



Economy and Environment Program
for Southeast Asia
22 Cross Street #02-55
South Bridge Court
Singapore 048421

Phone: (65) 6438 7877
Fax: (65) 6438 4844
E-mail: hfrancisco@idrc.org.sg
Web site: www.eepsea.org

The Economy and Environment Program for Southeast Asia (EEPSEA) was established in May 1993 to support training and research in environmental and resource economics across its 9 member countries: Cambodia, China, Indonesia, Laos, Malaysia, Papua New Guinea, the Philippines, Thailand, and Viet Nam. Its goal is to strengthen local capacity for the economic analysis of environmental problems so that researchers can provide sound advice to policymakers.

EEPSEA Policy Briefs summarize the key results and lessons generated by EEPSEA-supported research projects, as presented in detail in *EEPSEA Research Reports*.

EEPSEA Policy Briefs and Research Reports are available online at <http://www.eepsea.org>

It Is Fair To Act Now! The Distributional Impact Of A Carbon Tax Policy In Indonesia

EEPSEA POLICY BRIEF • No. 2008-PB1

It is widely acknowledged that the three dimensions of sustainable development—economic, social, and environmental—are crucial, inseparable and inter-related. In many cases, however, their goals come into conflict with one another. This conflict often arises in the case of environment-related →

A summary of EEPSEA research report 2008-RR1, "The Distributional Impact of Environmental Policy: The Case of Carbon Tax and Energy Pricing Reform in Indonesia", by Dr. Arief Anshory Yusuf, Center for Economics and Development Studies (CEDS), Faculty of Economics, Padjadjaran University, Bandung, Indonesia. Tel: 62 22 4204510 Email: arief.yusuf@fe.unpad.ac.id.

" A c a r b o n t a x w a s

→ policies, the issue of climate change mitigation being no exception.

Climate change mitigation policies to reduce carbon emissions from the energy sector by way of measures such as introducing a carbon tax have been widely known to be regressive i.e., the burden is borne more by lower income rather than higher income households, thereby making income distribution less equitable or fair. An expectation of such an adverse distributive effect may even prevent the policy from being implemented in the first place.

The reason why most literature concludes that taxing energy consumption (through say, a carbon tax or fuel tax) to curb global warming is regressive is based on the assumption that lower income households spend a higher proportion of their income on fuel. This conclusion may generally hold true for developed countries (on which such literature is often based), but may not necessarily be the case for less developed countries like Indonesia. Moreover, the distributional impact of environmental policies depends not only on expenditure patterns (how the policies affect prices of household commodities), but also on income patterns (how the type of jobs and sectors of employment households depend on are affected). These patterns may naturally be different in rich and poor countries.

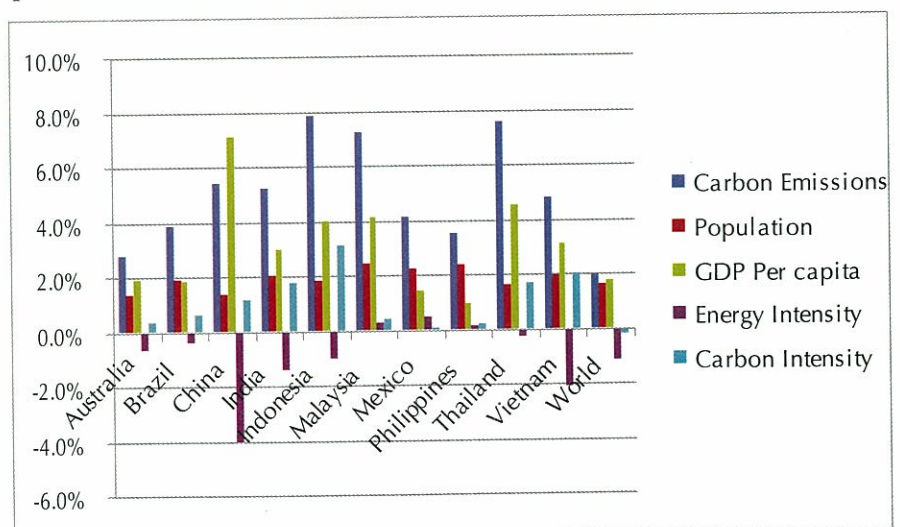
Indonesia Becoming More Carbon-Intensive Economy

As the fourth largest country in the world in terms of population, Indonesia plays an important role

in global climate change policies especially as it has been recognized by the international community that the active and committed participation of developing countries is indispensable in successfully mitigating global warming. In particular, Indonesia needs to pay more attention to its contribution to global carbon emissions. For the last three decades, its reduction in energy intensity (energy used per unit of output) has been among the lowest in the region unlike China, which managed to reduce its energy intensity by 4% per annum. Moreover, during the same period, Indonesia's growth in carbon intensity of energy (carbon content for every unit of energy used) has been among the highest in the region. Indonesia is increasingly becoming more dependent on fossil fuel, way above world and regional standards. This is, to some extent, correlated with the energy pricing policy in the country which maintains fuel prices distorted below international market prices, a classic example of policy failure being the cause of environmental problems.

Impact Of Carbon Tax On The Indonesian Economy

The main methodology tool used in this study was a multi-sector, multi-household, Computable General Equilibrium (CGE) model called INDONESIA-E3 (Economy-Equity-Environment). The model has 38 industries and 43 commodities with corresponding energy sectors identified. It allows substitution among energy types and between energy and primary factors; provides a detailed labour classification, and distinguishes between formal and informal labour (which is relevant for developing countries); introduces emission accounting and carbon taxation; and fully integrates highly disaggregated households, which is a necessary element in distributional analysis. It not only allowed for treating both the income and expenditure patterns as inseparable driving forces in income distribution in an economy-wide framework, but also enabled a more direct and accurate calculation of inequality indicators and poverty incidences to be made.



Growth of carbon emissions and its drivers (1971-2004)

Source: Author's calculation using data from the International Energy Agency (IEA).
<http://data.iea.org/ieastore/statslisting.asp>

shown to be progressive.”

Three simulations using this model were conducted: (1) A carbon tax implemented without revenue recycling, i.e., the revenue from the carbon tax was assumed to be used for fiscal adjustment, allowing the government to run a budget surplus; (2) The implementation of a carbon tax accompanied by a reduction in the uniform general ad valorem sales tax rate for all commodities, such that government revenue remained in balance; and (3) Returning the revenue from the carbon tax as a uniform lump-sum transfer to all households.

Carbon Tax In Indonesia Is Not Regressive

The results from the three simulations suggest that, in contrast to most studies conducted in developed countries, the introduction of a carbon tax in Indonesia would not necessarily be regressive. It was in fact shown to be strongly progressive in rural areas, and either neutral or slightly progressive in urban areas, the overall distributive effect nationwide being progressive. As can be seen from Table, national poverty incidences and Gini coefficients decline in all scenarios (especially SIM 3 where the revenue from the carbon tax is returned to households).

The main driver behind this outcome was the economic restructuring which resulted from the increase in the relative prices of carbon-intensive products. The results also indicate that the industries that would experience a larger contraction would generally be the more energy-intensive ones. Compared to other industries, these industries employ factors of production (namely, capital, skilled labour, and formal labour) which are concentrated among higher income households and in the cities. As a result of the contraction, these industries would tend to reduce the employment or income of their labour force. Either way, this would have an adverse effect on the revenue of higher income households.

In contrast, the income sources of the largely rural poorer proportion of the population are mostly wages from employment as informal agricultural or unskilled labour. Sectors which employ this sort of labour intensively would experience less contraction or even expansion. For example, demand for the products of the food crop, other agriculture, or food manufacturing sectors may rise due to the increase in the income of lower income households, because the products from these sectors constitute the largest share of these households' consumption. As these sectors are relatively less energy-intensive, they do not face constraints in expanding their supply. Because they employ largely informal, agricultural, and unskilled labour (i.e, mainly the poor), a carbon tax will work to the benefit of these less

Simulated distributional effects of a carbon tax

Poverty and Inequality Indicators	SIM 1 No-revenue recycling	SIM2 Uniform cut on commodity tax rate	SIM3 Uniform transfer
Urban			
Ex-ante Poverty Incidence	13.600	13.600	13.600
Ex-post Poverty Incidence	13.768	13.613	12.915
Change in Poverty Incidence	0.168	0.013	-0.685
Rural			
Ex-ante Poverty Incidence	20.200	20.200	20.200
Ex-post Poverty Incidence	19.430	19.743	16.198
Change in Poverty Incidence	-0.770	-0.457	-4.002
Urban + Rural			
Ex-ante Poverty Incidence	17.194	17.194	17.194
Ex-post Poverty Incidence	16.852	16.951	14.703
Change in Poverty Incidence	-0.343	-0.243	-2.492
Urban			
Ex-ante Gini Coefficient	0.347	0.347	0.347
Ex-post Gini Coefficient	0.347	0.347	0.337
Change in Gini Coefficient	0.000	0.000	-0.010
Rural			
Ex-ante Gini Coefficient	0.277	0.277	0.277
Ex-post Gini Coefficient	0.274	0.275	0.260
Change in Gini Coefficient	-0.003	-0.002	-0.017
Urban + Rural			
Ex-ante Gini Coefficient	0.350	0.350	0.350
Ex-post Gini Coefficient	0.347	0.348	0.333
Change in Gini Coefficient	-0.003	-0.002	-0.017

Note: SIM 1, 2 and 3 = Simulations 1, 2 and 3 respectively

privileged members of society.

The typical expenditure pattern in developing countries would also help drive the progressivity of a carbon tax policy. In Indonesia, energy-related spending in proportion to total expenditure is greater among higher income households as compared to lower income households. With a rise in the prices of carbon-sensitive products due to the carbon tax, however, the increase in the cost of acquiring the "consumption basket" for lower income households would be lower than that for the wealthy in the cities. Considered together with the increase in their factor income, this implies that rural households, especially poorer ones, will experience a welfare gain from a carbon tax.

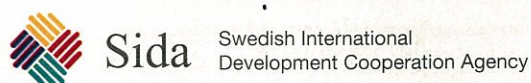
Carbon Tax Is Good For Environment And Equity

The findings of this study have important implications and should be applicable to other developing countries which share economic characteristics similar to Indonesia's. Encouraging developing countries to reduce carbon emissions would not only increase the cost-effectiveness of carbon abatement globally, but would also have a favourable

distributional impact in these countries, in contrast to a less favourable distributional impact in developed countries. While a 'global efficiency gain' from shifting the location of the bulk of carbon abatement activities from industrialised to developing countries has been widely acknowledged, this study introduces the additional notion of a 'global equity gain'.

In general, this study reveals that there need not be a conflict between environmental and equity objectives, and in fact provides a platform for harmony between social welfare and environmental goals in developing countries. The policy implication is also straightforward in that the later we—in developing countries—adopt actions against heavy energy consumption, the worse our situation will be as we would over time, simply grow more and more reliant on the massive use of energy resources. The distributional effects of mitigation then would more likely be regressive. Thus, we should not wait at all since this study clearly shows that "It is fair to act now!"

EEPSEA is administered by Canada's
International Development Research Centre (IDRC) on behalf of EEPSEA's sponsors:



Canadian International
Development Agency Agence canadienne de
développement international

