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93401



934010

Draw a cross through the box (☒)
if you have NOT written in this booklet



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OUTSTANDING SCHOLARSHIP EXEMPLAR



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Scholarship 2023 Geography

Time allowed: Three hours
Total score: 24

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

Pull out Resource Booklet 93401R from the centre of this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–24 in the correct order and that none of these pages is blank.

Do not write in any cross-hatched area (AREA TO BE
DO NOT WRITE). This area may be cut off when the booklet is marked.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE
END OF THE EXAMINATION.**

INSTRUCTIONS

The materials in the resource booklet will enable you to become familiar with the theme and contexts of this examination: **energy in a global context**.

Information to answer any question can be taken from any resource.

Your answers to ALL three questions must include:

- specific information from the resource booklet
- knowledge and insight you have gained from your studies in geography
- relevant original and/or effective visuals, such as maps, graphs, and diagrams.

Space for planning has been provided on pages 4, 10, and 16 to help you prepare your responses. The questions on page 3 are repeated on their respective planning pages.

QUESTION ONE

Perspectives are bodies of thought, theories, or world views that shape people's values.

Critically evaluate through perspectives the use and production of fossil fuels compared to alternative forms of energy.

Use page 4 to plan your ideas, and begin your answer on page 5.

QUESTION TWO

How significant is geographic location in influencing the geopolitics of global energy? Discuss.

Use page 10 to plan your ideas, and begin your answer on page 11.

QUESTION THREE

The United Nations has stated that the energy sector is the source of around three-quarters of greenhouse gas emissions. Its Paris Agreement goals state that emissions need to be reduced by 45% by 2030 and reach net zero by 2050.

Discuss the likelihood of these goals being met across the globe.

Use page 16 to plan your ideas, and begin your answer on page 17.

QUESTION ONE

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PLANNING

Diagram

- ↓
- ① All perspectives.
 ② Pro vs Con fossil fuel

environmental Pg 10 & 11 global warming ↳ SDG (concrete)	geopolitical Pg 8 <u>OPEC</u> renewable gives security	economic
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negative { Pg 6,
Asia: 0.7mi
2.8 mi

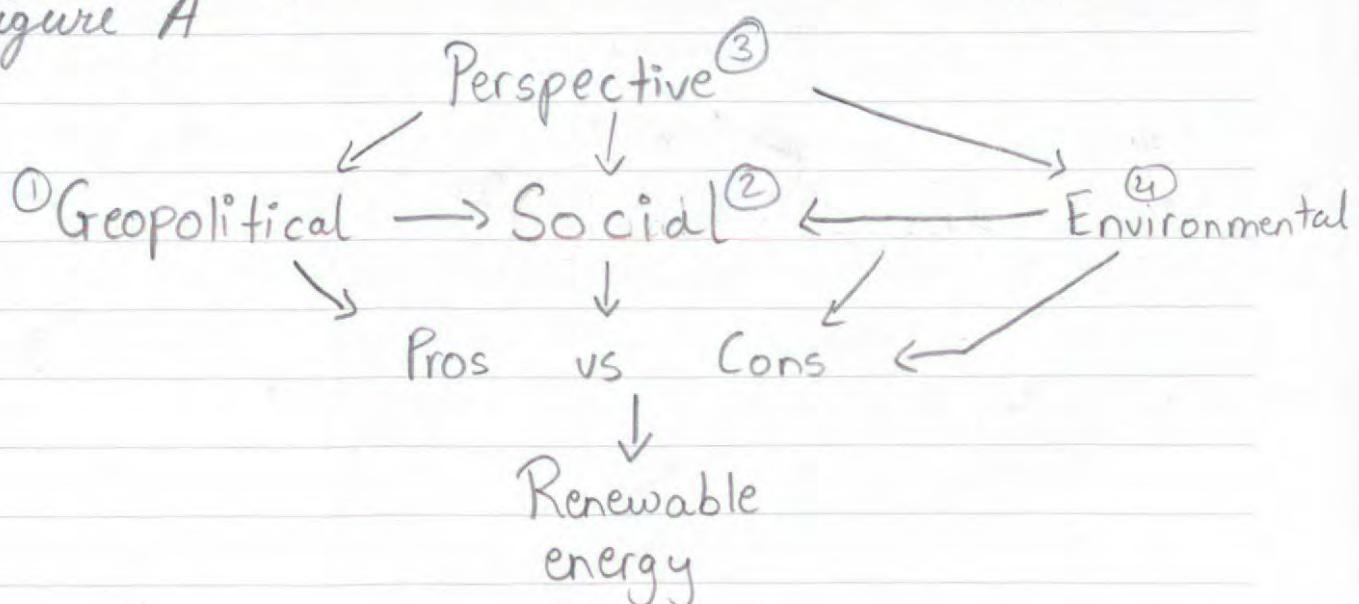
+ve { Pg 7 2nd
graph
↓
Part review
better

hydro power
better

Begin your answer to **Question One** here:

Fossil fuels have been used as the primary energy source in the world for centuries ~~and so~~ are at the centre of ^{many} economies. However, with the increasing risk of global warming and climate change as a result of fossil fuels, there needs to be a global energy transition towards renewable resources. While these resources may help the climate crisis ~~their~~ implementation is ~~a~~ not a easy process. They also have other positive and negative impacts. ~~on the~~ By ~~strong,~~ ~~viewing~~ weighing the pros and cons of both fossil fuel and renewable energy through social, geopolitical, ~~etc~~, and environmental perspective presents renewable energy ~~in particular~~ ~~perspective~~ ~~first~~ as arguably the ~~best~~ ^{better} option for an alternate to fossil fuel. However, there is no single form of renewable energy that is suitable over the others. A combination of them needs to be employed to have the desired effect.

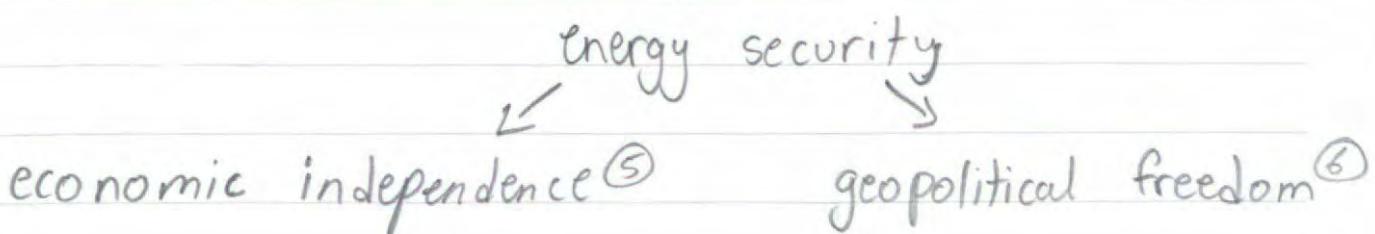
Figure A



Firstly, the geopolitical perspective (as indicated by ① in Figure A) reveals the ~~and~~ advantages of fossil fuel to countries who have access to them. Because these countries control the supply of fossil fuels which continue to remain in high demand, they can adjust supply to purposely increase prices of fossil fuels to maximise their profits or serve their political agenda. For example, the Organisation of petroleum exporting countries (OPEC) consists of 13 member states who control 80% of global oil reserves and are responsible for 60% of global oil export. This provides these countries with great power in the international market over countries who heavily rely on fossil fuel for energy. For instance, in 1973 OPEC put an embargo on USA and other countries who sympathised and supported Israel in a war against their fellow arab country. Since USA in 1973 was heavily reliant on oil with limited alternatives the price of oil ~~in~~ quadrupled ^{within} 3 months. This reveals how countries who have fossil fuels can use it ~~as a~~ to influence international politics to favour themselves. In contrast, for the countries who do not have such access to fossil fuel, ~~it~~ it is a renewable energy which provides ^{it} ^{with} energy security ~~to its~~. Figure B reveals the positives of this security.

Figure B

Renewable energy

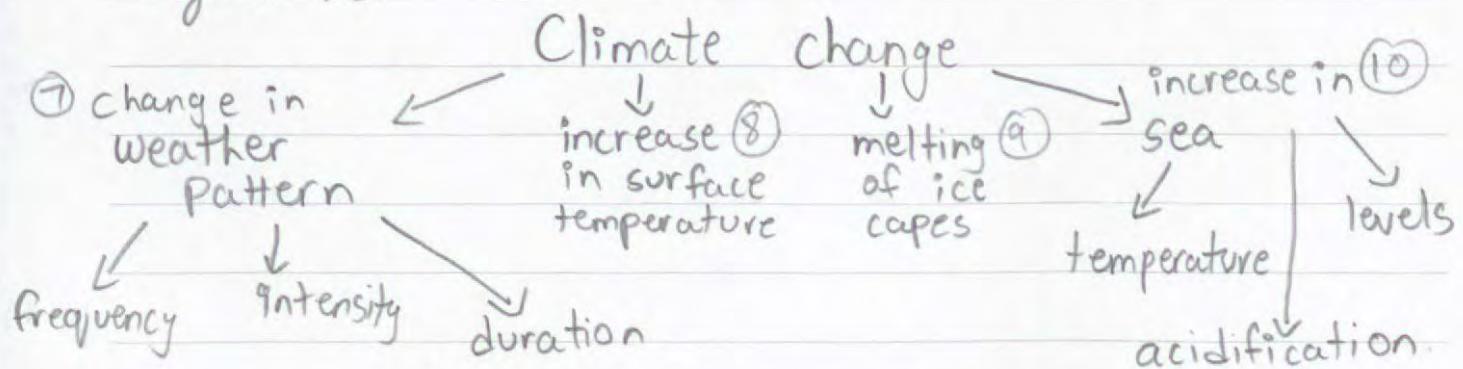


* since resources such as sun or wind cannot be controlled by a set of countries. However, renewable energy does not just have positives when viewed from a geopolitical perspective. For In China 2 months of drought in 2022 plunged them into energy security crisis as they had placed a rash control on domestic coal production to promote renewable energy. But China's high energy demand was unable to be met by renewable energy especially through hydropower due to drought causing water levels to fall. This inability of renewable energy to have short term benefits further hurts its argument in the geopolitical perspective as politicians "tend to focus on policies with immediate benefits." Therefore while so, while renewable energy can provide long term economic independence ⑤ and freedom ⑥, in the short term it's ability to give security is limited. Despite this the benefits of renewable energy's security in the political landscape is far greater than short term security provided by fossil fuels as it never truly provides the country with

political freedom. Therefore, arguably renewable energy has greater benefits from a geopolitical perspective.

Shifting to onto the ~~social perspective~~^{environmental perspective} environmental perspective which presents the greatest drawbacks of fossil fuels. Fossil fuels are responsible for around 37 billions tons of CO₂ being emitted into the atmosphere annually. This increase in heat trapping CO₂ concentration traps more heat in the Earth's atmosphere leading to global warming, which is the annual rise in average temperature of the Earth's surface due to GHG greenhouse gas (GHG) emissions. Furthermore, fossil fuel emissions are also linked to climate change which is broken down into 4 primary categories as shown in Figure C.

Figure C.



Global warming due to CO₂ emission by fossil fuel leads to ⑧ and ⑨ and rise in sea levels in figure C and ⑨ leads

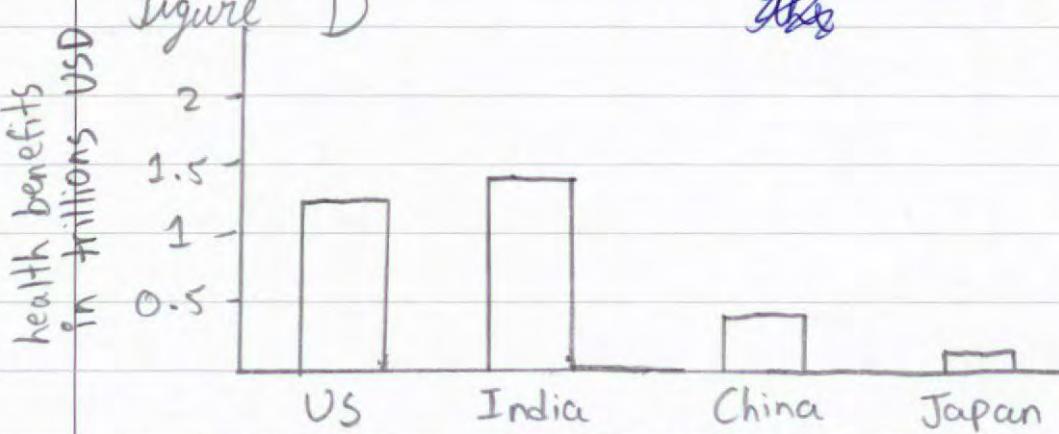
to increase in sea levels. Burning of fossil fuels releases gases like H_2SO_4 which cause acid rain and acidification of sea. All this reveals how fossil fuels ~~can~~ affect climate change and have a negative impact on environment. This presents renewable energy such as wind and solar energy as better sources because it uses energy from the environment and does not emit harmful CO_2 gas. ~~For~~ For solar power the land use ranges from 3.5 to 16.5 acres per megawatt and individual house solar panels have very limited land use. Similarly wind energy generates between 30-141 acres per megawatt and notably windmills can be built ~~on~~ on the outskirts near farmland without disrupting farming activity. This limited land use prevents deforestation and habitat destruction which ~~has~~ allows for more trees to absorb CO_2 out of atmosphere instead of emit into it. Therefore, ~~a~~ renewable energy is presented as a superior alternative to fossil fuel due to reduced environmental impact.

Ultimately, these geopolitical and environmental benefits also have benefits on humanity when viewed from a social perspective. (2) Fossil fuel electricity has an estimated \$886.5 billion a year ~~on~~ health impact on US alone.

Extra space if required.
Write the question number(s) if applicable.

- 1) The American Lung association suggests that transition to renewable energy would lead lead to health benefits of \$1.2 trillion by 2050 in USA. Similarly, in Asia the decrease in death due to air pollution caused by fossil fuel would lead to \$2.8 trillion health benefits. Figure D reveals

Figure D



the health benefits of several countries by transitioning to low carbon power. Thus, the reduction in GHG emissions and pollution by reducing fossil fuel burning has significant social impact by saving human lives.

Overall, the analysis of fossil fuels and renewable energy through geopolitical, environmental and social perspective presents renewable energy as a better alternative to the negative externalities of fossil fuels.

QUESTION TWO

How significant is geographic location in influencing the geopolitics of global energy? Discuss.

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Your answers to ALL three questions must include:

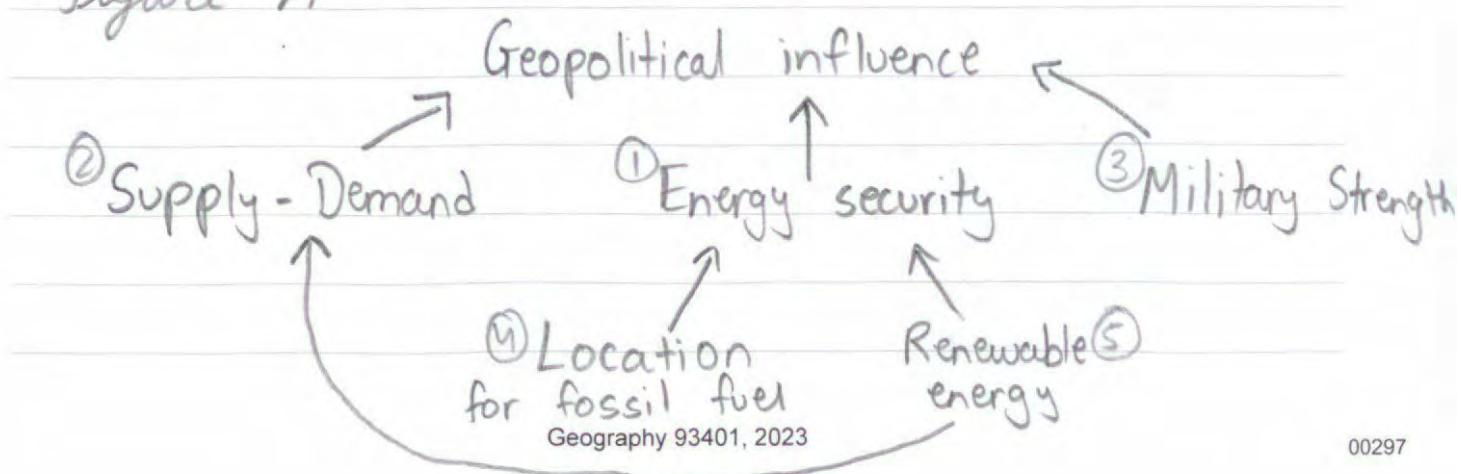
- specific information from the resource booklet
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PLANNING

Begin your answer to **Question Two** here:

Notably, the ~~s~~ The countries which often has greater access to resources have greater influence in ^{the} geopolitical landscape. Indeed, as ~~the~~ the ~~reliance~~ traditional reliance of various countries on fossil fuels, has meant that countries whose geographical location provides them ~~is~~ with plenty of natural fossil fuel and so they can use these fuels ~~as~~ ~~more~~ to heavily influence other countries by whose geographic location does not provide them with fossil fuels. This ~~influences~~ The level of influence these countries have is determined by ~~the~~ ~~as~~ ~~these~~ three factors: supply-demand, energy security and military strength. Ultimately if ~~a~~ country has most of these ~~it~~ ~~in its~~ ~~favor~~ Energy security is heavily (but not solely) influenced by geographic location, while the other two factors are ~~not~~ not influenced by location. Thus, the argument is presented that geographic location has ~~not~~ influence on geopolitics of global energy.

Figure A



As shown in Figure A ~~for~~ energy security ① which refers to how much of the energy consumed within the country is in its complete control is influenced by 2 two factors ② and ⑤. Location of a country plays a large part in the access it ^{export} has to fossil fuels which it can ~~import~~ to other countries. Russia is the world's 3rd largest oil producer, 6th largest coal producer ~~and~~ in 2020 all because of its location and size. This means that as Russia exports ~~the~~ this source of energy they can force ~~the~~ the other countries whom they export to, to comply with their ideology and actions or lose access to Russian oil ~~and~~ and coal. In countries who are heavily reliant on ~~such~~ Russia its restrictions on oil exports because these countries have denounced Russian invasion of Ukraine and placed embargo on them, gas prices ~~have jumped by as to~~ has peaked increased as high as by 565%. * This reliance ~~on these~~ other countries however, can be reduced by ~~introduction~~ enhancing the renewable energy, which also affects supply demand ②. Therefore, ~~as~~ the geographic location does have a significant impact on a country's ability to influence geopolitics of global energy by ~~withholding~~ withholding resources.

However, the ~~extraction~~ enhancement of renewable energy not only ~~increases~~ increases a country's ① but also affects ② on a global market. The increase ~~is~~ of renewable energy in the energy mix would lead to less reliance on fossil fuel ~~by~~ of countries like Taiwan who get ~~their~~ their energy 97.7% by fossil whose energy mix contains 97.7% fossil fuel. Increasing renewable energy production also means that the country has less demand for fossil fuels produced by other countries which not only increase its own energy security and economic independence but also reduce the fossil fuel producing country's influence in global politics. This reveals how fossil fuel reduces renewable energy reduces which is independent of geographic location & affects energy security and supply-demand, two factors which affect geopolitics of global energy.

Furthermore, OPEC which has 80% of global oil reserves and is responsible for 60% of global oil exports, in a time like 20th century where countries lacked renewable ~~the~~ energy and relied on oil has great geopolitical ~~is~~ influence. In 1973 Arab-Israeli conflict OPEC placed embargo

on USA for supporting Israel causing oil prices to quadruple in 3 months in USA.

Overall, geographic location has little importance on geopolitical influence influence on global energy due to renewable resources.

QUESTION THREE

The United Nations has stated that the energy sector is the source of around three-quarters of greenhouse gas emissions. Its Paris Agreement goals state that emissions need to be reduced by 45% by 2030 and reach net zero by 2050.

Discuss the likelihood of these goals being met across the globe.

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PLANNING

raises
(hope)

Emissions & Net zero
define

more
renewable
↓
harnessing
wind

Still need
to harness
solar
pg 22

While
steps
are
taken
Pg 21
graph

countries
back on
track.

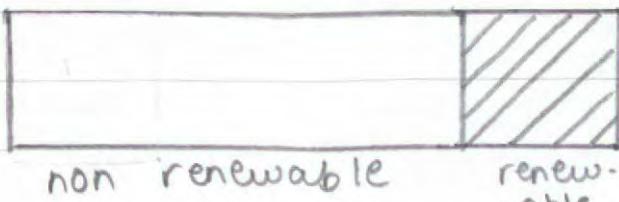
↑
shows
fail
&
Saudi

more
renewable
↓
harnessing
wind

Begin your answer to **Question Three** here:

~~While the~~ The Paris Agreement set ambitious long term goals ~~on~~ of reducing emissions by 45% ~~and~~ by 2030 ~~and~~ reaching net zero~~es~~ by 2050. Net zero^(zero) refers to the mitigation of any GHG emissions into atmosphere due to human activity by reducing and capturing these emissions. While the initial steps taken by many countries, especially the ones who have ~~the~~ a large quickly growing urban population, raise hope that these ~~set~~ goals can be met. ~~The ultimate bleak conclusion re~~ However, the actions of certain other countries ~~and~~ ~~as~~ before negate these changes. This provides a bleak conclusion that the goals set in the agreement cannot be met across the globe.

Firstly, the ^{energy} transition of countries towards renewable sources raises hope that GHG emissions may be reduced allowing for the globe to reach the net zero aim by 2050. Figure A reveals the ~~distribution~~^{split} of ^{energy} electricity consumed by the EU generated by renewable and non renewable sources in 2018. As the figure reveals 32% of the electricity consumed in EU is generated by renewable energy.



Source	Percentage
non renewable	68%
renewable	32%

This indicates the shift in both production and consumption that has taken place as the countries are attempting to reduce their GHG emissions by reducing electricity produced by renewable sources and the consumer are becoming more conscious and ~~choosing for~~ ~~consu~~ are choosing ~~renewable~~ consuming renewable alternatives.

* While, the steps taken by EU are significantly ~~an important~~ those steps will have minimal impact due to two reasons. Firstly the

Another Furthermore, another reason the hope of reaching the goal of the agreement ^{globally} is increased is, the countries who initially appeared off course ~~to~~ are not back on track to meet their requirements for the goal. In the agreement Canada set a goal of reducing their ~~net~~ emissions to 40-45% which is in line with the global goal of 45% by 2030. However, by year 2010 it failed to reach its ~~target~~ target for the year which would have left them on path to reach 45% by 2030, ~~by~~ by a mammoth 22%. However, Canada similar

* Thus, this shift towards energy transition away from fossil fuel in producing electricity will evidently reduce GHG emissions contributing to the net zero goal of the Paris agreement

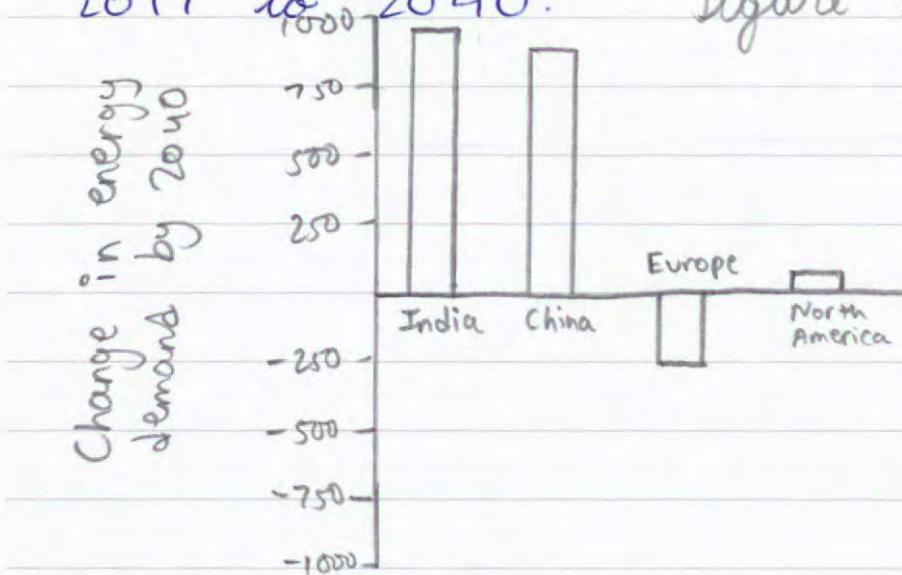
to the EU, has taken steps to reach its goal. Firstly, the government has introduced a carbon tax. Carbon tax spreads the burden across the entire economy as it forces customers to pay more for products which emit GHG into atmosphere. This, as a result, causes the demand for these goods and services to drop forcing producers to find alternative ways to renewable methods to produce goods. This allows for the industry to remain profitable. This allows for voluntary transition of industry away from GHG emitting fossil fuel. ~~This~~

Secondly, Canada has spent \$15 billion to pass Canada's 2030 GHG emission reduction targets. All this has resulted in Canada being back on path to its 2030 Paris Agreement target of 45% GHG emissions. Thus, the return of countries like Canada who are back on track to reach their goals raises hope that the 2030 Paris agreement goals can be met.

While steps taken by these countries (like Canada and EU) is important, their contributions will have minimal impact due to ~~the~~ two reasons: 1) the declining or just slightly increasing energy demands; 2) the ~~rise~~ far greater energy demands of Asian ~~countries~~ and African countries. Asia, in particular China and India has the highest growing energy demands in the world.

due to its increasing urban population.

Figure B reveals the significant gaps in change in energy demands between different regions from 2019 to 2040. Figure B



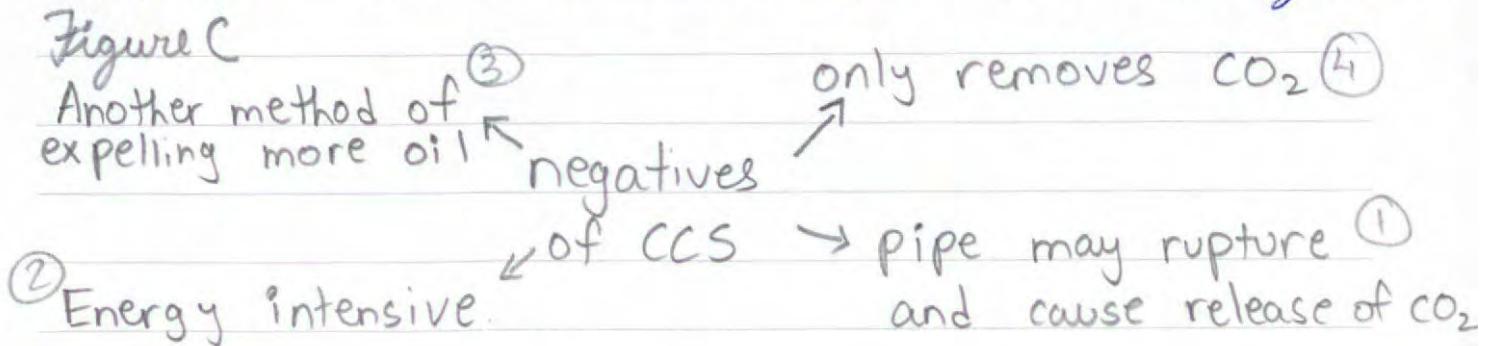
As Figure B present, the EU's energy demand is going to decline by -256 Gt while N. America's

energy demand only increases by 70 Gt pa compared to India's $+982\text{ Gt}$ and China's $+807\text{ Gt}$. This makes it crucial for India and China to employ the necessary steps in order to ensure meeting $\frac{1}{2}$ of the net zero goal by 2050. Indeed, India and China are taking steps towards ~~achieve~~ to transition towards low carbon power. China ranks first in both energy produced by electricity produced by solar and wind power with 178TWh and 366TWh respectively. And India ranks fifth in both of these categories with 31TWh for solar and 55TWh for wind in 2018. Clearly, both of these countries who have the highest growing energy demand are shifting towards renewable sources to further raising hope of reaching the net zero by

~~2050~~ claim goal set in the agreement.

However, the reason why the goal cannot be met globally is because some countries are negating the positive impacts implemented by these countries. For example, Saudi Arabia is a country which forecasts to make around \$150 billion annually from oil exports and so ~~will~~ will not have a desire to ~~switch~~^{shift} to renewable sources and will continue the use of oil as fuel energy source. Saudi Arabia claims that they have implemented the carbon capture and storage system (hereafter CCS) to ensure they meet their ~~good target~~ target to achieve ~~their~~ the goal. However, there are significant drawbacks to the CCS which arguably increase GHG emissions, as shown in Figure C.

Figure C

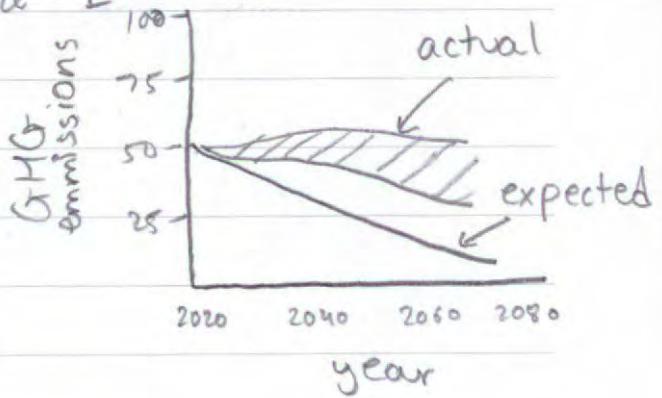


As indicated in ~~the~~ According to the Figure C, the CCS is very energy intensive ~~as~~ ^② as it requires removing 1 billion tons of CO₂ requires the electrical output of the entire USA. Further, the injecting of CO₂ into wells for storage in

Extra space if required.
Write the question number(s) if applicable.

3) wells in fact expels more oil out of them ③ increasing fossil fuel in economy. This combined by Saudi's carbon. This, thus Therefore, the inability of countries like Saudi Arabia ~~reduce the~~ to eliminate the ability of the globe from reaching the goal set in the agreement. The Saudi Arabia causes this decrease. This reason is therefore, this reason is why the current GHG emissions and the expected ones to reach the Paris agreement goal have such a gap as revealed in Figure E.

Figure E



Overall, while the steps taken by EU, countries getting countries like Canada back on track and countries with large energy demand changes transitioning to renewable sources raises hope of meeting the goal, countries like Saudi Arabia negate these changes and prevent this goal from being reached. of net zero by 2050 and reduction in emission by 45% by 2030

**Extra space if required.
Write the question number(s) if applicable.**

QUESTION
NUMBER

93401

Outstanding Scholarship

Subject: Geography

Standard: 93401

Total score: 21

Q	Score	Marker commentary
1	07	The candidate demonstrated a sophisticated and critical evaluation through the consideration of perspectives. Depth of evaluation is evident when comparing fossil fuels to alternative forms of energy. Very effective creation and use of original diagrams support the argument. Excellent reflection and extrapolation of evidence from the 'whole' resource booklet. Convincing communication through a well-structured, logical essay. An insightful response.
2	06	This is the weaker of the three answers. The candidate demonstrated the ability to discuss both sides of the argument. The response was set up well, yet lacked the depth and breadth to reach the Outstanding Scholarship level in this question. Synthesis of resource material and the application of developed knowledge was evident. The candidate demonstrated critical thinking.
3	08	The candidate created an insightful and perceptive, well-balanced argument. The response demonstrates clarity of ideas through logical development. The integration and abstraction of a wide range of information is effective (both from the resource booklet and own knowledge). The discussion on the likelihood of the goals being met is fluent. This response has both depth and breadth. The four diagrams enhance the answer. An outstanding response.