

# Commentary

## Climate Investment, Low-Carbon Innovation and Green Industrial Policy

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### Decarbonization and Radical Transformation

Climate debates are changing. In mid-June 2015, the Pope issued an historic call for urgent action to address climate change. The same month, G7 leaders called for greenhouse gas emissions to be cut by 40 to 70 per cent by 2050, and for the complete decarbonization of the world economy by end of this century.

More surprising than the G7 commitment was the statement of the Saudi oil minister, who, in an interview in the *Financial Times* in June 2015, anticipated that his country—the largest oil exporter in the world—would end all fossil fuel exports by as early as 2040.<sup>1</sup> The energy future, according to the Saudi oil minister, lies in solar and wind.

The Saudi minister is not the lone voice in the energy sector anticipating a dramatic shake-up in global energy markets because of climate change. Among the most noteworthy of the flurry of public statements, petitions and promises is the joint letter from the CEOs from the six largest European oil and gas companies—including BP, Shell and Statoil—urging governments to adopt broad-based carbon pricing.<sup>2</sup>

Such statements are not new, nor is the underlying economic work to support them. But the urgency of these calls is striking.

<sup>1</sup> See <http://www.ft.com/intl/cms/s/0/89260b8a-ffd4-11e4-bc30-00144feabdc0.html#axzz3gSM6j0jc>

<sup>2</sup> See <http://newsroom.unfccc.int/unfccc-newsroom/major-oil-companies-letter-to-un/>.

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Economists have supported the use of fiscal measures to confront environmental externalities for many decades, from early work by Solow (1970), Kneese (1970), Wallace and Oats (1979), followed by Repetto, Wilcoxon, Pearce, Nordhaus and others, as well as decades of work by the Organisation for Economic Co-operation and Development (OECD), the World Bank and others. This extensive literature clearly shows that carbon pricing is the first and best means to shifting markets to reveal climate truths about the extent and consequences of damaging externalities, by costing pollution shift markets to clean energy solutions.

Today, carbon pricing is mainstream in economic thought. For several years, the International Monetary Fund (IMF)—that most cautious and conservative of all international financial organizations—has concluded that carbon pricing (notably a carbon tax) is the most effective means of addressing greenhouse gas emissions.

Whole economic analysis around carbon pricing is not new in theory, but it is finally gaining momentum: approximately 40 countries have some form of carbon pricing, and that number is growing. Yet the cautionary part of this uptake is that the mere existence of carbon pricing is no guarantee that greenhouse gas emissions will be significantly reduced. Put another way, it is not the existence of the policy instrument that matters. Instead, what matters is the level of ambition within each policy instrument chosen. A carbon tax may give the impression of dramatic action, but a low or modest tax rate will



likely have equally modest impacts on emissions in the short term. This is no different from the existence of a cap-and-trade scheme with an underwhelming cap or environmental regulations with weak maximum allowable thresholds.

It is clear from climate science that there is little room left for weak or ambiguous policy measures: all governments have agreed to limit the global temperature increase to 2 degrees Celsius. Therefore, whatever climate measures are adopted need to move from conceptual experiment to bold action. Accordingly, the IMF calls for carbon taxes stringent enough to propel what it calls the “radical transformation”<sup>3</sup> in global energy systems to move beyond fossil fuels toward cleaner, low-carbon energy systems.

### **Ambition Matters More Than Instrument**

Debates about policy choices are important. For example, *The Globe and Mail* recently criticized Ontario’s alignment with the Quebec-California emissions trading scheme, arguing (apparently without irony) that emissions trading is especially vulnerable to regulatory capture, apparently overlooking the thousands of pages of corporate tax loopholes and subsidies that exist in most countries due to the efforts of lobbyists for tax breaks.<sup>4</sup> The simple point is that emissions trading, carbon taxes, regulations or any public policy runs the risk of capture by special interests.

Moreover, carbon pricing faces at least three challenges. First, while economists strongly agree that carbon pricing in general, and carbon taxes in particular, is the best option, the political economy of taxes remains rocky. Simon Upton, the head of the OECD Environment Directorate, recently called carbon taxes the “third rail” in many countries, due to the combined forces of low-tax lobbyists and carbon skeptics.<sup>5</sup> In Canada, the federal government commonly links four words together: “job-killing carbon tax.”

<sup>3</sup> See <http://www.imf.org/external/np/exr/facts/enviro.htm>

<sup>4</sup> *Globe and Mail* (2015, June 19). B.C.’s lesson for Alberta and Ontario. Retrieved from <http://www.theglobeandmail.com/globe-debate/editorials/bcs-global-warming-lesson-for-alberta-and-ontario/article25028188/>. The editorial warns that in Ontario’s cap-and-trade system, the “impulse to mispend-to subsidize well-connected companies, to support favorite industries or to pay for politically popular projects—will be hard to resist.”

<sup>5</sup> Clark, P. (2015, May 27). Climate campaign wins over more senior executives. Retrieved from <http://www.ft.com/intl/cms/s/0/fad8327e-03c8-11e5-a70f-00144feabdc0.html#axzz3gRvVlrf2>. Upton was quoted in the article thus: “Politically, it’s still regarded as a third rail issue: touch it and you are out of office,” pointing to Australia’s repeal of its carbon tax as one example of lobbying efforts by companies against high carbon taxes.

In most countries, domestic climate policies comprise an array of different policy measures, from the many jurisdictions that deploy carbon taxes to varying degrees (notably the European Union and the Quebec-California emissions trading scheme recently joined by Ontario), regulatory approaches to emission reductions used, for example, by the U.S. Environmental Protection Agency (EPA) and Environment Canada, mandatory and voluntary energy efficiency standards, third-party certification systems such as product-specific carbon footprints, renewable energy power targets with lock-in purchasing contracts or renewable portfolio standards, to the greening of public procurement practices that include clean, low-carbon buildings and infrastructure—to name just a few of the mitigation measures in the domestic toolboxes of most countries.

Multiple measures to lower greenhouse gas emissions are used in most countries. The Council of Canadian Academies recently observed that there is not a single “silver bullet” to shrink the environmental footprint of Canada’s oil sands. This also applies to countries: responses to climate mitigation comprise a suite or toolbox of multiple instruments and approaches.<sup>6</sup>

Of greater relevance is ensuring the coherence of different policy choices within countries, as well as thinking carefully about the trade effect of different domestic climate measures with trading partners. Twenty years ago, the World Trade Organization (WTO) signalled the importance of border tax adjustment mechanisms to smooth trade flows between differing domestic environmental standards, while adhering to core principles of national treatment and non-discrimination. Today, work is actively underway to apply those principles related to border tax adjustment within the California-Quebec-Ontario emissions trading scheme.

A second reason why market-based approaches like pricing and taxes remain challenging is that these instruments work when markets work. Yet the sheer magnitude of market distortions and failures in the global energy sector is staggering, leaving aside failures revealed through carbon externalities. Global oil markets are cartelized. Oil companies tend to be oligopolies. The amount of global

<sup>6</sup> Council of Canadian Academies. (2015, May). *Technological prospects for reducing the environmental footprint of Canadian oil sands*. Retrieved from <http://www.scienceadvice.ca/uploads/ENG/AssessmentsPublicationsNewsReleases/OilSands/OilSandsFullReportEn.pdf>



subsidies allocated yearly to distort fossil fuel prices is an estimated USD 550 billion, comprising direct payments to both consumption and production. The IMF recently estimated that the combined cost of these subsidy payments, including externalities, is more than USD 5.3 trillion a year.<sup>7</sup>

There has been progress in exposing fossil fuel subsidies as a first step to eliminating them. For example, at an IISD-hosted meeting of a group of countries called the Friends of Fossil Fuel Subsidy Reform held during the World Bank/IMF annual meetings in April, finance and energy ministers lent their support to a joint communiqué to cut out harmful subsidies.<sup>8</sup> Both the United States and France joined Denmark, Sweden, New Zealand, Costa Rica, Ethiopia and others in pledging to reduce such subsidies. (The Canadian federal government recently noted that eliminating these fossil fuel subsidies was aspirational.)

A third challenge in applying carbon pricing is the need for strong domestic tax and finance institutions needed to design, implement and ensure transparency and compliance with any tax regime. Many countries are hindered by weak tax and finance institutions, which are needed to support well-functioning carbon pricing.

## The Investment Roadmap Ahead

Given distortions within energy markets coupled with other challenges, the recent letter from the six energy company CEOs is newsworthy not because of the reference to carbon pricing (the energy sector has been calling for such action in varying degrees for a decade), but rather because of their reference to the future investment roadmap linked to climate policy choices.

One interpretation of the energy industry's endorsement of carbon pricing is that it will be gradual and be paired with modest tax rates, to enable the orderly transition to lower-carbon energy systems. This raises a key question: is carbon pricing sufficient to move markets towards the kind of radical transformation the IMF and so many others endorse? According to the OECD, the answer is no: carbon taxes are important in prompting incremental

change in energy markets, but are not enough to propel transformative change that drives innovation towards nurturing and scaling up clean, low-carbon energy systems.<sup>9</sup>

Hence, an alternative and much blunter option than market-based incremental changes is the growing focus on carbon divestment. Climate divestment began within Western universities, with students demanding that university endowments drop all of their investment in carbon assets. Divestment continues to grow, to the point that Oxford University recently had to explain why they were not unloading all their carbon-based assets.<sup>10</sup> And divestment is accelerating beyond universities: in 2014, for example, the Rockefeller Brothers Fund announced their divestment of all fossil fuel assets.<sup>11</sup>

Proof of the mainstream push for divestment is the recent statement by Mark Moody-Stuart, who, as a former Chairman of Shell, characterized carbon divestment as the “rational approach” to keep within the 2 degree C temperature increase envelope. His comments startled markets and have given pause to those who dismissed divestment outright.<sup>12</sup>

This shift in focus from market pricing to investment pressure is accelerating. In 2014 Governor Mark Carney of the Bank of England argued that coal and other fossil fuel assets could not be burned if global temperature increases are to be kept to the 2 degree Celsius increase. It was not an off-the-cuff comment. Carney clarified his comments in a letter to a U.K. Parliamentary Committee Chair, in which he described the bank's comprehensive inquiry to identify financial stability risks linked to stranded fossil fuel assets.<sup>13</sup> In 2015 the bank reiterated that stranded fossil fuel investments could be especially disruptive to the global insurance sector.<sup>14</sup>

<sup>9</sup> OECD. (2011). *Fostering Innovation for Green Growth*. Paris: OECD.

<sup>10</sup> Carrington, D. (2015, May 15). Oxford University rules out investing in coal and tar sands. Retrieved from <http://www.theguardian.com/environment/2015/may/18/oxford-university-rules-out-investing-in-coal-and-tar-sands>

<sup>11</sup> Rockefeller Brothers Fund. (2015). Why the fund decided to divest from fossil fuels. Retrieved from <http://www.rbf.org/post/why-fund-decided-divest-fossil-fuels>

<sup>12</sup> Carrington, D. (2015). Fossil fuel divestment is rational, says former Shell chairman. Retrieved from <http://www.theguardian.com/environment/2015/jun/04/former-shell-chairman-advocates-fossil-fuel-divestment>

<sup>13</sup> Mark Carney, Letter of 30 October 2014 to the Chair of the Environmental Audit Committee; Bank of England, Prudential Regulation Authority.

<sup>14</sup> “Confronting the challenges of tomorrow's world.” Speech given by Paul Fisher, Deputy Head of the Prudential Regulation Authority and Executive Director, Insurance Supervision, Bank of England, March 3, 2015.

<sup>7</sup> Coady, D., Parry, I., Sears, L., & Shang, B. (2015). *How large are global energy subsidies?* Retrieved from <http://www.imf.org/external/pubs/ft/wp/2015/wp15105.pdf>

<sup>8</sup> IISD. (2015, April 17). Communiqué in support of fossil fuel subsidy reform launched in Washington. Retrieved from <https://www.iisd.org/media/communique-launch>



The game changer came in late May 2015, when the parliamentary committee that has been examining the fossil fuel-related assets of the Norwegian sovereign wealth fund—the largest in the world with of current value of approximately USD 900 billion—voted to divest that fund of all coal assets.

## Industrial Policy and Innovation

A third option between incremental—and thus insufficient—market-based measures and the sudden jolts associated with divestment is industrial policy dedicated to clustering and scaling up technical innovation needed to realize low-carbon energy systems.

Industrial policy clearly has had a bad rap. Yet industrial policy is alive and well not only in Europe (notably the Nordic countries), but also in China (for example, state-owned enterprises broadly and the huge jump in renewable technologies specifically), Chile (with support to the successful expansion of salmon, grapes and other exports), Brazil (aircraft) and elsewhere.<sup>15</sup> Clearly, industrial policy has a tarnished reputation: the hackneyed expression that governments are unable to pick winners and remain anchored to losers is now a standard retort to industrial policy. Dani Rodrik views industrial policy from a different lens: not the ability to pick winner, but “the capacity to let losers go.”<sup>16</sup>

## Coherence and Policy Space

Industrial policy typically entails a suite of tools that differ within and between sectors and countries. The industrial policy menu is diverse. Roughly 50 countries employ policies that include research and development, partnerships with universities, tax treatment including special tax breaks to industry for certain technology choices, concessional lending, patent and intellectual property systems to provide time-limited protection, and a range of lock-in contracts such as feed-in tariffs for renewable energy systems.

Based on an extensive literature survey, Harrison and and Rodriguez-Clair (2010)<sup>17</sup> find that there is an important

<sup>15</sup> Rodrik, D. (2010). The return of industrial policy. Project Syndicate. Retrieved from <http://www.policyinnovations.org/ideas/innovations/data/000165>

<sup>16</sup> Ibid.

<sup>17</sup> Ibid.

<sup>17</sup> Harrison, A. and Rodriguez-Clair, A. (2010). Trade, foreign investment, and industrial policies for developing countries. In Rodrik, D. and Rosenzweig, M. (eds.), *Handbook of development economics*. North-Holland

role for “soft” industrial policy, whose goal is to develop processes for government, industry and cluster-level private organizations to collaborate on interventions that increase productivity and improve systems for enhancing policy impact and linking production to markets. The shift is to directly address coordination problems that keep productivity low for domestic producers, and limit their innovative capacities or abilities to link up with new technologies.

Industrial policies largely exist to support strategic cooperation between public policy and private markets towards a common objective. Economists like Ha-Joon Chang have argued that, while once used by industrialized countries to accelerate their economic growth, industrial policies have been either discouraged or deemed to be incompatible with international rules like free trade agreements. However, it is clear from WTO jurisprudence that there is little overt collision between national industrial policy and trade liberalization rules, as long as due process combined with relevant national treatment and non-discrimination principles are adhered to. However, the new generation of mega-regional trade agreements, like the Trans Pacific Partnership, may offer less room for industrial policy than currently provided by the WTO. Nonetheless, even these agreements will still provide several industrial policy options that could be used to achieve most of the requisite objectives, especially with respect to co-ordination, removing systemic constraints, and providing assistance to improve technical and productive capacities. To some extent, however, to further encourage policy towards green technologies, the global system may need to provide additional policy space such as was done for certain green subsidies under the WTO’s Uruguay Round Agreement on Subsidies and Countervailing Measures.

## A Serious Debate about Climate Industrial Policy

Policy coherence and policy space matter, as does money to sustain and amplify start-up innovation. In this regard, public finance linked to industrial policy is critically important to spur green innovation in the same way venture capital is important more broadly in markets. Rodrik notes that the U.S. Department of Energy alone has provided USD 40 billion in loan guarantees to



accelerate a range of green technologies such as wind turbines, solar technologies, the electric car and other technologies.<sup>18</sup> Sustainable Development Technology Canada, supported with more than CAD 900 million in federal funding, similarly provides venture capital to support pre-commercialization development of clean technology options. In Alberta, the Climate Change and Emissions Management initiative similarly provides start-up capital to promising clean technologies, with more than CAD 400 million in funding from the carbon-intensity tax imposed by the provincial government on major greenhouse gas emitters.

One example of new approaches to Canada's climate challenge is offered by Brendan Haley, who suggests that the transition to a low-carbon economy will require overcoming structural rigidities within energy markets that hinder innovation. Compared to other sectors, the oil, gas and coal sectors are significantly less innovative, when measured by standard indicators like research and development expenditures.<sup>19</sup> Haley argues that the

structure of most energy sectors is less conducive to transitional innovation because of various rigidities such as long-term start costs, and high capital-intensive fixed costs including a dependence on large-scale infrastructure networks. Haley thus argues that climate debates need to turn towards the opportunities to link Canada's lead in a number of low-carbon energy systems with its existing industrial structures. Linkages could be forged between structurally rigid and capital-intensive systems (like hydro) and more networked and modular energy innovations like electric vehicles and wind.

Rodrik argues that a "serious debate about the design of industrial policy would bring it out of the shadows and allow it to be carried out in an explicit manner." The time to begin that serious debate is now, as countries look beyond the next Conference of the Parties in Paris to translate emission reduction targets into on-the-ground implementation efforts that accelerate clean innovation.

<sup>18</sup> Rodrik, D. (2010). *The return of industrial policy*. Project Syndicate. Retrieved from <http://www.policyinnovations.org/ideas/innovations/data/000165>

<sup>19</sup> Haley, B. (2014). *Exploring low-carbon energy transitions in Canada: Natural resource staples, the carbon trap and innovating from a hydroelectric base* (Ph.D. thesis), University of Ottawa.