



**Pricing  
Nature**

# PRICING NATURE

## Curriculum Supplement

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YALE  
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Yale *Tobin Center*  
*for Economic Policy*



*"Pricing Nature exemplifies the kind of education and public engagement we should support as economists. I recommend using it in your classes, along with this curriculum supplement, to help students connect economic and political concepts with the way those concepts materialize in public policy discussions."*

—Steven Berry, David Swensen Professor of Economics and Jeffrey Talpins Faculty Director of the Tobin Center for Economic Policy at Yale



# Foreword

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This toolkit accompanies *Pricing Nature*, a podcast about carbon pricing policy that weaves together concepts from economics, business, geopolitics, political economy, and public policy. The idea is simple: People should pay for their pollution. But as we demonstrate, even simple ideas can become complex on the way to implementation. This podcast series gets into the weeds in an accessible way, offering support for lessons in the economics, politics, and policy of climate change.

The following modules build on each other in chronological order, though each can stand alone independently. If you're interested in demonstrating the fundamental economic concepts behind carbon pricing, use Module Two. If you're focused on international politics, skip to Module Three. If you're curious about the partisan divide around climate policy, jump to Modules Four, Five, and Six.

To get in touch, please email us at [carbon@yale.edu](mailto:carbon@yale.edu). To subscribe to our newsletter, visit [pricingnature.substack.com](http://pricingnature.substack.com)

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## Module 1: Introduction to Carbon Pricing

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### Listen to Episode 1 on [Spotify](#) or [Apple Podcasts](#)

In our first episode, we break down the basics of pricing carbon dioxide and other harmful greenhouse gases. We're joined by Susanne Brooks, former Senior Director of U.S. Climate Policy and Analysis at EDF, to talk about how to design good carbon pricing policies.

We work to answer the following questions: Why put a price on carbon emissions? What should the government do with the revenue generated by such a price? Where would we actually apply a carbon price? How do we design carbon pricing policy in an equitable manner?

### Key Terms

- **Social cost of carbon:** A monetary estimate of all economic damages that would result from emitting one additional ton of carbon dioxide into the atmosphere.
- **Revenue-neutral:** Describes a carbon pricing policy that automatically reallocates any funds generated by the policy.
- **Point of regulation:** The point in the energy supply chain at which a carbon price is applied.
- **Border carbon adjustment:** A system of tariffs and rebates applied to imported and exported goods which ensures that all goods pay the local carbon price where those goods are consumed.
- **Intergovernmental Panel on Climate Change (IPCC):** A United Nations organization which provides regular reports on the scientific consensus around climate change, its impacts and future risks, and options for adaptation and mitigation.

### Discussion Questions

1. Can you think of another example like the one Casey shared about people dumping into the brook behind his childhood home? What are some other instances in which misplaced incentive structures fail to protect a natural resource?
2. What are the benefits and drawbacks of a carbon tax or a cap-and-trade system? If you were a state legislator, would you advocate for either of these mechanisms? If so, which one and why?

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### Additional Resources

[Cap and Trade vs. Taxes](#) from the Center for Climate and Energy Solutions

[Carbon Pricing 101](#) from Resources for the Future

[Why Price Carbon?](#) from Climate XChange



## Module 2: What's the Right Price?

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### Listen to Episode 2 on [Spotify](#) or [Apple Podcasts](#)

In Episode 2, we discuss the social cost of carbon with expert economists and policy professionals. We talk to Nobel laureate William Nordhaus (a Sterling Professor of Economics at Yale), Fran Moore (an Assistant Professor of Environmental Science and Policy at University of California Davis), Howard Shelanski (a Law Professor at Georgetown University and former White House administrator), and Senator Sheldon Whitehouse (U.S. Senator from Rhode Island).

The social cost of carbon is estimated using mathematical models called Integrated Assessment Models (IAMs). Each model takes a different approach to key questions about the social cost of carbon. How much should we discount the value of future health and resources? How can the effects of climate change compound and spiral out of control? How likely are the worst effects of climate change? Once we understand where the social cost of carbon comes from, we can start thinking about how it should be applied to policy.

### Key Terms

- **Integrated Assessment Model:** A mathematical model that describes the intertwining effects of societal, economic, and scientific phenomena.
- **Discount rate:** A rate which quantifies the future value of an asset.
- **Feedback loop:** An input-output system which forms a circuit, where outputs "feed back" into the system as inputs.
- **Tipping points:** Thresholds at which cascading, unpredictable phenomena occur.
- **Fat-tail risks:** In contrast with normal distributions, fat-tailed distributions include extreme scenarios of moderate to low probability, rather than negligible probability.

### Discussion Questions

1. Can you think of feedback loops that exist in today's world?
2. What do you think is a more appropriate approach to discounting—the prescriptive approach, or the descriptive approach?
3. How do you think economic modeling should be used to design policy?

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### Additional Resources

[Climate Change and Discounting the Future: A Guide for the Perplexed](#) by David Weisbach and Cass Sunstein

[Discounting climate change](#) by Partha Dasgupta

[Stern Review: The Economics of Climate Change](#)

[The Stern Review on the Economics of Climate Change](#) by William Nordhaus

[Report of the High-Level Commission on Carbon Prices](#) from the Carbon Pricing Leadership Coalition



## Module 3: The Road to Paris

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### Listen to Episode 3 on [Spotify](#) or [Apple Podcasts](#)

In Episode 3, we discuss 30 years worth of global climate negotiations in the span of one hour. We speak with Susan Biniarz (Senior Fellow for Climate Change at the UN Foundation and Visiting Lecturer at Yale), Dan Esty (Hillhouse Professor of Environmental Law and Policy at Yale), and David Roberts (Author of “Volts,” a podcast and newsletter on clean energy and politics and former Vox journalist) to understand the key moments of the last three decades and what we can learn from global attempts to fight climate change. We look at the struggle to balance the stringency of global agreements with a need for widespread global participation. Finally, we learn about the disproportionate influence of the United States on the success or failure of these agreements.

### Key Terms

- **The Montreal Protocol (1987):** A legally-binding international agreement that transitioned the global economy away from ozone-depleting chlorofluorocarbons (CFCs).
- **UN Framework Convention on Climate Change (UNFCCC):** Crafted at the Rio Earth Summit in 1992, the UNFCCC acknowledged a need to act on climate change, and established an annual “Conference of the Parties.”
- **Conference of the Parties (COP):** The supreme decision-making body tasked with implementing the goals of the UNFCCC. Conference of the Parties also refers to the annual meeting of this body.
- **The Kyoto Protocol (COP3, 1997):** A legally-binding international climate agreement that dictated carbon emission reduction targets for high and upper-middle income countries. Importantly, the United States Congress declined to ratify this agreement.
- **Annex I:** A list of countries found at the end of the Kyoto Protocol, made up of mostly High-Income and Upper-Middle Income countries. Only Annex I countries were required to reduce their emissions under the Kyoto Protocol.
- **Clean Development Mechanism:** Under the Kyoto Protocol, Annex I countries could meet some of their emissions obligations by investing in decarbonization efforts in non-Annex I countries. This was known as the Clean Development Mechanism.
- **The Copenhagen Accord (COP15, 2009):** A non-binding international climate agreement which set a goal to restrict global temperature rise below 2 degrees Celsius. The accord established the mechanism of non-binding, domestically-determined emissions targets, later known as “Nationally Determined Contributions.”
- **The Paris Agreement (COP21, 2015):** An international climate agreement which included Nationally Determined Contributions from countries representing 97% of global emissions.

## Discussion Questions

1. Who is responsible for decarbonizing the economy? Yesterday's emitters, today's emitters, or tomorrow's emitters?
2. Where else is social pressure applied to enforce global agreements, where global governance systems may be lacking or non-existent?

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## Additional Resources

[In-depth Q&A: How 'Article 6' carbon markets could 'make or break' the Paris Agreement](#)  
by CarbonBrief

[What You Need to Know About Article 6 of the Paris Agreement](#) by Kelley Kizzier, Kelly Levin and Mandy Rambharos

[Should we continue to use the term "developing world"?](#) by Tariq Khokhar and Umar Serajuddin

[If You Shouldn't Call It The Third World, What Should You Call It?](#) by Marc Silver

[The Economic Potential of Article 6 of the Paris Agreement and Implementation Challenges](#)  
from the Carbon Pricing Leadership Coalition





## Module 4:

# Why doesn't the U.S. have a national price on carbon?

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### Listen to Episode 4 on [Spotify](#) or [Apple Podcasts](#)

For two decades, Democratic and Republican members of congress have regularly introduced carbon pricing bills, but the U.S. still doesn't have a national price on carbon. To understand why, we speak with Senator Sheldon Whitehouse (D-RI), Nat Keohane (Senior Vice President for Climate at EDF), Saya Ameli Hajebi (Sunrise Movement activist), Carlos Curbelo (Former Congressman R-FL 26), David Roberts (Author of the Volts newsletter on clean energy and politics), and Susanne Brooks (former Senior Director of U.S. Climate Policy at EDF). We discuss historic carbon pricing bills that almost passed, and the political barriers that doomed them.

### Key Terms

- **The Waxman-Markey Bill:** Also known as the American Clean Energy and Security Act, the Waxman-Markey Bill would have implemented a national carbon cap-and-trade program in the United States. The bill passed in the House in 2009, but never made it to a vote in the Senate.
- **The Tea Party Movement:** A political wave of fiscal conservatism that arose in 2009, and grew to have major influence in the Republican Party.
- **Deepwater Horizon (2010):** A massive oil rig in the Gulf of Mexico which exploded in 2010, killing 11 people and pouring ~210 million US gallons of oil into the Gulf.
- **Citizens United v. Federal Election Commission (2010):** A controversial U.S. Supreme Court decision that enabled unlimited political spending through Political Action Committees, or PACs.
- **The Climate Solutions Caucus:** A bipartisan group in congress formed in 2016, dedicated to depoliticizing and acting on climate change.
- **The Green New Deal:** A U.S. House Resolution introduced in 2019 by Representative Alexandria Ocasio-Cortez which outlines progressive strategies for combating climate change with an emphasis on equity and justice.

### Discussion Questions

1. What do you think is the value of passing bipartisan legislation to fight climate change?
2. What philosophical differences may have led to polarization around climate change? Is there a path to depolarizing the issue?
3. Where do you think carbon pricing should fit in the “climate policy tent?”
4. Can you think of other examples, like the Great Recession or Deep Water Horizon, where circumstantial current events have had political effects on legislation?

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## Additional Resources

Carbon Pricing Bills in the 116th Congress from [Resources for the Future](#) and the [Center for Climate and Energy Solutions \(C2ES\)](#)

How to Save a Planet's [“How 2020 Became a Climate Election”](#)

Full text of the [Green New Deal](#)

[Guide to Communicating Carbon Pricing](#) from the Carbon Pricing Leadership Coalition



## Module 5: The Conservative Case for Carbon Pricing

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### Listen to Episode 5 on [Spotify](#) or [Apple Podcasts](#)

Some consider carbon pricing and other “market-based” regulatory efforts to be fundamentally conservative ideas. In Episode 5, we speak with some conservative thinkers who embrace market-based climate strategies. Former Congressman Bob Inglis (RepublicanEN), Kiera O'Brien (Young Conservatives for Carbon Dividends), former Congressman Carlos Curbelo (FL-26), and Jerry Taylor (Niskanen Center) each shared their case for why carbon pricing is a conservative policy, and why more conservatives should support it.

### Key Terms

- **Carbon dividends:** A proposed form of revenue allocation, where revenue from a carbon tax or cap-and-trade market are redistributed to taxpayers as a lump sum.
- **Regulatory rollback:** A removal of existing regulations in response to the implementation of a new policy (e.g. carbon pricing), in an effort to reduce regulatory redundancy.
- **The Baker-Shultz Plan:** A Republican-led carbon tax proposal that includes a steadily rising carbon price, universal carbon dividends, regulatory rollback, and a border carbon adjustment.
- **Students for Carbon Dividends (S4CD):** A bipartisan student group dedicated to market-based climate action.

### Discussion Questions

1. Where would you place carbon pricing policy along the political spectrum? How would you tune a carbon pricing policy to make it more "conservative"?
2. How does a policy mechanism's design impact its public support?
3. What do you think it takes to change policy makers' minds?
4. What are some of the challenges of implementing a border carbon adjustment?

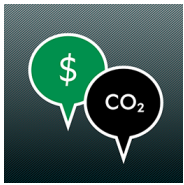
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### Additional Resources

[Pros and Cons of a Carbon Border Adjustment Mechanism](#) from Forbes

The [Baker-Shultz Plan](#) from the Climate Leadership Council

The [“Raise Wages, Cut Carbon” Act](#) and the “Market CHOICE Act” of [2018](#) and [2019 Report of the High-Level Commission on Carbon Pricing and Competitiveness](#) from the Carbon Pricing Leadership Coalition



## Module 6: Carbon Pricing Hits a Brick Wall on the Left

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### Listen to Episode 6 on [Spotify](#) or [Apple Podcasts](#)

Why does President Biden's American Jobs Plan make no mention of carbon pricing? In the final episode of the season, we speak with Michael Méndez (Assistant Professor at UC-Irvine) and Danny Cullenward (energy economist and lawyer at CarbonPlan and Stanford) about the tensions between policymakers and environmental justice advocates surrounding California's cap-and-trade program. This case study informs our conversation with Keya Chatterjee (Executive Director of U.S. Climate Action Network) about progressive critiques of carbon pricing policy and outcomes. David Roberts (author of the Volts newsletter) helps us understand what progressives favor instead: sector-specific standards and massive investments in infrastructure, emphasizing justice. We close with a discussion of political pathways to future progressive climate action.

### Key Terms

- **Distributive justice:** Fairness in distribution of outcomes.
- **Procedural justice:** Fairness in decision making processes (typically via inclusion of marginalized voices).
- **Overallocation:** A state of excess pollution permits within a cap-and-trade market, where regulated entities face little economic pressure to reduce emissions.
- **Carbon offsets:** Decarbonization projects, like landfill methane capture or forest management, which represent a quantifiable reduction of carbon emissions. Under some regulatory systems, entities can invest in these projects to offset their own emissions.
- **Filibuster:** A procedural rule in the U.S. Senate which functionally requires 60 votes to pass most major legislation.
- **Budget reconciliation:** A procedural process in the U.S. Senate which allows a simple (51-vote) majority to pass budgetary legislation.
- **The American Jobs Plan:** A \$2.7 trillion infrastructure spending plan proposed by the Biden Administration in 2021, which would invest heavily in a clean energy transition.

### Discussion Questions

1. How would you tune a carbon pricing policy to make it more "progressive"?
  2. What might be lost by not including carbon pricing in a climate policy platform?
  3. What philosophical beliefs do you hold that shape how you think about policy design?
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### Additional Resources

[Climate Change from the Streets](#) by Michael Méndez

[Climate policy, environmental justice, and local air pollution](#) by Meredith Fowlie, Reed Walker, and David Wooley

## Additional Resources continued...

[Letter opposing Mary Nichols for Administrator of the Environmental Protection Agency](#)

[Tracking banking in the Western Climate Initiative cap-and-trade program](#) by Danny Cullenward, Mason Inman, and Michael Mastrandrea

[Do Environmental Markets Cause Environmental Injustice? Evidence from California's](#)

[Carbon Market](#) by Danae Hernandez-Cortes & Kyle C. Meng

[A critique of "Do Environmental Markets Cause Environmental Injustice?"](#) by Danny

Cullenward and Katie Valenzuela

[USCAN's Vision for Equitable Climate Action](#) led by Keya Chatterjee

[At last, a climate policy platform that can unite the left](#) by David Roberts

[Making Climate Policy Work](#) by Danny Cullenward and David Victor

[Washington state now has the nation's most ambitious climate policy](#) by David Roberts

[Using Carbon Revenues](#) from the Carbon Pricing Leadership Coalition

# GLOSSARY

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# Developing Stories

## Module 2:

On February 26, 2021, the Biden Administration announced an updated Social Cost of Carbon Dioxide of \$51/MTCO<sub>2</sub>. The Interagency Working Group tasked with identifying this dollar value is expected to update its estimate by [January 2022](#).

## Module 3:

The 26th Annual Conference of the Parties is scheduled to take place in Glasgow, beginning on November 1, 2021. Countries are expected to provide updated Nationally Determined Contributions, and to continue discussions of [Article 6](#), a portion of the Paris Agreement concerning international emissions trading.

## Module 4:

In June, 2021, Senators Whitehouse (D-RI) and Schatz (D-HI) introduced the [Save Our Future Act](#), a carbon tax bill that sets a price of \$54/MTCO<sub>2</sub>. The bill includes direct checks to low- and middle-income households, investments in environmental justice communities, and support for fossil fuel workers and communities.

## Module 5:

In late April, 2021, Republican House Leadership announced the [Energy Innovation Agenda](#), an updated energy and climate platform that includes ~30 separate measures. Critics of the agenda note the absence of a plan to curb fossil fuel use, the primary driver of climate change.

## Module 6:

As of late August, 2021, a \$1 Trillion bipartisan infrastructure package passed the U.S. Senate. Democratic lawmakers have now shifted their focus to a [\\$3.5 Trillion budget reconciliation bill](#) meant to cover the remainder of President Biden's jobs plan. Proposals for the reconciliation bill have included a "[Clean Electricity Payment Program](#)," a form of clean electricity standard designed for the budget reconciliation process.



# Thank You!

Thanks for listening to Season 1 of Pricing Nature, a limited-series podcast from the Yale Carbon Charge, the Yale Center for Business and the Environment, the Yale Tobin Center for Economic Policy, and the World Bank Carbon Pricing Leadership Coalition. Our podcast tells the story of carbon pricing, which many argue should play a critical role in any national climate policy. Join us in the 2021-2022 academic year for Season 2!



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