



Department of
Environmental
Conservation

Value of Carbon

Climate Leadership and Community Protection Act

July 24, 2020

Climate Leadership and Community Protection Act (CLCPA)

Signed by Governor Cuomo in July 2019

- Effective January 1st, 2020

Article 75 of the Environmental Conservation Law

- 75-0113 Value of Carbon

Today's Presentation

1. Key Terms in ECL 75-0113
2. Establishing DEC Guidance on a Value of Carbon
3. Federal Interagency Working Group
4. Example Uses of a Value of Carbon
5. Key Considerations

ECL 75-0113 Value of Carbon

1. No later than one year after the effective date of this article, the department, in consultation with the New York state energy research and development authority, shall establish a social cost of carbon for use by state agencies, expressed in terms of dollars per ton of carbon dioxide equivalent.
2. The social cost of carbon shall serve as a monetary estimate of the value of not emitting a ton of greenhouse gas emissions. As determined by the department, the social cost of carbon may be based on marginal greenhouse gas abatement costs or on the global economic, environmental and social impacts of emitting a marginal ton of greenhouse gas emissions into the atmosphere, utilizing a range of appropriate discount rates, including a rate of zero.
3. In developing the social cost of carbon, the department shall consider prior or existing estimates of the social cost of carbon issued or adopted by the federal government, appropriate international bodies, or other appropriate and reputable scientific organizations.

Key Terms from the CLCPA

- Value of Carbon
- Social Cost of Carbon
- Marginal Abatement Cost

Value of Carbon

Any representation of the monetary cost that should be applied to a unit of greenhouse gas emissions.

Many different approaches have been used by public and private organizations to meet different goals.

CLCPA requires DEC to consider the damages or marginal abatement cost approaches.

Damages Approach

The most common damages-based value is the "Social Cost of Carbon", e.g., used by federal agencies.

The net cost of societal damages (or impacts) from a marginal ton of greenhouse gas emissions, usually carbon dioxide, over a period of time, using a specified discount rate.

Other Approaches

- **Marginal Abatement Cost** – the net cost of actions to abate a marginal ton of greenhouse gas emissions in order to meet a greenhouse gas emission reduction target.
- **Market-based allowance price** - established by an emissions trading scheme (such as RGGI).
- Other examples may be used for other purposes.

Establishing a Value of Carbon

This guidance will:

- Provide background on the value of carbon and specific considerations for State agencies.
- Serve as an additional tool to aid decision-making.
- Consider a range of discount rates, including zero.
- Discuss how to value non-CO₂ greenhouse gases.

This is not a carbon price and will not impose any fees.



Federal Interagency Working Group (IWG)

The IWG established a damages-based value of carbon for use by federal agencies.

Three metrics:

- Social cost of carbon (dioxide)
- Social cost of methane
- Social cost of nitrous oxide

How is the IWG value estimated?

The federal SCC was calculated using models that follow four steps.

1. Predict future emissions using factors such as economic growth and population.
2. Model future climate responses, such as temperature increase and sea level rise.
3. Assess the economic impact on aspects of the economy, such as energy use, health, and agriculture, from these climatic changes.
4. Convert future damages into their present-day value using discounting and add them up to determine total damages.

<https://www.rff.org/publications/explainers/social-cost-carbon-101/>



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Federal Interagency Working Group (IWG)

The IWG values are based on:

- Three frequently cited, peer reviewed integrated assessment models (IAMs): FUND, DICE, and PAGE models.
- Three discount rates of 2.5, 3, and 5 percent, along with the 95th percentile estimate at a 3 percent discount rate.

Selecting a Discount Rate

- This has a large impact on the value of carbon estimate, but there is no “correct” rate. It depends on the purpose.
- Discounting is used to measure the difference between present values and future values.
 - How *should* society trade off current and future benefits vs. How *does* society trade off current and future benefits.

Selecting a Discount Rate

- Discounting can be used to reflect the rate that society is willing to trade present benefits for future benefits.
- As a discount rate is lowered, more value is placed on future benefits and costs. Sometimes this is referred to as the public's willingness to pay.
- A rate of zero values future benefits equal to present benefits and assumes no economic growth.

Federal IWG Discount Rates

Example: Federal IWG 2013 “Social Cost of Carbon”

Revised Social Cost of CO₂, 2010 – 2050 (in 2007 dollars per metric ton of CO₂)

Discount Rate	5.0%	3.0%	2.5%	3.0%
Year	Avg	Avg	Avg	95th
2010	11	32	51	89
2015	11	37	57	109
2020	12	43	64	128
2025	14	47	69	143
2030	16	52	75	159
2035	19	56	80	175
2040	21	61	86	191
2045	24	66	92	206
2050	26	71	97	220

(Interagency Working Group., US Government 2013)

What the IWG considered:

- The 3% rate is based on observable consumer behavior and should be the “central” rate
- Reporting multiple discount rates describes a range of benefits.



Example Uses

Cost Benefit Analyses

- U.S. agencies use in Cost Benefit Analysis in rulemakings and may use in environmental assessments.
 - e.g., EPA GHG and Fuel Efficiency Standards for Medium and Heavy-Duty Vehicles - Phase II Rule (2015)

Planning Documents

- The value of carbon describes the benefits of policies
 - e.g., California included in their 2017 Scoping Plan



EPA GHG and Fuel Efficiency Standards for Medium and Heavy-Duty Vehicles - Phase II Rule (2015)

Table IX-14—Upstream and Downstream Annual CO₂ Benefits for the Given SC-CO₂ Value ^a Using Method B and Relative to the Less Dynamic Baseline
[millions of 2012\$] ^b

Calendar year	5% Average	3% Average	2.5% Average	3%, 95th Percentile
2018	\$13	\$43	\$65	\$130
2019	26	91	130	270
2020	40	140	210	420
2021	92	330	500	1,000
2022	170	590	880	1,800
2023	250	860	1,300	2,600
2024	400	1,300	1,900	4,000
2025	540	1,800	2,600	5,500
2026	720	2,300	3,400	7,000
2027	890	2,900	4,200	8,900
2028	1,100	3,500	5,100	11,000
2029	1,300	4,200	5,900	13,000
2030	1,500	4,800	6,900	15,000
2035	2,500	7,400	11,000	23,000
2040	3,300	9,700	14,000	30,000
2050	5,000	14,000	19,000	42,000
NPV	22,000	100,000	160,000	320,000

Notes:

^a The SC-CO₂ values are dollar-year and emissions-year specific.

^b For an explanation of analytical Methods A and B, please see Section I.D; for an explanation of the less dynamic baseline, 1a, and more dynamic baseline, 1b, please see Section X.A.1.

How the EPA used the SCC:

For each year

- Estimated the emission reduction for that year
- Multiplied the changes in emissions with the SCC for that year

The net present value of a project is the sum across all years.

For this rule, the benefits ranged from \$22-\$320 billion, or **\$100 billion at the central 3% discount rate.**



California Air Resources Board 2017 Climate Change Scoping Plan

TABLE 9: ESTIMATED SOCIAL COST (AVOIDED ECONOMIC DAMAGES) OF POLICIES OR MEASURES CONSIDERED IN THE 2017 SCOPING PLAN DEVELOPMENT[#]

Measure (Measures in bold are included in the Scoping Plan)	Range of Social Cost of Carbon \$ million USD (2015 dollars)**
Scoping Plan Scenario SC-CO ₂	\$1,060–\$8,970
Scoping Plan Scenario SC-CH ₄	\$860–\$2,260
Scoping Plan Scenario (Total)	\$1,920–\$11,230

How California used the SCC

- Estimated the emission reductions across a suite of policies included in the plan.
- Used the federal IWG values and discount rates – for carbon dioxide and methane.

For this plan, the benefits ranged from \$1.9-\$11 billion, or up to **\$7.8 billion at the central 3% discount rate.**



Past Uses of an SCC by NYS Agencies

DPS - “Staff White Paper on Benefit-Cost Analysis in the Reforming Energy Vision Proceeding” (14-M-0101)

- Benefit-cost analyses of utility expenditures that may impact CO₂ emissions
- Avoided CO₂ cost compensation to clean distributed generators
- Zero-emission credits (ZEC) for at-risk nuclear generation power plants

Past Uses of an SCC by NYS Agencies

NYSERDA

- Uses SCC estimates in studies that inform state energy policy and program investment decisions.
- Examples include the 2018 NYS Offshore Wind Master Plan and the 2019 New Efficiency: New York - Analysis of Residential Heat Pump Potential and Economics.

DEC

- Have supported (in comments) use of the federal IWG's SCC by federal agencies.

NYISO - "IPPTF Carbon Pricing Proposal"

- Proposal to incorporate the SCC into the price of the wholesale energy market.

Key Considerations

- **Selecting discount rates**
 - Public entities tend to choose lower discount rates.
 - Federal government reports multiple rates.
 - What range would be useful for NYS agencies?
- **Other greenhouse gases and other impacts**
 - How should other greenhouse gases be valued?

Key Considerations

- How can state agencies use the damages-based value of carbon?
 - Federal government uses it in regulatory benefit-cost analyses and environmental reviews (see above).
 - Others have used it in policy analysis and resource planning.
- How can agencies use other values of carbon?
- What other considerations should be included?

Thank You

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