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

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TOP SCHOLAR



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 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.

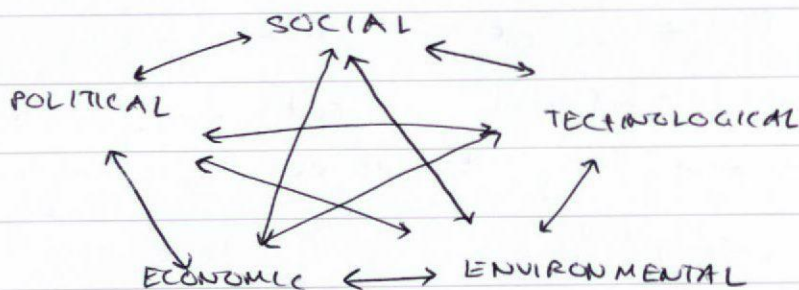
Discuss the likelihood of these goals being met across the globe.

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

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

Currently, according to Fig. 2 on pg. 5 of the resource booklet (RB onwards), the majority of historical and current global energy consumption has been of fossil fuels—namely coal, crude oil and natural gas. Yet, with non-renewables expected to run-out in 90-120 years, there is a need to transition to alternative forms of energy. This essay will evaluate such a transition from fossil fuels to alternative forms through the following key perspectives: social, ^{technological} ~~pathological~~, environmental, economic and political. However, it is necessary to concede that these ~~Firstly, from a social perspective,~~ perspectives are all interlinked, and one cannot be truly understood separately, as shown in Figure A:

Figure A:



Firstly, from a social perspective, we can look at the health impacts of fossil fuels, which in the US alone are estimated to be \$886.5 billion per year (pg 6 RB). The American Lung Association claims the total benefit of a transition away from fossil fuels could total to \$1.2 trillion by 2050. When we translate these numbers to words, we can understand that there will be fewer cases of disease and cancer due to respiratory

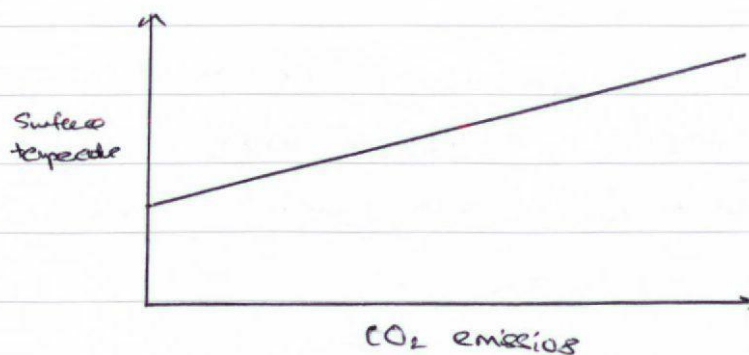
illnesses induced by fossil-fuels. Moreover, it is notable to point out that these figures are in the US; we are likely to see exponential increases in LEDCs, where more energy is produced via fossil fuels and where public health systems are not as strong. Moreover, from a social perspective there are interesting niches which are notable. For instance particularly in LEDCs, women are 1.5 times more likely to die from air pollution; hence, by aiding some of this, a small part can be ~~part~~ done to alleviate inequalities in that sense. Furthermore, in the UN's SDGs (Sustainable Development Goals), a transition to alternate forms would work to achieve SDG 7 (Affordable and Clean Energy). However, as always, every perspective has lenses in favour and lenses against. In opposition to the transition from fossil fuels, there is increased fuel reliability for the people and fewer power outages. Furthermore there could be significant job cuts, which could lead to detriment to particularly ~~less~~ lower socio-economic communities.

From a technological perspective, ~~one has to~~ ^{once again} there are views in favour and in opposition of a transition from fossil fuels to alternate renewable forms. Firstly, there already is solid infrastructure for fossil fuels, and comparatively alternate forms of energy are still in their infancy stages. Furthermore, energy storage is a significant issue for alternate renewable forms. There is a great deal of variability in weather events, which means to make alternate forms reliable, a large amount of energy needs to be able to be stored. However,

there are huge shortages of resources and components which are required to make these energy storage devices. Furthermore, often alternate forms of energy such as hydro dams and geothermal spots are location-specific and also come with a significant distance to the grid, posing additional challenges. However, for all these documents, one must concede the opposite can always occur too. For instance, on page 9 of the RB, Hurricane Sandy is said to have damaged fossil fuel-dominated electric generation, whilst renewable energy projects were left with minimal ~~large~~ damage.

From an environmental perspective, and arguably the most significant perspective, given that we are ~~at~~ facing a climate crisis with respect to climate change and about to reach a 'tipping point'. Energy-production through fossil fuels is estimated to be responsible for upwards of $\frac{2}{3}$ of contributions to GHG (greenhouse gases). This leads to the Greenhouse Effect, where these gases trap the Sun's heat energy in the atmosphere leading to global surface temperatures rising, as shown in Fig B:

Figure B:

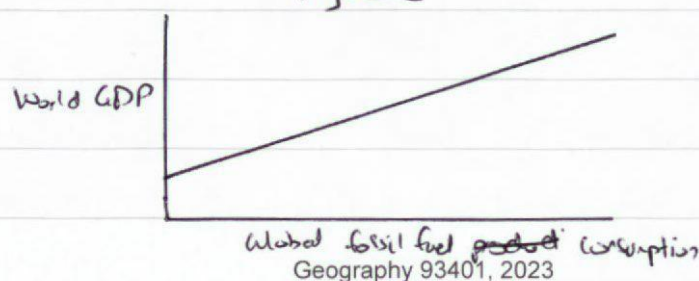


The rising temperatures can have cumulative and unforeseen consequences on the environment, leading to

extinctions of species, which cannot adapt fast enough, ~~and~~ amongst a myriad others. Furthermore, fossil fuels — particularly oil and gas — are running low in easily-accessible supplies. As a result, oil companies have undertaken hydraulic fracking to extract more resources. However, this leads to earthquakes and water contamination, as well as using 60 million gallons of water per oil well. ~~In addition to this, fossil fuels lead to~~ Comparatively, alternate forms have effects on the environment, which are less severe, but still problematic. Although, they do not release CO_2 , they can still significantly affect environments. For instance, hydro dams significantly alter the ecosystems of rivers leading to massive losses in biodiversity; they also lead to flooding. For instance, at the Three Gorges Dam in China, communities were relocated to make way for floodgates and reservoirs. Moreover, wind power can lead to noise pollution and can harm wildlife such as birds. However, ultimately, both solar and wind power do not produce toxic products and are thus environmentally favourable.

From an economic perspective, we must appreciate the fact that increases in world GDP is significantly tied to global fossil fuel consumption, as shown in Figure C:

Figure C



Fossil fuels have enabled the likes of the industrial revolution, which has enabled us to thrive economically. However, with this, there rises a significant inequality between MEDCs and LEDCs. ~~For instance, as~~ There is a ^{positive} ~~an~~ ^(FF) relationship between economic development and fossil fuel consumption. The poorest countries in the world use the least energy whilst the richest ~~and~~ ^{and} use more FFs per capita. ~~Further~~ In fact, 1.1 billion people are without electricity and 3 billion still burn solid fuels, such as wood and animal dung. Hence, a transition to renewable forms, with transparency and subsidies might see economic ~~and~~ inequalities reduced.

Finally, from a political perspective, fossil fuels are tied with economic dependence. A few countries and companies control fossil fuels, hence ~~the~~ being able to influence political decision-making through agreements and lobbying. ~~As a result~~ ~~Further~~ Here, shifting to renewable alternative forms could work to alleviate dependence. Also, however, a transition to renewables, is politically very challenging, as in most countries, parties are in power for a short number of years in a term, and thus need to focus on short-term issues rather than long-term changes such as the transition to renewable energy.

Overall, thus, we can see how the transition and comparison between FFs and alternative forms can be visualised through a variety of diverse perspectives.

QUESTION TWO

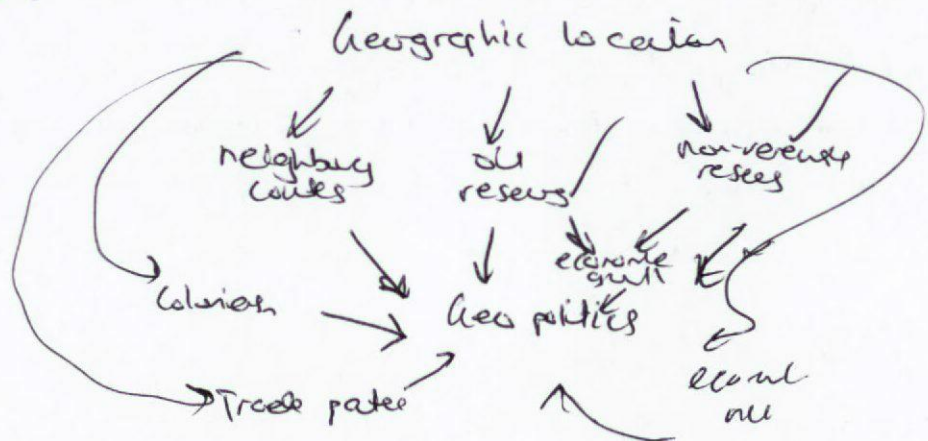
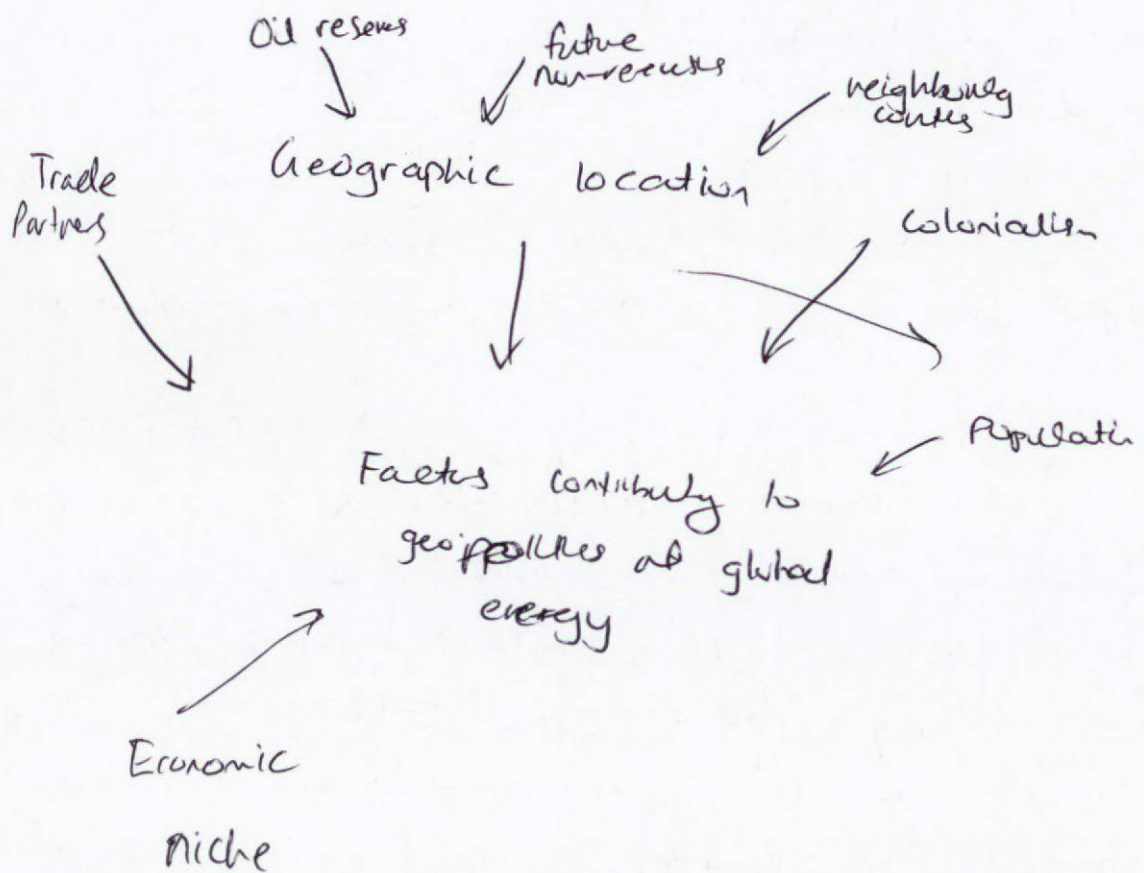
How significant is geographic location in influencing the geopolitics of global energy? Discuss.

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PLANNING



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

There are a myriad of factors that contribute to the geopolitics of global energy, including trade partners, colonialism, economic niches and arguably the most significant factor — geographical location.

Firstly, perhaps the most significant factor to the geopolitics of global energy is geographical location. At the core of human endeavour is energy. We see that countries' GDP increases when historically oil was discovered. For instance, in the Middle East, there was historically not as much investment and growth, however, following the discovery of oil, its economy grew exponentially, particularly in the likes of United Arab Emirates. Figure A below shows the contributing factors to geopolitics:

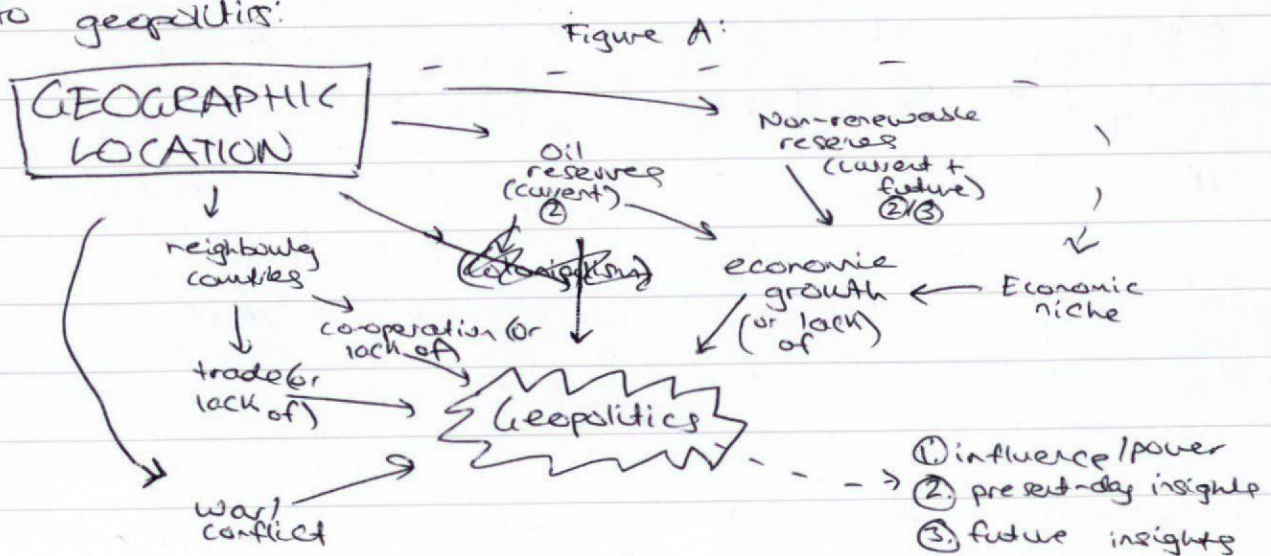


Figure A reveals that there is a tight web of factors contributing to a country's geopolitics: namely ① their global influence / power; ② ~~present~~ their current state; & ③ their future predictions. The key factor to understood here is that the countries who are superpowers today — US, Russia, UK — identified and used their

energy reserves first and entered the industrial revolution first. This is based on their geographic location, in terms of how obvious and easily-accessible the resources were but also how long people have been living there, in terms of H.Sapiens migratory patterns. Furthermore, a significant facet of ~~geog~~ geopolitics is (3) the future insights. With non-renewables set to run out within 90 years, we will see another time when geographic location ~~has~~ significant impacts. Countries with rich renewable energy ~~will be~~ sources such as rivers, sunlight, wind and geothermal reserves, will be at an advantage. Furthermore, the countries which are able to export excesses in their renewable energy, will thrive even more. For instance, a country like NZ, although we have abundant supplies of renewable energy, because of our isolation, we cannot easily export this. However, a country enclaved between other countries would be much better at this, such as Switzerland.

Now, another factor to geopolitics has been economic niches. For instance, Taiwan ~~controls~~ manufactures 65% of global semiconductors and 90% of ^{advanced} computer chips. This is almost an insurance policy for their lack of natural resources, an insurance policy which they can use in ~~for~~ trade for energy. ~~Here~~ The reason they had to come up with an economic niche, such as this, is partly indebted to

having a lack of resources. Thus, once again geographical ~~not~~ location seems to be a contributing factor.

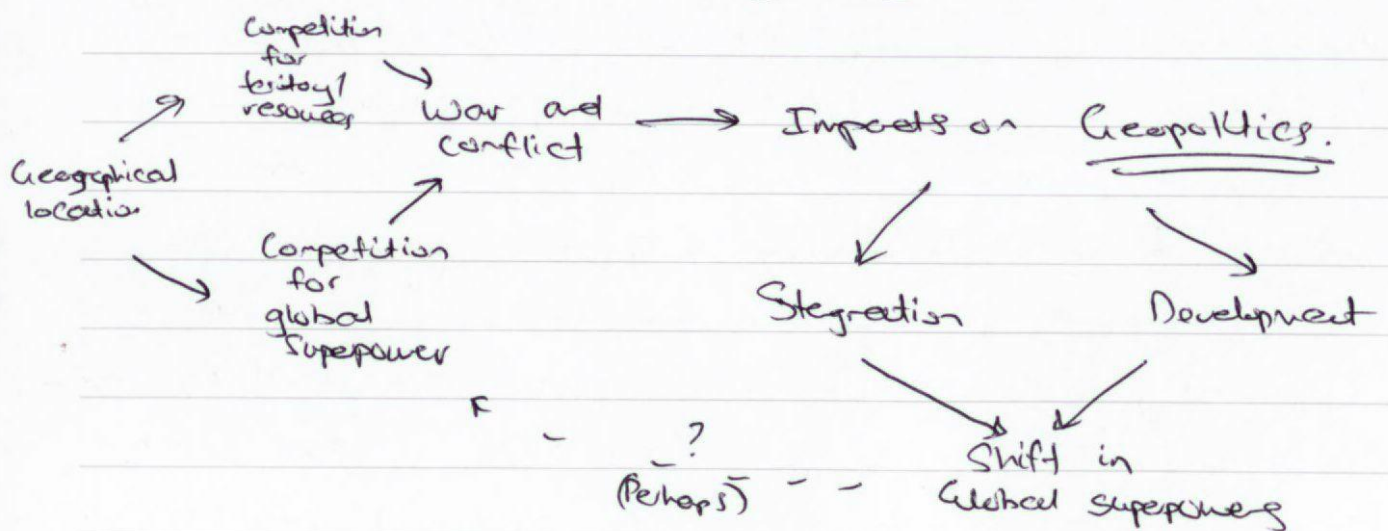
In addition, the neighbouring countries of a country are significant to their trade and co-operation.

Such trade and co-operation is particularly strong because these countries are likely to have similar cultures and ideas on the world. For instance, OPEC is a conglomeration of the oil-producing states in the Middle East. They can work together to regulate oil prices and supply to protect their own collective interests. Such a similarity in interests can only occur due to similar resources and cultural views, which again is - bluntly-put - due to geographical location.

For instance, in OPEC'S 1973 decision to cut petroleum exports to Israeli-Supporting countries is a pressing example of how through unity these Arab countries were able to gain influence on the geopolitical world stage. This, indeed, is an example that is particularly pressing today. Furthermore, neighbouring countries can both be ^{but also} ~~beneficial~~ ^{destructive}, as depicted in the case study of the Caspian Sea region. For instance, ~~when~~ Russia, Iran, Azerbaijan, Kazakhstan ~~and~~ Turkmenistan cannot agree on things. Here, their geographical closeness is a detriment to their geopolitical power - A reluctance to work together, perhaps propagated by conflicts and cultural animosities that occur because of the very fact that they are geographically linked. Thus, through the co-operation ~~of~~ of neighbouring countries, geographical location appears to still be a big player in geopolitics.

Finally, on a similar, but more extreme note to the aforementioned point — war and conflict is a significant factor to geopolitics. War and conflict leads to sanctions and bans. For instance, with respect to the 2022 Ukraine — Russia conflict, the EU imposed sanctions on Russia. In retaliation, Russia restricted gas supplies to 12 EU countries leading to steep increases in prices. This war is clearly having a significant impact on European and Global geopolitics, in the sense that, for instance, China and India have ~~replaced~~^{filled} the gap opened by Russia's move away from European countries. Hence, we could see future stagnation in European development and increased ~~de~~ growth in Asia, if this persists. Fig B illustrates this process: and explains why geographical location leads to war and conflict.

Figure B:



Overall, thus, when looking at all the contributing factors — resources, economic niches, neighbouring countries and wars/conflicts — we can see that geographical location is deep-rooted in all of them. Hence, it is the most significant factor to geopolitics.

QUESTION THREE

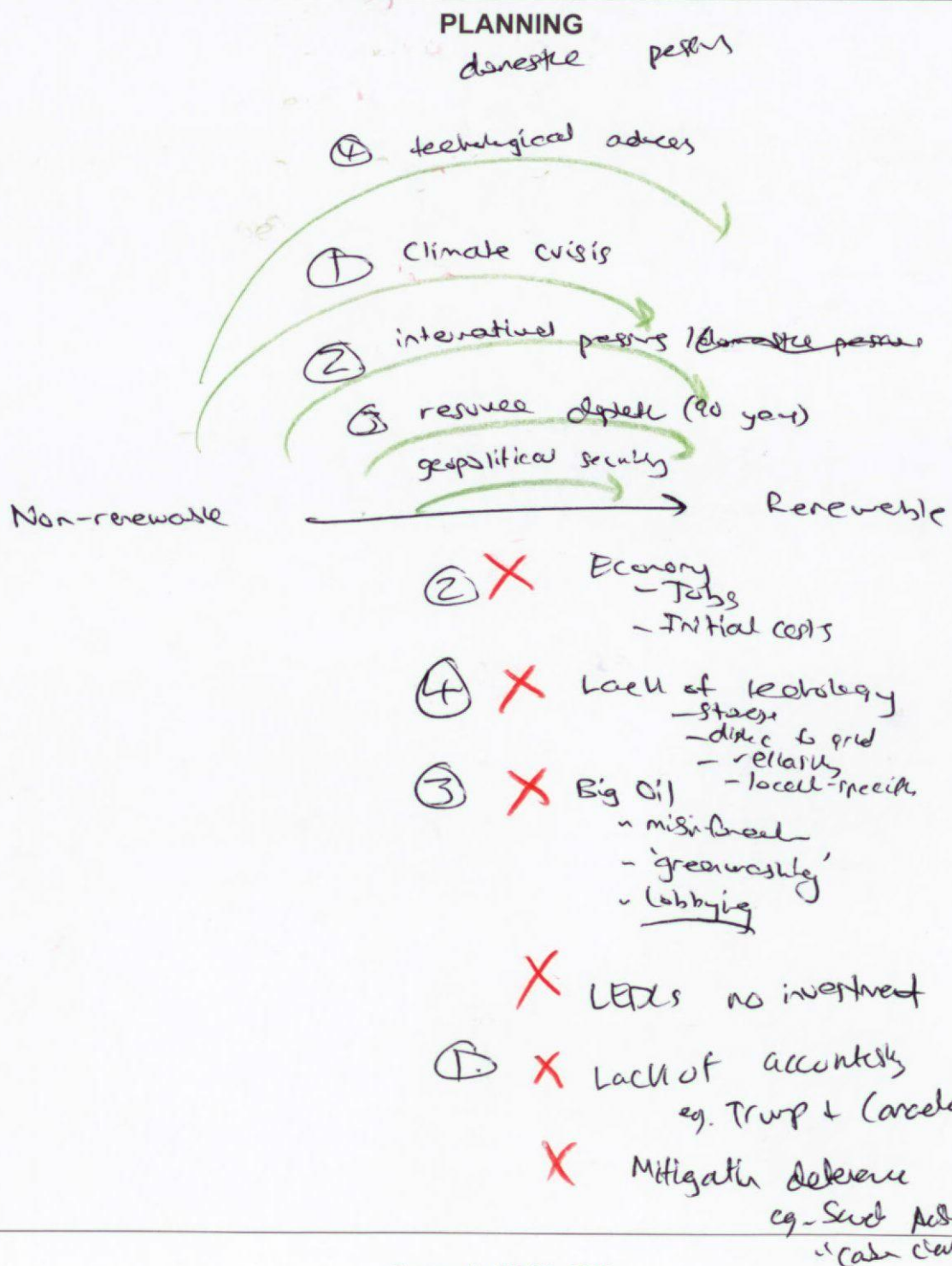
The United Nations has stated that the energy sector is the source of around three-quarters of greenhouse gas emissions. Its Paris Agreement goals state that emissions need to be reduced by 45% by 2030 and reach net zero by 2050.

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

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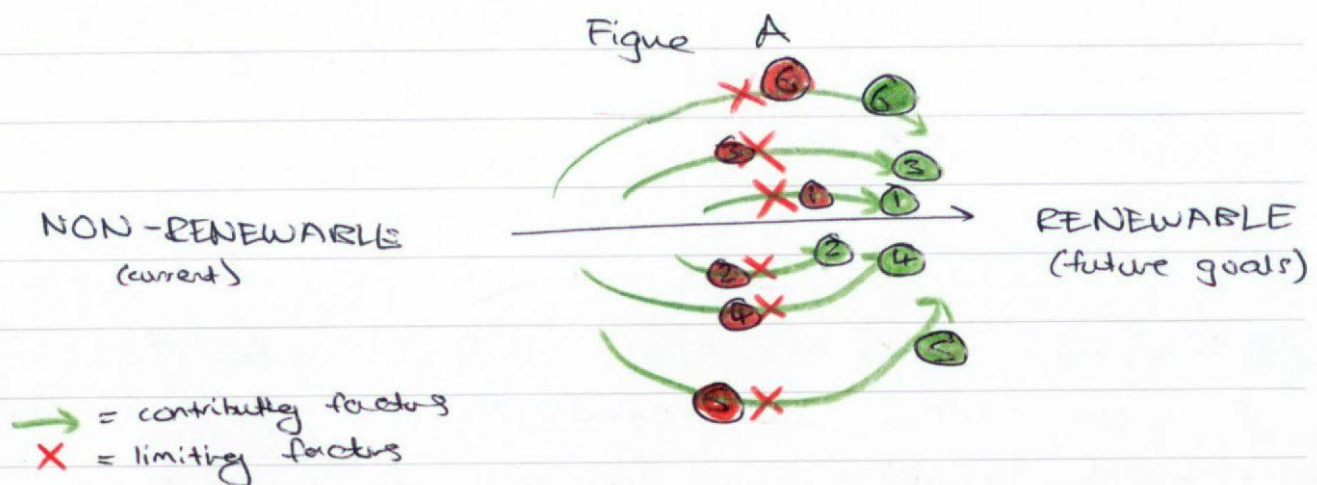
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Begin your answer to **Question Three** here:

The Paris Agreement represents a wider commitment for, intrinsically, the transition from non-renewable to renewable ~~facts~~ ^{energy}. However, as with any significant change, there are contributing factors and limiting factors. Figure A illustrates some of these factors.



Firstly, as for the contributing factors, ① the climate crisis is perhaps the most important factor. We are facing a point in time, called the 'tipping point'. Once we pass this point, we will not be able to recover from the effects of climate change. Policy-makers have come to the collective consensus that climate change is a significant issue, and accordingly making plans such as the Glasgow Climate Pact as part of COP26 in 2021 and, of course, the Paris Agreement Goals. However, the lack of accountability ①, means that countries although admitting the issue of climate change, can simply fall short on their commitments without any significant effects. For instance, ^{former} President of the US, Donald Trump, withdrew the US out of the Paris

Agreement without any lasting penalties. Furthermore, Canada has been failing to meet its targets without any repercussions. For instance, Canada failed to meet its 2000 Rio de Janeiro target by 21% and its 2010 Kyoto target by 22%. It is worthy to mention that the Kyoto Protocol attempts to mitigate this with carbon offsets, however, these rich countries can simply buy credits from LEDCs at pennies on the dollar.

Moreover, another significant factor contributing to these goals being achieved is (3) the depletion of non-renewables. Non-renewables are projected to run out in 90 years. As a result, venture capitalists have been investing in ~~non~~ renewable energy. For instance, BlackRock venture capitalists have pledged to helping NZ get to 100% renewable energy by 2050. What this means is that, with these increased investment, technological advancements and breakthroughs (4) can continue to occur. For instance according to pg 20 of the RB, and Bill Hare, CEO of Climate Analytics, technological changes are responsible for flattening 2100 temperature increase trajectory from 3.5°C to 2.9°C. This chain of events is illustrated by Figures B & C:

Figure B:

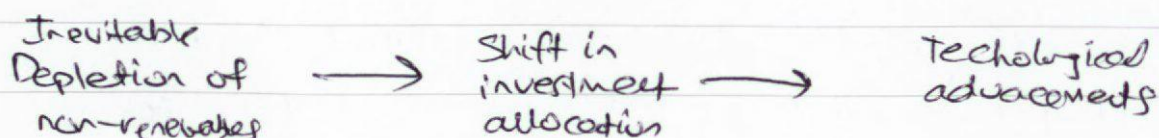
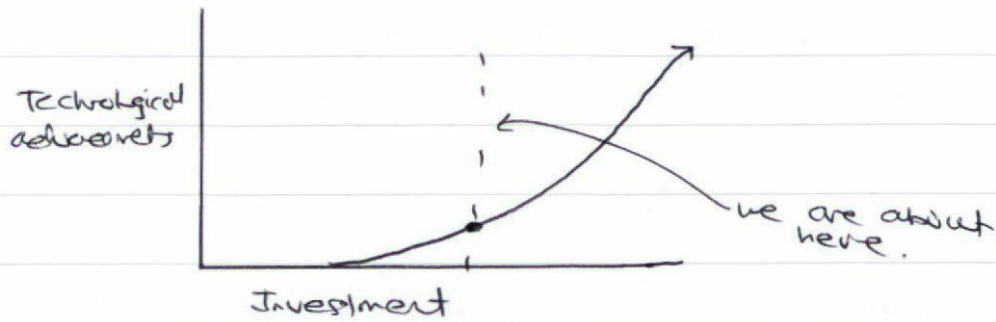


Figure C:



However, as far as these technological advancements there are also concerns about the economy ⁽²⁾. For this transition to occur, there will be initially high prices. This is a short-term implication that most governments are not willing to endure — most likely because political power is only held for short terms. Furthermore, a lot of countries are worried about the job losses that a new transition could bring and hence there is a lot of uncertainty, scepticism and NIMBY-ism. Furthermore, Big Oil ⁽³⁾ as a significant limiting factor to this transition. Big Oil is the 6 leading oil companies in the world. They conduct a significant amount of lobbying and hence impact political decision-making in their favour. They have more capital, and ~~do not~~ ^{hence overpower} environmental groups, which try lobbying as well. Furthermore, with this massive capital, comes the capability for misinformation surrounding renewable energy. Additionally, Big Oil carries out a lot of 'greenwashing' — which is the process of making their companies seem environmentally friendly, even when they are not. Now, although part of the technological

Shortcomings of renewable energies might be misinformation, we cannot deny that there are genuine issues with renewable energy ④. For starters, lack of energy storage and often the distance-to-grid are significant factors. Also, renewable energy is often weather-dependent and is hence unreliable. Furthermore, there ^{is} already infrastructure in place for non-renewables, making the initial jump to renewables economically undesirable. Also, a lot of renewable energy is inherently location specific.

Moreover, domestic pressures ^{are} a worthy contributing factor. As more people get educated on the issues, especially youth, they can protest and vote and collectively influence political decision making. Furthermore, geopolitical security ⑤ is another factor in favour of a transition. By countries developing their own renewable energy sources/plants, they are not economically dependent on fossil-fuel containing countries. For instance, a ^{long} term solution for Germany against its dependence on Russian Oil was to invest in developing its own renewable energy.

Finally, we must consider that LEDCs do not have the capability ⑥ to invest in renewable technology as they are not as economically well-off. This is shown by the fact that they are not even present for the most part on pg. 18 (A)

Paris Agreement Goals. Also, mitigation deterrence is a significant limiting factor. As shown by Saudi Arabia's "Carbon Check Economy" — it touts unreliable carbon capture and storage instead of taking full steps to transition to renewable energy.

Overall, thus there are a myriad of both contributing and limiting factors to whether or not these goals can be met across the globe, and overall for these goals, the ~~are~~ limiting factors outweigh the contributing factors.