# SSDC Phase 1 Topic Breakdown

This document is designed to help students develop a strong understanding of the SSDC Phase 1 debate topic. It outlines the key concepts, areas of focus, and common pitfalls to avoid in preparing for the competition. Please note that this is not an exhaustive guide; students are encouraged to conduct further research and develop their own original arguments and perspectives.

***Topic: Governments should prioritize biotechnological solutions over carbon capture technologies in achieving carbon neutrality.***

## 1. Definitions and Interpretation.

- Governments: National or local authorities that create laws, fund programs, and shape climate policy.
- Prioritize: To give more attention, funding, or policy support to one option over another – not necessarily choosing only one.
- Biotechnological solutions: Using living things or biological science (like genetically engineered crops, algae that absorb $CO_2$, or biofuels) to reduce or remove emissions.
- Carbon capture technologies (CCTs): Machines and systems that pull carbon dioxide out of the air or from industrial processes (like factories), then store it underground or reuse it.
- Achieving carbon neutrality: Reaching a balance where a country or system removes as much carbon as it emits – also called "net-zero" emissions.

*Important*: This is not a debate about whether we need to solve climate change – both sides agree we must. This is a debate about which kind of technology governments should focus on more.

## 2. Contextual Background

Scientists agree we need to reach carbon neutrality by around 2050 to stop dangerous global warming. There are many tools available: using less energy, switching to clean energy, removing carbon from the air. Governments have limited money and attention – so they must choose where to focus their help.

Two options on the table:

- Biotech: newer, based on nature and science, could change farming and fuels.
- Carbon Capture: often tied to existing industries like fossil fuels; already has investment.

## 3. Strategic Overview

### Proposition Strategy (Support Prioritizing Biotech)

Main Idea: Biotech is more natural, creates more long-term change, and works with the environment instead of trying to fix problems after the fact.

To Win, You Should:

- Explain why biotech is more promising or transformational.
- Argue that carbon capture is too limited, expensive, or slow.
- Show that biotech brings extra benefits – like better farming, cleaner fuel, and healthier land.

### Opposition Strategy (Defend Carbon Capture Focus)

Main Idea: Carbon capture is the only tool ready now to handle big polluters; biotech is exciting but not ready yet.

To Win, You Should:

- Show that some industries can't reduce emissions without carbon capture (like cement or steel).
- Explain how biotech is still being developed and might not scale up fast enough.
- Argue that climate change is urgent – we don't have time to wait for new technology to mature.

## 4. Main Areas of Clash

- Which tech works better? - Which one removes or avoids more emissions effectively?
- Which is more realistic to use soon? - Which one can be used now or in the next few years?
- What are the side benefits? - Does it help with food, water, jobs, energy?
- Is one a risky bet? - Will it fail or cause other problems (like pollution or safety issues)?
- What is the best way to spend money? - Should we invest in proven tools or new ideas?

## 5. General Debate Notes – Mistakes to Avoid

- Treating it like a tech debate only – This is not a science fair! You need to talk about governments, priorities, and policy choices.
- Ignoring the comparative – You must compare biotech and carbon capture directly; not just say one is good.
- Assuming both are equal in timelines – Discuss which one works faster and why that matters.
- Missing stakeholder impacts – Talk about real people affected: farmers, workers, communities.

- Failing to challenge assumptions – Don't just accept what the other side says. Ask how they know it's true.
- Using vague language – Be specific. Don't just say 'biotech is cleaner'; explain how.

## 6. Recommended Readings (to build basic understanding):

NASA Climate Kids – What is Carbon Capture? https://climatekids.nasa.gov/carbon-capture/

BBC Bitesize: What is Climate Change and How Can We Stop It?: https://www.bbc.co.uk/bitesize/articles/zrjvxyc

National Geographic Kids – Climate Solutions: https://kids.nationalgeographic.com/science/article/climate-change

Carbon180 Student Guide to Carbon Removal: https://carbon180.org/publications

BioTech Primer's Beginner's Guide to Biotech & Climate: https://biotechprimer.com

Our World in Data – $CO_2$ Emissions and Net Zero: https://ourworldindata.org/co2-and-other-greenhouse-gas-emissions

Drawdown's Solutions Table: https://drawdown.org/solutions/table

## 7. Suggestions from the scientific community.

| Debate Focus | Pro Side (Biotechnology Priority) | Con Side (Carbon Capture Priority) |
|---|---|---|
| Carbon Reduction Effectiveness & Efficiency | More thorough, source control | Strong scalability, suitable for heavy industry |
| Efficiency in Application | Preferred long-term solution with lasting benefits | More realistic and feasible under urgent emission reduction tasks |
| Cost & Feasibility | Sustainable, cost gradually decreasing | Expensive to build but delivers immediate results |
| Additional Benefits | Improves agriculture, energy structure and ecosystems | No additional ecological or economic synergy effects |
| Risks & Side Effects | Relatively eco-friendly l, high public acceptance | Leakage risks, dependence on underground storage, etc. |
| Policy Investment Return | High long-term input-output ratio | Short-term returns unclear, but quantifiable carbon reduction effects |

**P.S. The above terms show how scientists would argue, and it doesn't mean the students should pick the same arguments. These are not mandatory.**