

Downstream Regulation: Design Options

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Downstream Approaches: Issues and Options

- Downstream approaches have significant appeal.
 - Familiarity from the Acid Rain program
 - Perception that regulation downstream sends a stronger, more direct signal to the entities that can achieve reductions, invest in new technologies
- However, downstream approaches have to overcome unique design challenges.
 - How to maximize coverage of sources of emissions while minimizing administrative costs and complexity

**POINT OF REGULATION OPTIONS:
DOWNSTREAM PROGRAMS**

OPTION	POINT OF REGULATION		COVERAGE (% US CO ₂ Emissions)	ESTIMATED NUMBER OF REGULATED ENTITIES
	LARGE SOURCES	OTHER SOURCES		
A. Downstream, All Source	Emitter	Emitter	100%	± 200 million
B. Downstream, Large Source - (Acid Rain Model)	Emitter	Unregulated	40-50%	3,000-14,000
C. Upstream / Downstream				
1. McCain Lieberman	Emitter	Refiner, Importer (except residential, agriculture)	85-90%	4,000-15,000
2. Downstream, Large Source + Refiner/Pipeline	Emitter	Refiner, Pipeline, Shipper, Importer	100%	4,200-15,200
3. Downstream, Large Source + Retail Distributor	Emitter	Retail Fuel Distributor	100%	>170,000
D. Hybrid	Emitter	Auto, Appliance Manufacturers (through efficiency standards for new products)	80-95%	3,000-14,000 plus entities subject to standards programs

Option A: Downstream, All Sources

- Under this option, all energy-sector sources of CO₂ emissions would be required to surrender allowances.
- It would involve regulation not only of large emissions sources, but also automobiles, home furnaces, and countless other small sources.
 - Regulated entities = +200 million
- While Option A would cover 100% of emissions, it presents massive administrative challenges.

Option B: Downstream, Large Sources (Acid Rain Model)

- Under this option, “large sources” would be required to surrender allowances.
- Like the Acid Rain program, “large sources” could encompass only electric generating units (EGUs). Or, it could also bring in industrial sources (e.g., with emissions $> 10,000$ MTCO₂/yr).
 - EGUs-only approach implies regulation of 3,000 sources and coverage of approx. 40% of CO₂ emissions.
 - EGUs + large industrial sources approach implies regulation of upwards of 14,000 sources and coverage of approx. 50% of CO₂ emissions. *Depends significantly on definition of “large source.”*
- Less than 100% coverage implies:
 - Lower cost-effectiveness – fewer reductions and low-cost reduction options fall outside trading system
 - Can address some of the gaps through offset projects, but these have high transaction and administrative costs
 - Possible leakage if production shifts from regulated to unregulated sources

Option C: Upstream/Downstream Designs

- Basic approach:
 - Regulate large sources (EGUs + industrial large sources) downstream.
 - Cover smaller sources in the transportation, agriculture, commercial, and residential sector through *upstream* regulation.
- Design issue:
 - Avoiding double regulation of fuels distributed to regulated large sources
- Design Options
 - 1. McCain-Lieberman Approach
 - 2. Large Source + Retail Distributor
 - 3. Large Source + Refiner/Pipeline Shipper

Option C1: McCain-Lieberman Approach

- McCain-Lieberman approach involves:
 - Downstream cap-and-trade regulation of large sources
 - Agriculture and residential sectors not covered
 - Upstream cap-and-trade regulation of fuels used for transportation purposes (*i.e.*, oil refiners, importers)
- Regulates approximately 14,000 sources
- Avoids double regulation by exempting certain sources
- However, the exemptions – particularly for residential and agricultural gas and oil use – mean that the program only achieves coverage of 85-90% of energy-sector CO₂ emissions.

Option C2: Downstream Large Source + Refiner/Pipeline Shippers

- This approach involves:
 - Downstream cap-and-trade regulation of large sources
 - Upstream cap-and-trade regulation of refiners, importers, and gas pipeline shippers.
- Can achieve close to 100% coverage of energy-sector CO₂ emissions.
- However, it requires development of a system to ensure that upstream fuels distributed to large sources are regulated only once.

Option C3: Large Source + Retail Distributor

- This approach involves:
 - Downstream cap-and-trade regulation of large sources
 - Upstream cap-and-trade regulation of retail petroleum and natural gas distributors.
- Can achieve close to 100% coverage of energy-sector CO₂ emissions
- To avoid double coverage, retail fuel distributors would surrender allowances only for sales of fuel to unregulated sources
 - From the standpoint of avoiding double-coverage, this approach might be easier to administer than Option C2 because retail fuel distributors, deal directly with end-users. (Refiners, pipeline shippers, and importers frequently do not.)
 - However, from the standpoint of number of regulated entities, it could be more difficult to administer because retail distributors number in the tens of thousands.
 - For example, there are 168,000 retail gasoline stations in the United States.

Option D: Hybrid

- This approach involves:
 - Downstream cap-and-trade regulation of large sources
 - Upgraded efficiency standards for motor vehicles, and petroleum and natural gas powered equipment and appliances used in the commercial, residential, and transportation sectors
- Can achieve:
 - Approx. 80% coverage of CO₂ emissions with existing standards programs
 - Approx. 95% coverage of CO₂ emissions with establishment of standards for currently unregulated equipment

Option D: Hybrid (Continued)

- Advantage – Achieves nearly 100% coverage without double-regulation issues and relies on existing or revised efficiency standards programs
- Disadvantages
 - Standards programs are less efficient than cap-and-trade programs (although standards can be “tradeable,” which makes them somewhat more efficient).
 - Standards only reach new products and therefore take time to penetrate market.
 - Requires upgrading numerous standard programs, *e.g.*,
 - Consumer standards: water heaters, furnaces, clothes dryers, pool heaters.
 - Commercial standards: steam boilers, ovens, kilns, dryers.
 - Maximizing coverage means establishing new standards for locomotives, vessels, heavy-duty trucks, aircraft.
 - Strengthening motor vehicle standards will meet significant resistance in auto industry.