REPEATING THE FAILURES OF CARBON TRADING

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Abstract: Carbon emissions trading, or cap-and-trade, is increasingly in vogue among Pacific Rim countries as a means of combating climate change. In theory, cap-and-trade promises to solve climate change by capping and gradually reducing the amount of carbon dioxide and greenhouse gas emissions, and to do so with maximum economic efficiency. In reality, environmentally effective and economically efficient carbon emission trading systems have eluded both the international community and the European Union, and in practice have arguably increased emissions by artificially prolonging and legitimizing reliance on fossil fuels.

In spite of this poor track record, five countries on the Pacific Rim committed to reducing their carbon dioxide emissions through domestic trading systems: Australia, China, Japan, New Zealand, and South Korea. Although these countries’ commitment to mitigating climate change is admirable, their domestic carbon emissions trading systems are characterized by the very same features that rendered the Kyoto Protocol’s international carbon market and the European Union’s Emissions Trading Scheme utterly ineffective. These countries are consciously repeating the same mistakes and expecting different results. Analyzing these five experiments, this comment identifies the features that will likely undermine the environmental and efficiency goals of these systems. This comment argues that due to these shortcomings, the emissions trading systems on the Pacific Rim will not lower carbon dioxide emissions to safe levels—instead, they will exacerbate climate change by artificially prolonging and legitimizing the use of fossil fuels. In addition, the reappearance on the Pacific Rim of these unsound design features lends credence to the theory that emissions trading is fundamentally unreliable as a means of regulating and reducing greenhouse gas emissions.

I. INTRODUCTION

Australia, China, Japan, New Zealand, and South Korea each implemented emissions trading systems to reduce their domestic carbon emissions and slow climate change. This is incredibly significant because the Asian Pacific region has one of the highest aggregate greenhouse gas emissions in the world, emitting 7.9 billion tons of carbon dioxide equivalent (“tCO2e”)¹ a year in the mid-1990s.² By 2011, these five countries generated 10,936.33 million metric tons of carbon dioxide emissions from the consumption of energy alone, of which 8,715.31 million

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metric tons originated in China—a—the largest global emitter. Australia is the world’s fifteenth largest emitter and emits more greenhouse gas per capita than any developed nation; Japan, despite its efficiencies and large renewable energy sector, is the world’s fifth largest emitter of greenhouse gases; New Zealand contributes comparatively little to greenhouse gas emissions globally, but it has the twelfth highest emissions per capita in the developed world; finally, South Korea is the world’s seventh largest greenhouse gas emitter and one of the fastest growing emissions sources. If these five countries successfully reduce their domestic emissions, their collective efforts could drastically slow climate change and influence other countries’ climate change policies.

These five countries, however, have elected to design and implement carbon emissions trading systems. Despite the inability to develop an environmentally effective and economically efficient carbon emissions trading system in Europe or internationally through the Kyoto Protocol,

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4 Elisabeth Rosenthal, China Increases Lead as Biggest Carbon Dioxide Emitter, N.Y. Times (June 14, 2008), http://www.nytimes.com/2008/06/14/world/asia/14china.html?_r=0.


cap-and-trade clearly remains a popular strategy. The five emissions trading experiments on the Pacific Rim even share distinct features with the Kyoto Protocol’s carbon market and the European Emissions Trading System (“EU ETS”)—features that ultimately undermined the economic efficiency and environmental effectiveness of these earlier systems. Because the same characteristics that made emissions trading systems environmentally ineffective in the past are reappearing in the present iterations on the Pacific Rim, these experiments are unlikely to reduce emissions. Instead, they will increase emissions by artificially prolonging and legitimizing the use of fossil fuels. In addition, the persistence of these unsound design features lends credibility to the argument that emissions trading systems are intrinsically flawed in design or purpose. This suggests that if countries on the Pacific Rim are committed to regulating and reducing their emissions, emissions trading is not the solution.

Part II of this comment explains the significance of climate change policy to these particular Pacific Rim countries, the previous international efforts to address climate change through emissions targets, deadlines, and emissions trading, the operation of an emissions trading system, and criticisms of emissions trading systems. Part III analyzes the five emissions trading systems developing along the Pacific Rim and identifies the design features that will likely undercut their efficiency and limit their effectiveness. In light of these shortcomings, Part IV concludes that these emissions trading systems will not be effective at reducing greenhouse gases and argues that countries dedicated to combating climate change should explore more effective methods of regulating and reducing emissions.

allowances that will be held off the market, about 900 million, is estimated to be only about half of the surplus of permits that would otherwise have built up by 2020”); Bryan Walsh, *If Carbon Markets Can’t Work in Europe, Can They Work Anywhere?*, TIME (Apr. 17, 2013), http://science.time.com/2013/04/17/if-carbon-markets-cant-work-in-europe-can-they-work-anywhere/ (arguing that the EU ETS is not an effective environmental policy).

11 See Melissa J. Durkee, *Persuasion Treaties*, 99 Va. L. Rev. 63, 73 (Mar. 2013) (quoting Sungjoon Cho & Claire R. Kelly, *Promises and Perils of New Global Governance: A Case of the G20*, 12 Chi. J. Int’l L. 491, 497-98 (2012)) (explaining that international climate change treaties are difficult because “negotiators are alert to changing global circumstances and are loath to eliminate their future flexibility by making concrete commitments; treaties are often accompanied by reservations and other party-specific caveats that minimize the treaty’s effectiveness; and the treaty amendment process is ‘tortuous,’ such that treaties cannot adapt quickly to rapidly evolving global regulatory needs.”); Quirin Schiermeier, *The Kyoto Protocol: Hot Air*, NATURE (Nov. 28, 2012), http://www.nature.com/news/the-kyoto-protocol-hot-air-1.11882 (noting “the reductions made under the treaty were dwarfed by the rise in emissions not covered by the accord, especially in Asia,” and that “[t]he treaty . . . was based on ‘dubious economic assumptions and flawed accounting systems’”).

12 See *infra* Parts II.C, III.B.

13 See *infra* Parts II.C, III.
II. THE RISE OF EMISSIONS TRADING SYSTEMS

Regulating and reducing carbon dioxide emissions is an important objective internationally because A) carbon emissions are the primary cause of climate change, the effects of which are already being felt in countries along the Pacific Rim. Initially expressed as mere targets and deadlines, B) international efforts to regulate carbon emissions are predominately market mechanisms such as emissions trading systems, rather than top-down regulatory schemes. Accordingly, countries along the Pacific Rim elected emissions trading systems as the preferred method of regulating carbon emissions. Rather than enforce specific emissions standards through civil or criminal sanctions, C) these systems are flexible, decentralized, and provide market incentives for reducing carbon emissions. However, D) the ability of such systems to actually reduce greenhouse gas emissions has been the subject of much criticism following the Kyoto Protocol and EU ETS.

A. To Reverse Climate Change, Countries Must Regulate its Primary Cause—Carbon Dioxide Emissions

Humans are radically altering the chemical composition of the globe by burning hydrocarbons. The concentration of carbon dioxide in the atmosphere surpassed pre-industrial values and is increasing steadily due to heavy reliance on fossil fuels. In 2011, atmospheric concentrations of carbon dioxide reached 391 parts per million, a level unprecedented in the last 800,000 years. Carbon dioxide absorbs sunlight that is reflected back towards space as infrared radiation; rather than escape Earth’s atmosphere, it converts into heat. The rise in global average temperatures since the mid-twentieth century is “extremely likely” due to the high concentrations of anthropogenic greenhouse gas—primarily carbon dioxide.

Beyond increasing the average global temperature, increased carbon dioxide concentrations in the atmosphere profoundly alter the planet’s physical and biological systems. Increased carbon dioxide concentrations

15 Id. at 11.
16 Id.
19 Intergovernmental Panel on Climate Change, supra note 14, at 17.
have very likely contributed to sea-level rise during the late twentieth century. Likewise, carbon emissions have altered wind patterns and extra-tropical storm tracks, exacerbated temperature extremes, and heightened risk of heat waves and frequency of heavy precipitation events. Increased carbon dioxide concentrations warm and acidify the ocean, which in turn negatively impacts marine life, particularly shell forming organisms, corals, and their dependent species. Some impacts may be irreversible. For example, the loss of Greenland and Antarctic ice sheets may result in rising sea levels, major changes in coastlines, inundations of low-lying areas, and loss of habitat for arctic species. Absent “substantial and sustained reductions of greenhouse gas emissions,” changes in the global climate system will escalate during the twenty-first century.

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20 Id. at 19 (concluding that “[i]t is very likely that there is a substantial anthropogenic contribution to the global mean sea level rise . . . based on the high confidence in an anthropogenic influence on the two largest contributions to sea level rise, that is thermal expansion and glacier mass loss”).


22 Stocker et al., supra note 21, at 295, 297.


24 Intergovernmental Panel on Climate Change, supra note 14, at 9, 11, 25-26, 70-72, 323.

25 Id. at 19.
Climate change will profoundly affect countries along the Pacific Rim in the twenty-first century. In East Asia, South Asia, Southeast Asia, and Australia, an increase in precipitation extremes related to the monsoon systems and cyclones is very likely. In East Asia and parts of Australia, heatwaves will likely increase in frequency, duration, and severity. In Australia, there is a risk of widespread and permanent damage to coral reef systems, species extinction, more frequent flooding and damage to key infrastructure, inundation of low-lying areas from rising sea levels, and a significant drop in agricultural production. East, Southeast, and South Asia could face some of the worst effects of global warming: heat stress, extreme precipitation, flooding, drought, and water scarcity.

B. Countries Adopted Market-based Mechanisms to Reach International Targets and Deadlines for Reducing Emissions

To counteract climate change, a number of countries committed to targets and deadlines to reduce their domestic carbon dioxide emissions. The first climate treaty at Rio de Janeiro led to the 1992 United Nations Framework Convention on Climate Change (“UNFCCC”), which is the basis for all subsequent climate change negotiations. To date, 189 nations have ratified this convention. This agreement formalized the goal of stabilizing greenhouse gas concentrations at safe levels, the principles of precaution, cost-effectiveness, and common but differentiated responsibilities, the obligation to report on greenhouse gas emissions and national measures to combat climate change, and the commitment for assistance and technology transfer to developing countries. UNFCCC is limited because it is legally non-binding and contains no qualitative limits or

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26 See Stocker et al., supra note 21, at 106, 109-13, 135.
27 Id. at 105-07, 1270, 1287.
28 Id. at 162, 1270.
33 Id.; see also United Nations Framework Convention on Climate Change, art. 3, May 9, 1992, 1771 U.N.T.S. 107 [hereinafter UFCCC].
enforcement mechanisms. However, it operates as a framework for negotiating binding limits among nations.

Convention parties incorporated cap-and-trade concepts in the first agreement negotiated under UNFCCC: the 1997 Kyoto Protocol. Under the Kyoto Protocol, developed countries voluntarily agreed to reduce their domestic emissions to five percent below 1990 levels by the end of the first compliance period (2008 to 2012) through national greenhouse gas emissions reduction programs. The Kyoto Protocol introduced three market-based mechanisms: Joint Implementation ("JI"), the Clean Development Mechanism ("CDM"), and international emissions trading. Under JI, countries with emissions reduction commitments earn emission reduction units ("ERUs") towards their target from emission reduction or emission removal projects in countries with emissions reduction commitments under the Kyoto Protocol. Under the CDM, developed countries may elect to meet their targets by initiating emissions reduction projects in developing countries that have no reduction commitments. A key condition is “additionality”: CDM projects must lead to emissions reductions “beyond business as usual,” or beyond what would have been achieved without the incentive to earn ERUs. Finally, parties to the Kyoto Protocol that reduce their emissions below their target levels earn excess credits that may be sold to countries that are over their targets. These mechanisms created an international carbon market.

Near the end of the first compliance period, countries convened in Durban, South Africa, and Doha, Qatar, to negotiate the terms of a second

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40 DEATHERAGE, supra note 31, at 23.
compliance period under the Kyoto Protocol. Parties agreed to extend the protocol through 2020, but the world’s largest greenhouse gas emitters, China and the United States, refused to adopt mandatory and quantitative emissions reduction targets. Japan and New Zealand declined to participate in a second compliance period. Without going into the merits of emissions trading systems, this extension of the Kyoto Protocol will likely be insufficient to counteract climate change given the number of large emitters not participating and the obsolete targets and baseline standards contemplated by the new protocol.

Although the Kyoto Protocol had a negligible environmental impact, in part because the world’s largest emitters of greenhouse gases refused to adopt binding emissions reductions, it was tremendously successful at promoting market mechanisms as a method of regulating greenhouse gas emissions. The EU ETS, launched in 2005, was the first international mandatory cap-and-trade system. It was designed to help member states

43 Id. (pointing out that the emissions cuts to which countries agreed are in aggregate only 18% below the 1990 level by 2020, compared with the 25-40% reduction required to restrict global temperature rise to two degrees Celsius); David Hodgkinson, Doha climate talks: time for an alternative approach, EAST ASIA FORUM (Dec. 24, 2012), http://www.eastasiaforum.org/2012/12/24/doha-climate-talks-time-for-an-alternative-approach/ (observing that at Doha, “not ‘a single new pledge to cut pollution from a major emitter’ was made,” and questioning “whether the UN system provided ‘cover for leaders to take no meaningful action’”).
44 Matrin Khor, A ‘Low Ambition’ Outcome in Doha, THIRD WORLD NETWORK (Jan/Feb 2013), http://www.twnside.org.sg/title2/resurgence/2013/269-270/cover01.htm (noting that original Kyoto Protocol parties Russia, Japan, and New Zealand decided not to join a second commitment period, and Canada dropped out of the protocol entirely).
45 Id. (explaining that the United States and China, the two largest contributors to global warming, have not agreed to binding, quantitative emissions reductions. See Reuven S. Avi-Yonah & David M. Uhlmann, Combating Global Climate Change: Why a Carbon Tax is a Better Response to Global Warming than Cap and Trade, 28 STAN. ENVTL. L.J. 3, 11, 17-18 (2009) (noting that the United States initially used its influence to exclude mandatory emissions reductions from the UNFCCC, and later refused to ratify the Kyoto Protocol); Jason J. Czarnezki, Climate Policy & U.S. China Relations, 12 VT. J. ENVTL. L. 659, 666 (2011) (noting that China signed the Kyoto Protocol but, like other developing countries, only agreed to mitigation measures, not quantitative emissions reductions); Lost in Translation, INST. FOR ENERGY RESEARCH (July 28, 2009), http://www.instituteforenergyresearch.org/2009/07/28/lost-in-translation/ (explaining that China historically denied responsibility for emissions, and quoting Minister Xie Zhenhua as stating that “[t]he primary responsibility for talking climate change should rest with the developed countries”).
meet their emissions reduction targets under the Kyoto Protocol.\textsuperscript{49} Likewise, the emissions trading systems in Australia, Japan, and New Zealand were initially adopted to help meet Kyoto Protocol targets and designed to link with the EU ETS and the Kyoto Protocol’s international carbon market.\textsuperscript{50}

Apart from committing to targets and deadlines under the Kyoto Protocol, many countries made international commitments to reduce or limit their domestic emissions by the year 2020 under the Copenhagen Accord.\textsuperscript{51} These targets vary—for example, the targets for Australia, New Zealand, South Korea, and formerly Japan are expressed as a percentage reduction in emissions relative to the level of emissions in a base year—a base year that varies from 1990 for Japan and New Zealand to 2000 for Australia.\textsuperscript{52} Commitments for China are expressed as a reduction in emissions intensity, or emissions per unit of GDP, against the base year of 2005.\textsuperscript{53}

<table>
<thead>
<tr>
<th>Country</th>
<th>Commitment to Limit Emissions by 2020 Relative to Various Base Years\textsuperscript{54}</th>
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<tbody>
<tr>
<td>Australia</td>
<td>5-25% below 2000 levels. Moving above five percent is contingent on global, comprehensive agreement.</td>
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<tr>
<td>China</td>
<td>40-45% below 2005 emissions intensity levels. Increase the proportion of non-fossil fuels used in primary energy consumption to 15% and increase forest coverage by 40 million hectares and forest stock volume by 1.3 billion cubic meters relative to 2005.</td>
</tr>
</tbody>
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\textsuperscript{49} Id.


\textsuperscript{53} Id.

\textsuperscript{54} Id. at 17. This table from the Australian Government Productivity Commission is based on the calculations of McKibbin, Morris, and Wilcoxen (2010), who attempted to convert the Copenhagen targets to equivalent targets with common base years. Id. These authors found that varying the base years affects the apparent stringency of these targets. For example, Australia’s commitment to an unconditional emissions reduction of five percent below 2000 levels is equivalent to each of the following: a 30\% increase in emissions relative to 1990 levels, a 18\% reduction relative to 2005 levels, and a 35\% reduction relative to business as usual levels in 2020. Id.
<table>
<thead>
<tr>
<th>Country</th>
<th>Target Description</th>
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<tbody>
<tr>
<td>Japan</td>
<td>25% below 1990 levels, contingent on all major economies joining a fair and effective international framework with ambitious targets.</td>
</tr>
<tr>
<td>New Zealand</td>
<td>10-20% below 1990 levels, contingent on global, comprehensive agreement.</td>
</tr>
<tr>
<td>South Korea</td>
<td>30% below business as usual levels.</td>
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All five countries implemented emissions trading systems to help meet these 2020 targets. The figures above demonstrate that Japan committed to the largest reduction in greenhouse gas emissions by 2020 (48%) and Australia’s commitment is in line with that of Europe (36%) and the United States (33%), whereas China’s commitment is smaller (22%). Yet Japan abandoned its Copenhagen commitments in November 2013, explaining that the Fukushima meltdown caused Japan to reevaluate its nuclear energy programs and that consequently a 25% reduction from 1990 levels is “unfeasible.” Japan’s revised climate goal is a three percent increase in greenhouse gas emissions above 1990 levels.

C. Elements of an Emissions Trading System

Australia, China, Japan, New Zealand, and South Korea selected emissions trading systems as the preferred method of regulating carbon emissions and meeting their Copenhagen or future Kyoto Protocol targets. Unlike a command-and-control regime, in which a government enforces specific emissions standards through civil or criminal sanctions, market-based mechanisms such as emissions trading systems are, in theory, flexible and decentralized. Private project developers and capital investors, rather than state or national governments, identify and implement carbon reduction projects. Emissions trading systems give regulated parties financial incentives to curb emissions through efficiency and innovation, either

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55 “Business as usual levels” refer to the projected level of greenhouse gas emissions assuming no reduction or mitigation measures are taken. Unlike historical emissions data for a baseline year such as 1990, which is fixed, the projected level of emissions in 2020 may be higher or lower than the actual level of emissions. Therefore, it may be misleading to equate meeting such targets with actual reductions in emissions—it depends on how close the projected and actual levels of emissions are.

56 AUSTRALIAN GOV’T PRODUCTIVITY COMM’N, supra note 52, at 17-18.


58 Id.


60 Id. at 17-18 (reflecting “the need in the climate change context to make millions of decisions about taking actions in millions of places all over the world, or even at the state or national level”).

61 Id.
because they want to avoid fines for exceeding allowable emissions or because pollution reductions generate financial assets that they can sell.\textsuperscript{62}

An important feature of an emissions trading system is the cap. After the government determines what industries or facilities are liable for specific emissions, it sets an overall emissions target, an absolute cap, which is the sum of all allowable emissions from liable facilities.\textsuperscript{63} Total emissions may not exceed this cap, which decreases over time.\textsuperscript{64} Although the price of emissions fluctuates with the market for tradable allowances, the absolute amount of emissions into the atmosphere is theoretically controllable.\textsuperscript{65}

 Tradable allowances, or emission credits, are rights to pollute that are either auctioned or allocated freely from the government to liable entities.\textsuperscript{66} These allowances authorize the release of a specified amount of greenhouse gas emissions, typically one allowance per tCO\textsubscript{2}e.\textsuperscript{67} Emitters may comply with emissions reductions by actually reducing their emissions or by purchasing allowances from a more efficient party that has reduced its own emissions more than required.\textsuperscript{68} Additionally, such systems typically allow pollution “offsets,” meaning that emissions reductions from activities that are not regulated can be used to meet the reductions required in activities that are regulated.\textsuperscript{69}

At this point, one major shortcoming of emissions trading systems is clear: such systems are designed to regulate emissions from discrete and typically fixed sources, such as fossil-fuel-based power generation facilities.\textsuperscript{70} This design makes sense because it is simpler to verify and monitor emissions from large, discernible, and fixed sources. However, it means that these systems are maladapted to regulate the smaller or diffuse sources of carbon emissions, such as private transportation, livestock, and

\textsuperscript{62} See id. at 19.
\textsuperscript{63} Id.
\textsuperscript{64} Id. at 19-20.
\textsuperscript{66} DEATHERAGE, supra note 31, at 19.
\textsuperscript{67} Id. For example, “assigned amount units” and other trading units in the Kyoto Protocol carbon market are each equal to one ton of CO\textsubscript{2}. International Emissions Trading, supra note 41.
\textsuperscript{68} DEATHERAGE, supra note 31, at 19.
\textsuperscript{69} Id.
\textsuperscript{70} One of the first cap-and-trade systems, the U.S. Acid Rain Program, was designed to regulate a total of 445 coal-burning electric utility plants in the U.S. Acid Rain Program, UNITED STATES ENVT’L PROTECTION AGENCY, http://www.epa.gov/airmarkets/progresreg/arp/basic.html (last visited Apr. 29, 2014). Environmentalist and carbon-intensive industries alike cite to the U.S. Acid Rain Program as a primary prototype. Koushik Ghosh & Peter Gray, Rushing to Copenhagen? Is Cap-and-Trade the Answer?, 53 CHALLENGE 5, 13 (2010).
agriculture, which also contribute significantly to climate change. The shortcomings of emissions trading systems will be explored in Part III, using the recent cap-and-trade experiments in Pacific Rim countries as examples. The next section identifies the major criticisms of emissions trading.

D. Criticisms of Emissions Trading Systems

Emissions trading systems have come under a myriad of criticisms. The most frequently voiced concern is the immense hurdles to their implementation. Despite their alleged “efficiency,” such systems conceal a number of inefficiencies in that they require an enormous amount of legal, institutional, and technological preparation apart from their high administrative costs. The integrity of emissions trading systems depends upon accurate monitoring, reporting, and verification of emissions. Unfortunately, direct pollution measurement and monitoring systems for greenhouse gases have large margins of error. Historical emissions data is typically provided by the regulated emitters themselves; many countries currently implementing emissions trading systems have weak environmental enforcement systems and lack far-reaching, uniform, and accurate systems for measurement and monitoring. Further, emissions trading systems are premised on the belief that emitters should internalize the cost of damage from climate change, yet calculating the monetary costs and benefits of pollution with the exactitude required by economic theory is impossible. These barriers to adoption, implementation, and enforcement inevitably delay emissions reductions and undermine the efficiency claims of emissions trading proponents.

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73 Id.

74 Id.


Critics also argue that emissions trading systems may prolong the use of fossil fuels. Businesses and political leaders predictably want more fossil fuel and less climate change;\footnote{Lohmann, supra note 72, at 23.} emissions trading systems are premised on society’s continued reliance on fossil fuels. Under such a scheme, regulated entities only reduce carbon emissions when it is profitable—when emissions allowances are over-allocated, such a system actually subsidizes emitters and prolongs reliance on fossil fuels.\footnote{Jane Andrew et al., \textit{Carbon Tax: Challenging Neoliberal Solutions to Climate Change}, 21 \textit{Critical Perspectives on Taxation} 611, 616 (2010) (explaining “[i]t would be possible for a firm to financially benefit from participating in an ETS by keeping business as usual as long as other firms were making reductions to pollution. . . . A firm need not actually reduce carbon pollution in order to trade in an ETS. Similarly, a firm may choose to pay a tax on its carbon pollution rather than incur capital expenditure to implement innovations to reduce pollution. In an ETS the risk of not achieving carbon reduction will rest entirely with the government and its use of the relevant science to determine the necessary cap upon the collective carbon pollution of industry and government’s monitoring of carbon offsets.”).} Consumers bear the cost of emissions reductions.\footnote{Dave Keating, \textit{Energy Intensive Industries Benefiting from ETS, Says Commission, EuropeanVoice} (May 16, 2013), http://www.europeanvoice.com/article/2013/may/energy-intensive-industries-benefitting-from-ets-says-commission/77280.aspx (observing that due to the surplus of emissions allowances that plagued the EU ETS since its inception, the emissions trading system “has been a financial support to the energy intensive industries . . . who usually complain that the ETS is killing them”).} Governments that adopt these systems assume that market forces will fix climate change by causing consumers and profit seeking firms to invest in efficient technological solutions over emissions-intensive energy generation and products.\footnote{Andrew et al., supra note 78 (observing that in emissions trading, “the responsibility for pollution is not placed with the polluter, and there need not be a direct link with carbon mitigation . . . . That is, the responsibility of carbon emissions can bypass the polluter and be passed onto the consumer. Accordingly: ‘[a]n emissions trading scheme will see the price of electricity and manufactured goods go up but that is no guarantee that the market will invest in alternatives, especially if polluters can pass on the extra cost to consumers, buy up environmentally dubious permits, or be compensated for extra costs that might damage their international competitiveness.’”).} Critics, however, doubt that pricing mechanisms can prompt the radical innovation and wholesale reorganization of our technological and economic structures that are necessary to halt climate change.\footnote{Splash \& Lo, supra note 75, at 71.} With political will directed at experimental technology and market fixes to climate change, policymakers can subordinate alternatives that entail substantial and systemic changes.\footnote{\textit{Id.} See also Kevin Anderson \& Alice Bows, \textit{A New Paradigm for Climate Change}, 1 \textit{Nature Climate Change} 639, 639 (2012) (adding that academics “have contributed to a misguided belief that commitments to avoid warming of 2° Celsius can still be realized with incremental adjustments to economic incentives”).} Critics worry that the true effect of emissions trading is to reward the

\footnote{For example, ceasing the extraction of fossil fuels from the ground, commencing large-scale public works to reduce society’s fossil fuel dependency, shifting subsidies for fossil fuel exploration, extraction, refining, transport, and use to renewable energies, implementing green taxes, and adopting conventional pollution regulation. Lohmann, supra note 72, at 330-31.}
heaviest polluters by taking taxation and conventional regulation off the
table while generating new sources of profit for polluters.\(^{84}\) This ensures
continued investment in fossil-fuel based technologies and disadvantages
industries that might investigate alternative energy.\(^{85}\) Tellingly, the fossil
fuel industry does lobby heavily for emissions trading when it would
foretall an alternative, more costly form of regulation: an emissions tax.\(^{86}\)

Finally, critics contend that emissions trading systems do not reduce
emissions. Although emissions trading systems have overall emissions caps
that decrease over time, regulated parties may simply buy permits rather
than reduce their emissions.\(^{87}\) If they cannot purchase surplus permits, then
they can generate credits from offsets by investing in carbon-saving and
carbon-sequestring projects—the climate effectiveness of which is highly
uncertain.\(^{88}\) Or they can use their influence over the allocation process to
secure a larger quantity of freely allocated permits.\(^{89}\) Emissions trading
systems appear highly susceptible to rent-seeking, lobbying for special
exemptions, and gaming through financial markets.\(^{90}\) Lastly, domestic and
international fairness issues suggest that it will be years before meaningful
international emission limits are adopted, let alone enforced.\(^{91}\)

These criticisms, based on the failures of carbon trading under the
Kyoto Protocol and EU ETS, are relevant to the experiments currently being
undertaken along the Pacific Rim. As explored below in Part III, the same
hurdles to implementation and limited effectiveness plague the systems in
Australia, China, Japan, New Zealand, and South Korea. This supports the

\(^{84}\) Id. at 34, 50.

\(^{85}\) Tamra Gilbertson & Oscar Reyes, *Carbon Trading: How it Works and Why it Fails*, 7 CRITICAL
CURRENTS 1, 31 (2009).

\(^{86}\) David G. Victor & Joshua C. House, *BP’s Emissions Trading System*, 34 ENERGY POLICY 2100,
2101 (2006); *see also* Lohmann, *supra* note 72 (arguing that while companies will have to make reductions
or pay up if emissions caps are tightened, “emissions trading encourages [companies] to treat global
warming not as a social and environmental problem to be solved but as a business and public relations
problem ... to be managed at the least possible relative financial and market loss to themselves. And it
gives them the means to make sure caps are not tightened very much or very swiftly. Far-sighted
companies treat the carbon trading as an opportunity to gain new property rights, assets and openings for
capital accumulation, even if climate change is accelerated in the process.” (italics in original)).

\(^{87}\) *See* Lohmann, *supra* note 72, at 106; Andrew et al., *supra* note 78, at 616.

\(^{88}\) Lohmann, *supra* note 72, at 137-139 (noting that it is difficult to measure the carbon stored);
(observing that the capacity of carbon sinks such as forests, soil, and ocean cannot possibly keep up with
rising carbon emissions).

\(^{89}\) Gilbertson & Reyes, *supra* note 85, at 35; *see also* Alan D. Viard, *The Cap-and-Trade Giveaway,
(arguing that free allocation provides windfall gains to stockholders without restraining energy prices for
consumers, and comparing a cap-and-trade system with freely allocated permits to a carbon tax in which
the tax revenue is given to stockholders).

\(^{90}\) Ghosh & Gray, *supra* note 70, at 13.

\(^{91}\) Id. at 13-14; DEATHERAGE, *supra* note 31, at 48.
theory that the problems pervading emissions trading systems are not subject to correction through experience, but are inherent to the system itself.

III. PACIFIC RIM EMISSIONS TRADING SYSTEMS WILL BE INEFFICIENT, INEFFECTIVE, AND ULTIMATELY COUNTER-PRODUCTIVE

To regulate their domestic greenhouse gas emissions, particularly carbon dioxide emissions, Australia, China, Japan, New Zealand, and South Korea are experimenting with emissions trading systems. Most of these countries initially implemented such systems to meet targets and deadlines under the Kyoto Protocol and subsequent Copenhagen Accord.92 These countries’ decisions to mitigate climate change are admirable. However, these systems have many features in common with the Kyoto Protocol carbon market and the EU ETS—features that rendered those systems inefficient and ineffective. Therefore, emissions trading on the Pacific Rim A) undermines claims that emissions trading systems are an efficient form of regulation, and B) will likely fail to reduce emissions to safe levels, lending weight to the theory that emissions trading systems are inherently flawed.

A. Pacific Rim Countries Have Incurred Substantial Implementation and Administrative Costs, Negating Efficiency Claims

As explained in Part II.D, countries face two primary hurdles to implementing emissions trading systems that undermine their economic efficiency claims and, to an extent, their environmental effectiveness. These are: 1) the substantial legal, institutional, and technological investment necessary to develop two distinct but interrelated regulatory systems, and 2) the necessity of designing accurate mechanisms to measure, report, and verify emissions from a variety of sources, often in the context of a dearth of emissions data or lack of enforcement capacity. Both hurdles accompany the current emissions trading experiments along the Pacific Rim.

1. Emissions Trading Experiments on the Pacific Rim Require Substantial Legal, Institutional, and Technological Investment, Making them Particularly Complex, Contentious, and Costly

Emissions trading systems require a large amount of legal, institutional, and technological investment. In addition to an environmental regulatory system, they require trading platforms for permits and a parallel

92 See infra Part II.B.
system of financial regulation. The necessity for consistent methodologies for estimating, reporting, verifying, and monitoring emissions of liable entities means that the resulting regulatory and advisory bodies require substantial technical support and resources to monitor and enforce compliance. All of this complexity raises the cost of implementing and administering an emissions trading system and negates proponents’ economic efficiency claims.

Australia alone established a number of domestic regulatory and advisory bodies to implement their emissions trading system. Australia’s Climate Change Authority advises on caps, tracks pollution levels, and reviews the carbon pricing mechanism; the Clean Energy Regulator administers the carbon pricing mechanism, the National Greenhouse and Energy Reporting scheme, the Renewable Energy Target, and the Carbon Farming Initiative; the Productivity Commission reviews the necessity and sufficiency of government assistance to industry; the Land Sector Carbon and Biodiversity Advisory Board oversees land sector initiatives; the Energy Security Council assesses emerging risks to energy security and offers loans to energy generators. If the Australian emissions trading system survives current attempts at repeal, then implementation and enforcement will be further complicated by linkage with international systems such as the EU ETS and the Kyoto Protocol. Additionally, Australia is only in its

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93 See, e.g., Avi-Yonah & Uhlmann, supra note 47, at 38-39 (explaining that emissions trading systems are “inherently more complicated” compared to a “carbon tax”); Lohmann, supra note 72, at 72 (pointing out that “in order to work, greenhouse gas trading has to create a special system of property rights in the earth’s carbon-cycling capacity”).

94 See Toni E. Moyes, Greenhouse Gas Emissions Trading in New Zealand: Trailblazing Comprehensive Cap and Trade, 35 Ecology L.Q. 911, 948 (2008) (explaining that “[r]eliable information about the emissions produced by participants in an ETS is vital to its integrity and effectiveness. Incorrect information interferes with the price of emissions units and the attainment of environmental goals of the scheme. In turn, incorrect information undermines investor confidence in the ETS market and the basis upon which participants plan to either reduce emissions or purchase emissions units. Emissions must be monitored accurately and consistently across participants and the collected data must be timely reported to both the regulator and the market. Further, for confidence, the regulator must be able to verify that reported emissions data is correct.”).


transitional, fixed price period, which means that the Clean Energy Regulator is still designing an auction platform for the coming emissions trading phase.\textsuperscript{98}

Like Australia, China is in a transitional phase, but one that entails a substantially more complex shift from multiple, independent pilots at the regional and municipal levels to a single, uniform national system.\textsuperscript{99} Prior to initiating a national emissions trading program, China’s 12th Five Year Plan (2011-2015) authorized multiple sub-national carbon emissions trading pilot programs.\textsuperscript{100} Beijing, Shanghai, Guangdong, Shenzhen, and Tianjin launched pilot emissions trading programs between June and December of 2013;\textsuperscript{101} Hubei, Chongqing, and Hangzhou are developing parallel pilot programs.\textsuperscript{102} Because no national legislation reinforces these emissions trading systems, each local system is authorized by municipal or provincial administrative rules.\textsuperscript{103} Each pilot program is implementing or developing a separate environmental and financial regulatory system and trading platform,\textsuperscript{104} which will ultimately be succeeded by a national emissions trading system.\textsuperscript{105} Although the National Development and Reform Commission is designing a national registry with the United Nations Development Programme, the pilots are currently developing individual

\begin{itemize}
  \item \textsuperscript{102} \textit{Tianjin Starts Carbon Trading Market, supra note 101.}
  \item \textsuperscript{104} \textit{See generally, Swartz, supra note 103.}
\end{itemize}
registries. These pilots will give China some experience in designing and administering emissions trading systems. Yet China must make substantial investments in infrastructure and financial regulatory capacity before implementing a national emissions trading system, and these pilots will only provide a partial picture of China’s nationwide emissions.

In addition to developing adequate institutional capacity and expertise, these countries must make a number of technical decisions, many of which are unique to emissions trading systems. These include setting and adjusting the national cap, deciding whether the cap is absolute or intensity-based, setting penalties for non-compliance, and determining the scope of the emissions trading system—who is liable for which emissions and whether non-emitters, such as financial institutions, may participate. Countries must also decide how parties may meet their emissions reductions targets, whether and to whom allowances will be freely distributed or auctioned, whether banking or borrowing of allowances is allowed, and whether liable parties will be allowed to use carbon credits to offset their emissions. Uniform standards to measure emissions and effective methods of monitoring and verifying emissions must be in place to verify compliance. The various emissions trading platforms must establish trading rules and require regulatory oversight. There are further complications if the system is linked to other domestic or international systems, such as whether the government should put in place any price controls or subsidies.

For a system driven by neoliberal, unfettered free-market concepts, emissions trading requires a substantial amount of government investment and oversight, including the creation of “a new market structure, enforcement, audit, fraud prevention, and control mechanisms.”

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106 Swartz, supra note 103.
110 For an example of necessary regulations, see Shanghai Ordinance No. 10, supra note 103.
112 Andrew et al., supra note 78, at 613.
undermines proponent’s efficiency claims. As explained below, these systems are also inefficient because the countries implementing them lack adequate means to measure, monitor, and verify emissions and offsets.

2. **Inadequate Mechanisms to Measure, Monitor, and Verify Emissions Will Make it Costly to Ensure Credits and Offsets Represent Actual Reductions**

For an emissions trading system to be effective, countries need accurate emissions data. Measuring, monitoring, and verifying emissions is crucial to set environmentally effective emissions cap, allocate allowances, and assess compliance. Without reliable data, a country might set a cap too high to be environmentally effective and the prices of permits may plummet, reducing the incentive for regulated entities to cut emissions. For example, the price of carbon emissions in the EU ETS collapsed to essentially zero in 2007 due to a lack of reliable actual emissions data, which led to an oversupply of permits; in January 2013, the price of permits sank to a new record of 4.76 euros (at the time, USD 6.37) per metric ton.

One of the advantages of China’s implementation of pilot programs is that the programs may generate more accurate emissions data, potentially making any national system adopted thereafter more environmentally effective. Obtaining accurate emissions data is a particular challenge for China given its wide variation in economic structure, growth rates, energy consumption, and carbon intensities, especially when coupled with China’s lack of reliable historic emissions data. China has not mandated a unified methodology to account and report emissions, which may make it difficult

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115 Id.


118 Id.
for pilots to transition to a national system.\textsuperscript{119} There are also concerns that pilots have not put in place stringent data-quality requirements, and that the economic data on which the emissions-intensity caps are based could be manipulated, undermining the pilots’ stringency.\textsuperscript{120}

Unfortunately, the demand for emissions trading systems has surpassed measurement and monitoring capabilities. This phenomenon is partially explained by the fact that carbon emissions trading systems were translated from the United States sulfur dioxide emissions context to global carbon dioxide emissions.\textsuperscript{121} These are very distinct contexts—for example, merely stabilizing sulfur dioxide emissions prevents acid rain,\textsuperscript{122} whereas only absolute reductions of carbon dioxide emissions can counteract climate change.\textsuperscript{123} Moreover, there is no known means of reducing carbon dioxide emissions apart from refraining from combusting fossil fuels.\textsuperscript{124} Absent a quick technological fix,\textsuperscript{125} transitioning to a low carbon society requires radical innovation and structural economic changes.\textsuperscript{126}

The greatest difference between applying an emissions trading system in the carbon dioxide context rather than the sulfur dioxide context is coverage. The sulfur dioxide market in the United States consisted of roughly 500 large, similar, stationary, and easily monitored sources; in contrast, the global carbon dioxide market is hundreds of millions of diverse, individual sources that may be impossible to monitor directly.\textsuperscript{127} This makes the task of administering a carbon market over an environmentally significant percentage of a country’s emissions formidable, particularly for countries that lack the technical and institutional capability to quantify and monitor industrial greenhouse gas emissions precisely and regularly.\textsuperscript{128} Consequently, emerging carbon emissions trading systems rely heavily on


\textsuperscript{120} \textit{Id.}

\textsuperscript{121} Gilbertson & Reyes, \textit{supra} note 85, at 19-21; Ghosh & Gray, \textit{supra} note 70, at 15.


\textsuperscript{123} Ghosh & Gray, \textit{supra} note 70, at 15.

\textsuperscript{124} \textit{Id.}

\textsuperscript{125} \textit{Id.}

\textsuperscript{126} Splash & Lo, \textit{supra} note 75, at 71; Anderson & Bows, \textit{supra} note 82; Lohmann, \textit{supra} note 72, at 330-31.

\textsuperscript{127} Ghosh & Gray, \textit{supra} note 70, at 15-16.

\textsuperscript{128} \textit{See, e.g.}, Lohmann, \textit{supra} note 72, at 98.
industry reporting rather than solely on impartial authorities\textsuperscript{129} and tend to limit coverage to large, immobile emitters such as power generators.\textsuperscript{130}

Both the New Zealand Emissions Trading Scheme and South Korea’s pending emissions trading system have comparatively broad coverage, in that they regulate emissions from agriculture and forestry.\textsuperscript{131} Because carbon dioxide is not the dominant greenhouse gas emission in New Zealand, regulation of deforestation and agricultural emissions such as methane and nitrous oxide is essential for New Zealand’s emissions trading system to be environmentally effective.\textsuperscript{132} This breadth of coverage makes monitoring, reporting, and verification of compliance more challenging.

New Zealand adapted the 2002 Climate Change Response Act’s electronic registry, which was established to track Kyoto units and emissions allocations, to serve as the national reporting and recording structure.\textsuperscript{133} Like other emerging emissions trading systems, this structure is highly dependent on self-assessment and self-reporting,\textsuperscript{134} which creates a risk that regulated entities will misrepresent data.\textsuperscript{135} For example, emissions permits

\textsuperscript{129} See, e.g., Moyes, supra note 94, at 948 (citing T. H. TIETENBERG, EMISSIONS TRADING: PRINCIPLES AND PRACTICE 1, 166 (2006)) (observing that virtually all systems rely on self-reporting coupled with external oversight out of necessity).

\textsuperscript{130} See infra Part III.B.1. South Korea is somewhat unique in that it has a company-level threshold for receiving a mandatory cap as opposed to a facility or building-level threshold, resulting in somewhat broader coverage than other emissions trading systems. SOPHER & MANSELL, supra note 9, at 5.

\textsuperscript{131} Moyes, supra note 94, at 913-14; NORTON ROSE, ASIA PACIFIC CLIMATE CHANGE POLICY SERIES: REPUBLIC OF KOREA 2 (May 2011), http://www.nortonrosefulbright.com/files/asia-pacific-climate-change-policy-series-republic-of-korea-52311.pdf. South Korea’s trial emissions trading scheme, the Target Management Scheme, includes forestry and agriculture as well. Id.

\textsuperscript{132} Agriculture accounted for 47.19\% of New Zealand’s greenhouse gas emissions in 2011; energy only accounted for 42.58\%. UNITED NATIONS CLIMATE CHANGE SECRETARIAT, SUMMARY OF GHG EMISSIONS FOR NEW ZEALAND 2, available at https://unfccc.int/files/ghg_emissions_data/application/pdf/nzl_ghg_profile.pdf. By comparison, energy as a percentage of total emission accounted for 76.42\% in Australia, 77.25\% in China, 91.32\% in Japan, and 83.47\% in South Korea that same year. See UNITED NATIONS CLIMATE CHANGE SECRETARIAT, GHG EMISSION PROFILES FOR ANNEX 1 PARTIES AND MAJOR GROUPS, available at http://unfccc.int/ghg_data/ghg_data_unfccc/ghg_profiles/items/4625.php; UNITED NATIONS CLIMATE CHANGE SECRETARIAT, GHG EMISSION PROFILES FOR NON-ANNEX 1 PARTIES, available at http://unfccc.int/ghg_data/ghg_data_unfccc/ghg_profiles/items/4626.php.


\textsuperscript{134} Moyes, supra note 94, at 948-49.

\textsuperscript{135} Also, private carbon consultancies, private auditors, and rating agencies that help design, validate, verify, and certify greenhouse gas emissions reductions and projects may “have little incentive to question the effectiveness of the carbon projects they work on, since to do so would be to jeopardise [sic] their chances of getting future work.” Lohmann, supra note 72, at 61 (describing controversies surrounding validators of United Nations CDM projects and the problem of conflicts of interest in international climate politics); see also MICHAEL GILLENWATER & STEPHEN SERES, PEW CTR. ON GLOBAL CLIMATE CHANGE, THE CLEAN DEVELOPMENT MECHANISM: A REVIEW OF THE FIRST INTERNATIONAL OFFSET PROGRAM 24-25 (2011), available at http://www.c2es.org/docUploads/clean-development-mechanism-review-of-first-international-offset-program.pdf (describing structural problems within the CDM project auditing process,
for the EU ETS were also initially based on estimates prepared by corporations themselves, resulting in permit allocation that exceeded carbon emissions by 50% in some industries. While this risk is likely not unique to emissions trading systems, it is amplified in the emissions trading context because the resulting credits or offsets can be sold for a profit to other emitters who then use those credits to offset their emissions.

Further, emissions from livestock, synthetic fertilizer, and deforestation pose unique obstacles to gathering emissions data. Unlike emissions from a single point source, such as a power generation facility, agricultural emissions from a single farm are strongly affected by weather variations and natural landscapes. There is significant uncertainty in calculating agricultural emissions because they are often the product of unpredictable microbial processes. This uncertainty makes it difficult for countries to set a meaningful national cap, allocate an appropriate number of allowances, and monitor compliance. Without an accurate measurement of these emissions, New Zealand resorted to using proxy estimates, such as emissions per number of livestock animals, amount of farm productivity, or quantity of fertilizer purchased—proxies that are not particularly accurate.

Another challenge is measuring carbon removal by the biosphere. In 2008, New Zealand’s emissions trading system phased in the forestry sector and recognized “carbon sequestration” and “sinks.” Landowners are granted emissions reduction credits for forestry activities that lead to the removal of carbon dioxide from the atmosphere and, conversely, are held liable for deforestation and practices that release carbon dioxide. Australia, China, and Japan, similar to New Zealand, allow carbon

such as the fact that auditors are paid by project developers, creating “the potential for conflicts of interest,” and the fact that the demand for project auditing exceeds the capacity of auditing firms, which “can lead to less than high quality auditing” as “audit firms attempt to finish projects quickly in order to handle the growing backlog”).

138 Id.
139 See Newell et al., supra note 114; Moyes, supra note 94.
140 Moyes, supra note 94, at 957.
141 Ministry for the Env’t, supra note 133.
142 Id.
144 Ling Ma, Guangdong Calls for More Forest Carbon Sink Projects, ICIS (Dec. 20, 2013), http://www.icis.com/resources/news/2013/12/20/9737769/guangdong-calls-for-more-forest-carbon-sink-
sinks to generate emissions credits, and South Korea is moving in that direction. However, measuring the capacity of a particular forest to sequester carbon dioxide entails a high margin of error. It is difficult for regulators to determine when to require liable entities to report changes in stored carbon and in what quantities because carbon accumulates in the forest and soil slowly. Finally, testing for stored carbon dioxide is expensive.

Beyond these significant verification issues, carbon sinks are based on the flawed assumption that stored, biotic carbon is equivalent to reductions in fossil carbon emissions. Although carbon dioxide emissions stay in the atmosphere for centuries, carbon exchanged from the atmosphere to the biosphere is easily reversible—for instance, a tree plantation designed to store carbon might burn in wildfire, or be turned into paper or furniture that decomposes in a landfill. In other words, “one
[ton] of carbon in a tree is climatically not the same as one [ton] of carbon in a deep coal deposit.”\textsuperscript{154}

Despite claims to the contrary, emissions trading systems are inefficient. Obtaining accurate data on emissions and sinks is key. Yet verifying carbon sinks entails frequent and expensive testing, the unreliability of which could result in costly errors, such as over-allocation of permits. Due to the penchant of carbon dioxide to be re-released from the biosphere to the atmosphere, substantial measures are needed to ensure sinks are permanent. Inadequate mechanisms for measuring, monitoring, and verifying emissions also create opportunities for error and abuse, making enforcement difficult and necessitating substantial governmental oversight.\textsuperscript{155} These inefficiencies would be less concerning if emissions trading systems successfully reduced carbon dioxide emissions. As the next section explains, they do not.

\textit{B. Emissions Trading on the Pacific Rim Will Likely Not Reduce Greenhouse Gas Emissions}

The emissions trading systems adopted by these Pacific Rim countries will likely fail to reduce emissions and reverse climate change. Such systems are ineffective because 1) they are poorly suited to regulating the many, diverse sources of carbon dioxide emissions, and 2) the decisions to freely allocate allowances and permit the use of offsets will likely result in over-allocation and an increase, not a decrease, in emissions. Rather, these emissions trading systems will legitimize the continued use of fossil fuels and create new sources of profit for the fossil fuel industry.

\textsuperscript{154} Id.

\textsuperscript{155} See, e.g., Stefano Valentino, \textit{Carbon Trading: Why ‘Good’ Companies Embrace ‘Bad’ Credits, THE CHRISTIAN SCI. MONITOR} (Apr. 23, 2012), http://www.csmonitor.com/Business/2012/0423/Carbon-trading-Why-good-companies-embrace-bad-credits (describing how the Kyoto Protocol carbon credit system incentivized a number of manufacturers to intentionally produce far more HFC-23 emissions than necessary in order to later reduce those emissions and sell the resulting credits for profit. Consequently, these emitters profited by accelerating global warming. Although EU ETS ultimately banned these CERs, industries lobbied for an extension, and the ban was delayed until May 1, 2013.); \textit{GILLENWATER & SERES, supra} note 135, at 18-19 (explaining how the initial CDM program had neither the procedures nor resources to thoroughly review all projects and issued little guidance on the concept of “additionality.” The CDM has since put in place detailed methods and requirements, added new layers of audit and review, and increased staff.).

Emissions trading cannot adequately regulate the numerous sources of greenhouse gasses. Nearly half of the world’s greenhouse gas emissions, or roughly 45.6%, originate from the energy sector and industry. The remaining 54.4% comes from various sectors, including transportation, livestock, agriculture, forestry, residential and commercial buildings, and waste. Some of these sectors pose significant challenges to designing and administering a comprehensive emissions trading system. For example, in the personal transportation sector, emissions trading systems have higher transaction costs are less effective than vehicle emissions standards, in part because it is hard to verify the actual emissions of automobiles during their use. In the agricultural sector, emissions from a single farm can fluctuate widely over time and are difficult to measure.

Consequently, most emissions systems are limited to large, immobile emitters in the stationary energy and non-energy industrial sectors, which leaves unregulated significant sources of greenhouse gas emissions. For example, China’s pilot projects cover large immobile sources from various industries. Within these regulated industries, only facilities that reach an emissions threshold are required to surrender emissions allowances. Such thresholds may reduce administrative costs, but undermine the system’s environmental effectiveness because not all sources of carbon dioxide are

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157 Id.


159 See infra Part III.A.2.

160 Swartz, supra note 103, at 4 (including iron and steel, chemicals, cement, electricity, heat, petrochemical, power, oil and gas mining, construction, and public buildings).

161 This emissions threshold ranges from companies that emit more than 60,000 tons of coal consumption for major sectors in the year 2010 or 2011 in Hubei province, to 20,000 tons per year for major sectors in 2010 or 2011 in Shanghai and 5,000 tons per year in Shenzhen. Id.
Similar limitations can be found in the other four experiments in Australia, Japan, New Zealand, and South Korea.

As explained in Part III.A.2, New Zealand and South Korea are exceptions to the narrow sectoral coverage as they intend to regulate a wide array of sectors, including agriculture, waste, forestry, fishing, and transportation. The challenges of accurately measuring, monitoring, and verifying emissions and sinks in the agriculture and forestry sectors makes it difficult to develop environmentally effective caps, allocate permits, and enforce compliance. In 2012, the New Zealand legislature postponed the surrender obligations for biological emissions from agriculture indefinitely, citing the lack of economically viable and practical technologies for farmers

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162 Beijing’s system is expected to cover only 40-50% of total emissions in Beijing; Tianjin’s is expected to cover slightly more, or 60% of Tianjin’s emissions, and Chongqing’s is expected to cover slightly less, or 35-45% of Chongqing’s emissions. Id.; Beijing Launches Carbon Emissions Trading, Xinhua (Nov. 28, 2013), http://news.xinhuanet.com/english/sci/2013-11/28/c_132926333.htm. Shenzhen covers just 38% of the city’s emissions. China “Launches its First Carbon Trading Scheme,” Phys.Org (June 18, 2013), http://phys.org/news/2013-06-china-carbon-scheme.html#inlRlv.

163 Australia’s Carbon Pricing Mechanism requires any facility that emits above an annual threshold of 25,000 tons of carbon dioxide to surrender emission permits to the government. Explanatory Memorandum, Clean Energy Bill 2011 (Cth) 33 (Austl.). In 2012, this system covered 377 entities, or 60% of Australia’s emissions. Id. at 45; Talberg & Swoboda, supra note 100, at 11. This excludes the agricultural and transport sectors, businesses, households, and light commercial vehicles; the transport sector is partially covered through a carbon price and fuel excise tax on fuel—including fuels used for light commercial transport, households, agriculture, forestry, and fisheries. Id. at 34; Peter Sopher & Anthony Mansell, Env’tl. Def. Fund & Int’l Emissions Trading Ass’n, Australia, The World’s Markets: A Case Study Guide to Emissions Trading 3 (2013), available at http://www.ieta.org/assets/Reports/EmissionsTradingAroundTheWorld/ef_ieta_austria_case_study_september_2013.pdf.


166 In South Korea, compliance is mandatory for companies or workplaces that meet the emissions threshold (an annual discharge of over 125,000 tCO2e for companies or over 25,000 tCO2e for workplaces). Sopher & Mansell, supra note 9, at 2-3. South Korea’s trial emissions trading system covers about 60% of the country’s annual greenhouse gas emissions. South Korean Emissions 31% Higher Than Government Forecast, Thomson Reuters (Feb. 12, 2014), https://www.pointcarbon.com/aboutus/pressroom/pressreleases/1.4086316.

167 See MINISTRY FOR THE ENV’T, supra note 133.

168 See infra Part III.A.2.
to reduce emissions and trading partners’ lack of progress. Roughly half of New Zealand’s greenhouse gas emissions are now unregulated by the scheme, severely curtailing its environmental effectiveness.

These emissions thresholds and limitations to particular emissions sectors are structural features that make emissions trading systems ineffective climate change policies. However, these particular experiments have additional coverage limitations. For example, partial geographic coverage is a separate issue in China, where most pilot programs are in the coastal cities and provinces of Eastern China. It is estimated that 80% of emissions related to items consumed in these coastal provinces and municipalities are released in less-developed provinces in central China. Until a national system exists, the pilots may exacerbate emissions outsourcing within the country, without producing significant reductions in China’s overall emissions.

Japan has huge gaps in coverage to the extent that their mandatory emissions trading systems are subnational only. Like the Kyoto Protocol, Japan’s national emissions trading program is entirely voluntary. Consequently, from 2005 to 2009, the Japan Voluntary Emissions Trading Scheme (“JVETS”) covered less than one percent of Japan’s industrial emissions, and less than one-third of participants adopted absolute targets.

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170 See UNITED NATIONS CLIMATE CHANGE SECRETARIAT supra note 132.

171 See generally SWARTZ, supra note 103.


173 Id.; see also TALBERG & SWOBODA, supra note 100, at 21-22 (noting the possibility that by establishing pilots in only a handful of provinces, industry will be tempted to relocate to unaffected provinces).


175 See generally SOPHER & MANSELL, supra note 164.

176 Id. at 3-4.
The Integrated Domestic Emissions Trading Market that succeeded this national scheme in 2008 is still voluntary, at its height covering 70% of Japan’s industrial firms.\textsuperscript{177} Reported emissions reductions are not necessarily reliable because only a few participants accepted external monitoring or verification.\textsuperscript{178} Participants could borrow allowances or invest in project-based Kyoto Protocol mechanisms to generate credits, which saved them from non-compliance with their own targets.\textsuperscript{179} Additionally, participants that failed to meet their targets faced nominal penalties.\textsuperscript{180} Japan’s only mandatory emissions trading schemes are at the municipal and regional levels.\textsuperscript{181}

The emissions trading systems along the Pacific Rim regulate greenhouse gas emissions incompletely. Some are geographically limited, others cover only a few emissions sectors, and all are limited to large, generally fixed sources of emissions. This partial coverage limits their ability to meaningfully reduce emissions because not all emitters are required to make cuts.

2. \textit{The Decision to Freely Allocate Allowances and Permit the Use of Offsets Will Likely Result in Over-allocation and an Increase of Emissions}

Emissions trading systems have not reduced emissions as promised.\textsuperscript{182} Their effectiveness depends on lowering the total allowable emissions over time, forcing emitters to either purchase increasingly scarce and thus expensive emission rights, reduce emissions through investment in lower emission technology or carbon capture and storage, or pay a penalty for noncompliance.\textsuperscript{183} As a result, emissions trading systems face severe

\textsuperscript{177} Rudolph & Schneider, supra note 174, at 6-8.
\textsuperscript{178} Id.
\textsuperscript{179} Id. at 7-8.
\textsuperscript{181} Tokyo launched a mandatory, municipal emissions trading scheme in April 2010; Saitama, Japan’s fifth most populous prefecture, launched a nearly identical emissions trading system in 2011. Talberg & Sloboda, supra note 100, at 19-20.
\textsuperscript{182} See Andrew et al., supra note 78, at 615 (observing that “the theory of carbon markets is based on the idea that a deregulated market will be the most efficient approach to carbon minimization because it is claimed that by eliminating ‘regulatory interventions such as carbon taxes or precise standards for polluters . . . the market will seek out the most efficient means of achieving the same emissions reduction goals.’ . . . Though the evidence so far indicates that the ambitions of neoliberal, market oriented carbon policy have remained unfulfilled. . . Therefore, relying on an ETS to reduce carbon pollution is either naïve, or this was never the primary purpose.”).
\textsuperscript{183} Deatherage, supra note 31, at 20 (observing that emissions reductions imposed on industry must be real, significant, and continue to decrease over time).
opposition, particularly from carbon intensive industries and industries exposed to international competition with countries that lack or have less stringent climate laws. Unfortunately, this opposition frequently results in concessions to emitters, including the adoption of low national or sectoral emission reduction targets, free allocation of emission allowances, the use of offsets, and expanded state aid. These concessions are environmentally harmful because they allow regulated entities to ostensibly comply with emissions caps while maintaining or increasing their emissions. As explained below, such concessions are characteristic of the emissions trading systems adopted in Australia, China, Japan, New Zealand, and South Korea.

The free allocation of allowances, undermines emissions trading systems by reducing the incentive for regulated entities to reduce emissions and creating windfall profits for emitters. Emissions allowances are valuable property rights that, counterintuitively, are awarded to the most carbon intensive industries. They derive their value from allowing holders to avoid cutting emissions. When emission allowances are auctioned, the price of reducing emissions is born by the regulated industry and the government earns revenue that may be put to other uses. Conversely, when emission allowances are allocated free of cost, the regulated entities gain a valuable property interest that may be sold for a profit and the cost of achieving emissions reductions is shifted from the regulated industry to the taxpayer. Thus free allocation undercuts the ability of an emissions trading system to incentivize emissions cuts and asks taxpayers to subsidize emissions-intensive industries.

Over-allocation undermines emissions trading systems. Theoretically, a gradually declining emissions cap, regardless of the price of allowances, compels regulated entities to reduce emissions. Yet, emissions trading

186 See Gilbertson & Reyes, supra note 85, at 18; Lohmann, supra note 72 at 344.
187 DEATHERAGE, supra note 31, at 31.
188 Id. at 31-32.
189 Under the EU ETS, the German power company, RWE, is estimated to have earned €1.8 billion in a year by charging customers for permits it received for free. Splash & Lo, supra note 75, at 75 (arguing that free allocation of permits creates “incentive to pass on the cost to consumers to reap windfall profits. Even if an industry receives permits free of charge, the price of its products typically rise to reflect the value of the permits. . . because free permits have an opportunity cost: excess permits can be sold in the market.”).
190 See id.
191 See DEATHERAGE, supra note 31, at 20.
systems are vulnerable to over-allocation, meaning that the emissions cap is set higher than actual emissions, possibly in response to political pressure for more free allowances or as a result of inaccurate and incomplete emissions data or projections. When allowances are over-allocated, there is no scarcity of allowances and regulated entities have enough permits to cover their current emissions, if not further emissions, meaning there is no incentive for regulated entities to cut emissions. Essentially, the emissions trading system begins to subsidize emissions intensive industries, encouraging investment in, and perpetuating reliance upon, fossil fuels.

The use of offsets allows regulated entities to reduce emissions from activities outside the scope of the emissions trading system to generate emissions reduction credits—credits that may be used to meet their own emissions reduction requirements. Offsets theoretically help achieve compliance at the lowest possible cost—if carbon dioxide emissions are equivalent across industries and regions, offsets allow emissions reductions

192 Largely due to free allocation of permits. See Alex Scott, EU Carbon Emission Trading Scheme In Freefall, C&EN (Feb. 18, 2013), http://cen.acs.org/articles/91/i7/EU-Carbon-Emissions-Trading-Scheme.html (explaining that in the EU ETS, the high number of exemptions for energy-intensive industries, plus the economic recession that suppressed manufacturing, created a huge oversupply of carbon emissions allowances. In 2013, just over 50% of allowances were auctioned—the remainder were freely allocated. Without intervention, the scheme will result in zero emissions reductions by 2020).


194 Andrew et al., supra note 78, at 615 (attributing the failure of the First Phase of the EU ETS to an oversupply of permits by the regulatory authorities); Will Nichols, EU Carbon Markets Set “To Be Oversupplied until 2027,” BUSINESSGREEN (Sept. 20, 2013), http://www.businessgreen.com/bg/news/2295736/eu-carbon-markets-set-to-be-oversupplied-until-2027 (analysts predict that the 2.5 billion excess carbon credits at the start of Phase III of the EU ETS will not be fully eroded until the mid-2020s with more aggressive climate policies); Damian Carrington, EU Emissions Trading Scheme “Set to Cancel Out Renewable Energy Gains,” THE GUARDIAN (June 25, 2013), http://www.theguardian.com/environment/2013/jun/25/eu-emissions-trading-scheme-energy (finding huge oversupplies of carbon pollution permits in the EU ETS, many of which “are being banded to enable emissions after 2020, when efforts to tackle global warming should be intensifying.” The price of carbon permits was as low as €4.13 in July 2013, far below the €30 analysts say is needed to effectively reduce emissions.); Backloading Inadequate to Revitalize EU ETS, FORTUM (Nov. 8, 2013), http://www.fortum.com/en/mediaroom/pages/fortum-backloading-inadequate-to-revitalise-eu-emissions-trading.aspx (arguing that reducing the oversupply that has led to the plummeting of price of emissions allowances in the EU ETS will require “backloading,” or temporarily withdrawing 900 million allowances from the market in 2013-2015 and postponing the auctioning of them until 2019-2020).

195 Keating, supra note 78 (according to Bloomberg New Energy Finance, “the steel, cement, refining, lime, glass, ceramics, and pulp sectors all generated a profit” within the European Union’s emissions trading scheme by being over-allocated. For example, the steel sector was given 1.2 million allowances for free over five years, and only 729,000 were used—which “translates to a theoretical profit of €1.5 million for the sector.”).

196 DEATHERAGE, supra note 31, at 19.

197 INT’L EMISSIONS TRADING ASSN’, supra note 157 (asserting that “cap-and-trade will deliver its environmental objective at the lowest cost to the economy”).
to be made wherever they are the cheapest, or most efficient. Offsets, however, compromise the environmental objectives. If offsets are unlimited, or if limits are unenforced, then they enable regulated entities to pollute over the cap, meaning that the cap could steadily decline, but emissions could actually increase. Thus, offsets exacerbate the effects of over-allocation. Even if the use of offsets is limited to a percentage of a regulated entity’s allowances, it is difficult to verify that offsets represent actual emission reductions. Assuming the integrity of offsets could be consistently and accurately verified, the cost of doing so cuts into the alleged efficiency of emissions trading systems. Finally, offsets directly and indirectly perpetuate reliance on fossil fuels, particularly in the most fossil-intensive industries and countries where emissions reductions are arguably more urgent because of the greater cost.

The emissions trading systems in Australia, China, Japan, New Zealand, and South Korea are flawed to the extent that they all freely allocate permits and sanction the use of offsets. Both characteristics render the programs more vulnerable to over-allocation and effectively subsidize

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199 Keating, supra note 78 (observing that if international credits such as credits through the Kyoto Protocol’s CDM are considered, the EU ETS’s total credit surplus is almost two billion allowances, worth €7.3 billion in May 2013).
200 See infra Part III.A.2; Carbon Trade Watch, supra note 197; Newell et al., supra note 114, at 137; James Wright, Politicians Right to Rebuff Business Lobby’s Scheming, Precarious Climate (Mar. 8, 2013), http://precariousclimate.com/2013/03/08/politicians-right-aig-business-lobby-scheming/ (criticizing international offsets as “a breeding ground for creating accounting while preventing structural decarbonization of the Australian economy”).
201 Newell et al., supra note 114, at 137 (to reduce emissions, “credits can only be given to projects (and for measurable reductions) that would not have occurred without the offset credit program. At the same time, rigorous screening creates transaction costs that eat into potential cost savings.”).
202 Indirectly because offsets compensate for continuing present carbon emissions; directly because the offset projects compensating for those emissions may actually be “supercritical” coal-fired power plants eligible for CDM credits. Stephen Lacey, In The ‘Crazy’ World of Carbon Finance, Coal Now Qualifies For Emission Reduction Credits, Climate Progress (Sept. 19, 2012), http://thinkprogress.org/climate/2012/09/19/865471/in-the-crazy-world-of-carbon-finance-coal-now-qualifies-for-emission-reduction-credits/# (observing that because new coal-fired power stations are eligible for CDM credits, “a coal-fired power plant in Europe could be “offset” by carbon credits . . . through another carbon-burning coal plant in India.”); Michael Lazarus & Chelsea Chandler, Coal Power in the CDM: Issues and Options (Stockholm Environment Institute, Working Paper 2011), available at http://sei-us.org/Publications_PDF/SEI-WP-2011-02-Coal-in-CDM-ES.pdf (questioning whether the CDM should be used to support marginal improvements in coal emission rates when the vast majority of such projects would have proceeded with or without the CDM and lock in over 400 million tons per year in emissions).
203 See Carbon Trade Watch, supra note 197 (arguing that offset projects enable continued pollution in industrialized countries and shift responsibility for emission reductions); Lohmann, supra note 72, at 103-04 (arguing that “[i]nstead of encouraging the type of innovations, long-term investments and broad restructuring that are crucial to speeding the transition to a society that doesn’t use fossil fuels, [offsets discourage] them in favor of scattered stopgap measures that may ultimately be very costly.”).
fossil fuel use or at least reduce the incentive to cut emissions. This prevents the systems from attaining meaningful emissions reductions.

a. These emissions trading systems are flawed to the extent that they freely allocate allowances

When the Australian emission trading system began in 2012, Australia allocated free permits for emissions-intensive, trade-exposed activities for up to 94.5% of the industry baseline emissions intensity, or 66% for the less-intensive and less-exposed industries. These baselines are drawn from historic emissions and production data submitted by the regulated entities themselves. Awarding free credits on the basis of data submitted by the regulated parties themselves increases the risk of over-allocation and little abatement. Also, these free permits essentially subsidize the largest emitters. Apart from free allocation, Australia also awarded coal fired electricity generators assistance in free units and cash payments. Because the quantity of permits available for purchase is unlimited in Australia until June 2015 when an emissions cap is introduced, there is not an absolute limit on the quantity of emissions.
China’s pilot programs allocate emissions permits primarily for free. Of the five programs already launched, Beijing, Shanghai, Shenzhen, and Tianjin allocate emissions permits for free. Thus far, Guangdong is the only pilot program that requires companies to buy a portion of their allowances through auction—three percent in 2013, and increasing to ten percent by 2015. Like Australia, the pilot programs’ emissions caps are not absolute, but rather intensity-based. Emissions intensity is the ratio of carbon dioxide emissions to some measure of economic output. Under intensity-based caps, absolute emissions may increase even as emissions intensity improves.

Japan lacks a mandatory, nationwide emissions trading scheme. Japanese companies have participated voluntarily in JVETS, which distributed allowances freely from 2005 to 2009, and government subsidies were available to finance one third of a company’s abatement measures. The Integrated Domestic Emissions Trading Market that succeeded this scheme in 2008 removed subsidies for abatement measures, but it remains voluntary and subsidizes polluters to the extent that they may choose between several free allowances to meet the target of their choice.


 SWARTZ, supra note 103, at 4, 25, 38, and 43; Shànghǎi shì rénmín zhèngfǔ guǎn yù běn shì kǎizhǎn tān páifāng jiāoyì shìdiàn gōngzú de shíshí yìjiá (上海市人民政府关于本市开展碳排放交易试点工作的实施意见) [Shanghai Municipal People’s Government to Carry out the Implementation of Views on the City’s Carbon Emissions Trading Pilot], http://www.shanghai.gov.cn/shanghai/node2314/node2319/node12344/u26ai32789.html.


 See, e.g., Shanghai Municipal People’s Government to Carry out the Implementation of Views on the City’s Carbon Emissions Trading Pilot, supra note 208.


 ID.

 In 2009, the Democratic Party of Japan promised to “reduce the political influence of large Japanese corporations and to establish an ambitious climate policy,” and the Basic Law on Global Warming Countermeasures, passed in May 2010, called for the creation of a national emissions trading system. However, it proved impossible to overcome industry concerns over international competitiveness without meaningful international action on climate change, so the legislation lapsed and the Fukushima disaster sealed its fate. Plans for a national, mandatory emissions trading system were formally abandoned in November 2012. See TALBERG & SWOBODA, supra note 100, at 22; SOPER & MANSELL, supra note 163, at 7; Meltzer, supra note 6, at 1-3; Shanahan, supra note 174.

 Rudolph & Schneider, supra note 174, at 5-6.

 ID. at 6-7.
Tokyo’s mandatory municipal emissions trading system still allocates permits to emitters for free. 217

In New Zealand, the steady decline and low price of emissions units reflects the low constraints imposed by their emissions trading system. 218 Under “transitional measures” that were extended indefinitely in 2012, 219 participants may purchase carbon units from the government at a fixed price and those in the energy, industrial, and liquid fuel sectors need surrender only one credit for every two tons of emissions produced. 220 Industries facing international competition, horticulture, and fishing receive up to 90% free allocation. 221 In the industrial sector, the percentage allocated for free was initially 90% for highly emissions-intensive activities and 60% for moderately emissions-intensive activities. 222 This free allocation for large emitters was set to decline by 1.3% per year starting in 2013, 223 but the 2012 amendment postponed these cuts indefinitely, “effectively lock[ing] in the ninety percent allocation subsidy.” 224

South Korea’s trial emissions trading system will transition to a national scheme in 2015, with significant concessions to emitters. 225 At least 95% of permits will be allocated for free in the first and second commitment periods, and at least five percent will be auctioned. 226 This is similar to the

218 Keys Defends NZ’s ETS Amid Criticism, FINANCIAL REV. (July 11, 2011), http://www.afr.com/p/national/politics/keys_defends_nz_ets_amid_criticism_9XA1ATGHI1GuFHfFxF1A J (noting that when Australia announced a carbon tax/fixed-price period that would force Australian polluters to pay $23 per ton of CO2-e, New Zealand’s credit price was $9.77, and noting that Green Party leaders expressed concern over the cost of subsidizing carbon pollution); TALBERG & SWOBOĐA, supra note 100, at 13.
219 TALBERG & SWOBOĐA, supra note 100, at 13.
220 Id. at 12.
221 Newell et al., supra note 114, at 130.
222 Sopher & Mansell, supra note 164, at 3-4.
223 Id.
224 Addendum to the Submission on the Climate Change Response (Emissions Trading and Other Matters) Amendment Bill, Submission to the Finance and Expenditure Committee, Dr. Jan Wright, Sept. 2012, Parliamentary Commissioner for the Environment 5-6, available at http://www.pce.parliament.nz/assets/Uploads/PCE-Submission-on-the-Climate-Change-Amendment-Bill.pdf (observing that under the original phase-out period, polluters would still be responsible for only half of their emissions by 2050; under the 2012 amendments, this phase-out is postponed indefinitely).
225 South Korea initially announced an emissions trading bill in 2011 with significant concessions to industry, including free permit allocation and easing non-compliance penalties. Norton Rose, supra note 130, at 1. Nevertheless, South Korea’s two largest business lobbies, the Federation of Korean Industries and Korea Chamber of Commerce & Industry, successfully lobbied to delay introduction of the emissions trading system for another four years—until 2015. Sangim Han, supra note 185.
EU ETS’s ratio when it was launched in 2005. In reality, emitters will likely receive all of their allowances for free during the first commitment period, 2015 to 2017, and as much as 97% free from 2018 to 2020. Moreover, the system will likely exempt certain key emissions-intensive and trade-exposed industries from the reduction in free allocations for the first two phases. Companies in energy-intensive and trade-exposed sectors will receive all of their allowances free.

Each of these emissions trading systems allocates the vast majority of permits to emitters for free. This substantially diminishes the financial burden on emitters, giving them less incentive to reduce emissions. The next section describes the use of offsets in these systems. Offsets, combined with the free allocation, could mean that a majority of emitters could comply with the regulations without making a single emissions reduction.

b. These emissions trading systems are flawed to the extent that they permit the use of offsets

Finally, because the emissions trading systems of Australia, China, Japan, New Zealand, and South Korea include offsets, these systems will likely be environmentally ineffective. In Australia, domestic carbon credits may be used to meet five percent of a regulated entity’s compliance obligation during the fixed price period. After July 1, 2015, there are no limits imposed on the amount of domestic offsets used. Regulated entities cannot use internationally sourced credits during the fixed charge years.

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227 Tom Young, The Ultimate Guide to South Korea’s Cap-and-Trade Scheme, BUSINESSGREEN (Apr. 20, 2011), http://www.businessgreen.com/bg/analysis/2044996/ultimate-guide-south-koreas-cap-trade-scheme. The EU ETS is poised to become significantly more demanding with only 40% of permits allocated free of charge from 2013. Id.


230 SOPHER & MANSELL, supra note 9, at 3.


232 House Explanatory Memorandum, supra note 204, at 117.

233 Clean Energy Act 2011, supra note 231, at part 6 div. 1 §121.
but they may use the credits to meet up to 50% of their compliance obligation in the first five floating price years.\footnote{Splash & Lo, supra note 75, at 74.}

In China, regulated entities may use carbon credits, Chinese Certified Emission Reductions,\footnote{Wênshí qìtǐ zìyuán jiānpái jiāoyì guānní zànxing bānfǎ (温室气体自愿减排交易管理办法) [The Interim Regulation of Voluntary Gases Emission Trading in China] (promulgated by the National Development and Reform Commission July 2012), available at http://cdm.ccchina.gov.cn/WebSite/CDM/UpFile/File2894.pdf (authorizing voluntary emission reductions from qualified projects to be traded as Certified Emission Reductions and used to offset compliance obligations. One Certified Emission Reduction equals one ton of CO2e).} to offset a limited portion of their compliance obligation. All Chinese pilot programs have agreed to accept these credits, with limits.\footnote{See, e.g., NAT’L DEV. AND REFORM COMM’N, supra note 143.} China’s national emissions trading system will likely incorporate offsets, as well.\footnote{Japan’s national emissions trading system was integrated into a new J-Credit Scheme. Projects are eligible under the domestic CDM system are a system whereby large enterprises provide technology and capital and validate the emissions reductions achieved through projects implemented by small and medium-sized enterprises in the agriculture, forestry and fisheries industries, the private sector (business and households), and the transportation sector. Large enterprises in Japan use this system to meet their voluntary action plan targets. MINISTRY OF ECON., TRADE, AND INDUS., supra note 239.}

Japan is heavily reliant on offsets, as opposed to emissions reductions, to meet its emissions targets, as demonstrated by the extensive incorporation of offsets in both its municipal and national emissions trading programs. Under the Tokyo Cap-and-Trade Program, small and midsized facilities can generate tradable offset credits, with no limit for offsetting.\footnote{See generally MINISTRY OF THE ENV’T, OFFICE OF MKT. MECHANISMS, CLIMATE CHANGE POL. DIVISION, OFFSET CREDIT (J-VER) SCHEME (2011), available at http://www.env.go.jp/en/earth/ets/mkt_mech/j-ver_scheme.pdf (including reductions and forest sinks). This is a system utilizing the mechanism of carbon offsets, under which the amount of reduction/Removal by sinks of greenhouse gas emissions carried out by domestic projects is certified as credits for offsetting. MINISTRY OF ECON., TRADE, AND INDUS., FINAL REPORT OF THE DIRECTION OF THE NEW CREDIT SYSTEM (2012), available at http://www.meti.go.jp/english/press/2012/0802_01.html.} Under JVETS, entities can also use CDM credits without limit, so long as they are not the “primary means” of achieving the pledged targets.\footnote{Id.} The J-VER scheme, established in 2008, is a verification scheme for credits generated through the reduction or recapture of greenhouse gases carried out via domestic projects.\footnote{The domestic CDM system is a system whereby large enterprises provide technology and capital and validate the emissions reductions achieved through projects implemented by small and medium-sized enterprises in the agriculture, forestry and fisheries industries, the private sector (business and households), and the transportation sector. Large enterprises in Japan use this system to meet their voluntary action plan targets. MINISTRY OF ECON., TRADE, AND INDUS., supra note 239.} This scheme and the domestic CDM system\footnote{Id.} were integrated into a new J-Credit Scheme. Projects are eligible under...
the J-Credit scheme if they are implemented within Japan, satisfy additionality, and ensure permanency—a particular challenge for forestry credits.\footnote{MINISTRY OF ECON., TRADE, AND INDUS., J-CREDIT SCHEME 21, 23-25 (2013), available at http://japancredit.go.jp/pdf/english/credit_english_001_2.pdf.}

Uniquely, Japan has established a Joint Crediting Mechanism/Bilateral Offset Credit Mechanism, a program under which Japan exports low carbon technologies to, and implements pollution mitigation actions in, developing countries to generate emissions reductions, or credits, which can be used to achieve Japan’s emission reduction target.\footnote{GOV’T OF JAPAN, RECENT DEVELOPMENT OF THE JOINT CREDITING MECHANISM (JCM)/BILATERAL OFFSET CREDIT MECHANISM (BOCM) 3 (2013), available at http://www.mmechanisms.org/document/20130523_JCMBOCM_goj.pdf.} Japan modeled this on the UN CDM: it relies on bilateral agreements between Japan and developing countries whereby Japanese investors can fund emissions reduction projects in partner countries to generate emissions credits.\footnote{TALBERG & SWOBODA, supra note 100, at 23.} Japan signed agreements with Bangladesh, Vietnam, Mongolia, Ethiopia, Kenya, Laos, and Indonesia.\footnote{SOPHER & MANSELL, supra note 163, at 6.}

New Zealand’s system lacks quantitative limits on offsets.\footnote{SOPHER & MANSELL, supra note 164, at 4.} Unlimited NZUs may be purchased from the forestry sector and Kyoto flexibility mechanisms.\footnote{TALBERG & SWOBODA, supra note 100, at 12; Pattrick Smellie, No Restrictions on Foreign-sourced Carbon Credits Confirmed, THE NAT’L BUS. REV. (Oct. 17, 2012), http://www.nbr.co.nz/article/no-restrictions-foreign-sourced-carbon-credits-confirmed-bd-130869 (capping the use of foreign credits would compromise the emissions trading scheme principle of “least cost of compliance.”) In October 2012, New Zealand Units were worth $3 a ton, well below the $25 a ton price cap; carbon credits on the global market were worth as little as $2 a ton.).} Unlimited NZUs may be purchased from the forestry sector and Kyoto flexibility mechanisms.\footnote{Surrendering Emissions Units, CLIMATE CHANGE INFO. NEW ZEALAND, http://www.climatechange.govt.nz/emissions-trading-scheme/obligations/surrendering-units.html (last visited May 8, 2014); CHRISTINA HOOD, INT’L ENERGY AGENCY, REVIEWING EXISTING AND PROPOSED EMISSIONS TRADING SYSTEMS 23, n. 14 (2010), available at http://www.iea.org/publications/freepublications/publication/ets_paper2010.pdf.} Until May 31, 2015, an unlimited amount of international Kyoto units can be purchased by participants in the emissions trading system and surrendered to meet obligations.\footnote{Sangim Han, South Korea Seeking CO2 Cuts at Home Before Allowing Offsets, BLOOMBERG (July 24, 2012), http://www.bloomberg.com/news/2012-07-25/south-korea-seeking-co2-cuts-at-home-before-allowing-offsets-1-.html. Since New Zealand refused to join the second Kyoto protocol compliance period, participants may not trade in any non-New Zealand CERs created after 2012. TALBERG & SWOBODA, supra note 100, at 13.} Regulated entities may also use UN CERs to meet their entire emissions reduction requirement.\footnote{Since New Zealand refused to join the second Kyoto protocol compliance period, participants may not trade in any non-New Zealand CERs created after 2012. TALBERG & SWOBODA, supra note 100, at 13.} As a result of this unrestricted use of offsets, the majority of credits submitted under the New Zealand emission trading system have been disproportionately ERUs, RMUs, and CERs, as opposed to fixed price
allowances. Additionally, a 2012 amendment enables pre-1990 forest land owners to participate in an offsetting mechanism: they may avoid incurring liability for deforestation if new forest is established elsewhere.

The South Korea system permits offsetting with credits generated by CDM projects located in Korea from the start. Companies under the ETS will not be allowed to use international offsets through 2020. Starting in 2021, however, regulated entities can use international offsets to meet at least ten percent of a liable entity’s surrender obligations, but the volume must not exceed the number of domestic offsets used. Simultaneously, the government is allocating as much as 97% of a company’s emission allowances for free between 2018 and 2020, and 90% after 2021.

Therefore, the emissions trading systems of Australia, China, Japan, New Zealand, and South Korea have three fundamental flaws. First, they allocate emission allowances free of cost to specific emitters. Free allocation artificially prolongs the use of fossil fuels by reducing the incentives for regulated entities to reduce emissions and shifting the cost of emissions reductions to the taxpayer. Second, because allocation is often based on incomplete or self-reported historical emissions data, there is a substantial risk that inaccurate or manipulated data will result in surplus allowances. When such over-allocation occurs, meaning the total emissions cap is set far higher than actual emissions, total emissions may actually increase under an emissions trading system, and fossil fuel intensive industries receive windfall profits. Third, regulated entities are permitted to use offsets to meet their emissions reduction requirements. These offsets allow regulated entities to emit pollution above the cap, relying on credits that may or may not represent actual emissions reductions, and perpetuates reliance on fossil fuels. While each of these factors alone should discourage

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251 Luis Mundaca & Jessika Luth Richter, “Figure 2: Carbon Credits Surrendered under the NZ ETS,” from Challenges for New Zealand’s Carbon Market, 3 NATURE CLIMATE CHANGE 1006-08 (2013), available at http://www.nature.com/nclimate/journal/v3/n12/fig_tab/nclimate2052_F2.html.
252 SOPHER & MANSELL, supra note 164, at 3.
253 Korea’s Emission Trading Scheme Receives Cabinet Approval, supra note 228.
254 Sangim Han, supra 250; South Korea to Exclude International Carbon Offsets from ETS till 2020, CLIMATE POL’Y WATCHER (July 23, 2012), http://www.climate-policy-watcher.org/?q=node/369 (noting that beginning in 2021 Korean emitters may use international units to cover ten percent of their emissions, but the volume used must not exceed the number of domestic offsets used).
255 Korea’s Emission Trading Scheme Receives Cabinet Approval, supra note 228.
256 Sangim Han, supra note 250.
257 See supra Part III.A.2; Gerard Wynn, Australia is Another Nail in Cap and Trade, REUTERS (Sept. 11, 2013), http://www.reuters.com/article/2013/09/11/column-wynn-australia-coidUSL5N0H622720130911 (observing that “[i]t is hard to think of a successful scheme, with the European and two regional U.S. markets facing an oversupply of emissions allowances”).
258 Wynn, supra note 257 (noting that the EU ETS “has handed tens of billions of dollars in windfall profits to electricity utilities, with barely a flicker of interest from energy consumers who footed the bill”).
countries from relying on emissions trading systems to reduce emissions, they are symptomatic of the larger, crucial shortcoming of emissions trading systems: the prioritization of economic interests over environmental results and the assumption that human-induced climate change can be solved without relinquishing our dependence on fossil fuels.

IV. CONCLUSION

Carbon emissions trading systems will not lower carbon dioxide emissions to safe levels. The degree of legal, institutional, and technological investment required to implement and administer such systems undermines their alleged efficiency and delays implementation. The inadequacy of data on carbon emissions and sinks, which is particularly pronounced for the forestry and agricultural sectors, undermines the effectiveness of these systems and makes measuring, monitoring, and verifying emissions and emissions credits costly. It also limits the coverage of emissions trading systems to large facilities in a few sectors, making emissions trading an incomplete solution to climate change at best. Finally, the practice of allocating allowances for free and permitting the use of offsets has the effect of artificially prolonging and even legitimizing the use of fossil fuels, while allowing regulated parties to increase emissions. The emissions trading systems along the Pacific Rim will only ensure continued investment in fossil fuel technologies and economies, distracting policymakers from the substantial and systemic changes that might actually slow climate change.