Oregon Cap and Trade

Cap and Trade vs Tax vs Direct Regulation

The idea is to limit the amount of GHG emissions by getting a price on them. This is a classic externality problem with a few classic solutions.

- *Direct Regulation*: Limit how much from each site or tell people how they must control GHG. Renewable portfolio standards and fuel prohibitions fit in this category.
- *Tax*: Charge per ton of CO_2 or CO_{2e}, the e is equivalent and gets at the other gasses that act in a similar way.
- *Cap and Trade*: Allocate property rights, allocations, and allow people to trade.

Direct Regulation

This is a very common approach. It gets the reductions but does not do it at the lowest cost.

- Some site find it easy and some find it hard to make reductions.
- Example:
  - Site A costs 1$ ton to reduce GHG and Site B, $3 per ton.
  - If each reduce 1 ton, two total, the cost is $4.
  - If site A reduces two tons and site B reduces not at all, the cost is $2.

Carbon Tax and Cap and Trade

- Tax, pick a price that is consistent with the desired emissions per year.
  - Tough to get the right price.
  - All natural variation and uncertainty creates variable emissions.
- Capt and Trade, treat the right to produce GHG like any other property right.
  - Gives a known emissions level but natural variation results is variable prices.
  - Business hate it when costs are variable.
  - Right to produce is called an allocation.

Carbon Tax

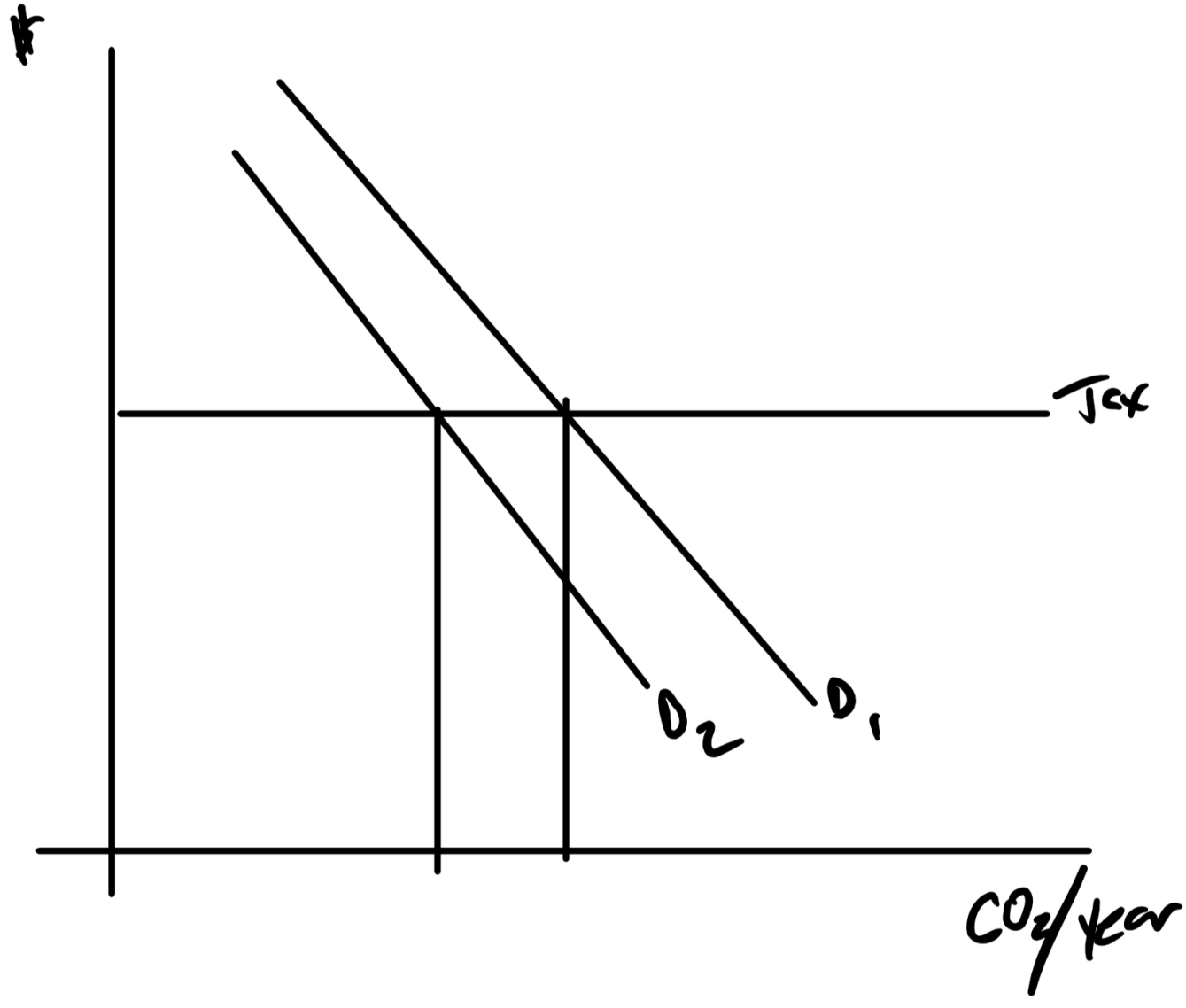

Figure 1:

Cap and Trade

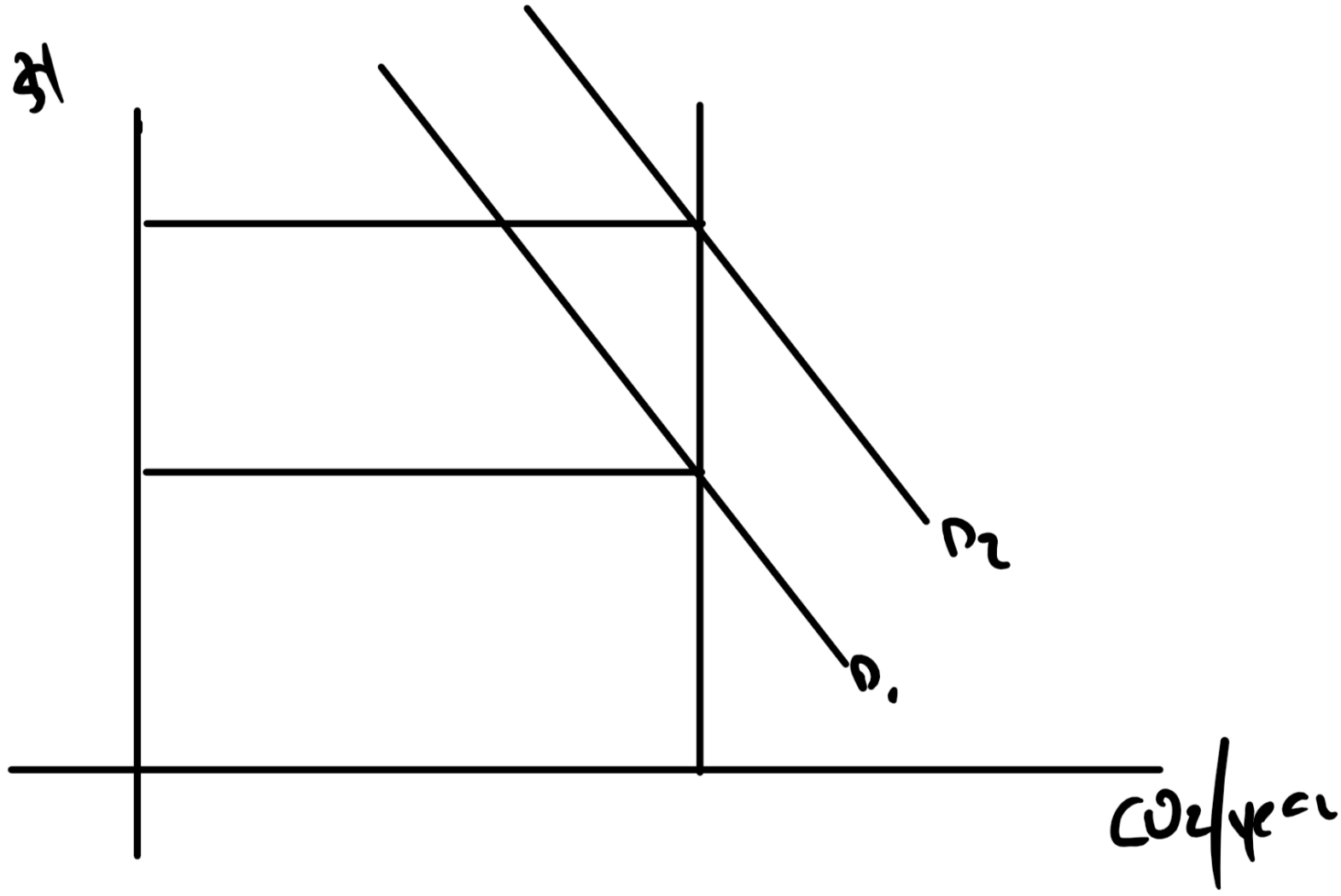

Figure 2:

Room for Compromise

You can put and ceiling and a floor on the price of allocations – a collar.

- Gives environmentalist certainty.
- Produces less variability in price for business.

Like all market constraints, it complicates things. What do you do when the price hits the floor or ceiling.

Bounding Price

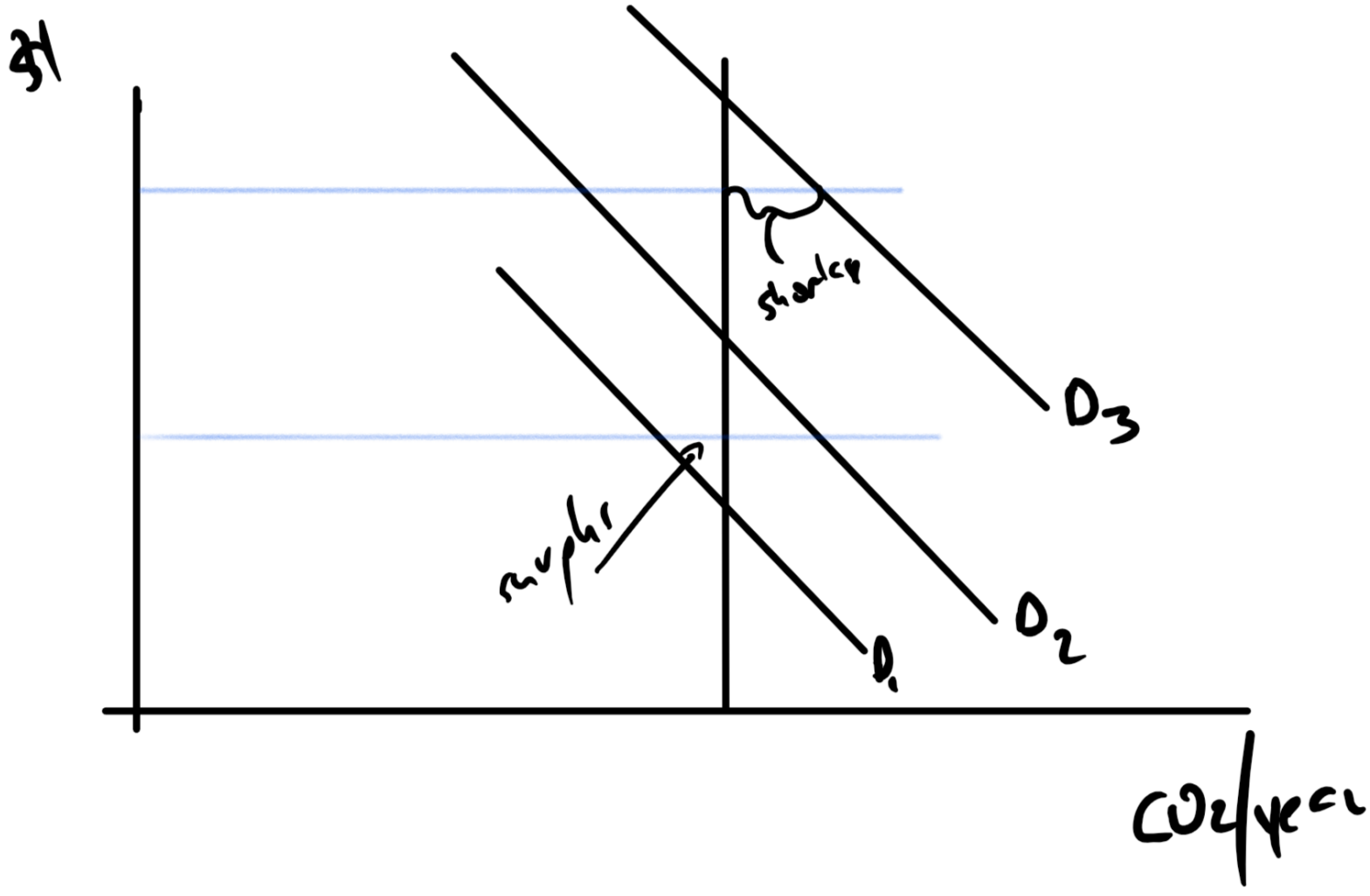

Figure 3:

Shortage and Surplusses

- At the ceiling, people want more allocations than exist.
- At the floor, people want fewer allocations than are for sale.

You need a mechanism to allocate when you can't user price.

Method 1

Just ignore it:

- At the ceiling, some people will be able to buy allowances and others will not.
- At the floor, some people will be able to sell and others will not.

The floor is rough if you counted on selling the allowances for revenue. The ceiling it rough if you need an allowance and can't buy.

Econ Picture DWL

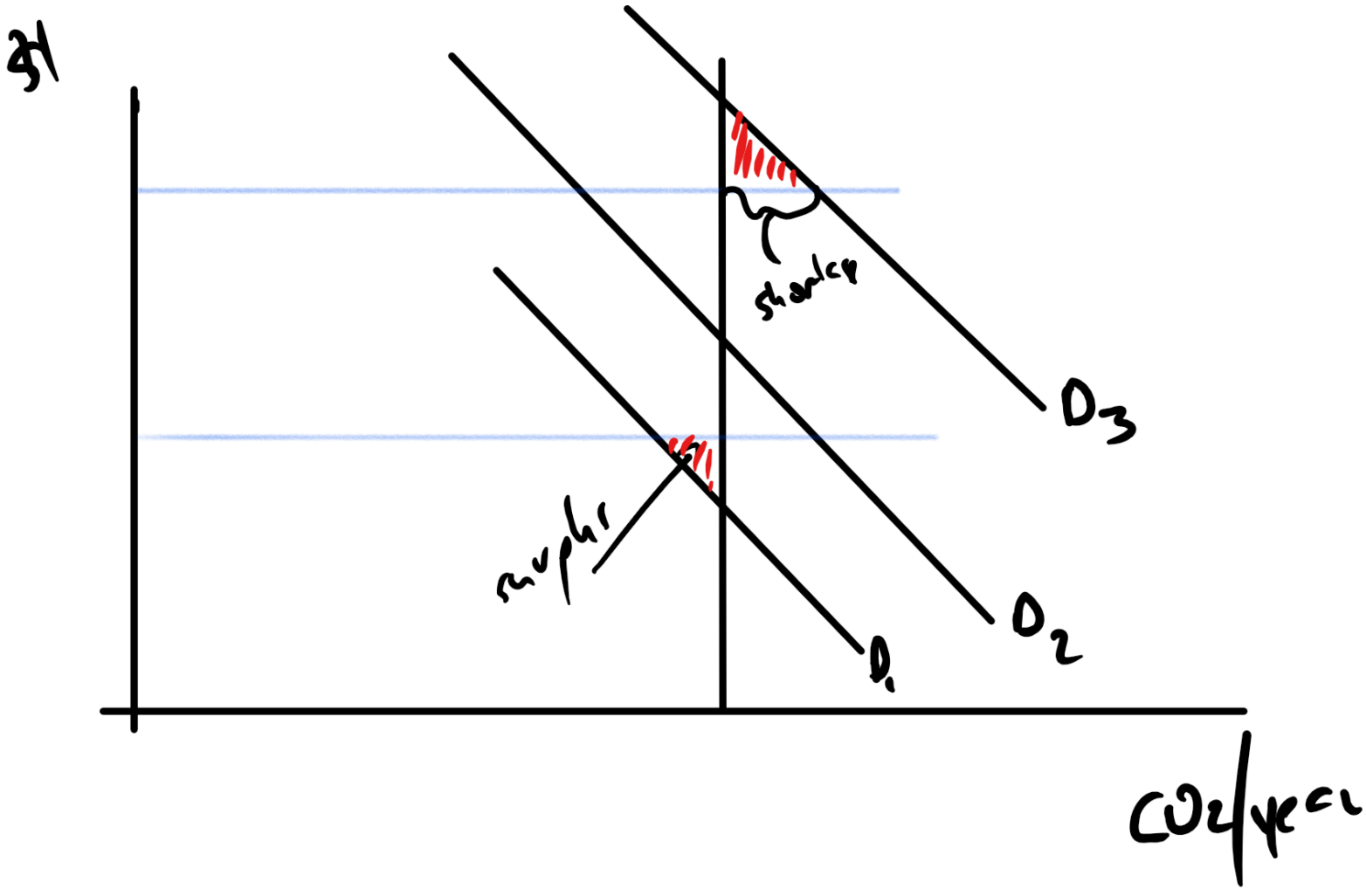

Figure 4:

Market Maker Approach

Someone (Government) stands ready to buy and sell allocations at all times:

- They buy when prices hit the floor
  - Hope you don't run out of money before you get to sell.
- They sell when the prices hit the ceiling.
  - Hope you bought enough when you were at the floor.

No guarantee of revenue neutrality. History shows that these spend a lot of time at the floor value.

Why so much time on the floor?

- Plenty of direct regulation, e.g., RPS, coal bans, to reduce GHG emissions.
- The annual limitations, supply, must make sense given the price floor.
- The annual allocations have been far too large given the floors.

Allocation prices on the floor are not evidence that direct regulation is all we need, it indicates we picked the wrong floor/annual allocation combination.

Why being on the floor is bad

Besides allowances there are also “offsets”

Offsets are new reductions in GHG:

- Geologic sequestration of existing.
- Methane capture
- Agricultural land management that reduces emissions.

If the price is low, you don’t invest to make these reductions.

Changes from Year-to-year

- With a carbon tax, this would be a slow increase in the tax from year to year.
- For cap and trade with a collar.
  - Annual reduction in allocations
  - Annual increase in both the ceiling and floor.

Oregon Complications

We are trying to do cap and trade with a collar but there are complications:

- OR constitution says gas taxes have to be spent on highways.
- "Revenue bills" have to pass legislature with 3/5 majority
  - Recent court decision is redefining revenue bills.
  - There is still room for appeal.
  - Still room to punt – "send it to the voters"
- Reasonable resources for transition
  - Somehow raise money from the sale of allocations.
    - Consignment
    - Free allocations
    - Direct sale
  - An investment plan

Oregon Complications (Con't)

- "Leakage" firms leaving the because of a price on carbon
- Complex rules that could make some people pay twice for GHG and other pay not at all.
- Interaction between:
  - Global Warming Commission
  - Public Utilities Commission
  - Department of Transportation
  - Oregon Business Development Department
  - Department of Environmental Quality

Current State of Affairs

- There is a placeholder bill from the 2017 session SB 1070 "Cap and Invest" (https://olis.leg.state.or.us/liz/2017R1/Measures/Overview/SB1070)
- They have been holding work groups to explore the ideas and get feedback (https://www.oregonlegislature.gov/helm/Pages/clean-energy.aspx)
  - Meeting material and video online.
  - If you have the time watch the videos
    - "Steakholder" group with a few experts thrown in
    - Sen Beyer used to be on PUC and was the executive director.
    - Carl Fink is very good
- I will spend little time on how to spend the money.

Major Questions

- What goes in legislation and what is rule making?

Wait. . . Rule making?

- Legislatures pass bills that become law, statute for the most part
  - Oregon Revised Statutes (https://www.oregonlaws.org/oregon_revised_statutes)
  - United States Code (http://uscode.house.gov/)
- Laws are always incomplete so you need clarification on what they mean, the clarification are called many things:
  - Code of Federal Regulations (CFRs) (http://www.ecfr.gov/)
  - Oregon Administrative Rules (OARs) (http://sos.oregon.gov/archives/Pages/oregon_administrative_rules.aspx)
  - Policies

Rule Making Body and Implementation

- Regulation are made by rule making bodies
  - Commissions and Boards: commission are told to do things by another higher group and formed by them. Boards are at the top.
  - HECC was created by the legislature
  - Boards of Education were created on their own.
- Implementation is by staff in an agency or other government body.

Example New Oregon Law

- New ORS
- Agencies and commissions created by Oregon Law create new OARs
- All governments under oregon law must obey the ORSs and OARs
  - They create detailed ‘regulations’ often called ‘polices’ if they need to.
  - The laws these other bodies make are also called ‘polices’.

Federal Example

- New US Code
- Agencies and commissions created by Federal Code create new CFRs
- All governments under US code must obey, so legislatures may create new laws *or*
  - Their agencies may create new regulations to clarify
  - The other downstream Boards may make policy independent of the level above.
  - Schools would write new policy for a CFR change even if OARs did not change.

Administrative Procedures

- Most states have them. Oregon is https://www.oregonlegislature.gov/bills_laws/ors/ors183.html
- The federal is in Title 5 section 500 of the US code.
  - It dates back to 1946 and sets up the adversarial system
  - Also record keeping and some other procedures.

How to make a regulation

- Issue a Notice of Inquiry
- Notice of proposed rule making (60 days for comment and 30 to reply)
- Further notice of proposed rule making.
- For Federal you can look here for the latest. https://www.regulations.gov/
- With state you have to go agency-by-agency.

Other places

- Can be as simple as “noticing” the rule
- Have several readings in an open meeting
- Vote and pass.
- Oregon generally requires two readings.

Always a provision for review

- At federal level, you can see a judge.
- At state level you can do that too, often the commission is the first judge, then you may get an administrative law judge, then a “real” judge
- The legislature may review the regulations. There may be bill in 2018 that requires it.

Remember . . .

Every procedure can be manipulated to an advantage

- Regulation is not apolitical, there is just less press attention.
- Boards and commissions tend to be appointed, not elected, and they are not so sensitive to political contributions.
- Sometimes, the regulators, "Bring a knife to a gunfight"

Involved Agencies

- Global Warming Commission
  - Establish limits
  - "Coordinate"
- Public Utilities Commission
  - Decide how to treat the allowances and offsets
  - Electricity G/T/D
  - Natural Gas
- Department of Transportation
  - How to spend the motor vehicle fuel part
- Oregon Business Development Department
  - How to help people transition
- Department of Environmental Quality
  - Establish a market for CO_2

What is covered.

The intent is to require allowances for:

- Natural Gas
- Electricity
- Motor Vehicle Fuel
- Point sources more than 20kT CO_2

Note that agriculture and Forestry are not connected to this system.
A firm level list is on p. 69
(http://www.oregon.gov/deq/FilterDocs/ghgmarketstudy.pdf)

Point of Regulation

"Point of Regulation" where do you put the meter and who pays.

Key Needs:

- Easy to meter at that point.
- Hard to avoid
- Makes sure nobody pays twice.

Point of Regulation: Electricity

- Must cover in-state merchant generators
- Must cover out of purchases
- Must cover in-state IOU generation

Complications:

- Some generation is gas fired (Avoid double counting)
- Out of state purchases must not run afoul of the commerce clause (Interstate trade is Federal)
- Co-gen?
- Bonneville Power Administration (Federal) is a balancing authority
- Wheeling (Generated out of state, passing through but to elsewhere.)

Point of Regulation: Natural Gas

- Interstate pipelines
- LNG terminals
- Marketers

Complications:

- Ontario has seen marketers split to avoid 20kT limit.
- Mix of inter and intra state pipelines

Point of Regulation: Motor Fuel

- Pipelines (https://www.eia.gov/state/maps.php?v=Petroleum)
- Trucking

Complications:

- Dyed (untaxed diesel)
- Oregon Constitution requires use of "Fuel taxes" on highways.

Point of Regulation Other

Mish mash of:

- Concrete
- Chemicals
- Landfill

This is hard

Leakage

Compound concept

- Businesses leaving regulated area to produce same GHG emissions outside cap and trade area.
- Shifting contracts so lower carbon is counted in Oregon and higher carbon is counted elsewhere.
- Washing the source of emissions.

Business Leaving (Emissions-Intensive Trade-Exposed (EITE))

- Note: emissions not energy.
- Compete with firms that do not face GHG allowance requirements.

Complications:

- GHG allowances are one price, we could be low on others.
- Current thought is to do this based on NAICS codes
- Or, individuals but renormed/assessed periodically

Problem goes away with greater coverage of cap and trade across states.

Shifting Contracts (Mostly Electricity)

Remember that electricity comes from everywhere. Electrons are not 'green' and 'brown', but contracts are.

Example:

- Merchant generator sells green and brown power, 1/2 to ID and 1/2 OR IOUs.
- OR IOU now only wants green
  - All Brown power goes to ID
  - All Green power goes to OR
- No change in net CO_2

Source Washing

Obscure the source of power through a chain of contracts.

Example:

- Buy coal power from A.
- Avoid buying directly from A
  - A sells to B.
  - B sells to C
  - ...
  - Z sells to IOU. We don't know if the power is green or brown so assume Natural Gas

Interaction with PUC

- The Public Utilities Commission (PUC):
  - Regulates retail prices for electricity and gas.
  - Defines allowable expenditures that are then passed on the the consumers in rates
- They must figure out how:
  - They will allow the LDC will treat allowances.
  - How existing coal phase-out interacts
  - How the existing renewable portfolio standards (RPS) interacts

How PUC treats Costs

- $Revenue\ Requirement = Expenses + (Rate\ of\ Return) Rate\ Base$
- *Expenses* are generally on the income statement, but there are a few things that start on the balance sheet and move over to income statement.
- *Rate Base* is generally on the balance sheet, but there are a few things that move back and forth between balance and income.

To be clear, the cost of the allowances will be passed on to the consumer but how?

- Allow only current allowances – Expenses.
- Allow them to bank them (if rules allow banking) – Rate base

The Rate Base Complication

- *If they can hold on to the allowances*, utilities will earn a 'fair rate of return'
- *If the purchase assets at the floor price*, the value goes up by at least the floor price.

$$(1 + \textit{Rate of Return})(1 + \textit{Price Increase}) - 1 = \textit{Utility Return}$$

Can be big

$$(1 + .06)(1 + .05) - 1 = 11.3\%$$

Note that this is risk free.

Coal Phase-out and RPS

- Both are expensive
  - IOUs have purchased new generation and long-term contracts
  - These costs are already embedded in utility rates.

Would you have committed to natural gas if you knew cap and trade was on the way?

Coal Phase-out and RPS Options

- Keep them separate:
  - Add those costs and the allowance costs into the revenue requirement.
  - Easy
- Give them credit for reductions:
  - Give them an allowance credit – every year – for the the difference between coal generation and natural gas.
  - Give them allowance credit – every year – for the avoided CO_2 emissions.
  - Real coal phase-out and RPS.
  - Similar to how going beyond RPS is treated now.

Two Phrases you missed: "Give Allowances", "Banking"

- Banking
  - Ability to save allowances from one year and apply to another.
- How to distribute allowances is not guided by microeconomics theory
  - Theory says it doesn't matter for price, with some caveats.
  - How they are allocated determines who gets the benefits.
    - State sells all – State gains
    - Given to utility – utility shareholders/consumers gain.
    - Can mix

Banking Allocations

- To bank or not:
  - Industry likes to bank. It allows stability
  - Hard to change ex post: European markets collapsed in 2007 when they tried to remove it.
- Options:
  - Limited banking. Three year is common suggested number.
    - 2018 allowances can be used till 2021.
    - Not PUC can be stricter than that if they wish.
  - Degrading
    - 10% less every year.
    - 1 T 2018 allowance is worth .9 T in 2019, .81 in 2020 ,. . .

Consignment, Free Allocations, Direct Expenditures

There are a few ways to allocate ownership of "allocations" (Sorry about allocate being used two ways)

- Free allocations: Given to those intended to use the proceeds for their self interest.
  - Current intent is for EITE industries
- Sale by the state: Used to generate revenue for the state
  - Current for majority of allowances.
- Consignment: Given to a party so that the proceeds of the sale can be used to benefit others.
  - Current for IOUs and LDCs for the benefit of low-income household transition.

Theory: Coase Theorem

- If you can establish property rights on an externality (like cap and trade)
- If transaction costs are small
- The allocation of the rights don't matter, you will get an efficient, Pareto optimal, allocation.

Pareto optimal means no one can be made better off without making someone else worse off.

Quick example

Values:

- Alice values quiet $5
- Bob values throwing a party $8 (Parties are loud)

Note that social welfare is maximized by throwing a party ($8 gain to society vs $5 gain for no party)

There is a right to Quiet

- Bob still wants a party.
- Bob offers Alice money, up to \$8, to be able to throw a party.
- Alice accepts, \$5.

Summary:

- Alice does not get quiet but gets \$5 for a net of \$0
- Bob gets a party and gets benefits of \$8 for the party less the \$5 to Alice or \$3.

Note: Party is socially optimal.

There is a right to Party

- Alice offers Bob $5 to not have a party.
- Bob does not accept and throws a party.

Summary:

- Alice does not get quiet and has net welfare of $0.
- Bob gets a party and has net welfare of $8.

Note: Party is socially optimal.

Summary

- The allocation of property rights (Party or Quiet) does not matter for what happens – a party is thrown.
- What matters is the allocation of the benefits.
  - Right to quiet: Alice \$0, Bob \$3, Party
  - Right to party: Alice \$0, Bob \$8, Party
- If trade is not allowed:
  - Right to quiet: Alice \$5, Bob \$0, No party
  - Right to party: Alice \$0, Bob \$8, Party

Could there be a problem with market power?

- Is there a problem with giving allowances to large emitters?
- Is there a problem with consignment?

Answer: It depends.

Key question: Can those that receive a lot of free allowances leverage market power in either the product or allowance market, to produce market power in the other?

Keep in mind, this is why CA wanted to make sure they connected to other states – they were afraid of the exercise of market power.

There are regulatory policies that can help

- Anti-fraud and manipulation requirements: 17 CFR 36.6 has regs that can help.
- Full access to trades
- Frequent, daily, reporting of transactions prices and volumes
- Connecting to the Chicago Climate Futures Exchange like CA will also put trades under greater scrutiny.
- Regularly reporting emissions.

JUST PUT IT IN THE RULES: No colluding. # Transition Considerations

What the Markets Look Like

- Western Climate Initiative (http://www.westernclimateinitiative.org)
  - Multi-state/province set of rules
  - Trading platform
  - Oregon has an on and off relationship with this.
- California (http://calcarbondash.org/)
- Futures Market (https://www.theice.com/products/31687042/California-Carbon-Allowance-Vintage-2017-Future/specs)
  - California is big enough.
  - Futures markets are where most price discovery takes place
  - Way more transactions.

Market Power Considerations

- Similarities with SO_2 markets
- Use to maintain market power

Offsets

- Offsets protocols https://www.arb.ca.gov/cc/capandtrade/offsets/offsets.htm#protocols
- Offset verification (https://www.arb.ca.gov/cc/capandtrade/offsets/verification/verification.htm)

CA limited this.

8% total now 4% with 2% in state.

Little action because the price of allowances are not high. On the floor.

The Offset Markets and Clawback

California's Offset Reduction

- Allowance allocation
- Risk diminishes with more online and should be removed.
- JW we need to focus on the effect on relative energy prices.
- What about trade patterns changing?