



Sustainable  
Prosperity

Issue Summary | June 2016

# Green Tape Measures Up

Environmental Regulation Comes with  
Lower Compliance Costs and Greater  
Innovation than Previously Thought



Team

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400

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300

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100

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1000

# About Sustainable Prosperity

Made up of business, environment, policy and academic leaders, Sustainable Prosperity (SP) is a national green economy think tank/do tank. We harness leading-edge thinking to advance innovation in policy and markets, in the pursuit of a greener, more competitive Canadian economy. At the same time, SP actively helps broker real-world solutions by bringing public and private sector decision-makers to the table with expert researchers to both design and apply innovative policies and programs. We believe that achieving the necessary innovation in policy and markets for a stronger, greener Canadian economy requires a new knowledge base and new conversations. SP's approach is to promote both by generating policy-relevant, expert knowledge to inform smart policy solutions and foster innovative conversations and connections.

**Report written by Michelle Brownlee**

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**I V E Y f o u n d a t i o n**

Recycle

En

ble  
ment



Climate  
change

ment

Industry

Energy  
saving

# Introduction

There is a growing body of evidence that environmental regulations can support strong economic performance.

In 2014, researchers at the OECD constructed the first comprehensive set of data on environmental strictness and found that “an increase in stringency of environmental policies does not harm productivity growth.” We know this to be true for specific policies as well – the United States SO<sub>2</sub> market has led to a greater than expected emissions reduction, at less than half the predicted compliance costs.<sup>1</sup> The same good news story has been seen in Canada – The introduction of British Columbia’s carbon price coincided with a 16% decrease in overall fuel use in its first 5 years, at the same time that the province’s economy grew slightly more quickly than the rest of Canada’s.<sup>2</sup>

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<sup>1</sup> Environmental Protection Agency. *Cap and Trade: Acid Rain Program Results*. Retrieved from <http://goo.gl/im5iUy>

<sup>2</sup> Elgie, S. (2014). *British Columbia’s Carbon Tax Shift: An Environmental and Economic Success*. World Bank blog. Retrieved from <http://goo.gl/9VEE0i>

There are a number of reasons why more and more studies are showing that environmental regulations bring economic dividends. This short paper and the two Policy Briefs that accompany it explore what we believe are the top three:

1

**Industry is far more innovative than we think** – When industries and individual companies are faced with a regulation that requires them to improve their environmental performance, that new “constraint” forces them to think creatively about their operations and products. This innovation can lead to more efficient resource use and creation of green/clean technologies – and that can improve the company’s economic performance so much so that in some cases, the company’s bottom line is strengthened.

2

**Compliance costs are not as high as we think** – It turns out that when we estimate the prospective costs of complying with environmental regulations before they are implemented, we systematically overestimate them, compared with the actual costs we see when we look back retrospectively. Not only do we overestimate, we do it in a big way – often by a factor of 10 or more.

3

**We’re designing better policies** – Compared to past regulatory approaches that mandated a specific technology or prescribed a process (i.e., command-and-control regulations), modern regulations are generally more flexible. Using prices (like a cap-and-trade system) or prescribing an outcome (like mandating a water quality standard) allows the regulated industry and individual companies flexibility in how they meet the regulation. We’ve known this to be true in theory but now increasingly, evidence is also showing that this is true in the real world.

Our ability to achieve environmental and economic outcomes jointly shouldn’t come as a surprise – many of us know intuitively that what improves our environment is good for our bottom line. After all, industries rely on accessing healthy ecosystems to provide them with natural resources and ecosystem services like clean water and air.

And yet this view is still seen as contradictory to what many government and companies seem to believe. Many still believe that environmental regulations and policies – sometimes called “green tape” – might be justified on the basis of needing to preserve the planet and its ecosystems, but come at high, immediate

This paper is supported by two Sustainable Prosperity Policy Briefs. The first Policy Brief *Environmental Regulation and Innovation: Select Case Study Evidence of the Porter Hypothesis* introduces the Porter Hypothesis, which states that well-designed environmental regulation can benefit regulated firms by spurring innovation, thus leading to improved efficiency and enhanced competitiveness; in sum, green innovation can spur revenue and increase firms’ economic position. This Policy Brief looks at cases studies in four economic sectors: oil and gas, manufacturing, construction, and exporters, to determine the extent to which environmental regulations can induce, or have already induced, green innovation. The Brief finds that in fact, there is support for the hypothesis that well-designed environmental regulations can induce innovation.

The second Policy Brief, *Overestimating the Costs of Compliance with Environmental Regulations*, investigates the extent to which industry and regulators overestimate the costs of environmental regulation prior to the implementation of the regulation. This Policy Brief also uses case studies to answer this question, and presents evidence from regulations in the US and Canada, including the Clean Air Act, the Acid Rain program, the Montreal Protocol, and Sulphur in Gasoline Regulations, chosen because of the availability of analysis and their relevance to Canada. Through these case studies, this Brief finds there is evidence that the costs of complying with environmental regulations are systematically overestimated.

economic costs.<sup>3</sup> However, times are changing. Industries, firms and other market players are increasingly seeking well-designed environmental regulations – those that are clear, transparent and flexible. This is perhaps most evident with the growing number of companies and associations calling for a carbon price.

The latest evidence makes it clear that well-designed green tape can result in a win-win – where economic benefits can be enjoyed alongside the health and wellbeing benefits of sustained ecosystems.

Governments and other decision-makers should not hesitate over the question of whether or not to implement green tape but should instead go directly to the question of how to ensure it is well designed.

The purpose of this paper and its two companion pieces is to show that green tape is not only needed – it's smart. The case is both economic and environmental – all in, green tape measures up. The sky has not and will not fall when well-designed environmental regulations are imposed.

## The Role of Green Tape

Environmental regulations are an important aspect of governments' response to managing natural resources and environmental degradation. There are various approaches governments can use:

- **Reporting and guidelines:** Governments can provide leadership and guidance to encourage responsible action by promoting voluntary guidelines and standards for practice.
- **Information:** Governments can install programs that raise awareness of a certain environmental issue, with the intention of appealing to society's moral values to encourage voluntary action.
- **Regulations:** Regulations are policies that state a law or prescribe behaviour. There are different types of regulations.
  - **Command and control regulations:** Command and control regulations allow government to regulate directly an industry or activity through legislation:
  - **Market-based instruments:** Market-based instruments use price incentives to reduce externalities. For environmental regulations, governments can use a variety of market-based instruments to intervene in a failed market. Such instruments include taxes, subsidies or transferable permits. Taxes and subsidies require governments to set a price on pollution, while transferrable permits require governments to set allowable quantities of pollution for the allocation of discharge permits.
  - **Performance standards:** Governments set a standard, such as a limit of the emission of a certain type of pollution, and polluters must meet the standard or face penalties.

<sup>3</sup> For instance, the Pew Research Centre notes of Americans: "Environmental protection draws more support in principle than when the issue of potential costs is raised. Among the public, 71% said the country "should do whatever it takes to protect the environment," according to a January-March 2014 survey. But a smaller majority (56%) said "stricter environmental laws and regulations are worth the cost." Nearly four-in-ten (39%) said tougher environmental laws and regulations cost too many jobs and hurt the economy." See <http://goo.gl/VG8JX9>



# "Green Tape" Explained

The term green tape is generally used to refer to environmental regulations- the environmental counterpart to red tape.

Some have used the term more broadly, to refer to any way in which a process or requirement related to the environment can be seen as a barrier to economic activity -- be it environmental assessment review, environmental regulation or non-regulatory environmental preservation considerations. Those who see green tape as a barrier argue that it can place a burden on the businesses, citizens or governments who must comply with the regulation.

Like any regulation, environmental green tape can be poorly designed and can indeed place a burden on those who must meet its requirements. However, as this analysis and that of others show, well-designed green tape can achieve important environmental objectives at lower cost and with induced innovation.

**Designed well, green tape measures up to scrutiny.**

For the purposes of this Issue Summary, Sustainable Prosperity uses the narrower definition of green tape as environmental regulation.

# Comparing Traditional and Modern Views of Environmental Regulations

A traditional view of environmental regulation frames regulation as detrimental to economic growth, due to the increased private costs imposed by complying with the regulation. From this perspective, firms are assumed to be using their resources at maximum efficiency, and any regulations could only serve to restrict their options, leading to less resource-efficient outcomes. This traditional view leads to a trade-off between the economy and the environment, that is, that a clean environment will only be possible at the expense of economic growth. (Figure 1)

**Figure 1: Traditional View of Environmental Regulation**

**Negative Impact on Business  
due to Compliance Costs**



*Industry*

**Positive Impact on Society  
from a Cleaner Environment**



*Society*

In this view, the main argument against environmental regulations is that those parties who fall under the regulation are negatively impacted because environmental regulations require parties to invest in more inputs for the same level of output. In other words, they have to pay for the use of certain resources that were otherwise once free. Ultimately, those who are regulated are concerned that this process affects their productivity, impacting their competitiveness relative to firms in jurisdictions who do not have to incur compliance costs.

However, research and analysis are increasingly showing a new way of looking at environmental regulation. This more modern perspective of environmental regulations considers the economic benefits that occur when well-designed environmental regulations encourage innovation on the part of those who are regulated. In this view, not only do well-designed regulations address the market failure by encouraging green innovations, these innovations can result in revenue for the regulated firms. There are no trade-offs between the economy and the environment, or between social and private costs, because the rising private costs to meet the regulation are offset by the falling private costs due to innovations spurred by the regulation. (Figure 2)

**Figure 2: Modern View of Environmental Regulation**

Lesser Negative Impact on Business due to Compliance Costs



Industry

Positive Impact on Business from Induced Innovation



Positive Impact on Everyone from a Cleaner Environment



Society

## The Growing Body of Evidence that Green Tape Measures Up

A growing body of research shows that environmental regulations are often on balance of no harm to the economy - and in a growing number of cases, they are beneficial to the economy. For example,

- The Grantham Research Institute on Climate Change and the Environment and the Global Green Growth Institute recently looked at environmental regulations and found that the impacts on employment and productivity are small and transitory, and this is particularly true for the pollution and energy intensive sectors.<sup>4</sup> The report concludes “the available evidence suggests that there is no case to cut back environmental regulations for competitiveness reasons, and seeking only ‘win-win’ solutions with no losers would risk leaving many socially beneficial policies off the table.”

### Regulation & Innovation

**3:** Firms in the Australian oil and gas industry that face environmental regulation are 3 times more likely to self-report the introductions of novel innovations (i.e. new to the whole industry).

**4:** They are 4 times more likely to report introducing innovations relating to their products/services.

<sup>4</sup>Dechezleprêtre, A., & Sato, M. (2014). The impacts of environmental regulations on competitiveness. *Policy Brief, Grantham Research Institute on Climate Change and the Environment, & Global Green Growth Institute*. Retrieved from <http://goo.gl/j04U5l>

- The OECD finds similar results: no evidence of long-term negative impacts to productivity at the macroeconomic, industry or firm levels. Short-term impacts from increasingly stringent environmental policy can lead to long-term increases in productivity in some industries. This study finds evidence for positive impacts in the short term for firms that are technological leaders, while other firms that are less productive may experience negative productivity impacts. Overall, the productivity impacts on the economy are not expected to be large.<sup>5</sup>
- Results from a “Greening Economic Growth” study undertaken through CIGI-INET have similar findings.<sup>6</sup> Most of their analysis finds a significant and positive effect on productivity, so they conclude that it is possible that well-designed and targeted environmental regulations can enhance competitiveness and productivity.<sup>7</sup>

## Regulation & Innovation

**0.3-0.9%:**

The increase in patents (as a proxy for innovation) that comes along with a 10% increase in pollution abatement and control expenditures (as a proxy for green tape), as seen in the European manufacturing sector.

**0.04%:**

The increase in patents that coincides with each \$1 million increase in pollution abatement and control expenditures in US manufacturing.

### Green Tape and Innovation

In 1991, Michael Porter, an economist at the Harvard Business School, published a paper that claimed that well-designed regulation could actually have positive impacts on the economy.<sup>8</sup> The Porter Hypothesis states that properly designed environmental regulations can lead to beneficial innovations, innovations that result in new and better ways of doing things and that bring in revenue – and which ultimately either partly or fully offset the costs of complying with the regulations. Once these technologies are developed, they become a competitive asset for the participating firm in relation to others in the same industry – they can reduce costs by lowering input prices or by increasing the productivity of an industry’s inputs.<sup>9,10</sup> A classic example is Scandinavian firms who early on developed chlorine free pulp bleaching processes and then exported that technology with rising global concerns about dioxins and resulting regulations.<sup>11</sup>

<sup>5</sup> Albrizio, S. et al. (2014). Do Environmental Policies Matter for Productivity Growth? Insights from New Cross-Country Measures of Environmental Policies. OECD Economics Department Working Papers, No. 1176, OECD Publishing. Retrieved from <http://goo.gl/vdnC8w>

<sup>6</sup> Centre for International Governance Innovation (CIGI) and the Institute for New Economic Thinking (INET)

<sup>7</sup> Lanoie, P. (2014). Greening economic growth: How can environmental regulation enhance innovation and competitiveness? Retrieved from <https://goo.gl/mM6ydf>

<sup>8</sup> Porter, M. (1991). America’s green strategy. Scientific American, 264 (4).

<sup>9</sup> Jaffe, A.B. & Stavins, R.N. (1994). The energy paradox and the diffusion of conservation technology. Resource and Energy Economics, 16(2), pp. 91-122.

<sup>10</sup> Barbera, A.J. & McConnell, V.D. (1990). The impact of environmental regulations on industry productivity: Direct and indirect effects. Journal of Environmental Economics and Management, 18(1), pp. 50- 65.

<sup>11</sup> See Coombs, R. (2001) Technology and the Market: Demand, Users and Innovation. Edward Elgar Publishing.

This paper's accompanying Policy Brief on the Porter Hypothesis explores different versions of the Porter Hypothesis through recent case studies from four industries, and finds strong support that environmental regulations induce innovation, with emerging evidence that the more modern well-designed regulations (those that are more flexible and stringent) perform particularly well.

### The Cost of Complying with Green Tape

There has been a persistent argument against environmental regulations on the basis that the compliance costs to regulated firms and industries are too high; however, mounting evidence shows that the cost of complying with environmental regulations are often overestimated – by both regulated industry and by the government imposing the regulation. This is partly because estimating costs is hard – data is limited, scenarios are forecasts. It's also partly because we fail to account for how innovative firms can be. There are also reasons why a regulated firm might provide a cost estimate that errs on the higher end of the range to the regulator.

Looking at cases where analysis has been done to compare prospective and retrospective compliance cost estimates, we find that we're in fact systematically pretty bad at estimating the costs – Estimates of anticipated costs made prior to the regulation's implementation are more often than not much greater – at least double, often as much as 10 times greater (or more). The accompanying Policy Brief on compliance costs provides more detail.

## Overestimating Costs

**30:1**

The ratio of benefits to costs for the 1990 amendments to the US Clean Air Act.

**\$4000**

Dollar value of the cleaner air benefits of these regulations to each affected child's lifetime income from less pollution, fewer sick days, more education and more income.

### Industry's Call for Green Tape

Increasingly, industry associations and individual firms are calling for environmental regulations, particularly regarding carbon pricing. They are doing so for a variety of reasons, such as a need for policy certainty, a desire for a level-playing field, a recognition that it lead to social license, and even a desire for a competitive edge. Both Canadian and global firms and sectors have been part of this movement, as have civil society groups.<sup>12</sup>

<sup>12</sup> See for instance: <http://goo.gl/dTXf93> and <http://goo.gl/22ts4Y> and <http://goo.gl/A64LW0>

## Not to Forget the Environmental Outcomes

While the good news story is that green tape can support rather than restrict economic position, the other side of the win-win is of course that the environment and its ecosystems are sustained. While in this suite of papers we show the economic upside, there is also a growing body of evidence that the benefits of green tape are larger than we have thought – human health and wellbeing benefit much more than we had thought. While we do not include that side of the equation in this work, recent research has shown that pollution costs Canadians at least \$10.5 billion per year (see box below). Environmental regulations that reduce pollution in effect avoid or reduce some of these costs.

### Overestimating Costs

**2.5 to 40:**

The factor by which compliance costs of the Montreal Protocol were overestimated.

**125**

The factor by which administrative costs were overestimated



### What does pollution cost Canada?

The purpose of environmental regulation is to manage environmental degradation and conserve natural resources, including limiting pollution. The costs of pollution are difficult to quantify, but a recent research paper by Smith commissioned by Sustainable Prosperity<sup>13</sup> surveys the literature and finds that in 2014 pollution costs Canadians: \$10.5 billion in lost asset values, \$1.5 billion in lost income, and \$18.8 billion in out-of-pocket expenses for business and governments.

<sup>13</sup> Smith, R. (2014). Pollution in Canada: A Review of the Literature and Initial Estimate of Costs. *Sustainable Prosperity Working Paper*. Retrieved from <http://goo.gl/xg9HxH>



# Resources for the Future's Regulatory Performance Initiative

Sustainable Prosperity compiled this review of retrospective analysis of the compliance costs of environmental regulation and of real-world experience with the Porter Hypothesis, however, other studies have similarly considered the performance of environmental regulation, many of which are referenced throughout this Issue Summary and its two accompanying Policy Briefs. Of particular note is a recent study undertaken by Washington, D.C based Resources for the Future (RFF).

In 2012, a Presidential Executive Order was issued in the United States that encourages identifying and reducing regulatory burdens, including via retrospective analysis. It notes that the regulatory system “must measure, and seek to improve, the actual results of regulatory requirements.”<sup>1</sup> With this important context in mind, RFF has undertaken a work program that explores performance of US environmental regulations.<sup>2</sup>

RFF carried out 9 studies that covered 34 US environmental rules, shedding light on a number of specific regulations, as diverse as energy efficiency standards, water treatment plant performance and rules under the Clean Air Act, while also drawing some cautious generalizations across the studies.

RFF’s research team finds a general rule of thumb that costs are overestimated, along with some evidence that benefits may be overestimated as well (such as when air pollution regulations do not take into account the local environmental impacts). They find examples of lower than expected technology costs, as in the case of standards for household appliances, as well as greater than expected technology costs, as in the case of renewable fuel content regulations, where the baseline assumptions did not include the possibility of extended low fossil fuel prices (fortunately, in this case, policy makers noted the change in regulatory environment and adjusted the rule accordingly.)

Similar to Sustainable Prosperity, RFF concludes with a plea for planning for retrospective analysis from the outset with greater data collection, and a prioritization of which green tape should be analyzed based on policy importance in recognition of the cost and effort of this type of analysis.

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<sup>1</sup> *The White House of the United States of America. Executive Order 13563 “Identifying and Reducing Regulatory Barriers” available at <https://www.whitehouse.gov/the-press-office/2012/05/10/executive-order-identifying-and-reducing-regulatory-burdens>*

<sup>2</sup> *Resources for the Future. “The Regulatory Performance Initiative at RFF” project website available at: <http://www.rff.org/research/collection/regulatory-performance-initiative-rff>*

<sup>3</sup> *“The Real Costs and Benefits of Federal Regulations: An Interview with Richard Morgenstern.” Resources Magazine. Winter 2016. Resources for the Future. Available at: <http://www.rff.org/research/publications/real-costs-and-benefits-federal-regulations-interview-richard-morgenstern>*

Regulatory analysis is currently done before regulations are issued—at a time when much of the analysis is based on unverifiable assumptions.

Retrospective analysis, on the other hand, provides the opportunity to look back and see how rules actually performed, what the goals were, whether they were fully achieved or not, and at what cost.

The broad point is to learn from past experiences and improve future rulemaking.

**Richard Morgenstern**  
Senior Fellow  
Resources for the Future





# Conclusions

Environmental regulations are an important aspect of governments' response to ensuring ecosystems can continue to provide us with natural resources and ecosystem services. When designed properly, environmental regulations can provide both economic and environmental benefits.

- Environmental regulations can be effective incentives to induce innovation in green technologies. These clean technology innovations can work to discourage further development of more polluting technologies, and their economic benefits may even exceed the costs of environmental regulations and contribute to positive economic performance.
- Both industry and government systematically overestimate the costs of complying with environmental regulation. Estimates of anticipated costs made prior to the regulation's implementation are more often than not much greater – at least double, often as much as 10 times greater (or more). A number of reasons cause this – including failing to account for innovation, incentive to overestimate on the part of the regulated entity, and simply the empirical challenge of estimating something unknown.

Well-designed regulations -- ones that are clear, sufficiently stringent and flexible – offer the best prospects for achieving win-win economic-environmental outcomes. Industry is increasingly calling for this type of regulation. Governments should strongly consider their use wherever possible.

However, a consistent finding in our research is there is a lack of analysis that looks specifically at the impacts of environmental regulations in Canada. This lack of evidence may further the traditional view that green tape is detrimental to the economy, because the costs and benefits of environmental regulations are not properly identified. Further research in this area would support good policy and regulatory design and could help to empower governments and other decision-makers.



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