

August 2007

**Climate Policy Group - Climate Policy Development Paper
A Three-Phased Legislative Approach Using a GHG Control Technology Trigger¹**

This proposal is meant to stimulate discussion on developing a substitute legislative approach to adoption of a near-term ghg emissions cap and trade program. This proposal addresses electricity power sector policies only, using a technology-triggered three-phased approach. Other sectors would be required to undertake similar efforts.

We support a multi-phased approach. In Phase I, policies should be adopted that help to deploy existing cost-effective emissions-reducing technologies. Existing technologies should be improved while new and innovative technologies must be developed through substantial increases in federal government support for research and development.

Phase I would continue the current ghg intensity reductions, with more emphasis on efficiency, conservation and deploying renewable energy while Federal research and development funds are increased substantially for technology and major demonstration projects for geologic sequestration of CO₂.

- Unaddressed geologic sequestration policy issues (siting, permitting, liability, environmental protection, whether CO₂ sequestered will be considered a waste) must be resolved and major, large scale demonstration projects of carbon capture and sequestration must be undertaken in advance of imposition of any CO₂ cap and trade program.
- A combination of incentives and mandates is needed to speed up the development of low and zero emitting technologies and improve existing technologies including new nuclear generation.
- Those states that do not have renewable portfolio standard should formally consider a clean energy standard, based upon state resources and including energy efficiency and conservation.
- A modest national fossil fuel user fee should be considered to provide the revenue base for a dedicated national clean energy research and development fund.
- NSR policy reform is required in order to permit efficiency improvements at existing plants. NSR should not be triggered for any efficiency improvement that reduce CO₂ emissions but does not increase SO₂, NO_x or mercury emissions.

¹ The CPG Principles have served as a guide for the development of this straw man. Additionally, papers approved by the CPG or used by CPG members have provided some of the background for this document.

Phase II is a transition phase where major new or first-of-its-kind clean coal and other generation technologies are deployed into the marketplace to confirm viable commercial application and improve performance. An entire new energy infrastructure will have to be constructed including transmission lines to reach remote generation sources, waste disposal for nuclear waste and pipelines for geologic storage of CO₂. Much of this infrastructure must be put into place in order to allow a ghg cap and trade program to work. International negotiations should assure that any future U.S. mandatory cap and trade program is *contingent* on comparable, enforceable actions from all developed nations and significant although not necessarily the same policy commitments from developing nations.

Phase III would be triggered by a “technology on-ramp.” Following a technological review and assessment by DOE that would certify that technological advances are sufficient to permit mandatory reductions of ghg emissions, DOE would recommend to Congress imposition of an upstream cap and trade program that would capture the entire economy. A sufficiency determination by DOE would include consideration of the increased cost of retail electricity, impact on fuel diversity and consistency with national energy policy objectives.

The Phase III trigger for ghg controls is based on the development and proven application of the necessary technologies that can effectively and economically result in a significant reduction in our nation’s ghg emissions. Rather than mandating arbitrary dates for achieving arbitrary emissions reduction targets, as is the case with all existing mandatory ghg emission reductions legislative proposals, this approach would schedule the timing and amount of emissions reductions based on the availability of technologies to effectively secure the reductions.

To attain economy-wide ghg reductions, a hybrid approach that contemplates a comprehensive set of changes to US policy is recommended. Mandatory ghg reduction policies would be based on the development of technology to achieve the reductions. The final program should be the single regulatory control regime for ghg emissions in the US and should preempt all other CO₂ regulations under the Clean Air Act as well as state CO₂ cap programs.

Critical to the success of this proposal, interim steps would be implemented in the electricity production sector to deploy existing ghg reduction technologies through conservation, emissions avoidance, and efficiency improvements. Federal monetary incentives (e.g. tax credits, targeted taxes) should be used to promote or fund improvements in existing technologies and transformational technologies with comparable incentives available to public power.

Basic Assumptions of Ultimate Implementation of Phase III:

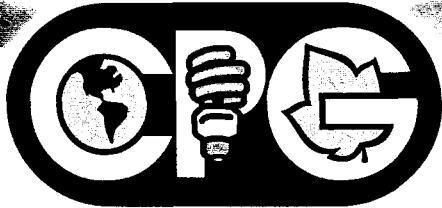
1. All ghgs must be covered;
2. All sectors must share equally in the reductions;
3. Cost increases and disparate cost impacts must be minimized;

4. There must be a transition period to any future cap or mandatory plant standards while new and innovative technologies are developed.

Justifications and Assumptions for a Three-phased Approach:

- GHG emissions caps do not produce new technology in and of themselves. Technologies for major reductions necessary for compliance are not yet proven or available for any sector making a ghg cap and trade program premature at this time.
- Imposition of caps in the short term, in the absence of the availability of broader ghg reduction technologies, will increase fossil prices to an unacceptable level and drive near term fuel switching to natural gas, increasing domestic natural gas prices and imports of high-cost natural gas. This will cause energy intensive industries, jobs and emissions to move to countries that do not have a similarly stringent program.
- Carbon capture and geologic storage have not been tested or demonstrated at a commercial scale electric utility application sufficient to enable controls on plants at this time.
- Policies to site, build, license and ensure the environmental integrity of CO₂ pipelines and sequestration remain unresolved at this time.
- A rational climate program should be based on a realistic estimate of the time it will take to prove the reliability and cost-effectiveness of new technologies.
- Technology advances and reductions in technology costs will be the quickest way to convince developing nations to apply ghg controls.
- Programs where states should have the lead include conservation and renewable energy. The Federal government should have the lead on mandatory ghg emission reduction programs.
- Federal and state governments should adopt minimum efficiency improvements over a ten-year period.
- GHG emissions reduction programs should be developed and implemented outside of the Clean Air Act.
- Cost/benefit tradeoffs must be considered in setting regulatory programs.
- DOE would be the best federal agency to administer ghg reduction programs, including a cap and trade program, since DOE has the requisite energy expertise and understanding of the critical role energy plays in U.S. economic growth.

Based on these assumptions and on the facts above, the CPG believes it is appropriate to engage and implement a policy consistent with the 2005 Sense of the Senate Resolution to slow, stop and reverse the growth of the nation's ghg emissions without causing harm to the U.S. economy. This policy should be undertaken in a phased approach that allows for cost-effective technologies for ghg controls to be developed, tested and proven at the scale of intended application. Interim steps should be undertaken to reduce ghg emissions through conservation, efficiency improvements and greater deployment of non-emitting generation in a manner that does not harm the economy.



Climate Policy Group Climate Policy Development GHG Control Technology Trigger

Phase I: GHG Interim Reduction Strategy: (Consistent with Slowing GHG Emissions Growth)

Congress should encourage additional conservation and efficiency to lower US ghg intensity:

Efficiency Mandates

- Additional Building design mandates;
- Additional Consumer item efficiency mandates (new performance standards for appliances and electronics);
- Lighting standards;
- NSR reforms must be adopted
- Incentives for hybrid, plug-in hybrid, or zero emission vehicles

Incentives for customer side efficiency and renewable energy:

- State public benefit funds should fund deployment of existing energy efficiency, renewable and conservation technologies
- Incentives for avoided energy
- Incentives for Efficiency improvements

Mandate to states to have current state energy plan/strategy

- PURPA Section 113 review of green power program,
- Plan must include feasibility of in-state RPS or CGPS;
- Plan should also include
 - Review of energy needs & alternative ways to meet growth
 - Review of conservation and renewable capacity
- Remove disincentives to conservation

Research should focus on both testing and improving existing technologies and developing and demonstrating new clean energy technologies.

1. Incentives for private research investment in existing efficiency improvements
 - a. Removal of regulatory and rate barriers to efficiency improvements
2. Accelerate funding for advancement and demonstration of CCS technologies

- a. The government should help fund and partner with industry on at least six commercial large scale projects which store ghgs in formations other than non-enhanced oil recovery. CCS projects should be conducted on multiple subspecies of coal and in diverse geographic locations.
3. Provide model investment incentives for new CCS technologies
 - a. Incentive program similar to EPAct nuclear incentives (loan guarantees, financial incentives, insurance guarantees, streamlined permitting, special emphasis on CCS outside of EOR areas)
4. Incentives for additional efficiency improvements:
 - a. Congress should accelerate funding for transmission and distribution technology improvements.

Congress should develop or improve regulatory policies for zero or low-emissions technology application:

Regulatory and legislative authority should be crafted to:

- Develop policies for CCS and other technology deployment including federal indemnification and expedited permitting, licensing requirements, and interstate siting authority;
- Develop policies for CO₂ transport system for CCS
- Improve policies to streamline licensing to expand nuclear generation;
- Improve policies for nuclear waste storage.

Federal Government research must be expanded considerably to fund transformational technologies:

- Manhattan style project on CO₂ technology, distribution and transmission system improvements—high risk, basic research focused on transformational technologies.

Congress should provide incentives for zero-emission technologies:

Zero (Low) Emission Generation

- Incentive for testing or researching new zero-emission technologies
- Loan guarantee programs must be workable for financing of projects
- New Nuclear Incentives/Priorities
- License extension of existing nuclear and hydro facilities
- Power uprates at existing nuclear facilities

Congress must generate a revenue stream and create mitigation incentives using tax policy to promote both research and application of technologies. All tax incentives must be available to public power.

Revision/Application of Tax Policy for ghgs

- Tax incentive package to encourage ghg reductions and efficiency improvements including the continuation, expansion, or addition of

tax incentives for efficiency improvements, insulation, efficient light bulbs, etc;

- Tax incentive package for early deployment of ghg technologies;
- Provide comparable mechanism for public power to participate in incentive program outside of the appropriations process such as a tradable tax credit.

Revenue Generation

- Congress should consider the development of a revenue generation mechanism specifically targeted to fund new research in ghg emissions reduction technologies. Revenue generation mechanisms targeted toward just the electric sector could include a wires surcharge or a fuel surcharge. Economy wide user fees could be targeted through a fuels surcharge levied upstream based on fossil fuels or on carbon content of the fuel.
- Revenues must be dispersed through a specific mechanism to ensure all collected funds are solely available for research, development and deployment of ghg generation emissions reduction technologies and associated programs;
- Revenues must be set aside from the general revenue funds to ensure funds are not used for purposes other than ghg emissions reduction technology development.

US must assure comparable international approach to ghg reduction:

International Actions

- Coordinate technology research programs amongst OECD countries and promote higher funding level commitments from all countries
- Commit to international partnership to develop comparable actions to reduce ghgs
- Consider trade policy based on comparability of reductions/cost of implementation;
- Develop policies that assure significant ghg reduction activities are undertaken by major emitting developing nations.

Phase II: Technology Demonstration and Infrastructure Construction

- Continuation of Phase I actions
- Resolution of siting, licensing, permitting issues affecting CO₂ sequestration, CO₂ pipelines, new transmission lines, nuclear power plants must be achieved
- Deployment of CO₂ capture and sequestration technologies and new nuclear power plants
- Construction of infrastructure (CO₂ pipelines, new transmission lines, nuclear waste disposal)

Phase III: GHG Reduction Policies: (Consistent with Stopping and Reversing GHG Emissions Growth)

Cost-effective, commercially available GHG control technology should trigger a cap and trade program

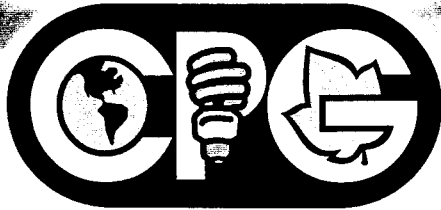
1. Any cap and trade program should be designed to cover the entire economy;
 2. The point of regulation should be upstream to minimize regulatory burden;
 3. Any cap and trade program should have economic safety valves and off ramps to prevent damage to the economy or consumers and to assure international comparative action;
 4. Any federal cap and trade program should pre-empt regulation under other sections of the Clean Air Act.
 5. Caps should be phased in on a reasonable schedule to allow for orderly deployment of new technologies.
- Cap and trade reduction targets and implementation triggers for fossil fuel generation units based on technology metrics:
 - Efficiency improvement in new technologies
 - Cost of new technologies
 - Applicability to types of units
 - New vs. existing unit applications
 - Resolution of geologic storage questions
 - Deployment availability

Economic burden of ghg reduction must be shared globally:

International Actions:

- When technology matures, primary ghg source countries must undertake comparable reduction policies to assure that U.S. does not suffer a competitive disadvantage.

CLIMATE POLICY GROUP



A PUBLIC POWER COALITION

Statement of Principles and Climate Policy

The Climate Policy Group, a public power alliance (Climate Policy Group) consists of public power utilities that collectively seek to provide input into the debate on global climate change and to work within the legislative and regulatory framework to craft a rational and economically viable federal policy on mitigating climate change impacts.

Should the U.S. choose to undertake a new federal policy on addressing global climate change, the Climate Policy Group believes the policy must comply with the following minimum principles and standards:

- CO₂ must be addressed on an economy-wide basis
- Research and development must be expanded significantly to develop cost-effective technologies to capture, sequester and/or reduce CO₂
- Coal-fired generation must remain a source of stable and affordable electricity supply as a matter of national security
- CO₂ policy must protect the U.S. economy by balancing U.S. economic interests with emerging industrial nations
- The production of electricity with zero emission technologies must be expanded
- Energy conservation and efficiency must be increased
- Incentives to promote new technologies must apply to all types of electric utilities
- A cap and trade system is not appropriate for controlling CO₂ emissions due to the lack of affordable, reliable and commercially available control technologies.
- If the federal government decides to regulate CO₂ emissions, such a program should be controlled only at the federal level under a single regulatory regime

Understanding the objective of federal legislation and/or regulation is necessary to crafting a policy that can attain success. What are the goals of the policy? What are the costs and the anticipated benefits? Do proposed legislative and regulatory policies achieve the hoped-for benefits? Do proposed U.S. actions achieve environmental improvement that can only be measured on a global scale? Are developed and developing nations' policies commensurate with U.S. action? Will U.S. economic growth, which is necessary to develop needed technologies, be compromised? Are U.S. actions designed to assure that the ability of the U.S. to compete internationally is not harmed?

Whatever policy the U.S. chooses to pursue, the objectives should be clearly articulated and the policy should be designed to meet those objectives. The Climate Policy Group will work on behalf of our consumers and the communities we serve to ensure these principles are embodied in any federal legislation or regulatory action.

The Climate Policy Group utilities serve over 7,000,000 customers in six states. With generating resources of 21,000 MW of capacity and over 75% of energy needs derived from fossil fuel based resources, our customers have a significant stake in the outcome of this debate.



New Coal Units: The Cost Of CO₂ Allowances Assuming No Free Allowance Allocation

A preliminary evaluation of the cost of carbon credits under the Bingaman-Specter Legislation using the Technology Accelerator Payment (TAP) as the base cost for compliance with the program estimates that the present value cost of the first ten years of compliance will be close to \$1 million for each MW of installed capacity for the first ten years.

To consider the costs of a cap and trade program on a new coal plant, it is helpful to understand the impact of the allocation of allowances to coal units. A risk for any new coal unit, and advocated by some in the environmental community, is the possibility of no allocation for new units. Under the best case scenario, a new coal unit would be allocated 100% of its carbon emissions based on some test run period and thereafter would have to bear the burden of compliance with the regulatory scheme. Somewhere in the middle is an allowance allocation mix that does not meet the total emissions of the new plant but rather some portion of the emissions.

This evaluation is designed to assess the exposure of a power plant to the cost of carbon emissions if no allocation is given to new plants. Any allocation scheme that provides an allocation to new plants will proportionally reduce the overall exposure of the plant.

According to research, an average new coal fired power plant will release between 1.6 and 2.2 pounds of CO₂ per kilowatt-hour of operation. For this calculation, we assume that any given coal-fired power plant will emit 1.9 pounds of CO₂ per kilowatt-hour.

A power plant with a one-megawatt (1,000 kilowatts) name plate capacity will produce the equivalent of 8,760,000 kilowatt hours annually at full operation -- that is, 8,760 hours multiplied by 1,000. At this rate, such a plant would emit an estimated 16,644,000 pounds of CO₂, which is the equivalent of 7,565 metric tons of CO₂. However, an average base load plant is generally out of operation or operating at a reduced load for some period of the year—this downtime results in plant usage that can be reasonably set at 90%. Thus the actual estimated emissions would be 6,809 metric tons.

The Bingaman-Specter Legislation places a 'safety valve' cost to purchase CO₂ emissions at \$12/metric ton which escalates at a rate of 5% per year plus the rate of inflation (set at 3% here). Because EU carbon credits already exceed the equivalent of

\$12/metric ton it is safe to expect that the safety valve price is a reasonable price for cost valuation of the Bingaman-Specter Cap and Trade Program.

Using these assumptions, we can produce the following cost estimates for CO₂ allowances necessary to operate a new 1000MW coal unit if the new unit were to receive no free distribution of CO₂ allowances. This calculation is carried out for a 10 year period though the program is expected to run at least through 2030 under the legislation. Estimates beyond 10 years are deemed to be outside the reasonable forecast window.

Year	TAP per metric ton	CO2 Emissions in Metric Tons	TAP Cost	Present Value of TAP Cost
2012	\$12.000	6,808,909	\$81,706,909	\$78,564,336
2013	\$12.978	6,808,909	\$88,366,022	\$81,699,355
2014	\$14.036	6,808,909	\$95,567,853	\$84,959,473
2015	\$15.180	6,808,909	\$103,356,633	\$88,349,683
2016	\$16.417	6,808,909	\$111,780,199	\$91,875,175
2017	\$17.755	6,808,909	\$120,890,285	\$95,541,348
2018	\$19.202	6,808,909	\$130,742,843	\$99,353,815
2019	\$20.767	6,808,909	\$141,398,385	\$103,318,415
2020	\$22.459	6,808,909	\$152,922,353	\$107,441,217
2021	\$24.290	6,808,909	\$165,385,525	\$111,728,535
Totals			\$1,192,117,006	\$942,831,352
Cost/MW over 10 yrs			\$1,192,117	\$942,831

This calculation is valid for new coal units. These are units that generally have the highest efficiencies. For older coal units the calculation for the cost of CO₂ compliance would be different based on the efficiency of the unit. Additionally, the allocation of credits would impact the cost to comply, as allocated credits would offset the number of credits required for purchase at the TAP price. Furthermore, the type of fuel burned also impacts that calculation, for example, lignite based generation units will have a different CO₂ emission rate than units which burn Appalachian or Powder River coal.

The 5 Barriers Standing In the Way of a Meaningful Greenhouse Gas Cap and Trade Program

Congressional leaders are currently engaged in a debate to establish targets and timetables for ghg reductions for the electricity sector. Before that can occur, critical technological, energy impact, permitting, liability and regulatory questions must be considered and resolved. The five critical issues that must be resolved before electric utilities can meaningfully participate in a cap and trade program are:

- **CO₂ CAPTURE TECHNOLOGIES MUST BE WIDELY DEPLOYABLE**
Current CO₂ capture technology is limited to small demonstration projects. Commercial scale demonstrations are needed to help prove which capture technologies are both technically feasible and economically sound.
- **ENERGY PENALTIES MUST BE REDUCED**
Current capture technologies reduce net energy output by 15-35%. Additional research and technology advances are needed to bring down these penalties otherwise more new generators will need to be built.
- **A DEDICATED CO₂ TRANSPORTATION SYSTEM MUST BE BUILT IN AREAS BEYOND THE CURRENT ENHANCED OIL RECOVERY (EOR) ZONES**
A new and expanded pipeline infrastructure dedicated to transport captured CO₂ must be sited, permitted and constructed to provide ready access by power plants.
- **CO₂ STORAGE, PERMITTING & LIABILITY STRUCTURES MUST BE IN PLACE**
Suitable geologic storage areas must be identified and tested. Once located, these sites need to be permitted for commercial operation at federal, state and local levels, and long-term storage liability must be assumed by the Federal Government. Pipeline access must be assured.
- **GHG REGULATIONS MUST BE UNIFORM AND PROVIDE FOR PREEMPTION**
The creation of one overriding federal regulatory control regime will not only result in enforcement efficiency, it will provide business certainty.

To date the primary proposals put forth in Congress do not adequately address technology funding and development or unresolved policy issues, nor do the timelines established sufficiently account for the required development and deployment period to resolve these issues. If these issues are not resolved, the only option available to the electricity sector that will result in significant emissions reductions is fuel switching to imported natural gas.

The 5 Barriers Standing In the Way of a Meaningful Greenhouse Gas Cap and Trade Program

CAPTURE TECHNOLOGY:

Utility-Scale CO₂ Capture Technology Has Not Been Developed

Carbon capture technology in laboratory settings and for certain industrial projects is a time-tested and well-established process. This is not the case for the capture and storage of CO₂ from fossil fuel electricity generating plants.

- The largest utility capture project currently sponsored by DOE is capturing the electric capacity of a 1MW plant—a project roughly 1/500th of an average new coal fired electric plant.
- No current data exist regarding the experience of constructing or operating a commercial utility scale CO₂ separation system or injection projects to store the CO₂ in non-EOR applications.

Congress must allow for development and, testing of dedicated utility storage projects before committing the country to a national program that presupposes certain outcomes from the development of the projects.

ENERGY PENALTIES:

Electricity Energy Output (MWH) and Capacity (MW) Penalties Associated with CO₂ Capture Technology Are Very Substantial

Energy output and capacity penalties result from the amount of additional energy required to actually run the capture system.

- Current capture technologies are expected to impose an energy penalty of 15 to 35% of the total output and capacity of a new electric generating unit.
- Retrofitting existing plants will have a similar energy and capacity penalty.

Energy and capacity consumed by the capture process must be replaced by another source—making the penalty a significant factor in how quickly CO₂ reductions can occur. Major advances in capture technology to reduce the energy and capacity penalty must be achieved before mandating significant reduction requirements.

GHG TRANSPORTATION

Pipeline Infrastructure Development Must Be Assessed

Carbon capture-equipped plants are restricted in where they can locate. A pipeline infrastructure must be built to transport captured CO₂ from power plants to suitable geologic storage formations beyond the existing infrastructure that serves EOR operations.

- Carbon capture systems will require operational and process changes at traditional fossil facility enhancing the need for substantial and reliable water sources.
- Other restrictions will include access to transmission capacity and a transportation network to deliver fuel.

Because CO₂ is compressed to a pressure much higher than traditional natural gas pipelines are designed to withstand, a new and separate pipeline system will have to be constructed to handle bulk transmission of compressed CO₂. Siting and permitting these facilities will also take time that must be accounted for in the legislating of any federal requirements.

CARBON STORAGE PERMITTING & LIABILITY

Storage Testing Needed to Verify the Ability to Sequester CO₂ on a Long-Term Basis

Injection and geologic storage of pressurized gases has been employed by the oil industry to enhance oil recovery, but it has not been undertaken for the purpose of sequestering carbon dioxide on a long-term basis.

- Commercial utility scale injection and storage will result in far higher volumes of CO₂ than have been attempted in the past.
- No comprehensive survey of available and appropriate storage sites has been conducted to support the necessary permitting of geographically diverse storage locations

Congress must allow for the testing and verification of the viability of geologic storage in all regions of the country and in multiple types of geologic formations before requiring reductions that assume the practicality of geologic storage. Congress must pass legislation like the National Carbon Dioxide Storage Capacity Assessment Act of 2007 and should base cap and trade regulations on the findings of such an assessment, including commercial operation of geographically diverse storage formations.

Legal Liability for the Risks Associated with CO₂ Sequestration Must be Assumed by the Federal Government

Long-term geologic storage of CO₂ comes with a real risk of leakage, migration or in the worst-case scenario, storage failure through catastrophic release.

- Securing financing and support for long term storage projects will depend on federal ownership of the liability of the project once injection and ultimate storage begins. Funding for future projects will not proceed in the absence of resolving the liability issue.

UNIFORM REGULATION OF GHG

New GHG Laws Must be Coordinated with Existing Local, State and Federal Laws and Potential Clean Air Act (CAA) GHG Regulations

From the standpoint of regulatory governance, there are multiple agencies with overlapping authority over the capture and storage of CO₂.

- The Environmental Protection Agency has issued R&D injection guidance under the Safe Drinking Water Act.
- The Interstate Oil & Gas Compact Commission is working on its own state-based regulations for CCS.
- There are components of CO₂ capture and storage that could fall under the authority of multiple federal laws including the CAA, RCRA, CERCLA (Superfund), and the Clean Water Act just to name a few.
- Concurrently, state and local regulatory issues arise as well.
- The threat of suits under federal laws, including the Clean Air Act and the National Environmental Policy Act, must be eliminated.
- The ability to block utility investments under New Source Review must be eliminated.

Resolution of these issues in advance of adoption of a CO₂ cap and trade program is critical if commercial-scale CCS projects are to proceed. If Congress adopts a ghg cap and trade program under the CAA, it should create one overriding regulatory regime that eliminates the possibility of piecemeal regulation under multiple sections of the CAA and the ability of opponents to use existing regulations to delay deployment of the technology.