Question 1: Singapore Electricity Market

Extract 1: The Retail Electricity Market

The Singapore electricity market consists of the wholesale electricity market and the retail electricity market. Power generation companies have to bid to sell electricity in the wholesale electricity market. Depending on electricity demand and supply, the price of electricity in the wholesale electricity market changes. Electricity retailers then buy electricity in bulk from the wholesale electricity market and compete to sell electricity to consumers.

Since 2001, the Energy Market Authority (EMA) has progressively opened up the retail electricity market to competition. This is to allow consumers to enjoy more choices and flexibility when buying electricity. Consumers will also benefit from competitive pricing and innovative offers while enjoying the same electricity supply.

The Open Electricity Market marks the final phase of market liberalization efforts. In November 2018, the Open Electricity Market was extended to all consumers in Singapore**,** giving them the option of buying electricity on a plan from any retailer that best meets their need**.**

Source: Adapted from openelectricitymarket.sg, accessed on 18 August 2023

Table 1: Market share of Electricity Retailers in Singapore between 2014 and 2021 (Unit: Percent (%))

	2014	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**
SP Services Ltd	33.0	30.8	30.1	27.7	24.6	20.4	15.8	15.5
Tuas Power Supply Pte Ltd	12.7	12.6	13.4	13.6	13.7	15.1	17.8	15.4
Keppel Electric Pte Ltd	13.4	11.5	10.4	13.8	14.4	14.1	15.0	15.0
Seraya Energy Pte Ltd	14.2	14.3	12.9	12.2	11.9	14.5	14.7	14.1
Senoko Energy Supply Pte Ltd	14.6	12.7	13.0	11.6	11.8	13.1	12.5	13.3
SembCorp Power Pte Ltd	8.3	12.2	9.8	10.9	11.9	12.8	12.8	13.1

Source: Energy Market Authority Singapore, accessed on 18 August 2023

Extract 2: Exits by Singapore electricity suppliers sparked by price volatility amid global energy crisis

The prospect of surging energy prices for the next few years amid volatile conditions are what spurred the departure of two retailers from Singapore's open electricity market (OEM), experts said. Of the 10 remaining retailers, at least two others are set for the exit door. Singapore's fourth-largest retailer iSwitch, as well as Ohm Energy, announced their departures from the market just days apart. Ohm Energy on Oct 15 informed customers it was exiting the market effective the same day due to "a volatile electricity market" rendering its prices unsustainable.

An e-mail to an existing Diamond Electric customer seen by The Straits Times cited "increasing costs of electricity" for the discontinuation of a similar plan.

Earlier this month, Trade and Industry Minister Gan Kim Yong cautioned that fuel prices have more than doubled over the past 18 months, and as an island state that imports almost all its energy,

Singapore is inevitably affected by global turbulence. This year, Singapore is facing “a perfect storm” of soaring energy prices induced by shortages in fossil fuel production, triggered by under-investment in energy projects and exacerbated by the Ukraine war, as well as severe disruptions in renewable power around the world.

Business lecturer Tan Tsiat Siong from the Singapore University of Social Sciences said, "Retailers offering fixed price plans are promising to sell electricity at a cheap price - and sometimes in large volume - without sufficiently ensuring that they would be able to purchase this electricity at low prices." However, observers said independent retailers also had to compete in a saturated Singapore market - with 12 retailers for 1.4 million residential households - and for some of them, at the disadvantage of not having their own power generation assets.

Continued competition, for one, would still bring about benefits such as improved service quality, greater choice of customized product offerings and overall lower prices.

Mr Sharad Somani, KPMG Singapore partner and the head of infrastructure advisory, called on industry regulator Energy Market Authority to review the appropriate number of retailers for a competitive yet financially and commercially sustainable retail market space. As for retailers, he noted that in some other countries, they are known to go beyond electricity to provide anything from energy management solutions to broadband and heating. These additional offerings improve the stickiness of their customer base and increase revenue per customer.

Said Mr Somani: "Retailers will need to reinvent their business model and offer more value-added and diverse services to stay relevant, competitive and profitable in the long term."

Source: Adapted from The Straits Times, October 2021

Extract 3: Singapore boosts UN climate targets, confirms net zero by 2050

Singapore's power sector now produces about 40 per cent of the country's emissions, but the sector could realistically bring this down to net zero by 2050, said a new report published on Tuesday (March 22). The report comes after Singapore announced last month that it will aim for national emissions to reach net zero "by or around" that same mid-century timeline. About 45 per cent of national emissions comes from the industrial sector, while land transport here makes up about 14 per cent of the total emissions inventory. But the power sector is likely to contribute a larger percentage to Singapore's emissions in the years ahead, especially with the move towards digitalization and the electrification of vehicles here.
The Energy 2050 Committee report, commissioned by industry regulator Energy Market Authority (EMA), said achieving this target can be done in ways that will neither compromise Singapore's energy security nor affordability.

Importing more clean energy into Singapore through regional power grids, developing infrastructure suitable for clean-burning hydrogen to be used as a fuel and maximizing solar panel deployment are some of the strategies the report recommended, with inputs from energy experts.

Most of Singapore's energy is generated by natural gas, a fossil fuel, which means burning it produces planet-warming emissions into the atmosphere. In response to questions, A National Climate Change Secretariat spokesman noted Singapore’s emissions were still growing but said: “Unlike other cities or countries that have abundant access to alternative energy sources like wind, nuclear and hydropower, Singapore’s geography and small land area hamper our ability to harness alternative energy.”

EMA chairman, Mr Richard Lim, highlighted how Singapore lacks natural resources and the ability to access other forms of renewable energy other than solar will require a clear-minded weighing of the trade-offs across energy security, energy affordability, and environmental sustainability.

The report by the committee sets out strategies like keeping abreast of research into emerging low-carbon technologies, such as nuclear or carbon capture; buying international carbon credits to offset emissions from any fossil fuels that have to be burned locally; managing energy demand; and leveraging digital technologies.

Source: Adapted from The Straits Times, March 2022

Questions

(a) (i) Compare the market share of SP Services Ltd and Senoko Energy Supply Pte Ltd between 2014 and 2021. [2]

(ii) Identify the market structure of Singapore's retail electricity market and justify your answer. [2]

(b) With reference to extract 2 and the use of a diagram, explain why Singapore is facing "a perfect storm" of soaring energy prices. [5]

(c) Explain why some electricity retail firms such as iSwitch, took the decision to shut down in 2022. [3]

(d) Discuss whether the Open Electricity Market scheme is the best way to improve consumer welfare in the electricity retail market. [8]

(e) Discuss whether the strategies proposed in Extract 3 can reconcile the trade-offs of energy security, energy affordability, and environmental sustainability. [10]

[Total: 30m]

Suggested answers:

(a) (i) Compare the market share of SP Services Ltd and Senoko Energy Supply Pte Ltd between 2014 and 2021. [2]

Similarity: The market share for both SP Services and Senoko Energy Supply Pte Ltd decreased between 2014 and 2021. **(1m)**
Difference: The market share of SP services is consistently higher than that of Senoko Energy Supply Pte Ltd over the period. **(1m)**

(ii) Identify the market structure of Singapore's retail electricity market and justify your answer. [2]

Identify: Oligopoly **(1m)**

Justify: The 6 firm concentration ratio is 96.2%.

OR

BTE is high due to high fixed costs and regulation like licenses are necessary to operate in the energy retail market. **(1m)**

(b) **With reference to extract 2 and the use of a diagram, explain why Singapore is facing "a perfect storm" of soaring energy prices.**

[5]

Fall in supply: Rise in cost of production due to higher fuel prices (Extract 2: Fuel prices have more than doubled; shortages in fossil fuel production triggered by under investment in energy prices & exacerbated by the Ukraine War) **(2m)**

Inelastic PED: Due to high degree of necessity for energy (electricity) as it is used in all production process and for which there are no close substitutes available, demand for electricity is price inelastic. The fall in supply will result in larger increase in prices of electricity relative to the fall in quantity of energy (electricity). **(1m)**

Explain how the rise in fuel prices caused **soaring** energy (electricity) prices via market adjustment process with reference to **diagram** drawn**. [2m]**

Cost of production of electricity increased since fuel is used as a factor input to produce electricity. The increase in cost of production will discourage firms from supplying electricity at each price levels. Thus, supply falls from S0 to S1. At the original price, P0, the occurrence of a shortage will result in upward pressure on prices resulting in rise in price of electricity to P1. Due to a lack of availability of close substitutes to electricity, demand for electricity is price inelastic. The fall in supply will result in larger increase in prices of electricity relative to the fall in quantity of electricity.

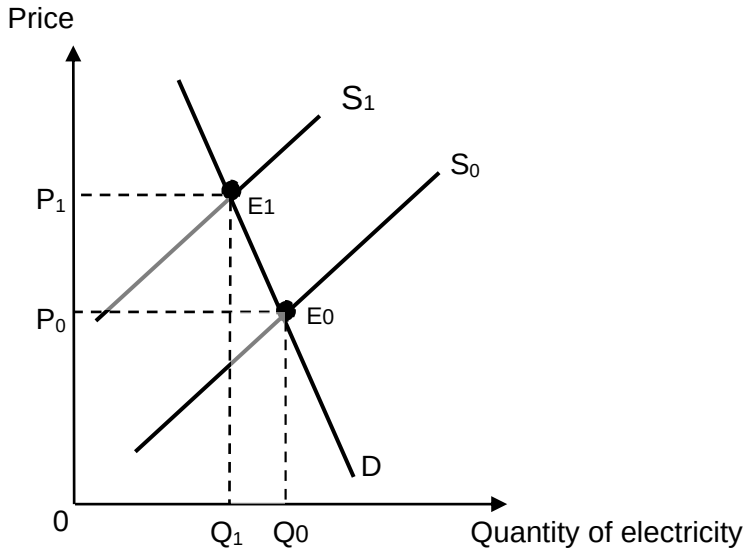


Figure 1

(c) **Explain why some electricity retail firms such as iSwitch, took the decision to shut down in 2022.** **[3]**

The implementation of the Open Electricity Market resulted in the liberalisation of the electricity market, prompting an increased number of firms joining the retail electricity sector. Consequently, this influx of competitors is expected to reduce the demand for firms such as iSwitch leading to a decline in their total revenue.

OR

Rising fossil fuel prices result in elevated production costs, causing electricity retail companies like iSwitch to experience an increase in costs of production.

(1**m for identifying the reason for sub normal profit)**

In the context of electricity retail firms like iSwitch, the total revenue generated from selling electricity may fall below the total variable cost. According to **Extract 2** "Retailers offering **fixed price plan**s are promising to sell electricity at a cheap price and sometimes in large volume – without sufficiently ensuring that they would be able to purchase this electricity at low prices." The evidence suggests that on one hand retailers are forced to keep the price of retail electricity low because of increased competition (**Extract 2**: retailers also had to compete in a saturated Singapore market) but are also incurring higher variable cost when they buy electricity as raw material from wholesale market (because of surging fuel prices **Extract 2**) . Additionally, because of the "fixed price plans" they are unable to increase the retail price of electricity to match the increase in the cost of production. Thus, it becomes more economically sensible for the firm to shut down its operations in the short run. This is because, by shutting down, the company would only incur the total fixed costs (FC) associated with the business. On the other hand, if iSwitch continues to operate and produce, it would need to incur the total fixed costs and part of the total variable costs, which would be greater than just the fixed cost (FC).

In the long run, if the firm consistently finds its revenue still insufficient to offset total costs of production (given that all costs are variable in LR) hence making subnormal profits, it should make the decision to shut down permanently and exit from the market.

(2**m for explaining the shutdown condition either SR or LR)**.

(d) **Discuss whether the Open Electricity Market scheme is the best way to improve consumer welfare in the electricity retail market.** **[8]**

Introduction:

The existence of significant market power and consequent dominance in the electricity retail sector leads to a decline in consumer welfare. Government intervention through initiative like the Open Electricity Market scheme facilitates the liberalisation of the electricity retail sector, contributing to the enhancement of consumer well-being.

Liberalisation involves eliminating the entry barriers to encourage the participation of new players in the market and fostering increased market competition. Consumer welfare is dependent on whether they can get the good at cheaper price , can enjoy more variety , have better quality of products and can maximise consumer surplus.

Thesis: Open Electricity Market scheme in the electricity retail market may improve consumer welfare.

Open Electricity Market scheme leads to the liberalisation of the electricity retail market (Extract 1 para 3), to allow potential electricity retailers to enter and compete with incumbent retailers.

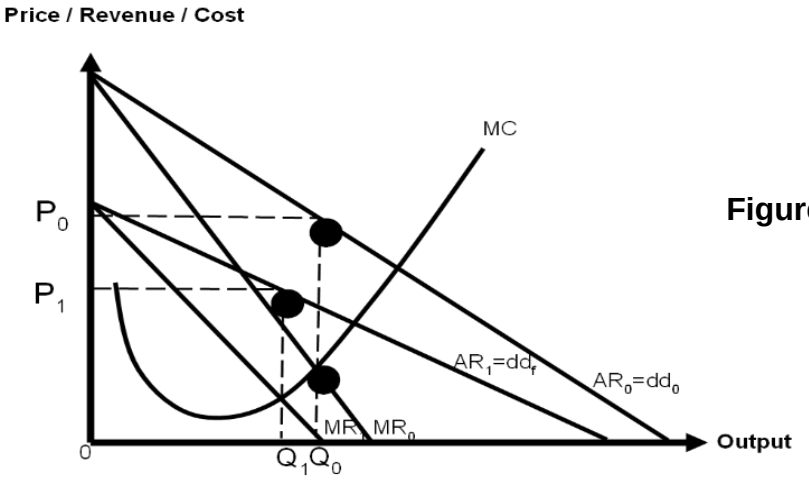


Figure 2

As shown in figure 2, the entry of new electricity retailers will cause the demand for existing firm like SP Services Ltd's electricity services to fall and become relatively price elastic as more substitutes are available, which is illustrated by a leftward shift of a firm's demand curve from AR0 to AR1 reducing the price of electricity improving consumers' welfare. Additionally, they also have more electricity retail firms to choose from, improving their welfare. (**extract 1 para 2**: Consumers will also benefit from competitive pricing and innovative offers while enjoying the same electricity supply). Consumers are also likely to get better services/offers as the firms compete for increasing their market share and tries to attract customers with differentiated products.

Evaluation:

However, as evident from Extract 2, because of Singapore's limited local market size, the point of market saturation is reached due to insufficient market demand to sustain many firms which limits the ability of new firms from enjoying substantial IEOS, especially at the early stage of entry into the market. Simultaneously, new entrants might struggle to effectively compete with established firms like SP Services that potentially possess their own power generation facilities or are supported by in-house power generation enterprises, providing a buffer against volatile supply or cost-related variables. Consequently, these new enterprises find themselves compelled to exit the market (as mentioned in Extract 2, regarding the "departure of iSwitch & Ohm Energy"). Under this circumstance, the continuing dominant firms are empowered to retain significant control over the market and possess the ability to establish prices well above the marginal cost. Thus, consumers will lose out in long run when they are likely to face higher prices set by dominant firms and lose flexibility to choose their preferred firms.

Antithesis: Provide 1 alternative solution to improve consumer welfare

Marginal cost pricing policy: MC pricing can improve consumer's welfare. The government can mandate that all firms in the electricity retail market to employ MC pricing. With MC pricing the firm will have to equate its price to its marginal cost i.e., produce at the output where P=MC. From Figure 3, before intervention the profit maximising monopolist is producing Qe and charging Pe.

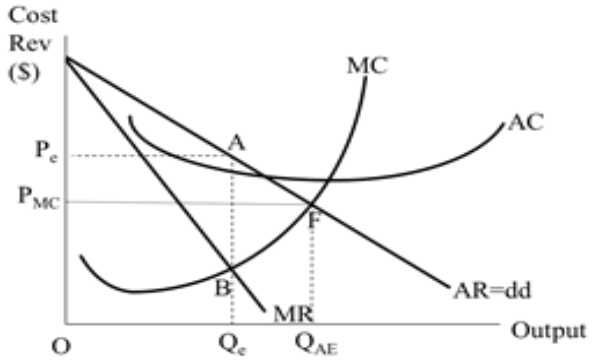


Figure 3

With MC pricing, the firm will produce at the output Q_{AE} where AR=MC. Prices will fall to P_{MC} and quantity will rise to Q_{AE}. At output Q_{AE}, the firm's price, P_{MC}, is equal to the marginal cost of producing Q_{AE}. Thus, consumers benefit by paying lower prices increasing their consumer surplus.

Evaluation: However, since the firm is producing more than its profit maximising output, Qe, profits of the firm would fall. From Figure 3, at output Qe, the firm is still making supernormal profits since AR>AC. However, it is possible that the reduction in supernormal profits may turn to subnormal profits. From figure 3, enforcing MC pricing may result in a monopolist firm earning subnormal profits. At the output Q_{AE}, AC >AR hence the firms will be earning subnormal profits. This will force the firm to shut down in the long run and exit the market (as mentioned in Extract 2, regarding the "departure of iSwitch & Ohm Energy"). Under this circumstance, the continuing dominant firms are empowered to retain significant control over the market and possess the ability to establish prices well above the marginal cost. Thus, consumers will lose out in long run when they are likely to face higher prices set by dominant firms and lose flexibility to choose their preferred firms.

Students can suggest AC pricing as well.

Overall evaluation: In the assessment of whether consumer welfare in the electricity retail market is better achieved through Open Electricity Market scheme or the implementation of marginal/average cost pricing, a comprehensive evaluation is essential, including consideration of the desirability inherent in each approach.

Marginal cost (MC) pricing would be effective in improving consumer welfare if Government has perfect information about the marginal costs for each firm and hence can determine the correct price. However, as firms may not reveal accurate information about their marginal costs since there is incentive for them to overstate their marginal costs (so that firms can charge high prices above their 'actual/true' MC) Government failure may occur. Additionally, MC pricing might not be ideal for firms due to unsustainable subnormal profits. This could lead to exits of firm unless subsidies are provided, potentially straining government budgets.

On the other hand Open Electricity Market scheme can benefit consumers with more pricing options and potential value-added and diverse services like provision of broadband and heating as done in other countries (**Extract 2** Second last Para –" in some other countries, they are known to go beyond electricity to provide anything from energy management solutions to broadband and heating") to differentiate themselves from other firms, leading to improved consumer welfare. However, it may be difficult for the firms to reap significant IEOS to reduce cost of production and pass on cost savings to consumers in the form of lower electricity prices. Also, since the firm now makes lesser profits, it may not be able to engage in product and process innovation through R&D due to the lack of funds.

However, in terms of long term, Open Electricity Market scheme seems more sustainable for improving consumer welfare as it does not need to rely on Govt subsidies. Additionally, potential competition in a liberalised market acts as a check against firms exploiting market power.

Mark Scheme

Knowledge, Understanding, Application and Analysis		
L2	• A **clear** and coherent answer that is **relevant** to the question requirements and context of case study. • Answer covers sufficient **scope** which include the following: • Explains how Open Electricity Market scheme works to improve consumer welfare in the electricity retail market. • Explains how an alternative policy can work to improve consumer welfare in the electricity retail market • Answer is **accurate** and has sufficient **depth**: ○ Detailed and accurate explanation of economic concepts. ○ Economic analysis is applied to the context of the case study and supported by accurately labelled and explained diagrams (market structure framework) and contextual evidence.	4–6
L1	• Question requirements are interpreted inaccurately. • Explanation of economic concepts may be incomplete or inaccurate, with limited application to the question. • Lack of diagrams or diagrams are not accurately explained or applied to support analysis. Limited use of contextual evidence.	1–3
Evaluation		
E	One evaluative point that is well-explained with a clear, overall relevant stand in the conclusion. One evaluative point that is explained.	2 1

(e) Discuss whether the strategies proposed in Extract 3 can reconcile the trade-offs of energy security, energy affordability, and environmental sustainability. **[10]**

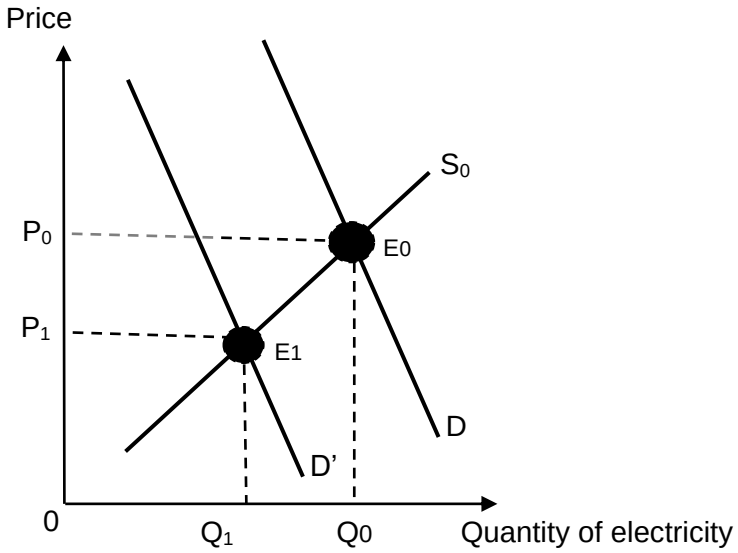
- **Introduction:**
  - Identify the strategies in Ext 3: [**Any 2** that are applicable to the response to analyse the conflict and/or complement to government's objectives]
    - Importing more clean energy into Singapore through regional power grids
    - developing infrastructure suitable for clean-burning hydrogen to be used as a fuel
    - maximising solar panel deployment
    - research into emerging low-carbon technologies, such as nuclear or carbon capture
    - buying international carbon credits to offset emissions from any fossil fuels that have to be burned locally
    - managing energy demand
    - leveraging digital technologies

  - **Identify and explain government's objectives:**
    - Energy security: long term, uninterrupted availability of energy to the country
    - Energy affordability: Availability of energy that is affordable to majority if not all of the population.
    - Environmental sustainability: Ability to protect global ecosystems to conserve natural resources, and support health and wellbeing of current and future generations.

- **Thesis: The strategies can reconcile the trade-off of the objectives:**

  1. 'managing energy demand':

  Through energy saving campaigns and strategies, such as the celebration of Earth Day in Singapore on 22nd of April every year, businesses in Singapore and households are encouraged to switch off the lights from 8.30 pm to 9.30 pm. This serves to promote awareness of energy conservation to protect the Earth. Road shows and exhibitions held in public areas and shopping centers seek to educate people on ways to conserve energy and reduce energy consumption such as the purchase of appliances with good energy saving ratings. This is aimed at reducing the demand for energy.



  The fall in demand for energy, hence electricity (derived demand) from D to D' will create a surplus at P_0. This will lead to a downward pressure on the market price, causing market

price of electricity to fall from P_0 to P_1. Thus, electricity price is reduced, **increasing the affordability of electricity, hence energy.** At the same time, the reduction in equilibrium quantity of electricity due to falling industrial and household energy consumption, reduces energy production and lower carbon emission ensuring greater **environmental sustainability.**

2. 'Importing more clean energy into Singapore through regional power grids'

Importing clean energy from other countries would ensure **energy security** since Singapore has limited options of alternative energy. Importing from other countries also allow Singapore to be less reliant on one single source of energy imported. In addition, importing clean energy also ensures **environmental sustainability** since there will be less carbon emission or pollutants being emitted, protecting the environment and welfare of Singaporeans.

Anti-thesis: The strategies cannot reconcile the trade-off of the objectives:

1. 'import natural gas from other countries':

Importing natural gas from other countries will ensure **energy security** since Singapore lack natural resources for energy generation. By importing natural gas from other countries, Singapore can be assured of a constant supply of natural gas from various countries that ensures long term, uninterrupted availability of energy. **However**, relying on other countries for import of energy can put Singapore at risk of imported inflation when other countries decide to raise the price of natural gas. This will increase the cost of producing electricity thus reducing the supply of electricity. Through the price mechanism, the shortage created will raise the price of electricity **reducing affordability of energy in Singapore.**

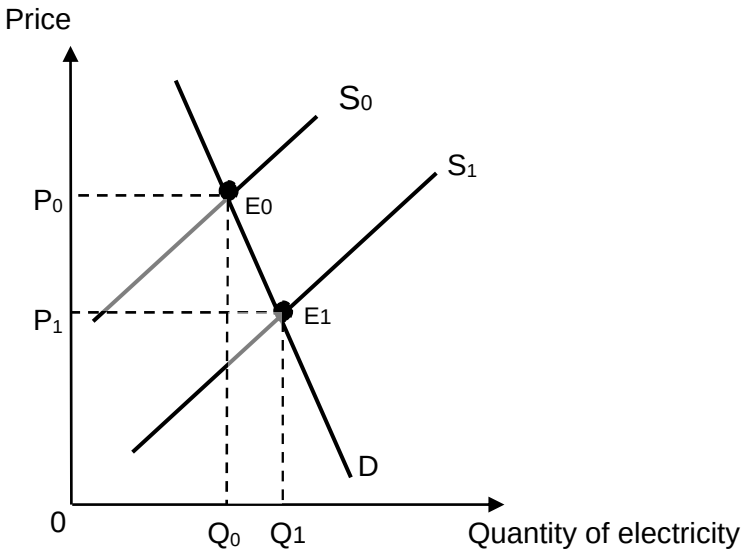
2. 'developing infrastructure suitable for clean-burning hydrogen' & 'maximising solar panel deployment':

The development of infrastructure for clean-burning hydrogen and the deployment of solar panels in Singapore will ensure e**nvironmental sustainability** as Singapore explores the use of clean alternative energy sources that does not pollute the environment. However, such infrastructure and the use of solar panels are expensive to install and maintain. Due to small land space in Singapore, energy production firms are **unable to enjoy substantial internal economies of scale (IEOS)** as mentioned in extract 3. Hence, the cost of infrastructure development and purchase of necessary technologies and solar panels will incur very high costs. The high cost of production will lead to high electricity prices, **reducing energy affordability.**

3. 'leveraging digital technologies':

The use of digital technologies such as digitalisation and the use of artificial intelligence (AI), can enable the optimal operation of energy systems and reduce overall demand for energy by cutting avoidable consumption. This will reduce the demand for energy, via the price mechanism, reduce price of energy to **increase energy affordability.**

On the other hand, use of digital technologies by electricity production firms can improve production efficiency, reducing the cost of production.



The fall in cost of production will increase the supply of electricity from S_0 to S_1. This creates a surplus at P_0, resulting in downward pressure of the market price. The price of electricity will fall from P_0 to P_1, **improving energy affordability** for consumers in Singapore.

However, digitalization and the use of AI require greater energy consumption and greenhouse emission, which conflicts with the objective of **environmental sustainability**.

- **Conclusion: Provide a stand with substantiation**
  Reconciling the government objectives of energy security, energy affordability, and environmental sustainability is very delicate and difficult to achieve. The measures proposed are able to ensure energy security due to the investments in alternative sources of energy to reduce reliance on external sources while seeking to reduce the impacts on the environment. The high costs of investments will derail the government's aim of ensuring affordable energy to Singaporeans. Hence, government subsidies and investments are required to lower the costs of infrastructure development and technologies acquisition to ensure low energy prices in the short run.

Mark Scheme

Level	Knowledge, Application/Understanding, and Analysis	Marks
L2	For a well-developed answer that has: ● **good scope** – Analysis of **3 strategies** that provide **2-sided response** on how the strategies might conflict **and** complement the government's objectives of energy security, energy affordability, and environmental sustainability. Analysis of **2 strategies with 2-sided discussion (L2-5m)**. ● **good rigour** – clear and detailed explanation of conflict or complement of the government's objectives with good use of economic analysis with appropriate use of diagrams; and ● **good application to context** – good use of case materials to support analysis.	5 – 7
L1	For an under-developed answer that: ● lacks scope – did not provide 2-sided response on whether the strategies conflict **or** complement the government's	1 – 4

	objectives of energy security, energy affordability, and environmental sustainability. ● lacks rigour – descriptive explanation of conflict or complement of the government's objectives without adequate use of economic analysis. ● lacks application to context – limited use of case material to support analysis	
E	A well-reasoned judgement on whether the strategies conflict or complement the government's objectives of energy security, energy affordability, and environmental sustainability	1 – 3

Question 2: The US Economy Inflation Challenge

Extract 4: Why is inflation in the US so high?

Prices in the United States (US) jumped at an annual rate of 4.7% last year - faster than any other country in the Group of Seven (G7) advanced economies, according to the Organization for Economic Cooperation and Development (OECD). In the United Kingdom (UK), for example, inflation was just 2.5%.

Last month, inflation in the US hit 8.6%, one of the highest rates in the world.

Many of the forces driving inflation last year - such as supply disruptions from Covid and higher food prices after severe storms and drought hurt harvests - were not unique to the US.

The reason the US fared worse? In two words - high demand.

That was driven by the massive USD$5 trillion in spending, which the US government approved to shield households and businesses from the economic shock of the pandemic and has helped people to keep purchasing goods and services.

Goods like furniture, cars and electronics saw a surge of orders, as shoppers redirected money they might otherwise have spent on restaurants and travel.

And as unusually high demand collided with supply issues stemming from Covid, businesses raised prices.

A recent study by the Federal Reserve Bank of San Francisco concluded that pandemic relief packages probably contributed to 3 percentage points of the rise in inflation until the end of 2021 - a factor that goes a long way to explaining why US inflation outpaced the rest of the world.

Source: BBC, 14 June 2022

Table 2: Government expenditure (% of GDP) and annual average inflation rate (CPI % in the US

Year	Government expenditure (% of GDP)	Average Inflation by Year (CPI) (%)
2019	35.73	1.8
2020	45.3	1.23
2021	42.36	4.7

Source: Macro Trends and International Monetary Fund, 5 August 2023

Extract 5: Soaring used car prices are pushing inflation higher, and there's not much the U.S. can do about it

The Biden administration has blamed much of the rising inflation rates in the country on the used car market. In December, prices consumers paid for goods and services rose 0.5% while used car prices rose 3.5%. The price of used cars is also having a historically high impact on overall headline inflation.

Economist Bernstein wrote that the primary supply-chain hiccup responsible for both used car inflation and its impact on the consumer price index data is a shortage of semiconductors used in the manufacturing of new cars.

The pandemic has changed consumers' demand for cars and forced hundreds of thousands to cancel or postpone travel plans in 2020. That one-time mass cancellation led to unprecedented demand for cars in the spring of 2021.

Source: CNBC, 13 Jan 2022

Extract 6: Fed raises interest rate by 0.75 percentage points as US seeks to rein in inflation

The Federal Reserve announced another sharp hike in interest rates on Wednesday as the central bank struggles to rein in runaway inflation, increasing the cost of everything from credit card debt and mortgages to company financing.

The Fed expects the rate rises to hit housing prices and the job market – raising unemployment from 3.7% to 4.4% next year – and to decrease economic growth.

Source: The Guardian, 21 Sep 2022

Extract 7: US interest rate hikes trample on emerging economies but not all is lost for them

While the global economy is still recovering from the COVID-19 pandemic, central banks in advanced economies are hiking interest rates. This spells double trouble for emerging economies which have borrowed from the US because interest rate hikes will increase their debts. Furthermore, the interest rate hikes in the US is likely to attract short-term investors to invest in the more appealing US market than in the emerging economies, with lower interest rates, thus resulting in massive capital inflows to the US and increased outflows from the emerging economies. This would cause the exchange rate between emerging economies and the US to widen, resulting in debt owed by emerging economies which is denominated by USD to increase even more and become unmanageable.

However, not all is lost for emerging economies, because the rising interest rates in the US benefit foreign trade. The stronger dollar that will accompany the interest rate increase should boost demand for products from the emerging economies, increasing corporate profits for domestic and foreign companies alike.

Source: Adapted from East Asia Forum, 18 August 2022 and Investopedia, 29 July 2023

Table 3: GDP growth rates of selected emerging economies

	2018	2019	2020	2021
Brazil	1.8	1.2	-3.9	4.6
China	6.7	6.0	2.2	8.1
India	6.5	3.7	-6.6	8.7
South Africa	1.5	0.3	-6.3	4.9

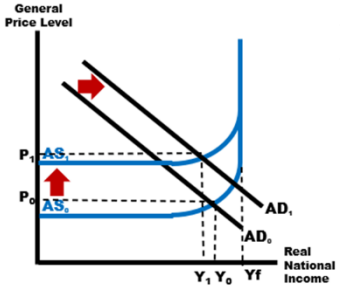
Table 4: Export of Goods and Services (% of GDP) of selected emerging economies

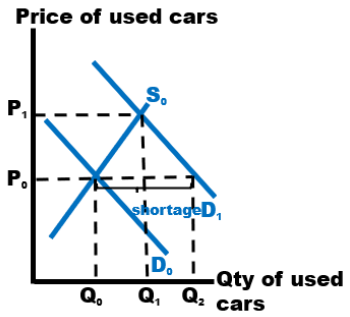
	2018	2019	2020	2021
Brazil	14.6	14.1	16.5	19.6
China	19.1	18.4	18.6	19.9
India	19.9	18.7	18.7	21.5
South Africa	27.6	27.3	27.6	31.2

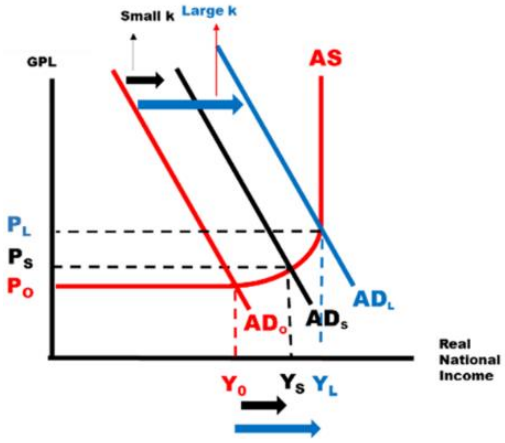
Source of Tables 2 and 3: World Bank, 5 August 2023

Suggested Answers

(a)		Compare the trend between government expenditure (% of GDP) and consumer prices in the US between 2019 and 2021. **Suggested answer outline:** Similarity: Both government expenditure (% of GDP) and consumer prices showed an increasing trend between 2019 and 2021. [1m] Difference: However, as government expenditure showed a decreasing trend between 2020 and 2021, consumers prices was increasing during that period. [1m] OR Government expenditure was increasing more than consumer prices. [1m]	[2]
(b)		Using Extract 4 and an aggregate demand and supply diagram, explain why inflation in the US is so high. **Suggested answer outline:** 1. AD factor [1m] - Increased govt spending e.g. direct cheques to HHs -> increased disposable Y -> increased PP -> **increased C** -> increased AD -> increased GPL. 2. AS factor [1m] - Supply disruptions from Covid -> **increased COP** -> decreased SRAS -> increased GPL. ***Combine increased AD & decreased SRAS to explain why inflation is so high:*** • With the combination of increased AD & decreased SRAS -> large shortage at price P0 -> upward pressure on price -> persistent rise in GPL. Illustrate with AD-AS diagram. [2m]	[4]

		**Note: Max 3 marks for students who explained everything correctly but did not explain price adjustment process.*  	
(c)	(i)	Explain the likely value of cross elasticity of demand between new and used cars. **Suggested answer outline:** New and used cars are considered to be **close substitutes**, i.e. satisfy the same want of driving. [1m] Therefore, XED is **positive** and likely to be **cross elastic**. [1m] **Students who mentioned that used & new cars are weak substitutes and therefore the likely value will be XED < 1 is acceptable and will be awarded full 2 marks.*	(2)
	(ii)	Using a diagram and Extract 5, explain how the "shortage of semiconductors used in the manufacturing of new cars" and the pandemic has caused the price of **used cars** to change. **Suggested answer outline:** ***Market for New cars:*** Shortage of semiconductors -> increased in COP as these are FOPs in the production of new cars -> decreased SS. OR Inability to travel due to pandemic -> diverted consumption meant for travelling to buying new cars -> increased DD for new cars. [1m] Decreased SS OR increased DD -> increased P from P0 to P1 of new cars. [1m] ***Market for Used cars:*** Hence, increased price of new cars -> decreased qty dd for new cars -> increased DD for used cars -> rightwards shift of DD curve from D0 to D1 -> shortage (Q0Q2) at price P0 -> increased price from P0 to P1 of used cars. [2m]	(4)

			
(d)		Discuss the impact of interest rate hike by the Federal Reserve on the emerging economies. **Suggested answer outline:** **Point 1: Positive impacts** ❖ ***Increased economic growth*** As mentioned in extract 7, the interest rate hike in the US will result in increased short-term investors to invest in the US due to greater returns than the emerging economies with lower interest rates. Thus, this would lead to massive capital inflows to the US and hence demand for USD would increase, resulting in the appreciation of the dollar. With the appreciation of USD, exports from emerging economies become cheaper in terms of the stronger USD, which resulted in increased demand for exports from emerging economies (extract 7 & table 4), leading to increased export revenue. Given the depreciation of the emerging economies' currencies, imports become more expensive in terms of the weaker currencies -> decreased qty DD for Ms, assuming that PED for Ms > 1 -> decreased M exp. Increased X revenue & decreased M exp will lead to increased net X, resulting in increased AD in emerging economies. The initial rise in AD, will cause an unplanned fall in the firm's inventory. To maintain their inventory, firms will need to employ more resources such as labour. As more labour are hired, they receive more in wages. The purchasing power of the labour force rises. This leads to a multiple rise in induced consumption. Each subsequent rise in induced consumption will be increasingly smaller. This results in a multiple rightward shift in the AD curve, where AD is rising at a decreasing rate. The overall rise is AD has resulted in a multiple rise in real NY (as evident from table 3, where the GDP growth rates of all the emerging economies showed increasing trend). Please see the figure below.	[8]



- ***Increased employment and material SOL***

Increased GDP growth rates of the emerging economies will lead to increased production of goods and services, resulting in increased demand for labour as it is in derived demand. Hence, employment increases, which results in increased disposable income and purchasing power, leading to increase material SOL of the residents in the emerging economies, as they are able to consume more and better quality goods and services.

Point 2: Negative impacts

- ***Sharp rise in public debt & decreased government spending***

With increase in interest rate, emerging countries who borrow from USA will be charged with a higher cost of borrowing. Hence, for the same amount they borrow, they have to repay more compared to when interest rate is lower. Hence it increases the public debt of the emerging countries.

In addition, with US dollar appreciating and emerging countries depreciating, the emerging countries need to use more domestic currency to exchange for one unit of USD. Hence, “dollar-denominated debt owed by emerging economies increases and becomes unmanageable”.

Given the sharp rise in public debt and hence increased repayments of these debts, the governments of emerging economies might need to engage in austerity measure where they decrease government spending on e.g. infrastructures, which would decrease ‘G’ component of AD. They could also decrease transfer payments, resulting in decreased disposable income and purchasing power, leading to decreased ‘C’. Furthermore, the governments would raise taxes e.g. personal income tax, corporate tax, leading to decreased ‘C’ and ‘I’. Decreases in C, I & G will lead to decreased AD -> decreased RNY, hence causing decreased actual economic growth for the emerging economies.

Decreased RNY -> decreased production of goods & services -> decreased DD for labour as labour is in derived DD -> increased unemployment.
Given the sharp rise in public debt and hence increased repayments of these debts, the governments of emerging economies might decrease government spending on infrastructure such as schools, hospitals, better road connectivity etc… and public health such as water sanitation, waste disposal etc…, which would lower the non-material SOL of the residents in the emerging economies.

Furthermore, given the increased in debt repayments, governments of emerging economies would need to increase taxes to help increase govt revenue to repay the debt, which increases the burden on future generations

given that their disposable incomes and purchasing power will fall, hence resulting in lower material SOL.

Evaluation

Sample 1:

The impact of the interest rate hike by the Federal Reserve on the emerging economies will be largely positive. This is because most emerging economies are trade dependent and given the appreciation of the USD due to increased capital inflow as a result of the interest rate hike, emerging economies will experience increased demand for their exports and hence increased export revenue, since US is a major trading partner of almost all the emerging economies.

Furthermore, the depreciation of the emerging economies' currency as a result of capital outflow due to lower interest rates compared to US, would also lead to increased demand for their exports from countries other than the US (since emerging economies' exports are cheaper in terms of the stronger foreign currencies), hence increasing export revenue. Given the increase in export revenue and decrease in import expenditure as imports are more expensive in terms of the weaker currencies of the emerging economies, net export will increase, resulting in increased AD -> increased RNY. Increase in net X -> BOT surplus.

Sample 2:

The impact of the interest rate hike by the Federal Reserve on the emerging economies will likely be negative. This is because most emerging economies were already borrowing large amount of funds from developed countries such as the US to help fund stimulus programmes to achieve economic growth. The borrowing increased further when the COVID-19 pandemic occurred. Thus, with the interest rate hike by the US, emerging economies will experience a large amount of interest payment on the loans they have with the US and this is exacerbated by the appreciation of the USD. Emerging economies will likely have to reduce government spending and increase taxes to pay back these loans, which is going to decrease RNY (i.e. delaying economic recovery after COVID-19 pandemic), increased unemployment and reduce SOL amongst the residents since they have to pay more taxes and have lesser disposable income to spend on goods and services.

Mark scheme

	Knowledge, Understanding, Application and Analysis	
L2	• Question requirements are interpreted accurately. • Well-developed positive and negative impacts on emerging economies. • Appropriate economic concepts, theories and principles are used. • Economic analysis is accurate, complete and well supported by contextual evidence. • Appropriate diagrams are used to support economic analysis, where relevant.	4 – 6

			4 marks • Well-developed positive OR negative impacts on emerging economies with appropriate economic framework and contextual evidence. **5 marks** • Well-developed positive & negative impacts (1 each) on emerging economies with appropriate economic framework and contextual evidence. **6 marks** • Well-developed positive & negative impacts (at least 3 points in total) on emerging economies with appropriate economic framework and contextual evidence.			
			L1	• Question requirements are interpreted inaccurately, or • Undeveloped positive or negative impacts, or • Positive and negative impacts are given but they are mostly lifted from the extracts without economic analysis. • Inappropriate economic concepts, theories and principles are used. Inaccurate economic analysis. • Inappropriate or wrong diagrams are used.	1 – 3	
			Evaluation			
			E	Evaluative comments are well-explained and supported by economic analysis. Unexplained evaluative comments.	2 1	
(e)		Discuss whether raising interest rates was the most effective way to address inflation in the US. **Suggested answer outline:** **Thesis: Raising i/r was the most effective way to address inflation in the US** ❖ **Increased interest rates - addresses DD-pull inflation** • Explain the type of inflation that USA is experiencing – DD-pull and cost-push inflation. According to extract 1, inflation seemed to be more DD-pull in nature due to large government spending. • Explain how i/r is raised – decreased money SS (increase CRR, increase bank rate) -> increased i/r -> increased COB -> decreased C & I -> decreased AD -> decreased GPL -> addresses DD-pull inflation. ❖ **Appreciation of USD - addresses cost-push inflation** • Interest rate hike in the US will attract short-term investors -> increased 'hot' money inflow into the US -> increased DD for USD -> appreciation			[10]

of USD -> imported FOPs becoming cheaper in terms of the stronger USD -> decreased COP -> increased SRAS -> downwards shift of SRAS curve from AS0 to AS1 -> decreased GPL -> addresses cost-push inflation.

OR

❖ **<u>Appreciation of USD - addresses demand-pull inflation</u>**

- Interest rate hike in the US will attract short-term investors -> increased 'hot' money inflow into the US -> increased DD for USD -> appreciation of USD -> US Xs become more expensive in terms of the weaker foreign currencies -> decreased DD for US Xs (from Us perspective) -> decreased X rev.

- Ms become cheaper in terms of the stronger USD -> increased qty DD for Ms (from US perspective), assuming PED for M > 1 -> increased M exp.

- Decreased X rev & increased M exp -> decreased net X -> decreased AD -> leftwards shift of AD curve -> decreased GPL.

Anti- thesis: Raising i/r was NOT the most effective way to address inflation in the US

❖ ***Explain the limitations of raising i/r***

- Rising unemployment and economic slowdown
- Extract 6 – unemployment is rising and economy is slowing down. Increased i/r -> increased COB -> decreased C & I -> decreased AD -> decreased RNY -> decreased production of goods & services -> decreased DD for L as L is in derived DD -> increased unemployment -> decreased disposable Y -> decreased PP -> decreased material SOL.

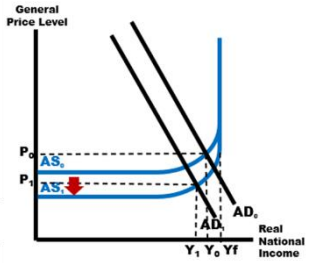
- Appreciation of the USD due to 'hot' money inflow as a result of interest rate hike is not sustainable as 'hot' money is unstable as it could flow to countries with higher interest rates. Thus, when this happens, USD will depreciate and hence imported FOPs become more expensive once again; not resolving cost-push inflation. Furthermore, it does not address the root cause of cost-push inflation, which is due to supply disruptions from Covid and higher food prices after severe storms and drought hurt harvests (extract 4).

- Appreciation of USD will cause US' exports to be more expensive for foreign countries with weaker currencies -> decreased DD for US' exports (from US' perspective) -> decreased X revenue. Given that imports are cheaper in terms of the stronger USD -> increased M exp. Decreased X rev & increased M exp -> decreased net X -> decreased AD -> decreased GPL & RNY. Though DD-pull inflation is addressed as GPL decreases but it is at the expense of decreased RNY.

❖ ***Suggest and explain an alternative policy***

- <u>Option 1: SR SS-side policy – Subsidies to producers</u>
- The US government could provide subsidies to domestic producers to decrease cost of production, which will lead to increased SRAS, resulting in the downwards shift of SRAS curve from AS0 to AS1 and hence decreased GPL from P0 to P1 (see figure below).

- This policy helps to reduce the dependence on other countries for imported goods, hence mitigating the issue of the supply chain disruptions.



- Option 2: Price ceiling
- The US government could implement price ceiling on raw materials. The price ceiling is a legally established price that is placed below the equilibrium price. Thus, cost of production for firms using these raw materials to produce goods and services will decrease, leading to an increase in SRAS, which results in a downwards shift of SRAS curve from AS0 to AS1 and hence decreased GPL from P0 to P1.

- Option 3: Establish more FTAs
- In a free trade agreement, countries agree to lower their tariffs or other barriers to facilitate more exchanges with their trading partners. This allows all countries to benefit from lower prices and access to one another's resources. Hence, the US government could establish more FTAs, which would help to lower the cost of imported final goods and FOPs as they would not be subjected to tariffs. This would help to reduce cost-push inflation in the US.

- Option 4: LRAS policies, e.g: R&D on alternative food options/ etc
- The US government could invest in R&D to develop alternative food sources which do not depend on weather conditions, hence reducing the issue of price spikes due to unfavorable weather conditions; resulting in cost-push inflation.

Evaluation

- Given that the inflation faced in the US is mainly caused by large government spending in the form of transfer payments, raising interest rates might not be the most effective way to address inflation in the economy as it is caused by an internal policy decision. Instead, the US government should reduce the amount of transfer payments given to the households and focus on SS-side policies to help address cost-push inflation caused by supply chain disruptions and bad weather.

- Furthermore, we assumed that raising the interest rates would decrease C & I -> decreased AD -> decreased GPL and hence addressing DD-pull inflation. However, C & I might be interest rate inelastic due to e.g. confidence that consumers and investors have in the US economy, thus increased i/r -> less than proportionate fall in C & I -> AD decreased by a small extent which might not be sufficient to lower the GPL sufficiently to address DD-pull inflation.

Mark scheme

Knowledge, Understanding, Application and Analysis		
L2	• Question requirements are interpreted accurately. • Balanced discussion of:	5 – 7

				- Thesis: Explain why raising interest rates is the most effective way to address inflation in the US (with specific mention of the type of inflation that US is experiencing). - Anti-thesis: Explain the limitations of raising interest rates in addressing inflation in the US (with specific mention of the type of inflation that US is experiencing) and an alternative policy in addressing inflation in the US. • Appropriate economic concepts, theories and principles are used. Economic analysis is accurate, complete and well supported by contextual evidence. • Appropriate diagrams are used to support economic analysis, where relevant.			
				5 marks • Well-developed one-sided analysis with the use of appropriate economic concepts, theories, principles and well supported by contextual evidence – max 5 marks.			
			L1	• Question requirements are interpreted inaccurately, or • Undeveloped one-sided answer, or • A balanced answer given but lacked economic analysis • Inappropriate economic concepts, theories and principles are used. Inaccurate economic analysis. • Inappropriate or wrong diagrams are used.	1 – 4		
				Evaluation			
			E	Evaluative comments are well-explained and supported by economic analysis. Unexplained evaluative comments.	2 – 3 1		