

**Europe's energy transition and Norwegian Policy:
is the quota price a measure of ambition (or commitment)?**

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1. What is this and why would we care;
2. Notice the price level. Please care!
3. Notice the wording: highest projection is called bullish, colored green



- Is it fighting the windmills that is futile
- Or fighting subsidies
- Or transitioning from fossil fuels?
- My answer: futility applies only to fighting windmills



G. A. HARKER-



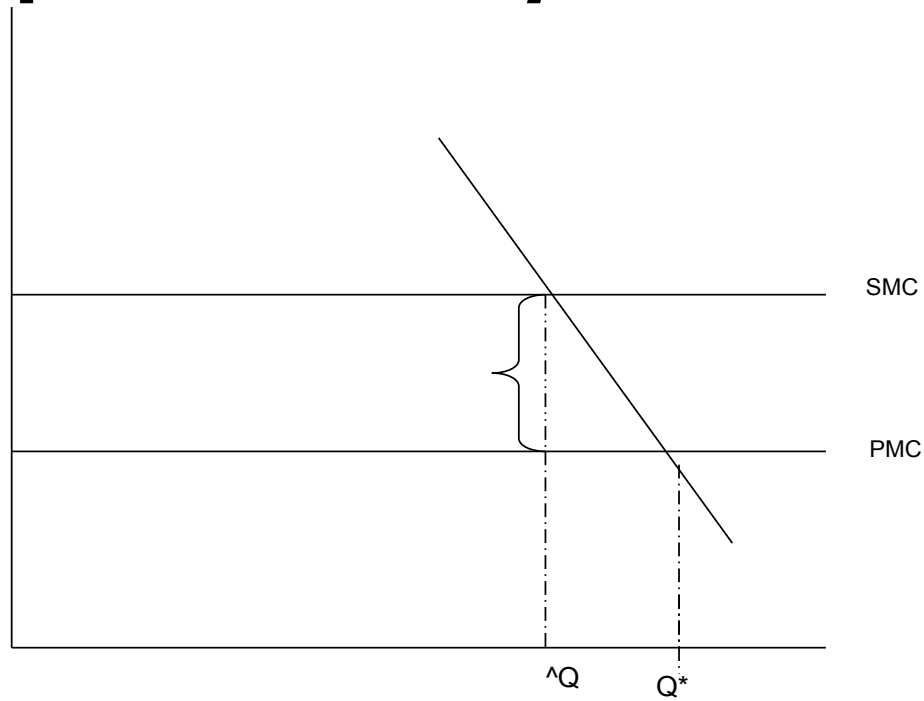
**Benefit cost analysis:
one representative agent
or
Benevolent planner, with
available instruments for costless
transfers, or, slightly more general: a
'planner' whose objective function is
increasing in each individual's utility.
=> neoclassical framework. Strong
assumptions, strong implications.**



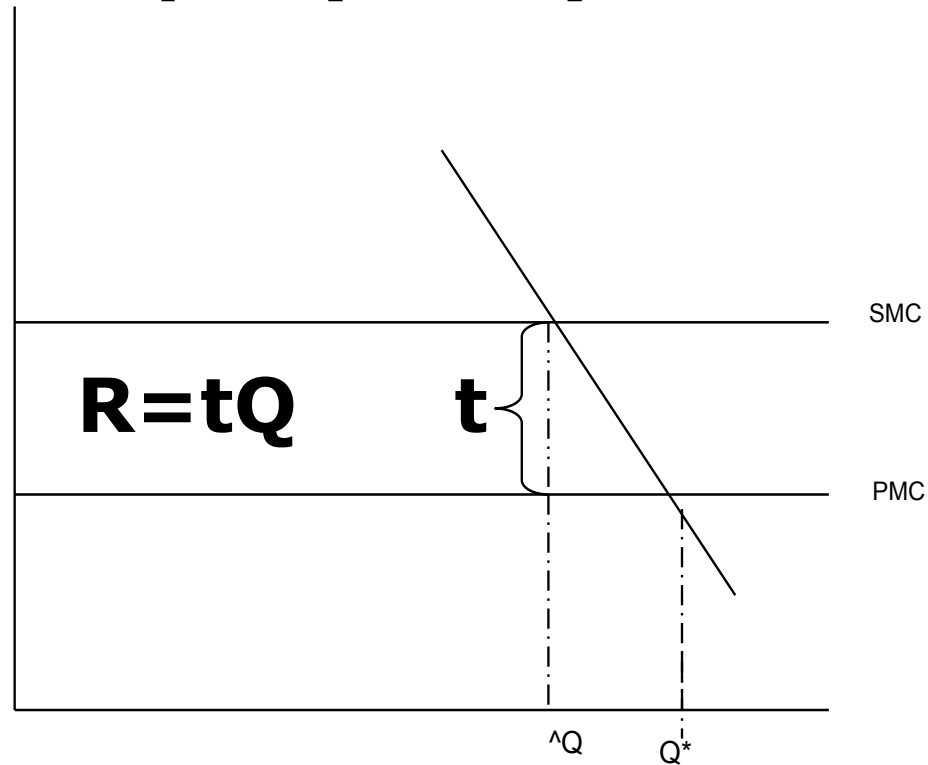
Economics:

- Classical: distribution and efficiency *jointly* determined (Ricardo, Malthus, Smith, Marx (well, and Nash))
- Neoclassical: tricks allowing separation of distribution and efficiency: benevolent planner, costless transfers, efficient negotiations, Hicksian compensation. Coase theorem. Marshall, Pigou, Hicks
- Modern micro-theory: asymmetric information => tradeoff between efficiency and distribution (starts w J Mirrlees). Games: Nash, Aumann, Selten. Climate: Harstad, Barrett.
- Institutional economics: A government successfully or optimally constrained from expropriation? Transaction costs. Coase. Fogel, North, Williamson, Leibcap.
- Political economy: the study of how 'who pays' influences policies and policy instruments: Who owns government. Buchanan.
- One hypothesis: established interests better represented than potential, concentrated interests better represented than dispersed

Neoclassical: Externality: quota & tx *equivalent*



Full Polluter Pays Principle (FPPP)



R could go to government! ?

**Cost effective
pollution control:
Several polluters
Polluters:**

$$c_1 = c_1(y_1, e_1)$$

$$c_2 = c_2(y_2, e_2)$$

Solution: fundamentals

$$\frac{\partial c_1}{\partial e_1} = \frac{\partial c_2}{\partial e_2}$$

So: marginal costs of emission reductions equalized across polluters (across chimneys, users, persons, technologies)

Solution: policy instruments

$$\frac{\partial c_1}{\partial e_1} = \frac{\partial c_2}{\partial e_2}$$

This can be achieved with the help of a very well informed dictator, or with the use of emission taxes, or with the help of quotas that are made tradable.

Appraisal and political feasibility

- Who gains, who loses
- Who influences policy, how (Skodvin et al, an example, Harstad and Eskeland, 2010)
- How do combinations of policy instruments come about
- Focus on *transition*



Example: electricity generation:

- i. Long lived assets
- ii. Greenhouse gases: Some plants 'polluting', others not
- iii. Costly emission reductions:
 - Obsolescence
 - New capacity (and costlier)
 - Capacity utilization
 - (Political costs)
- iv. Limited trade (in and out of Europe, say), limited substitution possibilities

Stakeholders:

- **electricity producers**
- **households and services and other users**
- **electricity intensive industries**
- **(other energy and emission intensive industries)**

An electricity producer: profit function

$$\pi^h(p_e, w, t_g) = \pi^h(p_e(t_g), w, t_g) =$$

π^h = profits, firm h, electricity producer

p_e = producer price, electricity

w = vector (string) of input prices

g, t_g = emissions, and tax on emissions



NHH A profit function: detail

$f^h(x^h)$ output of electricity,

a function of input quantities, $x^h = x_1^h, x_2^h, \dots, x_m^h$

$\sum_j w_j x_j^h =$ total costs, firm h

$$\pi^h = p_e(t_g) f^h(x^h(p_e(t_g), w, t_g)) - \left(\sum_j w_j x_j^h(p_e(t_g), w, t_g) + t_g g^h(x^h(p_e(t_g), w, t_g)) \right)$$

$$\frac{\partial \pi^h}{\partial t_g} = y_e^h \frac{\partial p_e}{\partial t_g} - g^h$$

$$\frac{\partial \pi^h / p_e y_e^h}{\partial t_g / t_g} = \xi_{pe,tg} - \frac{t_g}{p_e} \frac{g^h}{y_e^h}$$

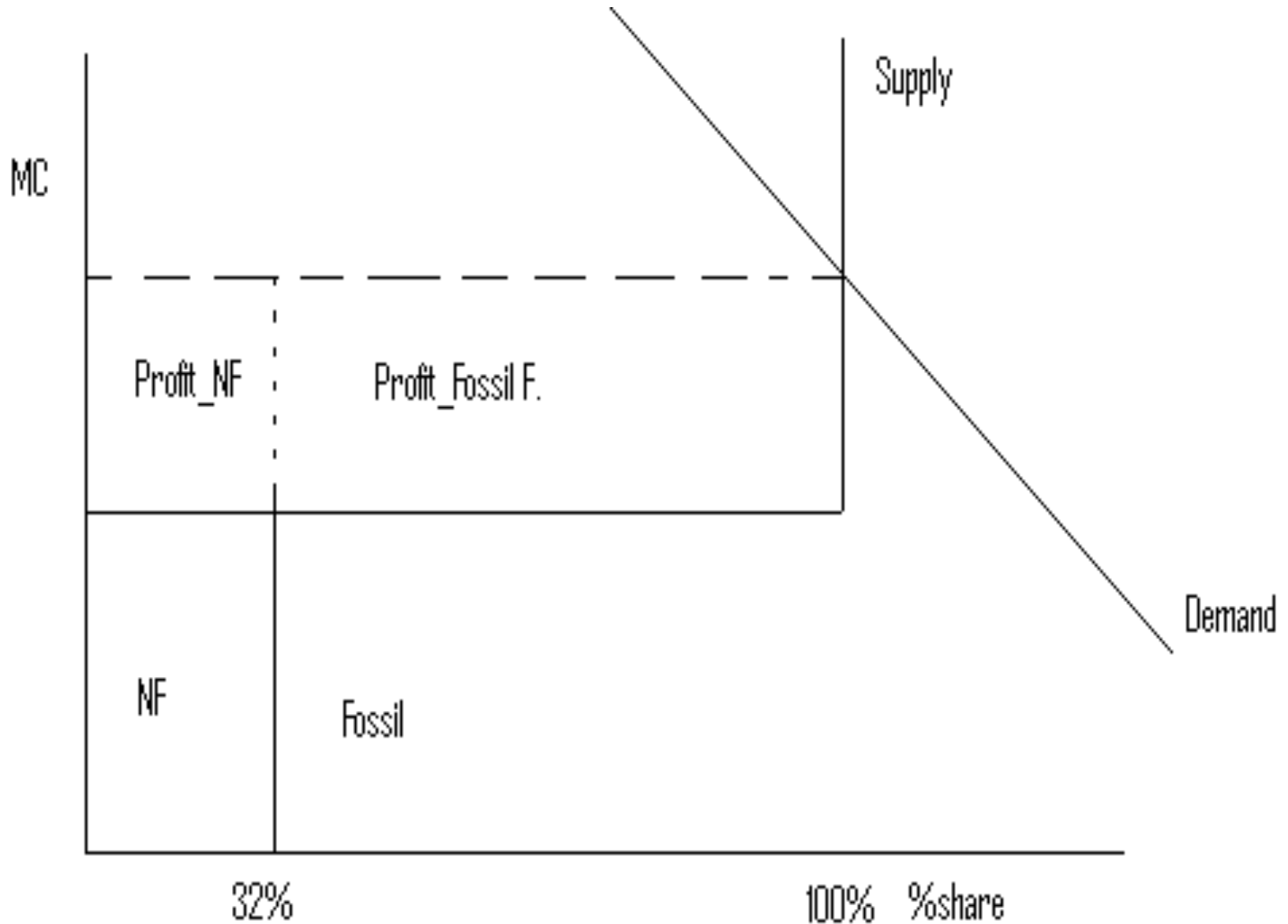
**Findings: is an industry, firm
'hurt' by polluter pays principle?
Depends on (only!!!):**

- 1) Will the price of output increase
(industry, market);**
- 2) Your share of emissions in costs
(firm).**

1) will the price of output increase (industry, market); Let us think of European electricity market

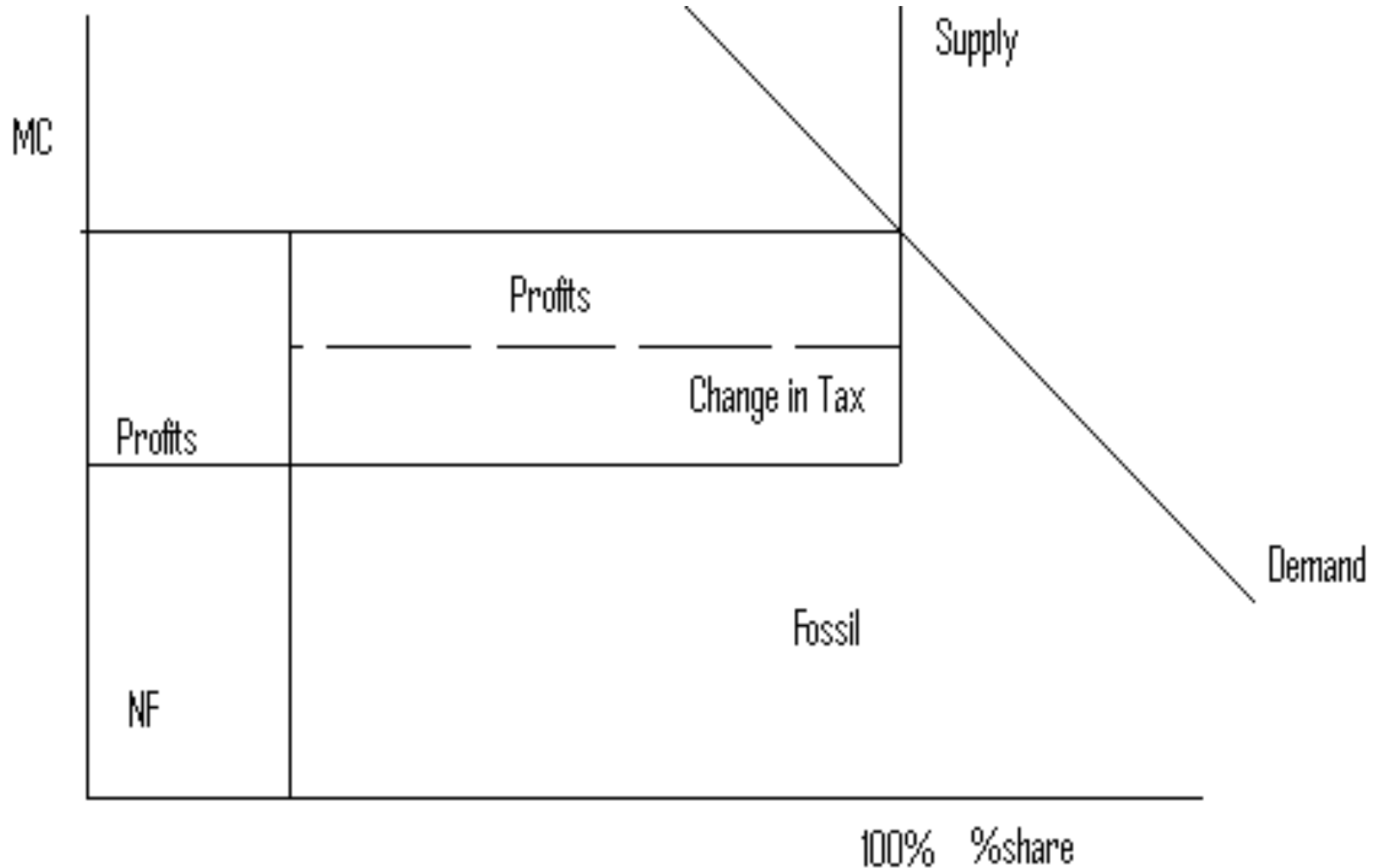
2) share of emissions in costs (firm).

Let us think of Norway and France, versus Germany and Poland. How about Iceland?



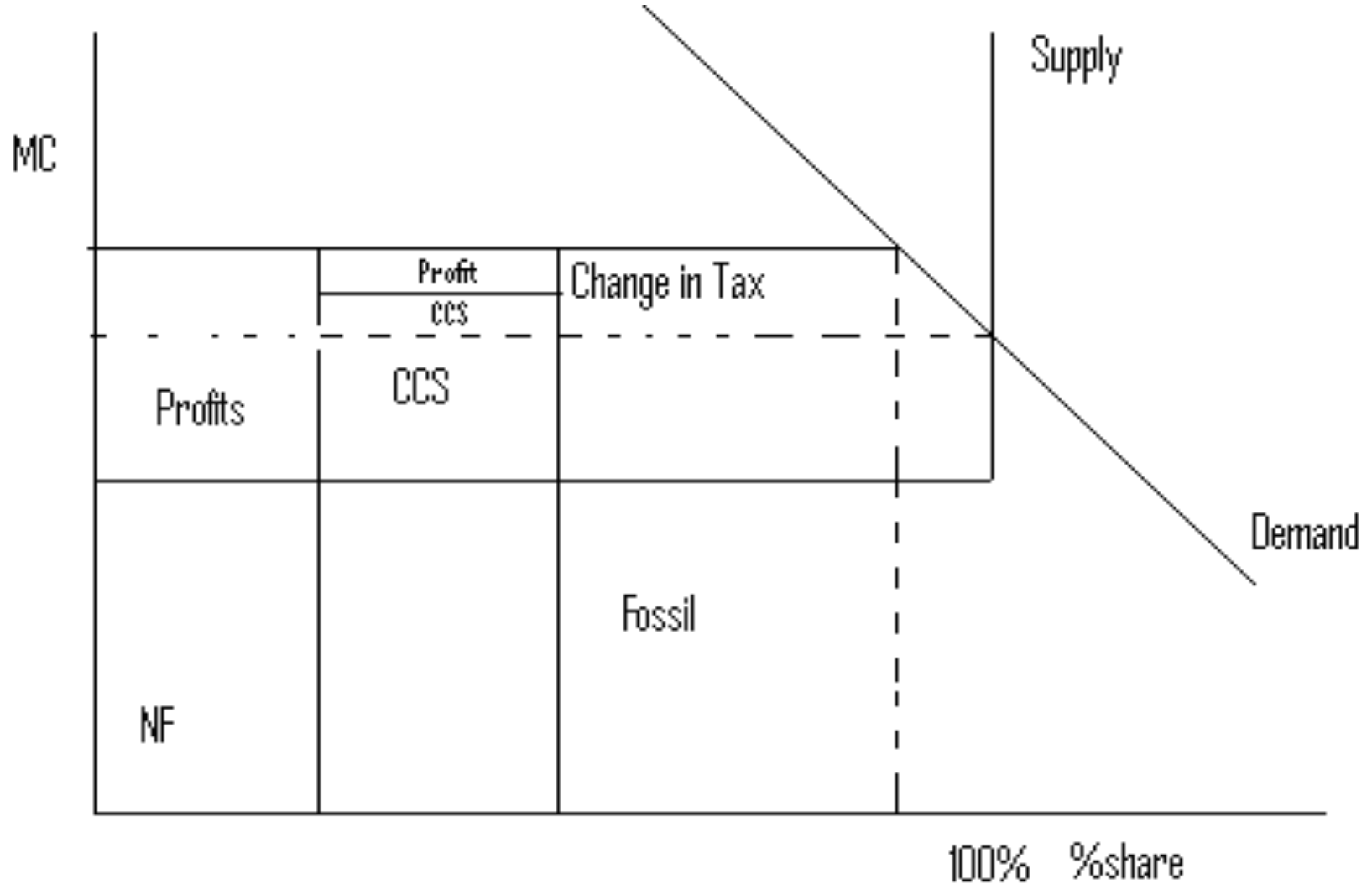


Emission taxes: take profits only





Until they raise prices, and/or induce abatement





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**So: huge transfers, before any
environmental transformation of sector...**

- ***Political feasibility I: the use of cross-subsidies***
- ***Political feasibility II: the distribution of quotas for free***
- ***Political feasibility III: energy efficiency programs (and other targeted programs)***
- ***Political feasibility IV: far-reaching technological change***
- ***Not tried yet V: border tax adjustments***



Norway not alone in supplementing the tradable quotas, so that other instruments became equally or more important (renewables subsidies like feed in tariffs and green certificates (performance standards))

Not only these subsidies, but also (and more), the economic downturn led quota prices to be lower than expected and – perhaps – lower than meaningful. Definitely lower than meaningful as a general measure or indicator of what emission reductions are worth for European policy makers.

With these subsidies and with this downturn, quota prices and electricity prices (and other prices like oil and steel) are lower than intended and lower than expected.

So in an economists view:

- quota prices not indicative of emissions
- el prices and other energy prices should rather be higher than lower
- From norwegian perspective, a shift from 'push' (supply subsidies) to pull (higher quota prices and elprices) is desirable.
- Elimination of green certificates would be a blessing, undisguised, unquestionably



Free quotas: a price to make change politically acceptable? An acceptable price?

- Literature: Yes: free quotas compensate the regulated population (power producers)
- Skodvin et al 2010: Industry interests reflected as follows
- Buchanan and Tullock, 1975: *the penalty tax ...will be viewed as confiscatory...*
- Literature: in practice (Burtraw et al, 2006, the US): *free allocation of emissions allowances can dramatically overcompensate the electricity industry...*
- *Harstad & Eskeland: gratis threatens tradability result*
- *Conclusion: expectations, and long term*
- *Is commitment to full polluter pays principle possible, including for surprising impacts such as climate problem?*

The distribution of costs (or pain, gain):

- Depends entirely on instrument choice
- History speaks:
 - Established capital is barely challenged
 - Freely distributed quotas as a way to change the world
- Electricity sector as example
 - Free quotas to old and to new: reasons and consequences
 - Green certificates etc: Tax and cross-subsidize
- Future speaks:
 - Free quotas
 - Border tax adjustments
 - CPP?



Conclusion

- It is not trivial neither for advisors nor politicians to base recommendations, policy and institutions on *Ignorance* and *Indifference*, but this is basically what it takes to advocate commitment to FPPP.
- The unavoidable consequence of deviations from FPPP commitment is rentseeking and noninternalization of environmental damage:
 - Coal fired power plants live 'too long' because they are awarded conditional emission quotas
 - Coal fired power plants are buildt because of subsidies engrained in part through conditional emission quotas (Sinn's green paradox)
 - Coal fired power plants fail to sell quotas because they are conditionally awarded
 - Energy saving and R&D is underutilized because of 'too low' prices and expected prices for emissions and emission intensive goods and services such as electricity, steel, milk and butter.

Summing up

- Benevolent planner, emission reductions easy in principle: equalize marginal costs of emission reductions everywhere
- Best done with FPPP, emission taxes, or tradable quotas
- Political economy: who pays influences policy instruments, policy instruments chosen to shield some interests, distribute costs
- Europe's transition to low emission society:
 - spreading costs
 - Not fppp
 - Partly to limit carbon leakage
 - But also in other ways to shield some interests
 - Typically allowing consumers to pay

Long term: very costly if not over time, costs are shifted directly to emitters.

Short term: don't expect high enough prices of quotas for these to do the job alone. For decades, this may last, I am afraid.