



Secure Tomorrow Series

Alternative Futures: Synthetic Biology Controller Guide

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Welcome and Introductions

[The instructions in this guide are built around a virtual execution of the workshop, using a virtual meeting platform.]

Hello. My name is [name], and for the next 3 hours I will be your game controller for Alternative Futures: Synthetic Biology. My role is to guide you through the game.

Before we get started, let's do a quick round of introductions. [Ask players for their name and a quick summary of their background.]

The Cybersecurity and Infrastructure Security Agency (CISA) National Risk Management Center (NRMCC) has developed this game to assist stakeholders across the critical infrastructure community to self-facilitate and conduct foresight activities that will enable them to derive actionable insights about the future, identify emerging risks, and proactively develop corresponding risk management strategies to implement now. One goal of the Secure Tomorrow Series is to develop a repeatable and defensible process that (1) identifies emerging and evolving risks to critical infrastructure systems, and (2) identifies and analyzes the key indicators, trends, accelerators, and derailleurs associated with those risks to help critical infrastructure stakeholders direct their risk management activities.

As such, today you will be playing as yourselves, bringing your knowledge, experience, and perspectives to debate strategies that will shape critical infrastructure resilience and security in light of potential advancements in synthetic biology. Hopefully, the game will be a fun and interactive way for you to think broadly about future threats and opportunities, learn from your peers, and identify strategies to inform preparedness activities.

The game consists of three rounds, each of which will present you with a scenario that could plausibly occur within the next 10–15 years. During each round, you will play one of three unique roles. [Display placemat document on camera and point to the appropriate column header for each role as you name them.] The three roles are the Innovator, the Devil's Advocate, and the Judge. [Assign which player has what role for Round 1. If there are more than three players participating, assign them to be additional innovators.] We will rotate roles after each round.

What do these roles entail?

- **The Innovator(s):** Your job is to propose initiatives that will help critical infrastructure owners increase the security and resilience of their systems in preparation of future issues that could arise from progress in and use of synthetic biology. Initiatives could be policies, legislation, investments, public-private partnerships, research and development, or other actions that, if successfully put into motion today, you believe will better position and prepare one or more critical infrastructure sectors for the future. You will have 15 minutes to think of and present up to three initiatives and up to three supporting arguments per initiative. When proposing an initiative, please consider both its potential effects and the feasibility of implementation. [Note: If there is more than one Innovator per round, each Innovator will introduce at least one of the three initiatives. All Innovators will develop these initiatives collaboratively, attempting to bolster the supporting arguments. Please be flexible on the 15-minute time limit, especially in cases in which there are multiple Innovators and during the first round.]
- **The Devil's Advocate:** Your job is to “stress test” the ideas of the Innovator(s). After the Innovator(s) finish(es) presenting the initiatives and supporting arguments, you will identify

counterarguments as to why these initiatives may not be successful. In total, you will have 10 minutes to present up to three counterarguments for each of the proposed initiatives. Your counterarguments can target one or more of the supporting arguments or can underscore a new concern that may cause the initiative to fail. You can choose to debate the effects the ideas will have or highlight challenges with implementation. Please note that the Innovator who proposed the initiative gets one last chance to rebut your counterarguments once you are finished.

As you've probably guessed by now, these two roles are competing against each other through your arguments and counterarguments. Depending on your role, you can score points for either successfully implementing your initiatives or denying your opponent's initiatives. Meanwhile, each successful initiative increases resilience to possible social, technological, economic, environmental, or political (STEEP) disruptions. [Display the STEEP Disruptors & Odds Poster on camera.]

- **The Judge:** Your job is to weigh the arguments versus counterarguments for each initiative and determine whether it has a high, medium, or low chance of success. [Display placemat document on camera and point to a row in the Judge's column that lists "Chance of Success."] To be clear, "success" means the initiative can be implemented and, if implemented, will substantially increase security or resilience against possible threats arising from the described scenario. As the Judge, you may interject at any time for clarification, but please be careful not to influence or aid the other players' arguments or counterarguments.

The Judge will determine the success of each initiative by rolling this virtual 20-sided die: <https://rolladie.net/roll-a-d20-die>. The die simulates the unpredictability of the supporting environment for initiatives and the game's inability to account for all positive and negative factors that might influence success. [Display the STEEP Disruptors & Odds Poster on camera.]

- An initiative with a **high** likelihood of success will be successful with a roll of 6 or higher (75 percent chance).
- An initiative with a **medium** likelihood of success will be successful with a roll of 11 or higher (50 percent chance).
- An initiative with a **low** likelihood of success will be successful with a roll of 16 or higher (25 percent chance).

Are there any questions so far?

As a final note about these roles, please understand that this game **does** encourage you to compete with one another, but the **purpose** of this game is to generate discussions that develop well-conceived and thought-provoking initiatives. Regardless of the outcomes of each round, it is your collective insights that matter.

Please use the placemat document you received to take notes and sketch out your arguments or counterarguments for each initiative.

Practice Round

To familiarize yourself with the three roles, let's walk through a practice example with one initiative using a completely unrelated topic. As the topic, let's use "reducing the number of car accidents in the United States."

[Motion to Player 1.] What is one initiative that you think might help reduce the number of car accidents occurring nationwide each year? Now, provide a supporting argument why you

think that this initiative would be successful, considering both how the initiative would affect the number of car accidents and how it could be implemented feasibly.

Normally, you would provide two more supporting arguments for this initiative, as supported by your fellow Innovators. You would then repeat this for up to two more initiatives. For this practice round, I'm going to move on to the Devil's Advocate.

[Motion to Player 2.] *As the Devil's Advocate, what is one reason why Player 1's initiative might fail?*

Normally, you would identify up to three counterarguments for each initiative. After you come up with your counterarguments, we would go back to the Innovator(s) for a rebuttal.

[Motion to Player 1.] *Do you have a quick rebuttal?*

[Motion to Player 3.] *Now, Judge, do you think this initiative has a high, medium, or low likelihood of success? Why? Finally, let's roll the die to see whether the initiative is ultimately a success or failure.*

[Determine whether successful.]

*Now that we've done a practice round, are there any final questions? Does everyone understand the flow of the game? How about the odds? **[Answer any questions.]***

If there are no more questions, let's move on to the actual game.

Present State

For the purposes of this game, we define synthetic biology as the redesigning and harnessing of biological organisms to impart new or improved abilities and produce products. The many potential applications for synthetic biology include diagnostics and therapeutics, environmental remediation, control of infectious of disease vectors, water treatment, energy and fuel production, chemical manufacturing, improvement of agricultural yields, and food production.

Some drivers underlying recent advances in synthetic biology include the following:

- *The significantly falling cost and rising speed of genetic sequencing technology*
- *Developments in bioinformatic tools such as artificial intelligence to parse and analyze genomic data*
- *Highly targetable methods for gene editing, such as CRISPR-associated protein methods¹*
- *Automation of gene synthesis and assembly, including high-throughput and liquid-handling robots*
- *Advances in lab-on-chip and organ-on-chip systems that allow for rapid testing of new products*

The recent response to the COVID-19 pandemic reflects some of the significant progress within the field that has taken place. This includes decoding the SARS-CoV-2 virus genome in just 40 hours, deploying mRNA technology to develop COVID-19 vaccines, and using genetic sequencing to conduct surveillance for new variants.

¹ CRISPR (clustered regularly interspaced short palindromic repeats) is a collection of DNA base pairs that tells an enzyme that snips DNA (Cas9) where to snip.

Moving forward, experts believe that synthetic biology will be a critical area of economic and geopolitical competition with national security implications.

SELECT A STEEP DISRUPTOR

[Point to the STEEP Disruptors & Odds Poster.] As I mentioned before, this poster outlines a popular framework for scanning the future. It covers five dimensions—social, technological, economic, environmental, and political—which make the acronym STEEP.

Each disruptor will force players to explore strategies to mitigate risks to critical infrastructure during a plausible future scenario that could arise pertaining to synthetic biology. These scenarios may limit player actions, reflect new capabilities or products achieved through synthetic biology, or require players to consider the implications of an event. [Identify the first player to log on by name.] As the first player to log on, you can choose which STEEP category you would like to explore for Round 1. [See Appendices I–V. Please note that each disruptor ends with a question that should be announced to the group after reading through the disruptor narrative, to clarify the issue that players will be addressing for the disruptor. Additional discussion questions are included in each appendix to serve as prompts or as questions for open discussion periods.]

Let's Play

ROUND 1

As a reminder, for Round 1, you are considering initiatives that, if successfully implemented today, you believe will help prepare critical infrastructure owners for potential risks arising in these future scenarios.

[Turn to the Innovator(s).] I am going to begin your turn by giving you 5 minutes to gather your thoughts about potential initiatives. After that point, I will encourage you to share your thoughts aloud so that the other players can get a sense of what you're thinking. I'll be engaging you in a dialogue to help you flesh out your initiatives and develop the supporting arguments. [If there are multiple Innovators, you may want to encourage the Innovator team members to begin sharing their ideas with each other after 2 minutes, before asking them to announce their first initiative after 5 minutes has elapsed.]

As a recommendation, try to stay away from sweeping generalizations. With such statements, I will push you to provide an example of what you are alluding to or ask you to give an anecdote to explain or demonstrate your idea. Innovator(s), your turn starts now.

[Start the timer from 15 minutes. After 5 minutes, prompt an Innovator to begin verbalizing their first initiative.]

Try to have the Innovator(s) frame arguments by explaining:

- How their idea addresses security and resiliency
- How the idea can be implemented
- What will change if the idea is implemented

Some questions to help the Innovator(s) develop supporting arguments include the following:

- Is there a precedent for the type of activity you are proposing?

- Are there major risks that need to be addressed in your supporting arguments?
- Are multiple steps necessary for implementation? What do you think might realistically be achieved in the next 10–15 years?
- Who are the stakeholders necessary for implementation to be successful (i.e., whose support do you need)?
- What conditions exist today that make you believe this initiative will succeed (as opposed to in the past)?

Throughout the Innovator(s) round, or after 15 minutes, recap the Innovator(s) initiatives and supporting arguments and look to each Innovator to validate.

[Reset the timer to 10 minutes.] Ask the Devil's Advocate to begin thinking aloud and presenting their counterarguments. Start the timer.

Throughout the Devil's Advocate's round or after 10 minutes, recap the points made by the Devil's Advocate and look to the Devil's Advocate to validate.

[Reset the timer to 5 minutes.] Ask the Innovator(s) to begin their rebuttal and start the timer.

After the rebuttal period, ask the Judge to select the likelihood of success for each initiative and to present their rationale. Afterwards, direct the Judge to roll the die once for each initiative.

Declare the winner for Round 1. **[If there was a good discussion among participants during the round, you may want to include a short open discussion period (< 10 minutes) following judgment to continue this discussion. This is also an opportunity to discuss how the initiatives could be strengthened.]**

[Gesture to the Round 1 winner.] *As the winner of Round 1, you get to choose the STEEP disruptor category for Round 2.*

SUBSEQUENT ROUNDS

Assign new roles.

Present the new scenario based on the STEEP disruptor chosen (see Appendices I–V).

[Please keep in mind that depending on what players present in the prior round, you may want to preclude them from selecting certain STEEP categories, since the discussion may become repetitive. Use your best judgment.]

Follow the instructions listed under Round 1.

Declare the winner for Rounds 2 and 3 based on the results.

Direct the winning player/team to select a STEEP disruptor (Round 2 only).

[You can adjust the number of disruptors explored as desired, but you will need to consider the corresponding increase or decrease in time commitment and modify the gameboard, as necessary.]

Wrapping Up and Final Discussion

[After rolling the die for the final round of the game:] *Before we conclude with some wrap-up questions, I would like to thank you all for participating today. I know some parts of this*

game can be frustrating, especially when... [Controller chooses whichever phrase is the most appropriate.]

- *...a well-conceived initiative fails due to the roll of a die, or*
- *...a poorly conceived initiative succeeds due to the roll of a die.*

[Controller chooses to say this or not, based on all Devil's Advocate performances.]

Additionally, we recognize that the Innovator's position is a little more challenging. The Devil's Advocate has more time to think through what to say, and it's easier to point out the flaws in the Innovator's ideas. We purposely designed the game to encourage this type of interaction because it pushes players not only to identify potential ideas for preparing for the future, but also to think critically about how these ideas can be executed and in what timeframes they can be achieved, and to begin to address major risks.

Although we've set up the game to encourage competition among players, it's important to stress that we are playing this game to generate ideas that will lead to more resilient and secure critical infrastructure systems in the future. I want to reiterate that it's your collective insights and subject matter expertise that matter. So, let's walk through what happened during each round today.

Walk through the outcomes of each round, and then move the game-board marker to its new position as follows:

- *If all three initiatives pass in a round, move the marker up two positions.*
- *If two initiatives pass in a round, move the marker up one position.*
- *If one or no initiatives pass in a round, move the marker down one position.*

Declare whether critical infrastructure systems have become more resilient as a result of the players' initiatives.

Some questions to ask during the open discussion include the following:

- *What were your key takeaways?*
- *What was the most surprising or unexpected initiative presented?*
- *What was the most enjoyable part about playing the game? The least? Are there any improvements you would suggest?*
- *What would your organization do differently, given what was discussed during the game?*

CISA has produced these scenarios to initiate and facilitate discussion. The situations described here are hypothetical and speculative and should not be considered the position of the U.S. government. All names, characters, organizations, and incidents portrayed in these scenarios are fictitious.

APPENDIX I: SOCIAL DISRUPTOR

Backlash Against Cultured Meat Products

By 2030, approximately 15 percent of meat products consumed in the United States are derived from a laboratory (as opposed to conventional animal harvest). The success of cultured meat products on the West Coast and in the Mid-Atlantic has increased demand for such products in major Midwestern and Great Plains cities. American Beef Supplier, a prominent meat packer and subsidiary of a holding company, announces plans to fund the construction of new industrial-scale meat culture laboratories in several southern and midwestern cities.

Political lobby groups representing cattle producers, as well as politicians representing rural agricultural districts across the region, react by publicly calling for protections for traditional meat animal harvest and meat products, and for investigations into the business and marketing practices of cultured meat laboratories and their investors. Cattle producers and their supporters begin organizing peaceful protests at state capitals, academic and commercial meat laboratories, university and college campuses, and government facilities across the region. Similarly situated peaceful counter-protest also commences. Despite the intended peaceful nature of the protests, some individuals become violent, resulting in the destruction of grocery store displays of traditional and cultured meat products, a break-in at an academic laboratory, a fire-bombing of a commercial meat laboratory, and the destruction of commercial farm property, resulting in the injury of farm workers. Due to the violence and destructive activity, both the synthetic meat and traditional meat suppliers encounter disruptions to their supply chains.

What are potential security and resilience concerns associated with emerging industries that may require different infrastructure support and supply chains?

ADDITIONAL DISCUSSION QUESTIONS

[These questions can be used to prompt the Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor these questions or ask new ones to meet the matrix game sponsor's specific needs.]

- ***What new infrastructure would need to be put into place to support emerging food industries and their supply chains? What security and resilience concerns might exist?***

APPENDIX II: TECHNOLOGICAL DISRUPTOR

Loss of Proprietary Information from Cybersecurity Lapses

While research and applications of synthetic biology have blossomed in the last 10 years, the ability of some organizations, especially startups, to implement cybersecurity best practices has not kept pace. Insufficient cybersecurity at several startups has resulted in the theft of intellectual property and the collapse of promising companies. Examples include the following:

- *In 2026, a synthetic biology startup company, AquaBiozys, demonstrated results from a synthetically engineered bacteria that can consume atrazine (a common herbicide). Within hours of its press release, AquaBiozys's computer systems were bombarded with cyberattacks. Post-incident analysis showed the cyberattacks resulted in theft of critical information about the scientific breakthrough. By 2027, AquaBiozys was bankrupt, with foreign companies marketing similar products.*
- *In 2027, a facility that provided large-scale biomanufacturing services fell victim to a cyberattack less than a year after going online. The cyberattack modified the temperature of several bioproduction processes underway; loss of critical samples resulted in significant costs to both the facility owners and the service users. Lack of confidence in the security of the facility resulted in its eventual demise.*
- *The most widely known incident, occurring in 2032, involves the intellectual property theft of the groundbreaking creation of bacteria that, when added to soil, would significantly reduce the need for chemically derived fertilizer. Importantly, this would also reduce worldwide agricultural demand for ammonia fertilizer, which relies heavily on the energy-intensive Haber-Bosch process. While the U.S. company that patented the discovery tackled regulatory hurdles to take its product to market, it experienced a massive cyberattack and data breach of the DNA sequence and protocols for creating the bacteria. Soon afterward, the same engineered bacterial products were sold widely by other foreign companies.*

What initiatives can you think of to improve the cybersecurity of synthetic biology organizations?

ADDITIONAL DISCUSSION QUESTIONS

[These questions can be used to prompt the Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor these questions or ask new ones to meet the matrix game sponsor's specific needs.]

- *As synthetic biology ventures take off, what initiatives can be put in place to mitigate concerns about cyber vulnerabilities?*
- *How does the risk potentially differ for synthetic biology organizations (versus other technology companies)?*
- *Are there knowledge gaps on the security implications and cyber risks that CISA might address to assist synthetic biology organizations? How can the federal government best assist synthetic biology organizations on this issue?*

APPENDIX III: ECONOMIC DISRUPTOR

Novel Food Starch Disrupts U.S. Markets

In 2032, after decades of research, companies in the country of Fictitia finally begin mass production of synthetic, food-grade starch. As early as 2021, Fictitia researchers pioneered the process in the lab, but they needed another decade to solve scalability issues (e.g., mass-produce the required enzymes, generate enough low-cost energy) to make large-scale food starch synthesis economically viable. Fictitia companies have developed different variants of synthetic starch that can be used to make bread, rice, and other grain products. Preliminary results indicate that synthetic starch production is 8.5 times faster than production using traditional agriculture and at a much lower cost. Additionally, this process consumes pollutants and substitutes for land-intensive agricultural production. Experts predict that Fictitia will have ramped up production to be a net exporter of food starch by 2035.

In the United States, Congress and the public are deeply divided on how to respond. Consumers and food processors point to estimates of food prices cut in half and global reductions by 30 percent relative to the status quo if the world switched entirely to consuming synthesized starch. Conversely, the U.S. agriculture industry vehemently opposes imported synthesized starch and is actively lobbying Congress to impose protective tariffs or to ban the import of synthetic starch. Furthermore, there is a small but vocal group of consumers who distrust synthesized food products, believing them to be unsafe. One narrative even claims that synthetic starch is part of a foreign plot to alter Americans' brain chemistry.

U.S. federal agencies are also divided about the economic security implications of importing Fictitia-produced synthetic starch. While recognizing synthesized starch's massive benefits in mitigating weather changes and lowering food prices, the United States would ideally like to be self-sufficient in domestic starch synthesis to ensure economic security amid U.S.-Fictitia tensions. However, the average cost for U.S.-produced synthetic starch is still 1.5 times that of Fictitia producers; absent substantial government intervention, domestic prospects for this industry remain limited for at least the next five years.

What initiatives can you think of to address the economic effects on the United States of Fictitia synthetic starch exports and the ripple effects on global food security?

ADDITIONAL DISCUSSION QUESTIONS

[These questions can be used to prompt the Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor these questions or ask new ones to meet the matrix game sponsor's specific needs.]

- ***Apart from trade barriers, what actions could the United States take to ensure economic and food security while mitigating the disruption of U.S. agriculture?***
- ***How could the United States prepare for a crisis scenario in which Fictitia restricts exports of food-grade starch, disrupting global markets and supply chains and potentially affecting short-term U.S. food security?***

APPENDIX IV: ENVIRONMENTAL DISRUPTOR

Devastating Poultry Disease

Extreme weather and rising average temperatures allow viruses and bacteria previously limited to tropical and sub-tropical conditions to flourish in more temperate regions. In spring 2028, migratory birds returning north carried a novel strain of highly pathogenic avian influenza virus, known as H9N11. While not harmful to the wild carriers, H9N11 proved to be extremely contagious and lethal to domestic chickens. The virus was introduced to flocks in major poultry states along the migratory route. What began as a series of localized outbreaks quickly escalated into an epidemic, forcing rapid mass depopulation of commercial broiler and broiler-breeder flocks.

By summer 2029, approximately 130 million broiler and broiler-breeder chickens—approximately 25 percent of the total U.S. flock—were depopulated. Poultry meat production declined drastically, causing a shortage of chicken meat and driving chicken prices to all-time highs in grocery stores. Agricultural experts project that the industry will need at least 6 months to rebuild flocks to pre-epidemic levels and that the United States will need to increase imports of chicken meat—at exorbitant prices—in order to meet demand.

In response to the chicken crisis, a prominent billionaire announced that she would provide seed money to laboratory facilities seeking to expand cultured meat production capacity and to offset demand and reduce reliance on imports while flocks were rebuilt. However, ramping up production has proven to be challenging for several reasons:

- *Western states traditionally more friendly toward cultured meat are experiencing severe drought. There is concern from these states about supporting this industry and providing the tax breaks and other incentives the investors are requiring.*
- *Domestic consumption of chicken meat—both conventionally harvested and cultured in the laboratory—has declined by nearly 15 percent, as consumers question the safety of poultry meat and protest the conventional industry practices (e.g., mass housing of birds) that facilitated the outbreak. The companies question whether they will be able to turn a profit on cultured chicken meat based on current trends.*

What initiatives can you think of to support the rapid increase in production of cultured meat products?

ADDITIONAL DISCUSSION QUESTION

[This question can be used to prompt the Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor this question or ask new ones to meet the matrix game sponsor's specific needs.]

- *How do you balance the manufacturing requirements with other concerns (e.g., use of water in drought conditions)?*

APPENDIX V: POLITICAL DISRUPTOR

Independent Actor Threat

In 2028, a worker alerted their company's leadership to concerns about the activities of a fellow biologist, noting concerning conversations about ways to make pathogens more virulent unrelated to their assigned work, a pattern of working odd hours, and several instances of inappropriately accessing the lab's animal facilities without authorization. After the organization investigated the employee, it found that the employee was removing intellectual property and bio-samples from the company, indicating potential theft. The company also found that the individual was using company time to conduct internet searches on non-work related topics such as genome sequences of pathogens, international organizations that do not screen deoxyribonucleic acid (DNA) sequences, and how to create a biocontainment lab from scratch. The organization alerted law enforcement to the potential theft, who searched the individual's residence. They found a small biological laboratory with stolen materials marked as hazardous, evidence that the individual ordered and received DNA sequences from offshore companies, and a written plan to infect animals in the company's animal testing facilities with smallpox DNA. Further analysis of the biological samples seized from the individual's residence demonstrated that they had fully synthesized the smallpox virus DNA.

While no one was harmed, the incident had the potential to jeopardize the health, safety, and wellbeing of the public. The incident garnered national media attention and many concerned citizens and politicians called for wide-spread restrictions on the sale of the kits and reagents that could be used to produce this type of threat. Additionally, legislators proposed a number of safeguards intended to prevent this type of illegal activity in the future. However, many in the synthetic biology and biotechnology research and development community claim the proposed changes will also stymie progress into many legitimate and beneficial applications of synthetic biology, including potential treatments for cancer, infectious disease, and other public health priorities.

What actions may be necessary to manage the increasing accessibility of and potential misuse or illegal use of synthetic biology technologies and knowledge?

ADDITIONAL DISCUSSION QUESTIONS

[These questions can be used to prompt the Innovator(s) if they get stuck or during the open discussion period following the die rolls. Facilitators can also tailor these questions or ask new ones to meet the matrix game sponsor's specific needs.]

- *How do you balance the need for oversight to mitigate safety and security risks and the need to avoid stifling progress in the field?*
- *How do you protect against intentional or accidental release of pathogens, viruses, or chemicals from unregulated laboratory settings?*

APPENDIX VI: GAME SCHEDULE

Table 1: Schedule for conducting the matrix game

	MATRIX GAME STAGES (~3 HOURS)		
Introduction	- Welcome participants and discuss game purpose (Controller)	3 Min	18 Min
	- Explain game rules (Controller)	5 Min	Total
	- Practice round	7 Min	
	- Introduce current state and potential implications (Controller)	3 Min	
Round 1	- Introduce future scenario based on STEEP disruption (Controller)	5 Min	41–51
	- Craft initiatives and present arguments (Innovator[s])	15 Min	Min
	- Present counterarguments (Devil's Advocate)	10 Min	Total
	- Rebuttal (Innovator[s])	5 Min	
	- Adjudicate arguments and roll die (Judge)	5 Min	
	- (Optional) Open discussion period	< 10 Min	
	- Select STEEP disruptor	1 Min	
Round 2	- Introduce future scenario based on STEEP disruption (Controller)	5 Min	41–51
	- Craft initiatives and present arguments (Innovator[s])	15 Min	Min
	- Present counterarguments (Devil's Advocate)	10 Min	Total
	- Rebuttal (Innovator[s])	5 Min	
	- Adjudicate arguments and roll die (Judge)	5 Min	
	- (Optional) Open discussion period	< 10 Min	
	- Select STEEP disruptor	1 Min	
Round 3	- Introduce future scenario based on STEEP disruption (Controller)	5 Min	40–50
	- Craft initiatives and present arguments (Innovator[s])	15 Min	Min
	- Present counterarguments (Devil's Advocate)	10 Min	Total
	- Rebuttal (Innovator[s])	5 Min	
	- Adjudicate arguments and roll die (Judge)	5 Min	
	- (Optional) Open discussion period	< 10 Min	
Wrap Up	- Determine final game status of critical infrastructure security and resilience (Controller)	5 Min	20 Min
	- Open discussion period (Players)	15 Min	Total