

Regulating Domestic Carbon Outsourcing: The Case of China and Climate Change

Alex L. Wang



ABSTRACT

The vast majority of the growth in greenhouse gas emissions in the coming decades is expected to come from outside of the developed world. Yet on the whole, scholars have made only modest headway in identifying the distinctive features of effective environmental regulation in the developing world. This Article argues that a particular feature of the emerging economies—sharp regional economic disparities—need not be a barrier to climate change regulation. Instead, these disparities can be harnessed to make climate change regulation more effective.

Taking China as its focus, this Article notes that both international law and Chinese domestic regulation have attempted to manage economic disparities according to the principle of common but differentiated responsibilities (CBDR). Building on these examples, it proposes a domestic CBDR approach for confronting China's climate change risks. Such an approach includes more stringent mitigation obligations for China's developed coastal provinces to the east, coupled with fiscal and technical support for developing provinces in China's interior.

This Article contends that features of the Chinese sociopolitical context offer advantages in policy development and implementation that render a domestic CBDR approach more likely to succeed than its international counterpart. These advantages include normative legitimacy and confluence with other domestic policy objectives, in particular. Interest group influence and institutional capacity factors offer potential benefits, but also serious challenges.

In the end, this Article aims to achieve two main goals: to highlight the importance of differentiated regulation in China's existing regulatory regime, and to argue that more extensive use of the approach can benefit policy formation and on-the-ground implementation alike.

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INTRODUCTION

Experts have determined that a failure to limit greenhouse gas emissions in the next fifteen years would make it “virtually impossible” to solve the problem of climate change with existing technologies.¹ The major developed countries (in particular, the United States and European Union countries) will certainly have an important role to play in any effort to mitigate carbon emissions given their expertise, financial clout, and historical responsibility for emissions. But the vast majority of greenhouse gas emissions growth in the coming decades is expected to come from outside the developed world. Ninety-two percent of the increase in global greenhouse gas emissions between 2012 and 2040 is projected to originate in countries that are not members of the Organization of Economic Cooperation and Development (OECD).² Forty-five percent of total growth is expected to come from China alone,³ which has already become the world’s leading emitter of greenhouse gases.⁴ Any solution to global climate change will require significant action from China in particular, and developing countries in general.

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1. Justin Gillis, *U.N. Says Lag in Confronting Climate Woes Will Be Costly*, N.Y. TIMES, Jan. 16, 2014, <http://www.nytimes.com/2014/01/17/science/earth/un-says-lag-in-confronting-climate-woes-will-be-costly.html> (referring to the draft findings of a report by the Intergovernmental Panel on Climate Change (IPCC), a United Nations panel of climate experts). *The New York Times* notes the IPCC draft report also states that “[a] delay would most likely force future generations to develop the ability to suck greenhouse gases out of the atmosphere and store them underground to preserve the livability of the planet But it is not clear whether such technologies will ever exist at the necessary scale, and even if they do, the approach would probably be wildly expensive compared with taking steps now to slow emissions.” *Id.*
 2. See *Annual Energy Outlook 2013*, U.S. ENERGY INFO. ADMIN. (Apr. 2013), <http://www.eia.gov/oiaf/aeo/tablebrowser/#release=IEO2013&subject=0-IEO2013&table=10-IEO2013®ion=0-0&cases=Reference-d041117>. The U.S. Energy Information Administration (EIA) estimates that global carbon dioxide emissions will increase from 32,299 to 45,455 million metric tons (MMT) between 2012 and 2040, an increase of 41 percent or 13,156 MMT. Of this increase, 12,102 MMT (91.99 percent) is expected to occur in countries that are not members of the Organization of Economic Cooperation and Development (OECD), and 1,054 MMT (8.01 percent) is projected to occur in OECD countries. *Id.* OECD membership has traditionally been a rough, but imperfect, proxy for developed country status. See, e.g., Lyngne Nielson, *Classifications of Countries Based on Their Level of Development: How It Is Done and How It Could Be Done* 4 (IMF Working Paper No. 11/31, 2011).
 3. See *Annual Energy Outlook 2013*, *supra* note 2 (estimating that China will account for 5,917 MMT (44.98 percent) of the projected 13,156 MMT of global growth in carbon dioxide emissions between 2012 and 2040).
 4. In 2011, China was the largest emitter of carbon dioxide (accounting for 29 percent of global emissions), followed by the U.S. (16 percent), the European Union (EU27) (11 percent), India (6 percent), the Russian Federation (5 percent), and Japan (4 percent). JOS G.J. OLIVIER ET AL., PBL NETHERLANDS ENVTL. ASSESSMENT AGENCY, TRENDS IN GLOBAL CO₂ EMISSIONS: 2012 REPORT 10 (2012), available at <http://www.pbl.nl/sites/default/files/cms/publicaties/PBL>

In thinking about effective regulatory strategies for developing countries, scholars have recognized that theories of regulation based on studies of the developed world may not be appropriate for developing country contexts.⁵ Yet, on the whole, scholars have only begun to make headway in identifying the distinctive features of effective environmental regulation in the developing world.⁶ And in practice, recommendations for regulatory reform in the developing world too often tend toward direct regulatory transplant from the United States and Europe—or, to put it more coarsely, recommendations to “be more like us.” Less frequently are local conditions taken at face value and used as the basis for building a regulatory system from the ground up.⁷

This Article seeks to develop an approach to mitigating China’s greenhouse gas emissions that takes relevant local circumstances seriously. In particular, it will explore the challenges and opportunities presented by a feature of the Chinese economy that has significant implications for the future growth of carbon emissions—the presence of sharp regional economic disparities.⁸ China has a number of relatively wealthy coastal provinces coupled with a vast interior of

[_2012_Trends_in_global_CO2_emissions_500114022.pdf](#), see also *Annual Energy Outlook 2013*, *supra* note 2.

5. See, e.g., JEAN-JACQUES LAFFONT, REGULATION AND DEVELOPMENT (2005); Antonio Estache & Liam Wren-Lewis, *Towards a Theory of Regulation for Developing Countries: Following Laffont’s Last Book* (ECARES, Working Paper No. 2008_018, 2008), available at http://www.ecares.org/index2.php?option=com_docman&task=doc_view&gid=32&Itemid=20.
6. See, e.g., ALLEN BLACKMAN, ET AL., RESOURCES FOR THE FUTURE, VOLUNTARY ENVIRONMENTAL REGULATION IN DEVELOPING COUNTRIES: MEXICO’S CLEAN INDUSTRY PROGRAM (2010); LESLEY K. MCALLISTER, MAKING LAW MATTER: ENVIRONMENTAL PROTECTION AND LEGAL INSTITUTIONS IN BRAZIL (2008); SMALL FIRMS AND THE ENVIRONMENT IN DEVELOPING COUNTRIES: COLLECTIVE IMPACTS, COLLECTIVE ACTION (Allen Blackman ed., 2006); BENJAMIN VAN ROOIJ, REGULATING LAND AND POLLUTION IN CHINA, LAWMAKING, COMPLIANCE, AND ENFORCEMENT: THEORY AND CASES (2006); DAVID WHEELER, WORLD BANK, GREENING INDUSTRY: NEW ROLES FOR COMMUNITIES, MARKETS, AND GOVERNMENTS (1999); Ruth Greenspan Bell & Clifford Russell, *Environmental Policy for Developing Countries*, ISSUES IN SCI. & TECH., Spring 2002, at 63; Allen Blackman & Winston Harrington, *The Use of Economic Incentives in Developing Countries: Lessons From International Experience With Industrial Air Pollution*, 9 J. OF ENV’T & DEV. 5 (2000); John Braithwaite, *Responsive Regulation and Developing Economies*, 34 WORLD DEV. 884 (2006); Lesley K. McAllister et al., *Reorienting Regulation—Pollution Enforcement in Industrializing Countries*, 32 LAW & POL’Y 1 (2010); Estache & Wren-Lewis, *supra* note 5, at 7–24 (discussing implications of institutional weakness in four areas: (i) limited regulatory capacity; (ii) limited commitment; (iii) limited accountability; and (iv) limited fiscal efficiency).
7. Doing so would mean more carefully incorporating native governance practices, political priorities, normative values, capacity levels, political economy dynamics, and other socioeconomic factors into regulatory design. See discussion *infra* Parts II.B–C, III.
8. See Daniel Farber, *Beyond the North–South Dichotomy in International Climate Law: The Distinctive Adaptation Responsibilities of the Emerging Economies*, 22 REV. EURO. COMP. & INT’L ENVTL. L. 42 (2013) (noting that sharp regional economic disparities are a feature of emerging economies).

much less developed provinces. Some of the most developed jurisdictions have reached per capita GDP levels in the range of developed countries, whereas the vast majority of provinces remain quite poor by standard metrics.⁹

For climate change mitigation purposes, regional economic disparities have several major implications. The first is carbon outsourcing (or leakage) from the wealthier coastal regions to the interior regions. One study found that 57 percent of China's emissions are associated with goods consumed outside of the province where they were produced.¹⁰ Indeed, as much as 80 percent of emissions associated with goods consumed in the developed eastern coastal provinces are produced in the interior provinces, where much of China's low value-added but high carbon-intensity production takes place.¹¹ If global trends are any indication, such interregional transfers of emissions are likely to grow in the future.¹² This is akin to the global dynamic, whereby carbon-intensive, low-efficiency industrial production has largely been outsourced from the developed to the developing world. Second, without intervention, such disparities are likely to result in carbon emissions in China growing for a much longer period than predicted by current modeling, as the interior provinces pursue rapid economic development.¹³ Third, carbon outsourcing also exacerbates traditional environmental pressures, such as air and water pollution. Fourth, a clearer understanding of carbon outsourcing also raises questions about whether consumption-heavy jurisdictions should assume a greater burden for mitigation. These issues of sharp regional economic disparities and domestic carbon outsourcing have received scant attention in the regulatory literature on China, or in scholarly work on environmental regulation in general.¹⁴

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9. See *Comparing Chinese Provinces with Countries—All the Parities in China*, THE ECONOMIST, http://www.economist.com/content/chinese_equivalents (last visited May 18, 2014) (GDP per person, 2010).
 10. Kuishuang Feng et al., *Outsourcing CO2 Within China*, 110 PROC. NAT'L ACAD. SCI. U.S. 11654, 11654 (2013).
 11. *Id.*
 12. Cf. *infra* notes 29–47 and accompanying text (explaining that developed nations are increasingly outsourcing their carbon emissions to China, and that China's wealthy eastern provinces in turn outsource those emissions to the interior provinces).
 13. See Daniel Abebe & Jonathan S. Masur, *International Agreements, Internal Heterogeneity, and Climate Change: The "Two Chinas" Problem*, 50 VA. J. INT'L L. 325, 357–78 (2010).
 14. The literature that touches on such economic disparities in China has made only cursory reference to regulatory implications. Rather, this literature has focused on (a) demonstrating the existence of interprovincial carbon emission transfers; (b) discussing the impact of regional economic disparities on the accuracy of emissions projections; and/or (c) describing implications for the international treaty context. For sources concerning (a), see Kuishuang Feng et al., *supra* note 10, at 11654–57 and sources cited *infra* notes 37, 45–46; for (b) see Abebe & Masur, *supra* note 13, at 357–78; for (c), see *id.* at 381–88, (arguing that side payments will likely be necessary for Chinese participation in a global climate treaty), and Farber, *supra* note 8, (arguing that emerging economies should have

Regulatory efforts at the international level have considered intercountry economic disparities, namely by recognizing the right of poorer jurisdictions to develop. This has emerged in the principle of common but differentiated responsibilities (CBDR). CBDR is embedded in the 1990 United Nations Framework Convention on Climate Change (UNFCCC) and other environmental treaties. In its broadest strokes, CBDR sets less stringent standards and offers support to developing countries. For the most part, however, the approach has failed to limit, and has even exacerbated, carbon outsourcing. China, for its part, has varied its regulations among regions based on development level and expected economic function—at first in the economic realm and more recently in environmental regulation—and offered subsidies to developing regions in some cases. China’s differentiated regulation has exacerbated regional economic disparities and carbon outsourcing, but in recent years it has also attempted to counter these problems.

Building on these approaches, this Article suggests a differentiated approach to reducing China’s carbon emissions and limiting carbon outsourcing that explicitly recognizes the right to development of China’s poorer regions. In concept, this regulatory approach is a simple one: Wealthier coastal provinces should take on more stringent mitigation obligations, interior provinces less, and coastal provinces should subsidize greenhouse gas mitigation or low-carbon development efforts in the interior provinces through fiscal subsidies and technology transfer. This is a proposal that acknowledges the priority China places on economic development, particularly in its poorer regions, but also seeks a way to avoid the traditional “pollute first, remediate later” (先污染后治理; *xian wuran hou zhili*) approach to development that has driven the Chinese “economic miracle” over the last thirty-five years.

On the surface this proposal resembles the international CBDR approach. This Article argues, however, that the proposal—domestic CBDR—benefits from a number of sociopolitical features of the Chinese context that

greater responsibilities to support adaptation efforts within their borders than other developing countries.) Springmann et al. discuss the related issue of consumption-based allocations for emissions-intensity targets. See MARCO SPRINGMANN ET AL., MIT JOINT PROGRAM ON THE SCI. & POLICY OF GLOBAL CHANGE, CONSUMPTION-BASED ADJUSTMENT OF CHINA’S EMISSIONS-INTENSITY TARGETS: AN ANALYSIS OF ITS POTENTIAL ECONOMIC EFFECTS (2013). The scholarly literature on environmental regulation in the United States has been deeply concerned with pollution leakage or a race-to-the-bottom problem, but such debates have not generally focused on regional economic disparities as a basis for regulatory design. See, e.g., Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the “Race-to-the-Bottom” Rationale for Federal Environmental Regulation*, 67 N.Y.U. L. REV. 1210 (1992); Richard L. Revesz, *The Race to the Bottom and Federal Environmental Regulation: A Response to Critics*, 82 MINN. L. REV. 535 (1997) (citing to various articles debating the race-to-the-bottom problem).

improve its chances of success as compared to international CBDR. These benefits fall roughly into four baskets. The first two—normative legitimacy¹⁵ and confluence with other state priorities¹⁶—offer the strongest support. The latter two—interest group influence and institutional capacity—present both opportunities and challenges.¹⁷ This analysis is meant to provide an assessment of policy feasibility more grounded in local circumstances than is commonly found in the regulatory literature.

This Article proceeds in three Parts. Part I describes China's climate change contribution and the problem of domestic carbon outsourcing. Part II describes how international law and Chinese domestic regulation have addressed and affected economic disparities and carbon outsourcing through a differentiated approach to regulation. This Part then makes a proposal for a domestic CBDR approach that seeks to mitigate carbon emissions while respecting the right to development of poorer provinces. Part III argues that domestic CBDR is bolstered by confluence with Chinese values and policy interests. Interest group and institutional capacity factors are of more equivocal impact, but offer some benefits nonetheless. These factors improve the feasibility of a domestic CBDR approach and highlight ways in which the proposal improves upon the shortcomings of existing international climate change law and domestic Chinese environmental regulation.

I. BACKGROUND

A. China's Climate Change Contribution¹⁸

China is the world's largest emitter of greenhouse gases¹⁹ and its largest consumer of energy.²⁰ This marks a dramatic change over thirty years, as rapid economic growth has resulted in a six-fold increase in energy consumption.²¹

15. Namely, attitudes towards development and notions of reciprocity among coastal and interior provinces. *See infra* Part III.A.

16. Such as air pollution reduction, economic transformation, and national unity. *See infra* Part III.B.

17. *See infra* Part III.C, III.D.

18. For more detail on the developments described in Part I.A, see Alex L. Wang, *Climate Change Policy and Law in China*, in *THE OXFORD HANDBOOK OF INTERNATIONAL CLIMATE CHANGE LAW* (Kevin R. Gray et al. eds., forthcoming 2014).

19. *See* OLIVIER ET AL., *supra* note 4, at 10; Spencer Swartz & Shai Oster, *China Tops U.S. in Energy Use*, WALL ST. J., Jul. 18, 2010, <http://online.wsj.com/news/articles/SB10001424052748703720504575376712353150310>.

20. *See* Swartz & Oster, *supra* note 19.

21. China's total primary energy consumption was 17.29 quadrillion British Thermal Units (BTU) in 1980 and 109.62 quadrillion BTU in 2011, a 6.34-fold increase. *See China: Country Analysis Brief Overview*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/countries/country-data.cfm?fips>

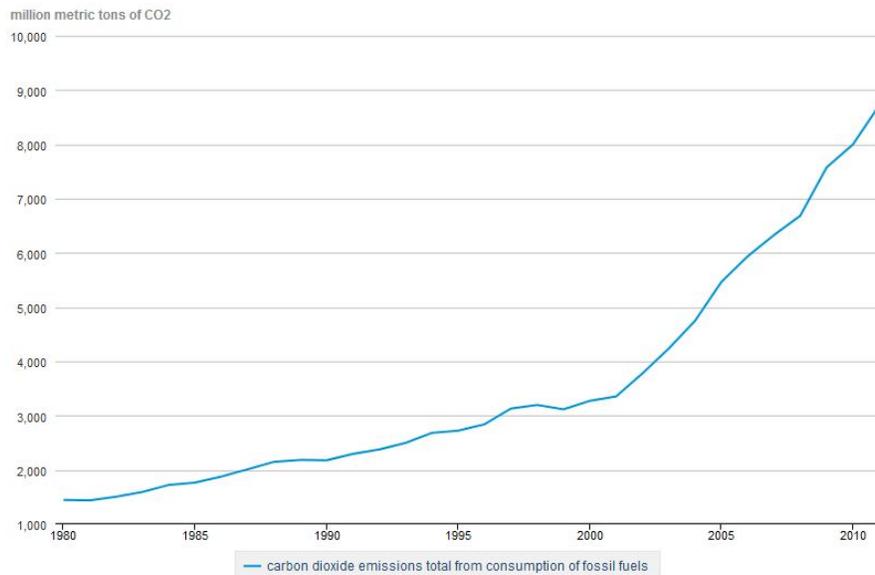
China's energy mix is fossil fuel intensive, with coal supplying approximately 70 percent of total energy.²² This expansion in carbon-intensive energy use has led to a several-fold increase in greenhouse gas emissions.²³ China's energy use and greenhouse gas emissions would be even greater if not for significant energy intensity improvements. Whereas China's real GDP grew by more than six times between 1980 and 2000,²⁴ energy use only slightly more than doubled in the same period.²⁵

But from 2002 to 2005, China's energy consumption increased at a faster rate than GDP, largely because of expanded investment in energy-intensive industries, such as cement and steel.²⁶ This shift reversed the two-decades-long trend of year-over-year energy efficiency improvements. While the trend toward greater energy efficiency resumed in the Eleventh Five-Year Plan (2006–2011)—due in part to a number of regulatory efforts—continued rapid economic growth has caused absolute energy use and greenhouse gas emissions to rise sharply nonetheless. And as stated above, future growth of emissions in China is expected to be significant; projections suggest that 45 percent of total global growth in emissions between 2012 and 2040 will occur in China.²⁷

=CH#tpe (last updated May 30, 2013). Over the same period, U.S. total primary energy consumption increased by 1.25 times, albeit from a much higher baseline (78.07 quadrillion BTU in 1980; 97.47 quadrillion BTU in 2011). See *United States: Overview Data for United States*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/countries/country-data.cfm?fips=US#tpe> (last updated May 30, 2013).

22. Fossil fuels accounted for 91 percent of total energy consumption in 2011 (69 percent coal, 18 percent oil, 4 percent natural gas). *China, Overview*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/countries/cab.cfm?fips=CH> (last updated Feb. 4, 2014). This compares to 80 percent of primary energy consumption from fossil fuels in the United States in 2011 (20 percent coal, 35 percent oil, 25 percent natural gas). U.S. ENERGY INFO. ADMIN., MONTHLY ENERGY REVIEW: FEBRUARY 2014, at 7 tbl.1.3 (2014), available at <http://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf>.
23. China's annual carbon dioxide emissions from fossil fuel consumption increased from 1.448 to 8.715 billion metric tons of CO₂ from 1980 to 2011. *China: Country Analysis Brief Overview*, *supra* note 21.
24. China's real GDP in 1980 (in billions of 2005 dollars) was \$216.31; in 2000, it was \$1417.06 (a 6.55 times increase). *International Macroeconomic Data Set*, U.S. DEP'T OF AGRIC. ECON. RESEARCH SERV., <http://www.ers.usda.gov/data-products/international-macroeconomic-data-set.aspx#UfexK1OydZl>—"Real GDP (2005 dollars) Historical" (last updated Dec. 19, 2013).
25. From 1980 to 2000, China's primary energy consumption increased from 17.287 quadrillion BTU to 40.936 quadrillion BTU (a 2.37 times increase). *International Energy Statistics*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=44&pid=44&aid=2&cid=regions&syid=1980&eyid=2000&unit=QBTU> (last visited Mar. 16, 2014).
26. C. FRED BERGSTEN ET AL., CHINA'S RISE: CHALLENGES AND OPPORTUNITIES 139–41 (2008).
27. See *Annual Energy Outlook 2013*, *supra* note 2. But see Abebe & Masur, *supra* note 13, at 379–80 (noting the wide variation in emissions forecasts for China).

FIGURE 1. China Carbon Dioxide Emissions Total From Consumption of Fossil Fuels (1980–2011)²⁸



B. The Problem of Domestic Carbon Outsourcing

The phenomenon of the West outsourcing a large percentage of its carbon emissions to the developing world, especially China, is well known.²⁹ But China faces a domestic version of this phenomenon that is less well understood: Its wealthy, coastal provinces outsource many of their carbon emissions to the less-developed interior. The domestic Chinese version of outsourcing poses a number of problems for controlling carbon emissions but also offers a surprising regulatory opportunity.

Although emissions in developed countries have flattened, this is attributable in significant part to the outsourcing of emissions to the developing world.³⁰

28. See *Country Analysis Brief Overview*, U.S. ENERGY INFO. ADMINISTRATION, <http://www.eia.gov/countries/country-data.cfm?fips=CH&trk=m#cde> (last updated May 30, 2013).

29. Outsourcing refers both to the movement of demand to companies in developing countries and companies actually moving production facilities overseas.

30. See Glen P. Peters et al., *Growth in Emission Transfers via International Trade From 1990 to 2008*, 108 PROC. NAT'L ACAD. SCI. U.S. 8903, 8903 (2011), available at <http://www.pnas.org/content/early/2011/04/19/1006388108.full.pdf+html>; see also Dabo Guan et al., *The Drivers of Chinese CO2*

In fact, between 1990 and 2008, emissions associated with such outsourcing far exceeded emissions reductions achieved by developed (or Annex I) countries under the Kyoto Protocol.³¹

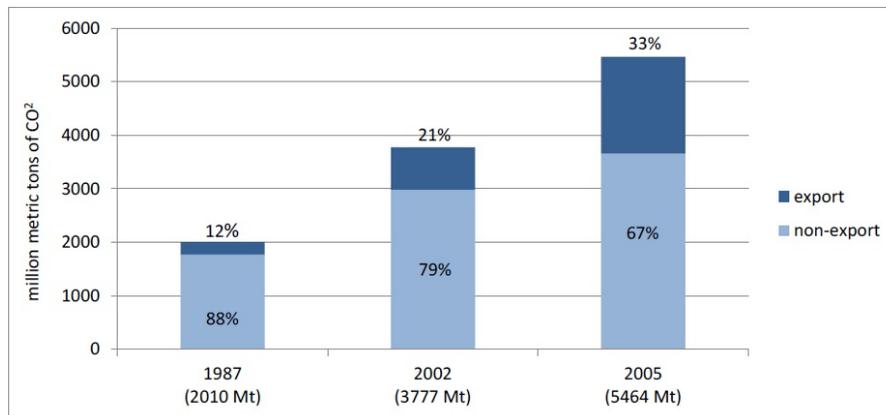
China has been the destination for much of this carbon outsourcing. Over the last few decades, some of the most energy- and carbon-intensive industries have been outsourced to China. For example, in 2012, China accounted for 11.3 percent of global GDP,³² but produced about 60 percent of cement, 43 percent of aluminum, and 50 percent of steel worldwide.³³ A significant proportion of Chi-

Emissions From 1980 to 2030, 18 GLOBAL ENVTL CHANGE 626 (2008); Dabo Guan et al., *Journey to World Top Emitter: An Analysis of the Driving Forces of China's Recent CO₂ Emissions Surge*, 36 GEOPHYSICAL RES. LETTERS L04709 (2009); Christopher L. Weber et al., *The Contribution of Chinese Exports to Climate Change*, 36 ENERGY POLY 3572 (2008); cf. SPRINGMANN ET AL., *supra* note 14 (discussing interregional emissions exports within China). Peters et al. suggest that this has not been driven by GHG emissions regulation, but by "other economic and policy factors." Peters et al., *Growth in Emission Transfers via International Trade From 1990 to 2008*, *supra*, at 8907; cf. PETER ERICKSON ET AL., STOCKHOLM ENV'T INST., INTERNATIONAL TRADE AND GLOBAL GREENHOUSE GAS EMISSIONS: COULD SHIFTING THE LOCATION OF PRODUCTION BRING GHG BENEFITS? (2013), available at <http://sei-international.org/mediamanager/documents/Publications/Climate/sei-3c-2013-pr-trade-ghg-lr.pdf> (detailing the feasibility of using trade to reduce global GHG emissions). Indeed, both the United States and European Union have experienced large increases in net emission transfers, although only the European Union had an extensive climate policy—the European Emission Trading System (ETS). Peters et al., *Growth in Emission Transfers via International Trade From 1990 to 2008*, *supra*, at 8907; see also Glen P. Peters et al., *China's Growing CO₂ Emissions—A Race Between Increasing Consumption and Efficiency Gains*, 41 ENVTL. SCI. & TECH. 5939 (2007); Glen P. Peters & Edgar G. Hertwich, *CO₂ Embodied in International Trade With Implications for Global Climate Policy*, 42 ENVTL. SCI. & TECH. 1401 (2008).

31. Peters et al., *Growth in Emission Transfers via International Trade from 1990 to 2008*, *supra* note 30, at 8903 ("Most developed countries have increased their consumption-based emissions faster than their territorial emissions The net emission transfers via international trade from developing to developed countries increased from 0.4 Gt [gigatons] CO₂ in 1990 to 1.6 Gt CO₂ in 2008, which exceeds the Kyoto Protocol emission reductions.").
32. GDP (Current US\$), WORLD BANK, <http://data.worldbank.org/indicator/NY.GDP.MKTP.CD> (last visited Mar. 17, 2014) (\$8.2 trillion for China in 2012); *World Bank Search*, WORLD BANK, <http://search.worldbank.org/all?qterm=world+gdp+2012> (\$72.5 trillion for global GDP in 2012) (last visited July 7, 2014).
33. Peter Edwards, *China: First in Cement*, GLOBAL CEMENT (July 23, 2013), <http://www.globalcement.com/magazine/articles/796-china-first-in-cement> ("China claims total cement production of close to 2.2Bnt in 2012. With total global cement production of 3.6Bnt in 2012, this means that, officially, China accounts for ~60% of all cement production in the world."); *July 2013 Crude Steel Production*, WORLD STEEL ASSOC. (Aug. 20, 2013), <http://www.worldsteel.org/media-centre/press-releases/2013/07-2013-crude-steel.html> ("World crude steel production for the 64 countries reporting to the World Steel Association (worldsteel) was 132 million tonnes (Mt) in July 2013 China's crude steel production for July 2013 was 65.5 Mt"); Agnieszka Troszkiewicz, *China's Aluminum Producers Seen Having to Make Cuts Amid Surplus*, BLOOMBERG, May 17, 2013, <http://www.bloomberg.com/news/2013-05-17/china-s-aluminum-producers-seen-having-to-make-cuts-amid-surplus.html> ("China accounted for 43 percent of production and 43 percent of consumption last year, according to the [Barclays Capital] bank."); *UPDATE 2—Global Steel Output up in July on US, Chinese Increases*, REUTERS (Aug. 20, 2013, 11:49 AM), <http://www.reuters.com/article/2013/08/20/steel-output-july-idUSL6N0GL21K20130820>

na's emissions are associated with goods produced for export. Studies have found that in recent years, these emissions embodied in export have comprised anywhere from 18 to 45 percent of China's overall carbon emissions,³⁴ and this proportion has increased over the past few decades. One study, for example, found that emissions of carbon embodied in China's exports were 12 percent of total emissions in 1987, 21 percent in 2002, and 33 percent in 2005.³⁵

FIGURE 2. Carbon Embodied in Chinese Exports³⁶



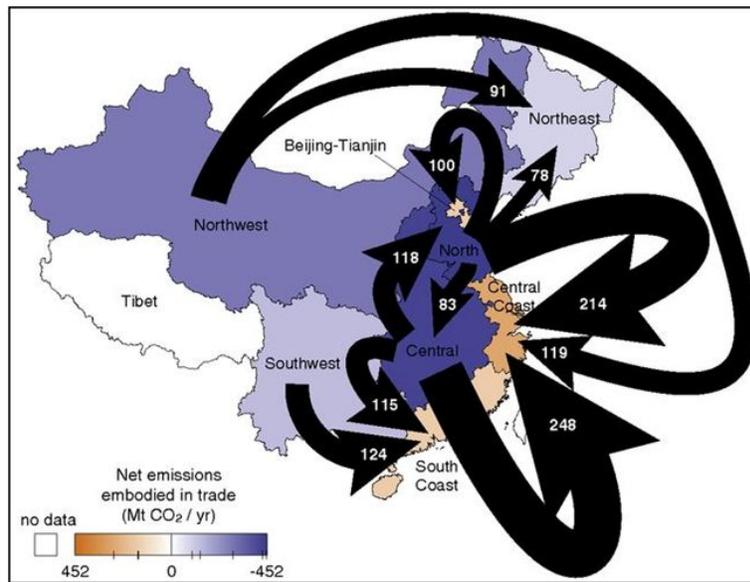
More recently, scholars have noted that this phenomenon of outsourcing carbon production occurs at the country level as well.³⁷ In China, 57 percent of

(“China, which produces half of the world’s steel supply and is also its top consumer, posted a 6.2 percent increase in output to 65.5 million tonnes . . .”).

34. See, for example, reports on China’s embodied emissions from 2005 to 2007. Misato Sato, *Embodied Carbon in Trade: A Survey of the Empirical Literature* 10 (Ctr. for Climate Change Econ. & Policy, Working Paper No. 89, 2012) (listing results of forty-five studies of emissions embodied in trade from 1995 to 2007 for China).
35. Christopher L. Weber et al., *The Contribution of Chinese Exports to Climate Change*. 36 ENERGY POLICY 3572, 3574–76 (2008). Note, however, that there is tremendous variation among studies. See Sato, *supra* note 34, at 10.
36. *International Energy Statistics*, U.S. ENERGY INFO. ADMIN., <http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=90&pid=44&aid=8> (last visited July 5, 2014) (total annual CO₂ emissions for China stated in parentheses).
37. Here, I rely primarily on Kuishuang Feng et al., *supra* note 10. But there are a number of other studies that address this phenomenon. See Afton Clarke-Sather et al., *Carbon Inequality at the Sub-National Scale: A Case Study of Provincial-Level Inequality in CO₂ Emissions in China 1997–2007*, 39 ENERGY POLY 5420 (2011); Kuishuang Feng et al., *Analyzing Drivers of Regional Carbon Dioxide Emissions for China*, 16 J. OF INDUS. ECOLOGY 600 (2012); Qiao-Mei Liang et al., *Multi-Regional Input-Output Model for Regional Energy Requirements and CO₂ Emissions in China*, 35 ENERGY POLY 1685 (2007); Lan-Cui Liu et al., *China’s Regional Carbon Emissions Change Over 1997–2007*, 1 INT’L J. ENERGY & ENV’T 161 (2010); Zhu Liu et al., *Uncovering China’s*

emissions from fossil fuel burning in 2007 were from production of goods and services ultimately consumed in other Chinese provinces or abroad.³⁸ Up to 80 percent of emissions associated with goods consumed in China's highly developed eastern coastal provinces³⁹ are produced in the interior provinces, where much of China's low value-added but high carbon-intensity production takes place.⁴⁰ In other words, consumption in the wealthier provinces is the cause of substantial emissions due to inefficient, energy-intensive production in the developing interior.

FIGURE 3. Largest Interprovincial Fluxes (Gross) of Emissions Embodied in Trade (Megatons of CO₂ Per Year) Among Net Exporting Regions and Net Importing Regions⁴¹



Greenhouse Gas Emission From Regional and Sectoral Perspectives, 45 ENERGY 1059 (2012); Lei Meng et al., *China's Regional CO₂ Emissions: Characteristics, Inter-Regional Transfer and Emission Reduction Policies*, 39 ENERGY POL'Y, 6136 (2011).

38. Kuishuang Feng et al., *supra* note 10, at 11654.

39. In 2013, the top ten provinces in China by per capita GDP are: (1) Tianjin, (2) Beijing, (3) Shanghai, (4) Jiangsu, (5) Zhejiang, (6) Inner Mongolia, (7) Liaoning, (8) Guangdong, (9) Fujian, and (10) Shandong. CHINA DATA ONLINE, <http://www.chinadataonline.org>. Overall, China has twenty-two provinces, four province-level municipalities (Beijing, Tianjin, Shanghai, and Chongqing) and five province-level autonomous regions (Inner Mongolia, Guangxi, Tibet, Ningxia, and Xinjiang), which are all provincial-level divisions of equal bureaucratic rank. For simplicity, all province-level jurisdictions are referred to as "provinces" in this Article.

40. Feng et al., *supra* note 10, at 11654.

41. Reprinted with permission from Feng et al., *supra* note 10.

Outsourcing of carbon emissions to China's interior provinces primarily relates to trade with three clusters of wealthier provinces in the eastern coastal regions: Beijing and Tianjin in the north; Shanghai, Zhejiang, and Jiangsu around the Yangtze River Delta; and Guangdong, Fujian, and Hainan around the Pearl River Delta to the south.⁴² The wealthy Chinese east, then, replicates the behavior of the wealthy Western world.

The international and domestic phenomena of carbon outsourcing are related aspects of a complex global chain of carbon outsourcing. Three-quarters of China's total exports in 2007, originate in provinces along China's central and southern coasts. Some 40 percent of the emissions related to exports, however, were produced in the interior provinces in the form of carbon-intensive, low-value-added intermediate goods that are later converted into finished goods in the coastal regions. Some interior provinces themselves have significant consumption-based emissions⁴³ associated with imports from other interior provinces.⁴⁴

This dynamic exists for two primary reasons. First, China's interior provinces have for decades been treated as a source of natural resources and low-cost labor for production in the coastal provinces.⁴⁵ These markets have expanded significantly in recent decades.⁴⁶ Second, as government and public pressure for environmental enforcement and industrial upgrade has increased, the wealthier coastal provinces have begun to close the most polluting, inefficient industrial fa-

42. *Id.* at 11655–56 figs.1 & 2. For example:

- 100 megatonnes (Mt) of net CO₂ emissions are embodied in trade from Hebei and Shandong Province to Beijing and Tianjin;
- 581 Mt of net CO₂ emissions are embodied in trade from the interior provinces in central, northern, and northwestern China to the Yangtze River Delta provinces (Shanghai, Zhejiang, and Jiangsu);
- 239 Mt of net emissions are embodied in trade from central and southwestern provinces to the Pearl River Delta Provinces (e.g., Guangdong, Fujian, and Hainan).

Id. Transfers to the Yangtze River Delta: 248 Mt from central provinces (Henan, Shanxi, Anhui, Hunan, Hubei, Jiangxi); 119 Mt from northwestern provinces (Inner Mongolia, Shaanxi, Gansu, Ningxia, Qinghai, Xinjiang); and 214 Mt from northern provinces (Hebei and Shandong). *Id.* Transfers to the Pearl River Delta: 115 Mt from Central provinces; 124 Mt from Southwestern provinces (Sichuan, Chongqing, Yunnan, Guizhou, Guangxi). *Id.*

43. Crediting emissions to the jurisdiction where the products or services associated with those emissions are consumed.
44. For example, the central provinces of Henan, Shanxi, Anhui, Hunan, Hubei, and Jiangxi import goods from Hebei and Shandong with net embodied emissions of 83 Mt of CO₂. Kuishuang Feng et al., *supra* note 10, at 11655–56 figs.1 & 2.
45. *See infra* Part II.B.1.
46. Yuji Miura, *How Far Has the Migration of Industry to Inland China Proceeded?* 45 PAC. BUS. INDUS., at 1(2012).

cilities. In some cases, these facilities have been moved to the less developed provinces.⁴⁷ For example, the Shougang steel facilities on the outskirts of Beijing were closed in 2010 and later relocated to nearby Hebei Province, which has a GDP per capita only one-third that of Beijing's.⁴⁸

What is the significance of this internal domestic outsourcing? One could argue, as some scholars have, that carbon outsourcing within China reflects an efficiency gain because carbon-intensive industries expand and relocate to interior provinces more abundant in energy resources.⁴⁹ In turn, observers suggest outsourcing tends to lead to technological advances in the interior provinces.⁵⁰

Whether or not the efficiency view is an accurate one, carbon outsourcing raises several environmental and distributional concerns that the efficiency account overlooks. First, this carbon outsourcing is the on-the-ground manifestation of what Daniel Abebe and Jonathan S. Masur have called the "Two Chinas" problem.⁵¹ The significantly lower level of development in China's vast interior means that these provinces will engage in carbon-intensive, high-emissions growth for the foreseeable future. Put another way, whereas the wealthy coastal provinces may be reaching an environmental tipping point with increasing efficiency and declining emissions, the interior provinces still have ahead of them a period of growth and rapidly increasing emissions.⁵² This growth is not accounted for in estimates of China's aggregate carbon emissions, which forecast emissions stabilizing in the next few decades. In other words, China's carbon

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47. See ECON. & ENV'T PROGRAM FOR SE. ASIA, DOES INDUSTRIAL RELOCATION WORK—A CASE STUDY FROM CHINA (2010), available at http://www.eepsea.net/pub/pb/12822699801Liu_Li_2010-PB2.pdf; Aizhi Wu et al., *Effects of Industrial Relocation on Chinese Regional Economic Growth Disparities: Based on System Dynamics Modeling*, 24 CHINESE GEOGRAPHICAL SCI. (Jan. 2014); Xiaoli Zhao & Haitao Yin, *Industrial Relocation and Energy Consumption: Evidence from China*, 39 ENERGY POL'Y 2944 (2011); Shengjun Zhu & Canfei He, *Geographical Dynamics and Industrial Relocation: Spatial Strategies of Apparel Firms in Ningbo, China*, 54 EURASIAN GEO. & ECON. 342 (2013); Enar Iazcano, *Industrial Relocation of Foxconn* (2009) (unpublished MBA Student Research Project, China Europe International Business School), available at <http://www.ceibs.edu/bmt/images/20110221/30206.pdf>; Xinhua News Agency, *Industrial Relocation Unleashes Growth Potential*, CHINA.ORG.CN (Feb. 26, 2012), http://www.china.org.cn/china/2012-02/26/content_24732345.htm; *China—Anhui Xuancheng Infrastructure for Industry Relocation Project*, WORLD BANK (June 20, 2013), <http://www.worldbank.org/en/news/loans-credits/2013/06/21/china-anhui-xuancheng-infrastructure-for-industry-relocation-project> (announcing a \$150 million industry relocation project in Anhui province).
48. Xinhua News Agency, *China's Leading Steelmaker Halts Production in Capital*, CHINA DAILY, Jan. 14, 2011, http://www.chinadaily.com.cn/business/2011-01/14/content_11852780.htm.
49. Ye Qi et al., Commentary, *Interpreting China's Carbon Flows*, 110 PROC. NAT'L ACAD. SCI. U.S. 11221, 11222 (2013) ("In other words, there is an efficiency gain in the current structure of production.").
50. *Id.*
51. See Abebe & Masur, *supra* note 13.
52. *Id.* at 361–74.

emissions in the aggregate will likely continue to grow for much longer than has been forecast by current models. Given warnings from the IPCC and others about the near-term urgency of carbon mitigation, such growth trends put at serious risk global efforts to “prevent dangerous anthropogenic [human induced] interference with the climate system.”⁵³

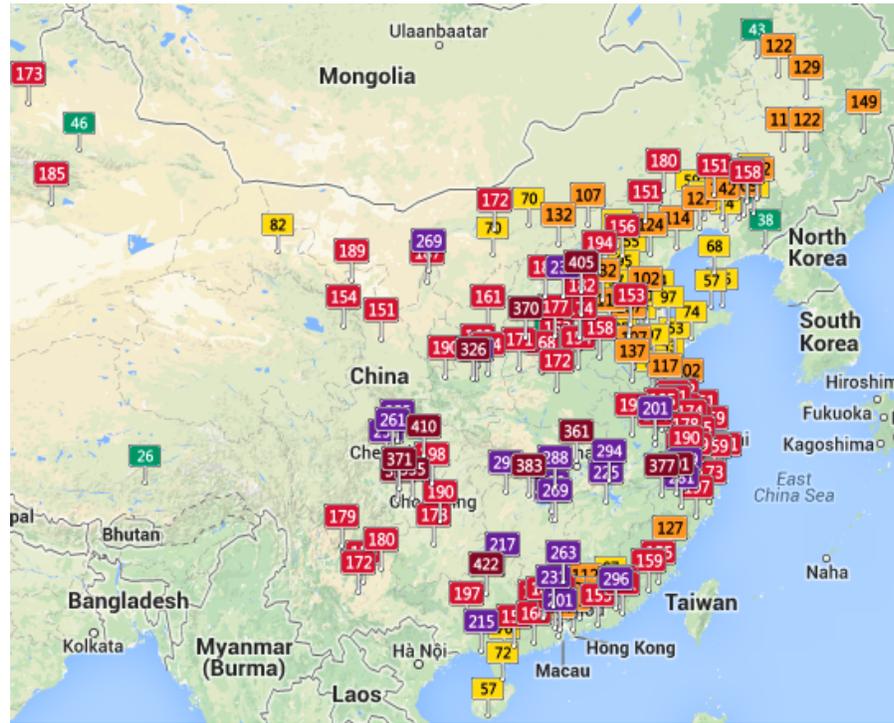
Second, carbon outsourcing exacerbates traditional environmental degradation both in the form of outsourced pollution that is transported back to the places where consumption takes place (blowback)⁵⁴ and in increased pressure on the environment in the regions of production. Prominent examples of pollution blowback are regional air pollution and water pollution on transboundary rivers.⁵⁵ For example, high levels of air pollution in Beijing are in significant part the result of emissions in surrounding provinces, such as Hebei, Inner Mongolia, Shanxi, and Shandong that export to the Beijing-Tianjin region.⁵⁶ In fact, China’s air pollution control policy recognizes this problem by focusing on regional (interprovincial) transport of air pollution in three geographical areas—Beijing-Tianjin-Hebei (known as *Jing-Jin-Ji* or 京津冀), the Yangtze River Delta (长三角), and the Pearl River Delta (珠三角).⁵⁷ Water pollution from

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53. United Nations Framework Conventions on Climate Change art. 2 (May 9, 1992), https://unfccc.int/files/essential_background/background_publications_htmlpdf/application/pdf/conveng.pdf. There are many interpretations of what constitutes “dangerous anthropogenic interference with the climate system,” but a common view is global annual mean surface temperature exceeding two degrees centigrade above pre-industrial levels. CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, 2007 § 1.2.2 (Bert Metz et al. eds., 2007), available at http://www.ipcc.ch/publications_and_data/ar4/wg3/en/ch1s1-2-2.html.
54. This phenomenon is seen at the global level as well. See Jintai Lin et al., *China’s International Trade and Air Pollution in the United States*, 111 PROC. NAT’L ACAD. SCI. 1736 (2014); Edward Wong, *China Exports Pollution to U.S., Study Finds*, N.Y. TIMES, Jan. 20, 2014, <http://www.nytimes.com/2014/01/21/world/asia/china-also-exports-pollution-to-western-us-study-finds.html>.
55. See KYUNG-MIN NAM ET AL., CLIMATE CO-BENEFITS OF TIGHTER SO₂ AND NO_x REGULATIONS IN CHINA (2012); KYUNG-MIN NAM ET AL., SYNERGY BETWEEN POLLUTION AND CARBON EMISSIONS CONTROL: COMPARING CHINA AND THE U.S. (2013); DA ZHANG ET AL., ANALYZING THE REGIONAL IMPACT OF A FOSSIL ENERGY CAP IN CHINA (2013).
56. David G. Streets et al., *Air Quality During the 2008 Beijing Olympic Games*, 41 ATMOSPHERIC ENV’T 480 (2007); Li Jing, *Quarter of Beijing’s Air Pollution Originates from Elsewhere*, S. CHINA MORNING POST, Sept. 24, 2013, <http://www.scmp.com/news/china/article/1316320/quarter-beijings-air-pollution-originates-elsewhere>. Tianjin itself is a major source of pollution for Beijing air.
57. *Guowuyuan bangongting zhuanfa huanjing baobubu deng bumen guanyu tuijin daqi wuran lianfang liankong gongzuo gaishan quyue kongqi zhibiang zhidao yijian de tongzhi* (国务院办公厅转发环境保护部等部门关于推进大气污染联防联控工作改善区域空气质量指导意见的通知) [State Council General Office Notice on Forwarding of the Ministry of Environmental and Other Departments Guidance Regarding Promotion of Joint Prevention and Control of Air Pollution to

upstream jurisdictions has also created serious problems for downstream (and often wealthier) jurisdictions. In 2013, more than ten thousand dead pigs floated downstream to Shanghai on the Huangpu River.⁵⁸ Transjurisdictional water pollution problems have plagued the Huai, Yellow, and other major river systems in China.⁵⁹ Even where outsourcing does not result in blowback, it tends to exacerbate local environmental pressures, including in pollution, water scarcity, and biodiversity.⁶⁰

Improve Regional Air Quality] (2013), http://www.gov.cn/zwqk/2010-05/13/content_1605605.htm (China).

58. Minghe Lü, *Shanghai's Dead Pig Story Stretches Back Upstream*, GUARDIAN ENV'T NETWORK, Mar. 25, 2013, <http://www.theguardian.com/environment/2013/mar/25/shanghai-dead-pig-story-upstream>.
59. See, e.g., Xuejun Wang & Edwin D. Ongley, *Transjurisdictional Water Pollution Disputes and Measures of Resolution: Examples from the Yellow River Basin, China*, 29 WATER INT'L 282 (2004), available at <http://www.tandfonline.com/doi/abs/10.1080/02508060408691782#UurELPvZUxE>.
60. See, e.g., CHINA WATER RISK, CHINA'S WATER CRISIS PART I—INTRODUCTION, 4, 7, 10 (2010), <http://chinawaterrisk.org/wp-content/uploads/2011/06/Chinas-Water-Crisis-Part-1.pdf>; GREENPEACE, THIRSTY COAL: A WATER CRISIS EXACERBATED 1, 4 (2012), available at <http://www.greenpeace.org/eastasia/Global/eastasia/publications/reports/climate-energy/2012/Greenpeace%20Thirsty%20Coal%20Report.pdf>; Christina Larson, *Growing Shortages of Water Threaten China's Development*, YALE ENV'T 360 (July 26, 2010), http://e360.yale.edu/feature/growing_shortages_of_water_threaten_chinas_development/2298; Scott Moore, Op-Ed, *China's Massive Water Problem*, N.Y. TIMES, Mar. 28, 2013, http://www.nytimes.com/2013/03/29/opinion/global/chinas-massive-water-problem.html?_r=0.

FIGURE 4. Map of Municipal Ambient Air Quality Monitoring Stations⁶¹

Third, carbon outsourcing has implications regarding how responsibility for carbon emissions should be allocated. At present, typical practice under most regulatory and emissions monitoring schemes around the globe is to account for emissions according to where they are produced, not where the goods associated with those emissions are ultimately consumed. In recent years, a number of scholars have suggested that a shift to a consumption-based system of emissions accounting would more fairly allocate responsibilities for carbon mitigation. At the international level, this would result in an increase of the emissions attributed to the United States, European Union, and other developed countries that have outsourced their most carbon-intensive production to developing countries.

61. *Air Pollution in China: Real-time Air Quality Index Visual Map*, <http://aqicn.org/map/china> (Jan. 25, 2014). This map shows hourly ambient air quality measurements in more than one hundred cities around China. The concentration of monitoring sites around the three major air pollution control regions (Beijing-Tianjin-Hebei, Yangtze River Delta, Pearl River Delta) reflects the regulatory focus on these areas. Measurements are according to the Chinese Air Quality Index (AQI). A score of less than 100 on this scale meets national ambient air quality standards and is what is known colloquially as a blue sky day.

Within China, this would increase emissions attributed to the wealthier coastal provinces.⁶²

In sum, China exhibits a pattern of carbon outsourcing from developed to developing provinces roughly analogous to the pattern of migration of emissions at the international level from developed to developing countries. Domestic carbon outsourcing in China matters because it will lead to greater future emissions than suggested by existing forecasts and will exacerbate traditional environmental problems. Understanding this phenomenon of carbon outsourcing also highlights how traditional accounting for emissions allows consumption-heavy regions to avoid full responsibility for emissions.

II. DIFFERENTIATED REGULATION AND OUTSOURCING IN CHINA

This Part considers the role of regulation in countering, or exacerbating, carbon outsourcing. At the international level, environmental treaties have adopted the principle of common but differentiated responsibilities with more stringent requirements for developed countries and support (financial and technical) for developing countries. This is an effort to strike a balance between economic development and environmental protection (that is, sustainable development). In the climate context, this approach has done little, if anything, to counter carbon outsourcing, and may even have exacerbated it, as developing countries are not subject to binding emissions reduction targets.⁶³ Moreover, developed countries have made insufficient efforts to support emissions reduction in the developing countries, either through financial subsidy or technology transfer.

What is less known is that China has long engaged in regionally differentiated regulation—first in the economic sphere and then in the sphere of environmental protection. This differentiated approach to regulation expressly takes different levels of economic development among jurisdictions into consideration. While this approach is not unusual around the world in economic regulation (economic development zones and development tax credits are examples of dif-

62. As I will argue in Part III.B, though, greater burdens on wealthier jurisdictions are more often justified based on greater entitlement to development than on consumption-based accounting. But some Chinese scholars have begun to support consumption-based accounting, perhaps in part because it has the effect of decreasing Chinese responsibility for emissions embodied in international trade. *See, e.g.,* Ye Qi, et al., *supra* note 49, at 11222.

63. The responsibilities of developing countries continue to be a source of contention in international climate treaty negotiations. *See, e.g.,* Eric Lyman, *Key Decisions Delayed at Bonn Climate Talks; US-China Gap Appears to Be Widening*, BLOOMBERG BNA, Mar. 26, 2014, <http://www.bna.com/eric-lyman-b12884908413/?blogid=12884902256>.

ferentiated economic regulation), it is less common in domestic environmental regulation, at least in the United States and other developed countries.⁶⁴

This Part then sets forth a proposal—domestic CBDR—designed to limit carbon emissions growth and carbon outsourcing in China that respects this particular balance of development and environmental entitlements, but also seeks to remedy the shortcomings of existing international and Chinese approaches to environmental regulation.

A. Common but Differentiated Responsibilities in International Law

The idea that poorer states should be treated differently from wealthier states has been a part of international law since as early as the Treaty of Versailles.⁶⁵ Differential treatment according to relative economic power has roots most prominently in international trade law.⁶⁶

In international environmental law, an early expression of differential treatment for developing nations appeared in 1972 with Principle 23 of the 1972 Stockholm Declaration on the Human Environment.⁶⁷ Since then, provisions

64. Cf. ALLEN BLACKMAN, COLOMBIA'S DISCHARGE FEE PROGRAM: INCENTIVES FOR POLLUTERS OR REGULATORS? 1–2 (2007), available at www.rff.org/rff/Documents/RFF-DP-05-31-REV.pdf (discussing the use of economic incentive policies in developing countries). The European Union has also adopted such an approach in differentiating environmental standards for the poorer Eastern Bloc countries more recently incorporated into the European Union. See GEORGE YU & ROB ELLSWORTH, TURNING THE TANKER: CHINA'S CHANGING ECONOMIC IMPERATIVES AND ITS TENTATIVE LOOKS TO EMISSIONS TRADING 24 (2012) (noting the European Union Emissions Trading System's practice of "giving countries with lower than average GDP a more generous target (and those with higher GDP a correspondingly higher target) so that money can flow to these regions").

65. Christopher D. Stone, *Common but Differentiated Responsibilities in International Law*, 98 AM. J. INT'L L. 276, 276–78 (2004).

66. The 1955 amendments to the original General Agreement on Tariffs and Trade (GATT) allowed developing countries to impose trade and import restrictions in support of infant industries. Edith Brown Weiss, *Common But Differentiated Responsibilities in Perspective*, 96 AM. SOC. INT'L L. 366, 367 (2002). Subsequent international trade agreements offered a range of special and differential provisions for developing countries. *Id.* at 367. The Uruguay Round Agreements and subsequent World Trade Organization (WTO) Declarations include nearly 150 such provisions. These include provisions to increase trade opportunities of developing countries; provisions for safeguarding the interests of developing countries; flexibility in commitments, actions, and use of policy instruments; transitional time periods; technical assistance; and provisions relating to least-developed countries. *Id.* Such differential treatment was aimed at improving participation, implementation, and compliance. *Id.* (citing Philippe Cullet, *Differential Treatment in International Law: Towards a New Paradigm of Interstate Relations*, 10 EUR. J. INT'L L. 549 (1999)).

67. Daniel Barstow Magraw, *Legal Treatment of Developing Countries: Differential, Contextual and Absolute Norms*, 1 COLO. J. INT'L ENVTL L. & POL. 69, 85 (1990); see also United Nations Conference on the Human Environment, Stockholm, Swed., June 5–16, 1972, *Stockholm*

regarding differential treatment based upon economic development level have appeared in a number of international environmental treaties and legal instruments.⁶⁸

The specific term common but differentiated responsibilities appeared in an international environmental treaty for the first time in the 1992 UNFCCC.⁶⁹ CBDR is also the basis for the two-tier framework set forth in the Kyoto Protocol, under which developed countries are subject to binding emissions reduction targets and developing countries are not.⁷⁰

Declaration, princs. 9–12 (setting forth principles recognizing the special needs of developing countries).

68. See, e.g., United Nations Environment Programme Conference of Plenipotentiaries, Basel, Switz., Mar. 22, 1989, *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal*, art.10 (May 5, 1992), available at <http://www.basel.int/Portals/4/Basel%20Convention/docs/text/BaselConventionText-e.pdf>; CENTRE FOR INTERNATIONAL SUSTAINABLE DEVELOPMENT LAW (CISDL), THE PRINCIPLE OF COMMON BUT DIFFERENTIATED RESPONSIBILITIES: ORIGINS AND SCOPE 1–3 (2002), available at http://cisdl.org/public/docs/news/brief_common.pdf. Stone, *supra* note 65, at 276 n.1 (listing international conventions that either use the term explicitly or differentiate explicitly without using the terminology, including the 1990 Adjustments and Amendments to the Montreal Protocol on Substances That Deplete the Ozone Layer). See generally LAVANYA RAJAMANI, DIFFERENTIAL TREATMENT IN INTERNATIONAL ENVIRONMENTAL LAW (2006); Lavanya Rajamani, *The Changing Fortunes of Differential Treatment in the Evolution of International Environmental Law*, 88 INT'L AFFAIRS 605 (2012).

69. United Nations Framework Convention on Climate Change, art. 3 § 1, http://unfccc.int/essential_background/convention/items/6036.php. The phrase “common but differentiated responsibilities” also appeared in Principal 7 of the 1992 Rio Declaration, which states:

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have *common but differentiated responsibilities*.

The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

United Nations Conference on Environment and Development, Rio de Janeiro, Braz., June 3–14, 1992, *Rio Declaration on Environment and Development* (1992) (emphasis added), available at <http://www.unep.org/Documents.Multilingual/Default.asp?documentid=78&articleid=1163>.

UN General Assembly Resolution 44/228 of 1989, which convened the United Nations Conference on Environment and Development in 1992, included language that evolved into the principle of common but differentiated responsibilities in the 1992 Rio Declaration: “the responsibility for containing, reducing and eliminating global environmental damage must be borne by the countries causing such damage, must be in relation to the damage caused and must be in accordance with their respective capabilities and responsibilities . . .” G.A. Res. 44/228, U.N. Doc A/RES/44/228 (Dec. 22, 1989), available at <http://www.un.org/documents/ga/res/44/ares44-228.htm>.

70. The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC). *Id.* at art. 10 (“All Parties, taking into account their common but differentiated responsibilities . . .”). The concept of common but differentiated responsibilities (CBDR) has since been reaffirmed in the Bali Declaration, the Copenhagen *Accord*,

CBDR is rooted in notions of fairness, as well as the fusion of overriding developmental needs of the poor and environmental concerns embodied in the concept of sustainable development.⁷¹ Under the UNFCCC, developed countries “should take the lead in combating climate change and the adverse effects thereof.”⁷² This is justified by the greater historical contribution developed countries have made to global greenhouse gas emissions, the right to development of poorer nations, and the lower financial and technological capacity of developing nations to mitigate and adapt to climate change, among other things.⁷³

In practice, differentiated responsibilities consist of both adjusted obligations and financial or technical assistance.⁷⁴ In the UNFCCC climate change

and other UNFCCC-related documents. United Nations Framework Convention on Climate Change, Bali, Indon., Dec. 3–17, 2007, *Bali Action Plan*, art. 1(a), U.N. Doc. FCCC/CP/2007/6/Add.1* (Mar. 14, 2008), available at <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf>; United Nations Framework Convention on Climate Change, Copenhagen, Den., Dec. 7–19, 2000, *Copenhagen Accord*, art. 1, U.N. Doc. FCCC/CP/2009/11/Add.1 (Mar. 30, 2010), available at <http://unfccc.int/resource/docs/2009/cop15/eng/11a01.pdf> (“We emphasise our strong political will to urgently combat climate change in accordance with the principle of common but differentiated responsibilities and respective capabilities.”). Some scholars have noted that the current form of CBDR, with its relatively coarse developed-developing, north-south dichotomy, is under pressure and unlikely to continue; in practice, it is likely that future manifestations of CBDR will reflect more gradations of differentiation, rather than fewer. See, e.g., Joost Pauwelyn, *The End of Differential Treatment for Developing Countries? Lessons From the Trade and Climate Change Regimes*, 22 REV. EURO. CMTY. & INT’L ENVTL L. 29 (2013).

71. WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT (WCED), OUR COMMON FUTURE 43 (1987). Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:
- the concept of ‘needs’, in particular the essential needs of the world’s poor, to which overriding priority should be given; and
 - the idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs.
72. United Nations Framework Convention on Climate Change, art. 3 § 1, U.N. Doc. FCCC/INFORMAL/84 (May 9, 1992).
73. Developing countries, including China, made CBDR a central negotiating position in the official discussions over the UNFCCC and other international environmental agreements. The United States and other developed states, for their part, have objected to China and other emerging economies (for example, Brazil, Russia, India, South Africa) being lumped into a single developing category along with much less developed states, and sought to negotiate greater obligations for the emerging economies. Jiahua Pan, a key advisor to the Chinese government on climate change, has noted that emerging economies will likely “join hands with developed countries” to take on mitigation obligations in the future. Jiahua Pan, *General Report: The Future of the International Climate Regime from China’s Perspective*, in CHINA’S CLIMATE CHANGE POLICIES 1, 13 (Weiguang Wang & Guoguang Zheng, eds., 2012). Greater consumption in developed countries offers another rationale for greater developed world responsibility as well, but this has not been a central part of the official rhetoric justifying CBDR at the international level.
74. Jorge E. Viñuales, *The Rise and Fall of Sustainable Development*, 22 REV. EURO. CMTY. & INT’L ENVTL L. 1, 9–10 (2013). Adjusted obligations were initially designed to assist developing countries in meeting their treaty commitments through such mechanisms as delayed compliance

treaty context, differentiated responsibilities meant that developing countries received complete exemption from binding reduction targets. Assistance under international treaty provisions includes a range of technical assistance programs, support funds, and market mechanisms. The Clean Development Mechanism (CDM), for example, is one of the project-based flexibility mechanisms under the Kyoto Protocol that assists developing countries in reducing greenhouse gas emissions and provides a means for developed countries to purchase credits (or offsets) for emissions reductions at a lower marginal cost of abatement.⁷⁵

The international approach has, of course, largely failed, even though (or perhaps because) it has respected developing country economic growth priorities. The absence of any binding targets for emerging economies like China, India, and others contributed to U.S. withdrawal from the Kyoto Protocol and has allowed developing countries to expand their emissions without limit and well beyond initial estimates. Support for developing-country mitigation has been insufficient and of limited effectiveness in reducing emissions in those countries. Flexibility mechanisms like the CDM have been subject to gaming and manipulation that call into question whether these mechanisms have achieved net reductions in emissions growth.⁷⁶

B. A Brief History of Differentiated Regulation in China

China's domestic economic and environmental regimes resemble the CBDR approach used internationally. China has differentiated among regions of the country in economic and environmental regulation, and in some cases has offered subsidies to developing regions of the country. This Subpart describes China's practice of differentiated regulation and argues that Chinese regulation has in recent years attempted to reduce regional economic disparities and carbon

schedules, the option to adopt subsequent base years, longer timelines for reporting, and less stringent non-compliance enforcement. *See, e.g.*, Report of the Second Meeting of the Parties to the Montreal Protocol on Substances That Deplete the Ozone Layer, London, Eng., June 27–29, 1990, Annex II, art. 5, 5(3)(a), U.N. Doc. UNEP/OzL.Pro.2/3 (June 29, 1990).

75. In short, approved projects in developing countries, such as for renewable energy, energy efficiency, or destruction of climate change causing gases, earn Certified Emission Reduction units that can be sold on carbon markets. Developed countries with obligations under the Kyoto Protocol can meet those obligations in part by purchasing these credits. To be approved, these credits must meet a range of requirements, including that of additionality (that is, the project produces emissions reductions beyond what would have occurred without the subsidy associated with the sale of the credits). Michael Wara, *Measuring the Clean Development Mechanisms Performance and Potential*, 55 UCLA L. REV. 1759, 1770–74 (2008).

76. Wara, *supra* note 75, at 1789, 1798.

outsourcing. But this approach, like its international counterpart, has done too little to stanch environmental degradation in developing areas.

1. General Foundations

China's early efforts to differentiate among regions of the country related primarily to economic development strategy. In the first two decades of so-called reform and opening, China's national economic policy actively prioritized the development of the coastal provinces over provinces in the interior. Official designations divided China into three regions—Eastern Coastal, Central, and Western.⁷⁷ The interior provinces were to support growth on the coast. For example, the Seventh Five-Year Plan (1986–1990) stated:

We must accelerate the development of the eastern coastal region. At the same time, we must focus heavily on energy and raw materials development in the central region, and vigorously make incremental steps to prepare for the development of the western region. We should connect up the development of the eastern coastal region and the exploitation of the central and western regions, creating a situation of mutual support and promotion.⁷⁸

This policy was a strategy to create a vanguard of provinces that would then presumably support the development of the entire nation. For example, Deng Xiaoping stated:⁷⁹

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77. The 1985 Chinese Communist Party Central Committee Proposal for the Seventh Five-Year Plan for National Economic and Social Development set forth specific allocations to each region: *Eastern*—Liaoning, Hebei, Beijing, Tianjin, Shandong, Jiangsu, Shanghai, Zhejiang, Fujian, Guangdong, Hainan, Guangxi; *Central*—Jilin, Heilongjiang, Shanxi, Inner Mongolia, Anhui, Jiangxi, Henan, Hubei, Hunan; *Western*—Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Sichuan, Chongqing, Guizhou, Yunnan, Tibet. C. Cindy Fan and Mingjie Sun, *Regional Inequality in China, 1978–2006*, 49 *EURASIAN GEOGRAPHY & ECON.* 3–4 (2008) (discussing the “three economic belts” established by the Seventh Five-Year Plan). Non-capitalized references to “eastern,” “central,” and “western” provinces in China do not necessarily correspond to this exact taxonomy, but refer to these regions of the country more generally.
78. *Zhonghua renmin gongheguo guomin jingji he shehui fazhan diqiye wunian jihua (zhuibao)* (1986–1990) (中华人民共和国国民经济和社会发展第七个五年计划(摘要)) [National Economic and Social Development 7th Five-Year Plan of the People's Republic of China (abstract) (1986–1990), Part Three, Policy on Regional Divisions and Economic Development], <http://cpc.people.com.cn/GB/64184/64186/66679/4493897.html>.
79. In 1988, Deng Xiaoping said: “The coastal areas, which comprise a vast region with a population of 200 million, should accelerate their opening to the outside world, and we should help them develop rapidly first; afterward they can promote the development of the interior.” Hongyi Harry Lai, *China's Western Development Program: Its Rationale, Implementation, and Prospects*, 28 *MODERN CHINA* 432, 432 (2002) (citing Deng Xiaoping, *The Central Leadership Must Have Authority* (Sept. 12, 1988), available at <http://english.peopledaily.com.cn/dengxp/vol3/text/c1910.html>).

To take the road to socialism is to realize common prosperity step by step. Our plan is as follows: where conditions permit, some areas may develop faster than others; those that develop faster can help promote the progress of those that lag behind, until all become prosperous.

The notion of the rich areas subsidizing the poorer areas was a part of the development strategy from early on, but Chinese leaders were cautious about implementing it too quickly:

If the rich keep getting richer and the poor poorer, polarization will emerge. The socialist system must and can avoid polarization. One way is for the areas that become prosperous first to support the poor ones by paying more taxes or turning in more profits to the state. Of course, this should not be done too soon. At present, we don't want to dampen the vitality of the developed areas or encourage the practice of having everyone "eat from the same big pot."⁸⁰

This approach to development has contributed to a massive increase in regional economic disparities over the last few decades.⁸¹ In the late 1990s, senior Chinese leaders determined that the time had come to offer more vigorous support for the interior provinces. Senior leaders offered rhetorical support for increased investment in the interior provinces and reduction of regional income disparities.⁸² In 1997, the municipality of Chongqing was carved out of Sichuan

80. Also stating: "We should study when to raise this question and how to settle it. I can imagine that the right time might be the end of this century, when our people are living a fairly comfortable life. At that time, while developed areas continue to grow, they should also give strong support to less developed areas by paying more taxes, turning in more profits and transferring technology. Most of the less developed areas are rich in resources and have great potential for development. In short, taking the country as whole, I am confident that we can gradually bridge the gap between coastal and inland areas." Deng Xiaoping, Excerpts From Talks Given in Wuchang, Shenzhen, Zhuhai and Shanghai (Jan. 18–Feb. 21, 1992), as reprinted in *THE SELECTED WORKS OF DENG XIAOPING: MODERN DAY CONTRIBUTIONS TO MARXISM-LENINISM*, <http://dengxiaopingworks.wordpress.com/2013/03/18/excerpts-from-talks-given-in-wuchang-shenzhen-zhuhai-and-shanghai> (last updated Mar. 18, 2013). The Eighth Five-Year Plan recommended that "coastal areas and cities to select underdeveloped areas and cities as economic partners." Hongyi Harry Lai, *supra* note 79, at 435.

81. See Fan & Sun, *supra* note 77, at 2–3 (noting that most studies on Chinese regional inequality have found that state economic policy plays a central role); see also SHAO GUANG WANG & ANGANG HU, *THE POLITICAL ECONOMY OF UNEVEN DEVELOPMENT: THE CASE OF CHINA*, chpts. 1, 5, 6 (1999).

82. Hongyi Harry Lai, *supra* note 79, at 435 (noting Zhu Rongji's declaration of increased state investment in the central and western regions at National People's Congress sessions in Mar. 1994 & 1995); *id.* ("In March 1996, NPC's proposal for the Ninth Five-Year Plan included Jiang's policy statement 'insisting on coordinated regional economic development and gradually reducing the gap in development between regions.'").

and elevated to province-level status, in part to take the lead in economic development of the interior provinces.⁸³

The most significant effort was the Western Development program initiated by President Jiang Zemin in March 1999.⁸⁴ This effort was motivated in part by concerns about national unity and ethnic unrest in China's western regions.⁸⁵ While official program documentation expressed concern for balancing development and the environment, scholars have suggested that the program would result in "ecological exploitation" of already fragile ecosystems.⁸⁶

2. Environmental

Since 1978, China has constructed an expansive environmental regulatory framework. Relatively unrecognized is the fact that this framework has both de facto and, in some cases, de jure allowed for greater pollution in less developed regions, enabling carbon and pollution outsourcing. Over the last decade or so, as environmental priorities have become more important, authorities have sought to increase the stringency of environmental regulation in the less developed regions of the country, while also offering various forms of financial and technological support to these regions from central and province-to-province transfers. These dynamics can be seen in the allocation of bureaucratic carbon, energy, and pollution targets, particularly since the Eleventh Five-Year Plan, as well as in eco-compensation (生态补偿; *shengtai buchang*) programs that support developing regions to improve environmental quality.

a. Environmental Law and Bureaucratic Targets

The implicit bargain in Chinese central-local governance since 1978 has been devolution of authority over economic development to local governments.⁸⁷

83. Hongyi Harry Lai, *supra* note 79, at 435.

84. See David S.G. Goodman, *The Campaign to "Open Up the West": National, Provincial-level and Local Perspectives*, CHINA Q., June 2004, at 317; Hongyi Harry Lai, *supra* note 79, at 435–36 (noting Jiang's first use of the phrase "great western development" (*xibu da kaifu*) in June 1999).

85. *Id.* at 436–441, 445–449.

86. Elizabeth Economy, *China's Go West Campaign: Ecological Construction or Ecological Exploitation*, 5 CHINA ENVIRONMENT SERIES 1 (2002). Chinese leaders have also expressed concern about this problem. See, e.g., *Legislators Worried About Environment Protection in China's West*, XINHUA (Oct. 24, 2013), http://news.xinhuanet.com/english/china/2013-10/24/c_132825158.htm.

87. See Kenneth Lieberthal, *China's Governing System and Its Impact on Environmental Policy Implementation*, 1 CHINA ENVIRONMENT SERIES 3 (1997), available at <http://www.wilsoncenter.org/sites/default/files/CES%201%20Kenneth%20Lieberthal%20Article%20with%20Charts%20and%20Graphs.pdf>. This is widely considered a key factor in China's rapid economic growth since 1978.

Environmental regulation has also been primarily a matter for local governments.⁸⁸ Thus, a central explanation for weak environmental regulation in China has been the problem of local protectionism—or the “fox guarding the hen house.”⁸⁹ Elsewhere I have argued that this dynamic simply reflects a privileging of economic development at all levels of the system (rather than a mistake of institutional design as other scholars have framed it).⁹⁰ The vagueness of environmental laws leaves significant discretion to lower-level rule makers. In practice, the stringency of enforcement has been greater in wealthier parts of the country. For example, Benjamin van Rooij and Carlos Wing-Hung Lo have demonstrated that enforcement of pollution standards violations has been more formalistic and coercive, with more enforcement actions and higher fines, in coastal areas than in interior provinces.⁹¹

Some regulations are explicit in creating weaker standards for developing regions of the country. For example, the environmental ministry issued guidance on allocation of sulfur dioxide targets for power plants that called for stricter allocations in eastern and central provinces than in northwestern and southwestern provinces.⁹² Such differentiation of environmental standards based on geography and economic disparity is not typical in the United States but is evident in developing countries.⁹³

As China’s environmental problems grew in severity, national environmental regulations began to strengthen bottom-line environmental protections, even as they continued to apply less stringent requirements to poorer provinces. Most

88. *Zhonghua renmin gongheguo huanjing baohu fa* (中华人民共和国环境保护法) [Environmental Protection Law of the People’s Republic of China], art. 16 (Dec. 26, 1989), <http://www.china.org.cn/english/environment/34356.htm> (China) (“The local people’s governments at various levels shall be responsible for the environment quality of areas under their jurisdiction and take measures to improve the environment quality.”).

89. See Abebe & Masur, *supra* note 13.

90. Alex L. Wang, *The Search for Sustainable Legitimacy: Environmental Law and Bureaucracy in China*, 37 HARV. ENVTL. L. REV. 365, 370 (2013).

91. Benjamin van Rooij & Carlos Wing-Hung Lo, *Fragile Convergence: Understanding Variation Patterns in the Enforcement of China’s Industrial Pollution Law*, 32 L. & POLY 14 (2010); see also Tucker Van Aken, *The Political Economy of Noncompliance in China: The Case of Industrial Energy Policy*, JOURNAL OF CONTEMPORARY CHINA (forthcoming).

92. *Guanyu yinfa eryang hualiu zongliang fenpei zhidao yijian de tongzhi* (关于印发《二氧化硫总量分配指导意见》的通知) [Notice Regarding the Distribution of “Guiding Opinions on the Allocation of Sulfur Dioxide Volume Limits”] 环发 [HUAN FA], Nov. 9, 2006, http://www.mep.gov.cn/gkml/zj/wj/200910/t20091022_172430.htm.

93. The United States does exhibit wide regional variation in implementation that amount to de facto regional differences in standards since enforcement is largely the responsibility of state governments. In addition, in areas without strong national legislation, state-level environmental rules can vary a great deal by geography and economic conditions (for example, poorer states will tend to have weaker environmental regulation).

prominently, this is seen in the environmental, energy, and carbon targets included in China's Eleventh and Twelfth Five-Year Plans.

At the outset of China's Eleventh Five-Year Plan (2006–2010), central leaders established binding environmental and energy efficiency targets for local government leaders for the first time. Under this system of bureaucratic evaluation, the central government allocated targets to each province according to a formula that included consideration of the jurisdictions' economic development level.⁹⁴ During the Eleventh Five-Year Plan, the main targets related to energy intensity⁹⁵ and pollution reduction.⁹⁶ In the current Twelfth Five-Year Plan (2011–2015), central authorities added targets for reduction of carbon intensity⁹⁷ and additional pollutants.⁹⁸

The following table illustrates regional differentials in target allocations.⁹⁹

TABLE 1. Twelfth Five-Year Plan (2011–15) Provincial Carbon Intensity Targets

| Carbon Intensity Reduction Target | Province Level Division (GDP Per Capita Rank, 2011) ¹⁰⁰ |
|-----------------------------------|---|
| 19.5% | Guangdong (7) |
| 19% | Tianjin (1), Shanghai (2), Jiangsu (4), Zhejiang (5) |
| 18% | Beijing (3), Liaoning (8), Shandong (10), Hebei (14) |
| 17.5% | Fujian (9), Sichuan (25) |
| 17% | Jilin (11), Chongqing (12), Hubei (13), Shaanxi (15), Shanxi (18), Hunan (20), Henan (23), Jiangxi (24), Anhui (26) |
| 16.5% | Yunnan (30) |
| 16% | Inner Mongolia (6), Ningxia (16), Heilongjiang (17), Guangxi (27), Gansu (29), Guizhou (31) |
| 11% | Xinjiang (19), Hainan (22) |
| 10% | Tibet (28) |

94. Wang, *supra* note 90, at 401–03.

95. The amount of energy utilized per unit of economic output.

96. Sulfur dioxide and chemical oxygen demand.

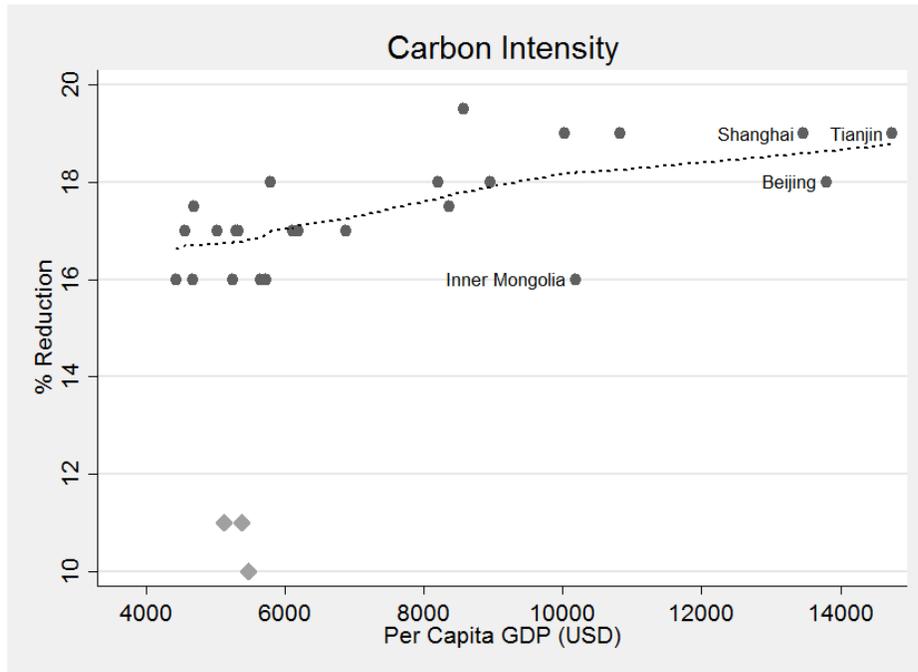
97. The amount of carbon emitted per unit of economic output.

98. Nitrogen oxides (an air pollutant produced by fossil fuel combustion) and ammonia nitrate (a measure of water pollution).

99. See table *infra* Appendix A (data and figure regarding Twelfth Five-Year Plan energy intensity targets).

100. CHINA DATA ONLINE, <http://www.chinadataonline.org>.

FIGURE 5. Provincial Carbon Intensity Targets and Provincial Per Capita GDP



b. Eco-Compensation Programs

While laws and bureaucratic targets have reflected differentiated responsibilities among regions, eco-compensation programs established subsidies and other support for less developed jurisdictions, mostly in the last decade.¹⁰¹ Some

101. See MICHAEL T. BENNETT, *MARKETS FOR ECOSYSTEM SERVICES IN CHINA: AN EXPLORATION OF CHINA'S "ECO-COMPENSATION" AND OTHER MARKET-BASED ENVIRONMENTAL POLICIES* 14 (2009); NATIONAL DEVELOPMENT AND REFORM COMMISSION, *PAYMENTS FOR ECOLOGICAL SERVICES AND ECO-COMPENSATION: PRACTICES AND INNOVATIONS IN THE PEOPLE'S REPUBLIC OF CHINA*, at viii (Qingfeng Zhang, et al. eds., 2010). Provisions regarding eco-compensation have appeared in various Chinese laws. See *Zhonghua renmin gonghe guo senlin fa* (中华人民共和国森林法) [Forestry Law of the People's Republic of China] (as amended by the Standing Comm. Nat'l People's Cong., Apr. 29, 1998, effective Jul. 1, 1998), art. 8, <http://www.china.org.cn/english/environment/207457.htm> (China); *Zhonghua renmin gonghe guo kuangchan ziyuan fa* (中华人民共和国矿产资源法) [Mineral Resources Law of the People's Republic of China] (as amended by the Standing Comm. Nat'l People's Cong., Aug. 29, 1996), art. 5, http://www.china.org.cn/environment/2007-08/20/content_1034342.htm (China); *Zhonghua renmin gonghe guo shuizhuan fangzhi fa* (中华人民共和国水污染防治法) [Law of the People's Republic of China on Prevention and Control of Water Pollution] (as amended by the Standing Comm. Nat'l

observers justify these programs as similar to U.S. programs that provide payment for ecosystem services. The U.S. programs are market transactions in which ecosystem services are monetized and independent actors strike bargains based on rational economic interest. A commonly cited example is the New York City, Catskill/Delaware Watershed case in which New York City found it more economical to pay upstate jurisdictions not to develop than to build and operate water treatment facilities.¹⁰²

The comparison of Chinese eco-compensation mechanisms to Western ecosystem services programs is somewhat misleading, as the Chinese mechanisms emphasize poverty alleviation goals and the entitlement to develop for poorer jurisdictions.¹⁰³ Moreover, they involve significant central and provincial government intervention and are less reliant on market actors.

Chinese eco-compensation regimes tend to combine elements of both polluter-pays and beneficiary-pays systems. Upstream polluters have some minimum responsibility to limit pollution, which, if violated, results in fines or penalties (polluter pays). But beyond this level of protection, the beneficiary should pay for the benefit received (beneficiary pays).¹⁰⁴

People's Cong., May 16, 1996), art. 5, <http://www.china.org.cn/english/environment/34325.htm> (China).

102. New York City's drinking water supply has relied on natural processes in the surrounding watershed to filter and provide a reliable water source. When development in the watershed threatened New York City's drinking water quality, the city was faced with the prospect of building a \$3 billion water treatment plant, but discovered that it could restore the purification function of the watershed with an investment of \$1.5 billion. Stephen Wood, *The Challenge of Maintaining Ecosystem Services*, SAGE MAGAZINE (Dec. 2, 2011, 9:50 AM), <http://www.sagemagazine.org/maintaining-ecosystem-services-an-ecological-question-and-management-challenge>. See also *Payment for Ecosystem Services: Getting Started—A Primer*, FOREST TRENDS 10 (2008) available at http://www.unep.org/pdf/PaymentsForEcosystemServices_en.pdf ("Payments for ecosystem services are not designed to reduce poverty. Rather, PES primarily offer economic incentives to foster more efficient and sustainable use of ecosystem services.").
103. See generally, Li Wenhua & Liu Moucheng, *Conference Paper 2: Reflections on the Development of Eco-compensation Mechanisms in the People's Republic of China*, in PAYMENTS FOR ECOLOGICAL SERVICES AND ECO-COMPENSATION: PRACTICES AND INNOVATIONS IN THE PEOPLE'S REPUBLIC OF CHINA 58 (Qingfeng Zhang et al. eds., 2010); Wang Jinnan et al., *Conference Paper 3: A Framework Design of River Basin Ecological Compensation Policy and Its Mechanism for the People's Republic of China*, in PAYMENTS FOR ECOLOGICAL SERVICES AND ECO-COMPENSATION: PRACTICES AND INNOVATIONS IN THE PEOPLE'S REPUBLIC OF CHINA 65 (Qingfeng Zhang et al. eds., 2010). These are in line with what some have called "pro-poor payments for ecosystem services." See *Payment for Ecosystem Services: Getting Started—A Primer*, *supra* note 102, at iii, 10.
104. This stands in contrast to how New York and other downwind states handled air pollution transported from Ohio, Pennsylvania, and other upwind states with heavy concentrations of coal-fired power plants. New York and a coalition of downwind states sued the upwind states for this pollution. If they followed the Chinese eco-system approach they would offer Ohio, Pennsylvania,

National interest in eco-compensation was spurred on by major flooding incidents along the Yangtze and other Chinese rivers in 1998, which highlighted problems of excessive deforestation in upper watershed areas and improper conversion of critical ecosystems to agriculture.¹⁰⁵ These events led to early eco-compensation programs, such as the Conversion of Cropland to Forests and Grassland program (退耕还林还草; *tuigeng huanlin huancao*), the Forest Ecosystem Compensation Fund (森林生态效益补偿基金; *senlin shengtai xiaoyi buchang jijin*), and the Natural Forest Protection Program.¹⁰⁶

These programs involved central government grants to farmers, local communities, or governments in exchange for reforestation of farmland, limiting development in existing forests, or taking actions to reduce erosion. The programs have mostly been implemented in China's western provinces and are meant to meet environmental goals, while also improving local living standards.¹⁰⁷ Central government interest in these programs deepened after 2005, as judged by the amount of policymaking and pilot program activity.¹⁰⁸ The key decision document from the 2013 Third Plenum meeting, which set forth key medium-term state policies, explicitly supported the continued development of eco-compensation programs.¹⁰⁹

Central and local governments have developed a variety of eco-compensation programs in the area of watershed pollution reduction and water conservation. These include interprovincial and intraprovincial (for example, between cities) fiscal transfers, emissions trading schemes, water use rights exchanges, and the establishment of ex-situ development zones.¹¹⁰

and these other states payments in exchange for reduced pollution. It is difficult to imagine such an approach being politically palatable to the citizens of New York.

105. QINFENG ZHANG & MICHAEL T. BENNETT, *ECO-COMPENSATION FOR WATERSHED SERVICES IN THE PEOPLE'S REPUBLIC OF CHINA* 6 (2011).

106. *Id.* at 8.

107. Li Wenhua & Liu Moucheng, *supra* note 103, at 61.

108. *See Guowuyuan guanyu luoshibi kexue fazhangan jiaqiang huanjing baohu de jue ding* (国务院关于落实科学发展观加强环境保护的决定) [State Council Decision Regarding Implementation of the Scientific Development View, Strengthening Environmental Protection] (2005), http://www.gov.cn/zwjk/2005-12/13/content_125680.htm (China) (stating that government "should improve eco-compensation policy, and develop eco-compensation mechanisms as quickly as possible."). For example, the Eleventh Five-Year Plan (2006–2010) called for the expansion of eco-compensation pilots. BENNETT, *supra* note 101, at 14.

109. *Zhonggong zhongyang guanyu quanmian shenbua gaige ruogan zhongda wenti de jue ding* (中共中央关于全面深化改革若干重大问题的决定) [Decision of the Central Committee of the Communist Party of China on Some Major Issues Concerning Comprehensively Deepening the Reform], art. 53, http://news.xinhuanet.com/politics/2013-11/15/c_118164235.htm.

110. Chinese policymakers are also partial to promoting industrial development as a form of eco-compensation (such as ex situ development zones), which experts have termed blood-creation efforts (in essence, instead of giving these provinces a fish, teaching them to fish). Wang Jinnan et

Environmental protection and development intertwine in watershed protection cases because the upper watershed areas of most rivers in China are often also areas of relative poverty and low levels of economic development. This is true with some of China's largest rivers, such as the Yangtze and the Yellow Rivers, which flow from the poorer western regions to the wealthier eastern coast. This is often also true on smaller river systems within and between provinces.¹¹¹

The redistributive component of eco-compensation is clear in leadership rhetoric. Vice-Minister Pan Yue of the Ministry of Environmental Protection (MEP) said in 2007, for example:

Eco-compensation policy that focuses primarily on instruments that transfer implementation and financial costs between developed and undeveloped regions, between urban and rural areas, between rich and poor, between lower and upper watershed areas, between those benefiting from the environment and those suffering from environmental degradation, and between high-polluting, high-energy industries and 'green' industries, needs to be improved.¹¹²

Fiscal Transfers for Air Pollution Prevention. An example of such eco-compensation arrangements is seen in fiscal transfers for air pollution prevention.¹¹³ As stated in Part I, Chinese regulators have focused air pollution prevention efforts on three regions of the country—Beijing-Tianjin-Hebei, the Yangtze River Delta, and the Pearl River Delta. The Beijing-Tianjin-Hebei airshed includes Shanxi and Shandong provinces as well as the Inner Mongolia autonomous region. While Beijing, Tianjin, Inner Mongolia and

al., *supra* note 103, at 69–70. Off-site (ex situ) “poverty reduction economic development zones” work as follows: in exchange for development restrictions upstream, downstream jurisdictions grant the upstream jurisdiction the development rights downstream. *Case Study 6: Zhejiang, in PAYMENTS FOR ECOLOGICAL SERVICES AND ECO-COMPENSATION: PRACTICES AND INNOVATIONS IN THE PEOPLE’S REPUBLIC OF CHINA* 22, 22 (Qingfeng Zhang et al. eds., 2010); Wang Jinnan et al., *supra* note 103, at 69–70. So, for example, in 1996, the Jinpan Development Zone was established between downstream Jinhua City and upstream Pan’an County in Zhejiang Province. *Case Study 6: Zhejiang, supra*, at 22. Pan’an County received rights to develop in the development zone in exchange for promises not to develop upstream. *Id.*

111. For example, Anhui Province has developed a plan to seek eco-compensation payments for selected Anhui cities (Huangshan and Xuan) along the Xin’an River Watershed upstream from the major city of Hangzhou in wealthier Zhejiang Province. Such payments are ostensibly justified by investment in protecting ecosystem services upstream and also a poverty alleviation goal to support Anhui’s economic development. Li Wenhua & Liu Moucheng, *supra* note 103, at 15, 61.
112. This is the statement of only one official (and one known for his outspokenness and progressive positions).
113. Chinese regulators and scholars might not formally call this example “eco-compensation.” Even so, it is an example that reflects the key elements of eco-compensation—a beneficiary-pays approach to limiting pollution in less developed regions, coupled with poverty-alleviation aspects.

Shandong have among the highest GDP per capita in China, Hebei and Shanxi are significantly less developed.

TABLE 2.¹¹⁴

| Province | GDP per capita (US\$) | National Rank |
|----------------|-----------------------|---------------|
| Tianjin | \$16,453 | 1 |
| Beijing | \$15,397 | 2 |
| Inner Mongolia | \$11,150 | 6 |
| Shandong | \$9,304 | 10 |
| Hebei | \$6,395 | 16 |
| Shanxi | \$5,751 | 22 |

Hebei demonstrates how eco-compensation works in practice. Hebei has some of China's most polluted areas, including seven of the ten most polluted cities in China.¹¹⁵ In 2011, Hebei consumed 80 percent of the coal used in the Beijing-Tianjin-Hebei region because of its dependence on heavy industry. The industrial sector (for example, iron and steel, coal, construction materials, and petrochemicals) accounted for 52.7 percent of Hebei's GDP.¹¹⁶ The less-polluting services industry only constituted 35.3 percent.¹¹⁷ In comparison, the services sector accounted for 76.4 percent of Beijing's GDP.¹¹⁸

Yet under the logic of Chinese governance, Hebei's right to economic development should not be abrogated by other jurisdictions.¹¹⁹ Rather, wealthier jurisdictions should offer funding, technology, and other support.¹²⁰

114. In 2013. CHINA DATA ONLINE, <http://www.chinadataonline.org>. At an exchange rate of 6.0539 CNY per 1 USD (as of Dec. 31, 2013, <http://www.exchangerates.org.uk/USD-CNY-exchange-rate-history.html>).

115. Zhang Chun, *Beijing Is Trapped in Its Polluted Neighbourhood*, CHINA DIALOGUE BLOG (June 25, 2013), <https://www.chinadialogue.net/blog/6135-Beijing-is-trapped-in-its-polluted-neighbourhood/en> (discussing the Ministry of Environmental Protection's ranking of 74 cities by pollution in the first quarter of 2013).

116. Jiang Xueqing & Wu Wencong, *Clearing the Air*, CHINA DAILY: USA (June 13, 2013, 7:06 AM), http://usa.chinadaily.com.cn/china/2013-06/13/content_16612897.htm.

117. *Id.*

118. *Id.*

119. Although Beijing is cutting its own coal consumption, it "cannot force other cities and provinces to sacrifice their own economic growth to promote cleaner air in the surrounding areas." *Id.* This is analogous to a central claim from Ronald Coase's *The Problem of Social Cost* that pollution can be seen as a reciprocal problem. It is not only that the polluter harms the pollution victim, but an order enjoining the polluter's discharges imposes harm on the polluter. R.H. Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960). On Coase and distribution, see, generally *infra* Part III.A.

120. Chai Fahe, vice-president of the Chinese Research Academy of Environmental Sciences, noted, "Considering that the three areas [BTH] are different in terms of their development stages, per

In response to this problem, the central government has offered an RMB five billion (\$818 million) incentive fund to subsidize local action on air pollution in six provinces in northern China.¹²¹ Much of this funding is expected to support Hebei Province pollution reduction work. Measures will include reducing production in heavy industries like steel and cement, decreasing coal consumption, increasing usage of natural gas, shutting down inefficient industrial capacity, and upgrading existing coal-fired power plants.¹²² While there may be near-term impacts on local economies, government planners are hoping the central government subsidies will help to develop green industries and, in the end, expand GDP growth.¹²³ In February 2014, China's State Council announced a RMB ten billion (\$1.54 billion) fund to reward cities and regions that make significant progress in air pollution control.¹²⁴

This Subpart has described the principle of CBDR in international law, and identified China's use of differential regulation for economic and environmental regulation. The next Subpart develops a regulatory approach that draws inspiration from, but seeks to improve on, both of these traditions.

C. Regulating Outsourcing—A Domestic CBDR Approach

This Subpart proposes that a domestic CBDR approach to regulation can reduce China's carbon intensity and limit carbon outsourcing, while also recognizing the right to development of China's poorer regions. In concept, this regulatory approach is straightforward: Wealthier coastal provinces take on more stringent mitigation obligations than interior provinces, and the coastal provinces

capita GDP and living standards, they should help each other when working towards the same goal, that of fighting air pollution, by sharing ideas, technology and funds." Jiang Xueqing & Wu Wencong, *supra* note 122. As Ma Jun, a leading Chinese environmentalist put it, "Different areas are at different stages of development and have different priorities. Because they are not on the same page, it's very difficult to carry out joint regional prevention and control of air pollution." *Id.*

121. Zheng Jinran, *Govt Offers 5b Yuan to Fight Pollution*, CHINA DAILY (Oct. 14, 2013 11:43 PM), http://www.chinadaily.com.cn/china/2013-10/14/content_17032103.htm.

122. *Id.*

123. Wu Wencong, *Tougher Plan to Reduce Air Pollution*, CHINA DAILY (July 25, 2013 2:47 AM), http://usa.chinadaily.com.cn/china/2013-07/25/content_16826755.htm ("Wang said that although eliminating outmoded methods of industrial production may have negative effects on local economies, the plan will boost the green industry. He said the plan will also create GDP growth of about 2,500 billion yuan.").

124. Edward Wong, *China to Reward Cities and Regions Making Progress on Air Pollution*, N.Y. TIMES, Feb. 13, 2014, <http://nyti.ms/Mf8px0>. It is unclear whether this amount overlaps with the RMB five billion amount announced in 2013.

subsidize greenhouse gas mitigation or low-carbon development efforts in the interior provinces through fiscal subsidies and technology transfer. The focus here on a domestic CBDR approach is at once an effort to highlight the existing role of differentiated regulation in Chinese environmental protection, as well as a call for Chinese regulation to utilize more extensive differentiation and subsidization than is presently the case to achieve more effective policy implementation.

This approach has a number of potential advantages that improve its likelihood of success in practice, and it also avoids the shortcomings that have made international CBDR and existing Chinese environmental regulation largely ineffective in the climate context.

A full examination of the appropriate choice of regulatory tools for implementation of a domestic CBDR approach is beyond the scope of this Article. The focus here is on the benefits—in policy formation and implementation—of incorporating a CBDR approach into China's domestic regulatory regime. This approach could be applied to regulatory regimes based on a variety of mechanisms—command-and-control, market, information regulation, or some combination thereof.

For purposes of discussion, I offer a stylized proposal below. The domestic CBDR regime described in this proposal treats China's thirty-one province-level jurisdictions as separate countries for purposes of differentiating obligations and providing financial and technical support.¹²⁵ Differentiated responsibilities are implemented through provincial carbon intensity reduction targets, with allocation determined according to relative wealth levels and consumption-based carbon emissions and energy use levels. Support for interior provinces involves fiscal and technology transfer funded through a carbon tax, which would also serve to internalize the cost of carbon emissions.

1. Differentiated Responsibilities

The first component of a domestic CBDR approach is differentiated responsibilities. While China already engages in differentiated regulation, domestic CBDR involves more significant differentiation than is currently in place—to reflect higher consumption levels and financial capabilities in the eastern coastal provinces.¹²⁶ Developing provinces also face minimum environmental standards,

125. To simplify the proposal, these provinces can be grouped into a lesser number of regions as well.

126. This also recognizes lower consumption and capacity, as well as the right to develop in the poorer interior provinces. Steve Vanderheiden, *Climate Change, Environmental Rights, and Emission Shares*, in *POLITICAL THEORY AND GLOBAL CLIMATE CHANGE* 43–63 (Steven Vanderheiden ed., 2008).

unlike in the international regime. Authorities could implement this through the bureaucratic apparatus already created for China's current system of environmental targets, which authorities elaborated to a significant degree during the Eleventh and Twelfth Five-Year Plans.

Making such allocations largely, though not exclusively, consumption-based would place a check on carbon outsourcing since outsourced emissions would still be credited to the province where consumption takes place.¹²⁷ Others have proposed allocating targets among the provinces based on other metrics of development, such as GDP per capita or the UN-developed Human Development Index.¹²⁸ But these other types of differential targets would likely encourage carbon outsourcing because developed regions would face no penalty for outsourcing carbon emissions.

2. Support for Interior Provinces

The second component of a domestic CBDR framework is financial and technology support for interior provinces. For purposes of discussion, assume that such support is funded through a national carbon tax. Central authorities could administer fiscal transfers through a central green fund for investments in projects or initiatives that reduce carbon emissions in the interior provinces. This builds on existing Chinese experience in funding afforestation and grasslands restoration projects to improve ecosystem services in western provinces.¹²⁹ Such a system could also draw lessons from the both the experiences at the international level of the Multilateral Fund of the Montreal Protocol, which has funded the costs incurred by developing countries in seeking alternatives to ozone depleting

127. A pure consumption-based allocation would impose substantial economic costs on wealthier provinces and create little obligation for poorer provinces to mitigate emissions. See, e.g., SPRINGMANN ET AL., *supra* note 14. A combination of consumption-based and production-based allocation will likely strike a fairer balance between costs and benefits.

128. The Human Development Index (HDI) was an effort to account for social and economic development in a single index. HDI combines "life expectancy, educational attainment and income into a composite" index. *Human Development Index (HDI)*, UNITED NATIONS DEVELOPMENT PROGRAMME, <http://hdr.undp.org/en/statistics/hdi> (last visited Feb. 15, 2014); see also STEPHANIE OHSHITA ET AL., TARGET ALLOCATION METHODOLOGY FOR CHINA'S PROVINCES: ENERGY INTENSITY IN THE 12TH FIVE-YEAR PLAN (2011), available at <http://escholarship.org/uc/item/5n29q83f#page-3>; Wang, *supra* note 90, at 390–92 (11th FYP allocations based in part on GDP per capita); Hu Angang, *A New Approach at Copenhagen (1)*, CHINA DIALOGUE (Jun. 4, 2009), <https://www.chinadialogue.net/article/show/single/en/2892-A-new-approach-at-Copenhagen-1> (setting forth a proposal based on relative provincial HDI).

129. See *supra* Part II.B.2.b.

substances, and, in the United States, of the fund for allocation of cap-and-trade revenues in California's carbon emissions trading system.¹³⁰

To summarize, the key components of a domestic CBDR approach include: (1) differential allocation: carbon- and energy-intensity reduction targets (based on a combination of consumption-based and production-based emissions); and (2) subsidy and abatement: a nationwide carbon tax, and fiscal and technology transfer to interior provinces (funded by the carbon tax and other revenue streams).

As stated above, this Subpart only offers a sketch of the basic contours for a domestic CBDR regime. More work is necessary, for example, to evaluate the cost-effectiveness of such an approach. But this Article is primarily concerned with whether domestic CBDR can overcome the problems of weak political will and insufficient regulatory capacity to achieve any level of implementation at all. Part III offers some thoughts on this question.

130. Michael Wara has suggested that the Multilateral Fund can serve as an alternative to the Clean Development Mechanism (CDM) that can help to avoid the gaming and other problems associated with CDM. See Wara, *supra* note 76, at 1800–02. The choice of mechanism for distribution of subsidies is, of course, also a decision about the allocation of power. A centralized fund tends to reinforce the power of central authorities. Less centralized or more market-based models will empower local governments or market actors, as the case may be. This Article selects a more centralized mechanism largely due to concerns about local protectionism and the difficulty of monitoring local actors. A centralized mechanism could, however, reinforce central power in a way that is undesirable, and create opportunities for rent seeking. Other possible regulatory mechanisms include province-to-province fiscal transfers, a domestic CDM, or a national cap-and-trade program with interprovincial buying and selling of credits.

Province-to-Province Fiscal Transfers: Developed provinces could earn carbon reduction credit for projects funded in developing regions of the country. China has experience in such inter-provincial transfers in the context of watershed eco-compensation programs described *supra*. But such diffuse bilateral arrangements would increase the difficulty of monitoring and prevention of collusion.

Domestic CDM: A domestic CDM system would allow government or private actors to generate credits through investment in approved, certified green projects in developing provinces. The developed provinces would then have the right to meet a certain percentage of their carbon reduction obligations through purchase of these credits. International experience with CDM (much of it in generating credits within China) has shown that implementation of CDM can be quite difficult, with concerns about additionality, gaming, and outright fraud. See David A. Jacques et al., *Inter-Provincial Clean Development Mechanism in China: A Case Study of the Solar PV Sector*, 57 ENERGY POLY 454, 456 (2013).

Cap-and-Trade: In 2011, China announced plans for carbon trading pilots in seven provinces and cities (Beijing, Tianjin, Shanghai, Chongqing, Hubei, Guangdong, and Shenzhen). In June 2013, Shenzhen became the first city to launch its carbon emissions trading pilot. Leslie Hook, *China Reveals Details of First Carbon Trading Scheme*, FIN. TIMES, May 21, 2013, <http://www.ft.com/cms/s/0/9221daf4-c221-11e2-ab66-00144feab7de.html#axzz32GOIXGkv>. Officials have announced plans to expand cap-and-trade nationwide within the next few years. But cap-and-trade regimes are extremely complex regulatory structures that require reliable monitoring data, strong regulatory enforcement, and capable regulatory and technical staff nationwide, all areas that are weak in China today.

III. ANALYSIS: SUPPORT FOR DOMESTIC CBDR (AND POTENTIAL BARRIERS)

Domestic CBDR is a proposal for stronger climate change regulation that takes seriously the right to development. It is a framework that on the surface looks like the international approach to CBDR. But, for the reasons discussed below, domestic CBDR is superior to its international counterpart in both the ability to garner political support and the feasibility of implementation.

A domestic CBDR proposal in China has advantages in two main respects—normative legitimacy and confluence with other state priorities—compared to the international context. Existing normative inclinations or values (about the right to development, reciprocity between coastal and interior provinces, and the fairness of consumption-based allocation of responsibilities) favor a differentiated approach in China. A differentiated approach to climate change mitigation would also have stronger political support, as it aligns with several other key priorities of the party-state, such as reduction of air pollution and shifting the economy away from reliance on heavy industry.

Two other factors—interest group influence and institutional capacity—offer both advantages and challenges. Domestic CBDR would create both winners (who would likely offer support) and losers (who would oppose the proposal). China's governance system offers potential "authoritarian environmentalism" advantages through its top-down, unitary bureaucratic system and a relative lack of checks and balances. For a limited number of core state priorities, the unitary state structure allows for governance approaches not available at the international level (for example, administration of a national carbon tax). At the same time, though, domestic CBDR would suffer from serious regulatory capacity limits, rent seeking, and corruption. While these constraints are not a special problem for domestic CBDR (they exist for any Chinese regulatory proposal), an awareness of these problems suggests a need to avoid regulatory complexity and to bolster supervision mechanisms (monitoring) and transparency.

A. Normative Legitimacy

Laws and regulations consistent with broadly held values offer greater opportunity for building consensus in Chinese legislative processes than would otherwise be the case.¹³¹ As to implementation, studies have also shown that

131. *See generally*, Murray Scot Tanner, *The Politics of Lawmaking in Post-Mao China: Institutions, Processes, and Democratic Prospects* (1999); Alford & Liebman, *Clean Air, Clean Processes*,

compliance with regulatory regimes is enhanced when those tasked with compliance hold values consistent with the rules they are required to follow.¹³² Normative disagreement with those rules, on the other hand, undermines compliance.¹³³ This dynamic holds true for those tasked with enforcement as well. Enforcement is enhanced when regulators' personal values are aligned with the values embedded in the rules they must enforce.¹³⁴

At least three values reflected in the Chinese context support a domestic CBDR approach and enhance the likelihood of policy formation and implementation. These are (1) persistent support for the entitlement to development, (2) a belief in the need for interregional reciprocity, and (3) concern about the unfairness of production-based emissions.

1. Entitlement to Development

Much of Chinese environmental law is formally framed according to a polluter-pays approach.¹³⁵ But underlying the formal law is what amounts to a tacit shift in entitlements in favor of polluting firms' right to pollute—what Chinese might call a “latent principle” (潜规则; *qian guize*).¹³⁶ In practice it can

Hastings Law Journal; VAN ROOIJ, *supra* note 6. These works, among other things, call into question assumptions about the “rubber stamp” nature of China’s legislative processes.

132. Robert A. Kagan et al., *Fear, Duty, and Regulatory Compliance: Lessons From Three Research Projects*, in EXPLAINING COMPLIANCE: BUSINESS RESPONSES TO REGULATION 44 (Christine Parker & Vibeke Lehmann Nielsen, eds., 2011) (“[W]hen the personal values of individual taxpayers or corporate employees are consistent with particular laws, regulations and company policies, they are much more inclined to comply voluntarily.”).
133. *Id.*
134. See, e.g., Robert Kagan, *Understanding Regulatory Enforcement*, 11 L. & POL. 89 (1989), available at <http://scholarship.law.berkeley.edu/cgi/viewcontent.cgi?article=1089&context=facpubs>.
135. See *Zhonghua renmin gonghe guo huanjing baobu fa* (中华人民共和国环境保护法) [Environmental Protection Law of the People’s Republic of China] (promulgated by the Standing Comm. Nat’l People’s Cong., Dec. 26, 1989, effective Dec. 26, 1989), Art. 41 (Lawinfochina) (China) (“A unit that has caused an environmental pollution hazard shall have the obligation to eliminate it and make compensation to the unit or individual that suffered direct losses.”); see also *Zhonghua renmin gonghe guo qinquan zeren fa* (中华人民共和国侵权责任法) [Tort Liability Act of the People’s Republic of China] (promulgated by the Standing Comm. Nat’l People’s Cong., Dec. 26, 2009, effective July 1, 2010), Art. 65, http://www.procedurallaw.cn/english/law/201001/t20100110_300173.html (China) (“Where any harm is caused by environmental pollution, the polluter shall assume the tort liability.”).
136. Calabresi and Melamed’s classic 1972 article on protecting entitlements offers a useful framework for understanding developments here in the Chinese context. Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1115–24 (1972). They set forth four ways in which entitlements between a polluter and a potential victim of pollution exposure could be allocated and protected. In short, the rules involve the allocation of entitlements to either a polluter (a right to pollute) or a victim of pollution

be quite difficult for those affected by pollution to obtain compensation, creating for polluters what amounts to a de facto property right to pollute.¹³⁷ Courts refuse to accept lawsuits seeking compensation for pollution harm.¹³⁸ Local regulators fail to take enforcement actions against polluting facilities.¹³⁹ Scholars have tended to frame this as a problem of institutional design. Local agents do not comply with central environmental dictates because monitoring and enforcement is largely left to the local agents themselves.¹⁴⁰

In recent years, however, as pollution problems have grown and the state has increased the priority of environmental goals, there is some evidence that China has begun to differentiate the way it handles pollution cases. In the highest priority and more developed regions, the state, whether at the local level or higher, has been more willing to implement the law as though an entitlement to be free from environmental nuisance existed—enjoining polluters from further pollution, or requiring payment of fines and compensation. In wealthier provinces, enforcement actions have grown more stringent.¹⁴¹

In the interior provinces where development is still an overarching priority, Chinese policy and regulations have begun to change in two different ways. The first is payment to developing regions to cease excessive levels of pollution. This dynamic is reflected in the eco-compensation programs discussed in Part II above.¹⁴² Where pollution levels in the developing provinces are severe, regula-

(a right to be free from pollution). In either case, a property right or a liability rule can be used to protect the entitlement, with injunction or compensation, as the case may be, available as remedy.

137. This is not always the case. Rachel Stern suggests that judges in environmental lawsuits attempt to attain rough justice that offers plaintiffs some level of compensation. Rachel E. Stern, *On the Frontlines: Making Decisions in Chinese Civil Environmental Lawsuits*, 32 L. & POLY 79 (2010). In other cases, plaintiffs are only compensated where they create risk of social instability (through protest, complaints, media attention, etc.). Payments to plaintiffs thus can be thought of not as compliance with the environmental law, but rather pay-offs in exchange for plaintiffs ceasing activities that threaten social instability, which is an important metric of evaluation in local cadre evaluation. The pay-offs are granted through favorable court decisions, direct payments drawn from local government stability maintenance funds (维稳基金; *weiwen jijin*), or the granting of other benefits (such as employment opportunities in local enterprises).

138. *Id.*

139. XIAOYING MA & LEONARD ORTOLANO, ENVIRONMENTAL REGULATION IN CHINA: INSTITUTIONS, ENFORCEMENT, AND COMPLIANCE (2000).

140. Local polluters are either too important a source of tax revenue for local governments, or else local polluters are the local government (such as in the case of township-village enterprises where local governments have significant investment and control over polluters).

141. Van Rooij & Lo, *supra* note 91, at 29–30.

142. Under the Calabresi & Melamed framework, this is a manifestation of an entitlement to pollute protected by a property right; that is, the polluter will stop when that property right is in essence purchased at the right price. Under eco-compensation schemes, this price in theory is the amount necessary to allow the developing locality to develop economically at a sufficient speed. See Calabresi & Melamed, *supra* note 136, at 1,116 (the “no nuisance” rule).

tors are forcing the cessation of pollution, but also offering payments and other support. This is in effect a “partial eminent domain coupled with a benefits tax,”¹⁴³ and reflects not the polluter-pays principle set forth in the law, but a beneficiary-pays concept. An example of this is the forced shut down of heavy industrial capacity in Hebei and other provinces, coupled with a central subsidy, described in Part II above.

Domestic CBDR attempts to build these values into the regulatory regime to improve regulatory effectiveness, rather than allowing it to happen on an ad hoc basis.

2. Reciprocity

Second, coastal province support for the interior regions would rest as much on a reciprocity argument as a distributional goal. That is, the Chinese Communist Party (CCP) has provided resources and other support disproportionately to the coastal provinces for the last thirty-five years in the name of economic growth. As a matter of reciprocity, it is fair to provide substantial support to the interior provinces now to encourage economic growth and environmental protection. This dynamic adds additional normative support for a differentiated approach to countering carbon outsourcing.

3. Consumption-Based Responsibility for Emissions

Finally, a shift from the current production-based approach to emissions accounting to a consumption-based model may have resonance in the Chinese domestic context as a matter of fairness. China has long argued in the UNFCCC negotiations that emissions embodied in trade should not entirely be attributed to China. Indeed, about one-third of China’s carbon emissions are associated with products consumed in developed countries. This argument that consumption-based accounting for emissions is a fairer way to allocate emissions applies equally to the domestic level, and for Chinese leaders who support such an argument at the international level, domestic CBDR could serve as a signal that at home China lives by the principles it espouses internationally.

A number of objections can be raised to the claim that Chinese policy and regulation reflect the normative values expressed above. For example, one could argue that Chinese policy does not actually reflect these normative values at all. Rather, leadership rhetoric and regulatory provisions expressing the need to sup-

143. See Calabresi & Melamed, *supra* note 136, at 1116.

port interior province development, a need for reciprocity, and the greater fairness of consumption-based accounting are cover for long-standing policies that have favored and continue to favor the wealthiest and most powerful coastal regions. One could also raise the objection that if the concern is redistribution, then differentiated environmental regulation is an indirect and inefficient way to achieve this. Better would be simply to offer fiscal transfers directly to citizens and enterprises in the interior provinces.¹⁴⁴ Another objection is to the use of provinces as the unit of administration. If fiscal transfers to interior provinces accrue disproportionately to wealthier parties in those provinces, there is no guarantee or even a likelihood that such transfers will be redistributive in the way we intend. A focus on relative per capita GDP of provinces also neglects the fact that even wealthy provinces have large populations that are not by any means wealthy.

These objections do not override the normative force of these values in favor of domestic CBDR. Domestic CBDR is not primarily a mechanism for redistribution, but rather a means of incorporating development concerns into environmental regulation in a systematic, transparent way. If policymakers feel that distributive aims are not fully met, other complementary policies (such as individual tax breaks or fiscal transfers) can be implemented.

B. Confluence With Other Party-State Priorities

A domestic CBDR approach also supports a number of important Chinese party-state priorities other than climate change mitigation. This confluence of myriad policy priorities with a domestic CBDR approach may strengthen the political support for, or at least reduces potential opposition to, the proposal.¹⁴⁵

144. See Eric A. Posner & Cass R. Sunstein, *Climate Change Justice*, 96 GEO. L.J. 1565, 1586–88 (2008).

145. This analysis is premised on the notion that Chinese bureaucrats will to a certain extent rationally pursue policy goals in the national interest, as set forth in central planning and policy documents. This is more so the case with high priority policy objectives, where monitoring and enforcement will tend to be stronger. Where agents are tasked with multiple goals, “bundling” is a typical response—that is, focusing attention on responses that achieve multiple goals and that do not conflict with other important objectives. See Genia Kostka & William Hobbs, *Energy Efficiency in China: The Local Bundling of Interests and Policies* (Frankfurt School of Finance & Management, Working Paper No. 151, 2010), available at <http://www.econstor.eu/bitstream/10419/40931/1/635933497.pdf>. Nonetheless, principal-agent problems are a continual challenge, resulting in bureaucratic agents acting in their own personal or immediate institutional interests where information asymmetry is great or outcomes are difficult to measure. In any event, policy priorities and their enforcement will form part of the background of incentives to which bureaucratic agents respond and react as they attempt to pursue their own interests. Part III.C.2 discusses the ways that competing agency or institutional interests in different parts of the government and Chinese society might affect the implementation of domestic CBDR.

First and foremost, a domestic CBDR regime is designed to incentivize actions that also contribute substantially to reduction of local air pollution. Air pollution reduction has become a top-level party-state priority particularly since the beginning of 2013, when dozens of cities in China faced emergency levels of air pollution for days on end. This approach also supports the national priority of economic transformation and national unity.¹⁴⁶

Pollution Reduction. China's air pollution problems have reached crisis levels. In the last few years, air pollution reduction has become a top state priority, and there is significant political will for strong regulatory action. As discussed above in Part I, carbon outsourcing has meant that heavily polluting, energy-intensive industries are expanding in the less developed provinces. A domestic CBDR approach would target its support at these heavy contributors to air pollution in China. Subsidies directed at the developing provinces would support the expansion of lower pollution services industries (eco- and cultural tourism, high-value-added agriculture, and others) and new green industries, such as renewable energy. They would also fund the greening of traditional industries, through energy efficiency, end-of-pipe pollution reduction, and the shutdown of backwards production capacity.¹⁴⁷

A domestic CBDR regime would benefit from the store of political will that now exists for air pollution regulation.¹⁴⁸

Economic Transformation and National Unity. China's state researchers have projected that the country's economic growth will slow in coming years.¹⁴⁹ Weak

146. See, e.g., Jonathan B. Wiener, *Climate Change Policy and Policy Change in China*, 55 UCLA L. REV. 1805, 1819 (2008) (quoting Elizabeth C. Economy, *The Great Leap Backward?*, FOREIGN AFF., Sept./Oct. 2007, at 38) (noting that China's effect on the environment poses dangers to its economy, public health, social stability, and international reputation). As will be discussed below, the political feasibility of achieving state interests in practice will also be assisted by their convergence with special interests (or the interests of certain elites, such as powerful state-owned enterprises or the families of political elites).

147. WORLD BANK & DEV. RES. CTR. OF THE STATE COUNCIL, CHINA 2030: BUILDING A MODERN, HARMONIOUS, AND CREATIVE SOCIETY 40, available at <http://www.worldbank.org/content/dam/Worldbank/document/China-2030-complete.pdf>.

148. Some actions that improve air pollution exacerbate carbon emissions though. For example, facilities that convert coal into natural gas provide relatively cleaner burning fossil fuel for use in wealthier eastern provinces, but create serious local pollution in the western provinces where such facilities are typically located. See, e.g., *China Outsourcing Smog to West Region Stirs Protest*, BLOOMBERG NEWS, Mar. 6, 2014, <http://www.bloomberg.com/news/2014-03-06/china-outsourcing-smog-to-west-region-stirs-protest.html>; see also, Boling Zhang, *Coal Industry Finds Itself at a Crossroads*, CAIXIN, Dec. 5, 2013, <http://english.caixin.com/2013-12-05/100614132.html>; *China's First Coal-to-Gas Project to Come Online*, REUTERS-GLOBAL TIMES, Nov. 7, 2013, <http://www.globaltimes.cn/content/823335.shtml#UxUPB16-M7w>; Kaixi Huang, *China Grapples with Natural Gas Shortage*, CAIXIN, Dec. 3, 2013, <http://www.marketwatch.com/story/china-grapples-with-natural-gas-shortage-2013-12-03>; Weidong Chen, *The Path to Cleaner Air*, CAIXIN, Nov. 18, 2013, <http://english.caixin.com/2013-11-18/100606283.html>.

economic performance creates serious political risk for leaders who have based the legitimacy of their rule over the last few decades in large part on rapid economic growth. Regional economic disparities have produced special problems in this regard that would make a domestic CBDR approach attractive to senior leaders. These include social disenfranchisement of ethnic minorities in the western provinces, social/family dislocation due to heavy west-to-east labor migration, and social costs imposed on recipient cities in eastern provinces. The Third Plenum of the Eighteenth Party Congress proposed economic and migration policy reforms aimed at expanding economic opportunities in the interior provinces. Domestic CBDR's support for more environmental economic growth in the interior provinces is fully consistent with national objectives of economic transformation and western development.

An objection to the claim that this confluence with other Chinese policy objectives enhances the political will available for domestic CBDR is that the political support for and economic logic of China's traditional pollute first, cleanup later mentality is simply too strong. Under this argument, the dramatic devolution of authority for economic decision-making to local levels of government has been the key to China's economic growth, even though a key driver of China's environmental degradation, and the political risk in holding back this economic engine is too great for the CCP to tolerate.¹⁵⁰

But environmental problems have arguably reached a level of severity too great to ignore, and are an ongoing threat to state legitimacy. Chinese leaders may feel that something must be done, lest these problems threaten social instability and even the continuing existence of the ruling regime. Between the choice of continuing business-as-usual and seeking a solution that attempts to achieve an economic-environmental win-win, balancing economic and environmental concerns will be the more palatable option for the powers that be.¹⁵¹

C. Interest Group Influence (Winners and Losers)

The political economy of low-carbon development in China is a work in progress. As with many areas in China, political actors are jockeying to stake a claim to new and rapidly evolving opportunities associated with environmental

149. World Bank & Development Research Center of the State Council, *supra* note 147, at 218.

150. SUSAN SHIRK, *THE POLITICAL LOGIC OF ECONOMIC REFORM IN CHINA* 149 (1993); Chenggang Xu, *The Fundamental Institutions of China's Reforms and Development*, 49 J. ECON LITERATURE 1076, 1098–107 (2011).

151. As described in Part III.D, *infra*, limits in regulatory capacity, corruption, and interest group influence may thwart the ability of central leaders to implement such a policy even if it is one supported with strong top-down agreement.

regulation. A domestic CBDR approach would offer economic and political gain for some interest groups (winners).¹⁵² But strong countervailing interests (losers) stand to block the development and implementation of any regulatory framework based on a domestic CBDR approach. Moreover, horizontal and vertical fragmentation among levels of government, state institutions at any given level of government, and increasingly non-state actors (businesses, civil society actors) render implementation of policy difficult even when there is strong support from many quarters.¹⁵³ Thus, on the whole, political economy considerations neither clearly support nor obviously hinder domestic CBDR.

Provincial and Local Governments. A large number of provinces would receive state subsidies, investment, or technology transfer under a domestic CBDR approach and so would likely support such a proposal. But regulation aimed at economic transition to low-carbon production approaches (services, higher value-added industries) might face more opposition in provinces with greater existing stakes in carbon-intensive production, like Shanxi, Inner Mongolia, or Hebei, which rely on heavy industry, coal, and fossil-fuel power production. At the same time, many of these provinces are already the subject of intensive enforcement campaigns to shut down or retrofit polluting facilities that contribute to air pollution in the Beijing-Tianjin-Hebei region. Given the high political priority placed on air pollution reduction, these provinces may feel that regulation is inevitable. Under these circumstances, a regulatory program like domestic CBDR that provides for subsidy and other support for interior provinces would likely be attractive. And lobbying might center more on obtaining a larger share of subsidies than on limiting regulation at all.

The interior provinces that would benefit from domestic CBDR, however, have less representation and power in elite governance circles. While local government representatives (from provincial and municipal levels) composed 42 percent of the Seventeenth Central Committee of the CCP with relatively even distribution among provinces, the coastal provinces were “overrepresented by a large margin” on the more powerful Politburo and Politburo Standing Commit-

152. For a discussion of interest group influence in supporting climate change regulation in California, see Eric Biber, *Cultivating a Green Political Landscape: Lessons for Climate Change Policy from the Defeat of California's Proposition 23*, 66 VAND. L. REV. 399 (2013).

153. See KENNETH LIEBERTHAL & MICHEL OKSENBERG, *POLICY MAKING IN CHINA: LEADERS, STRUCTURES, AND PROCESSES* (1988); SHIRK, *supra* note 150; Andrew Mertha, “Fragmented Authoritarianism 2.0”: *Political Pluralization in the Chinese Policy Process*, 200 CHINA Q. 995 (2009).

tee.¹⁵⁴ Thus, there may be limits on the ability of interior province representatives to influence policy, particularly if coastal province representatives object.

State-Owned Enterprises (SOEs). Some influential state-owned enterprises will benefit from supporting a domestic CBDR regime. For example, the major state-owned power companies have been the most aggressive investors in renewable energy in China. SOEs account for most of domestic investment in hydro-power¹⁵⁵ and also develop the majority of wind power projects (as high as 90 percent in recent years).

Other SOEs have a clearer interest in opposing any sort of environmental regulation. For example, the petroleum or coal SOEs—like Sinopec, Petrochina, or Shenhua—have long been obstacles to improved fuel-quality standards and other environmental measures. These enterprises would not likely support stronger climate change regulation.¹⁵⁶

Ministries. Bureaucratic competition for resources and political authority will affect the political feasibility of climate change regulation in China. The National Development and Reform Commission (NDRC) and the climate change department headed by Vice-Minister Xie Zhenhua have been fairly aggressive in promoting energy efficiency and carbon-intensity reduction efforts nationwide. A carbon tax, however, which is part of the domestic CBDR approach set forth in this Article, would likely be under the jurisdiction of the Ministry of Finance (MOF). On the other hand, emissions trading is administered by NDRC.

Therefore, the choice of regulatory tools will have an impact on the extent to which different ministries support domestic CBDR. Some have suggested that the reason emissions trading has become formal policy (through local carbon trading pilots), whereas the carbon tax is still under discussion, is NDRC's relatively greater influence within the bureaucracy and the unwillingness of NDRC to cede authority in climate change regulation to MOF.

154. Zhiyue Bo, *The Seventeenth Central Committee of the Chinese Communist Party: Institutional Representation*, 44 ISSUES & STUD. 1, 2 tbl. 1 (2008); Cheng Li, *A Pivotal Stepping Stone: Local Leaders' Representation on the 17th Central Committee*, CHINA LEADERSHIP MONITOR, No. 23/Winter 2008, available at http://www.brookings.edu/~media/research/files/articles/2008/1/winter%20china%20li/winter_china_li.

155. *China Wind Power Outlook 2012*, GREENPEACE (Sept. 18, 2012), <http://www.greenpeace.org/eastasia/publications/reports/climate-energy/2012/wind-energy-report-2012>; Michael Davidson, *Transforming China's Grid: Sustaining the Renewable Energy Push*, THE ENERGY COLLECTIVE (Sept. 24, 2013), <http://theenergycollective.com/michael-davidson/279091/transforming-china-s-grid-sustaining-renewable-energy-push>.

156. Edward Wong, *As Pollution Worsens in China, Solutions Succumb to Infighting*, N.Y. TIMES, Mar. 21, 2013, <http://www.nytimes.com/2013/03/22/world/asia/as-chinas-environmental-woes-worsen-infighting-emerges-as-biggest-obstacle.html?pagewanted=all>.

It is unclear how these countervailing currents in the political economy of climate change regulation in China will ultimately play out. Potential allies for climate change regulation and a domestic CBDR proposal are more prevalent than one might expect, however, and are likely to grow in number and strength in the future.

D. Institutional Capacity and Corruption

While on the whole regulatory capacity¹⁵⁷ is a barrier to implementation in China (as it is in many developing and emerging economies), there are some potential advantages to China's system of governance in climate change mitigation and the implementation of a CBDR-based framework. China's is a system with strong top-down bureaucratic management that is weak on legislative, judicial, and public checks. The potential benefits of such a system are consistent with arguments forwarded by supporters of authoritarian environmentalism, who note that authoritarian states not limited by democratic and constitutional checks and balances may be able to promulgate and implement policies about which there may be deep opposition of one sort or another. High-priority issues with significant agreement among elite leaders receive heavy enforcement focus and resources, and bureaucratic career advancement is linked to achievement of these limited number of high-priority objectives through the cadre evaluation system.¹⁵⁸ For example, strong top-down pollution-reduction targets have caused local officials to increase investment in pollution control and accelerate the shut-down of inefficient industrial capacity.¹⁵⁹ Christiana Figueres, Executive Secretary of the UNFCCC, commented on this phenomenon in January 2014: "China is able to implement policies because its political system avoids some of the legislative hurdles seen in countries including the U.S."¹⁶⁰ Critics of the statement objected to this support for an undemocratic approach to climate regulation.¹⁶¹

157. Here, regulatory capacity refers mainly to human resources capabilities, mature regulatory institutions and systems, regulatory budgets, and the hardware necessary for effective regulation (for example, monitoring equipment).

158. Thus, economic growth, social stability, one-child policy, and now potentially environmental protection are examples of hard and veto targets, designations that signify the higher priority of these objectives. Wang, *supra* note 90, at 380.

159. *Id.*, at 420–24.

160. Sangwon Yoon, *Biggest Emitter China Best on Climate, Figueres Says*, BLOOMBERG (Jan. 14, 2014), <http://www.bloomberg.com/news/2014-01-13/top-global-emitter-china-best-on-climate-change-figueres-says.html>.

161. See, e.g., Ed Morrissey, *UN Climate Chief Declares Communism Best for Fighting Global Warming*, HOT AIR (Jan. 16, 2014), <http://hotair.com/archives/2014/01/16/un-climate-chief-declares-communism-best-for-fighting-global-warming> ("Anyone offering communism as an environmental solution has to be either ignorant or deliberately obtuse.").

The high proportion of the economy that remains state-owned may also offer some regulatory advantages, despite the conventional view of state-owned enterprises as interest groups that have often stymied environmental regulation. In addition to the standard repertoire of regulatory tools, authorities also possess the levers of bureaucratic control. Moreover, state-owned enterprises are meant to fulfill social and political as well as economic functions, and there are few legal constraints on offering state support for SOEs to support these state priorities.

Despite these possible advantages of authoritarian environmentalism, limits in regulatory capacity and rampant corruption present perhaps the greatest challenge to the implementation of a domestic CBDR regime. Much of the scholarly literature on Chinese environmental regulation has focused on these limits and I will not repeat those findings in detail here. In brief, challenges include lack of personnel, training, and equipment; fragmentation among ministries and governments; principal-agent problems among levels of government; and corruption.¹⁶² These critiques constitute a substantial broadside against the authoritarian environmentalism argument. Indeed, top-down implementation in authoritarian states has a poor history of producing desired outcomes and is more often than not associated with environmental destruction. Critics argue that China's governance success, to the extent it exists, is due to its allowance of a greater local autonomy than is typical in authoritarian states, rather than any special capabilities at more effective top-down governance.¹⁶³

Nonetheless, these problems are a barrier to the implementation of any regulatory regime, not just domestic CBDR. The presence of such limits puts a premium on limiting regulatory complexity, continuing to strengthen regulatory and monitoring capacity, and increasing transparency to allow for greater exposure of regulatory pathologies. This also means that regulatory proposals, which rely on institutions that are weak in China, such as the judiciary, will not be effectively implemented without wide-ranging reforms to the underlying institutions.

On the whole, this analysis suggests that domestic CBDR with its explicit recognition of differentiated regulation has advantages with regard to political feasibility and implementation that have not been adequately recognized.

162. See notes 138, 140, *supra*.

163. See, e.g., RONALD COASE & NING WANG, HOW CHINA BECAME CAPITALIST (2013).

TABLE 3. Summary of Domestic CBDR's Advantages and Potential Barriers¹⁶⁴

| | Support | Potential Barriers |
|--------------------------|---|--|
| Normative Legitimacy | * Entitlement to development * Reciprocity * Fairness of consumption-based emissions allocation | - Lack of actual support for reciprocity, interior development |
| Policy Confluence | * Pollution reduction * Economic transformation and national unity | - Conflict with traditional "pollute first, clean up later approach" |
| Interest Group Influence | - Winners | - Losers |
| Institutional Capacity | - Authoritarian environmentalism | * Lack of capacity, rent seeking, and corruption |

CONCLUSION

Substantial action by China will be an essential component of any long-term global solution to climate change. The question for China's leaders is how to address climate change concerns while meeting economic development goals and a range of other state objectives. This Article takes one long-standing dynamic—sharp regional economic disparities—thought by most to be a barrier to climate change action and sets forth an avenue for using such circumstances to advance climate mitigation.

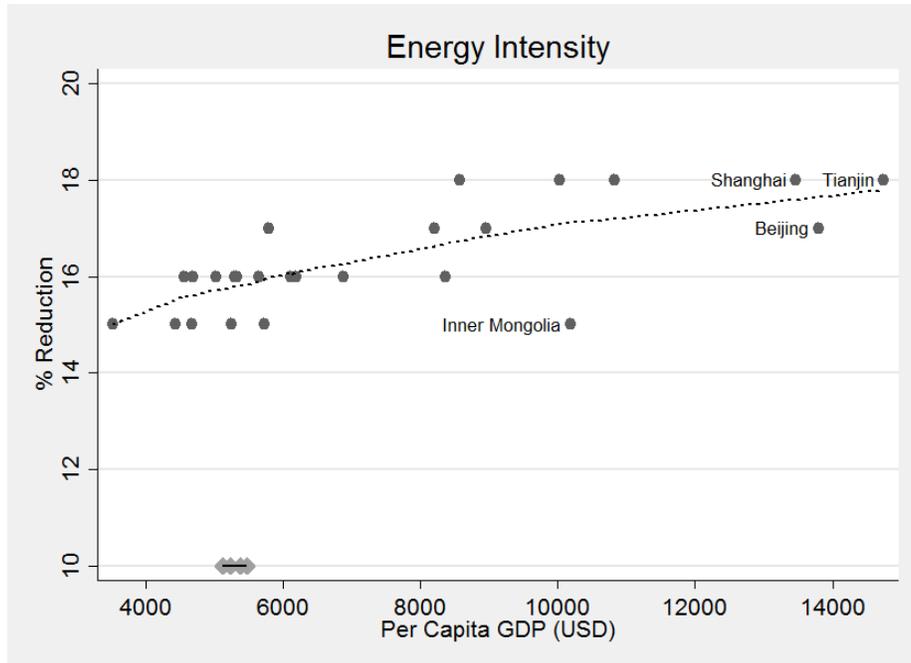
Even if one believes that one-size-fits-all proposals are seldom appropriate for China (or for the developing world in general), it is rarely clear exactly how local conditions should be taken into consideration in regulatory design. A domestic CBDR approach is an effort to bring to the fore salient factors too often ignored by Western examinations of Chinese (and developing country) regulation. Increasing pressures on our global environment and the imperative for more effective environmental regulation demand that we do so.

164. N.B.: Shaded boxes highlight the most salient factors.

APPENDIX A

TABLE 4. Twelfth Five-Year Plan (2011–15) Provincial Energy Intensity Targets

| Energy Intensity Reduction Target | Province Level Division (GDP Per Capita Rank, 2011) ¹⁶⁵ |
|-----------------------------------|--|
| 18% | Tianjin (1), Shanghai (2), Jiangsu (4), Zhejiang (5), Guangdong (7) |
| 17% | Beijing (3), Liaoning (8), Shandong (10), Hebei (14) |
| 16% | Fujian (9), Jilin (11), Chongqing (12), Hubei (13), Shaanxi (15), Heilongjiang (17), Shanxi (18), Hunan (20), Henan (23), Sichuan (25), Jiangxi (24), Anhui (26) |
| 15% | Inner Mongolia (6), Ningxia (16), Guangxi (27), Yunnan (30), Gansu (29), Guizhou (31) |
| 10% | Xinjiang (19), Hainan (22), Qinghai (21), Tibet (28) |



165. CHINA DATA ONLINE, <http://www.chinadataonline.org>.