

FS 2020 - 1 - Consultation
Proposed Fuels Market Definition



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A. Introduction

1. The Utility Regulation and Competition Office ('OfReg' or the 'Office') is the independent multi sector regulator with responsibility for the key utilities providers in the Cayman Islands, including the fuel sector ('Fuel Sector'), in addition to the electricity, information and communications technology ('ICT'), water, and wastewater sectors.
2. Different decisions by the Office will affect persons and organisations throughout the country in different ways. It is therefore important that the Office makes regulatory decisions and proposes new regulations with the appropriate input from persons with sufficient interest or who are likely to be affected by the outcome of such decisions. Consultation is an essential aspect of regulatory accountability and transparency and provides the formal mechanism for these persons to express their views in this manner. The requirement for the Office to consult is mandated in its enabling legislation.
3. Under its enabling and foundational legislation, the Office has several principal mandates. One of these principal mandates is to assure competition, transparency, efficiency and innovation in the Fuel Sector, along with its continuing function of ensuring safety and compliance across the Fuel Sector. The Office may do so by making administrative determinations, decisions, orders and regulations.
4. The Office is in the process of considering options for a comprehensive regime to effectively monitor and regulate the Fuel Sector, in order to achieve the Office's mandate in respect of the Fuel Sector. As a part of this process, the Office is undertaking a comprehensive market study of the Fuel Sector with the objective of defining the relevant markets within the Fuel Sector, and then assessing the extent and effectiveness of competition within these markets, reflecting the types and grades of fuels currently and potentially on the market in the Cayman Islands. The first element of the market study is the assessment of and report on the market definitions for the purposes of competition assessment for the various fuels markets in the Cayman Islands. The second element of the market study will be a comprehensive competition assessment of the relevant markets and assessment of the potential options (if any) for regulatory reforms of those markets.
5. The purpose of this consultation paper is to seek the views of operators, the general public, and other interested parties, regarding the draft Market Definition Report in relation to the Fuel Sector ('the draft Market Definition Report').

B. Legal Framework

6. The Office is guided by its statutory remit in developing the draft Market Definition Report, notably the provisions which follow.
7. The Utility Regulation and Competition Law (2019 Revision) (the ‘URC Law’) is the principal legislation governing the Office’s mandate in respect of the Fuel Sector. Alongside the URC Law, the sector-specific legislation governing the Fuel Sector are the Dangerous Substances Law (2017 Revision) (the ‘DS Law’) and its supporting Regulations (‘DS Regulations’), and the Fuel Market Regulation Law (2017) (the ‘FMR Law’).
8. Section 6(1) of the URC Law outlines that the principal functions of the Office, in the markets and sectors for which it has responsibility, include “*to promote appropriate effective and fair competition*”, “*to protect the short and long term interests of consumers in relation to utility services*”, and “*to promote innovation and facilitate economic and national development*”.
9. Section 5(1)(b) of the FMR Law provides that one of the functions of the Office in relation to the Fuel Sector is to “*promote fair competition in the fuel sector*”.
10. Section 5(1) of the FMR Law states in part:
 5. (1) *The Office shall supervise the fuel sector in accordance with its jurisdiction under the Utility Regulation and Competition Law, 2016 and, in doing so, the functions of the Office are as follows–*
 - (a) *To implement policy objectives set out in directions issued by Cabinet pursuant to the Utility Regulation and Competition Law, 2016;*
[...]
 - (b) *promote fair competition in the fuel sector;*
[...]
 - (e) *to monitor the prices of fuel;*
[...]
 - (k) *to prevent discrimination against, or preferential treatment of, any person in the fuel sector, and to prevent monopolistic control of any segment of the chain of supply of fuel; and*
 - (l) *to minimise barriers to entry for new participation and investors in the fuel markets.*
11. Section 6(2)(o) of the URC Law states that the Office, in performing its functions and exercising its powers under the URC Law or any other Law,

may “conduct research and studies into any matter or technology which may be relevant to its functions and publish its findings, if appropriate”.

12. Section 7(1) of the URC Law requires the Office, before issuing an administrative determination which in the reasonable opinion of the Office is of public significance, “... to allow persons with sufficient interest or who are likely to be affected a reasonable opportunity to comment on the draft administrative determination.”

C. Draft Market Definition Report Conclusions

13. The Office considers that it is in the interest of the public to consider options for a comprehensive regime to effectively monitor and regulate the Fuel Sector, in order to achieve the Office’s mandate in respect of the Fuel Sector including to promote fair competition in the Fuel Sector. This process will ensure that the Fuel Sector delivers the most competitive and desirable outcomes possible for residents, businesses, and other stakeholders in the Cayman Islands.
14. The draft Market Definition Report is attached to this consultation document as “APPENDIX 1”, and is summarised in the paragraphs below. The Office strongly encourages respondents to read the draft Market Definition Report prior to submitting comments, or to answering the consultation questions in the next section, as this summary is not intended to be exhaustive.
15. Market definition is generally the first step in a comprehensive competition assessment of markets. A defined “market” in competition assessment and competition law is the product and geographic space in which rivalry and competition take place; it identifies those products and locations that may potentially constrain the economic decisions of participants in that field of competition, including because there is strong substitution among the products/services and geographies within the defined market if there is sufficient price incentive for customers to substitute among the alternative products/services and geographies.
16. The draft Market Definition Report concludes that the markets for all relevant fuels in the Fuel Sector should be segmented into separate markets according to the relevant level of the supply chain, consisting of:
 - The importation of the relevant fuel.
 - The wholesale and bulk sale and marketing of the relevant fuel.
 - The retail sale and marketing of the relevant fuel.
17. On a product dimension, the Draft Market Definition Report concludes that markets should be delineated as follows:
 - Gasoline, and all gasoline-ethanol blends with 10% or less of ethanol.

- Gasoline-ethanol blends with more than 10% of ethanol, including pure ethanol.
 - Petroleum-derived diesel, and all diesel-biodiesel blends with 20% or less of biodiesel.
 - Diesel-biodiesel blends with more than 20% biodiesel, including pure biodiesel.
 - Jet fuel and kerosene.
 - Propane (LPG).
 - Natural gas (including LNG and CNG).
 - Aviation gas.
 - Butanes.
 - Acetylene.
 - Hydrogen.
 - Methanol.
18. On a geographic dimension, the Draft Market Definition Report concludes that markets should be delineated as follows:
- World-wide for the market for imported fuels.
 - Cayman Islands-wide for the retail and wholesale markets for the aviation fuels (jet fuel and kerosene, and aviation gas).
 - Grand Cayman, Cayman Brac, and Little Cayman separately for all other fuels product markets at the wholesale and retail supply chain levels.

D. Consultation Questions

19. Based on the above, the Office invites all interested parties to submit their comments, with supporting evidence, on the following questions:

Question 1:

What are your views on the segmentation of the functional levels of the relevant fuel markets into:

- a) the importation of the relevant fuels?
- b) the wholesale and bulk sale and marketing of the relevant fuel?
- c) the retail sale and marketing of the relevant fuels?

Question 2:

What are your views on the proposition that upstream production activities and refining, need not be defined for the Cayman Islands on the basis that such activities do not take place on an appreciable commercial level and there is no realistic prospect of market activities taking place in the Cayman Islands in the foreseeable future?

Question 3:

What are your views on the different fuels considered under the product markets (Section 4) in the draft Market Definition Report? This would include the fuels currently in use and the potential future fuels with a realistic prospect of these fuel introduced into the fuel mix in the Cayman Islands in the foreseeable future?

Question 4:

- a) **What are your views on the proposed definition of gasoline plus gasoline-ethanol blends up to a “blend wall” of 10% ethanol as comprising one product market, and all gasoline-ethanol blends with more than 10% ethanol including pure ethanol as comprising a separate product market?**
- b) **Similarly, what are your views on the proposed definition of petroleum-derived diesel (“diesel”) plus diesel-biodiesel blends up to 20% biodiesel as comprising one product market, and all diesel-biodiesel blends with more than 20% biodiesel including pure biodiesel as comprising a separate product market?**

Question 5:

What are your views on the proposed definition of:

- a) **propane,**
- b) **natural gas,**
- c) **butanes, and**
- d) **acetylene**

as separate product markets?

Question 6:

- a) **What are your views on the proposed geographic market definition that each of Grand Cayman, Cayman Brac, and Little Cayman is a separate geographic market for all of the fuels considered except for jet fuel and kerosene, and aviation gas?**
- b) **What are your views on the proposed geographic market definition that a single Cayman Islands-wide geographic market is proposed for jet fuel and kerosene, and aviation gas?**

Question 7:

- a) **What are your views on the proposed geographic market definition that Grand Cayman is a single geographic market for all road vehicle fuels and other fuels (except for jet fuel and kerosene) considered, rather than being further segmented into highly localized geographic markets according to the different Districts of Grand Cayman or other similar basis?**

- b) In your view, are the conditions and outcomes of competition in the different Districts of Grand Cayman broadly similar and connected to each other?
- c) Are there Districts of Grand Cayman where fuels suppliers could increase their local prices without substantially losing customers to retail stations or suppliers in other parts of Grand Cayman?
- d) If yes to 7 c) please explain.

Question 8:

Please provide your views on any other matters you consider relevant to this Consultation.

E. How to Respond to This Consultation

1. This consultation is conducted in accordance with the Consultation Procedure Guidelines determined by the Office and found on the Offices website.¹
2. The Office considers that because the draft Regulations are published as part of this consultation, this consultation will be conducted as a single-phase consultation over a period of **thirty (30) days**. Where, upon review of the responses to the consultation, it becomes clear that a second phase of consultation is required, a further notice will be issued accordingly. As noted above, **section 7(1)** of the URC Law states that prior to issuing an administrative determination of public significance, the Office shall “*issue the proposed determination in the form of a draft administrative determination.*” The Office considers the attached draft Regulations to be a “*draft administrative determination*” for the purposes of **section 7(1)**.
3. All submissions on this consultation should be made in writing and must be received by the Office by **5 p.m. on 27 April 2020** at the latest.
4. The Office will post any comments received within the stated deadline on its website by **5 p.m. on 11 May 2020**.
5. Submissions may be filed as follows:

By e-mail to:
consultations@ofreg.ky

1

<http://www.ofreg.ky/upimages/commonfiles/1507893545OF20171DeterminationandConsultationProcedureGuidelines.pdf>

Or by post to:
Utility Regulation and Competition Office
P.O. Box 10189
Grand Cayman KY1- 1002
CAYMAN ISLANDS

Or by courier to:
Utility Regulation and Competition Office
3rd Floor, Alissta Towers
85 North Sound Rd.
Grand Cayman
CAYMAN ISLANDS

6. If a respondent chooses to file any information in confidence with OfReg, it should, *at the time of making its filing*, also file redacted versions for the public record along with the reasons for each confidentiality claim and the other requirements for confidentiality claims as specified in section 107 of the URC Law.
7. If a respondent chooses to apply to the Office for an extension of the time to file comments or reply comment, it must do so no less than four (4) days before the day of the existing deadline, include a complete and detailed justification for the request, and copy all other respondents (if known) *at the same time* as it applies to the Office. The other respondents (if applicable) may comment on the application for an extension within two (2) days of submission of the application, copying all other respondents *at the same time*. The Office reserves the right not to accept applications for extensions that do not satisfy these requirements. However, at no time will the Office accept an application for an extension submitted after the deadline in question has passed.
8. The Office expects to issue a Determination regarding the draft Regulations by the end of third (3rd) quarter of 2020.



APPENDIX 1

Proposed Draft Market Definition Report



MARKET DEFINITION REPORT

A CONSULTATION REPORT PREPARED FOR THE CAYMAN
ISLANDS FUEL SECTOR – FUEL MARKET DEFINITION AND
ECONOMIC & REGULATORY ASSESSMENT STUDY

11 March 2020

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1 INTRODUCTION AND SUMMARY

1.1 Background

The Utility Regulation and Competition Office (“**OfReg**” or the “**Office**”) is the independent multi sector regulator with responsibility for the key utility providers including the fuel sector in the Cayman Islands (the “**Fuel Sector**”). The Utility Regulation and Competition Law (2019 Revision) (the “**URC Law**”) is the principal legislation governing the Office’s mandate in this respect in the Cayman Islands. Alongside the URC Law, the sector-specific legislation governing the Fuel Sector are the Dangerous Substances Law (2017 Revision) (the “**DS Law**”) and its supporting Regulations (“**DS Regulations**”), and the Fuel Market Regulation Law (2017) (the “**FMR Law**”).

1.2 The Market Study

The Office is in the process of establishing a comprehensive regime to effectively monitor and regulate the Fuel Sector, in order to achieve the Office’s mandate of assuring competition, transparency, efficiency and innovation in the markets, along with its continuing function of safety and compliance across the sector. As a part of the establishment of the Office’s regulatory role in the Fuel Sector, the Office is undertaking a comprehensive assessment of the Fuel Sector entitled the *Cayman Islands Fuel Sector – Fuel Market Definition and Economic & Regulatory Assessment Study (the “**Market Study**”)*. The objective of the Market Study is to define the relevant markets within the Fuel Sector, and to assess the extent and effectiveness of competition within these markets, in order to provide guidance and a foundation for the regulatory mechanisms that will be required, for the Office to achieve its mandate under the various laws. The Market Study intends to reflect all the types and grades of fuels currently offered in the Cayman Islands, and consideration is given to fuels which are under review, and may be introduced to the Island’s fuel mix in the near future.

Economics Partners Limited (“**Economics Partners**” or the “**Firm**”) is a firm of economic consultants specializing in competition and regulatory economics and market assessments. The Firm was appointed in September 2019 pursuant to an open tender to conduct the Market Study on behalf of and in cooperation with the Office. The Market Study will consist of two principal elements:

1. An assessment of and report on the market definitions for competition assessment purposes for the various fuels markets in the Fuel Sector which are to be assessed during the course of the Market Study (the “**Market Definition Report**”); and
2. An assessment of the effectiveness of competition of all fuels markets defined in the Market Definition Report, and any recommendations regarding potential regulatory models, intervention strategies, recommended market rules, and regulatory determinations to be considered and implemented in the relevant markets in the Fuel Sector (the “**Market Assessment Report**”).

After its appointment, the Firm has undertaken a comprehensive process of information gathering pertaining to the different potential markets in the Fuel Sector in the Cayman Islands, and has analysed this information using commonly accepted techniques and approaches of market definition for competition assessment. The present report is the Market Definition Report and it is the product of the Firm's analysis.

2 SUMMARY OF FINDINGS

This Market Definition Report analyses the market definitions applying to different fuels on sale and potentially on sale in the Cayman Islands. It uses the orthodox approach to market definition, comprised of consideration of different relevant factors including quantitative measurements where possible, and relevant qualitative factors to conclude as follows:

On a functional Level, the markets for all relevant fuels are segmented into separate markets according to the relevant level of the supply chain, consisting of:

1. The importation of the relevant fuel;
2. The wholesale and bulk sale and marketing of the relevant fuel; and
3. The retail sale and marketing of the relevant fuel.

On a product dimension, the markets are delineated as follows:

1. Gasoline, and all gasoline-ethanol blends with 10% or less of ethanol.
2. Gasoline-ethanol blends with more than 10% of ethanol, including pure ethanol.
3. Petroleum-derived diesel, and all diesel-biodiesel with 20% or less of biodiesel.
4. Diesel-biodiesel blends with more than 20% biodiesel, including pure biodiesel.
5. Jet fuel and kerosene.
6. Propane (LPG).
7. Natural gas (including LNG and CNG).
8. Aviation gas.
9. Butanes.
10. Acetylene.
11. Hydrogen (potential future market).
12. Methanol (potential future market).

On a geographic dimension, the markets are delineated as follows:

1. World-wide for the market for imported fuels.
2. Cayman Islands-wide for the retail and wholesale markets for the aviation fuels (jet fuel and kerosene, and aviation gas).
3. Grand Cayman for all other fuels at the wholesale and retails supply chain levels.
4. Cayman Brac for all other fuels at the wholesale and retails supply chain levels.
5. Little Cayman for all other fuels at the wholesale and retails supply chain levels.

Each of these market definitions is based on current information, including available information on consumer behaviour, regulatory standards, and other information. Should relevant factors change in a material way in the future, such as changes in regulatory standards affecting fuel blends, then the relevant market definitions may need to be adjusted to reflect those changes.

Not all the defined relevant markets are currently being actively supplied. In particular, certain fuels are not currently actively marketed in the Fuel Sector, and certain other fuels (including for instance aviation fuels) are not currently actively marketed in all defined geographic markets and at all defined functional levels. The relevant markets are nevertheless defined for competition analysis purposes based on information on consumer behaviour and other relevant information – should those markets become

supplied in the future, the relevant market definitions would apply. The current absence of supply in those markets will be reflected in the next step of the Market Study, which will be the competition and market assessment.

3 PRINCIPLES OF MARKET DEFINITION

Competition assessment defines relevant markets in a particular way that may not always match how market participants think about their “markets”. It is therefore useful to begin by outlining how markets are thought of in competition assessment, and what factors are taken into account in competition market assessment. This section outlines these concepts.

3.1 Market definition in competition assessments

Assessing how competition is functioning in a market commonly involves defining the relevant market in which the structure of the market and the conduct of the market participants may influence the conditions of competition. Market definition of the various relevant markets in the Fuel Sector is the purpose of this present Market Definition Report.

A defined “market” in competition assessment and competition law has a particular meaning. A market for competition law and analysis purposes is the product and geographic space in which rivalry and competition take place. Market definition establishes the relevant “field of inquiry” for competition analysis; it identifies those products and locations that may potentially constrain the economic decisions of participants in that field.

A market is commonly defined by reference to a product/service and its close substitute products/services, and a geography in which there is similar substitution. Within the bounds of a defined market there is substitution: substitution between one product and another, and between one source of supply and another, in response to changing prices. So a market is the field of actual and potential transactions between buyers and sellers amongst whom there can be strong substitution, at least in the long run, if given a sufficient price incentive.

Market definition is purposive, which means that the definition of a relevant market cannot be separated from the particular competition issue under investigation. Market definition always depends on the specific facts and circumstances of an inquiry, and evidence from market participants will often be highly important. Decisions relating to market definition in previous, albeit similar, competition inquiries may also be instructive as additional guidance.

3.2 Substitution as the key to market definition

Identifying relevant substitutes is key to defining a market. Substitution involves switching from one product to another in response to a change in the relative price, service or quality of two products (holding unchanged all other relevant factors, such as income, advertising or prices of third products). Market definition begins by selecting a product supplied by market participants in a particular geographic area and incrementally broadening the market to include the next closest substitute until all close substitutes for the initial product are included.

There are two types of substitution: demand-side substitution, which involves customer-switching; and supply-side substitution, which involves supplier-switching.

It will often be possible for consumers to substitute a wide variety of products in various geographic regions for the products of the market participants to some degree. Not all of these substitutes will be included in the relevant market. For instance, some customers might view seemingly remote products as substitutes under some limited circumstances, but not under many other circumstances. Such limited substitution may not be sufficient to result in the inclusion of those partial substitutes in the defined market. On the other hand, substitution does not have to be complete or instantaneous, and products do not have to be “perfect” substitutes to form part of the same market; they merely have to be sufficiently close substitutes to offer a meaningful and close competitive constraint on the particular geographic region (or a group of products or regions) in question.

3.3 The product dimension of a market

Product markets are therefore defined by evaluating the range of products (or services) that competitively constrain the product (or service) in question. Based on economic principles, all potential alternative products should be included in the same market if customers are likely to switch readily to said alternatives (demand side substitutability), or if production can switch readily to making those alternatives (supply side substitutability), or both. Demand side substitutability is commonly the starting point for the evaluation of market boundaries, but where supply side substitution can be done rapidly and readily, and without significant additional expense, then markets should be expanded on economic principles to include those ready supply side substitutes.

3.4 The geographic dimension of a market

Concurrent with evaluating the market in relation to the products (or services) that make up the market, the market is commonly also evaluated on its geographic dimensions. A defined product market determines the variety of alternative products that competitively constrain the product in question; a defined geographic market determines the geographic range over which that competitive constraint operates. If a customer will easily switch to a different location as an alternative potential source for a product, then that alternative location would be said to be in the same geographic market by principles of demand side substitutability. An assessment of the geographic market therefore commonly requires analysing how readily consumers will substitute between products located in different geographic locations and whether those different geographic locations will competitively constrain one another. Similarly, if the producer will readily switch to supplying the product from an alternative location, then that alternative location would be said to be in the same geographic market because of supply side substitutability.

3.5 The hypothetical monopolist test of market definition

To define markets, one therefore commonly starts by analysing how readily consumers will switch to other products and geographies. A common method of analysing consumer switching behaviour is to apply the so-called “hypothetical monopolist test”. The hypothetical monopolist test starts with the smallest candidate market (in terms of products and geographies) and asks: if there was a hypothetical monopolist of the product in question, and the supplier increased the price by a small but meaningful amount, would consumers readily switch to other products (or locations), thereby rendering the price rise unprofitable for the hypothetical monopolist because of strong switching away? If consumers would switch readily to another product (or location), then that other product (or location) is a close enough substitute that it should also be included in the market – and as a result the defined market boundaries should be expanded to include it. On the other hand, if consumers would not readily switch away, then that other product (or location) is not a sufficiently close substitute, and therefore should not be included in the defined market. The price rise used to apply this test is usually a hypothetical small but significant, non-transitory increase in price (known as a “SSNIP”) of a given product or service, which is commonly taken to be a long-lasting price rise of 5% or 10%.

However, while the hypothetical monopolist is a useful tool and “intellectual aid” for analysis, it is less often strictly applied to factual circumstances in a competition assessment, because it typically requires large amounts of complex data, and those data are often not sufficiently available. Consequently, in many competition assessment, other quantitative and qualitative information must be used as the basis of market definition. Nevertheless, the hypothetical monopolist test provides the analytical foundation for how such other information is applied, and the questions it seeks to answer: will consumers readily switch to other products and locations, or will they not readily switch?

3.6 Other factors to consider in market definition

A wide range of different information can be useful in different circumstances to identify close demand-side and supply-side substitutes and therefore to determine the product and geographic boundaries of defined markets. These include the following:

- Information from market participants to identify and assess the strength of substitution possibilities.
- The function or end use of the product.
- The physical and technical characteristics of the product.
- The costs to consumers of switching purchases between the product and potential substitutes, and of obtaining supply from alternative regions.
- Any limitations on the ability of customers to access alternative products, or sources of supply in alternative regions.
- The views and past behaviour of buyers regarding the likelihood of substitution between products
- Evidence of buyers switching to other products in response to price increases in the recent past.

- Evidence of producers redeploying their production capacity in response to price increases in the recent past.
- Costs of switching production and distribution systems from another product line to a product that is closely substitutable with the relevant product
- Views, business records and past behaviour of suppliers of the relevant products regarding the impact of price and marketing decisions by suppliers of potential substitute products on their own pricing and marketing decisions.
- Relative price levels and price movements of the product compared to potential substitutes, and relative to different geographic sources of supply.
- The portability of the relevant product as determined by its perishability, weight, etc.
- Transportation costs to move the relevant product between regions (particularly the transportation costs as a proportion of total value of the product)
- Any regulatory or other practical constraints on suppliers selling alternative products or selling to alternative regions.
- Records relating to trade flows and the actual movement of customers and/or suppliers between geographic regions, especially related to changes in relative prices across regions in the recent past.
- Views and business records of buyers and suppliers regarding the likelihood of switching between geographic sources of supply.

In some circumstances, a market may comprise several products or regions that overlap with each other in “chains”, even where the extreme ends of the “chains” are not directly closely substitutable. An example is in geographic market definition where transport costs matter. Consumers or suppliers might be limited to certain areas around their location (a consumer’s residence, or a supplier’s plant) because of the existence of transport costs. However, if the distribution of locations of the different consumers or suppliers is such that there are strong overlaps between the areas around different consumers or plants, then it may be that the pricing of the relevant products will be constrained by a chain substitution effect, and lead to the definition of a broader geographic market. As a practical matter, for a chains of substitution effect to be established for market definition purposes, this would require showing price interdependence across the chain, including determining that price levels at the opposite ends of the chain are sufficiently close related to each other for the whole chain to be considered as part of the same market.

3.7 The resulting defined market

The resulting defined market will be the narrowest set of products (or services), over the narrowest geographic range, in which the products and locations are sufficiently close constraints on each other that the market is a sufficiently unified (or homogeneous) field of rivalry between different producers.

4 PRODUCT MARKETS

The previous Section 3 outlined the principles adopted for market definition in standard competition analysis and by most modern government competition authorities. In this Section 4, those principles are applied to the Fuel Sector in the Cayman Islands to determine the product dimensions of the market definitions that we recommend should be applied to the Fuel Sector.

4.1 The Industry levels

Fuels generally pass through a number of stages and hands before reaching their final customers.

Over its entire production cycle, the fuels industry is commonly considered to be divided into two main segments:

- The “**upstream**” segment, consisting of the exploration of oil, development, extraction, transport and sales of crude oil in relation to petroleum-derived products, and analogous production activities in relation to other non-petroleum fuels; and
- The “**downstream**” segment, consisting of oil refining, primary transport and storage of refined products, wholesale operations, secondary transport and storage and retail sales in retail stations on and off motorways and other roadways.

The downstream segment of fuels products may be more finely divided into different activities and production levels in accordance with the supply chain segments of fuels. The supply chain of petroleum products in the downstream segment involves several stages. Three main stages in the value chain of refined products may be highlighted:

- The **Refining or Importing of Fuels** – this stage refers to the refining of crude oil to produce petrol or diesel in the case of petroleum-derived fuels, the blending of fuel components, or the import of fuels from abroad.
- The **Wholesale Transportation and Bulk sales of Fuels** – this stage is where the fuels (which are the refined products in the case of petroleum-derived fuels) are then transported to large capacity storage which serves as a distribution terminal. Transport modes generally may include marine tankers, pipelines, road tankers, rail, and barges – not all these transport modes are used in the Cayman Islands. Large-scale operators may resell part of their purchases in bulk to other operators, to retailers and to major industrial clients. This is a second level of distribution, as it normally involves lower quantities when compared to ex-refinery sales. The refined products are transported to the customer (either a wholesaler or a retailer) by road tanker or truck bearing ISO containers.
- The **Retailing of Fuels** – this stage refers to sales in retail stations to final consumers, typically from retail stations in the case of road vehicles, marinas in the case of marine vessels, or from other retail outlets or channels in the case of other fuels. Different categories of retail stations exist: retail stations selling under

the brand of oil companies, independent retail stations, and retail stations selling under the brand of retail distribution chains.

There are several markets in the fuel sector, placed at different stages of the value chain, with diverse supply and demand characteristics. The various markets have different geographic dimensions, from markets with a global scale to markets which are national, regional or local in scope. In the short term, price movements in these markets may not always go together. Nonetheless, these groups of markets are closely interconnected, and although time lags and asymmetries in the adjustment of prices downstream to changes in the prices upstream exist, prices in these different markets are interrelated in the long term.

4.2 The industry levels in the Cayman Islands

The Fuel Sector in the Cayman Islands does not include any material activities in the upstream sector: there is no crude oil extraction in the Cayman Islands, nor is there any large commercial-scale production of any other non-petroleum fuels beyond local production of small quantities of biodiesel. None of the relevant upstream markets therefore exist in the Cayman Islands, and these are therefore not considered further in the Market Definition Report. However, these upstream markets *are* further considered in the Market Assessment Report to the extent that they influence the competitive dynamics of markets that exist in the Fuel Sector in the Cayman Islands.

Similarly, at the “highest” level of the downstream segments, no refining takes place in the Cayman Islands, and there is no reasonable prospect that there will be refining in the foreseeable future. All fuels of meaningful commercial quantities in the Cayman Islands are imported. Refining of fuels is therefore also not considered further in the Market Definition Report, although it is considered in the Market Assessment Report to the extent that the competitive dynamics in refining influences markets existing in the Fuel Sector in the Cayman Islands.

The three activities that do take place directly in the Cayman Islands are the remaining three activities in the Fuel Sector supply chain: importing of fuels, wholesale distribution of fuels, and retail distribution of fuels. These three activities are therefore considered as the three potential candidate supply chain levels for market definition.

4.2.1 *Importing of fuels*

Importing of fuels is the bulk purchase of commercial quantities of the relevant fuel from abroad. In the Cayman Islands, fuel is essentially imported by two different routes: (1) as bulk shipments brought in dedicated vessels and transferred ashore by way of a pipeline to bulk storage tank facilities at Jackson Point on Grand Cayman and Creek on Cayman Brac, and (2) in standardized International Organization for Standardization (“ISO”) compliant container-sized tanks brought in container vessels and brought ashore by way of the container port on Grand Cayman and by barge to Cayman Brac and Little Cayman.

Purchasers of imports in the Fuel Sector are principally Cayman Islands commercial purchasers and bulk users. The suppliers are manufacturers and refiners abroad.

As outlined in Section 3 above, a central question in market definition is whether customers of a particular product or service (or location) would readily switch to an alternative product or service (or location) in the event of a certain price rise e.g. a permanent 5% price rise in the product in question (a SSNIP). In the case of the Fuel Sector and the importation of fuels, the following points are most relevant in delineating the industry level of the markets:

- Similarly, while switching from retail to wholesale/bulk local sources may in theory be possible, it is unlikely to take place in sufficient quantities to competitively constrain imports. This is for similar reasons: local bulk sales are ultimately entirely sourced from imports, and invariably have higher prices than pure import landed prices because of additional costs and margins. Switching to local bulk sales, while it may take place in restricted quantities including in cases of temporary supply interruptions, in the general case switching will not be strong enough to merit the inclusion of imports and wholesale/bulk sales in the same market.
- The geographic scope for the sourcing of imports is by definition outside the Cayman Islands, and is at least regional (North America and adjacent regions) and potentially world-wide.
- There is little prospect that an importer of fuels would turn to local retail sources as an alternative to importing fuels if the price of imports rose by a SSNIP, as the local retail sources are all themselves entirely dependent on imports. Retail prices are in almost all cases invariably substantially higher, as retail prices also incorporate additional costs and margins from the wholesale/bulk and retail supply chain elements, which pure imports ordinarily do not need to take into account. Retail unit prices are therefore generally too high (compared with the comparable import unit prices) to incentivize sufficient switching. Moreover, switching to local retail sources for bulk quantities is in most cases not practical and therefore not realistically feasible. Switching would therefore not be sufficient to merit the inclusion of imports and retail sales in the same market.

As a result of these considerations, markets for fuels should be defined separately at the import level distinctly from the wholesale/bulk and retail levels of the supply chain.

4.2.2 Wholesale and Bulk Distribution of fuels

The wholesale and bulk distribution of fuels is the part of the supply chain where fuels, once imported (in the case of the Cayman Islands), are then transported to large capacity storage, and transported and on-sold to other operators, to retailers and to major industrial clients.

This functional level ultimately concerns the sale of fuels within the Fuel Sector in the Cayman Islands. From this very broad perspective, this functional level therefore comprises of broadly comparable activities to those in the retail level, which also concerns the sale of fuels to customers. One must therefore consider whether wholesale and retail should be considered to be within the same defined markets for competition purposes. The following points are the most relevant in delineating the wholesale and retail segments of the Fuel Sector:

- It is conventional in the industry to distinguish between wholesale and retail sales as comprising quite different activities and market dynamics.
- It is similarly conventional within competition analysis in most jurisdictions to distinguish wholesale and retail sales, as the functional activities, market participants, and market dynamics in these different segments are quite distinct from one another. The buyers in the wholesale/bulk segments are generally other operators, retailers, and large-scale industrial clients; the buyers in the retail segments are generally end consumers and small-scale commercial buyers.
- These quite distinct customer groups will generally not substitute sufficiently or plausibly between bulk-scale purchases and retail-scale purchases in the face of a SSNIP. Bulk sales are conducted at large volumes that are generally incompatible with the volume needs of retail customers. Bulk sales also require storage facilities that retail customers generally do not possess. Moreover, as outlined above, retail prices are almost invariably higher than wholesale prices, because they involve an additional step in the supply chain and thereby involve additional costs and margins. It is therefore highly unlikely that sufficient wholesale customers would switch to retail sources in the face of a SSNIP in the ordinary course of these markets' operation.

4.2.3 Retail Distribution of fuels

Retail distribution of road fuels commonly takes place through retail stations for the fuelling of road vehicles. In case of other fuels such as home cooking fuels, retail distribution commonly takes place through other retail outlets or home delivery by the supplier. Retail distribution is essentially the sale of fuels in quantities and through outlets amenable to the final end consumer of these products (other than large bulk sales to commercial customers).

As outlined immediately above, retail customers would not be expected to switch to bulk sources (imports or wholesale sources) in the face of a SSNIP.

4.2.4 Market Definition at the supply chain level

As a result of the considerations in this section, markets in the Fuel Sector should be defined separately for:

- The importation of fuels;
- The wholesale or bulk sales of fuels; and
- The retail sale of fuels.

4.3 The Products

A number of fuels are sold in the Fuel Sector in the Cayman Islands and are potentially covered by the URC Law, the DS Law, the DS Regulations, and the FMR Law. This Section 4.3 outlines the different fuels potentially at issue, and the appropriate product market definition in relation to those fuels.

4.3.1 Gasoline (Petrol)

Gasoline (also known as “petrol”) is a petroleum-derived flammable liquid. It is produced in oil refineries.

Gasoline is primarily used as a fuel in internal combustion engines that are designed for gasoline use. In practice, gasoline-fueled internal combustion engines are primarily found used in passenger cars, with smaller numbers in heavier vehicles such as buses.

From consumers’ perspective, different grades of gasoline are further differentiated according to their octane ratings. The octane rating is a standard measure of an engine fuel: the higher the octane rating, the higher the fuel performance in a gasoline engine, but also the higher the price consumers are willing to pay.

The principle issue for determining the product dimension of market dimension is whether or not consumers, when faced with a price rise (SSNIP) in relation to the product in question, will readily switch to other alternatives in large numbers, in which case the market definition must be expanded to include the alternative(s), or whether they will reduce their consumption of the product somewhat but will not readily switch to alternatives, in which case the market definition should not be expanded to include the alternative(s). Where there is evidence of switching, quantitative studies of the kind outlined in Section 3 may be the best evidence to determine the extent of switching. However, where there are clear constraints on switching of a regulatory or technical nature, then this may be sufficient evidence to determine the market definition.

Internal combustion engines are designed for particular fuels. Engine modifications may permit some substitution of fuels in certain specific cases, but in the general case it is not possible to substitute a different fuel for that fuel for which the engine was designed. For instance, if one puts diesel fuel or kerosene into an engine designed for gasoline fuel, then the engine will not operate (at best) and may require repair or be ruined.

This is sufficient to conclude that gasoline is generally not a viable substitute with other fuels. Specifically, the ordinary consumer, when faced with a 5% increase in the price of gasoline relative to the price of diesel, will not readily fill their car with diesel instead, because their car will not work and may be ruined.

One can therefore readily conclude that gasoline is manifestly not in the same product market as diesel, kerosene, hydrogen, or most other fuels.

Two issues remain in relation to defining the product dimension of gasoline markets:

1. Should one define separate markets for different grades of gasoline according to different octane ratings? The evidence suggests that different grades of gasoline should all be defined as constituting a single market. First, from an engineering perspective, different grades of gasoline are closely substitutable for one another in gasoline-designed engines. Second, there is good evidence that consumers *are* sufficiently price sensitive as regards the relative prices of different ratings of gasoline, and readily switch between them in response to changes in relative prices. Third, there is ready supply-side substitutability between different grades of gasoline as they are all delivered using the same equipment and facilities, which can readily accommodate a supplier switching

the grade of gasoline being delivered at the pump. Fourth, no major competition authority has defined separate markets for different grades of gasoline, but authorities have instead generally defined the relevant market as being the market for “gasoline” of all grades.

2. Should ethanol and ethanol blends be defined as constituting separate market, or should they be defined as belonging to the same market as gasoline? This issue is addressed in the sections immediately following.

Market participants have raised the issue of whether racing fuel may be defined as comprising part of the product market for gasoline. Racing fuel is very high octane gasoline containing other boosting agents, and it is currently imported into the Cayman Islands in small but commercial quantities. We judge that racing fuel ought to be defined as part of the general gasoline market. Performance differences aside, it is fully functionally interchangeable with regular and premium gasoline in engines for most purposes. To our understanding racing fuel gasoline is governed by the same safety standards as regular gasoline, meaning that there is no impediment to consumer substitutability from the regulatory perspective. However, should separate safety standards apply to racing fuel in the future in a way that materially reduces the ability of consumers to switch between regular gasoline and racing fuel gasoline, then this may alter the analysis sufficiently in favour of racing fuel being defined as a separate market.

4.3.2 Ethanol

Ethanol fuel is the chemical ethyl alcohol (C_2H_5OH). It is produced industrially by ethanol fermentation of glucose from crops such as corn and sugarcane, and as a product of petroleum by hydration of ethylene or acetylene.

Industrially-produced ethanol is primarily used as a fuel in internal combustion engines. Ethanol is also the same type of alcohol found in alcoholic beverages.

Pure ethanol (not blended with gasoline, diesel, or other petroleum-derived fuels) can only be used as a fuel in engines that have been designed or modified for that purpose. Vehicles that may run on pure hydrous ethanol (also called “E100”) are currently principally in use in Brazil as a result of sustained government policy to promote “neat ethanol” vehicles.

This is sufficient to conclude that pure ethanol is not generally a viable substitute for gasoline or other road fuels. Specifically, similar to lack of substitution between gasoline and diesel, the ordinary consumer faced with a 5% increase in the price of gasoline relative to the price of pure ethanol, will not readily fill their car with ethanol instead. Similarly, ethanol is also not a ready substitute for other road fuels such as diesel, or other non-road fuels.

One can therefore readily conclude that ethanol is not in the same product market as gasoline, diesel, kerosene, hydrogen, or most other fuels.

4.3.3 Ethanol Blends

Ethanol blended fuels are mixtures of gasoline and ethanol in varying proportions. They are primarily used in internal combustion engines.

The degree to which ethanol blends can be used in internal combustion engines as substitutes for pure gasoline depends on the proportions of gasoline and ethanol in the blend. Any mixture of 10% or less ethanol with the remainder being gasoline can generally be used in most modern gasoline-powered vehicles without the need for any modification of the engine or fuel system in the vehicle. Gasoline/ethanol blends with 10% ethanol (known as “E10”) or lower proportions of ethanol such as 5% (“E5” gasoline) and 7% (“E7” gasoline) are in common, legal use in a number of countries and jurisdictions including the United States of America, Jamaica and the Cayman Islands.

At blend ratios with more than 10% of ethanol, substitution between pure gasoline and ethanol/gasoline blends becomes more difficult. The expert evidence suggests that there is a “blend wall” of 10% ethanol above which the blends can no longer be substituted for pure gasoline without consequences or difficulties, with these adverse consequences increasing as the proportion of ethanol increases. Blends with 15% ethanol (“E15” gasoline) are also in use in some locations and for some motor vehicles, but subject to greater restrictions. For instance, in the United States the Environment Protection Agency has authorized the use of E15 gasoline in passenger cars with a model year of 2001 or later, but not for cars older than this, and not for use in motor-cycles, heavy-duty vehicles, or non-road engines. Moreover, most vehicles in current production are not approved by their manufacturers as compliant with E15 gasoline; moreover, a number of major vehicle manufacturers have warned that the warranties attached to their vehicles do not cover damage related to the use of E15 gasoline.

Marine equipment and marine vessels commonly have a lesser ability to tolerate ethanol blending in gasoline than do modern road vehicles, because the ingress of traces of water that is more likely in a marine environment is not suitable for ethanol blended gasoline, meaning that ethanol blends are generally not recommended for (and commonly prohibited by the manufacturers of) marine engines. As a result, gasoline customers in a marine environment are less likely to substitute readily between pure gasoline and ethanol blended gasoline. However, the appropriate analysis in market definition as to whether a potential substitute is not whether *all* consumers would switch to the substitute in the face of a SSNIP price rise; the appropriate analysis is whether *sufficient* consumers might switch to make the price rise unprofitable, in which case the market definition is widened. In the case of marine engines, this means that the inability of some gasoline-fueled engines to tolerate ethanol blends does not prevent a market definition that includes ethanol blends, as long as a sufficiently large number of customers operating road vehicles are able to and would readily switch to ethanol blends. In the Fuel Sector, the substantial majority of gasoline sales are in respect of road vehicles able to substitute to blends.

As a consequence, we judge that ethanol-gasoline blended fuels with 10% or less of ethanol are readily substitutable with pure gasoline and are in the same product market as pure gasoline. However, ethanol-gasoline blended fuels with more than 10% of ethanol are *not* sufficiently readily substitutable with pure gasoline to satisfy the conditions for being in the same market.

As a result, we conclude that there is a separate market for competition purposes for ethanol-gasoline blended fuels with more than 10% of ethanol.

This market definition is dependent on the state of technology of internal combustion engine production as is available in motor vehicles available to the mass market, associated regulatory standards regarding the “blend wall” for ethanol-gasoline blended fuels, and other related factors. Should the state of engine technology change so that a sufficient number of motor vehicles can readily use higher-level ethanol blends without modification or risk of engine damage, then the present product market assessment may be changed in line with changing technology. Similarly, should regulatory standards change in a way materially affecting the ability and willingness of consumers to substitute between potential alternatives, then the present product market definition would likely need to be adjusted in accordance with those changes. However, a changing product market definition would require that a substantial proportion of vehicles in current use can use the higher-level ethanol blends without adverse consequences; as vehicles currently in use are expected to have remaining lives of many years, any change in this market definition would only likely occur on a time horizon of many years in the future, and would require evidence that a sufficient proportion of cars on the road can use the higher-level blends highly interchangeably.

4.3.4 Diesel

Petroleum-derived diesel (hereafter known simply as “**diesel**”) is a petroleum-derived flammable liquid. It is produced in oil refineries as a fractional distillate of petroleum fuel oil.

Diesel is used in internal combustion engines that are designed for diesel use. Diesel-powered engines have a wider use than gasoline-powered engines. Diesel-powered passenger cars are commonly available, and widely used in some areas (in particular Europe) but less in other areas (in particular North America). However, heavy vehicles such as buses, trucks, tractors, off-road vehicles, and military vehicles are more commonly equipped with diesel engines and much less commonly with gasoline engines. One reason is that diesel engines are particularly fuel efficient (relative to gasoline engines) when run at part-load, such as is relatively common for heavier vehicles. Diesel is also in common use in heavier industrial machinery, including as the primary fuel driving turbines in the generation of electricity; in the Cayman Islands, aside from a relatively small amount of peak load solar capacity, essentially all commercial electricity is generated using diesel-fueled turbines.

From consumers’ perspectives, different grades of diesel are further differentiated according to their sulphur contents, with ultra-low-sulphur diesel (“**ULSD**”) referring to diesel that has been refined with substantially lowered sulphur contents. Currently, virtually all diesel in the North American and European markets and in the Cayman Islands for vehicle use is ULSD. Diesel fuels are also differentiated according to their cetane number ratings, with fuels with higher cetane numbers having higher performance characteristics and commonly commanding higher prices in the form of “premium” diesel or similar.

As discussed earlier, internal combustion engines are designed for particular fuels, and different fuels cannot generally be substituted for one another in such engines. This is sufficient to conclude that diesel is generally not a viable substitute with other fuels.

The ordinary consumer, when faced with a 5% increase in the price of diesel relative to the price of other road fuels, will not readily fill their car with those other fuels instead.

Similar consideration apply in relation to the other uses of diesel. A significant use of diesel in the Fuel Sector in the Cayman Islands is in electricity generation, with the electricity generating companies being bulk purchasers of diesel from the wholesalers for this purpose. Evidence gathered from the market establishes that the current electricity generating assets in the Cayman Islands could from the technical perspective not be switched to using other fuels without very significant capital works; moreover, there has been no switching in the face of diesel price fluctuations that would be sufficient to constitute a “SSNIP” price change. As a result, one can conclude that diesel is in a separate market to other fuels at the wholesale/bulk level as well as at the retail level.

One can therefore readily conclude that diesel is not in the same product market as other fuels.

Two issues remain in relation to defining the product dimension of diesel markets:

1. Should one define separate markets for different grades of diesel according to their sulphur contents? The evidence suggests that different grades of diesel should all be defined as constituting a single market. First, from an engineering perspective, different grades of diesel are almost perfectly substitutable for one another in diesel-designed engines; the different sulphur contents do not generally prevent such substitution. Second, there is ready supply-side substitutability between different grades of diesel as they are all delivered using the same equipment and facilities, which can readily accommodate a supplier switching the grade of diesel being delivered at the pump. Third, no major competition authority has defined separate markets for different grades of diesel, but authorities have instead generally defined the relevant market as being the market for “diesel” of all grades.
2. Should biodiesel and biodiesel blends be defined as constituting separate market, or should they be defined as belonging to the same market as diesel? This issue is addressed in the sections immediately following.

4.3.5 Bio Diesel and Bio Diesel Blends

Bio diesel is a flammable liquid derived from oils or fats through an industrial process also involving alcohol.

Bio diesel has essentially interchangeable uses with petroleum-derived diesel. It can be used in diesel-powered engines as pure bio diesel or blended with petroleum-derived diesel, subject to certain limitations.

Blends of bio diesel and petroleum-derived diesel are products most commonly distributed for use in retail diesel markets. Blends are commonly indicated by a “B” factor, with for instance B100 referring to pure 100% bio diesel, B20 referring to 20% bio diesel blended with 80% petroleum-derived diesel, and similar.

As with petroleum-derived diesel, there is an upper limit (a “blend wall”) on the proportion of bio diesel that can be blended with petroleum-derived diesel without

potential adverse consequences for the engine or consumers. Blends of 5% biodiesel or less can almost universally be used fully interchangeably with pure petroleum-derived diesel; and blends of 20% bio diesel or less can generally also be used in diesel equipment without modification or only minor modifications necessary. Blends of above 20% bio diesel (including pure bio diesel, B100) may require more substantial modifications.

As a consequence, we judge that diesel-biodiesel blended fuels with 20% or less of biodiesel are readily substitutable with pure diesel and are in the same product market as pure diesel. However, diesel-biodiesel blended fuels with more than 20% of biodiesel are *not* sufficiently readily substitutable with pure diesel to satisfy the conditions for being in the same market.

As a result, we conclude that there is a separate market for competition purposes for diesel-biodiesel blended fuels with more than 20% of biodiesel, including pure biodiesel.

As was also observed in relation to gasoline-ethanol blends, this market definition is dependent on the state of technology of internal combustion engine production as available in passenger and other vehicles and available to the mass market, associated regulatory standards regarding the “blend wall” for diesel-biodiesel blended fuels, and other related factors. Should the state of engine technology change so that a sufficient number of motor vehicles can readily use higher-level biodiesel blends without modification or risk of engine damage, then the present product market assessment may be changed in line with changing technology. Similarly, should regulatory standards change in a way materially affecting the ability and willingness of consumers to substitute between potential alternatives, then the present product market definition would likely need to be adjusted in accordance with those changes. However, a changing product market definition would require that a substantial proportion of vehicles in current use can use the higher-level biodiesel blends without adverse consequences; as vehicles currently in use are expected to have remaining lives of many years, any change in this market definition would only likely occur on a time horizon of many years in the future, and would require evidence that a sufficient proportion of cars on the road can use the higher-level blends highly interchangeably.

4.3.6 Jet Fuel and Kerosene

Jet fuel refers to a class of petroleum-derived flammable liquids produced in oil refineries. The majority of jet fuel commercially sold is based on kerosene, a petroleum-based flammable liquid; other jet fuels are based on naphtha, a flammable liquid produced from petroleum distillates or natural gas condensates. There are different types of jet fuel commercially available, with the different types being defined according to performance specifications. Type Jet A-1, a kerosene-based jet fuel, is the standard jet fuel used in most of the world, except in the former Soviet states where the kerosene-based TS-1 is also in common use. Naphtha-based jet fuels are generally used only in military aviation rather than in civil aviation, and are therefore not considered further in this report.

Jet fuel is based on kerosene, but refined to a higher standard, with the addition of additives to aid in clean burning and to prevent ice formation and corrosion.

As with combustion engines generally, aviation turbine engines are designed to operate using specific fuels, and other fuels cannot ordinarily be substituted without harm to the engine. Accordingly, users of jet fuel are prevented by technical restrictions from substituting to other fuels, and would therefore manifestly not substitute even in the face of an appropriate price rise (a SSNIP).

Accordingly, one can define the product dimension of this market as being for “jet fuel and kerosene.”

4.3.7 Propane (LPG)

Propane is a flammable hydrocarbon with the chemical formula C_3H_8 . It is produced as a by-product of petroleum refining and natural gas processing. Propane is a gas at standard temperatures and pressure, but it is commonly compressed to a liquid for transportation and storage. In its liquid form, it is also commonly known as liquified petroleum gas (“LPG”).

Commercially available propane is generally not pure C_3H_8 , but rather is C_3H_8 blended with other hydrocarbons such as ethane, propylene, or butanes, in proportions varying by location and commercial factors. The United States Heavy Duty 5 (HD-5) standard for propane is at least 90% propane blended with no more than 5% propylene and no more than 5% butanes and ethane). For certain uses such as cooking fuels, propane can be mixed with higher proportions of butane; depending on the applicable safety standards, propane/butane mixes with butane proportions of up to 50% may be used.

As LPG, propane is commonly transported and stored in standardized steel cylinder tanks. Propane is commonly used as a cooking fuel both in home use and for portable cooking facilities such as barbeques, for home heating, and for small-scale electricity generation such as home generators. Propane also has certain commercial and industrial uses.

As with combustion devices generally, including home cooking devices and similar devices powered by propane, they are designed to operate using specific fuels, and other fuels cannot ordinarily be substituted without harm to the device, or danger to the operator. Accordingly, users of propane in such devices are prevented by technical restrictions from substituting to other fuels, and would therefore manifestly not substitute even in the face of an appropriate price rise (a SSNIP). However, propane users are not similarly prevented from substituting to propane-based fuels blended with butane or ethane up to the blend proportions tolerated by propane equipment.

Accordingly, one can define the product dimension of this market as being for “propane gas and propane gas blends able to be used on propane-based equipment.”

4.3.8 Natural Gas (LNG and CNG)

Natural gas has is a flammable mixture of hydrocarbons consisting mainly of methane with the chemical formula CH_4 , mixed with certain amounts of ethane C_2H_6 . It is produced from hydrocarbon natural deposits. Natural gas is a gas at standard

temperatures and pressure, but it liquifies when sufficiently cooled in temperature. In its liquid form at cool temperatures, natural gas is also commonly known as liquified natural gas (“LNG”); in its compressed form at ambient temperatures, it is also commonly known as compressed natural gas (“CNG”). Natural gas is commonly transported through long-distance pipelines in a gaseous but compressed state, or as ocean-going cargo in its LNG form. The principle different between LNG and CNG is the storage method; the underlying fuel in both cases is natural gas.

Natural gas has a wide range of uses, including large-scale electricity generation, small-scale domestic use including home heating and cooking, and as an industrial feedstock in a variety of processes including fertilizer manufacturing. In its LNG form, its uses include domestic uses and to power certain types of vehicles, including larger trucking, and passenger cars in some jurisdictions.

As with combustion engines generally, natural gas-fueled devices including electricity generators and domestic use devices are designed to operate specifically using natural gas, and other fuels cannot ordinarily be substituted without harm to the engine, generator, or device. Accordingly, users of jet fuel are prevented by technical restrictions from substituting to other fuels, and would therefore manifestly not substitute even in the face of an appropriate price rise (a SSNIP). Similar lack of switching is evident in relation to potential bulk uses of natural gas in electricity generation. A significant potential use of natural gas in the Fuel Sector in the Cayman Islands is in electricity generation, as a long-term potential substitute for diesel-fueled generators. However, switching from diesel to natural gas, or from natural gas to diesel or any other generation fuel, would require very significant capital works and refitting of the relevant plants, and therefore switching could not be readily done and would not likely occur merely as the result of a small price rise (a SSNIP); rather, switching would occur as part of a much larger strategic and long-term planning process considering many different strategic and economic factors. Moreover, there has evidently been no switching in fuels in the face of natural gas or other fuel price fluctuations that would be sufficient to constitute a “SSNIP” price change.

As a result, one can conclude that natural gas when introduced will be in a separate market to other fuels at the wholesale/bulk level as well as at the retail level.

4.3.9 Aviation Gas

Aviation gas (also known as “avgas”) is a petroleum-derived flammable liquid. It is produced in petroleum refineries.

Aviation gas is used as an aviation fuel in certain types of non-turbine internal combustion engines used in aircraft, predominantly propeller-driven aircraft.

Modern gasoline is not substitutable in its uses with aviation gas. Gasoline on sale in most jurisdictions today, including in the Cayman Islands, is unleaded gasoline permitting the use of catalytic converters. In contrast, the most commonly used grades of aviation gas are still leaded, for mechanical engine reasons including to prevent a phenomenon known as “engine knocking”. Certain specific aviation gas-fueled aviation engines, including engines in certain ultralight aircraft, are capable of taking gasoline not containing ethanol as a substitute for aviation gas. However, for the majority of

non-turbine aviation engines, ordinary motor gasoline cannot be used as a substitute for aviation gas.

Accordingly, one can conclude that aviation gas is in a separate market to gasoline and other petroleum-derived fuels.

4.3.10 Butanes

Butane is a flammable hydrocarbon with the chemical formula C_4H_{10} ; specifically, butane is commonly composed of a mixture of two different isomers (n-butane and isobutane) of this molecular structure. Butane is a gas at standard temperatures and pressures but it liquifies relatively readily. It is commonly found dissolved in crude oil.

Butane is commonly used as a blend with or additive to other hydrocarbons including gasoline and LNG, as a feedstock in certain industrial processes, and as a fuel for small-scale uses including in cooking gas cylinders and in cigarette lighters.

As with other fuels, the core test for market definition is whether or not consumers would readily switch to alternatives in the face of a small increase in the price of butanes (a SSNIP). Our understanding is that in most of its uses, other fuels cannot be readily substituted for butanes in existing butane-based equipment. For instance, pure or predominately butane gases and propane-based gas require different equipment (different gas injectors) for use with cooking stoves, as the air-to-gas ratios required for each fuel is quite different; as a result, switching between them would require investment in capital equipment, which sharply reduces the prospect of ready switching.

Accordingly, one can conclude that butane gas including predominately butane gas blends is in a separate market to other fuel gases and other fuels.

4.3.11 Hydrogen for use in Fuel Cells

A fuel cell is an electrochemical cell that converts a fuel and oxygen into electricity through electrochemical reactions inside the fuel cell. Fuel cells require a continuous source of fuel and oxygen to generate electricity continuously. There is a wide variety of designs, fuel sources, and applications of fuel cells. Fuel cells fuelled by hydrogen are under development for use in powering passenger vehicles, and there has been initial small-scale commercial release of several models by large car manufacturers. The fuel used in these vehicle is hydrogen.

Hydrogen is an un-compounded chemical elements with the symbol H, and the most abundant chemical substance in the universe. In its natural state it exists as H_2 , a gas at standard temperature and pressure, but it liquifies at extremely low temperatures. However, the gas H_2 is very rare on Earth, and almost all of the hydrogen existing on Earth exists in compounded form, including in water (H_2O), all hydrocarbons, and almost infinite other compounds. Its un-compounded form is predominantly produced in a variety of chemical and thermochemical processes and through the electrolysis of water.

It should be noted that there is currently no existing market for hydrogen in the Cayman Islands for use in fuel cells. However, as technology in fuel cell vehicles develops and

becomes commercially viable, one may expect that this market would develop in the Cayman Islands. Accordingly, this potential future market is designed here in the Market Definition Report in anticipation of its coming into existence, and is addressed in more detail in the Market Assessment Report concerning future market developments to be taken account in an updated regulatory framework for the Fuel Sector.

Fuel cells are an entirely separate technology from the combustion engines (internal and otherwise) generally under focus in this report. There is simply no possibility at all for the substitution of hydrogen for any petroleum-derived or other such fuel.

Hydrogen is therefore in a separate market from other fuels on a product dimension.

4.3.12 Acetylene

Acetylene is a flammable hydrocarbon with the chemical formula C_2H_2 . It is most commonly manufactured as a by-product of the combustion of other hydrocarbons. Acetylene is a gas in its untreated form at standard temperatures and pressures, but as it is unstable it is commonly converted into solutions in other liquids and thus handled in liquid, dissolved form.

Acetylene has certain highly specific industrial-type applications. A primary use is in welding, as the fuel used to power oxyacetylene gas welding torches; the welding equipment used does not operate with alternative fuels. Acetylene also is used as the power source in certain specific types of lighting, including LED lighting, although its use for lighting in mining operations has essentially been phased out because of safety concerns. Acetylene also is used as a feedstock in certain chemical processes, although this use is in sharp decline due to environmental considerations.

There is some, limited substitutability between acetylene and propylene (also noted in the following section on propylene). However, in respect of the majority of the uses of acetylene, neither propylene nor any other fuel is technically substitutable for acetylene. One can therefore conclude that there is not sufficient substitutability between acetylene and propylene for these two gases to create a sufficient competitive constraint on one another to justify defining a market that includes both gases (or any other alternative gas).

Acetylene is therefore in a separate market on its product dimension from other gases and fuels.

4.3.13 Methanol

Methanol (also known as methyl alcohol) is a chemical with the chemical formula CH_3OH . It is primarily produced by industrial manufacturing processes. It is a flammable liquid at standard temperatures and pressures.

It is predominantly used as a precursor chemical to a wide variety of other industrial chemicals, including formaldehyde, ether, and a wide variety of other specialized chemicals.

Methanol has been proposed as a potential alternative fuel source to petroleum-derived hydrocarbons for internal combustion engines, either blended with gasoline or independently. However, the adoption of methanol as a motor fuel has been extremely limited, currently being confined to certain motor racing sport engines. Methanol is not substitutable for gasoline or diesel in standard commercially-available vehicle engines.

There is currently no existing market for methanol in the Cayman Islands for use as a road or other fuel (although relatively small quantities are used as a feedstock in the local production of biodiesel). Moreover, the prospects of the large-scale commercial adoption of methanol as a fuel (as opposed to certain niche activities such as motor sports) appear unclear. However, should this situation change as technology evolves, and should the use of methanol as a road fuel become commercially viable, then the use of methanol as a fuel would presumably fall under the broader regulatory framework for the Fuel Sector. Accordingly, this potential future market is designed here in the Market Definition Report in anticipation of its coming into existence, and is addressed in more detail in the Market Assessment Report concerning future market developments to be taken account in an updated regulatory framework for the Fuel Sector.

Methanol cannot currently be used as an alternative fuel in any engines designed to be fuelled by other fuels such as gasoline or diesel. Similarly, methanol-fueled engines cannot accept other fuels as substitute fuels. Methanol is therefore in a separate market from other fuels on a product dimension.

4.4 Other Potential Future Fuels

The fuels for which markets are defined in this Report are those currently in use in the Fuel Sector or which may realistically come into use in the foreseeable future. In addition to these fuels, there are other fuels that are not currently in the foreseeable fuels mix for the Cayman Islands. Nevertheless, there may be a sufficient change in markets, consumer demand, and technology which would introduce such new fuels into the potential fuels mix in the Fuel Sector. By way of example, such potential future fuels may include:

- Propylene;
- Ethylene;
- Butylene;
- Butadiene; and
- Fuels for which the technology is not yet available.

Should these or other new fuels be introduced in the future, then there may be a need and justification for markets to be defined by OfReg for such new fuels. Such a market definition process including the product dimension of the market definition would broadly follow the same analytical approaches as are used in this Market Definition Report and would be based on comparable considerations, which may include a similar public consultation process.

5 GEOGRAPHIC MARKETS

Section 3 outlined the principles adopted for market definition in standard competition analysis and by most modern government competition authorities. In the previous Section 4, the product dimensions of the market definitions of the Fuel Sector were outlined. In this Section 5, the market definition principles are applied to the Fuel Sector in the Cayman Islands to determine the geographic dimensions of the market definitions that we recommend should be applied to the Fuel Sector.

5.1 Geographic markets – consumer behaviour is the main factor

The core principle of geographic market delineation is equivalent to the product dimension – to what extent will consumers (or suppliers in the case of supply-side substitution) readily switch to another location to purchase the same product if the price of the product experiences a slight rise in price (a SSNIP) in their current location? Another way of asking this question is – how far will consumers travel to get a better deal?

This core question is reflected in the approach of most current competition authorities in determining the extent of the geographic market definition in respect of road and other fuels (in addition to many other retail markets involving “bricks and mortar” shopping, such as grocery retail markets). It is common for authorities to consider that, for most private consumers, the demand for road and other fuels from retail stations has strong regional-local aspects, determined by the geographic regions where the consumer lives and works, and by the principal traffic routes that connect these regions: this is the broad approach taken by the United States Federal Trade Commission, the United Kingdom Competition and Markets Authority, the Australian Competition and Consumer Commission, among others, and it is the approach followed in this Market Definition Report.

Following this approach, one can therefore say that competition for retail consumers takes place in local markets; as a result, the price-setting by individual retailers is significantly determined by the conditions of competition in their local markets. Consumers usually have a preference for purchasing fuel within a limited geographic area, normally around their home, work, or along their usual commute. Consumers may have a limited willingness to travel more than a certain distance drive from their usual commute or location in order to purchase fuel from another fuel retailer.

The information used in the assessment of geographic market definitions in this report includes the following, in line with broadly accepted principles of geographic market definition as outlined in Section 3 above:

- Information from market participants to identify and assess the strength of substitution possibilities.
- The costs to consumers of obtaining supply from alternative regions (to the extent available).
- Any limitations on the ability of customers to access sources of supply in alternative regions.

- Evidence of buyers switching to other products in response to price increases in the recent past.
- Relative price levels and price movements of the product compared to potential different geographic sources of supply.
- The portability of the relevant product as determined by its perishability, weight, etc.
- Transportation costs to move the relevant product between regions (particularly the transportation costs as a proportion of total value of the product)
- Any regulatory or other practical constraints on consumers buying from alternative regions.
- Any regulatory or other practical constraints on suppliers selling to alternative regions.
- Records relating to trade flows and the actual movement of customers and/or suppliers between geographic regions, especially related to changes in relative prices across regions in the recent past.
- The extent to which “chains of substitution” brought about by overlapping catchment areas may affect the geographic market definition.

5.2 The Three Islands

The Cayman Islands is comprised of three different islands: Grand Cayman, Cayman Brac, and Little Cayman, each separated by long stretches of water, without bridge connections between any of the islands. This geographic reality means that transport between the islands is realistically limited to barge and other marine vessels transportation for heavy items, or air transport for passengers and light goods.

This seemingly simple observation has powerful and essentially conclusive implications for the geographic market definition. As already outlined, the core test of geographic market definition is whether consumers would (and by implication, whether they *can*) travel to alternative locations to shop if the local price of a product increase slightly by a SSNIP. In the case of the three islands of the Cayman Islands they cannot. Factors to consider in geographic market definition include whether there are any regulatory and other practical constraints on consumers buying from alternative regions, the portability of the product in question, and transportation costs of moving the product between different locations.

In this case, the overwhelming reality is that consumers in Cayman Brac cannot drive to Grand Cayman to refill their cars, or similarly drive between any of the islands. The only realistic way to obtain fuel for a road vehicle from a retail station on another island is to transport one’s vehicle to the other island by barge, or to have a tank of fuel brought from the other island on the customer’s individual account. It is therefore evident without further analysis that, in the ordinary case, such a process would be prohibitively complex and expensive, relative to the price of fuel and the increased cost to the customer of a small increase (by a SSNIP) in that cost. In terms of the factors to be considered, one can conclude that (1) there are very significant practical constraints on consumers buying their retail fuel from another island, (2) retail fuels are not readily portable between islands from the consumers’ perspective, and (3) the transport costs

of doing so would be prohibitively expensive relative to the cost of absorbing a SSNIP in the fuel price in the consumers' relative locations.

Similar considerations would apply in relation to non-vehicle fuels (such as cooking gases) and wholesale/bulk sales of fuels. While the precise calculus of inter-island shipping costs and complications would be slightly different in relation to each different product, and would depend to a material extent on the quantity of the fuel to be shipped between the islands, one can nonetheless conclude that in each case there are significant practical constraints on switching one's supply to a source on another island, consumers buying their retail fuel from another island, fuels are not readily portable between islands from the buyer's perspective, and the transport costs are highly material.

There are two potential exceptions to these island-based geographic markets which may have wider geographic markets: gasoline and other fuels used for marine purposes, and aircraft fuels including both aviation jet fuel (also known as jet fuel or avjet) and aviation gasoline (also known as avgas).

Marine vessels using gasoline are distinguishable from gasoline-fueled road vehicles as they are in principle capable of cost-effective travel to another island to obtain fuel; the same absolute geographic constraints applying to road vehicles therefore do not apply to marine vessels. However, for reasons outlined in Section 4.3.1 above, the special difficulties of marine engines in tolerating ethanol-blended gasoline do not prevent the defined product market for gasoline from including ethanol blends up to the blend wall, because sufficient proportions of other consumers *are* able to switch to ethanol-blended gasoline. By a similar but inverse process of reasoning, we note that, while some gasoline consumers would be readily willing to switch supply location to another island in the face of a SSNIP price rise, the substantial majority of gasoline customers would *not* be able to do so because the majority of gasoline sales in the Cayman Islands are for road vehicle use. This means that the number of customers willing to switch locations would therefore not be enough to "defeat" the SSNIP price rise, meaning that different islands should not be included in the same geographic market. As a result, we conclude that the geographic market for gasoline and all other road fuels is confined to individual islands, notwithstanding any marine use of those fuels.

Jet fuel is currently commercially available principally on Grand Cayman at Owen Roberts International Airport, with smaller volumes also being supplied on Cayman Brac at Sir Captain Charles Kirkconnell International Airport. Aviation gas is currently commercially available only on Grand Cayman at Owen Roberts International Airport. However, there is strong evidence from market participants that a substantial proportion of customers of jet fuel is highly sensitive to price differences between different fueling locations, and routinely do choose among different airport locations for refuelling by partial reference to the price of jet fuel. This price sensitivity and the customers' *ability* to displace themselves to other island locations points in favour of a Cayman Islands-wide geographic market for jet fuel. In respect of aviation gas, while we do not have strong evidence of such routine substitution between airports for refueling by aviation gas customers, they are nevertheless inherently mobile between islands and currently refuel principally on Grand Cayman. That jet fuel is currently principally available on Grand Cayman and to a lesser extent on Cayman Brac, and aviation gas is only available on Grand Cayman, will be considered in the Market Assessment Report;

for the specific purposes of market definition, there appears to be no strong reason to segment the Cayman Islands into the individual islands, and accordingly we conclude that the geographic market for aviation fuels (jet fuel and aviation gas) is the entire Cayman Islands.

One can therefore conclude with confidence that, with the exception of the aviation fuels (jet fuel and aviation gas) for which the geographic market should be defined as Cayman Islands-wide, the three different islands of Grand Cayman, Cayman Brac, and Little Cayman each constitutes a separate geographic market for all fuels under consideration in the Fuel Sector.

5.3 Geographic markets within each island

Having determined that there are clear geographic market boundaries between the three islands, one must then consider whether each of the islands should be further segmented into different geographic locations. As explained above, fuels markets are strongly characterized by regional-local market considerations, as determined by consumers' willingness (or unwillingness) to travel to alternative locations to purchase their fuel needs.

The following geographic market definitions are based on currently observed consumer behaviour and prices and their interaction with the physical geography of the Cayman Islands. However, should the relevant information change in the future as a result of changes in consumer behaviour, material changes in the relevant fuels supply chains, or other significant changes in or affecting the Fuel Sector, then it may be appropriate for the geographic market definition to be re-assessed and potentially changed in light of the changed circumstances.

5.3.1 *Grand Cayman*

Grand Cayman is approximately 22 Miles (35 kilometers) long, and at its widest point is around 8 Miles (13 kilometers wide). Moreover, driving distances are such that the road distance between the most distant points are even longer: the driving distance from West Bay to Rum Point is around 31 Miles (50 kilometers), and the driving distance from West Bay to East End is around 28 Miles (45 kilometers).

The island is therefore sufficiently large to be capable of constituting several separate geographic markets for retail fuels consumers. For instance, a driving distance of 50 kilometers would generally be considered too long for consumers to readily switch to the alternative location to purchase their fuels, and may justify separate geographic markets.

However, these distances are the distances between the extreme ends of the potential geographic market(s), and there are a large number of retail stations in between the extreme ends. Excluding marinas, there are 20 retail stations spread throughout Grand Cayman, most tightly concentrated in George Town with 13 stations, but also including 2 stations in West Bay, 3 stations in Bodden Town, 1 station in North Side, and 1 station in East End. In addition, there are 5 marinas that also sell road fuels, of which 2 are in

West Bay, 2 are in George Town, and 1 is in North Side. The distribution of the stations across Grand Cayman is shown in Figure 1 below:

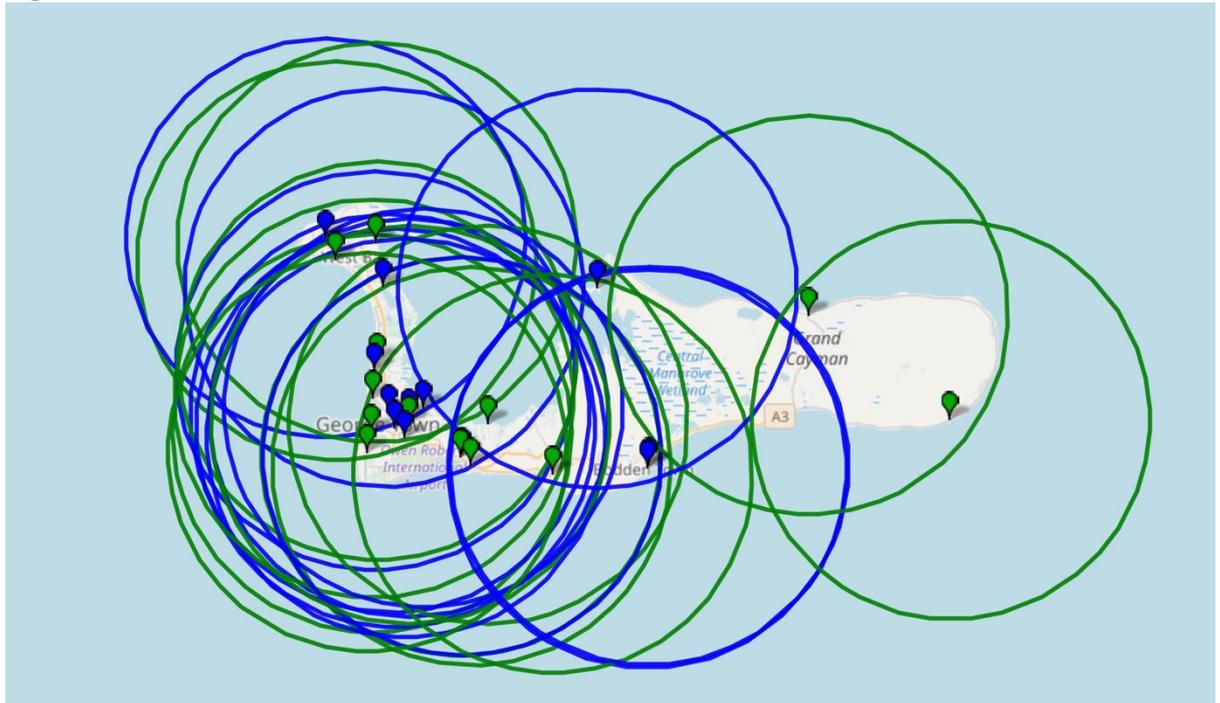
Figure 1:



This map shows the geographic distribution of service across Grand Cayman. As a general principle, the most relevant retail stations to a consumer will (everything else being equal) be the stations geographically closest to that consumer – and for a consumer considering an alternative station because the local price has increased by as SSNIP, the most relevant alternative will often be the next-closest station. It is the closest alternatives, as importantly influenced by the distance of the nearest alternative, that exercise the closest and tightest competitive constraints on each station’s pricing behaviour.

One can take this analysis an important step further by analysing the typical “catchment” areas as regards the customers of each of these stations and how they interact with each other. The Firm sought different types of more granular information on customer movements within Grand Cayman, specifically to establish how far customers will travel on Grand Cayman to purchase their fuel – the information sought included any information on customer work and residential locations relative to station locations, as potentially gleaned from customer accounts, customer loyalty programs, and similar sources of information. Unfortunately, due to the common practices in the Fuel Sector, these types of information were not available. Nevertheless, one can look to experience elsewhere to estimate broadly that, for each station, a large majority of road fuels customers will live or work within 15 kilometers of the station. Figure 2 shows these retail customer catchment areas for the different stations on a map of Grand Cayman. 10 kilometer radiuses shown around each station to provide a highly conservative view of the geographic market definition; with 15 kilometer radiuses, the overlaps are shown to be even stronger and the conclusion regarding geographic market definition even clearer

Figure 2:



This analysis shows that Grand Cayman is essentially covered by a network of station catchment areas that overlap strongly with one another. This creates strong chains of substitution across the whole of Grand Cayman which suggests that competitive conditions in different parts of Grand Cayman are all interrelated to one another and cannot systematically differ from one another across the different parts of Grand Cayman, because of this chain of competitive links across the island. Such a strong chain of substitution across the island would point to competitive conditions being broadly similar across the island. This similarity of competitive conditions in turn would point towards a conclusion that Grand Cayman is one geographic market for retail road fuels.

To illustrate this, consider a station at one end of the network, at the far end of West Bay. This station is likely too far from a station in Rum Point for those stations to competitively constrain each other, and so if these two stations were the only stations, they would not be in the same geographic market. However, the station at the far end of West Bay is constrained by any other station in northern West Bay. It is also constrained by any other stations in southern West Bay; the station in southern West Bay in turn is constrained by stations along West Bay Road; those stations in turn are constrained by stations in George Town; those stations in turn constrain stations in Bodden Town; and so on all the way to Rum Point and East End. If the links along this chain are sufficiently strong and continuous, this chain results in the geographic market being defined as a single market, even if the respective ends of the chain do not directly compete with one another. In this case, the overlaps between the different catchment areas along the chain are strong and continuous, because the stations are close enough to each other and well distributed across the chain. This strongly suggests the conclusion of a single geographic market for retail road fuels.

To test this conclusion, we have employed another market definition technique known as “correlation analysis”. Simply put, one can measure how closely different data series are related to each other by a measure of correlation, where the measure of correlation

is in a range from one (1) to negative (-1). Data series are closely correlated if they have a correlation measure towards one (1); data series that are closely related but in an inverse way have a correlation measure towards negative one (-1); and data series that are not closely related to each other have lower correlation measures towards zero (0). In terms of market definition, one generally expects that if products or locations are in the same market, then the prices of alternative products or locations in that market will be closely correlated, but if they are not in the same market, then their prices would be less closely related. A high correlation measure is therefore evidence of being in the same market, and a low correlation measure is therefore evidence of not being in the same market.

A correlation analysis was conducted on gasoline prices at all the different stations in Grand Cayman, including the marinas selling gasoline. To ensure comparability (so that apples are compared to apples and not to oranges), this correlation analysis was conducted using two separate specific products: (1) the prices of regular gasoline (89 octane) with pump self-service, and (2) the prices of premium gasoline (93 octane) with full pump service.

The detailed results of this correlation analysis are shown in a table in Appendix 1 (below). In summary, these results show that prices of the specific products are closely related to one another across the whole of Grand Cayman. This suggests that the different geographic areas of Grand Cayman are all part of the same geographic market for the purposes of market definition. These results are not conclusive by themselves, and must be caveated by the statement that correlation does not prove causation, and that prices are also likely to be substantially caused by independent factors including critically the world crude oil price. However, in combination with the other factors to be considered, it adds additional weight to the conclusion that there is a single geographic market covering the entirety of Grand Cayman.

We therefore conclude that in respect of the retail sales of road fuels, the entire island of Grand Cayman constitutes one sphere of competition, and therefore one geographic market.

By contrast, the geographic market in relation to the wholesale/bulk sector is relatively straight-forward to define. For bulk fuels, there are effectively only two source points: the bulk entry point by pipeline at Jackson Point, and the container port in George Town for the importation of fuels by way of ISO containers. Similarly, large scale storage facilities are relatively concentrated around the George Town and Jackson Point region. All bulk and wholesale fuels around Grand Cayman ultimately originate from this region of the island. As a result, there is no basis for segmenting the island's wholesale/bulk industry level more finely than being island-wide.

We therefore conclude that in respect of wholesale / bulk sales of fuels on Grand Cayman, the entire island of Grand Cayman constitutes one sphere of competition, and therefore one geographic market.

The geographic markets relating to retail non-vehicle fuels (such as propane and comparable home-use gases) are similarly relatively straightforward to define. For retail home-use fuels, information from market participants suggests that a sufficient number of consumers on the individual islands obtains home-based delivery of products at island-wide rates meaning that the consumers do not distinguish between

different origin locations. Similarly, market suppliers do not classify customers by location other than to distinguish between Grand Cayman and the Sister Islands; nevertheless, for comparable reasons outlined in respect of other fuels, a consumer of home non-vehicle fuels (e.g. propane) based in one of the Sister Islands would be unlikely to travel to the other Sister Island to obtain the same fuel as a result of a SSNIP price rise. The evidence therefore suggests that the geographic market for the retailing of non-vehicle fuels including propane is the entire island of Grand Cayman.

5.3.2 Cayman Brac

Cayman Brac is about 12 miles (19 kilometers) long and on average around 1.2 miles (2 kilometers) wide.

There are two retail stations on Cayman Brac, and similar to Grand Cayman, Cayman Brac has one ship to shore pipeline for bulk fuel and the Port where international tankers and barges can land to also bring various fuel supplies (inclusive of aviation fuel and propane) in smaller quantities. The bulk diesel mainly used for the purposes of electricity generation.

The dimensions of the island and fuels supply characteristics of the island suggest that there is no reason to further segment Cayman Brac into different geographic markets. Moreover, there is no information at hand to suggest that the conditions of competition are materially different on different parts of the island – vehicle owners on all different parts of the island travel to the same retail stations to purchase their fuel.

It is therefore likely that the entire island of Cayman Brac constitutes one sphere of competition, and therefore one geographic market at both retail and bulk wholesale levels.

5.3.3 Little Cayman

Little Cayman is about 10 miles (16 kilometers) long and around 1.2 mile (2 kilometers) wide.

There is one retail station on Little Cayman, more generally one shopping location with one store, and effectively one place where barges can land to bring fuel supplies in smaller quantities.

The dimensions of the island and fuels supply characteristics of the island suggest that there is no reason to further segment Little Cayman into different geographic markets. Moreover, there is no information at hand to suggest that the conditions of competition are materially different on different parts of the island – vehicle owners on all different parts of the island travel to the same retail station to purchase their fuel.

It is therefore likely that the entire island of Little Cayman constitutes one sphere of competition, and therefore one geographic market.

5.4 Other Potential Future Fuels

The fuels for which markets are defined in this Report are those currently in use in the Fuel Sector or which may realistically come into use in the foreseeable future. In addition to these fuels, there are other fuels that are not currently in the foreseeable fuels mix for the Cayman Islands. Nevertheless, there may be a sufficient change in markets, consumer demand, and technology which would introduce such new fuels into the potential fuels mix in the Fuel Sector, as is also outlined in Section 4.3.14 above in connection with the product market definition. Should these or other new fuels be introduced in the future, then there may be a need and justification for markets to be defined by OfReg for such new fuels. Such a market definition process including the geographic dimension of the product market would broadly follow the same analytical approaches as are used in this Market Definition Report and would be based on comparable considerations, which may include a similar public consultation process.

6 APPENDIX 1: CORRELATION ANALYSIS, GRAND CAYMAN

Table 1: Correlation of retail stations selling self-service regular gasoline

	E1	B2	G1	G2	G3	G4	G5	G6	G7	G8	G9	G10	G11	G12	G13	G15
E1	1.00															
B2	0.97	1.00														
G1	0.91	0.88	1.00													
G2	0.92	0.90	0.98	1.00												
G3	0.91	0.88	0.99	0.99	1.00											
G4	0.92	0.90	0.99	1.00	0.99	1.00										
G5	0.93	0.90	0.98	0.98	0.98	0.98	1.00									
G6	0.93	0.93	0.94	0.96	0.95	0.96	0.97	1.00								
G7	0.91	0.92	0.94	0.95	0.93	0.95	0.96	0.98	1.00							
G8	0.96	0.96	0.88	0.90	0.88	0.90	0.91	0.93	0.92	1.00						
G9	0.94	0.97	0.94	0.87	0.83	0.87	0.88	0.92	0.91	0.95	1.00					
G10	0.97	0.92	0.86	0.87	0.85	0.87	0.87	0.88	0.86	0.89	0.90	1.00				
G11	0.98	0.97	0.92	0.93	0.91	0.93	0.94	0.94	0.93	0.96	0.96	0.92	1.00			
G12	0.94	0.96	0.83	0.86	0.82	0.86	0.87	0.92	0.91	0.94	0.98	0.88	0.96	1.00		
G13	0.15	0.10	0.02	0.07	-0.06	0.07	0.15	0.07	0.17	0.31	0.24	0.07	0.08	0.28	1.00	
G15	0.81	0.77	0.88	0.88	0.88	0.88	0.87	0.88	0.89	0.79	0.74	0.85	0.83	0.74	0.25	1.00

Legend:

E1 = station in East End offering self-service regular gasoline.

B2 = station in Bodden Town offering self-service regular gasoline.

G1 = station in George Town offering self-service regular gasoline.

G2 = station in George Town offering self-service regular gasoline.

G3 = station in George Town offering self-service regular gasoline.

G4 = station in George Town offering self-service regular gasoline.

G5 = station in George Town offering self-service regular gasoline.

G6 = station in George Town offering self-service regular gasoline.

G7 = station in George Town offering self-service regular gasoline.

G8 = station in George Town offering self-service regular gasoline.

G9 = station in George Town offering self-service regular gasoline.

G10 = station in George Town offering self-service regular gasoline.

G11 = station in George Town offering self-service regular gasoline.

G12 = station in George Town offering self-service regular gasoline.

G13 = station in George Town offering self-service regular gasoline.

G15 = station in George Town offering self-service regular gasoline.

Table 2: Correlation of retail stations selling full-pump premium gasoline

	WB1	WB2	WB3	WB4	BT1	BT2	BT3	NS1	GT1	GT2	GT3	GT4	GT5	GT6
WB1	1.00													
WB2	0.68	1.00												
WB3	0.84	0.82	1.00											
WB4	0.12	0.89	0.54	1.00										
BT1	0.65	0.97	0.78	0.86	1.00									
BT2	0.70	0.93	0.83	0.88	0.92	1.00								
BT3	0.66	0.94	0.80	0.85	0.93	0.96	1.00							
NS1	0.77	0.85	0.82	0.81	0.83	0.86	0.81	1.00						
GT1	0.67	0.98	0.82	0.88	0.98	0.93	0.94	0.84	1.00					
GT2	0.65	0.98	0.81	0.88	0.98	0.93	0.94	0.84	0.99	1.00				
GT3	0.66	0.98	0.81	0.88	0.98	0.93	0.95	0.84	0.99	1.00	1.00			
GT4	0.65	0.98	0.81	0.88	0.98	0.93	0.94	0.84	0.99	1.00	1.00	1.00		
GT5	0.61	0.95	0.81	0.86	0.94	0.89	0.89	0.84	0.94	0.95	0.94	0.95	1.00	
GT6	0.69	0.97	0.80	0.87	0.97	0.93	0.93	0.85	0.97	0.97	0.97	0.97	0.93	1.00
GT7	0.70	0.98	0.83	0.89	0.97	0.95	0.94	0.86	0.97	0.97	0.97	0.97	0.95	0.99
GT8	0.70	0.93	0.82	0.90	0.92	0.96	0.96	0.85	0.93	0.92	0.93	0.92	0.88	0.93
GT9	0.75	0.92	0.85	0.83	0.91	0.96	0.96	0.83	0.93	0.91	0.93	0.91	0.86	0.92
GT10	0.67	0.92	0.80	0.87	0.91	0.99	0.95	0.84	0.91	0.92	0.92	0.92	0.88	0.93
GT11	0.69	0.95	0.83	0.88	0.94	0.99	0.97	0.87	0.95	0.95	0.95	0.95	0.91	0.95
GT12	0.76	0.92	0.86	0.81	0.92	0.95	0.96	0.85	0.4	0.92	0.94	0.92	0.87	0.93
GT13	0.30	0.90	0.47	0.86	0.87	0.98	0.97	0.63	0.91	0.90	0.91	0.90	0.78	0.88
GT14	0.71	0.92	0.84	0.89	0.91	0.95	0.95	0.85	0.92	0.92	0.92	0.92	0.90	0.93
GT15	0.60	0.92	0.75	0.69	0.93	0.91	0.92	0.71	0.93	0.92	0.93	0.92	0.86	0.90

	GT7	GT8	GT9	GT10	GT11	GT12	GT13	GT14	GT15
GT7	1.00								
GT8	0.94	1.00							
GT9	0.93	0.95	1.00						
GT10	0.95	0.96	0.95	1.00					
GT11	0.96	0.97	0.96	0.98	1.00				
GT12	0.94	0.95	0.98	0.94	0.97	1.00			
GT13	0.90	0.99	0.97	0.97	0.98	0.97	1.00		
GT14	0.93	0.95	0.95	0.94	0.96	0.94	0.97	1.00	
GT15	0.91	0.89	0.91	0.90	0.92	0.93	0.88	0.88	1.00

Legend:

WB1 = station in West Bay offering full-pump premium gasoline.

WB2 = station in West Bay offering full-pump premium gasoline.

WB3 = station in West Bay offering full-pump premium gasoline.

WB4 = station in West Bay offering full-pump premium gasoline.

BT1 = station in Bodden Town offering full-pump premium gasoline.

BT2 = station in Bodden Town offering full-pump premium gasoline.

BT3 = station in Bodden Town offering full-pump premium gasoline.

NS1 = station in North Side offering full-pump premium gasoline.

GT1 = station in George Town offering full-pump premium gasoline.
GT2 = station in George Town offering full-pump premium gasoline.
GT3 = station in George Town offering full-pump premium gasoline.
GT4 = station in George Town offering full-pump premium gasoline.
GT5 = station in George Town offering full-pump premium gasoline.
GT6 = station in George Town offering full-pump premium gasoline.
GT7 = station in George Town offering full-pump premium gasoline.
GT8 = station in George Town offering full-pump premium gasoline.
GT9 = station in George Town offering full-pump premium gasoline.
GT10 = station in George Town offering full-pump premium gasoline.
GT11 = station in George Town offering full-pump premium gasoline.
GT12 = station in George Town offering full-pump premium gasoline.
GT13 = station in George Town offering full-pump premium gasoline.
GT14 = station in George Town offering full-pump premium gasoline.
GT15 = station in George Town offering full-pump premium gasoline.