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Mercator Research Institute on
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Making carbon pricing work

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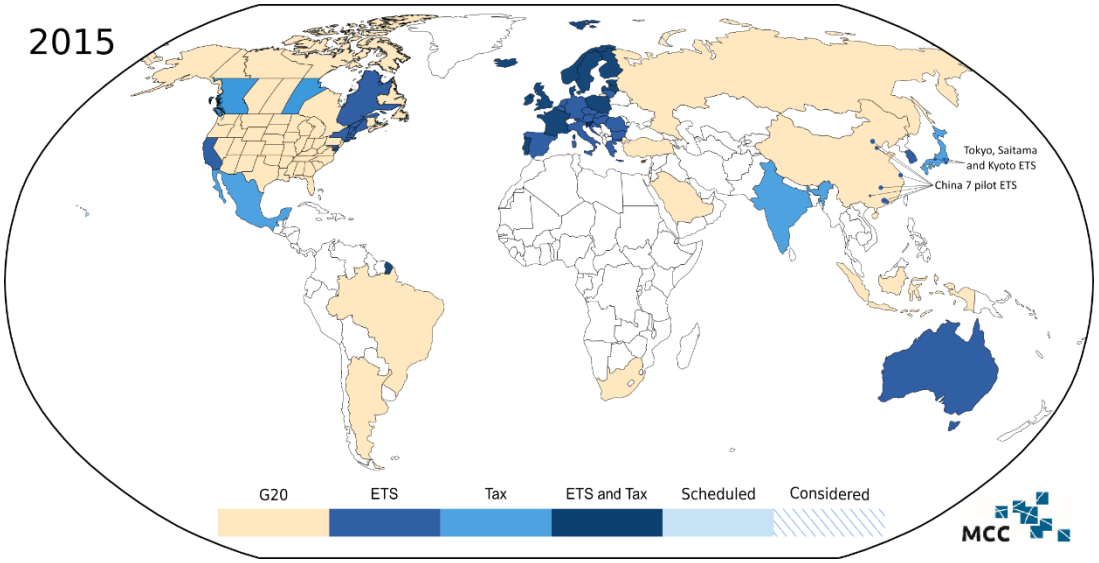
Carbon pricing: efficiency and equity

Carbon pricing efficient but limited coverage:

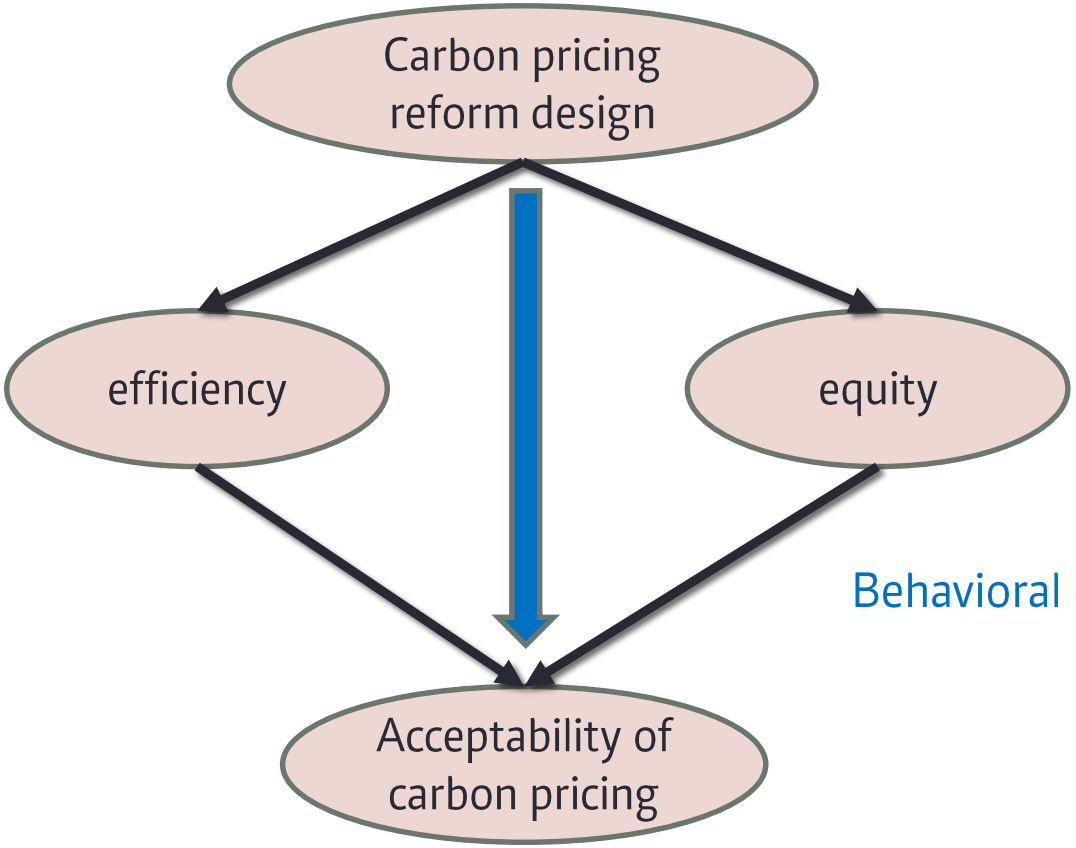
- Raising US$ 26 billion
- Only around 13% of global greenhouse gas emissions covered (World Bank, 2016)



Equity

- Carbon pricing regressive in **developed countries,** due to carbon-intensive subsistence consumption (Grainger and Kolstad, 2010).
- Neutral or progressive in **developing countries** (Sterner, 2011)

Carbon pricing: acceptability?



Traditional approach

Behavioral effects

For humans, not econs, acceptability goes beyond equity and efficiency!

Research question and methods

- How should the revenue recycling of a carbon pricing reform be designed in order to be successful?

- Analyze insights from:
  1. general equilibrium modeling
  2. integrated assessment modeling (IAM)
  3. optimal taxation theory
  4. behavioral economics

- Provide a rough classification of different recycling schemes in terms of efficiency, equity and acceptability

- Contrast theoretical insights with data on existing carbon pricing schemes

Main findings

Recycling of revenue in carbon pricing schemes should involve one or more of the following characteristics:

1. green spending
2. covering losses of incumbents
3. providing salient dividends to all households
4. supporting especially affected households.

I. Revenue recycling: Theoretical foundations

II. Comparing different recycling options

III. Real-world carbon pricing schemes

IV. Summary and policy implications

Theory (I)

General equilibrium models

- Distortionary tax required to raise revenue
- Introduce a price on carbon – lower distortionary tax with carbon tax revenue
  - ➢ cost reduction of carbon tax reform
- Example: labor taxes , (weak) **double dividend** (Bovenberg, 1999; Goulder, 1995)

Integrated assessment models

- Computable general equilibrium models calibrated to economic data in great detail (Carbone et al., 2013; Goulder and Hafstead, 2013; Rausch et al.,2011)
- Ranking of different recycling options

  Efficiency: capital/corp. tax cuts > labor tax cuts > transfers

  Equity: transfers > labor tax cuts > capital/corp. tax cuts

Theory (II): Optimal taxation

Taxes are set optimally to internalize an externality:

- oversaving in an overlapping generations model (capital taxes)
- suboptimal distribution in a Mirrlees model (labor taxes)

Example: Optimal labor and environmental taxation (Aigner, 2015; Cremer et al., 1998; Jacobs and de Mooij, 2015; Klenert et al., 2016)

- What are optimal labor and environmental tax rules? (How) do they interact?
- Main results: If labor tax system before the reform is
  - Optimal: recycling through labor tax cuts yields no weak double div.
    instead, uniform lump-sum transfers are preferable
  - Suboptimal:
    recycling through labor tax cuts moves tax system closer to optimum, enhances equity and efficiency

Theory (III): Behavioral economics

General insights on the acceptability of carbon pricing reform design (going beyond equity and efficiency):

1. **Recycling** is important since the effectiveness of Pigouvian taxes is often doubted
2. **Labeling**: Don't call it a tax!
3. **Earmarking** the revenue for a specific purpose enhances acceptability
4. Making benefits **salient** enhances acceptance
5. Olson (1965): a policy reform can only be successful if the costs are **diffused** and the benefits are **concentrated**. Confirmed by Kallbekken et al. (2011) with experiments.

Literature: Baranzini and Carattini, 2016; Chetty et al., 2009; Kallbekken et al. 2011; Rivers and Schaufele, 2015

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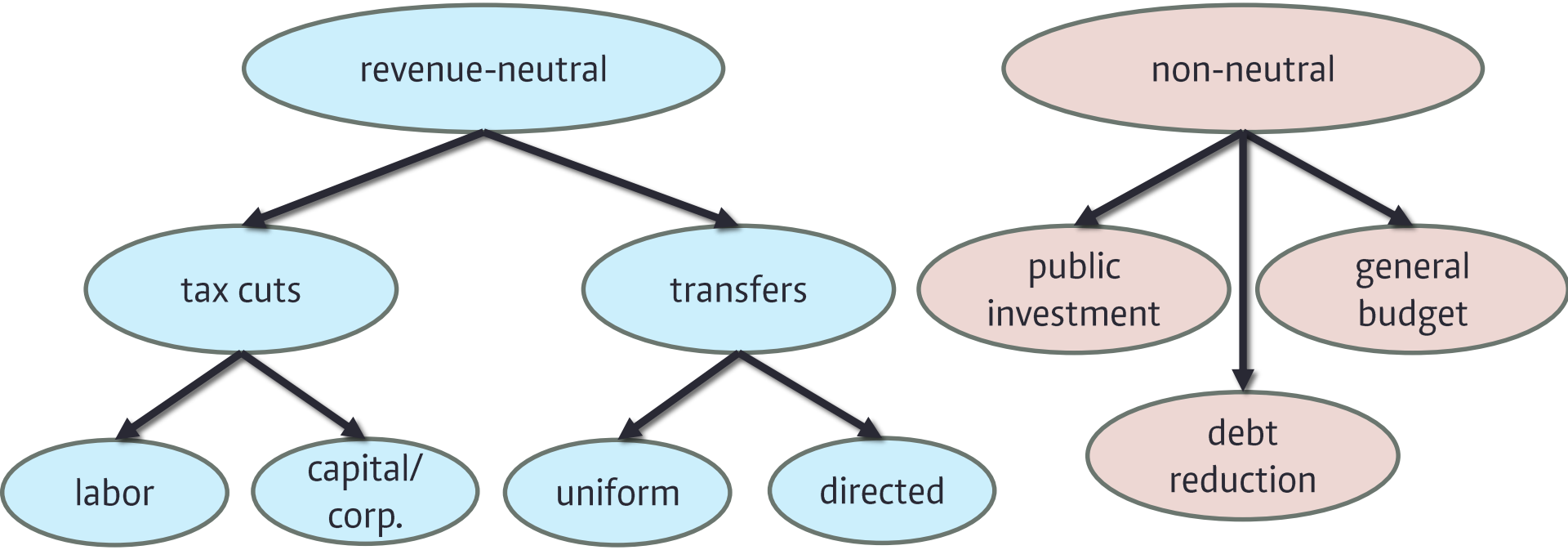
Recycling options



Labor tax cuts

- General equilibrium/optimal taxation: If labor tax system before the reform is
  - **suboptimal**, reducing labor tax rates can enhance efficiency and reduce inequality.
  - **optimal**, recycling through uniform lump-sum transfers is superior.

- Integrated Assessment Models:
  - **Efficiency**: capital/corp. tax cuts > **labor tax cuts** > transfers
  - **Equity**: transfers > **labor tax cuts** > capital/corp. tax cuts

- Acceptability: rather neutral, potential earmarking effect

	efficiency	equity	acceptability
labor tax (distortionary)	+	+	0
labor tax (non-distortionary)	0	0	0

Capital and corporate tax cuts

- General equilibrium modeling & IAMs:
  - **Efficiency-enhancing** since it removes distortions from the economy, (Auerbach and Hassett, 2015; Goulder, 2013)
  - **Regressive** since capital/firm owners benefit
- Optimal taxation
  - Capital taxes are already set optimally in order to address some externality Reducing them would distort the economy.
- Behavioral economics
  - Earmarking

	efficiency	equity	acceptability
Capital tax (distortionary)	+	-	0
Capital tax (non-distortionary)	0	-	0

Directed transfers

- General equilibrium modeling & IAMs:
  - Not efficient (does not remove distortions)
  - Progressive – more than offsets regressive effects of carbon price
- Optimal taxation: ---------
- Behavioral economics
  - Earmarking
  - Olson (1965) fulfilled: diffused costs, concentrated benefits
  - Salience: transfers very visible

	efficiency	equity	acceptability
directed transfers	0	+	+

Uniform transfers

- General equilibrium modeling & IAMs:
  - Not efficient (does not remove distortions)
  - Progressive – more than offsets regressive effects of carbon price (less than directed transfers)
- Optimal taxation:
  - More efficient than labor tax cuts if pre-existing tax system is optimal
- Behavioral economics
  - Salience: transfers very visible
  - Survey (CH): very popular due to distributional fairness and simplicity (Carattini et al., 2016)

	efficiency	equity	acceptability
uniform transfers (tax system optimal)	+	+	+
uniform transfers (tax system non-optimal)	0	+	+

Non-neutral recycling

Public investment:

- excellent option in the long term in terms of equity and efficiency. Short term effects adverse.
- acceptability: enhanced due to (a) earmarking and (b) if spent on green investment, compensates for ignorance of workings of Pigouvian taxation

Debt reduction:

- exacerbates intergenerational inequality but very efficient since it implies lower tax rates in the future. (Rausch and Reilly, 2015).
- acceptability: unclear, potential positive effect due to earmarking.

General budget:

- Terrible option from the point of view of acceptability, because of lack of understanding of Pigouvian taxation (Kallbekken et al., 2011).

	efficiency	equity	acceptability
public investment (short term)	-	-	+
public investment (long term)	+	+	+
debt reduction	+	-	0
general budget	?	?	-

Theory: summary

- If pre-existing income tax system is optimal: uniform lump-sum transfers best
- Otherwise: labor tax reduction, uniform and directed transfers are all ++
- If state of tax system is unclear, uniform lump-sum transfers are a safe bet.

		efficiency	equity	acceptability
Revenue-neutral	labor tax (distortionary)	+	+	0
	labor tax (non-distortionary)	0	0	0
	capital/corporate (distortionary)	+	-	0
	capital/corporate tax (non-distortionary)	0	-	0
	directed transfers	0	+	+
	uniform transfers (tax system optimal)	+	+	+
	uniform transfers (tax system non-optimal)	0	+	+
Non-neutral	public investment (short term)	-	-	+
	public investment (long term)	+	+	+
	debt reduction	+	-	0
	general budget	?	?	-

Theory: summary

- If acceptability is excluded, ranking is more ambiguous
- Uniform lump-sum transfers not always a safe bet

		efficiency	equity	acceptability
Revenue-neutral	labor tax (distortionary)	+	+	0
	labor tax (non-distortionary)	0	0	0
	capital/corporate (distortionary)	+	-	0
	capital/corporate tax (non-distortionary)	0	-	0
	directed transfers	0	+	+
	uniform transfers (tax system optimal)	+	+	+
	uniform transfers (tax system non-optimal)	0	+	+
Non-neutral	public investment (short term)	-	-	+
	public investment (long term)	+	+	+
	debt reduction	+	-	0
	general budget	?	?	-

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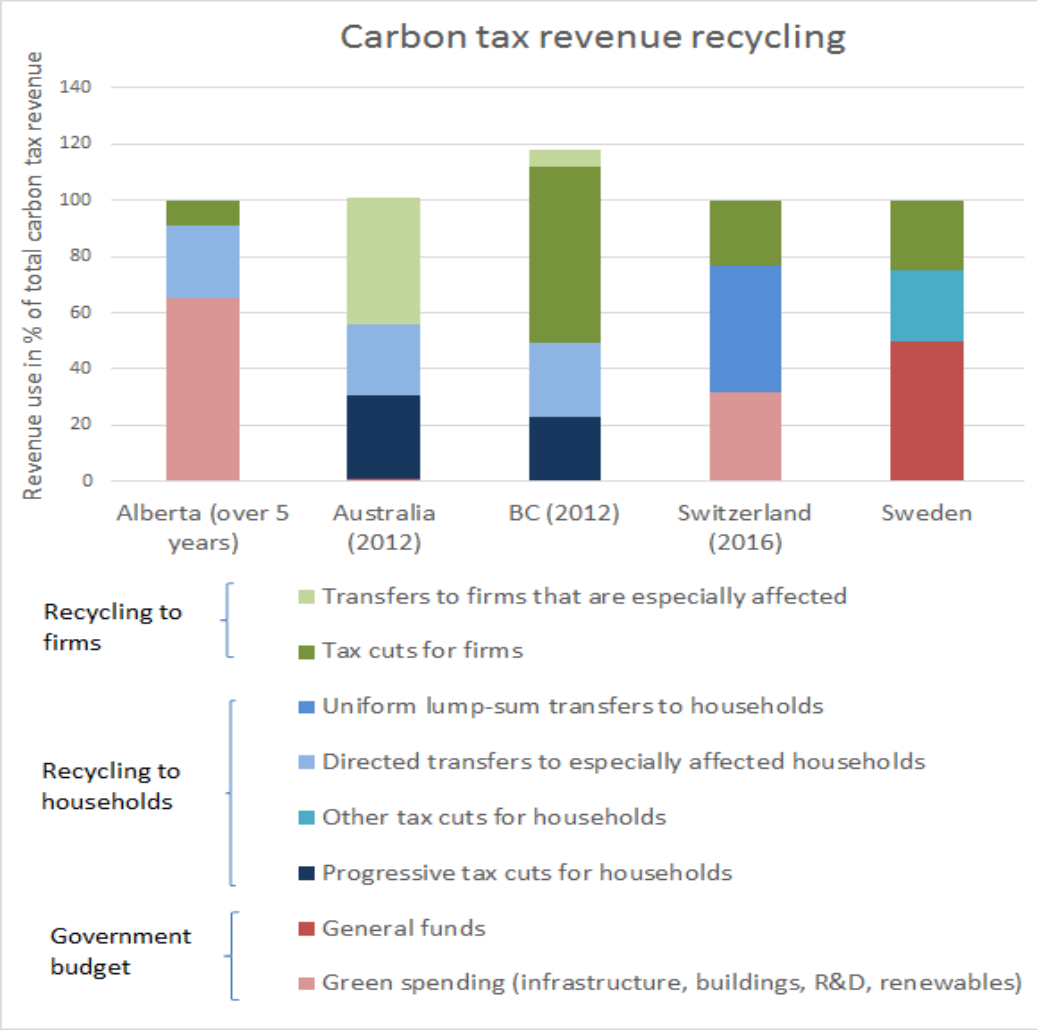
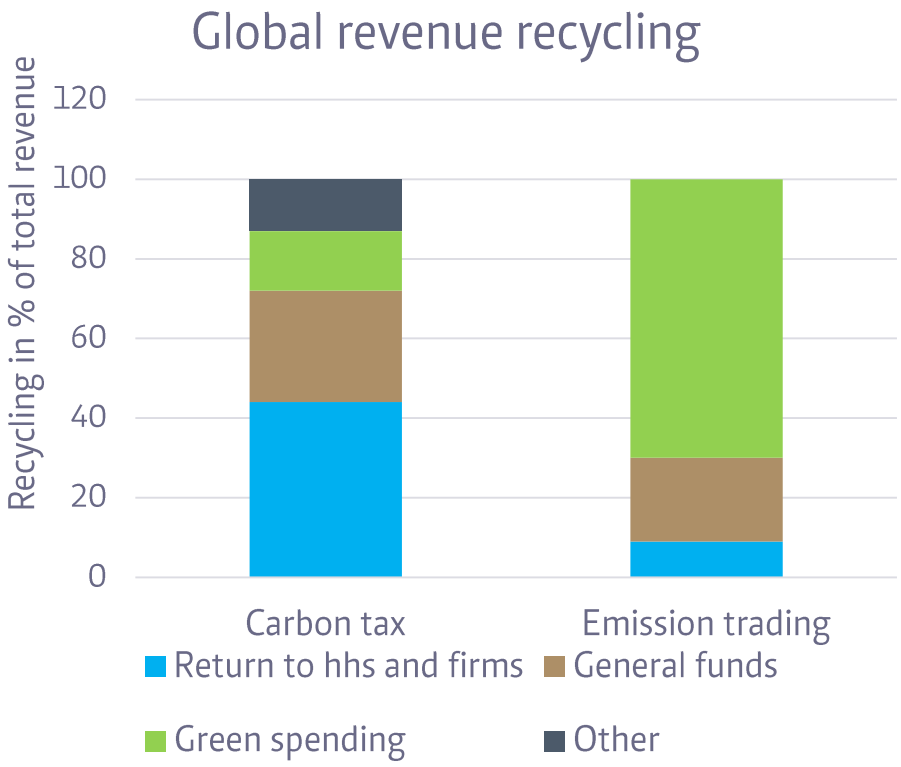
Real-world carbon pricing



- Range of carbon prices in these regions: 15–131 US$/tCO2e
- All schemes return a share of the revenue to the households (blue) and a share to firms (green)
- Three of the five use the revenue for some form of government financing/investment

Real-world carbon pricing: global scale



Based on: Carl and Fedor (2016) , data from 2013.

- Fundamental differences in recycling between tax and emission trading schemes.
- Tax schemes return a much higher percentage to households and firms.
- ETS use the majority of revenues for green spending (excluding grandfathered permits).

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Summary: methods and results

- We provide an ordinal classification of revenue recycling options by considering: equity, efficiency and other acceptability criteria.

- Real-world recycling schemes differ widely across regions and depending on the exact design of the pricing (tax vs. ETS)

- The five analyzed recycling schemes have two things in common:

  (i) especially affected households are reimbursed,

  (ii) both households and firms receive a share of the revenue.

Summary: Policy implications

1. Uniform lump-sum recycling:
   - non-distortionary, salient, simple, progressive (popular in survey study)
   - a safe option if optimality of the income tax system is unclear

2. Carbon revenue recycling in the real world depends strongly on the political and economic context:
   - **Focus on distribution**: directed transfers outperform other mechanisms
   - **Focus on efficiency**: corporate and capital tax reductions/debt reduction
   - If **initial income tax system is very inefficient**, using the carbon tax revenue to make it more efficient could enhance both equity and efficiency.
   - **Using the revenue for green investments**, could enhance support from citizens which are unaware of the workings of a Pigouvian tax.

Latest example: Californian „Cap and Dividend“?

- Legislative proposal (SB775), announced May 1, 2017 to replace existing Californian ETS from 2021 on.
- Cap and Trade scheme with price floor (details debated).

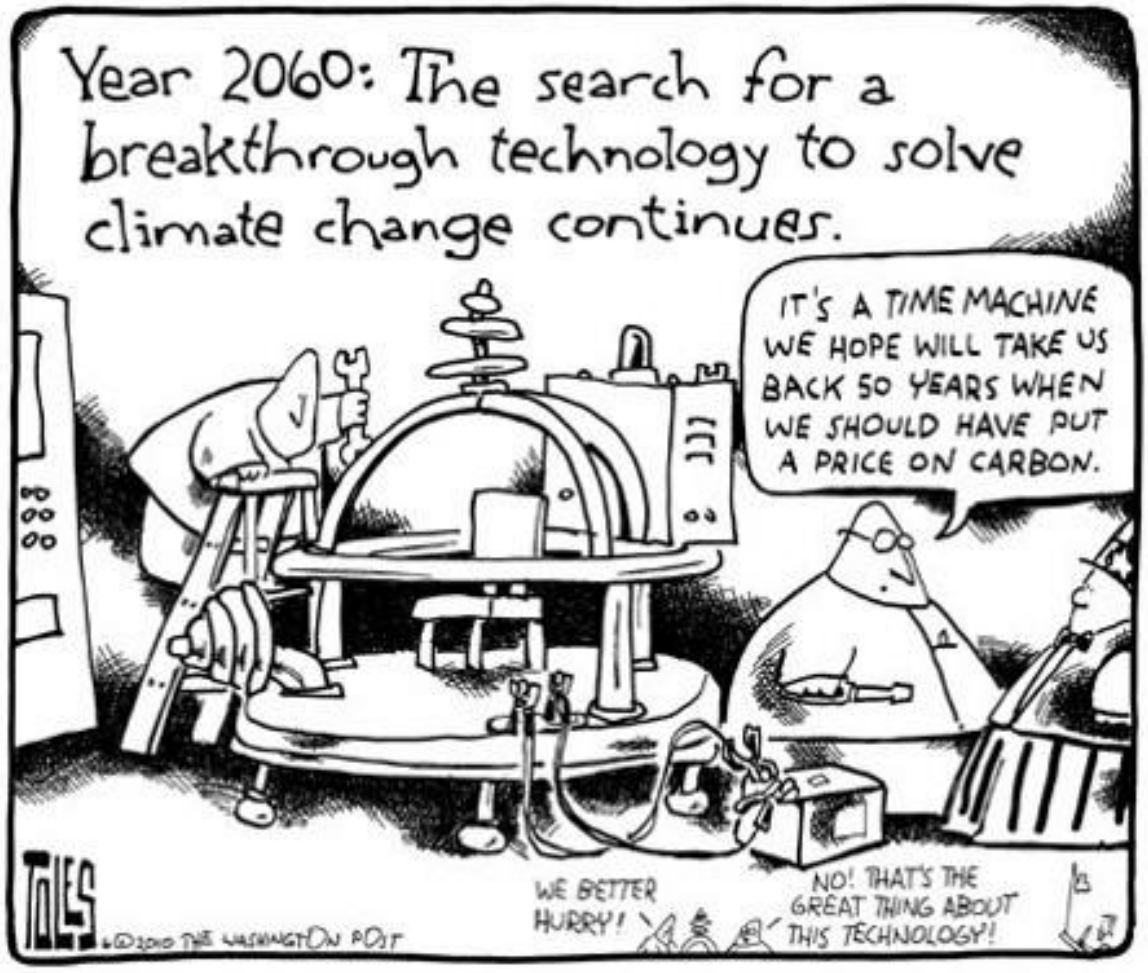
Revenue recycling:

- 50-90% as **lump-sum dividend**
- Remainder used for “**green spending**”:

  -public infrastructure investments, notably in disadvantaged communities

  -climate and clean energy research and development

Thank you for your attention



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