Cerulogy

Low carbon fuel standards: lessons from road transport

Decarbonising maritime transport workshop, November 2018

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Introductions

- Chris Malins
- Independent consultant at Cerulogy
- Previously:
  - Member of LCFS Advisory Panel
  - Fuels Lead for the International Council on Clean Transportation 2010-2016
  - Communications Specialist for the UK Renewable Fuels Agency 2008-2010
- PhD in Applied Mathematics, Sheffield University

https://scholar.google.co.uk/citations?user=Y16zidkAAAAJ&hl=en&oi=ao

Alternative fuels policy – a step back

- Sonia just reviewed the California Low Carbon Fuel Standard in detail
- I'm going to take a moment to compare the LCFS to other alternative fuel policies
  - Goals
  - Outcomes
  - Complexity
- What is the right fit for maritime?

Duty derogations, mandates, carbon and sustainability

- Before LCFS and biofuel mandates, we had tax incentives – a defined reduction in tax liability for every unit volume of biofuel consumed
  - Reduce tax take to the exchequer
  - Can be unlimited in principle
  - Level of adoption unpredictable
  - Generally not linked to sustainability rules
- In the EU and U.S., tax incentives have been gradually phased out in favour of mandates:
  - Clearly set target for volume supply
  - Benefits more predictable, costs more limited
  - Cost burden falls on fuel suppliers (and thence fuel consumers) not the exchequer
  - Have been linked to sustainability rules

RFS vs. RED

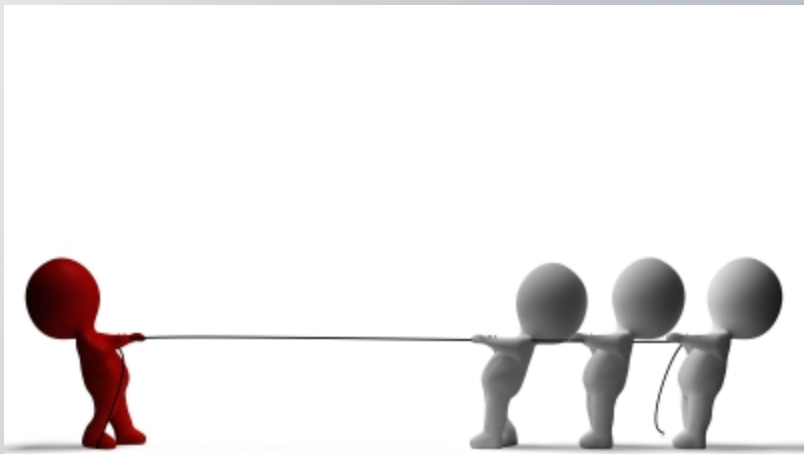
- In the U.S. the Renewable Fuel Standard sets targets for:
  - 'renewable' fuels (largely corn ethanol);
  - 'advanced' fuels (largely 'biomass based diesel' which has a sub-target, plus sugarcane ethanol);
  - 'cellulosic' fuels (largely biogas at this point).
- No biofuels from recently cleared forest land (enforcement limited)
- Carbon saving thresholds are set for each category (20%; 50%; 60%)
- In the EU, the Renewable Energy Directive sets:
  - overall target (10% of transport energy);
  - not more than 7% to be from food-based first generation fuels;
  - sub-target for advanced fuels (mostly cellulosic);
  - double counting of fuels from wastes and residues.
- No biofuels from recently cleared forest land, wetlands or protected biodiverse land
- Carbon saving thresholds are set increasing over time (35%; 50%; 60%)

Mandates vs. LCFS

- LCFS limits value to fuels with limited climate benefit, mandates can do this with thresholds (dependent on LCA)
- LCFS provides continual incentive to improve climate efficiency of production practice. Mandates do not.
- LCFS provides a natural basis for technology neutrality (dependent on LCA). Mandates tend to include some options and exclude others.
  - Expanding the number of compliance pathways gives incentives to more producers, but can add value uncertainty
- LCFS will increasingly depend on credits from electric vehicles (also RED)

What's the point?

- Alternative fuel policies have multiple possible goals
  - Increase supply of commercially available biofuels
  - Drive investment in new biofuel technologies
  - Deliver transport CO_2 reductions in the cheapest way
  - Maximise CO2 savings
  - Throw some money at the farm sector
- Different frameworks have different advantages



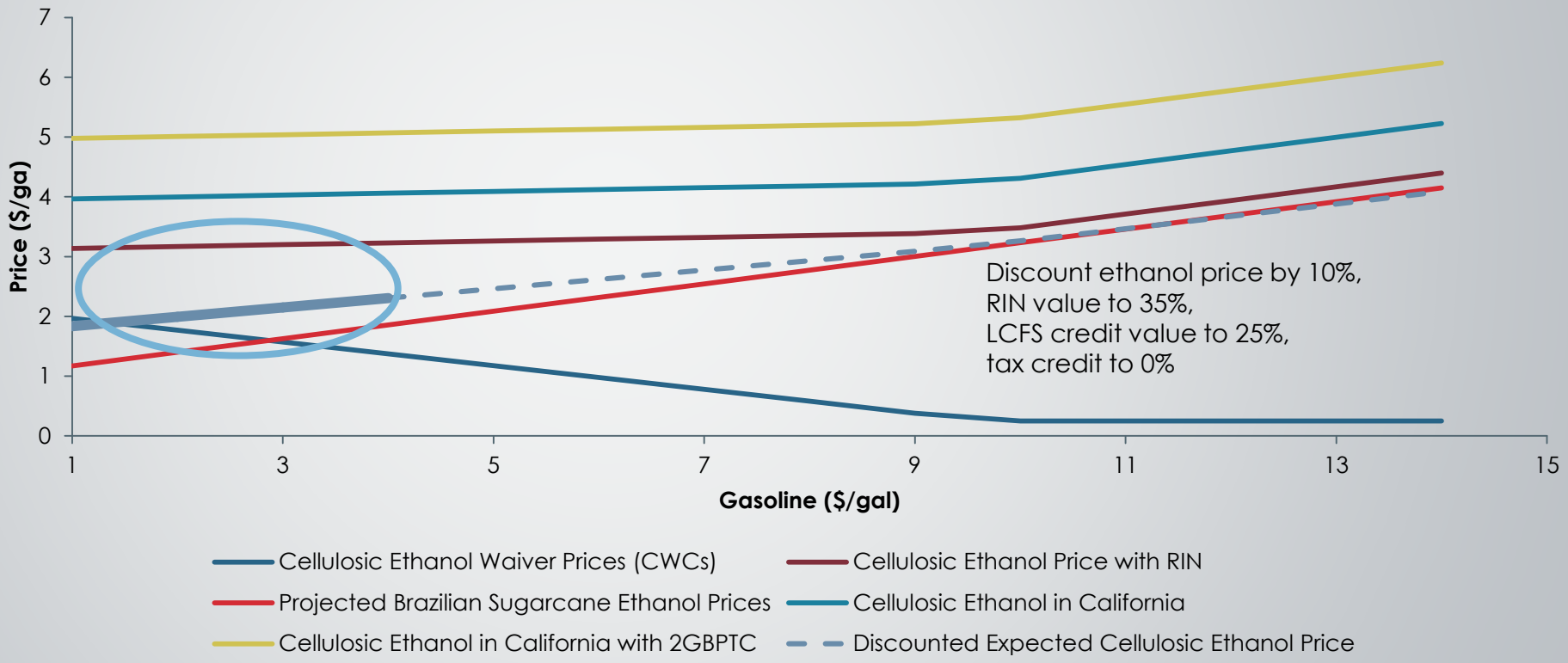
What's the right fit?

- Mandates are good to increase supply of simple stuff that we know how to do
  - e.g. corn ethanol
- Credit markets allows (in principle) for minimal cost and maximal benefit…
- But investing in new technologies is very sensitive to uncertainty
  - mandates and LCFS have a weak record in driving new technology deployment
  - tax incentives have a clearer value proposition
- LCFS allows us to give extra reward for extra benefit
  - This only works if our tools are able to accurately rank fuels (cf. ILUC, uncertainty in LCA)
  - Works well for marginal improvement for a given fuel
- LCFS needs more administrative and analytical capacity to run

What hasn't worked?

- Indirect land use change (ILUC) – biofuel support policy has probably driven agricultural expansion in a way that undermines policy goals
  - Analysing and reacting to ILUC remain enormously controversial, but central to the effectiveness of policy
  - There's also food vs. fuel, which is also controversial at every level
- Cellulosic fuel technologies have been held out as the near future for a decade and more – but we haven't got far
  - Compare to recent excitement about power to liquids fuels
- Sustainability governance is challenging, and generally decried as too weak when reviewed
  - Voluntary standards have provided more assurance than legal requirements

Discounting the value proposition for uncertainty



The maritime context

- Ships can use low quality fuels (compared to road and aviation)
  - Potential cost advantage
- …but this means shipping has a low cost tolerance for new fuels
  - May reduce appetite to compete with aviation and road
- The IMO is not the California Air Resources Board
  - It may be difficult to deliver the complexity and responsiveness that ARB bring to the LCFS
  - What happens if an IMO Member State is invested in a biofuel that may have poor performance?
- Fuels only?
  - Is there an interested in mandating only liquid fuels, or also supporting other options like electrification?
- Who is the obligated party?
  - In road, relatively easy to identify fuel suppliers
  - For maritime, can the burden be placed on suppliers or would it fall to ship operators

Thanks

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