

“governing in the Anthropocene” tackles directly how political systems are changing—or not—to respond to problems like climate change that extend across both space and time.⁴³

Fourth, and more generally, systems theorists—including Geoffrey Vickers, quoted above, who was a pioneer of the field—have explored many of the patterns that long problems raise. When considering systems overall, differential rates of change, as opposed to levels, are often the most important variables to study. Causal processes may exhibit positive or negative feedback effects. Tipping points may lead to fundamentally new equilibriums, creating nonlinear processes. All of these concepts help us probe the time-dependent assumptions that bind much social science scholarship.

While these four bodies of work are mostly in dialogue with each other, one contribution of the book is to gather their insights together and to translate them into the language of most social scientists, who stand to gain from taking them seriously. It is fair to say that each of them is significantly ahead of the bulk of contemporary political science, economics, or related disciplines in their conceptualization of time. As I argue in chapter 6, most contemporary social science literature makes fairly strong (implicit) assumptions about problem length that truncate the scope of our analysis and limit the generalizability of our theories across time.

That is a shame because there is in fact a huge amount that political science in particular can contribute to these questions. I aim to show how the discipline’s central concerns—how and why actors develop certain interests, how they build, wield, and contest power to advance those interests, and how institutions structure their interactions—enrich our overall ability to understand long problems. In particular, this book focuses on understanding the political implications of long problems and analyzing how and under what conditions governance may emerge. Political science has much to give back to the wider intellectual community grappling with the dilemma of long problems. Studying the political economy of long-term governance can help fill a vital gap between normative ideals and abstract concepts on the one hand and the realities of how societies organize themselves on the other hand.

Although attention to long problems remains underdeveloped in the core of political science, there are significant exceptions. As chapter 6 discusses, the discipline possesses significant tools for studying time. In particular, this book takes as its point of departure three key works: Paul Pierson’s *Politics in Time*, Alan Jacobs’s *Governing for the Long Term*, and Jonathan Boston’s *Governing for the Future*. Pierson not only provides a canonical treatment of path dependency

but also sets out how to understand long-term processes of change and sequencing more generally. Jacobs analyzes the politics of intertemporal investments in democracies, creating both a theoretical structure and a rich empirical baseline for considering the politics of redistribution across time. And Boston encyclopedically surveys and evaluates mechanisms for how governance can be made less short term. I seek to build on these insights and other work in the field.⁴⁴

The book proceeds as follows. Having presented the challenge of long problems and explained why they matter, in the next chapter I explore why long problems are hard to govern. It begins by compiling the various arguments made around short-termism in politics: why it exists and why it can lead to perverse outcomes. The bulk of the chapter, however, uses the concept of long problems to clarify three enormous political challenges. People in the future have only “shadow interests” in the present, limiting political agency that favors long-term outcomes. Dynamic problem structures that shift over time lead to institutions that lag behind what is functionally required of them. And because long problems require, by definition, action before their effects are felt, issues of uncertainty, low salience, and obstructionism are pervasive.

Chapters 3 through 5 then analyze strategies for governing long problems, corresponding respectively to the three challenges introduced in chapter 2: shadow interests, institutional lag, and the early action paradox. I start in chapter 3 with the last, as it encapsulates perhaps the core challenge of long problems: acting early. Making information about the future known and salient through informational tools or foresight processes can change action in the present when/if actors in the present have incentives to act in a long-term way, an important scope condition. But policymakers can also go further and use experimentalist governance techniques to confront the challenge of uncertainty directly, or deploy catalytic strategies and institutions, including those in the Paris Agreement, that can under certain conditions erode obstructionism by shifting incentives over time.

Chapter 4 turns to the challenge of shadow interests. Institutions that represent future interests in politics, either with reference to a specific issue like climate change or on behalf of future generations in general, can add an important element of agency to efforts to make knowledge of the future known and salient in politics. More powerfully, trustee institutions like courts and central banks can be given explicit mandates and powers to act on behalf of future interests. And a wide range of strategies can be used to actually extend political actors’ time horizons, including forms of participatory deliberation like climate assemblies.

Chapter 5 focuses on the dilemma of navigating the tension between durability and adaptability to overcome institutional lag. Long-term goal-setting like the Sustainable Development Goals (SDGs) can drive continuity, while tools like sunset and review clauses can create opportunities for reflexive updating. Similarly, by incorporating automatic trigger mechanisms—such as indexing policy to certain trends or outcomes—into governance, policymakers can ensure there is an opportunity to update, while building up reserves, such as those we see emerging in sovereign wealth funds, can provide the capacity to do so.

Each of these three chapters surveys a range of governance solutions to a specific challenge long problems pose and examines the conditions under which and processes through which they can have more or less effect on the problem. I do not present a novel empirical examination of how we have in the past governed long problems but rather use the book's theoretical tools to examine how we might do so drawing on a range of examples. Throughout, my focus is not on abstract solutions but how and under what conditions specific tools may or may not reshape politics. As these chapters show, these tools are used by and available to all types of countries—democracies and autocracies, wealthy and developing countries—with a wide range of political cultures. As with all governance, however, state capacity is needed to deploy such tools effectively. These chapters represent the bulk of the book's contribution, drawing extensively on the example of climate change but also drawing in other issues for comparison.

Unlike the others, chapter 6 targets scholars and research students specifically, looking at which social science tools, both theories and methods, can already help us analyze long problems and how new approaches can deepen our understanding of them. It explains how taking long problems seriously both challenges current approaches and creates exciting opportunities for theoretical innovation. It emphasizes the importance of looking at rates of change, dynamic problem structures, and empirical study of future outcomes. Readers not seeking to analyze long problems themselves may wish to skim or skip this chapter, though social scientists will find a perhaps provocative challenge to expand our methodological and even epistemological repertoire.

Finally, chapter 7 concludes by considering what it would really mean to govern across time. Although there has been some progress in climate policy in the last decades, we are collectively falling woefully short. The policy ideas exist, but sufficient political support for them does not. The arguments in this book help explain why. The political institutions we have inherited are stacked against effective governance of long problems like climate change.

To really tackle climate or any other long problem, we need to change the rules of the game.

I therefore propose an institutional agenda on climate change to help build the political conditions under which effective policy becomes more feasible. This agenda builds on the tools examined in chapters 3–5: weaving together future-oriented informational systems across the policymaking process, experimental and catalytic strategies and institutions, ways to represent future generations and create trustees for them that have real power, processes that can extend time horizons such as participatory deliberation, frameworks to set and continuously update long-term goals and pathways toward them, triggers to keep us on course, and new reserves to enable investment in transition and resilience. Together and over time, this family of long-term governance reforms could remake our political institutions in profound ways, reaching beyond a single issue like climate change and reorienting politics overall toward long-term interests.

However, the threat of climate change or any other long problem will not necessarily drive us toward this governance transformation. Indeed, we have reason to expect that as climate impacts and decarbonization grow more intense and existential, political pressure for immediate reaction and protection will make our political system more short-termist, not less. Instead, what the climate challenge does present is an opportunity for policymakers and citizens to catalyze more long-term governance systems going forward. The choice to do so or not is ours.

The book ends by considering the possibility that we succeed. Throughout human history, profound changes in political “technology”—the nation-state, representative democracy, global governance—have tended to lag changes in economic and social systems. But if we take governance of time seriously, then political decisions and activities can increasingly shape the social and economic future. Although there is always mutual feedback between these macrosystems, improving society’s capacity to shape material and social outcomes in the future—that is, to govern time—can create unprecedented possibilities, perhaps both good and bad, for our collective agency.

INDEX

- Abbott, Kenneth, 67
acceleration, 145, 195–98
activism, political, 99–100
Adam, Barbara, 158, 165
adaptation: climate change and, 22–23, 136–37, 154; determinants of, 148; durability and, 122–27, 176–77; endurance and, 105; to global temperatures, 144–45; investments in, 42; plans for, 173; rates of change and, 147–49
adaptive management, 55
Agenda 2063 (Africa), 107
agenda-setting, 27
agent-based modeling, 141, 161, 162
Aklin, Michaël, 132
Alien Tort Claims Act, 88
American Constitution, 13
analysis: of the future, 157–65; hubris in, 160; seriousness of, 129–37; of war, 129–30
Annex I countries, 37
Anthropocene, start of, 185–86
anticipatory governance, 43–44. *See also* governance
antimicrobial resistance, 146
Asimov, Isaac, 157
asset revaluation model, 134–35, 136, 153
Auld, Graeme, 133
autocorrection, 46

bacteria, 188
Bangladesh, 108
Barrett, Scott, 163
Bayesian approach, 161

Beck, Ulrich, 190–91, 200n29
belief systems, 14
benchmarking, 68, 111
benefit corporations (B corps), 92
Bernstein, Steven, 62, 63, 133, 161, 164
Better Business Act (United Kingdom), 92
biodiversity, 185
bioenergy with carbon capture and storage (BECCS), 42, 154
Bjornerud, Marcia, 128, 186, 187
boomerang effect, 72
Boston, Jonathan, 23, 52, 76–77, 191
Burke, Edmund, 70
Busby, Joshua, 133

California Air Resources Board (CARB), 84–86
campaign contributions, 175
capacity-building, 95
capital, reserves of, 124–25
capitalism, 1, 92
carbon, 1, 2, 49, 126–27
Carney, Mark, 23
Cashore, Benjamin, 133
casual mechanisms, 140, 164
catalysts: for climate change, 63–64; in early action paradox, 167; eroding of obstructionism by, 60–69; flexibility regarding, 65; as institutionalized, 64; iteration of, 66; learning effects from, 62–63; movers in, 65; overview of, 60–61; policy interventions and, 62
catalytic cooperation model, 133–34, 136

- central banks, 82, 83, 86, 172
- Central Organization Department (China), 109–10
- Charter of the United Nations, 13
- checks and balances, 88
- Chenoweth, Erica, 99
- Chile, wealth funds in, 124
- China: accomplishments of, 107; authoritarian nature of, 118–19; Central Organization Department in, 109–10; competing demands in, 114; COVID-19 pandemic and, 114; emissions trading system of, 63; five-year plan of, 107; fragmented authoritarianism of, 106; governance in, 13; government structure in, 26; net-zero target of, 109; organizational patterns in, 56; Paris Agreement and, 109; planning process in, 106; policymaking of, 106, 118–19; wealth funds in, 124
- Citizen's Assembly on Climate (Germany), 96
- civic engagement, 99–100
- Cixin, Liu, 144
- clauses, review and sunset, 115–18
- Clean Air Act (United States), 80
- Climate Assembly (Denmark), 97
- Climate Assembly UK, 97
- climate change: activism regarding, 99–100; adaptation and, 22–23, 136–37, 154; analysis of, 131–37; asset threats and, 133–34; as catalyst for institutional change, 177–80; catalytic action regarding, 63–64; catalytic cooperation model regarding, 133–34; consequences of, 2; defining, 9; deliberative techniques regarding, 97–99; disclosure requirements regarding, 93; distributional view of, 133–34; dynamic problem structure chains of, 151–56; education regarding, 95–97; elements of, 6; as entertainment subject, 143; experimentalism for, 57–58; foresight and, 50; as global collective action problem, 131–32; governance and, 3, 168–69; high-mitigation scenario regarding, 153–54; incentives regarding, 110; institutional agenda on, 169–77; institutional lag and, 36; integrated assessment models (IAMs) for, 141–42; knowledge base regarding, 45; levels of, 146; litigation regarding, 87–88; low-mitigation scenario regarding, 155–56; mitigation of, 62, 132, 133, 134, 147–49, 154; norm cascade for, 63; object of policy in, 61; policy winners and losers regarding, 132–33; polycentric model of, 132; prevention and, 152–53; rates of change and, 146, 147, 149; salience from, 46; shadow interests and, 31; Special Report on Global Warming of 1.5°C (IPCC) and, 72–74; strategies regarding, 178–79; success regarding, 180–81; as “super wicked” problem, 61, 134, 200n26; targets for, 63; as transition problem, 4; transnational governance of, 65; triggers and reserves regarding, 126–27; trusteeship and, 86; understanding regarding, 7–9
- Climate Change Act, 74
- Coase, Ronald, 31
- coercion, in experimentalist governance, 56
- Cold War, 120, 144, 189
- Colgan, Jeff, 133
- collective action, 131–32, 133–34, 153
- Collect Pond, Manhattan, New York, 39
- Collinridge, David, 41
- Colombia, litigation in, 87
- Commission for Sustainable Development and the Rights of Future Generations (Tunisia), 75
- commitment devices, 80
- commitment-making, iteration of, 66
- Committee for the Future (Finland), 50–51, 75
- common pool resources, 131
- communication, changes in, 1–2
- companies/institutions/organizations: accountability cycles of, 24–25, 26–27; building strategies of, 104; campaign contributions and, 175; catalyst overview of, 68–69; changing of, 35, 171–72; climate goal mandates for, 175;

- commitment-making by, 66; constituency growth by, 68; earnings reporting of, 91–92; endurance of, 105–14; foresight use by, 50; goal-setting and benchmarking by, 68; inconsistent incentives for, 27; issue processing by, 27; malleability of, 120; norm changes by, 95; path dependence of, 35; political weight of, 77; and power, 34; and processes for learning, 67; punctuated equilibrium and, 35–36; reflexive governance and, 115–22; reporting by, 26–27; short-termism and, 24–28; as sticky, 34–35, 36; thermostatic, 122; updating of, 115–22
- computational models, 161
- Conference of the Parties (COP), 65, 67, 73, 97
- Congressional Budget Office (CBO), 47–48, 72
- conservatism, 14
- constitutions, change process for, 35
- constructivism, limitations of, 7
- COP. *See* Conference of the Parties (COP)
- Council on Future (Sweden), 75
- COVID-19 pandemic, 46, 47, 112, 114, 122–23
- creeping problems, 200n26
- crises, salience from, 46
- critical junctures, 139, 140
- critical theory, 16
- Dahl, Robert, 169
- Dannenberg, Astrid, 163
- debt, during COVID-19 pandemic, 47
- decarbonization, 57–58, 62, 153, 154, 178
- deceleration, rates of change and, 145
- decision-making, 25–26, 45–46, 47, 79, 83
- Declaration of Independence, 193
- Declaration of the Rights of Man and of the Citizen, 193
- Declaration on Future Generations, 15, 89
- delegation, 79, 80, 84
- deliberative techniques, 97–99
- Delphi method, 49
- democracy, 130, 196
- democratic myopia thesis, 25
- Denmark, Climate Assembly of, 97
- Dewey, John, 55
- diffusion, in experimentalism, 58
- dilemma of control, 41
- direct air capture (DAC), 154
- discount rates, 138
- distributional politics, 130–31, 133–34, 136, 153
- Douglass, Frederick, 30
- drought, 9, 123, 178
- Dubash, Navroz, 174
- durability, 122–27, 176–77
- dynamic problem structure chains, 149–65
- early action paradox, 3, 22, 38, 43; and anticipatory governance, 43–44; and catalysts, 61; and experimentalism, 57; and informational instruments, 52; solutions to, 47, 61, 167; and uncertainty, 54
- Earth Overshoot Day, 184
- earth system governance, 186
- ecologism, 14
- economic inequality, 131
- economy, 125, 145, 150–51, 188
- education, for climate change, 95–97
- Edwards, Paul, 187–88
- Egypt 2030 plan, 107
- elections, democratic myopia thesis regarding, 25
- electricity, decarbonization of, 39
- emissions: acceleration of, 146; from Annex I countries, 37; as climate change cause, 9; doubling of, 21; economics and, 23; reduction of, 8, 39; statistics regarding, 39, 185; technologies regarding, 42; trading systems for, 63; triggers regarding, 126–27. *See also* climate change
- endurance, institutional, 105–14
- environmental change, 190
- environmental impact assessments (EIAs), 48, 52, 53
- environmental movement, 184
- environmental policy, 118

- Environmental Protection Agency (EPA), 80
epidemiological models, 161
Equiano, Olaudah, 30
ethanol, 176
European Court of Human Rights, 84
European Union (EU), Green Deal of, 170
experimentalism: agenda for, 174; coercion in, 56; defined, 153; in early action paradox, 167; failures of, 41, 176; goal in, 56; learning and diffusion in, 58; overview of, 54–60; political consensus in, 58–59; problem structure in, 59; willingness for, 57
experimental physics, 160
extinction, 185
Extinction Rebellion, 100

Fawcett, Paul, 196
Figueres, Christiana, 94–95
financial crisis (2008–2009), 46
Finland, 50–51, 52, 75
Five Points slum, Manhattan, New York, 39
food production, 145
food storage, 123
forecasting, 49
foresight, 44–54, 167, 172, 203n30
forest fires, 10, 187
formal theory, 141
free riding, 135
French Citizens Convention on Climate, 96
Fridays for Future, 100
Fuerth, Leon, 44
future/future generations: arguments regarding, 53; caring about, 14–15, 192; empirical analysis of, 157–65; failures regarding, 176; hubris regarding, 160; innovation regarding, 160; as known and salient, 44–54; outcomes for, 158–59, 160; powerlessness of, 29; pragmatic approach to, 159; predictions regarding, 157–58; quantitative methods regarding, 157; representation of, 71–78; selective interests regarding, 53–54; study of, 159; voice for, 71–78
game theoretic modeling, 141
gaming, 142–43
Geels, Frank, 133
geoengineering, 179
geopolitical rivalry, 144
Germany, 87, 96
Glasgow Financial Alliance for Net Zero, 111
Global Footprint Network, 184
globalization, 2, 55
Global Optimism, 94–95
Global Stocktake (Paris Agreement), 67, 169
global temperatures, 9, 144–45, 146, 155, 178, 185. *See also* climate change
goals/goal-setting: behavior of actors and, 109–10; benchmarking and, 111; benefits of, 173; coherence regarding, 111–12; competing, 114; defined, 56; endurance of, 106, 108; events for, 107; in experimentalist governance, 56; incentives regarding, 110; institutionalization of, 106; institutional lag and, 105–14, 167; by institutions, 68; overview of, 64, 106; as problematic, 114; rule-making versus, 106; salience of, 108; targets for, 173
Goetz, Klaus, 197
Gore, Al, 24
governance: adaptive management in, 55; anticipatory, 43–44; challenges of, 3; experimentalism in, 54–60; future as known and salient in, 44–54; intergovernmental, 3; of long problems, 12–15; participatory system of, 55; procedural requirements in, 47; reflexive, 55, 115–22, 167; of risk society, 190–91; self-constraint in, 81; support for, 25; temporal inconsistency of preferences of, 27; time-inconsistency problem in, 81; transnational, 3, 65; use of intermediaries in, 65
Government Foresight Group (Finland), 51
Great Acceleration, 185
Green, Jessica, 133
Green Climate Fund, 67
Green Deal (EU), 170

- greenhouse gases (GHGs), 6, 154–55.
 See also carbon; emissions
Green New Deal (United States), 170
Gross Domestic Product (GDP), 47, 185
Guardian of Future Generations (Malta), 75
- Held, David, 192
Helimann, Sebastian, 56
Hellmann, Gunther, 159
Hitler, Adolf, 13
Hoffmann, Matthew, 62, 63, 133
Holocene, 147, 185
horse manure, 51
hubris, in analysis, 160
human development, pace and scale of, 185
human rights institutions, 86
humans, rights and timescales of, 184–87, 193
Hungary, 75, 76
Huntington, Samuel, 196
- incentives, 110, 131, 133, 179
industrialization, 9, 196
inequality, 4, 6, 130–31
inflation, 83
innovation, in social science methods, 160
institutional change, climate change as
 catalyst for, 177–80
institutional lag, 4, 32–37, 102–5, 167; climate
 change and, 36; endurance and, 105–14;
 example of, 22; goal-setting and, 105–14,
 167; reflexive governance and, 115–22,
 167; triggers and reserves of, 122–27,
 167; updating institutions and, 115–22
institutions. *See* companies/institutions/
 organizations
integrated assessment models (IAMs),
 141–42, 161–62
Inter-American Court of Human Rights, 84
Intergovernmental Panel on Climate Change
 (IPCC), 21, 72–74, 77–78, 94, 188
International Energy Association, 146
International Monetary Fund (IMF), 83, 121
international relations theory, 33–34
intervention points, sensitive, 61
- Irish Citizens' Assembly (Ireland), 97, 99
Iroquois people, maxim of, 14, 47
Ise Jinju temple (Japan), 102
Israel, 75, 76
- Jacobs, Alan, 7, 128
Jacobs, Harriet, 30
Japan, in World War II, 143
Jasanoff, Sheila, 200n29
Jefferson, Thomas, 102–3, 115
Johnson, Steven, 39
Jordan, 123
Juliana v. the United States, 87
- Kant, Immanuel, 130
Kennedy, John, 108
Keohane, Nannerl O., 94
Knesset Commission for Future Genera-
 tions (Israel), 75, 76
Korea, wealth funds in, 124
Krznaric, Roman, 28, 32, 192
Kyoto Protocol, 37, 57, 59, 67, 119, 135
- land restoration, 58
land use policies, 58
Lasswell, Harold, 128
laws, change process for, 35
legal long-termism, 88–90
Levin, Kelly, 133
Lindblom, Charles, 38–39, 43
literacy, 139
lock-in, overcoming, 133
long problems: cause and effect related to,
 9; costs and benefits of, 12; early action
 and, 38; existing tools for, 137–43;
 governance challenges regarding, 3;
 governance need regarding, 12–15;
 governance process regarding, 4; as
 marathons, 143; ongoing problems as
 compared to, 10; political dilemmas
 regarding, 22; problem structure shifting
 of, 33; study of, 4–5
loss and damage, 8, 179
Lowi, Theodore, 116

- Maastricht Treaty, 80
Madison, James, 102–3, 115, 120–21
malapportionment, 175
malleability, 120
Malta, 75
Malthus, Robert Thomas, 145, 150, 197–98
Manulak, Michael, 117
Mao Zedong, 13
Marrakech Partnership for Global Climate Action (UNFCCC), 60, 65
Marx, Karl, 179–80
material transfers, process of, 66–67
media, influence of, 28
meteorology, 187–88
microorganisms, 188
Middle Ages, pathogen spread in, 195
Mildenberger, Matto, 132
Milieudefensie et al. v. Royal Dutch Shell plc., 87
Millennium Development Goals (MDGs), 105–6, 107, 112, 113
Ministry of Cabinet Affairs and the Future (United Arab Emirates), 75
mitigation: of climate change, 22–23, 132, 133, 134, 147–49, 154; dynamics of, 31; plans for, 173; viewpoints regarding, 8
mobilization, 99
Montreal, Canada, 56–57
Montreal Method, 57
Montreal Protocol, 56–57, 135, 152
moral cosmopolitanism, 193
moral long-termism, 194
muddling through, 37–42, 43
multilateral rule-making, 119

National Adaptation Plan (Bangladesh), 108
national adaptation plans, 108
National Environmental Policy Act, 48
National Foresight Network (Finland), 51
nationally determined contribution (NDC) structure, 59
natural disasters, 123
natural resources, human budget of, 184
near-term decisions, future implications of, 44–54

New York City, horse manure problem in, 51
New Zealand, 48–49, 52, 72, 114
Nigeria, 125
NIMBYism, 117
nonsimultaneous exchange, 31
North, Douglas, 128
North Sea, 23
Norway, 124, 125, 126
Nowotny, Helga, 186
nuclear age, 189

obstructionism, 37–42, 41, 60–69, 174
ocean chemistry, 185
Ogburn, William Fielding, 196, 197, 198
ongoing problems, long problems as compared to, 10
Ord, Toby, 193
Organisation for Economic Co-operation and Development (OECD), 109, 124, 203n30
Organization of Africa Unity, 107
organizations. *See* companies/institutions/organizations
overlapping generations, 138

pandemic disease, 6, 40, 188, 195. *See also* COVID-19 pandemic
Paris Agreement: as abstract, 60; activism and, 99–100; adoption of, 110; benchmarking for, 111; capacity-building and, 95; catalyst overview of, 69; commitment-making and, 66; effects of, 37; flexibility regarding, 65; Global Stocktake of, 67, 169; as institutionalized, 64; integrated assessment models (IAMs) for, 142; iteration of, 66; legitimacy of, 64; as modest instrument, 59–60; overview of, 108; Paris Committee on Capacity Building, 67; review of, 119; United States and, 111–12
Paris Committee on Capacity Building, 67, 95
Parliamentary Commissioner for Future Generations (Hungary), 75, 76
participatory deliberation, 172

- path dependence, 139, 140
Patomäki, Heikki, 161
Patrocinio, José do, 30
Pearl Harbor attack, 143
penalty defaults, 56, 59
pension funds, 126, 137
Permanent School Fund (Texas), 124
Permanent University Fund (Texas), 124
petroleum, 123
phosphorous cycle, 185
Pierson, Paul, 10, 12, 128, 140
Pinochet, Augusto, 88
planetary systems, 13, 184–87
planning, acceleration and, 196
Plato, 116
plotlines, 164
Polanyi, Karl, 179–80
policy: acceleration and, 196; barriers to, 105; environmental, 118; reserves in, 122–27; triggers in, 122–27. *See also specific policies*
political activism, 99–100
political consensus, in experimentalism, 58–59
political leaders, tenure of, 108–9
political problems, 5–12, 33–34, 191–94, 195–98
political will, 170
politics: capacity for change in, 104; carbon view of, 1–2; defined, 29; methods for change in, 32; veto players in, 104
Pompeii, 44–45
population growth, 145, 150–51
poverty, 112
power relationships, 34, 175–76
prediction, evaluation of, 157–58
preferences, 24, 90–101, 138
prevention, of climate change, 152–53
primacy, 9
Prince, Mary, 30
problem length, 3, 5, 9, 10, 11, 38, 129–39
problems, defining, 5–12. *See also* political problems
problem-solving, participatory system of, 55
Public Investment Fund (PIF) (Saudi Arabia), 125, 126
punctuated equilibrium, 35–36
pure time preferences, 24
qualitative process tracing, 140
Rapa Nui (Easter Island), 185
rapid change, 196
rates of change, 143–49
rationality, bounded, 24
Rayner, Steve, 136
reflexive governance, 55, 115–22, 167
regulatory impact assessments (RIAs), 48–49
renewable energy, 41–42, 61, 62, 67, 146, 148
reserves, 122–27, 167, 174
resistance development, 144–45
review clauses, 115–18, 173–74
risk, future, 140
risk society, 190–91
Rivett-Carnac, Tom, 94–95
Roosevelt, Franklin, 82–83
Rosa, Hartmut, 195, 198
Ruggie, John, 122
rule-making, goal-setting versus, 106
Russia, wealth funds in, 124
Sabel, Charles, 54, 56, 136
salience, 37–42, 44–54, 108
SARS, 46
Saudi Arabia, 107, 125, 126
scenario planning, 142
scenario-style approach, 163–64
School of International Futures, 210n3
science, future vision of, 187–91
Science Based Targets Initiative, 110
scientific development, 13–14, 43–44
seawalls, 58
securities law, 91–92
security, foresight regarding, 50
self-control, shadow interests and, 81
sensitive intervention points, 61

- shadow interests: activism regarding, 100;
changing preferences regarding, 90–101;
example of, 22; horizon-shifting regarding,
90–101; interventions regarding, 70–71;
overview of, 4, 29–32, 70–71, 167; political
focus of, 70; representation and, 71–78, 167;
self-control strategies and, 81; time hor-
izons in, 167; trusteeship and, 78–90, 167;
voices for future generations regarding,
71–78
- shadow of future, 191–94
- shareholder capitalism, 92
- short-termism: causes of, 138; in climate, 23;
crises as affecting, 46; defined, 3; drivers
behind, 21; incentives for, 179; limita-
tions of, 28–29; overcoming, 91; tyranny
of the present and, 22–29; variation in, 25
- simulation modeling, 141, 142–43, 162–63
- Skocpol, Theda, 48
- slavery, 29–30, 136
- slow-moving casual processes, 140
- social media, 190, 195
- social science: agent-based models for, 161,
162; analysis and, 129–37; approaches to,
160–61, 164–65; bias in, 129; computa-
tional models for, 161; dynamic problem
structure chains and, 149–65; empirical
analysis of the future in, 157–65; epidemio-
logical models for, 161; existing tools in,
137–43; free riding and, 135; innovation in
methods of, 160; overview of, 128; rates of
change and, 143–49; scenario-style ap-
proaches in, 163–64; simulation modeling
for, 162–63; time horizons and, 138–39;
timing, sequence, and contingency tools
in, 139
- social security (United States), 125–26
- social systems, timeframe for, 186
- social trust, 121–22
- society, 1, 70
- sociopolitical tipping point, 148
- Solyndra, 41
- South Africa, deliberative techniques
of, 97
- Soviet Union, 120, 144
- Spain, net-zero transition plan requirement
in, 93
- Special Report on Global Warming of 1.5°C
(IPCC), 72–74
- spending, assessment of, 47
- stakeholder capitalism, 92
- state capacity, as enabling condition, 177
- Stockdale, Liam, 53, 140
- storytelling, 142–43
- Structural Reform Support Division
(OECD), 203n30
- structure change, of long problems, 149–65
- successive limited comparisons, 38–39
- Sunrise Movement, 100
- sunset clauses, 115–18
- support, in governance, 25
- sustainable development, 194
- Sustainable Development Goals (SDGs),
64, 107, 112–13
- Sweden, 75
- Syria, drought in, 9
- Talanoa Dialogue, 97
- taxation, 92
- Technical Expert Meetings (UNFCCC), 60
- technology/technological development:
accumulative infrastructure of, 187;
anticipatory governance regarding, 43–44;
climate change and, 187–88; effects of,
13–14, 189–90; future vision of, 187–91;
learning curve of, 62; network effects
of, 62; obstructionism and, 41; rate of
change in, 144; salience and, 41; uncer-
tainty and, 41
- temporal focal points, 117–18, 139
- tenure of statutes act, 116
- Tetlock, Philip, 49, 157, 159, 160
- Thailand, COVID-19 pandemic and, 114
- Thames (river), 23, 28
- theory of pragmatism, 55
- thermostatic institutions, 122
- The Three Body Problem* (Cixin), 144
- Thunberg, Greta, 74
- time: horizons of, 138–39, 167; power and,
140; qualitative approaches regarding,

- 140–41; time preferences, 24; time revolution, 193
- Toffler, Alvin, 160, 196, 198, 210n6
- trade liberalization, 31
- transition theory, 153–54, 155
- transnational governance, 3, 65. *See also* governance
- Tremmel, Jörg, 88, 119
- triggers, 122–27, 167, 173–74
- Trump, Donald, 111–12
- trusteeship: authority of, 82; California Air Resources Board (CARB) as, 84–86; central banks and, 82, 83; challenges regarding, 87, 126; courts/judges as, 89; creating, 81; decision-making power of, 83; defined, 79; delegation to, 79, 84; dilemma regarding, 79; empowerment of, 89–90; examples of, 86; influence in, 94; legal long-termism and, 88–90; mandates for, 172; needs for, 81–82; orientation of, 81–82; overview of, 78–90, 167; power to, 172; trust in, 84
- Tunisia, 75
- UK Climate Change Committee (UKCCC), 74–75, 77–78
- uncertainty: in climate change, 39; early action paradox and, 37–42; experimentalism and, 54–60; of long problems, 39; pandemic disease and, 40; problem length and, 38; as source of limitations, 38; technological development and, 41
- Under 2 Coalition, 110
- UN Environment Programme, 96
- United Arab Emirates, 75
- United Kingdom (UK): Better Business Act, 92; Climate Assembly UK, 97; net-zero transition plan requirement in, 93; one in, two out rule in, 116
- United Nations (UN), 13, 34, 35, 170
- United Nations Educational, Scientific, and Cultural Organization (UNESCO), 96
- United Nations Framework Convention on Climate Change (UNFCCC), 34, 36–37, 57, 60, 104–5, 108, 119, 120, 179
- United States: Clean Air Act of, 80; climate change activism in, 100; climate-related financial risk requirement in, 93; Declaration of Independence of, 193; and Green New Deal, 170; Paris Agreement and, 111–12; social security payments in, 125–26; Soviet Union and, 120; sunset clauses and, 116–17; wealth funds in, 124; in World War II, 143; zoning in, 117
- UN Security Council, 120
- urban planning, successive limited comparisons and, 39
- Urgenda Foundation v. State of the Netherlands*, 87
- Urpelainen, Johannes, 133
- Venkataraman, Bina, 44
- Vesuvius, Mount, 44–45
- veto players, 104, 115
- Vickers, Geoffrey, 12, 17, 181, 197
- Vickers, John, 169
- Victor, David, 54, 56, 136
- Vietnam War, 120
- Vision 2030 plan (Saudi Arabia), 107, 125
- war, 120, 123, 129–30, 143, 162–63, 195; as short problem, 130
- We Are Still In coalition (United States), 111–12
- webcraft, for climate change, 65
- Wellbeing Economy Alliance, 92
- Wells, H. G., 157, 158
- Welsh Commission for Future Generations, 75
- Wenger, Andreas, 158
- white supremacy, 7
- wicked problem, 200n26
- World Bank, 83, 121
- World Meteorological Organization, 96
- World War II, 143
- Xi Jinping, 109
- Young, Oran, 103–4, 106
- youth, activism of, 100–101
- zoning, 117