a very short period (see annex 1 for a list of interviewees). The outcome is an overview of the economic effects, limitations, opportunities and risks for each strategic option as well as an overview of the different actors involved in Curaçao. In task 4 the necessary studies to be implemented in phase 2 have been identified and a work plan for phase 2 has been drawn.

1.4 Structure of the report

In this report the focus is on part 1 of phase 1, dealing with information to be provided to Ministry of Economic Development of Curaçao. Part 2, the work plan to be set up for phase 2, is not described in this report but will be reported separately.

This report is structured as follows. Ambitions of the Government of Curaçao and a first step for vision development aimed at sustainability as well as the methodological framework are described and explained in Chapter 2. Chapter 3 is dealing with a detailed description of the strategic options to be explored. Next, in Chapter 4 a tentative analysis will be presented of the feasibility of the three strategic options, based on a qualitative assessment of economic effects, limitations, opportunities and risks. This chapter ends with an overview of the effects on the actors involved. Finally, in Chapter 5, gaps of information resulting from the analysis in chapter 4 will be discussed. A summary of the main findings can be found at the beginning of this report.

2 Ambitions, vision development and methodological framework

2.1 Sustainable development: key policy issue for the new Government of Curaçao

The national Government of Curaçao aims at a sustainable development of the island. Sustainable development is a pattern of resource use, aimed to meet human needs while preserving the environment so that these needs can be met not only in the present, but also for generations to come.

For the use of available space for national economic development this means that areas, used for industrial purposes like the ISLA site, should – after ending such use – be restored in such a way that it doesn't impede possible new uses by future generations.

2.2 Vision and ambitions

The Government of Curaçao wants to formulate a political vision, showing its ambition to realise an economically, socially and ecologically sustainable development of the island. Obviously, two well-known dossiers will play an important role in this process, the *ISLA refinery* and the *site* on which it is located for more than a century. Which is the role the national Government should play on this field? How far should the ambitions of the Government reach, and how do they relate to possible initiatives of private parties?

From the problem, stated in the ToR and in the introduction, it becomes clear in what direction the ambition for both elements points. We indicate them hereafter as track A and track B.

- Track A: development of a clear, well underpinned and socio-economic motivated viewpoint of the Government of Curaçao regarding continuation, or closure and relocation of refinery activities on the island after 2019 (or earlier).
- Track B: recovering the ISLA area, an industrial site, which – given its prime location – would be extremely suitable for a number of useful and value generating economic applications if only it is no longer protractedly and heavily polluted by former and present petrochemical processes.

Both tracks are mutually dependent. Sustainable reclamation of the ISLA area will only be possible if refinery activities will come to a complete stop, if they would be continued in a new refinery on another site (for instance Bullenbaai), or if upgrading of the ISLA-installations on the present site are combined with economies of space and thorough cleaning.

What will – seen from a welfare economic point of view – be the involvement of the national Government if one or both tracks will be followed? And will the tasks the Government should play be different for both tracks?

- Investment and operation of a refinery is first of all a private matter. If there are – given expected developments on the global markets for crude oil and refinery products - chances to realise commercial profits, it will chiefly be the task of private parties to take initiatives. Governments may try to stimulate their decisions by facilitating private initiatives and giving incentives, but it is not their role to start investing in or to operate this type of business. It is neither advisable for governments to take over the operations on a structural basis. In order to prevent closure the government must be able to take over the operations during a possibly

transitional period to prevent a socio-economic deterioration. On the other hand, however, it is a task of the Government to accompany closure processes from the sideline, for instance in order to prevent a too abrupt deterioration in welfare of employees involved and to monitor proper dismantling and cleaning operations. It is also possible that the authorities take measures to delay an imminent close-down. In such cases they must, however, be sure not to accept too large losses in national welfare (for instance allowing that existing emission or pollution standards are heavily exceeded), especially so if it is clear that delay will in the end not lead to a cancellation of closure.

- However, if after termination of the refinery-activities a heavily polluted site remains, and the costs of cleaning and clearance can not be recovered from (former) users, the Government has a different responsibility. It is then legitimate for the Government to make the first move, and – within acceptable limits - to take financial risks on behalf of the community, if and as far as removal and cleaning are commercially not (sufficiently) profitable for private parties (for instance by recycling and selling recovered petrochemical products), and if the site shows considerable potential for a sustainable welfare increase on the long term.

2.3 Methodological Framework: How to determine the economic value of a policy intervention

What are the welfare consequences for the national economy of policy interventions according to track A (flanking incentives and coordination measures to promote private investments in upgraded or new refinery activities) and track B (initiating, financing and carrying out removal and cleaning operations)? To get an answer on this question the Government of Curaçao wants to commission an economic Cost-Benefit Analysis (CBA) regarding a number of possible policy interventions (also called 'strategic options' or 'project alternatives').

By performing a CBA the national economic development, to be expected if a well-specified policy intervention will be carried out, is compared with the 'base case' development. This is the development which would take place on the island in case of the complete absence of any intervention according to track A or B, or if interventions are limited to an unavoidable and bare minimum. In the base case or minimum intervention case no new policy interventions or financial effort will take place to facilitate the preservation of a refinery or supervise its closure, combined with removal and the minimum level of cleaning required to prevent safety and health risks for the island population.

The annual differences in development between a policy intervention case and the base case are called the annual effects of the policy intervention. In an economic CBA these effects must – as far as possible - be valued (in the national currency) and discounted to the present (their present value in 2011).

It is quite foreseeable that especially policy interventions of type B will generate important effects which during Phase 2 of the study will probably result in substantial financial losses. This is due to the risk that it may take many years before the (large) costs of removal and cleaning will be followed by benefits, generated by new uses of the ISLA site. By discounting costs and benefits at a conventional economic rate (of 8% to 12 %) the net welfare change and the internal rate of economic return will almost certainly be negative.

This is a well-known phenomenon in the economic CBA practice for projects or interventions with an important ecological content. As the benefits of this type of projects are expected to be realised in the rather remote future, and will mainly accrue to future generations, the underlying time preference rate has a negative effect.

One can of course try to move the benefits forward in time, on the one side by speeding up the necessary removal and cleaning activities and preventing them to drag on too long, and on the other side by readjusting existing zoning plans elsewhere on the island, abandon the intended occupation of already zoned areas and block them for specific uses. It remains to be seen if this would suffice to turn the CBA outcome into a positive result.

Another conceivable possibility is to lower the discount rate, by explicitly assigning a larger weight to the interests of future generations. It is advisable to examine if and to what extent this way of thinking might be defensible for this type of policy interventions (i.e. track B).

An economic CBA is an analytical instrument, meant to bring the welfare implications of complex policy options in a consistent and transparent way out into the limelight. The results offer policy makers important information, but as a matter of course the outcomes are not meant to tell them what to do. Political decision makers should take note of the welfare-economic analysis, but have the responsibility to weight themselves all pros and cons in their own way.

Important aspects, like uncertainties about nature and size of future benefits of the cleaning operation, the wish to explicitly give proper weights to the welfare contributions of new sustainable uses for present and future generations, and improvement of the image of the island of Curaçao boosting new élan, might be reasons for the Government to not let itself too easily become deterred by potential negative outcomes of policy interventions of type B.

For that reason it deserves serious consideration to present the economic valuation of the policy options of type B not as an economic Cost-Benefit Analysis, but rather as a Cost-Effectiveness Analysis (CEA). In a CEA the effects to be realised - e.g. cleaning level x for y hectares of the ISLA site, to be zoned for specific use z – are specifically and precisely defined. Then the costs are identified of all possible ways to realize this objective.

In the end the outcome of the CEA can be corrected for all identifiable socio-economic benefits, arising from the proposed future use. The final result will be consistent with a proper CBA.

3 Description of the strategic options to be explored

3.1 Introduction

Based on the ToR and already mentioned briefly in the introduction chapter, we propose to distinguish two tracks (A and B) in describing the strategic options in more detail.

However, before starting the explanation and elaboration of the two tracks, it is useful first to explain very briefly, some basic elements of an economic (or social) cost-benefit analysis. Although this analysis will only be carried out in the second phase, an agreement on the definition of the strategic options as well as on the so-called reference option (hereafter called “base case”), is crucial.

A cost-benefit analysis can be characterized as an incremental or marginal approach: benefits, or welfare effects of the investments, are always defined as differences (advantageous or disadvantageous effects) between the development of a strategic option with the development according to the base case. These differences are also called project impacts or intervention effects. Therefore, apart from defining the strategic options in a detailed way (section 3.2 and 3.3), it is essential also to define the base case (section 3.4).

3.2 Track A: a refinery at Curaçao which operations will last far beyond 2019⁶

In track A two strategic options are distinguished: A1: upgrading the present refinery, and A2: building a new (modernized) refinery at a different location within Curaçao.

A1 Keeping the ISLA refinery at its current location and “upgrading” it

- The upgraded refinery will be in operation from 2019 onwards (or, if possible starting its operations earlier), fully using the same extensive area of 600 ha;
- In upgrading the refinery, some variants are possible. Compare for instance the two options⁷ proposed by Purvin & Gertz in 2005, on behalf of RdK: a ‘delayed coker case’ and a ‘gasification case’.
- Upgrading the ISLA refinery also implies a certain degree (to be determined afterwards) of *cleaning and containment* (in order to prevent further dispersion of soil- and bottom contamination, to avoid acute danger for public health and safety).

A2 Building a new refinery at a different location in Curaçao

- The new (modernized) refinery will be built at Bullenbaai⁸ and will be in operation from 2019 onwards (or, if possible starting its operations earlier), using a much smaller area (currently unknown) compared to the ISLA site.

⁶ For both strategic options A1 as well as A2 variants are possible. However, not to loose oneself not in too much detail, variants will not be considered until further notice.

⁷ Today, it is not clear if the two options proposed in 2005 are still valid. But, in case it is, the related investment and operational costs as well as the gross margins need to be updated.

⁸ Bullenbaai is probably the only option available in Curaçao that fulfils fully one of the main requirements to establish a new refinery. It already has the required infrastructure (and super structure) to accommodate deep-sea vessels as mammoth

3.3 Track B: ‘corner’ solutions for re-development of the ISLA area (after closure of ISLA in 2019 or earlier)

In track B three strategic options will be dealt with, which have to be seen as ‘corner’ solutions for re-development of the ISLA area until further notice.

B1 Proposed use: industrial activities

This strategic option includes the following:

- Dismantling and removal of the existing ISLA refinery;
- Containment and cleaning activities directly fine-tuned for industrial purposes;
- Industrial activities to be established at the “clean up” site being port related (so-called ‘wet’ activities) and/or service related (so-called ‘dry’ activities).

B2 Proposed use: residential areas for local people and immigrants

This strategic option includes the following:

- Dismantling and removal of the existing ISLA refinery;
- Containment and cleaning activities directly fine-tuned for residential purposes;
- Residential areas to be developed with diversification by type of accommodation (single-family dwellings, apartments, residences, etc.).

B3 Proposed use: tourism areas and offices

This strategic option includes the following:

- Dismantling and removal of the existing ISLA refinery;
- Containment and cleaning activities directly fine-tuned for tourism and office purposes;
- Tourism areas to be developed by type of tourism (marina’s, hotels, golf course, etc.) as well as offices.

In all three strategic options it is expected that huge volumes of oil residues have to be removed which leaked into the soil of the ISLA area during decades. One possibility is to recover the oil residues making use of some of the existing ISLA refinery installations. In that particular case, some parts of the dismantling operations have to be postponed.

In general, the cleaning and recovery operations differ from variant to variant. In strategic option B3, with a proposed tourist use, cleaning operations need to be more intensive than for example in strategic option B1, in which the area is meant for industrial purposes.

3.4 Reference option or “base case”

As already discussed in the introductory section of this chapter, all strategic options have to be compared to the reference option or “base case”.

The base case (R0) is defined as the closure of the ISLA refinery and includes the following:

- The refinery will be closed in 2019 (or possibly earlier), which implies that there will no longer be a refinery operational at Curaçao;
- Dismantling and removal of the existing ISLA refinery;
- Take into account the possibility to phase the dismantling operations, because a part of the existing ISLA refinery installations might be needed to recover leaked oil residues;

tankers (VLCC & ULCC) up to 500,000 DWT supplying crude oil and transporting the outputs to the various export markets.

- Minimal containment and cleaning activities (according to the basic guidelines for a healthy and safety environment) in order to prevent further dispersion of soil- and bottom contamination, to avoid acute danger for public health and safety.
- On the long run (suggestion up to 2045) no possibility for re-development of the ISLA site for new activities (fallow area strictly forbidden to enter).

3.5 Strategic options to be considered in more detail

Based on the strategic options described in the previous sections, quite a number of combinations of options can be made. Before doing that, it is important to pay attention to the following:

- In case of upgrading the ISLA refinery (option A1), the options mentioned under track B are not valid during the entire period up to 2045;
- In case of building a new refinery (option A2) four combinations have to be taken into account⁹:
 - A2 with – after closure of ISLA – dismantling activities as well as minimal containment and cleaning activities (like in R0); and
 - A2 with one(or a mix) of the three ‘corner solutions’ (B1, B2 or B3).

Table 3.1 Strategic options to be considered in more detail

Strategic option	Refinery on Curaçao after 2019?	Dismantling and cleaning ISLA site?	Redevelopment ISLA site?
R0	No	Minimal cleaning for human health and safety, minimal costs	-
A1	Upgrading ISLA	Containment only (as in R0) or more?	-
A2+B1	New refinery at Bullenbaai	Dismantling + cleaning for industrial use	Industrial use
A2+B2	New refinery at Bullenbaai	Dismantling + cleaning for residences	Residential use
A2+B3	New refinery at Bullenbaai	Dismantling + cleaning for tourism or service related activities	Tourism or service related use
A2+mix B	New refinery at Bullenbaai	Dismantling + cleaning for mixed use	Mixed use
B1	No refinery at Curaçao	Dismantling + cleaning for industrial use	Industrial use
B2	No refinery at Curaçao	Dismantling + cleaning for residences	Residential use
B3	No refinery at Curaçao	Dismantling + cleaning for tourism or service related activities	Tourism or service related use
Mix B	No refinery at Curaçao	Dismantling + cleaning for mixed use	Mixed use

For each of the options mentioned above, a time horizon has to be specified. The main reason is that in the financial and economic cost-benefit analysis¹⁰ during that period all annual costs (investments, exploitation, maintenance) and benefits (value of direct, indirect and external effects) have to be determined and discounted (to the year 2011). With an economic lifetime of the new refinery of 25 to 30 years, the time horizon should be fixed at the year (2019+25=) 2045. The same

⁹ As mentioned before, options B1, B2 and B3 are to be considered as ‘corner solutions’. This means that it is assumed for the time being that the entire ISLA area (for 100%) will be zoned for respectively industry, or residential purposes, or for tourism/offices. It is obvious that a mix of these three destinations (and maybe others as well) would be more realistic. However, the simplistic assumption is chosen to keep the methodological structure clear and to avoid that too many options are put on the table at an early stage. In later stages a mix of uses has to be discussed explicitly.

¹⁰ These analyses will be carried out later on in Phase 2 of the study.

holds for upgrading the existing ISLA refinery: here we also assume an economic lifetime of 25 years after the upgrading investments have been implemented.

4 Comparison of the effects and feasibility of the strategic options

Each strategic option has advantages and disadvantages compared to the base case. A quantitative analysis of the effects and a calculation of the economic value of the strategic options is not feasible in this stage of the study. However, based on information provided by stakeholders, the client and our own expertise, it is possible to indicate the following types of determining factors for each strategic option:

- Economic effects;
- Opportunities;
- Limitations; and
- Risks.

This chapter shows the supposed nature of these determining factors for each strategic option compared to the base case. In the second phase of this study the hypotheses, presented here, will be tested and extended with a quantitative analysis, based on additional information to be gathered during the second phase.

4.1 Characteristics of the base case

In this chapter the strategic options distinguished will be compared to the base case. The base case is defined as the closure of the refinery in 2019, followed by dismantling and a minimum of cleaning the area. In order to make a sound analysis it is necessary to indicate at first the most significant characteristics of the base case. To that end we make a comparison of the situation after 2019 with the current situation (2011). The following issues are relevant:

- Decrease of employment (direct 1,000 fte¹¹ and indirect 600 – 1,000 fte) and GDP¹² (minus about 7 percent) in the refinery sector and their local suppliers and consumers;
- Reduction of diversification (industry mix; interindustry linkages) of the economy of Curaçao;
- Complete disappearance of the ISLA air emissions (resulting in a significant improvement of the environment, health and safety);
- After closure (2019) dismantling and a minimal degree of site cleaning and containment will take place without establishing any kind of new economic activity;
- All planned initiatives (tourism, housing, industrial services, etc.) will be implemented on the current zoned locations, pointed out in the EOP¹³ of Curaçao, which means that the ISLA site is not considered to be a possible substitute for already zoned locations.

4.2 Determining factors for the three main strategic options

Each strategic option has its own economic effects, limitations, opportunities and risks. In this section these factors will be presented for each strategic option. The Figures 4.1 to 4.3 give an overview of the factors, identified for the development according to each strategic option and *compared to the base case development*, and refer to the period 2019 to circa 2045. As described

¹¹ fte = full time equivalent

¹² GDP = Gross Domestic Product

¹³ Economisch Ontwikkelings Plan (Economic Development Plan)

in Chapter 3, nine strategic options are distinguished. In this section the following three main strategic options are discussed (again: developments are each time compared to the base case):

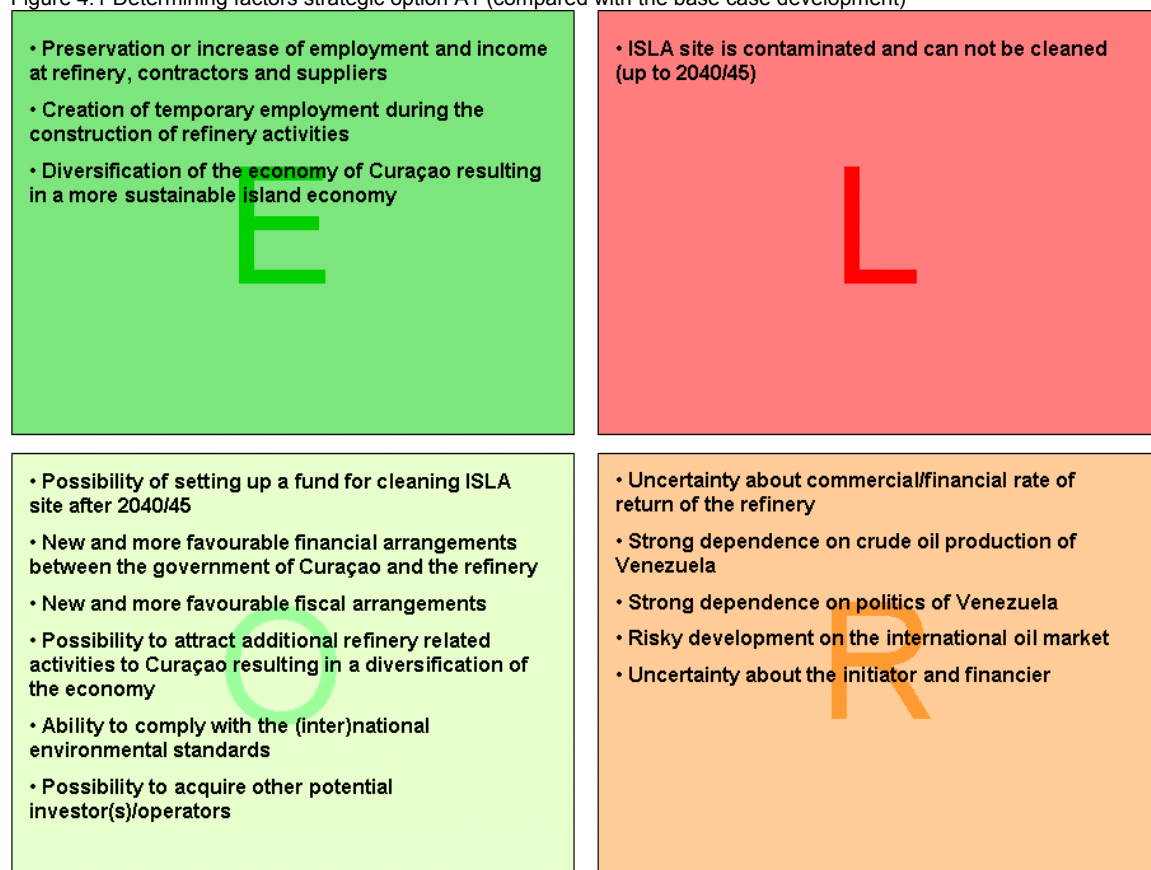
- A1 Upgrading the ISLA refinery;
- A2 Closure of the ISLA refinery and construction of a new refinery at Bullenbaai. (please note: Dismantling, cleaning and containment of the ISLA site are not part of this option, but are dealt with in option B);
- B Dismantling, cleaning, containment and alternative use of the ISLA site.

Strategic option B has not been split up into B1, B2 and B3 since for the moment we are only able to define the general economic effect, limitations, opportunities and risks that are applicable to any kind of re-development at the ISLA site. Furthermore, strategic option B can be combined with strategic option A2. The strengths of both options A2 and B can be added up. For instance the determining factors of strategic option A2+B2 is the sum of options A2 and B presented in the tables below.

4.2.1 Analysis of determining factors of option A1

The economic effects, limitations, opportunities and risks of the strategic option “upgrading” the ISLA refinery (A1) are summarised in the figure below.

Figure 4.1 Determining factors strategic option A1 (compared with the base case development)



(E = economic effect, L = limitations, O = opportunities, R = risks)

Economic effects

A strong advantage of this option, compared to the base case development, is the significant contribution to the diversity of the island economy due to the continued presence of the refinery. The upgraded refinery warrants structural employment during some decades for technical skilled employees as well as structural employment for subcontractors working at the site for regular

maintenance and shutdowns and for all kind of suppliers. A permanent increase in employment is expected after the implementation of the investments to upgrade the refinery¹⁴. During the construction phase of the upgrading process, temporary employment for contractors and suppliers will be created.

Limitations

This strategic option has, compared with the base case, one main limitation: upgrading of the refinery leads to some more contamination of the site (than the base case), and activities to clean the site have to be postponed to at least 2040/45.

Opportunities

Upgrading the refinery results in the following opportunities:

- Possibility to create a fund for cleaning the ISLA site after 2040/45: with this fund (part of) the costs of cleaning the ISLA site can be paid in case the refinery will be closed in 2040/2045¹⁵.
- New favourable financial and fiscal arrangements: the upgrading of the refinery gives the government of Curaçao the opportunity to negotiate new and more favourable contract provisions regarding inter alia financial and fiscal arrangements. (The current lease contract with PdVSA and the agreed fiscal arrangements are not very satisfactory for the government of Curaçao.)
- Possibility to attract additional refinery related activities to Curaçao. This will result in a further diversification of the island economy.
- Ability to comply with the (inter)national environmental standards.
- Possibility to acquire other potential investor(s)/operators.

Risks

The two most significant risks are:

1. Uncertainty about the commercial/financial rate of return of the upgraded refinery (commercial viability of a refinery on Curaçao).
2. Strong dependence on the government of Venezuela and the crude oil production from Venezuela.

Both factors are a precondition for the feasibility of this strategic option. If the upgrading of the refinery is commercially not viable or if PdVSA decides not to invest in the ISLA refinery and no other investors are interested, this strategic option will not be implemented.

Commercial/Financial rate of return: At this moment it is unclear whether the investments are financially sustainable and commercially viable or not. The technical, financial sustainability and commercial viability of this option have to be determined and tested in phase 2 of this study. The development on the international oil markets will be one of the key factors influencing the commercial/financial rate of return of the investments. Fluctuating oil prices, a swing in processing locations to the Eastern part of the world among other things could have an impact on the demand for oil refining at Curaçao. If demand is weakening, investments in new activities or in upgrading are risky.

Example of developments on the oil market that might affect the upgrading of the refinery

In the period 2009-2015 it is expected that in “the West” (North and South America) refineries will be closed with a total capacity of 4.9 million bpd and new refineries will be built with a total capacity of only 0.4 million

¹⁴ Based on the two upgrading options defined in 2005 by Purvin & Gertz (2005)

¹⁵ The final decision to upgrade the refinery again in 2040/45 or to close the refinery definitively has to be taken after the year 2035

bpd. On the contrary, in “the East” (Europe, Africa and Asia) refineries will be closed with a total capacity of 2.6 million bpd and new refineries will be built with a total capacity of up to 6.1 million bpd.

If an upgrading of the refinery is not commercially viable, this strategic option will not be realistic.

Strong dependence on crude oil production from Venezuela and on the government of Venezuela
The upgraded refinery heavily depends on the crude oil production and supply from Venezuela. Although the facilities and installations are technically designed for processing all type of crude oil including the specific crude oil from Venezuela, the latter is the only crude currently feasible from an economic point of view. Therefore, it is highly uncertain if crude oil originating from other countries will be processed in an upgraded refinery on Curaçao in the short and medium term. Furthermore, the willingness of PdVSA to continue its operations and also to invest significantly in an upgrading of the existing refinery is highly uncertain. Nevertheless, a strong initiator and financier are essential for a successful investment in upgrading the refinery.

4.2.2 Analysis of determining factors of option A2

The economic effects, limitations, opportunities and risks of the strategic option “building a new refinery” (A2) are summarised in the figure below.

Figure 4.2 Determining factors option A2 (compared with the base case development)



(E = economic effect, L = limitations, O = opportunities, R = risks)

A strong advantage of this option is, just like in the case of option A1, the significant contribution to the diversity of the island economy due to the presence of the refinery (compared to the *base case*). In case of a new refinery at Bullenbaai, it is expected that employment will remain stable (compared to the *present situation*) or slightly decrease due to increased efficiency of the new (modernized) refinery. Investments in a new refinery will generate temporary employment for

contractors and suppliers during the construction phase. Moreover, the new refinery creates structural employment for technical skilled employees as well as structural employment for subcontractors working at the site for regular maintenance and shutdowns and for all kind of suppliers.

Another effect of this strategic option is the possibility to create some “economies of scale”. If the refinery activities will be moved to Bullenbaai, tanker transport and towing services will also shift from Schottegat to Bullenbaai, resulting in a concentration of these activities on one spot.

Finally, the removal of the refinery from Schottegat to Bullenbaai and the redevelopment of the ISLA site may significantly improve the island community’s self-confidence: Curaçao succeeds in solving the “refinery issue” at the ISLA site.

Limitations

Two elements can be considered as the main limitations of strategic option A2: Costs and pressure on the environment (soil and water contamination).

- Costs: In this strategic option, the following costs have to be taken into account:
 - Land zoning and preparation costs at the Bullenbaai site;
 - Infrastructure costs: The erection of a new refinery at Bullenbaai will result in an increasing pressure on the existing infrastructure at Bullenbaai. Additional investments are needed to improve and to extend the infrastructure.

In this stage of the project these costs are unknown. The area needed and available for a new refinery at Bullenbaai, the costs for land preparation, infrastructure improvement and the investment costs for the refinery itself will be examined in phase 2 of this project.

- Pressure on the environment: The operation of the refinery at Bullenbaai will result in an increase in soil and water pollution (compared to the base case). This is inevitable, when operating a refinery, despite all measures taken according to environmental and safety standards.

Opportunities

A new refinery at Bullenbaai results in the following opportunities:

- New favourable financial and fiscal arrangements: the upgrading of the refinery gives the government of Curaçao the opportunity to negotiate new and more favourable contract provisions regarding inter alia financial and fiscal arrangements. (The current lease contract with PdVSA and the agreed fiscal arrangements are not very satisfactory for the government of Curaçao.)
- Possibility to attract additional refinery related activities to Curaçao resulting in a more diversified economy.
- Possibility to comply with the (inter)national emission standards after building a new refinery at Bullenbaai.
- Possibility to acquire other potential investor(s)/operators.

Risks

The two most significant risks which can be considered as are a precondition for the feasibility of this strategic option are:

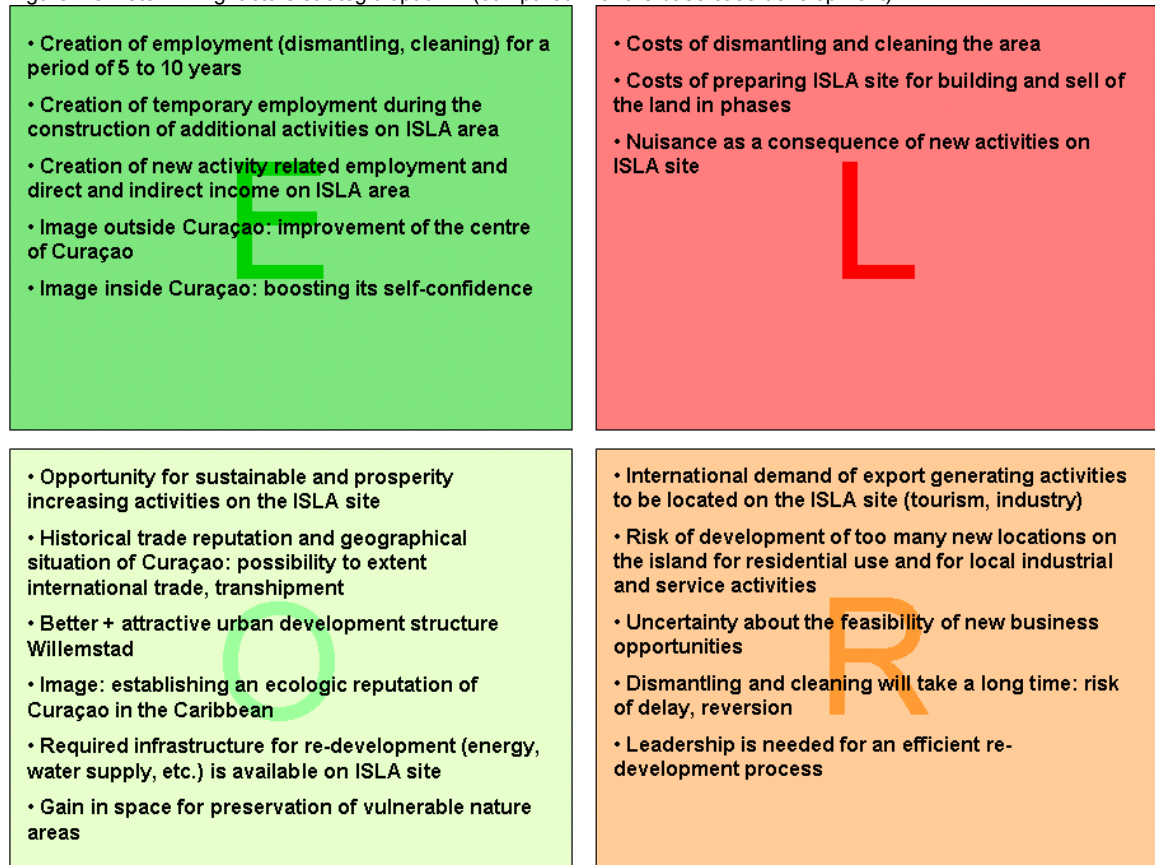
1. Uncertainty about the commercial/financial rate of return of the new refinery.
2. Moderate dependence on the government of Venezuela and the crude oil production from Venezuela. This is due to the possibility that other potential investors/operators are interested in new refinery activities.

One additional risk can be mentioned; the unknown available area capacity at Bullenbaai related to the area required for building a new refinery. If the available capacity is not sufficient for the new refinery, an arrangement has to be made to extend the capacity like for instance changing the existing zoning plan.

4.2.3 Analysis of determining factors of option B

The economic effects, limitations, opportunities and risks of the strategic option B dismantling, cleaning, containment and alternative use of the ISLA site are summarised in the figure below.

Figure 4.3 Determining factors strategic option B (compared with the base case development)



(E = economic effect, L = limitations, O = opportunities, R = risks)

Economic effects

The most significant effect of this strategic option (compared to the base case) is the generation of employment and income resulting from dismantling and cleaning activities and from the development and establishment of new activities on the ISLA site. Several factors will stimulate the development of these new activities:

- The availability of a location situated at the centre of the island with entrance for deep sea vessels. This is a very strong asset for attracting (new) economic activities such as harbour related activities, tourism (mega-yachts), etc;
- The improved public image of Curaçao after closing the refinery. This will have an impact on the tourism sector as well;

Limitations

Investments in dismantling and cleaning the ISLA site and preparing the site for construction of infrastructure are the main limitations of this strategic option. The total amount of these necessary investment costs is unknown. Furthermore the investment cost for cleaning the ISLA site highly depend on the activities to be developed on the ISLA site.

Dismantling and cleaning

Dismantling and cleaning of the ISLA site will take place in strategic option B. A first rough estimate of the cost incurred was made in 2005¹⁶, summing up to USD 310 million for dismantling activities and to USD 85 million for cleaning activities (both in 2005-prices). It has to be stressed here that these estimates were cursory and very conservative. For instance, the cleaning costs only covered the application of isolation techniques needed for developing an industrial area, and therefore has to be seen as an absolute minimum. Both activities (dismantling and cleaning) will be subject of a more detailed study during phase 2 in which accurate estimates will be made of dismantling costs as well as cleaning costs taking into account the actual pollution of the soil and water, the available techniques also in relationship to the alternative activities that might be established on the clean area.

Depending on the new use of the ISLA site, nuisance like noise, soil, air etc. and traffic congestion might occur as a consequence of the new activities which have corresponding negative effects for population in the neighbourhood.

Opportunities

The main opportunity of strategic option B, compared to the base case, is the development of sustainable and prosperity generating activities on the ISLA site after dismantling the refinery and cleaning the site. This is supported by the following other opportunities:

- Historical trade reputation and geographical situation of Curaçao: possibility to extent international trade and transshipment;
- Establishing an ecologic reputation of Curaçao in the Caribbean: dismantling the refinery and carrying out intensive cleaning of the ISLA site could give Curaçao rather an ecologic reputation in stead of the reputation of polluter as it currently is;
- An improved and more attractive urban development structure of Willemstad: alternative use of the ISLA site for e.g. tourism activities (hotels, marinas etc.), residences, offices, etc. makes this site more attractive compared to the base case;
- Gain in space for preservation of vulnerable nature areas: because of the prime location of the ISLA site it is expected that planned expansion of several activities elsewhere in Curaçao (according to the base case) will be realised in on the ISLA site instead of for instance in more remote and vulnerable areas (e.g. Caracas Bay, East Point). This means also that vulnerable nature reserves will be preserved.
- The availability for new users of already existing infrastructure (roads, electricity and water networks) on the site.

Risks

The most important risk is a longstanding lack of demand for activities to be developed on the ISLA site. If there is insufficient demand for the new activities on the ISLA site, this strategic option will not be feasible.

- The ISLA site can be developed for export generating activities like tourism and port-related industry. A survey on the possible international demand for these activities/products should be the basis for the decision on the total amount of area that needs to be developed in the long run, to establish these activities at the ISLA site as well as for a decision on the planning stages during a period of 20 to 30 years. Overcapacity is a serious threat and should in any case be avoided.

¹⁶ Ecorys Report 2005

- This is also valid for the development of new areas on the reclaimed site for residences, local industrial products and services. The demand of the population of Curaçao should be the basis for the decision on the capacity for those activities to be developed at the ISLA site.

Another risk is the process of dismantling, cleaning and re-development. It will take a very long period and/or the necessary decisions could also be delayed year after year. If this will be the case the interest of property developers, investors/financiers, etc. will reduce significantly and as a consequence the economic impact of this strategic option will diminish considerably. It is an absolute necessity to keep up the pace. This requires strong leadership for managing the whole process from dismantling up to re-development, and also sufficient community support.

4.3 Effects of strategic options on actors

The strategic options discussed above all have an impact on various actors at Curaçao. This section presents for each strategic option which actors and in what way these actors are involved and/or affected.

Strategic option A1

The investments in upgrading the refinery should be initiated, managed and financed. At present it is not certain and clear who will take the lead, but one might expect that PdVSA could fulfil this role.

Upgrading the refinery results in temporary employment and income for contractors and suppliers, who participate in the construction activities of the upgrading works. When the upgraded refinery is in operation it creates additional structural employment for employees of the refinery, contractors and suppliers of the refinery (compared to the base case).

Upgrading the refinery gives the Government of Curaçao the opportunity to enter into new and more favourable financial and fiscal arrangements. Tax revenues could increase and the balance of payments could improve.

Finally, the general health of the population will improve slightly (compared to the present situation) assuming the adoption of the (inter)national emission standard and enforcement.

Strategic option A2

The actors involved and affected in strategic option A2 are similar to the ones mentioned in strategic option A1. An exception is the structural employment and income for employees of the refinery. In case of a new refinery at Bullenbaai, it is expected that employment will remain stable or slightly decrease compared to the present situation due to increased efficiency of the refinery. The employment will increase if we compare option A2 with the base case (which is a closure of the refinery in 2019). Supplementary to option A1 is:

- Additional temporary employment and income with regard to the preparation of Bullenbaai for the establishment of industrial activities.
- Curaçao Port Authority (CPA), responsible for tanker transport and towing services, will benefit of moving the refinery from Schottegat to Bullenbaai. The activities will be concentrated on one spot.
- Possibly new investors/operators interested in new refinery activities, will (partly or entirely) initiate, manage and finance these activities.

Strategic option B

An important element of strategic option B is the effort to dismantle and clean the ISLA area. This will generate temporary employment for contractors. The total duration foreseen is a 5 to 10 years period. Dismantling and cleaning of the ISLA site will generate employment for contractors. It will enable the majority of the technical workers employed at ISLA during its operation, to find a job that fits well with their education/profession. This is due to the assumption that the refinery at the ISLA site will be closed in 2019 and no new refinery will be built at Bullenbaai resulting in a decrease of direct and indirect employment of about 2,000 people in total. In case a new refinery is established at Bullenbaai, dismantling and cleaning activities create additional jobs.

The cleaned area will be redeveloped with support of property developers and the government of Curaçao which has to change zoning plans depending on the chosen new activities.

The investments in new economic activities on the clean ISLA site will result in temporary jobs and income for the population of Curaçao. When the new activities are in operation, additional employment and income will be generated. It is expected that a mix of all, or in any case several, of the following activities is the best option:

- Tourism: hotels, marinas, mega-yachts facilities etc.;
- Harbour related industrial activities: transshipment, storage etc.;
- Non-harbour related industrial activities;
- Residential area;
- Green area.

5 Information gaps to be elaborated in phase 2

The outcome of phase 1 of this study is a qualitative assessment of the three identified strategic options. It can be concluded that much (quantitative) information, needed for a qualitative assessment and an economic valuation, is not available at this moment. In the following section the main gaps of information will be discussed and will be taken into account in the proposal for carrying out phase 2.

5.1 Information gaps related to the refinery

Study into the international oil market

A study has to be carried out into the main developments in the international oil market, at least taking into account a.o.:

- Types and quality of products the market requires;
- Competition from other refineries serving the same market (including trends in supply and demand and capability of these refineries);
- Net prices expected for the refinery in Curaçao;
- Product quality regulations in relation to the current products of the ISLA refinery which are at a lower end of the quality spectrum;
- Product quality requirements to be used in evaluating upgrading options;
- Environmental issues.

Feasibility study for upgrading the existing ISLA refinery at Curaçao

A feasibility study has to be carried out for upgrading the existing oil refinery at its current location. Based on the technical condition of the ISLA refinery, the current products and product quality requirements from the international oil market as well as the current and future market outlook for ISLA to be a competitive market player in the region in the long run (see 5.2.1), the possibilities for upgrading the refinery have to be assessed from a technical, financial and commercial point of view¹⁷. Among other things, in any case the following issues have to be dealt with:

- Commercial and financial rate of return;
- Gross margin;
- Estimate of total investments costs and breakdown into details (including environmental investments);
- Estimate of total operational costs (including O&M, overhead, regular shutdowns, etc.);
- Employment and type of skills needed;
- Possibilities for outsourcing maintenance activities to local contractors;
- Duration of the investment/implementation period..

Feasibility study for building a new (modernized) refinery at a different location in Curaçao

A feasibility study has to be carried out for building a new (modernized) refinery at a different location in Curaçao with a capacity of 220,000 up to 250,000 barrels per day. Based on the market outlook of the international oil market and the position of Curaçao in the regional oil market in the long run (see 5.2.1), the possibilities for building a complete new refinery at Curaçao at Bullenbaai, fully complying with international environmental standards have to be assessed from a technical,

¹⁷ In that respect it is worthwhile to first find out if the strategic options of upgrading the refinery proposed in the Purvin & Gertz study (2005) are still valid and can be used as starting point in the analysis.

financial and commercial point of view¹⁸. Among other things, in any case the following issues have to be dealt with:

- Commercial and financial rate of return;
- Gross margin;
- Estimate Investments costs including breakdown into details;
- Estimate of the operational costs (O&M, overhead, regular shutdowns, etc.);
- Employment and type of skills
- Possibilities for outsourcing maintenance activities to local contractors;
- Duration of the investment/implementation period.

Appraisal of the current and future market value of the ISLA refinery

An appraisal of the refinery has to be carried out by a certified appraiser in order to establish the market value of the ISLA refinery in each year from 2010 up to 2019 (inclusive). In that respect it should be noted that the facilities and installations of the ISLA refinery are basically designed for processing the specific crude oil from Venezuela. Crude oil originating from other countries can not be processed in this refinery.

5.2 Information gaps related to dismantling the refinery and cleaning the refinery area

Dismantling and removal of the ISLA refinery

A study has to be carried out dealing with the costs of shutting down and dismantling the refinery (and its removal). This study among others has to include accurate estimates of costs for:

- Asbestos removal;
- Dismantling and removal of equipment for re-sale;
- Dismantling and removal of remaining equipment for scrap;
- Dismantling and removal of underground piping;
- Dismantling and removal of the foundation;
- Possibilities of sales of scrap.

Cleaning of the total site of ISLA taking into account the redevelopment of the area

A study has to be carried out dealing with cleaning the total site of ISLA taking into account the redevelopment of the area for alternative use(s) as tourism activities, industry (port related and service related), residential area, offices, etc.

In this study the following issues (among others) have to be dealt with:

- Finding out and mapping the degree of soil- and bottom contamination for the whole ISLA area (including the hot spots);
- Finding out what type of measures can be taken to solve the soil and bottom contamination identified above and the costs of those measures (in unit prices);
- Categorize the type of measures that can be taken (given the degree of contamination identified) in relationship with the possible alternative use(s), as mentioned above;
- Indicate the constraints for alternative uses based on the various locations on the site and the degree of contamination;
- Estimate the minimum and maximum costs of cleaning taking into account the various measures and the alternative uses, given a few proposals for zoning the ISLA site;
- Estimate the duration of the cleaning activities taking into account possible alternative uses.

¹⁸ In that respect it is worthwhile to first find out if the strategic options of upgrading the refinery proposed in the Purvin & Gertz study (2005) are still valid and can be used as starting point in the analysis.

5.3 Information gaps related to location Bullenbaai and ISLA site after cleaning

Location Bullenbaai

In consultation with the Ministry of Traffic, Transport and Spatial Planning (former DROV) at least the following information has to be gathered and analysed:

- Total industrial area of Bullenbaai differentiated into “occupied” and “not occupied” (in ha);
- Current use of the total industrial area by type of industry;
- Possibility of the COT area to build a new refinery (after closure of ISLA and closure of the activities of PdVSA at COT);
- Possibility of extension of the industrial area;
- Estimates of costs of extension (including preparation of the site for industrial purposes);
- Possible consequences for infrastructure (electricity, water, roads, etc.);
- Constraints (legal, environmental, etc.);
- Duration of activities required.

Location ISLA after closure and after cleaning the site (including bottom)

In consultation with the Ministry of Traffic, Transport and Spatial Planning (former DROV) at least the following information has to be gathered and analysed:

- Activities to be carried out before allowing new activities to be established on the cleaned area:
 - Preparation of the site, including costs?
 - Infrastructure needed, including costs?
- Duration of activities required;
- Constraints for zoning plan and zoning plan process.

5.4 Information gaps related to redevelopment of the ISLA site after cleaning

A study has to be carried out in which the “corner” solutions for re-development of the ISLA area, as mentioned in section 3.3, will be further elaborated. This has to be done in close consultation with the Ministry of Traffic, Transport and Spatial Planning (former DROV). The result will be a few realistic proposals for a zoning plan to be discussed with the various stakeholders. The final result will be the basis for an Economic Impact Assessment, used as input for the Cost-Benefit Analysis for strategic option B.

Annex 1 List of interviewees

Government institutions

Mrs. M. Jonker	Ministry of Traffic, Transport and Spatial Planning
Mr. L.J. Janga	Ministry of Traffic, Transport and Spatial Planning
Mrs. E. Biesbrouck-Palm	Ministry of Health, Environment and Nature
Mr. U. Sillié	Ministry of Health, Environment and Nature

Private Organisations

Mr. S. Maduro	RdK
Mr. A.C. Casperson	Aqualetra
Mr. M.R.J. de Lannoy	CPA
Mr. G.J. Capella	Curoil
Mr. E. Paulina	Curoil
Mr. G. Louisa	Curoil
Mr. E.R. Smeulders	Curinde
Mr. E.J. Yzer	Curinde
Mr. H. Clarinda	CTB
Mr. I.S. Martina	Buskabaii NV
Mr. N. George	Foundation Humanitarian Care
Mr. P. van Leeuwen	SMOC
Mr. M. Ruijter	SMOC
Mr. J. Hernandez	Former director PdVSA
Mr. R.H. Ignacio	CGTC/ABVO
Mr. K.E. Valpoort	CGTC/CTDF

Principal

Mr. L. Girigorie	Ministry of Economic Development Curaçao
Mr. A. Janga	Ministry of Economic Development Curaçao
Mrs. N. Petronella	Ministry of Economic Development Curaçao
Mrs. S. van Rijn	Government of Curaçao

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