A STUDY OF POSSIBLE IMPOSITION OF CARBON TAXES IN INDONESIA

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Abstrak

Makalah ini menggali kemungkinan pilihan kebijakan dan argumentasinya bahwa pajak karbon merupakan cara paling efektif yang telah diterapkan di berbagai negara untuk mengurangi emisi. Pajak karbon adalah pajak yang dikenakan atas emisi sejumlah karbon dioksida. Dalam bentuknya yang paling sederhana, pajak karbon dikenakan pada bahan bakar fosil, pada beberapa titik transaksi sebelum pembakaran, dengan menerapkan jenis pajak penjualan dengan basis pajak berdasarkan pada kandungan bahan bakar karbon. Karbon dioksida adalah emisi gas rumah kaca yang paling melimpah, dan idealnya suatu instrumen kebijakan basis pajaknya akan mencakup semua emisi gas rumah kaca, pengaturan emisi karbon dioksida dari bahan bakar fosil adalah aspek terpenting untuk mengendalikan emisi gas rumah kaca. Karena karbon dioksida adalah emisi gas rumah kaca yang berumur paling lama, yang tersisa di atmosfer selama lebih dari seabad setelah emisi, penting untuk segera menerapkan Pajak Karbon sebagai salah satu upaya untuk mendukung kehidupan manusia secara berkelanjutan dengan memitigasi risiko perubahan iklim. Pajak karbon adalah bagian fundamental dari kegiatan ekonomi dalam menghadapi tantangan terbesar perubahan iklim melalui instrumen perpajakan. Makalah ini merekomendasikan penerapan pajak karbon untuk bahan bakar fosil, diperluas dengan memasukkan beberapa sumber lain dari emisi gas rumah kaca ke dalam basis pajak yang telah berlaku seperti Pajak Pertambahan Nilai dan Cukai atas obyek tertentu, Pajak Kendaraan Bermotor, Pajak Bahan Bakar Kendaraan Bermotor dan Pajak Konsumsi Listrik (Pajak Penerangan Jalan) yang relatif mudah dalam implementasinya.

Kata kunci: Perubahan iklim, emisi, gas rumah kaca, karbon dioksida, pajak karbon.

I. INTRODUCTION

Global climate change has become the dominant environmental issue of our time. The "greenhouse effect," or the trapping of heat from the sun as it bounces off the Earth's surface, keeps heat within the Earth's atmosphere instead of allowing it to radiate back into space. "Greenhouse gases" such as carbon dioxide trap this heat, and in fact play a vital role in regulating the Earth's temperature. But this regulatory mechanism preserves a delicate balance, one that has been disturbed by the carbon dioxide emissions from the burning of fossil fuels. The Earth can only absorb so much carbon dioxide, it appears, and the excess emissions that have been accumulating since the onset of the Industrial Revolution have increased the Earth's temperature, threatening to disrupt life for an entire planet that has gotten used to very specific climatic conditions. Adapting to climate change is a relatively

new topic for Indonesia citizens, who have only recently become fully aware of the implications of changes in the Earth system that will result from having more heat trapped in the oceans and the atmosphere. In recent years, some states, cities, and sectors have begun to make plans to adapt to current and anticipated changes in the climate system. Some "early adopters" have focused primarily on limiting greenhouse gases (GHGs). Others, however, are also addressing ways to limit impacts of the anticipated changes, recognizing that regardless of efforts to limit emissions, adaptation is required now and will become even more important in the coming decades. Although planning for adaptation is still in its infancy, there is a groundswell of interest in moving forward quickly to avoid future impacts of climate change.

Advising the nation on how to prepare for the impacts of climate change is especially daunting in a country with so much geographic and economic diversity and so many private- and public-sector decision makers. The challenges associated with multiple regions, sectors, scales, and time frames have made this a difficult assignment, and in the end, our panel has concluded that is not possible to provide a list of actions to be taken now to adapt in each region and sector. As has been noted by many researchers and practitioners, adaptation is fundamentally implemented at local and regional levels and needs to consider the socioeconomic and political factors. Priorities regarding "what to do" need to be set in decision contexts relative to other important priorities faced by society and resource managers. Vulnerability associated with climate change is based on underlying social and ecological stresses, and these stresses tend to vary dramatically from place to place. Degrees of vulnerability are not directly connected to wealth, but certainly a lack of financial capacity is highly correlated with a reduced number of options for adaptation. In this report, our panel emphasizes that adaptation decisions need to be made in the context of promoting long-term sustainability objectives, including social, economic, and ecological welfare rather than focusing only on the short-term outcomes that may be more politically and economically expedient. Although many ideas are available about ways to adapt to climate variability and change, few of these options have been assessed for their effectiveness under projected future climate conditions and for their potential interactions across sectors and with other stressors. Little attention has been given to the processes that decision makers might use to make appropriate adaptation decisions.

Because impacts of climate change are already being observed in many countries and elsewhere in the world, and because these impacts will increase in severity even if GHG emissions are reduced substantially in the near term, Indonesia needs to improve its ability to adapt to impacts of climate change. Concerns about these impacts are generating increasing interest in adaptation and wide-ranging discussions about potential actions that might be taken by individuals, sectors, cities, and government.in some cases without sufficient information about the options that are available. Considering the range, and in some instances the severity of climate change risks, it seems clear that capacities currently available for adaptation at the local and state levels are inadequate to address risks to health, well-being, property, and ecosystem services in many regions of Indonesia. To reduce greenhouse gas emissions, many studies recommended five main options: (1) a carbon tax (2) traditional environmental regulation, sometimes referred to as "command-and-control" regulation, (3) "cap-and trade" programs in which allowances to emit are allocated and freely traded, and (4) government subsidies targeted at low-carbon technologies and processes; (5) The government limit or prohibit selected industries including vehicles which produce significant negative externalities or GHG emissions. Again, many other ideas and combinations of ideas are a part of the wide climate change discourse, but in order to focus in on the advantages and disadvantages of the carbon tax as a fundamental approach, this book frames the discussion in the context of the main alternative policy approaches.

II. CARBON TAXES

A **carbon taxes** are taxes levied on the carbon content of fuels. It is a form of carbon pricing. Carbon is present in every hydrocarbon fuel (coal, petroleum, and natural gas) and converted to carbon dioxide (CO2) and other products when combusted. In contrast, non - combustion energy sources wind, sunlight, geothermal, hydropower, and nuclear do not convert hydrocarbons to CO2. CO2 is a heat-trapping "greenhouse" gas which represents a negative externality on the climate system (see scientific opinion on global warming). Since GHG emissions caused by the combustion of fossil fuels are closely related to the carbon content of the respective fuels, a tax on these emissions can be levied by taxing the carbon content of fossil fuels at any point in the product cycle of the fuel.

A carbon tax targets fossil fuels, by far the greatest contributors to carbon dioxide emissions and to global climate change in developed countries—about 60 percent in Indonesia. The nature of the three primary fossil fuels—coal, natural gas, and oil—is such that the carbon content is generally known or easily ascertainable once it is extracted and placed into the stream of commerce, and so a carbon tax based on carbon content can be easily established. This means that a carbon tax will generally track the actual quantity of carbon dioxide emitted, avoiding economic distortions that occur when there is a mismatch between the tax and the damages from emissions. This will also be true of a cap-and-trade program that assigns allowances based on carbon content. Regulating or taxing fossil fuels has the advantage of being attachable to a global paper trail, which is initiated whenever a fossil fuel is extracted almost anywhere in the world. A carbon tax can be levied at several points, from the early extraction or processing point (upstream) Climate Change Policy Alternatives right up to the point immediately preceding combustion before the carbon dioxide is released (downstream), or points in between. In many developed countries, the tax is generally collected relatively downstream, and every firm or "person" (in the broad legal sense) that sells or imports a fossil fuel is required to collect a carbon tax by a specified amount. In 2008, the carbon taxes was first levied in British Columbia, Canada at the amount of about $10 per ton (Cdn) of carbon dioxide, increasing over five years to $30 per ton (Cdn) (Duff, 2008). The original statute actually listed, in a detailed schedule, each of the twenty fossil fuels, and the carbon taxes amount for each of the fossil fuels, as a dollar amount per liter, ton, or cubic meter, depending on the fossil fuel and how it is commonly denominated. The carbon taxes was explicitly listed for each fossil fuel for each of the five years in which the carbon taxes would be phased in, up to 2012, when the carbon taxes actually reaches $30 per ton (Cdn). In terms of tax collection, the carbon taxes essentially deputizes every fossil fuel retailer as a tax collector, requiring the collection of the tax at the retail sales level. For example, gasoline retailers—fueling stations—are required to collect the carbon taxes at the fuel pump. Of course, gasoline retailers are already required to collect a variety of other provincial and federal taxes at the fuel pump, so the administrative burdens of collecting the carbon taxes are trivial. Similarly, the dominant natural gas supplier in British Columbia, Terasen, simply adds the carbon taxes onto customers' bills. Of course, carbon taxes can be designed and administered in any number of ways, so the British Columbia experience is not necessarily indicative of how a government would implement. But the British Columbia case is illustrative, demonstrating how a carbon price can be adopted and carried out with relative ease, again, building upon a well-established tax collecting infrastructure. Carbon dioxide is emitted in a variety of nonfossil processes, as are a number of other greenhouse gases. According to a study by Climate Change Science Program (2003), an expanded carbon taxes that covers some non fossil carbon dioxide emissions and also some of the other greenhouse gases could, at relatively little cost and administrative burden, cover as much as 90 percent of all greenhouse gas emissions in the United States.

To sum up, a carbon tax is for the most part a tax on consumption— mostly consumption of fossil fuels that lead to the emission of carbon dioxide. A slightly expanded carbon taxes would also tax emissions of a small number of other sources of emissions, both carbon dioxide emissions from non fossil sources, and emissions of other greenhouse gases. Apart from these non-fossil emissions, a carbon taxes are levied by some governmental authority at some transaction point at which ownership of a fossil fuel changes hands. Thus, superficially, a carbon taxes seems to most resemble other consumption taxes, such as a sales tax or a gasoline tax..

The case for a carbon taxes in OECD countries are strong. A well-designed carbon taxes could efficiently reduce the emissions that cause climate change encourage innovation in cleaner technologies, and cut other pollutants. The resulting revenue could finance income tax reductions, spending priorities, or deficit reduction policies that could offset the tax's distributional and economic burdens, improve the environment, or otherwise improve Indonesians' well-being. A carbon taxes could thus help us build a cleaner, more efficient economy. But moving a carbon taxes from the whiteboard to reality is challenging. A tax that works well in principle may stumble in practice. A real carbon taxes will inevitably fall short of the whiteboard ideal. Practical design challenges thus deserve close attention. To help policymakers, analysts, and the public evaluate those challenges, this Academic Report examines the what, why, and how of implementing a carbon taxes and using the revenue it would generate.

The challenge for any effort to reduce climate change is that emissions come from millions of sources and activities. For this reason, setting emission limits on individual sources, mandating specific technologies, or establishing other direct regulations will be difficult and needlessly costly. Piecemeal regulations can reduce emissions, but even the best-intentioned approaches under control some sources, over control others, and overlook still others. Moreover, direct regulation does little to reward innovation beyond regulatory minimums

Thus, market-based approaches that place a price on emissions are particularly attractive for combatting climate change. Establishing such a price would allow the market to do what it does best: encourage consumers and businesses to reduce emissions at the lowest cost and provide an ongoing incentive for innovators to develop new ways to reduce carbon emissions. Policymakers could establish a price on emissions—for short, a price on carbon—by levying a tax or by setting a limit on emissions and allowing trading of emission rights. These two approaches have much in common. By putting a price on carbon, both a tax and a cap-and-trade system harness market forces to reduce emissions as efficiently as possible.

Carbon taxes offers social and economic benefits. It is a tax that increases revenue without significantly altering the economy while simultaneously promoting objectives of climate change policy. The objective of a carbon taxes is to reduce the harmful and unfavorable levels of carbon dioxide emissions, thereby decelerating climate change and its negative effects on the environment and human health.

Carbon taxes offer a potentially cost-effective means of reducing greenhouse gas emissions. From an economic perspective, carbon taxes are a type of Pigovian tax (1920). They help to address the problem of emitters of greenhouse gases not facing the full social cost of their actions. Carbon taxes can be a regressive tax, in that they may directly or indirectly affect low-income groups disproportionately. The regressive impact of carbon taxes could be addressed by using tax revenues to favor low-income groups. A common economic prescription for reducing pollution is the imposition of a "Pigouvian" tax, named for the economist Alfred Pigou. A Pigouvian tax is a unitary tax levied to make an emitter

pay for the externalities caused by its emissions—no more, no less. A carbon taxes could be a Pigouvian tax. In theory, a Pigouvian carbon taxes would be set at a level equal to the marginal damages of the emissions of a ton of carbon or carbon dioxide.2 That is, the tax would be such that it mimicked a payment for the increment of damage—the marginal damage, caused by each individual ton of carbon dioxide. If this calibration could be achieved, a Pigouvian tax would induce just the right amount of carbon dioxide emissions reductions. Further reductions would cost too much (more than would be saved in terms of environmental damages), and lesser reductions would be too environmentally harmful (more costly than further reductions would cost). No value judgments are made in levying Pigouvian taxes; the only goal of a Pigouvian tax is to achieve an economically efficient outcome. Punitive damages and moral judgments are completely outside of the realm of Pigouvian taxation (1920).

Few pollutants are as well suited for Pigouvian taxation as carbon dioxide. Most individuals in the world, even in poor countries, contribute by burning something that produces carbon dioxide. It is thus difficult to demonize emitters as immoral, since the production of carbon dioxide is so widespread. Some toxic pollutants are dangerous enough that allowing polluters to "pay to pollute" is discomforting. Not so with carbon dioxide: while the massive buildup of carbon dioxide poses grave threats to the Earth, no emitter in the world emits enough to pose any immediate threat. Some pollutants are difficult to measure as they are emitted from a smokestack or tailpipe. Not so with carbon dioxide: at least with respect to fossil fuels, measuring the amount of carbon dioxide emitted is trivial, as the carbon content of almost any fossil fuel is known when it is extracted. Finally, some pollutants cause more damages in some places rather than others, and at some times more than others. Not so with carbon dioxide: carbon dioxide emitted anywhere on Earth and at any time makes the exact same marginal contribution to the climate change problem. The problem with the Pigouvian taxation of carbon dioxide is that there is a great deal of controversy over estimates of the marginal damages of carbon dioxide emissions. Efforts to estimate the marginal damages of carbon dioxide emissions are complex, varied, and controversial. A plethora of modeling issues and assumptions make huge differences in marginal damages estimates. A 2005 survey of marginal damages studies by Richard Tol found a range of estimates from zero to more than one thousand dollars per ton. More recently, a study by William Nordhaus estimated the marginal social damages at about $7.50 t/CO2.Amuch higher estimate was obtained in the UK government– commissioned Stern Review, by Nicholas Stern (, a former chief economist of the World Bank, which estimated current marginal damages at about $85/tCO2.

III. CARBON TAXES PRACTICE IN VARIOUS COUNTRIES

A number of countries have implemented carbon taxes or energy taxes that are related to carbon content. Most environmentally related taxes with implications for greenhouse gas emissions in OECD countries are levied on energy products and motor vehicles, rather than on CO2 emissions directly. Opposition to increased environmental regulation such as carbon taxes often centers on concerns that firms might relocate and/or people might lose their jobs. It has been argued, however, that carbon taxes are more efficient than direct regulation and may even lead to higher employment. Many large users of carbon resources in electricity generation, such as the United States, Russia, and China, are resisting carbon taxation.

A straightforward primer on carbon pricing systems in 1990, Finland started taxing emissions from heat and electricity production, later also targeting heating and transportation fuels. It was the first country in the world to put a price on greenhouse gas (GHG) emissions, and other countries, provinces and states followed suit, among them

Sweden and Norway (1991), British Columbia (2008) and more recently Chile, France and South Africa. In 2005, another milestone in "carbon pricing" (so-called because the majority of human-caused GHG emissions are carbon dioxide): the European Union's Emission Trading System became the first cap-and trade program designed to reduce heat-trapping pollution. Its current broad goal is a 20 per cent reduction in 1990 emissions levels by 2020. Other variations on cap-and-trade have appeared since. One such program is the Western Climate Initiative, which currently sees Quebec and California trading emissions permits, and in September 2015, China, the world's largest polluter, announced a nationwide emissions-trading program that's set to begin in 2017. Whether by taxing emissions, putting a hard cap on an economy's overall release of GHGs or operating some kind of hybrid of those systems, carbon pricing puts a measurable deterrent — economic cost — on every tons of carbon we put into Earth's atmosphere. The top goals of carbon pricing are always the same: curb pollution at the lowest possible cost and work to limit emissions-exacerbated climate change, in order to reap long-term benefits for our environment, our health and our economies.

Inhabitant tax comprises tax on income and per capita equalization tax and is assessed by both prefecture and municipalities (Tokyo metropolis and special wards in the case of Tokyo). Each municipality is responsible for the administration of these taxes. Local inhabitant tax on income is levied on income of a resident taxpayer. A non-resident taxpayer is not subject to inhabitant tax on income. Inhabitant tax is assessed on the income of an individual if the individual is a residential taxpayer as of 1 January in the next year. This means that income from the year during which the taxpayer leaves Japan permanently (technically becoming a non-resident taxpayer) is not subject to inhabitant tax on income.

In the last decades, many countries have implemented various measures on taxation, including the introduction of Tax for Climate Change Mitigation (so-called carbon taxes) and greening vehicle taxation. However, several countries such as Japan, the CO2 emissions from energy use reached a record 1.224 billion tons in FY2013. Japanese government is expected to mobilize every possible means in order to reduce CO2 emissions and taxation policy is one of the tools effective for this purpose. Therefore, to suggest future direction of greening Indonesia's taxation system, we compared environmental taxes in several EU countries (Finland, Denmark, Germany and the UK), which are environmentally-advanced countries on taxation. Firstly we summarized the latest trend of environmental taxes in Indonesia then compared it with experiences in EU countries. For energy taxes, tax rates on fuels in Indonesia are lower than those of EU countries and, in all the four EU countries, tax rates on fuels have been raised year by year but in Indonesia, for example, gasoline tax rate has been stable since 2010. When it comes to carbon taxes, differences between Indonesia and EU countries are tax rates and use of revenues. In Indonesia, carbon taxes has not been implemented, but implicitly inserted in several types of local taxes such as vehicle Tax relatively lower than EU countries and tax revenue goes into special account and the revenue is used for promoting renewable energies and so on, while in EU countries, all the revenues go into the country's general budget. Thus in Indonesia, emissions reduction effect of putting price on carbon has not yet taken into consideration through taxation system. For vehicle taxes, tax bases of Indonesia's vehicle taxes are acquisition price, weight of vehicles, etc., which is different from EU countries; fuel efficiency. Thus Indonesia's vehicle taxes are not functioning as a driver to promote purchasing more energy efficient vehicles. Based on the results of these comparisons, we expect the Government of Indonesia to put higher price on fuel consumptions to track the international trend of carbon pricing and thus reduce energy consumption, and to introduce CO2-based vehicle taxes to increase the share of environmentally friendly vehicles in Indonesia. Carbon dioxide is one of several heat-trapping greenhouse gases (GHGs) emitted by humans (anthropogenic GHGs). The scientific consensus is that human-induced greenhouse gas emissions are the primary cause of global

warming, and that carbon dioxide is the most important of the anthropogenic GHGs. Worldwide, 27 billion tons of carbon dioxide are produced by human activity annually. The physical effect of CO2 in the atmosphere can be measured as a change in the Earth-atmosphere system's energy balance – the radiative forcing of CO2. Carbon taxes are one of the policies available to governments to reduce GHG emissions. In the Kyoto Protocol (an international treaty), CO2 emissions are regulated along with other GHGs. Different GHGs have different physical properties: the global warming potential is an internationally accepted scale of equivalence for other greenhouse gases in units of tons of carbon dioxide equivalent.

A carbon tax is a form of explicit carbon pricing directly linked to the level of carbon dioxide emissions. While a maximum level of emission reductions is not guaranteed, a carbon tax is a cost- effective economic instrument. Fourteen countries are implementing or have passed legislation on a direct carbon taxes. One sub-national jurisdiction (British Colombia) has been implementing a carbon tax since 2008. The effective carbon rate (ECR) is the sum of carbon taxes, specific taxes on energy use (mainly excises), and tradable emission permit prices, expressed in EUR per tons of CO2-emissions. It is the price on carbon emissions that energy users face as a result of market-based policies that increase the relative price of energy. The OECD has estimated the ECR for 41 countries, covering around 80% of global energy use and global CO2-emissions in 2012. Global energy use is expected to grow strongly as the world economy grows. The need to abate CO2-emissions from energy use to limit the costs of climate change is therefore clear. Energy is an input into a wide range of consumption and production activities. Energy comes at a cost, so users have an interest in containing energy use, for example by investing in energy-efficiency as long as that costs them less than paying for additional energy use. However, the social interest in containing energy use outstrips energy users' private interests, because energy use has negative side effects that matter to society but that are not reflected in pre-tax prices of energy use, including emissions of local air pollutants and CO2. Policy intervention is required to induce energy users to take these negative side effects into account in their decisions on how much and what form of energy to consume. Policy instruments that "make polluters pay" are very effective at accomplishing this task, because they achieve a better alignment of the polluters' and the social interest; see OECD (2018). Price-based or market-based policies can take the form of taxes or emissions trading systems. For CO2, controlling the level of emissions at any one particular point in time is less critical than controlling the stock over time. In addition, decarbonisation will require long-term investments in emission reduction technologies and infrastructure, which will be undertaken in response to credible and stable price signals. Taxes are well-adapted to these circumstances. Where smooth markets are feasible and not too costly to obtain, and where price volatility can to some extent be managed, emissions trading mechanisms can also perform well.

Table 1 : Milestones in Adoption of Carbon Taxes

1990	**Finland adopts first carbon tax; Poland carbon taxes**
1991	**Sweden carbon taxes ; Norway carbon taxes**
1992	**Denmark carbon taxes**
1995	**Latvia carbon taxes**
1996	**Slovenia carbon taxes**
2000	**Estonia carbon tax**
2008	**Switzerland carbon tax; British Columbia carbon taxes**
2010	**Ireland carbon taxes; Iceland carbon taxes** **India Clean Environment Cess**
2012	**Australia Carbon Pricing Mechanism**
2013	**United Kingdom Carbon Price Floor**

2014	**France carbon taxes; Mexico carbon taxes** **Australia Carbon Pricing Mechanism repealed**
2015	**South Africa publishes Carbon taxes Bill; Portugal carbon taxes**
2016	**Canada announces national Carbon Price Floor**
2017	**Alberta carbon taxes ; Chile carbon taxes** **Colombia carbon taxes' Singapore carbon taxes announced**

Source: World Bank, 2017. Carbon Tax Guide a Handbook for Policy Makers MARCH 2017

- Case of United Kingdom

A carbon tax is a fee for making users of fossil fuels pay for climate damage their fuel use imposes by releasing carbon dioxide into the atmosphere, and for motivating switches to clean energy. Because CO2 is released in strict proportion to the fuel's carbon content, the carbon taxes can be levied "upstream" on the fuel itself when it is extracted from the ground or imported.

The United Kingdom's Climate Change Levy (CCL) began in 2001 and applies to energy used by industries, businesses, and the public sector. The CCL is linked to climate change agreements (CCAs), under which energy-intensive businesses are eligible to receive a 65% discount on the CCL (increased to 90% in 2013) if they meet energy efficiency or carbon reduction targets. The CCAs have been controversial, with some arguing that the agreements helped win management support for energy-saving investments and others arguing that the agreement targets were too weak and captured many actions that would have happened anyway (IEEP 2013).

Many people worry that global warming due to accumulations of greenhouse gasses in the atmosphere will impose significant costs on the world economy in future years. Frustration with the lack of carbon use restrictions nationally has led to a push at the Sub-National Governments level to limit greenhouse gas emissions.

A carbon fee/tax is a simple and transparent way to create a price for emitting carbon dioxide (and possibly other greenhouse gases) to the atmosphere. Such a fee/tax would support the state's other policies that contribute to meeting the mandates of the Global Warming Solutions Act (GWSA) of 2008 and the roadmap set by the Massachusetts Clean Energy and Climate Plan for 2020. These documents require the state to reduce its greenhouse gas (GHG) emissions to 25% below the 1990 level by 2020 and to at least 80% below 1990 by 2050.

The CPF (the carbon price floor) is designed to provide an incentive to invest in low-carbon power generation by providing greater support and certainty to the carbon price in the UK's electricity generation sector. The changes to the tax point create certainty and simplify the administration of the carbon price support (CPS) rate for coal. They also provide clarification about who is liable to pay the tax where the owner of the input fuel and the generator are not the same person. The changes relating to the taxation of non-CHP (combined heat and power) generators and CHPs remove anomalies in tax treatment and ensure a continued benefit from maximizing efficiency under the CHP Quality Assurance (CHPQA) Programmed.

Legislation will be introduced in Finance Bill 2013 to amend the changes to Schedule 6 made by Finance Acts 2011 and 2012. In the interests of transparency and clarity, the legislation will be consolidated into a new schedule. Two statutory instruments will be laid in spring 2013 and come into force on 1 April 2013. The Climate Change Levy (General) (Amendment) Regulations 2013 will amend the general regulations to enable HM Revenue and Customs (HMRC) to administer the CPS rates of CCL, including the reliefs. The

Hydrocarbon Oil Duties (Reliefs for Electricity Generation) (Amendment) Regulations 2013 will amend the 2005 regulations to adjust the amount of fuel duty that can be reclaimed by those generating electricity using oils (in effect creating CPS rates of fuel duty). The changes will also ensure that oils used in a CHP to produce heat will continue to be fully reclaimable.

Tax point and taxable person the changes clarify when a supply takes place for the purposes of the CPS rates of CCL and who has to register and account for those rates (the taxable person) to HMRC. The supply of coal, natural gas or LPG to a generator with a generating capacity above 2 megawatts (MW) will continue to be exempt from main rates of CCL when the fuel is to be used for generating electricity. However, a supply will be deemed to take place for the purposes of the CPS rates of CCL (the deemed supply) upon delivery of the fuel to the generating station or site of CHP scheme. The taxable person will be the owner of the generating station in the case of a non-CHP generator and the operator in the case of a CHP generating station. Coal or LPG delivered to a generating station before 1 April 2013 will not be taxable as a result of these changes.

Climate change is an environmental challenge that will affect everyone globally. Producers of greenhouse gases have rarely been held accountable for the costs of their emissions. This is further complicated by the fact that these costs will only become apparent in the future. Climate change is an example of a market failure because the costs of GHG emissions are not reflected in the final prices of goods and services. Unlike many local market failures, a "tragedy of the commons" situation arises since the effects of climate change transcend boundaries of the particular nation state to which accrues the benefit of carbon consumption, while the costs are borne by the entire globe at various intensities.

Regulations or market-based instruments are needed to correct this market failure by affecting decisions taken by producers and consumers. Policies to restrict GHG emissions and/or promote reductions fall into two categories: command-and-control and market-based approaches.

Climate change levy (CCL), is a levy on the business use of certain supplies of energy products. It is a single stage tax charged only on taxable supplies to end users within its scope. The current rates of levy *applying are:*

	1 April 2015 to	**From April 2016**	**UNIT**
Electricity	0.554	0.559	p per kWh
Natural gas	0.193	0.195	p per kWh
Liquid petroleum gas used for heating	1.220	1.251	p per kg
Any other taxable commodity (e.g. coal and other solid fuels)	1.512	1.526	p per kg

There are a number of exemptions and exclusions such as fuels supplied for domestic heating, renewable source electricity generation and energy products used for certain mineralogical and metallurgical processes and to create new bio fuels such as biodiesel, bio blend bioethanol and bioethanol blend. There's a 65% relief available for energy intensive facilities covered by Climate Change Agreements (CCA) other than for electricity for which the relief is 90%.

Carbon Price Support (CPS) is a rate of CCL applied by fossil fueled electricity generators to input fuel used. It is a self-accounted tax and applies to all fossil-fueled

generation with a capacity greater than 2MW. CPS applies to oil-powered electricity generation by a reduction in the rebate of fuel duty available. CPS rates of CCL applying on fossil fuels used to generate electricity.

- Australia Carbon taxes

Australia imposed a carbon tax in July 2012, covering fuels used to generate electricity and several other sectors, though not motor fuels for passenger transportation. The tax was rescinded in July 2014 when a new national government repealed it. Thus Australia provides a potentially unique test case for looking at changes when the tax began and again when it ended. The changes are perhaps best illustrated by a set of two graphs from The Australia Institute (2015). The empirical evident in Australia indicated that CO2 emissions from the electricity and petroleum sectors over the 2006–14 period, showing a sharp drop in electric-sector emissions beginning when the tax began, with emissions rebounding as soon as the tax ended. Petroleum emissions were not affected as petroleum was untaxed.

Australia's carbon price package, which was introduced by the government in July 2011, is commonly referred to by the government, opposition, media, and public, as Australia's 'carbon taxes'. It is not however, a tax is an emissions trading scheme (ETS) with a fixed price. The Australian government has announced that it will price carbon by introducing a carbon tax from July 1st 2012 with a view to transforming the policy to a market-based emissions trading scheme in three to five years' time from its introduction (Gillard, 2010). The tax began as a fixed price of $23 per tons of CO2-e (CO2 equivalent). The government also has its plan to reduce Australia's emissions to 5 per cent below 2000 levels by 2020 as the voluntary target in the absence of a coherent international agreement on the level of carbon emission reduction. Any policy for reducing carbon pollution, whether it is a carbon tax or tradable emission permits, will increase the price of energy. The tax is likely to have an economy-wide impact affecting Australia's GDP, industrial structure and trade. Within a carbon tax system, a price on carbon is set, and emitters are charged per tons of carbon they release into the atmosphere, leading people to reduce their emissions to avoid the tax and save money. There is no limit ('cap') to emissions within a tax-based system – people can emit as much as like, but have to pay for these emissions. Therefore, it is the price on carbon that influences emission levels. The policy to cut emissions is regressive and the tax burden will be unequally distributed among different household groups with low-income households carrying a relatively higher burden. There are many different ways of encouraging the transmission from carbon-intensive energy to alternative low-emission energy uses. Australia has used the policy of subsidizing low-emission energies and new technologies over the last five years. The programs included investing directly to improve wind and solar energy, in using biomass waste from sugar mills, in geothermal energy from hot dry rocks, and to extract more hydropower through cloud-seeding (Humphreys, 2007). This approach known as 'picking winners' has its own drawbacks due to high capital content in technologies involved and the bias in political decision making. It is argued that market based approaches are superior to political processes in picking winners in an attempt to reduce greenhouse gases.

The price on carbon package has been a hotly debated and controversial topic in Australian politics and society in general. One of the greatest challenges has been in effectively communicating how the introduction of a complex economic instrument will impact the average Australian. Like any complex and politized issue, the public have become even more confused by the misinformation reported by commentators who do not properly understand the issue, or the propaganda from industries which will be affected by a price being put on carbon, who have cited 'job losses', 'higher costs for households', and 'moving business offshore' without sufficient evidence, to influence public opinion. Along with providing assistance to households, the plan will provide assistance to Australia's emissions-

intensive trade-exposed industries. There is a valid role for government in protecting industries by exempting them from some of their carbon emissions costs, where there is a realistic threat that 'carbon leakage'1 could occur. However, analysis by the highly respected, independent policy think-tank the Grattan Institute found that proposed the levels of protection that will be provided to the black coal, liquefied natural gas and steel industries is unjustified and costly, and will increase costs borne by the rest of the community to achieve Australia's emissions reduction targets. Fortunately, assistance is only guaranteed for the first 5 years, and the legislation requires the Productivity Commission to investigate the continuing need for this assistance. The Grattan Institute recommends that the Commission should be given the scope to review protection in the wider public interest, by applying a true carbon leakage test. Overall, the carbon price package is a "good" tax relative to a number of other taxes (such as stamp duty), as the financial burden will be shared widely across Australia's economy, roughly proportionate to consumption, and it will encourage people to avoid emitting carbon, by changing their personal purchasing and consumption choices. With a net increase in the costs of production, average living standards in Australia will inevitably grow more slowly for a time. However, increased efficiencies and the avoided consequences of climate changes will lead to financial savings, and ultimately the greater well-being of all current and future Australians and citizens worldwide, in the longer term.

The decision by the Australian government to adopt direct market based approaches to reducing emissions by a es will have an impact on the relative prices of goods and services. When the emitters begin passing on the costs of the tax into the prices of their products, low-carbon or carbon-free goods and services become cheaper than high carbon intensive ones. This change in relative prices will lead industries to substitute away from carbon-intensive inputs to low-carbon inputs and primary factors; and consumers (households) to reduce the use of carbon-intensive goods and services in their consumption bundle. These behavioral changes will have feedback effects on the economy's resource allocation, industry structure and product-mix, economic growth, and income distribution. Such economy-wide effects cannot be discerned in a partial equilibrium modelling approach and hence they require more complex general equilibrium models which use input-output data as the benchmark of the economy. This paper analyses the impact of a carbon taxes in Australia using a computable general equilibrium (CGE) model developed for that purpose.

IV. POSSIBLE IMPLEMENTATION OF CARBON TAXES IN INDONESIA

Despite its apparent political liabilities, the carbon taxes may just fit the bill. A carbon tax presents a number of advantages relative to the heretofore more popular alternatives. These advantages, as well as the disadvantages and the implementation challenges, are explored in this book. A carbon tax, if adopted, should start at a modest level right now and increase in time, to allow time for economies to plan and adjust, and also to at least parallel (if not track) what most economists believe to be a path of increasing marginal damages over time.

Carbon taxes is a form of shifting the tax burden or tax-shifting and not increase the tax burden or tax increase is. The imposition of a carbon tax based on an interest to take into account all of the costs required to produce goods and services, including costs incurred as a result of the use of fossil fuels (full costing pricing). Taxpayer must pay the Carbon taxes is a legal entity or individual that causes pollution. Establishing a carbon tax, which would either tax those emissions directly or tax fuels that release CO2 when they are burned (fossil fuels, such as coal, oil, and natural gas). Emissions of CO2 and other greenhouse gases accumulate in the atmosphere and contribute to climate change—a long-term and potentially very costly global problem.

No policy is perfect, and the prospects for finding one that satisfies even a bare

majority of countries seems dim. Other alternatives have emerged as being more popular and politically palatable, but there is considerable doubt as to whether they will move the world toward the coordinated effort necessary to curb greenhouse gas emissions, as they represent no real commitment on the part of Indonesia to actually reduce emissions. There is no time to wait in terms of addressing climate change, as delay will only further complicate the task of stabilizing greenhouse gas levels at an acceptable level. Waiting to see what other countries will do will only drive up the future costs of reducing emissions? It is thus in the self-interest of developed economies to impose a carbon tax now not only because it is the most effective way to reduce emissions, but also because it will begin the important job of re-ordering economies that have long been predicated on low fossil fuel prices. Because time is not on our side, doing something modest right now is vastly preferable to finding just the "right" greenhouse gas policy, assuming adventurously that such a thing exists.

Initial Carbon taxes applied for Indonesia, is to include the tax in the existing Taxes such as selected Value Added Tax and Excise objects, Motor Vehicle Tax, Fuel Tax and Electricity Consumption Tax (PPJ). Efforts to control externalities on the environment can basically be done through four policy, namely the internalization of externalities (processing/internalization waste in environment-related industries), restrictions on production, Environmental Pollution Tax, or prohibition of certain industries resulting externalities. When selected alternative Environmental Pollution Tax to a particular industry, then apply the provisions of this law. The introduction of Tax Environmental Pollution will positively impact the certainty the industry is allowed to operate, control externalities can be implemented, the price of products related industries reflects a reasonable price (marginal social cost = marginal cost) as well as local government earn additional revenue which partly can be used to create a healthy environment, sustainable and creating a green economy. Therein lies the political problem: a carbon tax places an explicit price on emitting carbon dioxide, and the price is more overt with a carbon tax than it is with other instruments.

Tax on Environmental Pollution. The tax is levied on goods and services in proportion to their environmental impact. One example is a carbon tax, which taxes products based on the emissions of carbon attributable to their production or consumption. The rationale of environmental taxation is that it encourages the use and development of goods and services with reduced environmental impacts. Like other taxes on goods and services, environmental taxes can be regressive – suggesting that environmental taxes need to be combined with other progressive taxes or rebates for low-income households. Among developed countries, the U.S. collects the smallest share of tax revenues from environmental taxes (OECD, 2010).

V. CONCLUDING REMARKS

1) The recommendations begin with a call for all decision makers—within national, provincial and local governments, tribal, and local institutions, in the private sector, and nongovernmental organizations (NGOs)—should identify their vulnerabilities to climate change impacts and the short- and longer-term adaptation options that could increase their resilience to current and projected impacts. They call for the development of a collaborative national adaptation strategy and program, including a significant climate change research effort as part of an integrated climate change research initiative. They suggest adaptation planning and implementation by U.S. states and tribes, local governments, and the private sector, nongovernmental institutions, and society at large, in a spirit of national partnership; and they suggest the government of Indonesia support

for international adaptation programs. Finally, they suggest incorporating adaptation objectives into a number of existing federal government programs.

2) Central, provincial and local entities and the private sector should take actions now to address current, known climate change impacts and risks and/or to provide effective risk management at a relatively low cost.
3) **Carbon taxes,** tax would be imposed only on the major sources of fossil fuel combustion, mainly oil, natural gas, gasoline, and coal and on emissions from electricity generation. The Taxpayer of CT is persons or entities that should live or have a business in the jurisdiction of the respective District/City. Due to the small contribution that electricity makes to reducing carbon dioxide (CO2) emissions when the carbon taxes is applied and considering electricity consumption has been imposed through Certain Goods and Services Tax, use of electricity shall be excluded from CT. CT on liquid fuels to the District/City Government maximum of Rp 50,000 (fifty thousand rupiah) Per Ton of CO2e.
4) Initial Carbon taxes applied for Indonesia, is to include the tax in the existing Taxes such as selected Value Added Tax and Excise objects, Motor Vehicle Tax, Fuel Tax and Electricity Consumption Tax (PPJ). Efforts to control externalities on the environment can basically be done through four policy, namely the internalization of externalities (processing/internalization waste in environment-related industries), restrictions on production, Environmental Pollution Tax, or prohibition of certain industries resulting externalities. When selected alternative Environmental Pollution Tax to a particular industry, then apply the provisions of this law.
5) The household categories most adversely impacted by carbon pricing, in relative terms, are low income households, unemployed households, aged pension households and households with children where government benefits exceed 30% of income. The risk is that, without policies which address equity, more citizens will be moved into poverty. A carbon tax of Rp50,000 (fifty thousand rupiah) per tonne CO2e, without ameliorating policies, is likely to move a further many citizens below the poverty line.

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