

# Lessons from the Costa Rica Carbon Tax Experience

### Kenneth Richards

Indiana University O'Neill School of Public and Environmental Affairs

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How did it start?
How did it adapt?
How did it resolve?



## World Bank Partnership for Market Readiness Carbon Tax Guide (2017)



### **Carbon Taxes and Emissions Trading Systems Worldwide**



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# The Beginnings (2016-2017)





- Emissions levy on CO<sub>2</sub>, SO<sub>2</sub>, CO, PM<sub>2.5</sub>, HC
- A separate rate in Costa Rica Colon/kg for each pollutant
- Tax based on kilometers driven, by vehicle age and category type (e.g., petrol auto vs. diesel van; sedan vs. bus vs. freight truck)
- Liability based on annual odometer reading at vehicle safety inspection
- Bill for emissions appended to "marchamo" (annual car circulation permit) statement
- New institutions required to manage the expected revenue



#### **Modeled effects**

- Change in emissions as function of levy rates
- Revenue
- Distributional effects
- Health benefits

#### **Suite of Models**

- **Physical model** to estimate changes in emissions as function of vehicle distance traveled for the CR vehicle fleet
- Economic (partial equilibrium) model to estimate changes in distance and revenue as function of levy rate
- Household spending model to estimate distributional effects
- Health effects model to estimate benefits as function of levy rate (via changes in emissions)



#### Modeling

- Physical effects require emissions factors
  - Annual data from inspection system (RITEVE) was incomplete
  - Dynamometer (energy/emissions tester) at UCR Engineering School tested fraction of vehicles
  - Imperfect solution: adapted the U.S. EPA MOVES model
- Low quality data
  - Ministry of Health's industrial energy use data used inconsistent/unclear units of measure
  - National Insurance Institute vehicle fleet data (number, type, make, model) "dirty"/incomplete

#### Implementation

- Political resistance (Government's fiscal deficit + citizen's tax resistance)
- Concentrated resistance from freight/trucking industry
- Manipulation of the odometer, especially on older vehicles



# Some results and outcomes

#### **Modeling results**

- Even a modest tax would induce some changes in emissions in the long-run
- Far more important to remove old dirty vehicles than induce new clean (e.g., electric) vehicles
- Diesel trucks were major source of CO<sub>2</sub> and health damages
- The revenue from a modest tax would be substantial
- The health benefits from local pollutant reduction would be even greater than the revenue

#### Outcome

• National election, change in administration, new administration wanted its own approach



## Lessons learned

- Perfect vs possible: when designing a policy, acknowledge the trade offs between what is ideal and what is feasible given the socioeconomic + political context, and resource constraints.
- Importance of creativity: software and digital transformation can facilitate modeling efforts in the face of limited data quality, but in the end, models are simply models.
- Changes in government: tensions between careful policy design and political risk (e.g., changes in priorities, foci, lack of rapprochement between the outgoing and incoming governments)
- Policy interactions: outdated fiscal policies influence, and may hinder, the "goodness of fit" and implementation of a new, related policy.
- Message framing matters: choosing a levy over a tax solved a legal constraint, as well as a "semantics" issue: a levy was better perceived than a tax by the public given the social discomfort.



### Thank you!

### Questions or Comments:

Ken Richards Email: <u>kenricha@indiana.edu</u> O: 1-812-855-1461 M: 1-812-929-7675



Jurisdiction	Coverage (%) GHGs	Fossil Fuel Type of Coverage	Coverage of Non-Fossil Fuel	Sector Coverage	Exemptions	Point of Application	Use of Revenue
Argentina	20%	All	No	All	None	Upstream on producers, distributors, and importers	Multiple beneficiaries (e.g., social security system, the Transport Infrastructure Trust, the National Housing Fund (FONAVI), the provinces, among others)
British Columbia	70%	All	Νο	All	ndustry, aviation, agriculture and transport users Upstream main er		Carbon tax relief and protect affordability; maintain industry competitiveness; and encourage new green initiatives
Canada	30%	All (21 Type of Fossil Fuel)	Yes (Combustribl e Waste)	All	Certain uses in agriculture and fisheries and n electricity generation for remoteUpstream on registered distributors andGeneration Generationcommunitiesproducers		General Budget of Origin Province/Territory
Chile	29%	All	No	Power and Industry	None	Downstream	General Budget
Colombia	23%	All liquid and gaseous fossil fuels	No	All	Natural gas consumers that are not in the petrochemical and refinery sectors, and fossil fuel consumers that are certified to be carbon neutral	Upstream on sellers and importers	Coastal erosion management, conservation of water sources, and the protection of ecosystems; all issues closely linked to Colombia's international commitments on climate change. Program for the Substitution of Illicit Use Crops
Denmark	40%	All	No	All	Electricity and other EU ETS installations, except central heating	Upstream on distributors, importer, and registered distributor	Reduced taxes on labor Energy efficiency and environmental programs Reduced industry contributions to government programs
Finland	36%	All except peat	No	Energy	Electricity generation	Upstream on distributors and importers	Income tax reductions Decreased employer social security payments ; General budget
Estonia	6.6%	All	No	Industry and Power	Industrial installations covered by EU ETS	Point sources	Promote higher and more inclusive growth

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Jurisdiction	Coverage (%) GHGs	Fossil Fuel Type of Coverage	Coverage of Non-Fossil Fuel	Sector Coverage	Exemptions	Point of Application	Use of Revenue
France	35%	All	No	Industry, buildings, and transport	EU ETS sectors, freight transport, public transport, taxi operators, farmers, air transport, fishing, navigation, and shipping	Upstream on distributors and importers	Reduced corporate income taxes Reduced labor taxes Energy assistance for low-income households
Iceland	55%	Liquid and gaseous fossil fuels	Yes (F-gas emission)	All	Jet Fuel	Upstream on producers and importers	General budget
Ireland	40%	All	No	Residential, commercial and road transport	Electricity production, industrial processes (chemical reduction, electrolytic or metallurgical processes), aviation and facilities covered by the EU ETS and shipping	Upstream on distributor and importers	Boost energy efficiency, alleviate fuel poverty and to encourage more sustainable farming practices
Japan	75%	All	No	All	Some exemptions for the industry, power, agriculture and transport	Upstream on producers	Clean energy technology Energy efficiency
Latvia	5%	All	No	Industry and power	Activities covered by EU-ETS	Upstream on distributor and importers	Indirect subsidy
Liechtenstein	80%	All	No	Industry, power, building, transportation	Importers of transport fuels are exempt, but need to offset a portion of the associated CO2 emissions	Upstream on distributor and importers	General budget
Luxembourg	65%	All	No	Transportation and heating	Electricity generation	Upstream on sellers	Climate energy fund, general budget
Mexico	44%	All	No	All	Natural Gas, Gasoline and Diesel (until 2024)	Upstream on producers and importers	General budget
Netherlands	<b>52%</b>	All	Yes (Waste incineration)	Electricity generators, industrial, and waste	Facilities with annual emissions below national CO2 emission baseline	Point-source on operators	General budget

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New Brunswick	39%	All	Νο	All	Aqua culturist; Farmer; Fisher; Silviculturist; Wood Producer; Forest Worker; Manufacturer; Mining and Quarrying; Operation of a Registered Vessel; and Large Emitter (these emitters are covered by the OBPS). Diesel fuel, light fuel oil for the following purposes: Preparation of food; Heating and lighting of premises; Heating water for domestic use.	Upstream on producers, distributors, and importers	Fund a reduction in the lowest personal income tax rate
Newfoundland and Labrador	47%	All	No	Energy	Heating fuels, municipal governments, extractive resource exploration, primary agriculture and fishing, and certain transport users	Upstream on producers, distributors, and importers	Reduction in GHG emissions
Northwest Territories	79%	Petroleum	No	All	Aviation gasoline and aviation jet fuel; Indian band-used fuel, fuel used in the generation of electricity for remote communities	Upstream	Investment on initiatives that will reduce GHG emissions
Norway	63%	All	Yes (Waste, CH4, HFCs and PFCs)	All	tivities covered by EU-ETS, except troleum production and domestic aviation importers		General budget Reduced labor taxes Decreased capital income taxes Pension plan for low-income individuals
Poland	3,75%	All	Yes	All	Operators covered by the EU ETS	Point sources on entities responsible for realising gases	Earmarked for environmental spending
Portugal	40%	All	No	Industry, buildings, and transportation	None	Upstream on distributor and importers	Income tax reductions for low-income households General budget



Jurisdiction	Coverage (%) GHGs	Fossil Fuel Type of Coverage	Coverage of Non- Fossil Fuel	Sector Coverage	Exemptions	Point of Application	Use of Revenue
Prince Edward Island	56%	All	No	All	Agriculter and Livestock (fishing); Shipping; Furnace oil and propane used for heating	Upstream on producers, distributors, and importers	Investment in provincial initiatives Offset the reduction in provincial gas taxes used as a way to shield against the federal levy's impact
Singapore	80%	All	Yes	All	Facilities with annual emissions below 25,000 tCO2e	Point source.	Support for emissions reduction initiatives
South Africa	80%	All	No	Industry, power, and transportatio n	Residential	Point-sources	Electricity levy reduction; Energy efficiency; Solar tax credit ; Renewable energy Energy services for low-income individuals Public transport ; Rail freight transport
Spain	19%	None	Yes (Fluorinated GHG emissions)	All	Military, international aviation, shipping, F-gassess with GWP less than 150	Upstream on manufacturing, importing, and intra-EU acquisition	General budget
State of Mexico	N/A	All	Yes	All	Federal jurisdiction	Point sources on entities responsible for realising gases	actions to guarantee the right of people to a healthy environment for their development and welfare
Sweden	40%	All except peat	No	All	Activities covered by EU-ETS, export fo fuels (non- energy uses), gasoline for rail or shipping, Jet duel or jet kerosene used in aviation, partial in agriculture, forestry and fishing	Upstream on distributor and importers	General budget Reduced labor and corporate taxes
Switzerland	33%	All Thermal	No	Heat, Light, or Electricity generation	Operators covered by the Switzerland ETS	Upstream on distributor and importers	Reduced health insurance premiums Decreased social security contributions Building energy efficiency Technology development
UK	24%	All	No	Power	Small power generators, stand-by generators and power production in Northern Ireland; Consumption of electricity generated from efficient on-site combined heat and power (CHP) plants	Users	General budget



Jurisdiction	Coverage (%) GHGs	Fossil Fuel Type of Coverage	Coverage of Non- Fossil Fuel	Sector Coverage	Exemptions	Point of Application	Use of Revenue
Ukraine	71%	All	No	Industry, power and buildings	N/A	Users	N/A
Uruguay	11.2%	Gasoline	No	All	None	Upstream	Promote the reduction of greenhouse gas emissions, sustainable transportation, and climate change adaptation, with the possibility to create a special fund for these purposes.
Yucatan	N/A	All	Yes	All	None	Point sources on entities responsible for realising gases	Finance policies and programs for climate change, environment, health, disaster risk reduction and management, dwelling, among others.
Zacatecas	N/A	All	No	All	None	Point sources on entities responsible for realising gases	Different purposes, mainly on environmental, sustainable development, and economic programs, and climate change mitigation and adaptation programs