

SECTION A

People and the Biosphere

Answer ALL questions.

Write your answers in the spaces provided.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1 Use Section A (pages 2, 3, 4 and 5) in the Resource Booklet to answer this question.

(a) Study Figure 1.

(i) Identify the biome most likely to be found north of the taiga (boreal forest) region. (1)

- A desert
- B grassland
- C tropical rainforest
- D tundra

(ii) State **two** local factors that can affect the distribution of biomes. (2)

1

2

(iii) Name **two** of the goods provided by forests. (2)

1

2

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



(b) Study Figure 2.

Identify which of the following best describes the density of Canada's population.

(1)

- A** It is highest in the north west
- B** It is highest on the border with Alaska
- C** It is lower in the north than the south
- D** It is the same density in the north and the south

(c) Study Figure 3.

Using data from Figure 3 and your own knowledge, explain **two** ways in which the winter climate of the taiga influences the characteristics of its trees.

(4)

1

.....

.....

.....

2

.....

.....

.....

(Total for Question 1 = 10 marks)

TOTAL FOR SECTION A = 10 MARKS



SECTION B

Forests Under Threat

Answer ALL questions.

Write your answers in the spaces provided.

2 Use Section B (pages 6, 7 and 8) in the Resource Booklet to answer this question.

(a) Using your own knowledge, explain **one** reason why tropical rainforests have higher levels of biodiversity than the taiga.

(2)

.....

.....

.....

.....

(b) Study Figure 4 in the Resource Booklet.

(i) State **one** reason why deforestation has taken place in this area.

(1)

.....

(ii) Identify the type of forest shown.

(1)

.....

(c) Study Figure 5 in the Resource Booklet.

Using evidence from Figure 5 and your own knowledge, explain **one** reason why population densities are higher in some biomes than others.

(2)

.....

.....

.....

.....

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(d) Study Figure 6.

Using evidence from Figure 6, explain **one** negative impact of developing hydroelectric power (HEP) in Canada.

(2)

.....

.....

.....

.....

(e) Using evidence from Figure 6, explain **two** reasons why human impact on the taiga is greater in some areas of Canada than others.

(4)

1

.....

.....

.....

2

.....

.....

.....

(Total for Question 2 = 12 marks)

TOTAL FOR SECTION B = 12 MARKS



SECTION C

Consuming Energy Resources

Answer ALL questions.

Write your answers in the spaces provided.

Some questions must be answered with a cross . If you change your mind about an answer, put a line through the box and then mark your new answer with a cross .

3 Use Section C (pages 9, 10, 11 and 12) in the Resource Booklet to answer this question.

(a) Study Figure 7 in the Resource Booklet.

(i) Identify which of the following energy resources has become less important since 1990.

(1)

- A coal
- B gas
- C nuclear
- D wind

(ii) Identify which of the following energy resources has nearly doubled in consumption since 1990.

(1)

- A coal
- B gas
- C hydroelectric power (HEP)
- D nuclear

(iii) The amount of energy produced by solar power is too small to be shown on Figure 7.

Suggest **one** reason why solar power is unimportant in Canada's energy mix.

(2)

.....

.....

.....

.....

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



(b) In 2022, Canada's exports rose by 142 billion US\$.

Oil, gas and coal exports made up 82 billion US\$ of this increase.

Calculate the percentage (%) of the increase in exports contributed by the oil, gas and coal industries.

Give your answer to **one** decimal place.

Show your working below.

(2)

.....%

(c) Study Figure 7 and Figure 8 in the Resource Booklet.

Using evidence from Figure 7 and Figure 8, explain **two** reasons why fossil fuels are important for Canada's economy.

(4)

1

.....

.....

.....

2

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....



(d) Study Figure 9 in the Resource Booklet.

Using evidence from Figure 9 and your own knowledge, assess the reasons why energy use per capita (person) varies from place to place and over time.

(8)

Area with horizontal dotted lines for writing.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Handwriting practice area with 20 horizontal lines. The first 10 lines are solid, and the next 10 lines are dashed.



P 7 8 7 2 5 R A 0 9 1 6

(e) Study Figure 10 in the Resource Booklet.

Using evidence from Figure 10 and your own knowledge, assess the reasons why it might be difficult to reduce the carbon footprint of most Canadians.

(8)

Area with horizontal dotted lines for writing.

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Total for Question 3 = 26 marks)

TOTAL FOR SECTION C = 26 MARKS



SECTION D

Making a Geographical Decision

Answer Question 4.

Write your answers in the space provided.

In this question, up to four additional marks will be awarded for your spelling, punctuation, grammar and your use of specialist terminology.

4 Study the three options below for how the Canadian Government should manage Canada's energy resources and the environment.

Option 1: Increase the exports of fossil fuels and use the income to research and expand renewable energy.

Option 2: Stop the exploitation of the taiga for energy production unless approved by the indigenous communities who live there.

Option 3: Increase taxes on fossil fuels to reduce consumption even if this reduces Canada's economic growth.

Select the option that you think the Canadian Government should choose to benefit both its environment and its economy.

Justify your choice.

Use information from the Resource Booklet and knowledge and understanding from the rest of your geography course to support your answer.

(12)

Chosen option

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Handwriting practice area with 20 horizontal dotted lines.



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Handwriting practice area with 20 horizontal dotted lines.

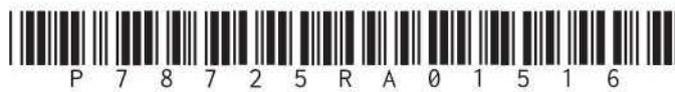


DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

Handwriting practice area with 20 horizontal dotted lines.



DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

(Spelling, punctuation, grammar and use of specialist terminology = 4 marks)
(Total for Question 4 = 16 marks)

TOTAL FOR SECTION D = 16 MARKS
TOTAL FOR PAPER = 64 MARKS



SECTION A

People and the Biosphere

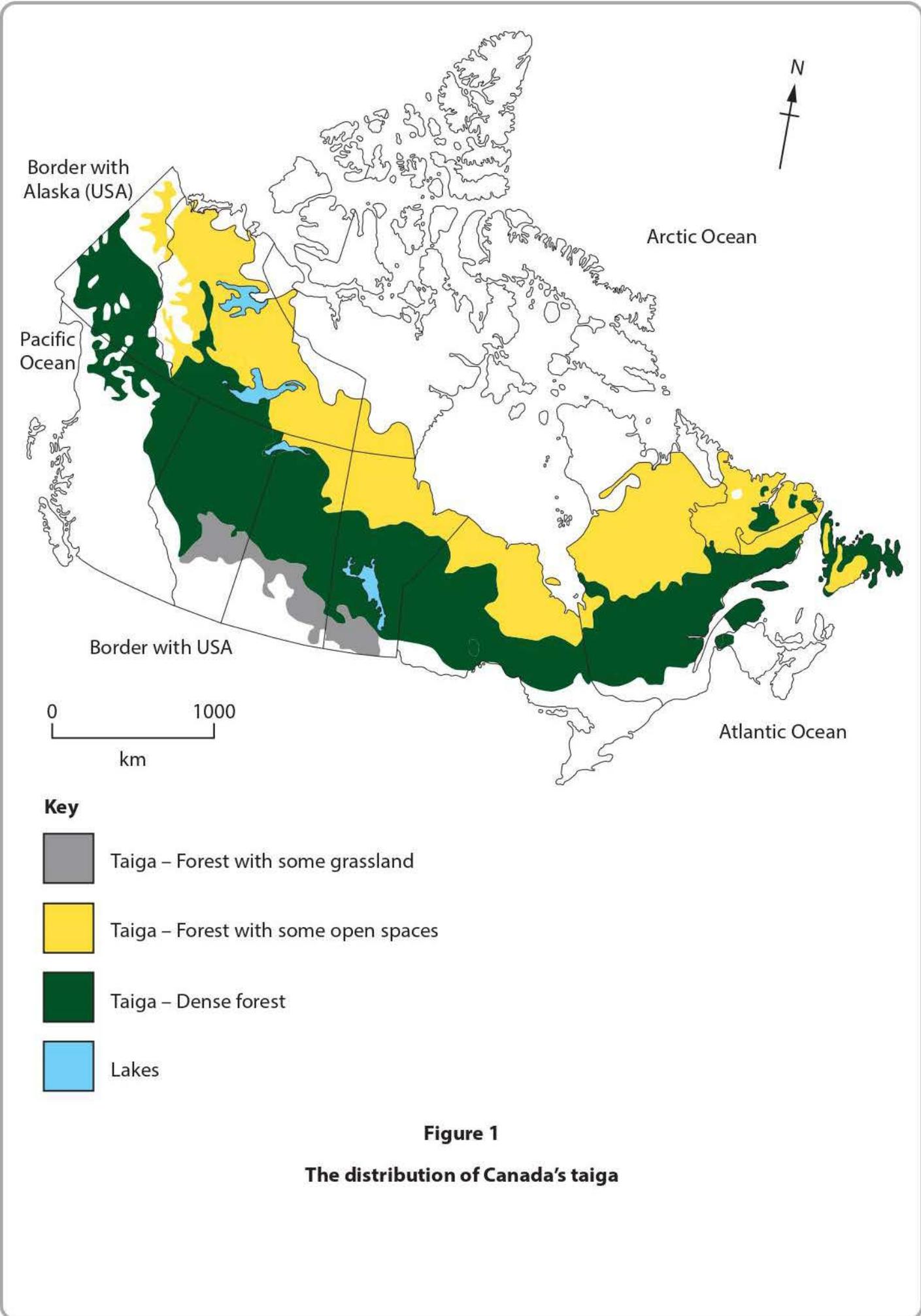
The issue: **which energy future for Canada and its population?**

- Canada has the 10th largest economy in the world.
- Canada has enormous reserves of natural resources and is a major exporter of energy including fossil fuels.
- Canada's people and environment face significant threats from climate change.
- Canada's First Nations indigenous people are likely to be the most affected by the challenges of climate change.

Introduction

- Canada has a population of approximately 38 million in a land area of 10 million km² making it one of the least densely populated countries in the world.
- 90% of its population live in the south of the country and live within 150 km of the border with the USA.
- 1.4 million Canadians are First Nations indigenous people. They are the majority in the northern regions of the country.
- About half of Canada is covered with taiga (boreal) forest which is a major resource.
- 75% of its population say that they are concerned by climate change and, of them, 15% give money to charities dealing with climate change.





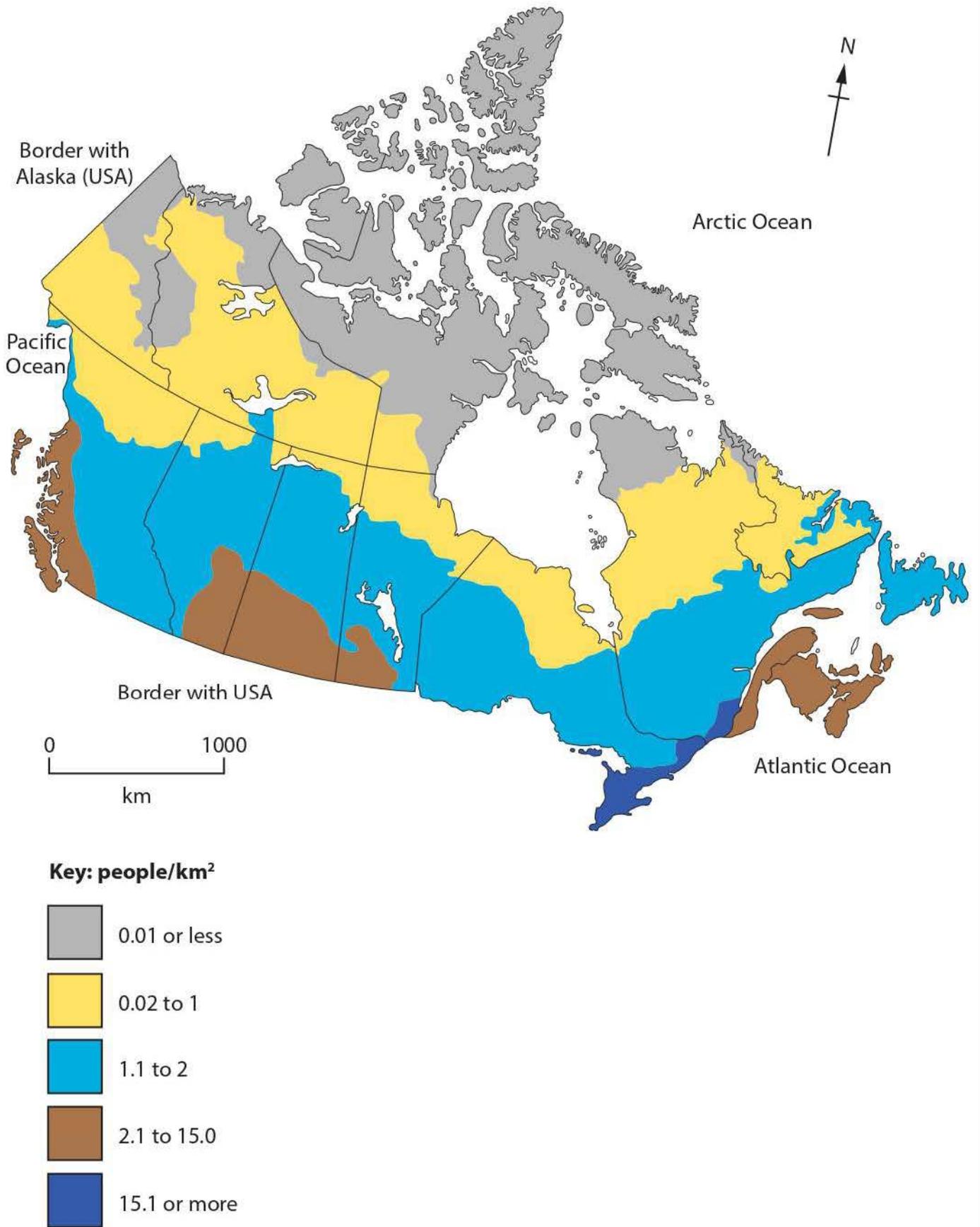
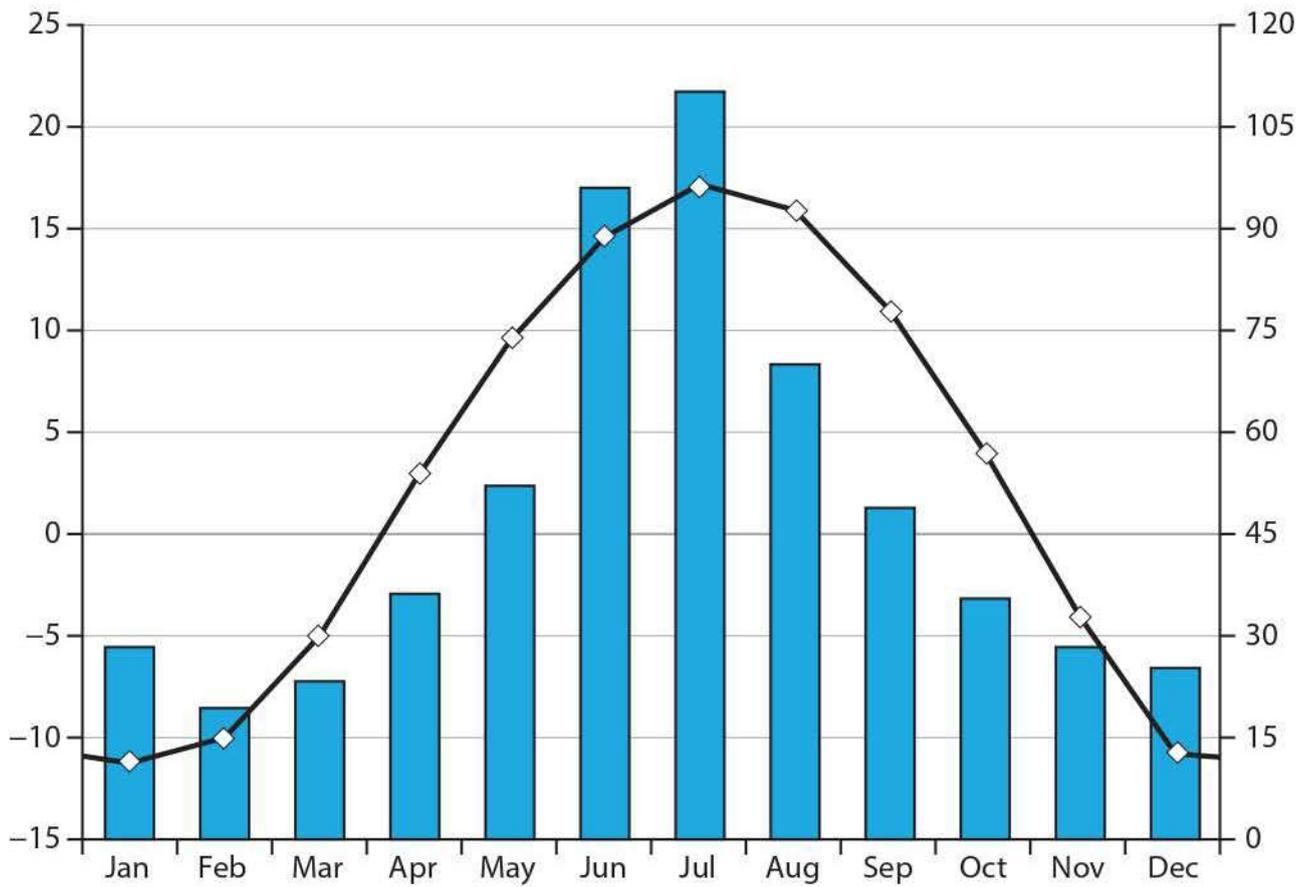


Figure 2
Canada's population density and distribution

Average temperature °C

Precipitation mm



Key



Precipitation



Temperature

Figure 3

The climate of the northern taiga



SECTION B

Forests Under Threat



- In some regions, oil is found near the surface mixed with sand.
- Extracting the oil from the sand requires energy, water and the removal of all vegetation.

Figure 4

A production site for oil extraction in Alberta, Canada

Country	Forest area (in km ²)	Population density (people per km ²)	Main type of forest biome
Russia	8,138,480	8	Taiga (boreal forest)
Brazil	4,918,480	25	Tropical rainforest
Canada	3,469,750	4	Taiga (boreal forest)
United States	3,104,500	35	Mixed, mostly temperate
China	2,114,050	149	Mixed, mostly temperate
Democratic Republic of the Congo	1,519,550	44	Tropical rainforest

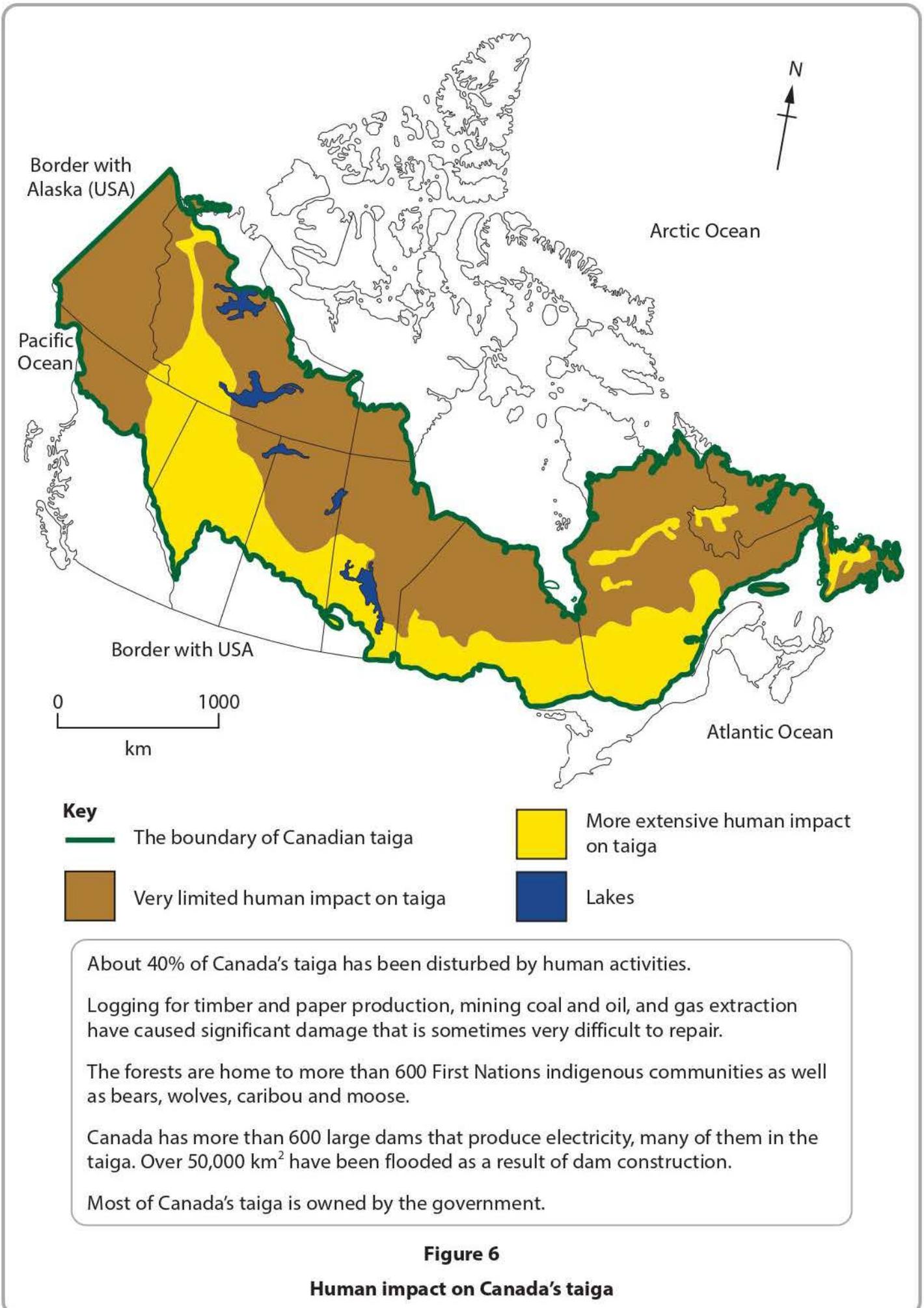
Taiga (boreal forest) covers 17 million km² of the Earth's surface. Of this, Russia and Canada's taiga amount to nearly 70% of all taiga forest cover.

The taiga is particularly sensitive to both land use changes and climate changes due to a short growing season and, in many places, poor soils that limit growth. These factors pose serious threats to taiga forests everywhere.

The taiga plays an important role in absorbing CO₂ from the atmosphere. However, temperatures in the Arctic are rising at three times the global rate of increase and as a result have increased the risk of wildfires.

Figure 5

Information about the six most forested countries ranked by their area of forest



SECTION C

Consuming Energy Resources

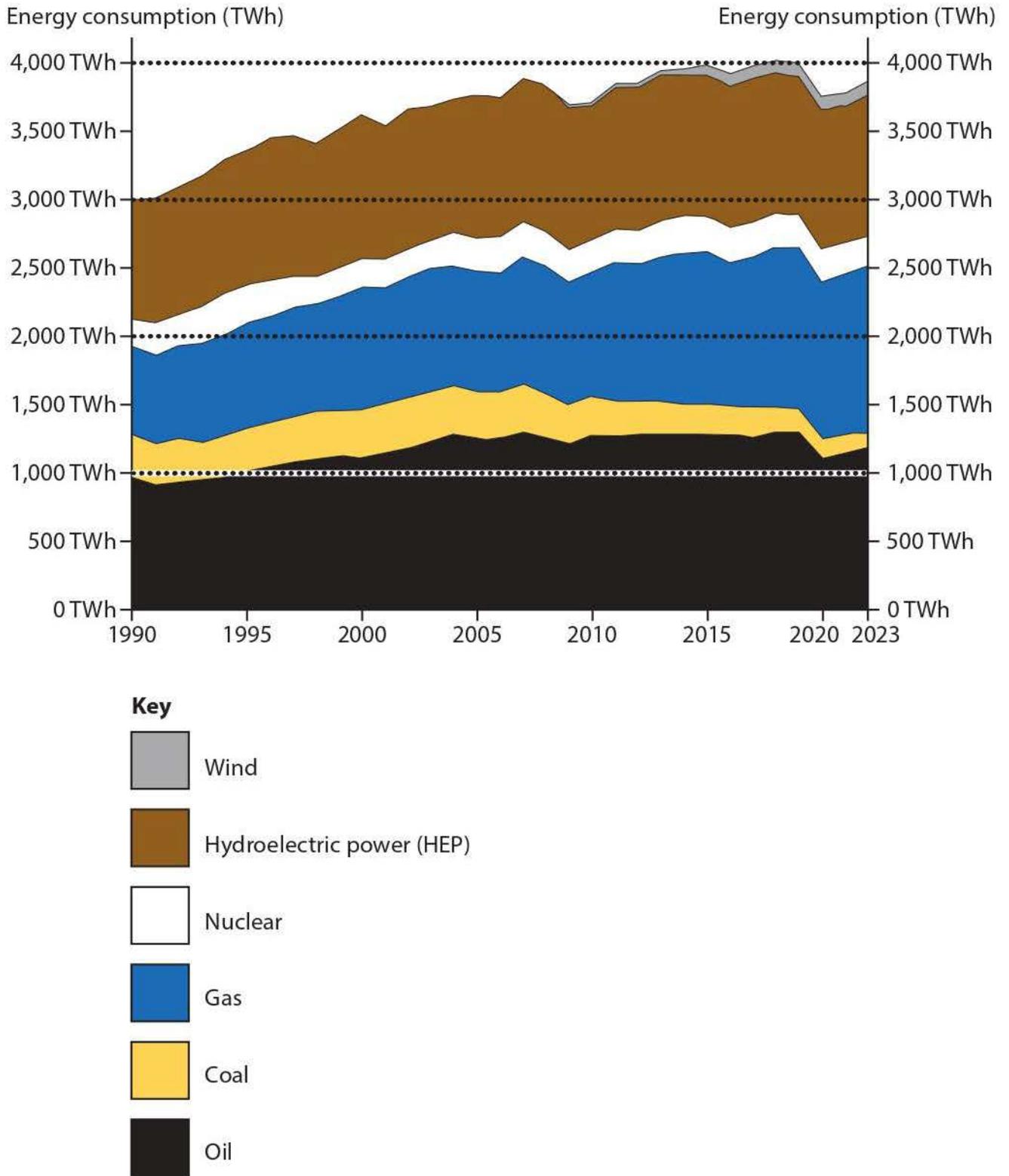


Figure 7

Canada's energy mix in terawatt hours (TWh), 1990–2023

Fossil fuels	Global rank for production of fossil fuels	Global rank for fossil fuel exports
Coal	14th	7th
Gas	5th	6th
Oil	4th	3rd
Non-fossil energy sources	Global rank for production of non-fossil energy sources	Exports of electricity
Nuclear power	6th	Along with fossil fuels, these energy sources are used to produce electricity. 5.8 billion US\$ was paid to Canada by USA for imports of electricity in 2022.
Hydroelectric power (HEP)	1st	
Wind energy	9th	
Biofuels	20th	

Over 30% of Canada's total exports are fossil fuels, of which oil is the most valuable.

91% of Canada's energy exports go to the USA.

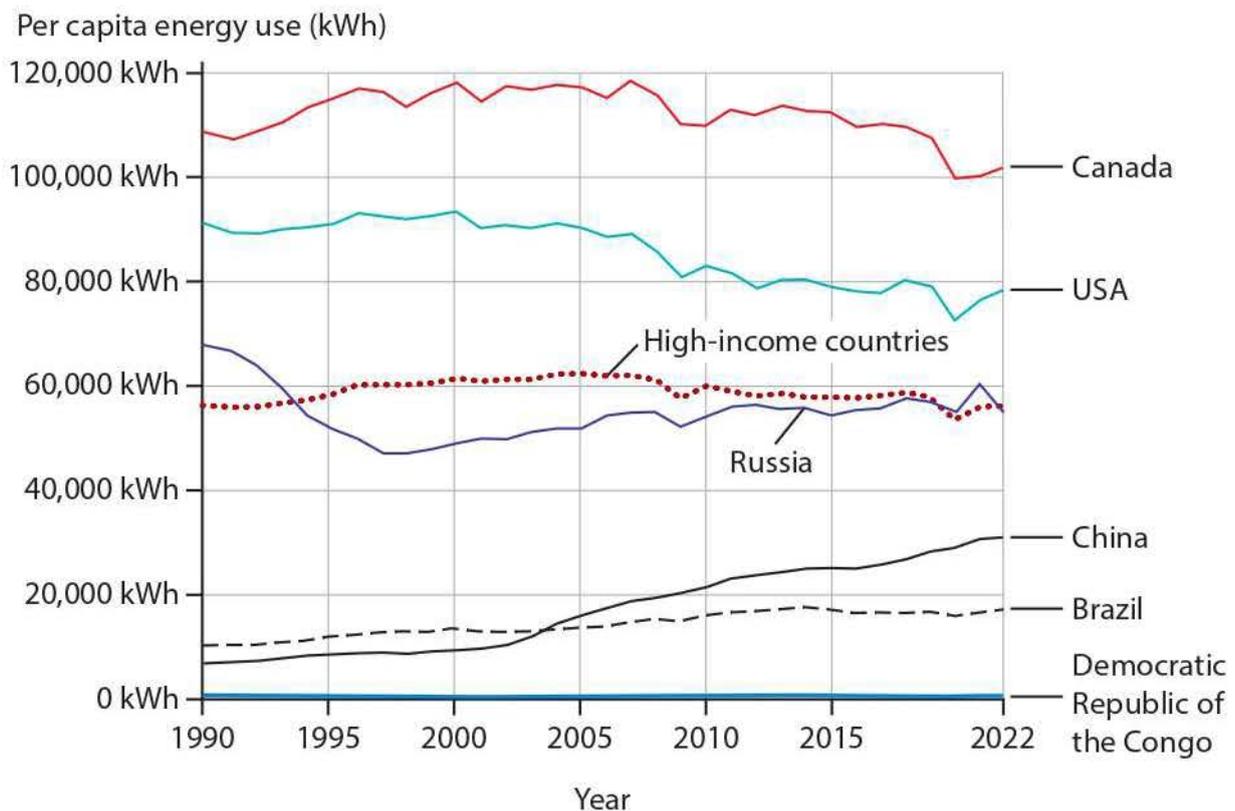
5% of Canada's total workforce (900,000 people), are directly or indirectly employed in the energy industry.

The energy industry contributed 10% of Canada's Gross Domestic Product (GDP) in 2021.

Figure 8

Canada's energy industry in a global context





The average per capita (person) energy consumption in high-income countries is about 60,000 kWh per year.

Canadians are amongst the world's highest energy users.

The reasons for this include:

1. Car ownership is high and average journeys are long, both commuting to and from work and for leisure.
2. The climate is extreme so heating in winter and cooling in summer are both needed.
3. Canadian houses are large, averaging a floor area of 180 m², whilst UK houses are on average 76 m².
4. Canadian electricity costs about 0.12 US\$ per kWh, half the price of electricity in the UK, whilst average incomes are higher in Canada.

Figure 9

Energy use per capita in kilowatt hours (kWh) for the six countries with the largest forest area and information about Canada's energy consumption

Country	Tonnes of CO ₂ per capita 1990	Tonnes of CO ₂ per capita 2021	Percentage (%) change 1990–2021	GDP per capita 2021 (in US\$)
Russia	17.1	12.1	–29	28,526
Brazil	1.5	2.3	+53	14,594
Canada	16.6	14.3	–14	49,884
USA	20.6	14.9	–28	62,589
China	2.2	8.0	+264	14,129
Democratic Republic of the Congo	0.1	0.1	0	1,022

Canada intends to reduce its carbon footprint (tonnes of CO₂ per capita) by:

- Stopping the use of coal and oil to generate electricity.
- Developing a plan to replace oil as the main fuel used in transport.
- Reducing methane and CO₂ emissions from the oil and gas industry.
- Stopping government support for the oil and gas industry.
- Improving the insulation of Canadian homes.

Figure 10

The carbon footprint and GDP per capita for the six countries with the largest forest area, and information about Canada's plans to reduce its carbon footprint

Acknowledgements

Pearson Education Ltd. gratefully acknowledges all the following sources used in the preparation of this paper:

Figure 4: ©ASHLEY COOPER/SCIENCE PHOTO LIBRARY

