

# The why and the how of flexible regulations for deep decarbonization

**Mark Jaccard**  
Simon Fraser University

**@MarkJaccard on Twitter**

**Smart Prosperity Symposium**  
**Ottawa**  
**February 27-28, 2020**

# Why consider flexible regulations instead of, or alongside of, carbon pricing?

Not true that carbon pricing is essential for deep decarbonization.

Can be 100% one or the other, or a combo.

Not certain that carbon pricing is always far more efficient.

Depends on design of policy - regulation or carbon price.

Political acceptability a big challenge for pricing.



# What are flexible regulations? (flex-regs)

A performance standard which obligates all firms in a sector to meet the requirement or pay others to do extra or pay significant fines

- \* increasing renewable electricity, low-&-zero emission vehicles, etc.
- \* decreasing industrial emissions intensity, fuel carbon intensity, etc.

Flexible response allowed those under the regulation mimics some of the cost reducing incentives of carbon pricing

- \* does not pick technology or energy winners, but lets market decide
- \* allows trading among market participants to reduce compliance cost

Are flex-regs a form of carbon pricing? No, but . . .

- \* c-tax / cap&trade can be called “explicit” emissions pricing, while
- \* flex-regs could be called “implicit” emissions pricing.



# Example of flex-regs in transportation: ZEV & LCFS

ZEV - zero-emission vehicle standard.

- \* vehicle sellers must meet future min % sales of ZEVs or pay large fine per vehicle sold in excess of target (ZEV is broadly defined)
- \* can trade credits among themselves to achieve aggregate target
- \* will cross-subsidize between vehicle types to achieve target

LCFS - low carbon fuel standard

- \* weighted average full-cycle carbon intensity of fuels must decline
- \* sellers of fuels must reach intensity targets or buy credits from others
- \* eligible "fuels" include electricity, hydrogen, natural gas, biofuels
- \* sellers of gasoline and diesel must raise prices to provide sufficient subsidies (purchase credits) to providers of low-emission energy

# Why the name flexible regulations?

Economists often characterize regulations as economically inefficient by being “inflexible” - limiting compliance options.

While this is an accurate depiction of many regulations, it is not inevitable - depends on design.

The more a regulation allows flexibility in achieving sector compliance, the more it approaches the efficiency of carbon pricing.

# What is a flex-reg not?

Flex-reg does not mean a regulation that allows “carbon offsets” to substitute for physical compliance in the regulated sector.

Flex-reg does not mean a regulation that allows “demonstrated innovation” to substitute for physical compliance.

Flex-reg does not mean a regulation that allows “market development investments” to substitute for physical compliance.

These and other attributes are not flexibility. They are loopholes that industry will propose and regulators must deny or minimize.

If the goal of any decarbonization policy is to stop using coal or oil, should the affected industry be allowed at the table?

# Won't flex-regs for deep decarbonization face the same political challenges as c-tax?

Possibly. But let's keep examining evidence from (1) jurisdictions that are leading and (2) surveys of key voters.

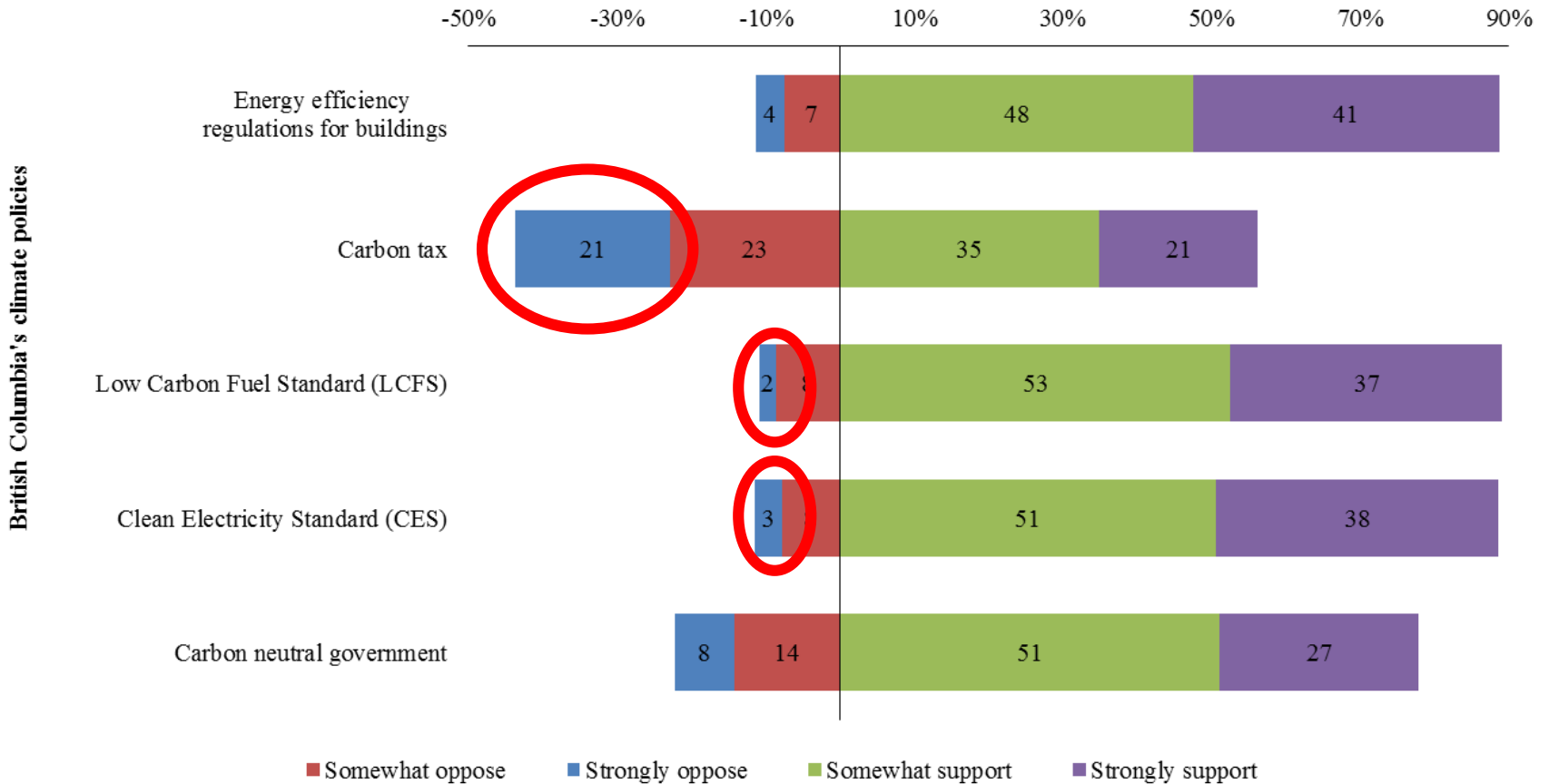
If carbon pricing is lead policy, climate-sincere politicians must survive lies of climate-insincere politicians targeting a small % of voters in key ridings - "carbon tax destroys the economy!"

If flex-regs are lead policy, climate-sincere politicians must survive the sophisticated resistance of a few major industries.

Both difficult - as all effective climate policy is. Which is why:  
we must not blindly push our own agendas on politicians  
we must provide useful evidence to help them make trade-offs.

# Evidence from BC's multi-policy experiment

Survey of 400 British Columbians a few years after BC's policies implemented and widely debated. Little knowledge except of c-tax.



C-tax has 7 to 10 times more 'strong opposition' than LCFS / CES.

Yet, CES produces 5 times more GHG reduction in electricity by 2020

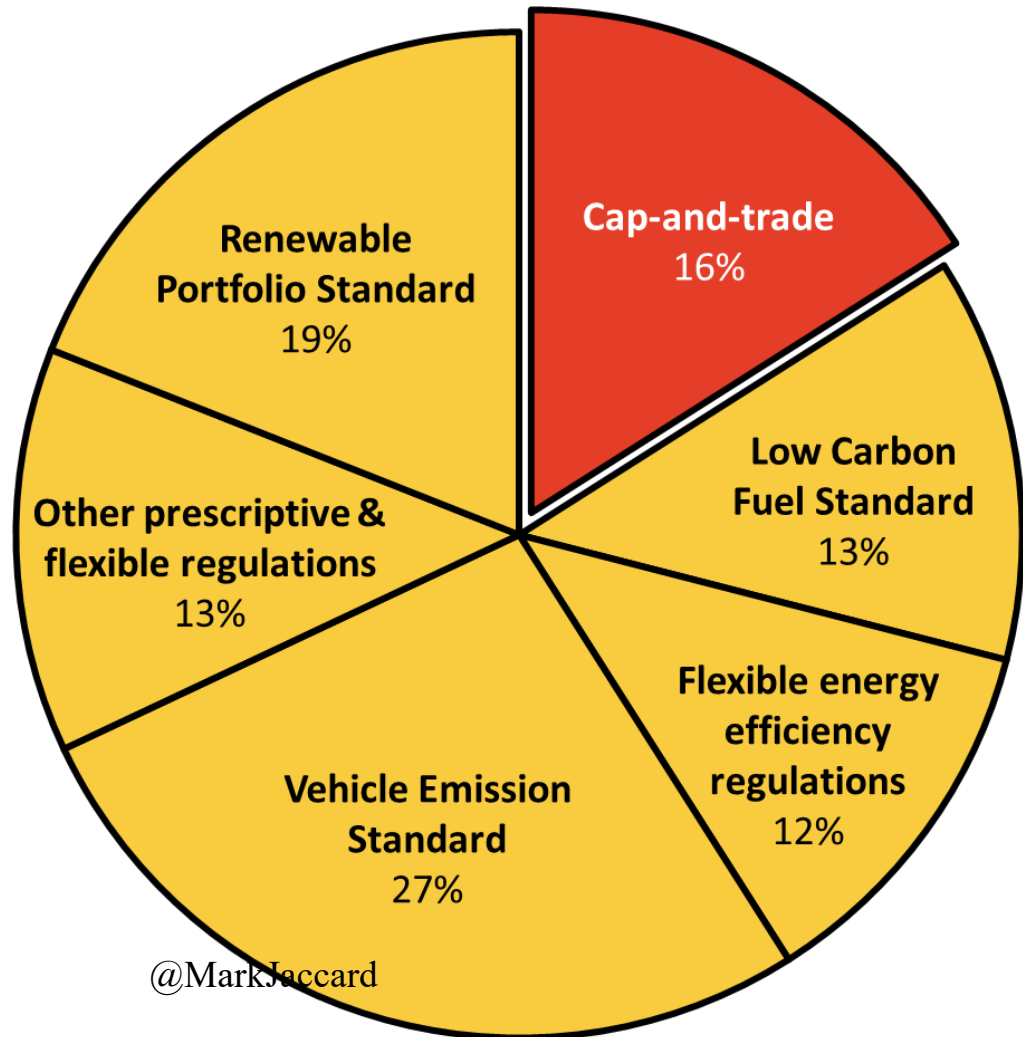


# Most leading jurisdictions rely on regulations (with some subsidies and carbon pricing)

California's GHG past  
and projected  
reductions to 2025.

Carbon pricing (cap &  
trade) contributes only  
16%.

Most reductions  
caused by regulations.



@MarkJaccard

# Researching economic efficiency difference of c-tax vs LCFS for deep decarbonization

Studies of California-BC (low carbon fuel standard) LCFS suggest it costs 2-5 times more than c-tax for marginal cost of GHG reduction.

But some results due to low LCFS stringency in these studies:

- \* assume LCFS to get 10% reduction instead of deep decarbonization, hence negligible price signal for demand reduction, effic. vehicles, etc.
- \* inflexibly high life-cycle GHG emissions of biofuels, but with deep decarbonization near-zero-emission providers would dominate
- \* exclude electricity and hydrogen, yet LCFS allows electric, hydrogen & biofuel vehicles, which dominate under deep decarbonization

We instead tested LCFS & c-tax for 65% GHG reduction of Cdn transport with energy-economy simulation (CIMS) and CGE (gTech) models

# Results: indicators of economic efficiency differences, c-tax vs LCFS

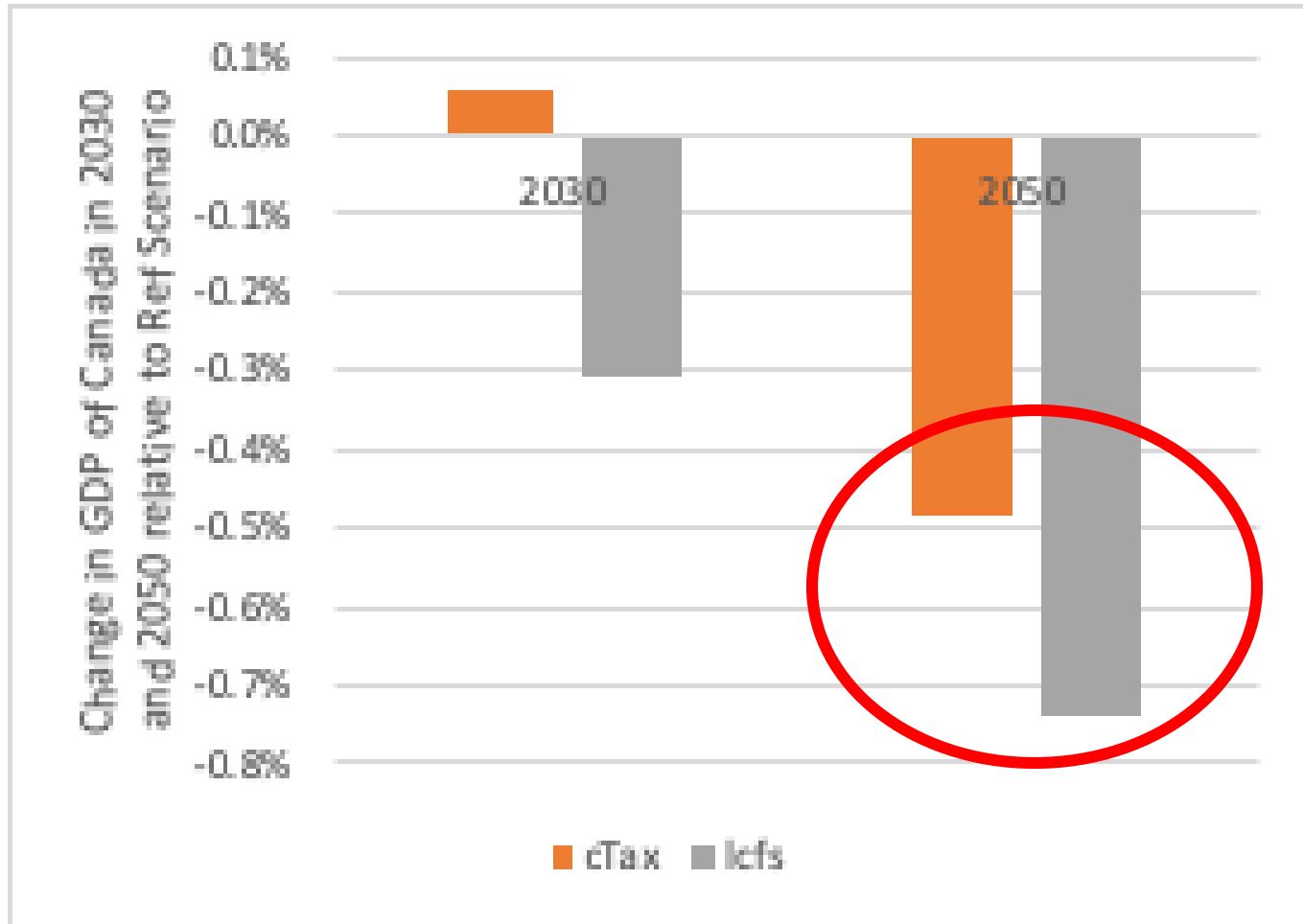
As policy stringency rises, both LCFS and c-tax policies:

- \* raise mobility cost, causing small mobility demand reduction
- \* raise vehicle mobility cost, causing mode shift and vehicle efficiency
- \* raise gasoline vehicle cost, causing vehicle fuel switch.

Differences between the two policies are modest for mobility costs, vehicle use costs, retail energy prices, CO2 abatement costs, and GDP costs.

- \* ave cost of abatement for 65% reduction: C-tax  $\approx$  \$130, LCFS  $\approx$  \$180
- \* negative GDP impact slightly greater for LCFS

# Change in GDP relative to BAU (65% GHG reduction): LCFS vs c-tax



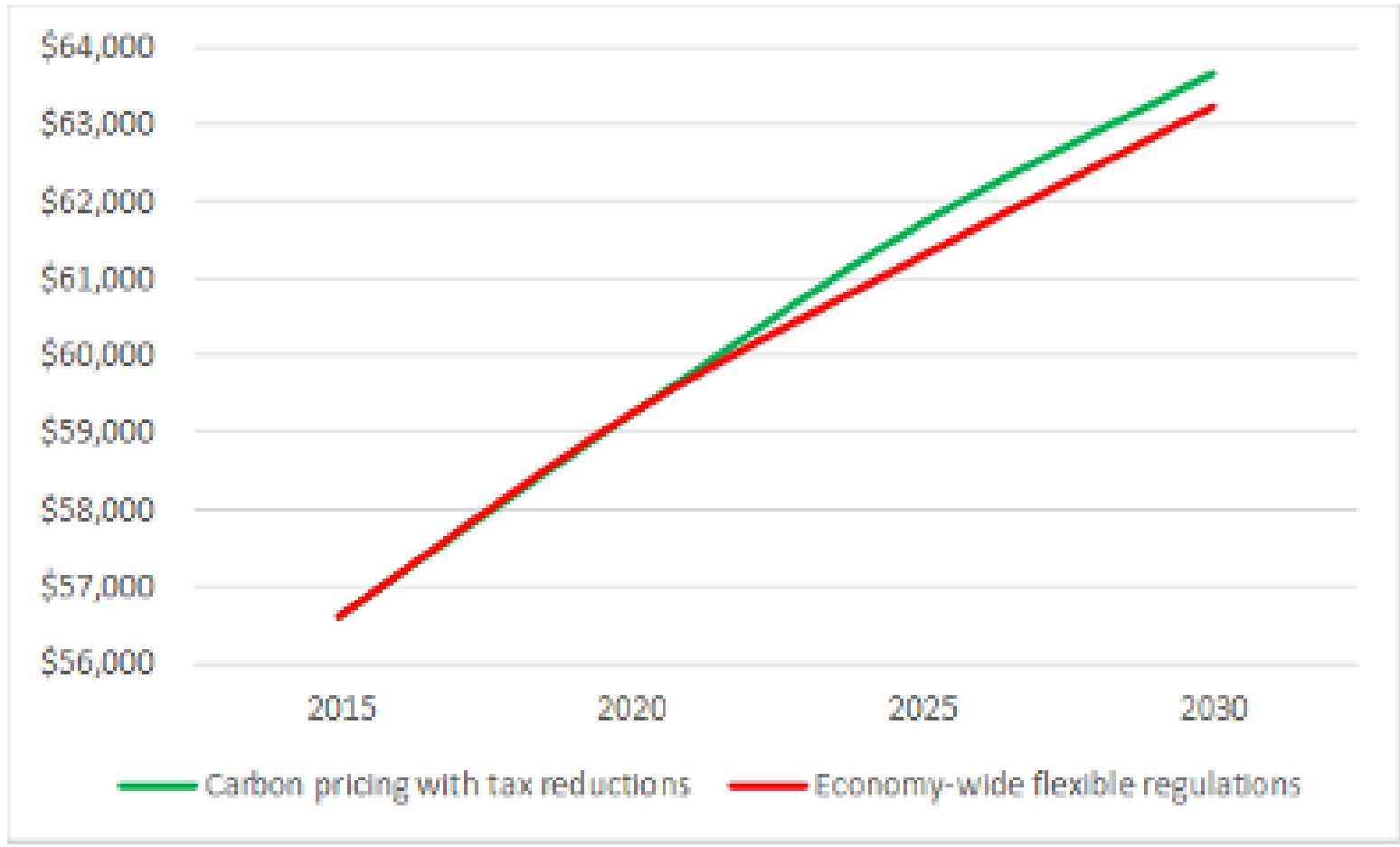
# Economy-wide deep decarbonization: Package of flex-regs vs carbon price

Ecofiscal Commission study of Canada and its 2030 GHG target, comparing economic costs of carbon price vs flex regs package.

Effort to set efficiently designed flex-regs.

- \* electricity - declining carbon intensity reg with tradable permits
- \* transportation - rising stringency LCFS focused on end-use
- \* buildings - rising stringency clean fuel standard focused on end-use
- \* light industry - rising stringency clean fuel standard
- \* emissions-intensive industry - carbon intensity with penalty or output based pricing system (same thing)
- \* municipal waste, forestry and agriculture - regulations

# Canadian ave GDP/cap using c-tax or flex-regs to achieve Paris: Navius for Ecofiscal



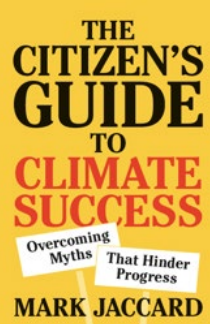
# Conclusion

Economists have been telling politicians that the energy transition requires c-taxes, even claiming these are **essential**. This incorrect claim may have played a role in policy procrastination.

Carbon taxes (even cap-&-trade) have not dominated the policy mix in the few jurisdictions / sectors where rapid GHG reduction has occurred.

Rather than (1) only promoting carbon taxes and (2) only showing efficiency losses of regulations, economists might better help estimate the long-run long-run cost implications of better regulatory policy designs.

**To help climate-sincere politicians with mission impossible!**



Thank you

Order book now on Amazon  
and other providers.  
Free e-version online at  
Cambridge University Press

Learn more at:

(blog) [markjaccard.com](http://markjaccard.com)

(twitter) [@MarkJaccard](https://twitter.com/MarkJaccard)

2020

[@MarkJaccard](https://twitter.com/MarkJaccard)

# THE CITIZEN'S GUIDE TO CLIMATE SUCCESS

Overcoming  
Myths

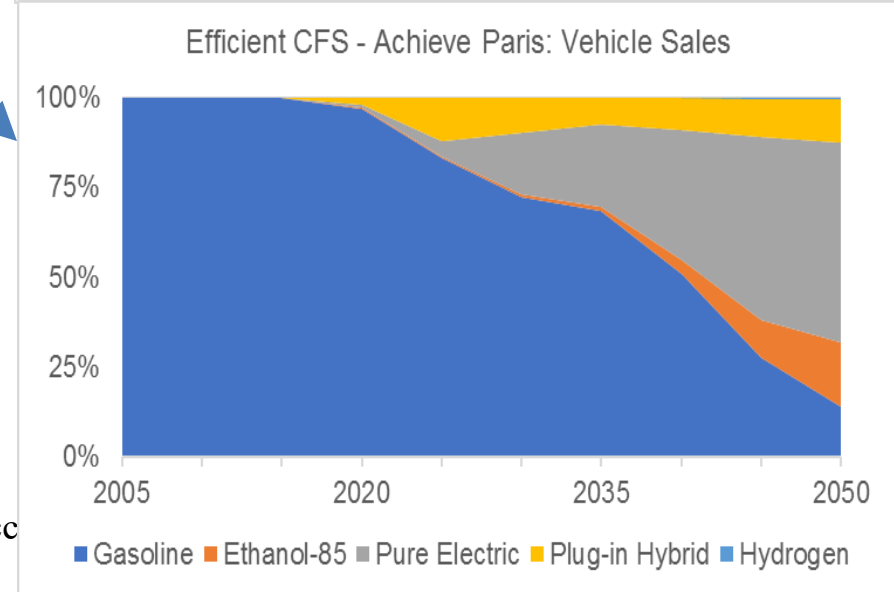
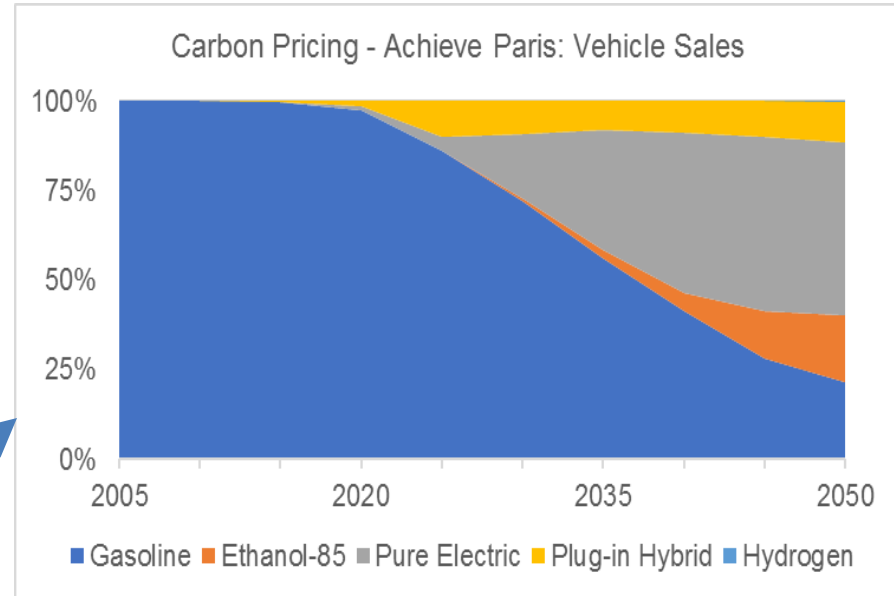
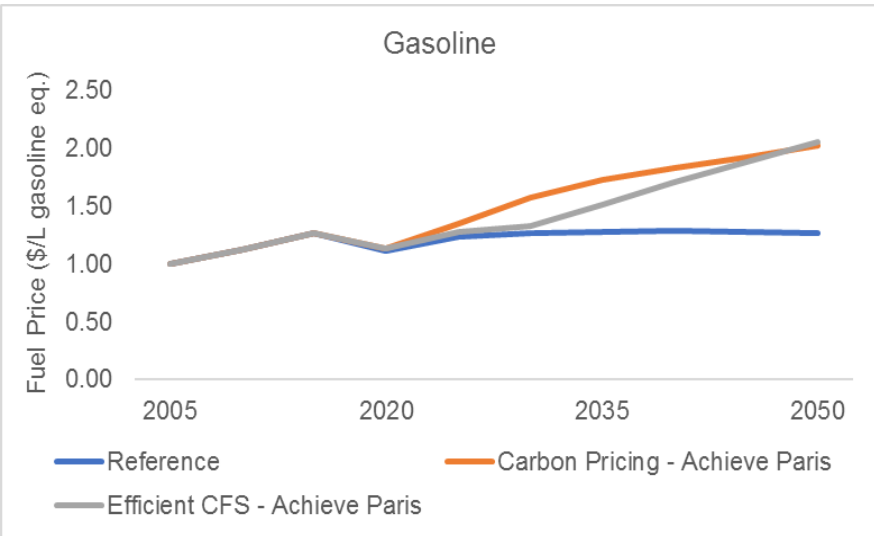
That Hinder  
Progress

MARK JACCARD



# LCFS (CFS) vs c-tax: gasoline price and car sales

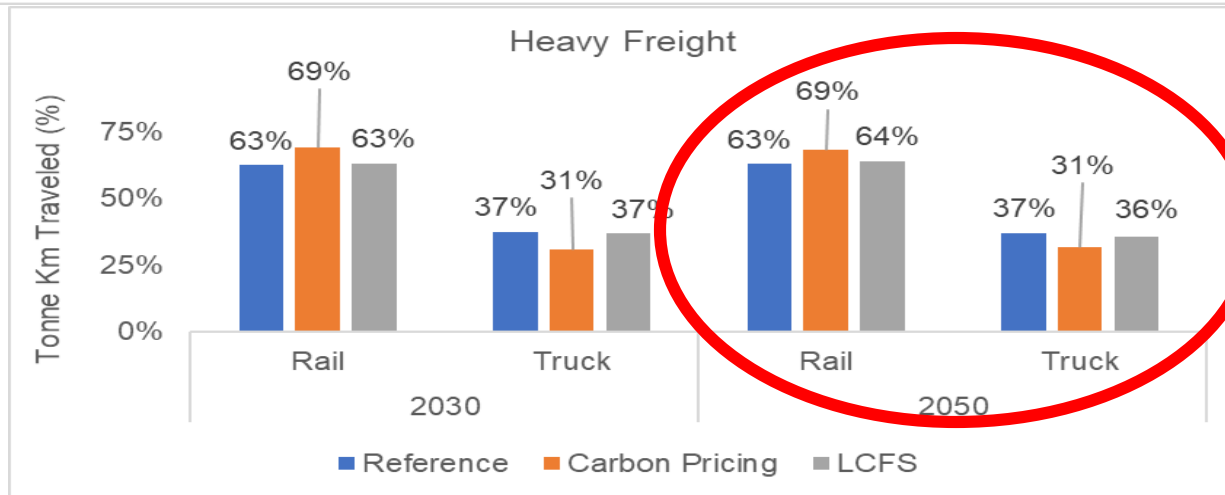
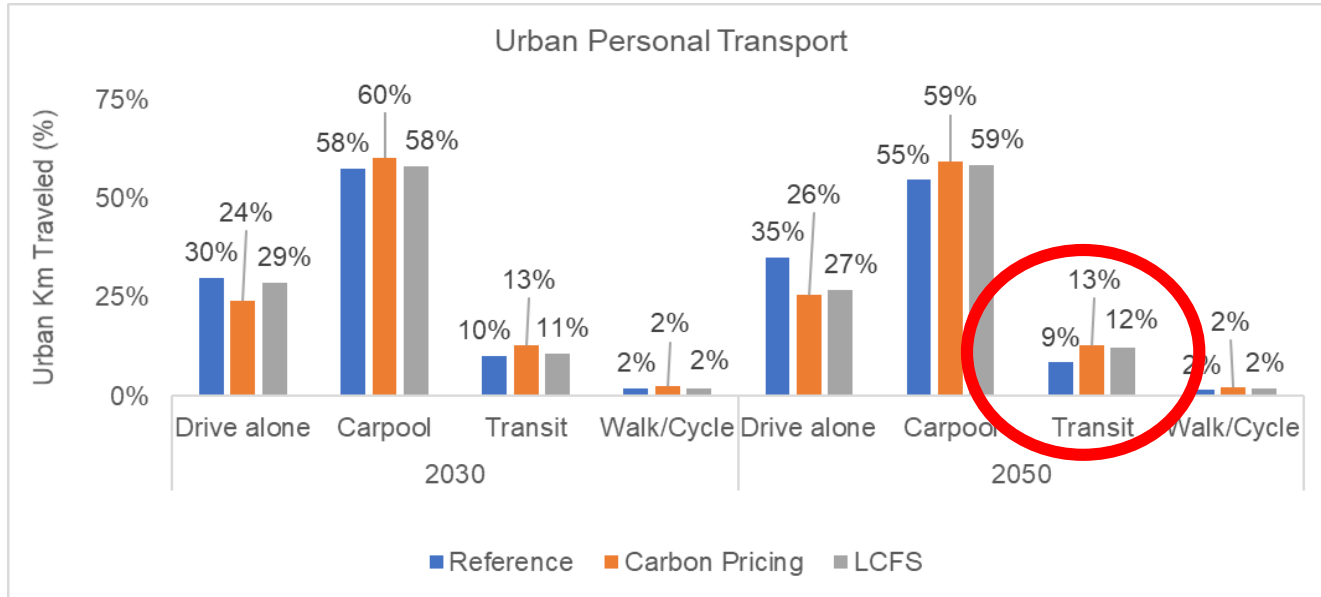
CFS is federal name for LCFS.



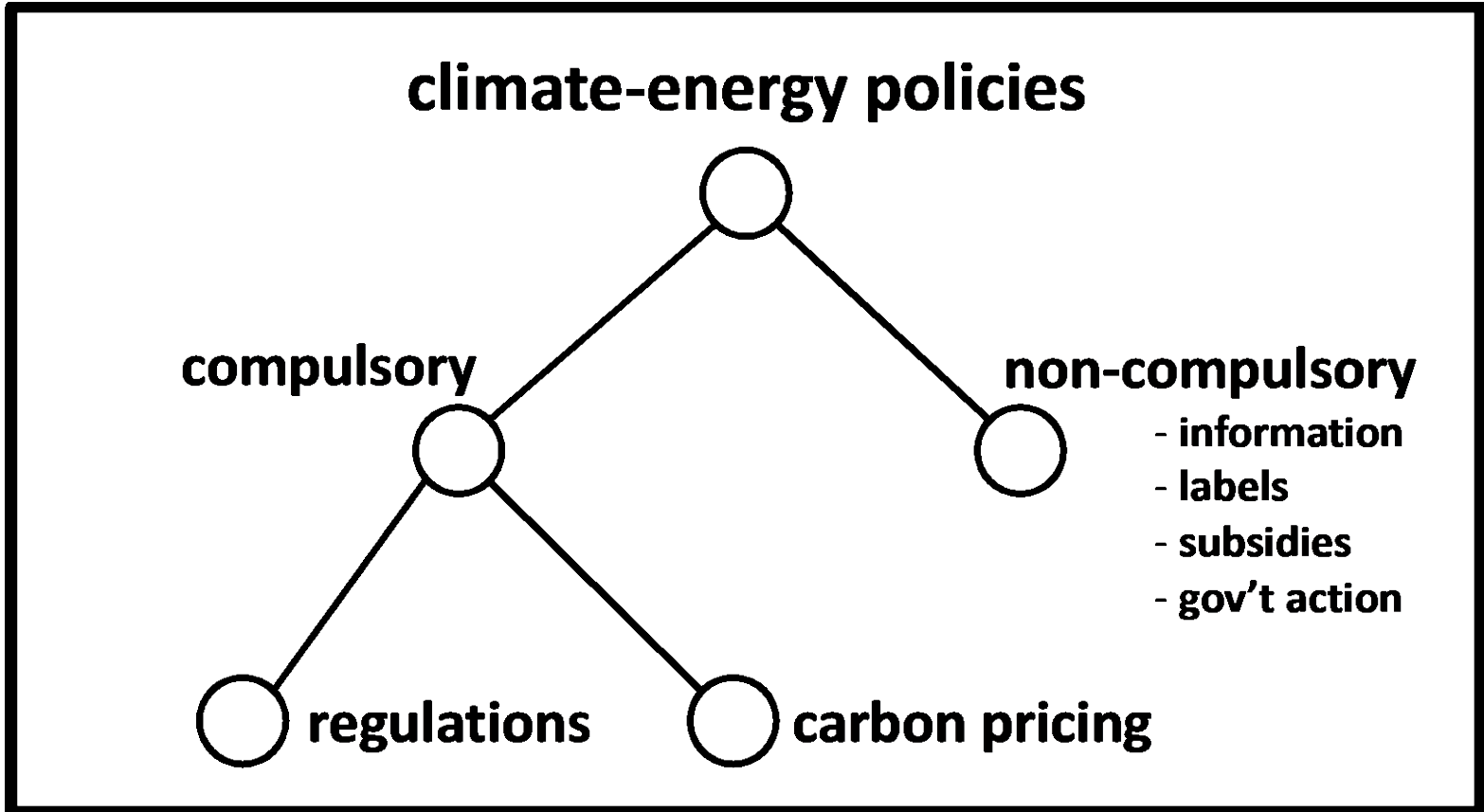
Gas price rises faster with c-tax, but by 2050 equal with CFS gas price.

Gasoline cars hang on a bit longer.

# Results: small mobility mode share differences, LCFS vs c-tax



# Compulsory policies essential for deep decarbonization



# Why might pursuit of carbon pricing be economically inefficient?

Stern (2006) estimated shift from 4 C to 2 C path would cost 5% of global GDP and not-shifting 20% of GDP in damages.

The 5% cost assumes leading policy a carbon tax. What if less-efficient, but flexible regulations cost 7% of global GDP to prevent the 20% damages?

And what if policy research says efficient approach has 20% likelihood of implementation while less efficient approach has 50% likelihood?

'Expected benefit-cost' analysis:

c-tax insistence:  $(.2 \times 5\%) + (.8 \times 20\%) = 17\%$  expected GDP cost

flexible regulations:  $(.5 \times 7\%) + (.5 \times 20\%) = 13.5\%$  expected GDP cost

Penny wise and pound  
foolish on climate policy?  
@MarkJaccard