SB 1383 Pilot Financial Mechanism
Possible Methods to Enhance the Certainty of the Value of Environmental Credits to Dairy-Related Projects Producing Low-Carbon Transportation Fuels
Agenda

– Introduction and current challenges
– Conceptual discussion of potential financial mechanism alternatives
  • Contracts for Difference (CfD)
  • Put Options
– Initial thoughts on program mechanics
– Initial thoughts on needed funding
Introduction

- “California’s dairy and livestock industries account for more than half of the State’s total methane emissions and for about five percent of the State’s GHG inventory, based on 100-year GWPs (using 20-year GWPs, the industries account for about 12 percent of California’s GHG emissions).” – SLCP Strategy Report, March 2017, page 63

- Can be downloaded at: https://www.arb.ca.gov/cc/shortlived/shortlived.htm
Introduction


– SB 32 (2016) directs ARB to reduce GHG emissions to 40% below 1990 levels by 2030.

– SB 1383 (2016) directs ARB to reduce short-lived climate pollutants (SLCP), which includes methane. SB 1383 charges ARB to adopt regulations to reduce methane emissions from dairies and livestock industry by 40% below 2013 level by 2030.
SB 1383 directs ARB to “develop a pilot financial mechanism to reduce the economic uncertainty associated with the value of environmental credits, including credits pursuant to the Low-Carbon Fuel Standard regulations (Subarticle 7 (commencing with Section 95480) of Title 17 of the California Code of Regulations) from dairy-related projects producing low-carbon transportation fuels.”
Environmental Credits Available to Dairy Biomethane to Vehicle Fuel Projects

![Graph showing the comparison of LCFS (Left Hand Side) and Cellulosic RINs (Right Hand Side) over time from May 2012 to Jan 2017. The graph displays the trend in $/MT CO2 and $/Gallon ethanol equivalent for both categories.]
Environmental Credits Provide a Large Source of Value for Dairy Projects

Sources of revenue from a scrape conversion and digester project:
- Fuel sales: 7%
- LCFS credit sales ($100 credit price): 43%
- RINs sales ($1.85 credit price): 50%

Sources of revenue from a covered lagoon and digester project:
- Fuel sales: 5%
- LCFS credit sales ($100 credit price): 37%
- RINs sales ($1.85 credit price): 58%

Note: Based on SLCP Strategy assumptions, page 119
Possible Pilot Financial Mechanisms

– Two mechanisms are considered: Contracts for Difference and Put Options.

– Both will decrease the exposure of developers and investors to fluctuations of environmental credit prices.

– Risk is not eliminated – some risk is transferred to the Program Administrator.

– We welcome suggestions of other alternatives or modifications to the alternatives presented.
Possible Mechanism: Contracts for Difference

1. **Contracts for Difference (CfD):** the program administrator (**Administrator**) will guarantee the fuel producer (**Producer**) a certain value for environmental credits (**Strike Price**) for a specified period of time (**Contract Period**).

   • If market prices of the environmental credits (**Market Price**) are lower than the Strike Price, the Administrator will pay the Producer the difference.
   • If the Market Price of the environmental credits is higher than the Strike Price, the Producer will pay the Administrator the difference.
Possible Mechanism: Contracts for Difference


- Also similar to a program implemented by the UK government to guarantee the price of electricity generated from renewable sources. More information can be found at [https://www.gov.uk/government/publications/contracts-for-difference/contract-for-difference](https://www.gov.uk/government/publications/contracts-for-difference/contract-for-difference)
Example: Contracts for Difference

- Assume a Producer has a CfD with a Strike Price of $80/MT CO₂, and a Contract Period of 2 years.
- Assume that the Market Price of environmental credits is $70/MT CO₂ in year 1, and $90/MT CO₂ in year 2.

Payments by the Administrator to the Producer

$0
T = 0
Price = $80

$10
T = 1
Price = $70

$0
T = 2
Price = $90

Payments by the Producer to the Administrator

$0

$0

$10
Initial Thoughts on Additional Provisions for CfD

- CfD can be modified so that there are two Strike Prices: a lower price (Floor) and a higher price (Ceiling).

- If the Market Price is below the Floor, the Administrator will pay the Producer the difference between the market price and the Floor.

- If the Market Price is above the Ceiling, the Producer will pay the Administrator the difference between the market price and the Ceiling.
Example: Contracts for Difference With Two Strike Prices

– Assume a Producer has a CfD with a Floor of $40/MT CO₂ and Ceiling of $60/MT CO₂, and a Contract Period of 10 years.
Possible Mechanism: Put Options

2. **Put Option**: Similar to a price insurance, the Administrator will guarantee a minimum value for the environmental credits *(Strike Price)* for a specified period of time *(Contract Period)*.

- The Producer will pay the Administrator the price of the option *(Premium)*. Proceeds will be used exclusively to fund the future payments by the mechanism.
- If market prices of the environmental credits *(Market Price)* are lower than the Strike Price, the Administrator will pay the Producer the difference.
- If the Market Price of the environmental credits are higher than the Strike Price, then no money is exchanged.
Possible Mechanism: Put Options

– Similar to the Pilot Auction Facility for Methane and Climate Mitigation Program developed by the World Bank Group.

Example: Put Options

– Assume a Producer purchases a put option with a Strike Price of $80/MT CO$_2$, and a Contract Period of two years.
– Assume that the Market Price of environmental credits is $70/MT CO$_2$ in year 1, and $90/MT CO$_2$ in year 2.
– Assume the Premium of the option is $5.

Payments by the Administrator to the Producer

T = 0
Price = $80
$0

T = 1
Price = $70
$10

T = 2
Price = $90
$0

Payments by the Producer to the Administrator

$0

$0

$0

$5
## Possible Mechanism: Summary

<table>
<thead>
<tr>
<th></th>
<th>CfD (one Strike Price)</th>
<th>CfD (two Strike Prices)</th>
<th>Put Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is Guaranteed?</strong></td>
<td>A specific price</td>
<td>A specific price range</td>
<td>A minimum price</td>
</tr>
<tr>
<td><strong>Upside potential?</strong></td>
<td>None</td>
<td>Within the specified range</td>
<td>Unlimited</td>
</tr>
<tr>
<td><strong>Upfront cost</strong></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Possible Mechanism: Questions

– Questions about the mechanisms just discussed.
Determination of Strike Price

– Technologies produce variable quantities of biomethane and credits.

– To not favor certain technologies, we are considering that the pilot financial mechanism should guarantee the value based on the quantity of GHG emissions reduced, rather than the amount of fuel/credits generated.
Determination of Strike Price

The Strike Price for both CfD and Put Options could be determined by a reverse auction.

Administrator declares initial Strike Price, (for options, declare fixed premium) (for CfD with two strike prices, declare a fixed difference between ceiling and floor)

Bidders decide whether to bid or not

Number of bids greater than funding available?

YES

New round: Administrator lowers offered Strike Price

NO

Bidders receive the instrument with the last round’s Strike Price
An alternative for Put Options only could be to fix a strike price, and determine the option premium by a forward auction.

Administrator declares initial option premium. Administrator declares fixed strike price.

Bidders decide whether to bid or not.

Number of bids greater than funding available?

YES

New round: Administrator increases option premium.

NO

Bidders receive the option with the last round’s premium.
Determination of Strike Price/Put Option Premium

– We are open to alternative auction mechanisms and other suggestions on how to determine the Strike Price/Option Premium.

– Questions about how to determine the Strike Price and the Option Premium.
Determination of Market Price

– In addition to LCFS credit value, what should be included in the calculation of Market Price?

• RFS credit?
• Value of fuel?
• Future credits/subsidies obtained by fuel production or use?
Example: Determination of Market Price

– *Example*: Assume a dairy project earns 1,000 LCFS credits and 60,000 RINs quarterly.

– It acquired sufficient Put Options with a Strike price of $100. Both the LCFS credit and RIN value are included in the Put Option coverage.

– Suppose the average quarterly price of D3 RIN is $1.00 and the quarterly price of LCFS credits is $70.

– The Market Price is thus = $1.00 \times 60,000 + $70 \times 1,000 = $130,000

– The Strike Price is = $100 \times 1,000 = $100,000

– Since the Market Price is higher than the Strike Price, no money is exchanged this period.
Questions about how to determine the Market Price.
Contract Period

– We are considering a 10 year period (in line with the crediting period under the Compliance Offset Protocol and the expected LCFS crediting period) to ensure dairy projects have a sufficient time period for the investments to pay back.

– We are considering adding a 1 – 3 year grace period, to allow for development and construction times.
Initial Thoughts on Funding Needs - CfD

– The initial funding needed could be calculated to cover the full cost in the worst case scenario, i.e. the value of environmental credits goes to 0.

– As the value of environmental credits in the future are uncertain, the actual cost of the program cannot be determined with certainty.

– If the future value of the environmental credits is high, the program may, in fact, generate income for the Administrator.
Example of Calculating Needed Funding - CfD

- Staff’s current calculations indicate that each $1 increase in Strike Price corresponds with an extra $7.72 funding needed (assuming a 5% discount rate, a 10 year contract period, and annual settlement).

- Illustration: To fund a CfD that fully covers a 2,000 cow dairy that generates 8650 MT of CO₂ reductions a year, for 10 years at a Strike Price of a range between 60 - 100 will require:

<table>
<thead>
<tr>
<th>Strike Price</th>
<th>Needed Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>$60</td>
<td>$4.0 million</td>
</tr>
<tr>
<td>$70</td>
<td>$4.7 million</td>
</tr>
<tr>
<td>$80</td>
<td>$5.3 million</td>
</tr>
<tr>
<td>$90</td>
<td>$6.0 million</td>
</tr>
<tr>
<td>$100</td>
<td>$6.7 million</td>
</tr>
</tbody>
</table>
Initial Thoughts on Funding Needs – Put Options

– Similar to CfD with one significant difference: the needed funding is reduced by the proceeds generated from the sale of the options.
Initial Thoughts on Program Funding Needs

– Questions about needed funding.
Information/Feedback Needed

– Suggestions for financial mechanism alternatives that were not considered.
– Feedback on preferred mechanism.
– Detailed feedback on preferred mechanism mechanics (e.g. contract period, determination of strike price and market price, needed funding).
– Suggestions on which entity/agency/NGO would be most appropriate to manage the program?
– More detailed data on cost inputs to determine the appropriate initial Strike Price and needed funding.
– Appropriate initial Strike Price and Initial Option Premium.
Next Steps

– Comments requested by July 31, 2017

– Prepare a draft report by September 2017

– Hold a second workshop in October 2017

– Publish final report by Jan 01, 2018
Questions/Feedback

Thank you!

For more questions please contact:
Firas Abu-Sneneh
(916) 323-1009

Please send your comments to:
LCFSWorkshop@arb.ca.gov