

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

Industrial Strategies Division
Transportation Fuels Branch

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Sacramento, CA

California Environmental Protection Agency
 **Air Resources Board**

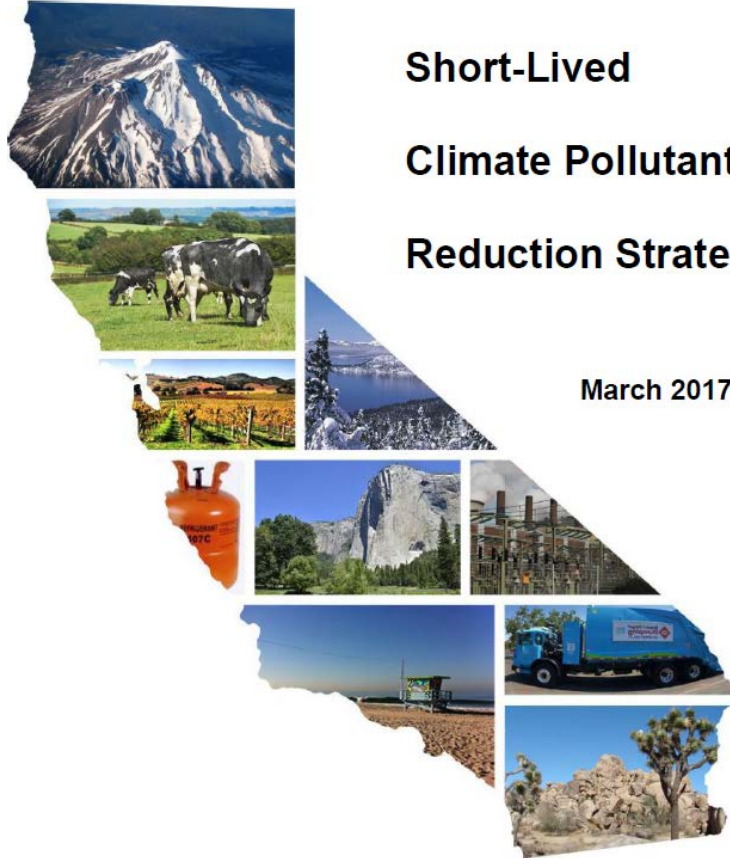
Agenda

- 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

Short-Lived Climate Pollutant Reduction Strategy

March 2017



California Environmental Protection Agency
 Air Resources Board

- “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>

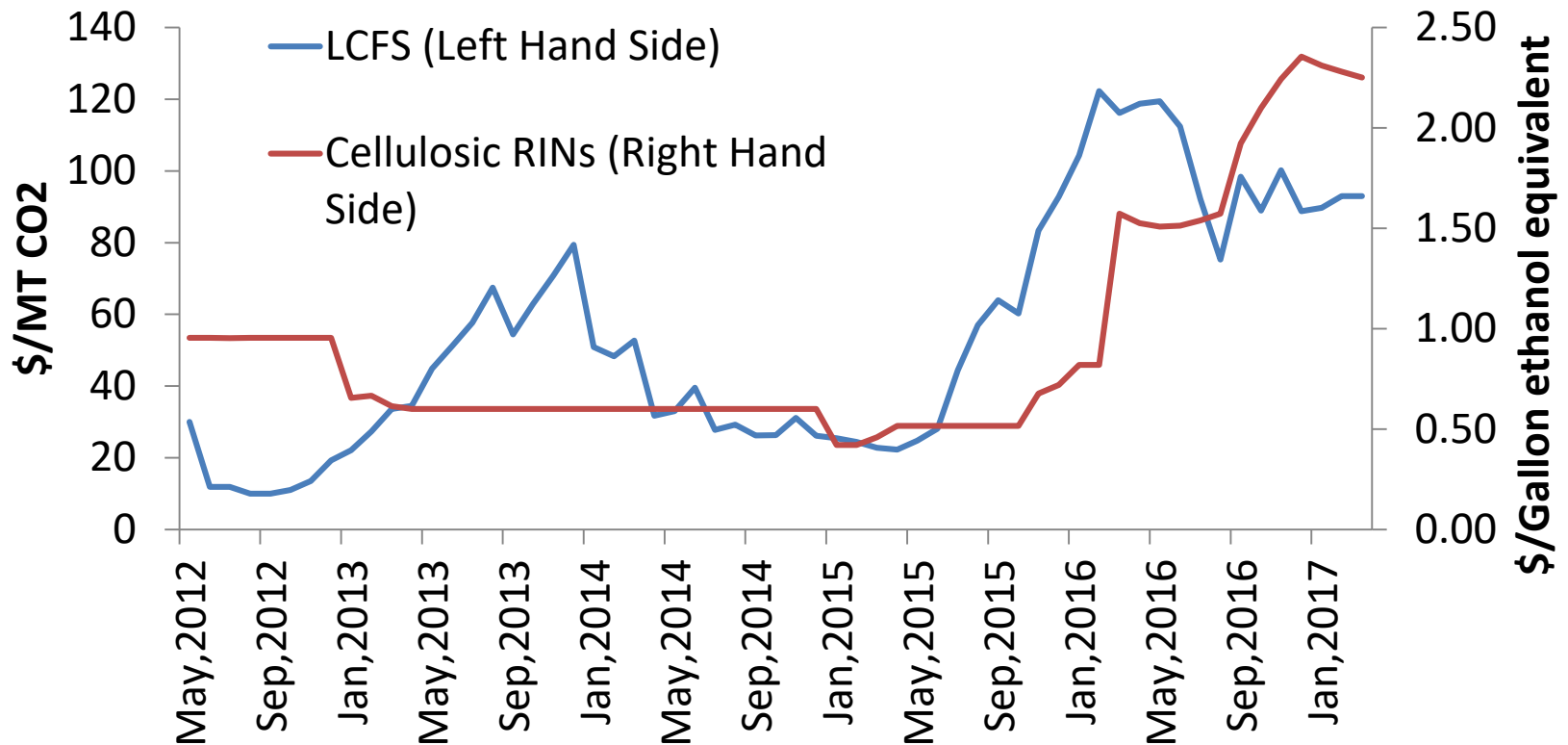
Introduction

- AB 32 (2006) directs ARB to reduce GHG emissions to 1990 levels by 2020.
- 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.

Introduction

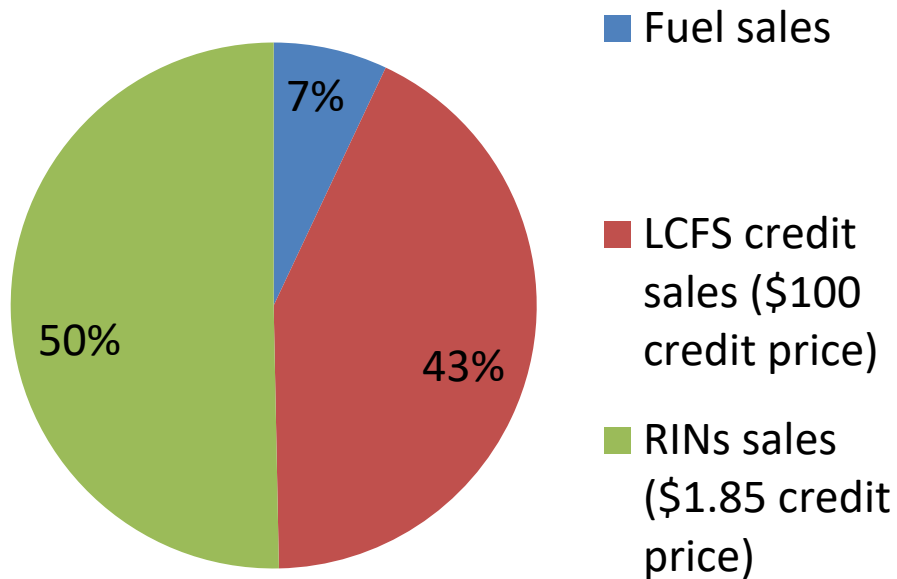
- SB 1383 directs ARB to *“develop a pilot financial mechanism to reduce the economic uncertainty associated with the value of environmental credits, including credits pursuant to the Low-Carbon Fuel Standard regulations (Subarticle 7 (commencing with Section 95480) of Title 17 of the California Code of Regulations) from dairy-related projects producing low-carbon transportation fuels.”*

Environmental Credits Available to Dairy Biomethane to Vehicle Fuel Projects

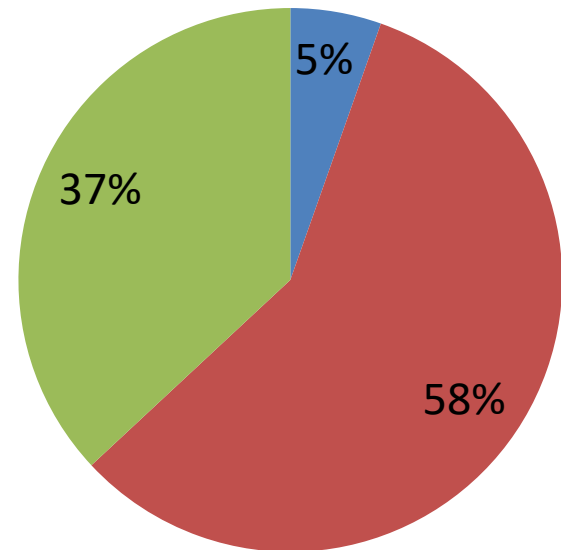


Environmental Credits Provide a Large Source of Value for Dairy Projects

Sources of revenue from a scrape conversion and digester project



Sources of revenue from a covered lagoon and digester project



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

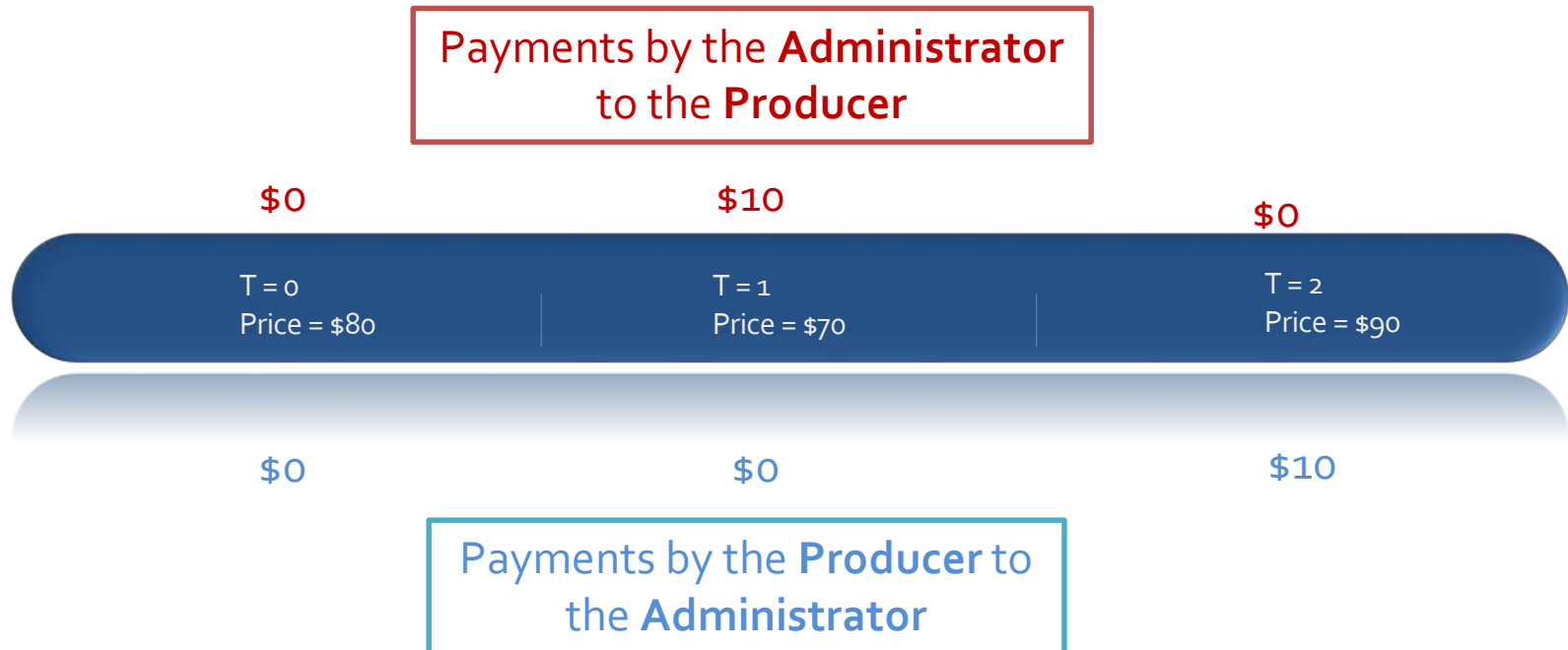
- 1. Contracts for Difference (CfD):** the program administrator (**Administrator**) will guarantee the fuel producer (**Producer**) a certain value for environmental credits (**Strike Price**) for a specified period of time (**Contract Period**).
 - If market prices of the environmental credits (**Market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

- Similar to the proposal by ICCT titled: *Development and analysis of a durable low-carbon fuel investment policy for California*. <http://www.theicct.org/durable-low-carbon-fuel-investment-policy-CA>
- 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>

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.

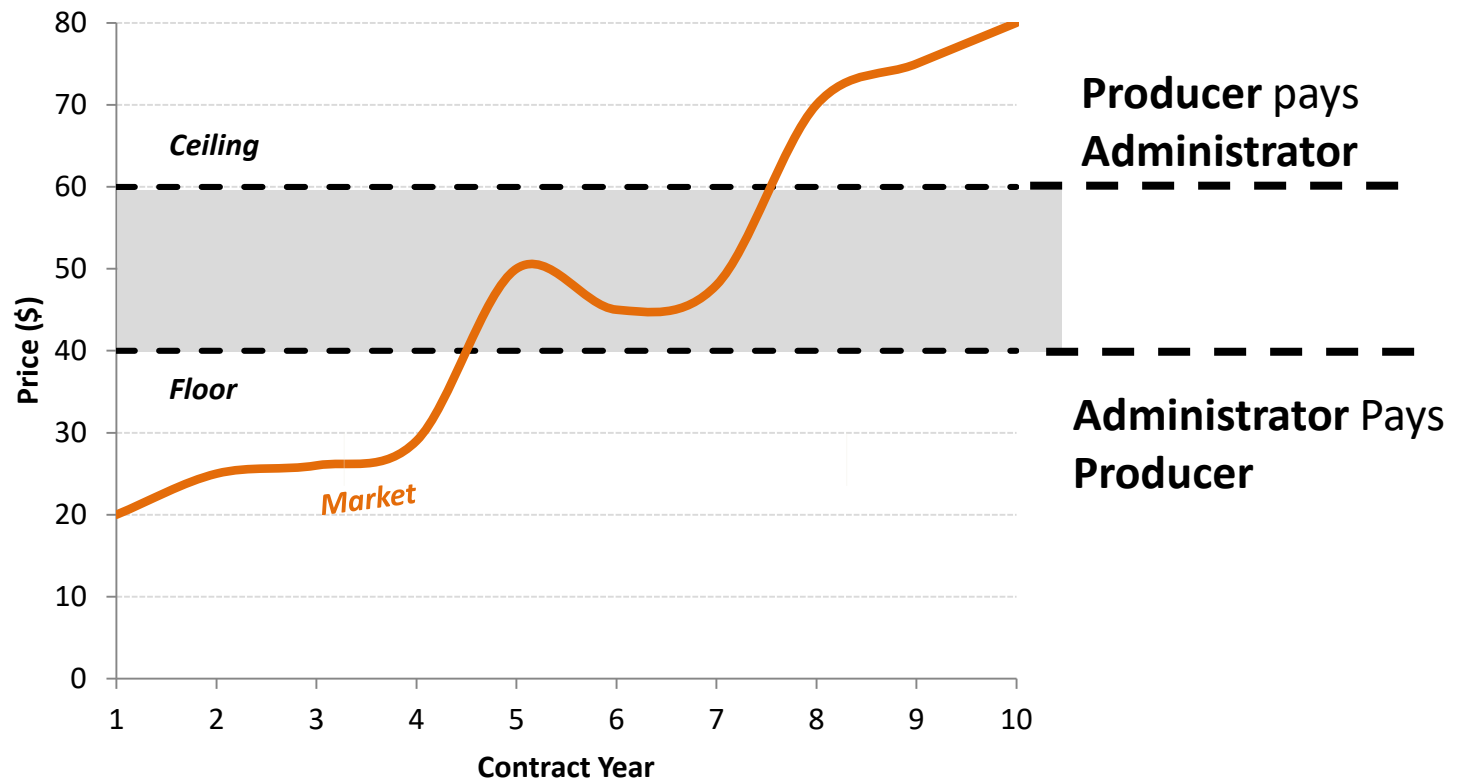


Initial Thoughts on Additional Provisions for CfD

- 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

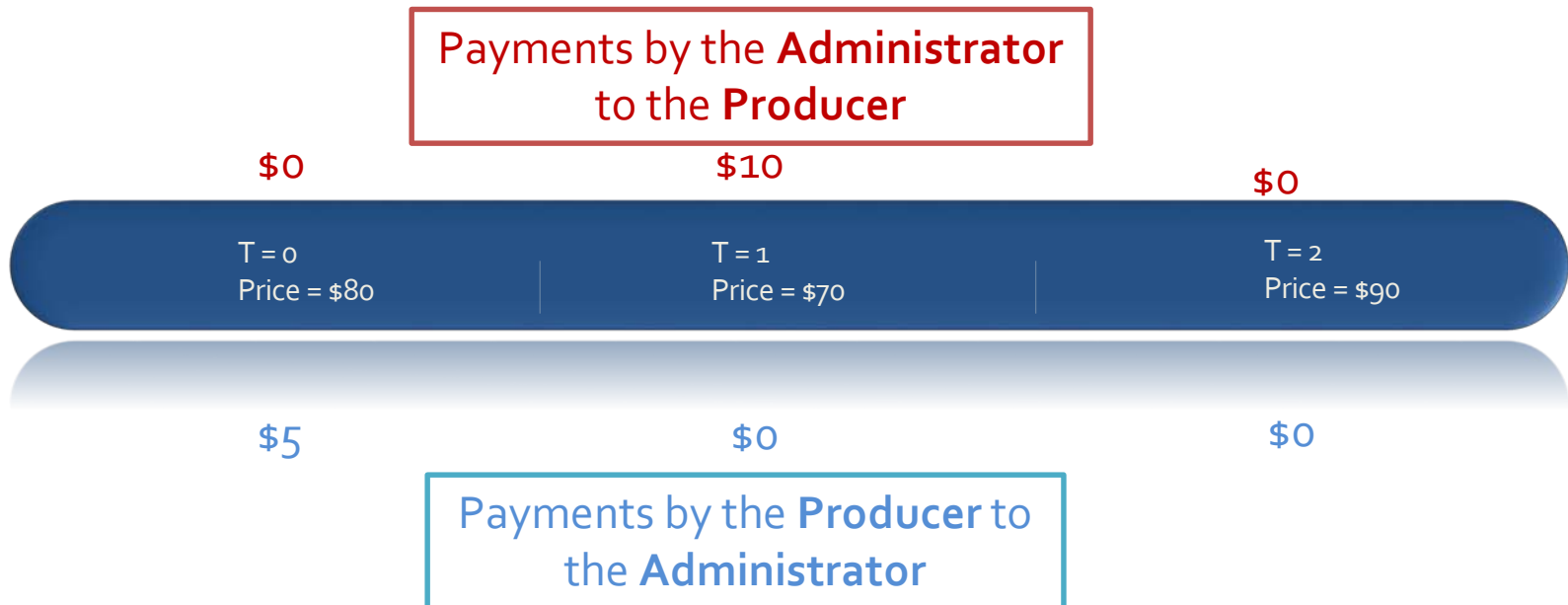
2. **Put Option:** Similar to a price insurance. the Administrator will guarantee a minimum value for the environmental credits (**Strike Price**) for a specified period of time (**Contract Period**).
 - The Producer will pay the Administrator the price of the option (**Premium**). Proceeds will be used 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.
- More information on this program can be found at <http://www.worldbank.org/en/topic/climatechange/brief/pilot-auction-facility-methane-climate-mitigation>

Example: Put Options

- Assume a Producer purchases a put option with a Strike Price of \$80/MT CO₂, and a Contract Period of two years.
- Assume that the Market Price of environmental credits is \$70/MT CO₂ in year 1, and \$90/MT CO₂ in year 2.
- Assume the Premium of the option is \$5.



Possible Mechanism: Summary

	CfD (one Strike Price)	CfD (two Strike Prices)	Put Options
What is Guaranteed?	A specific price	A specific price range	A minimum price
Upside potential?	None	Within the specified range	Unlimited
Upfront cost	No	No	Yes

Possible Mechanism: Questions

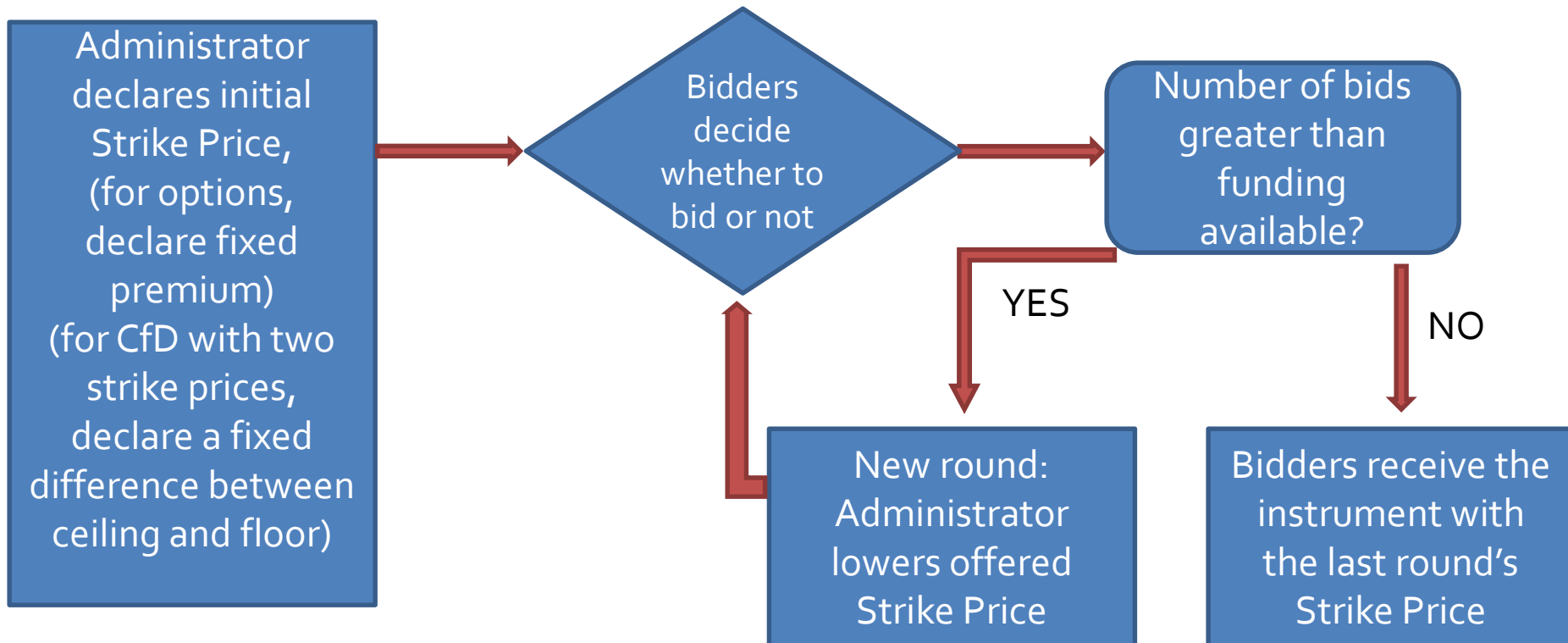
- **Questions about the mechanisms just discussed.**

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.

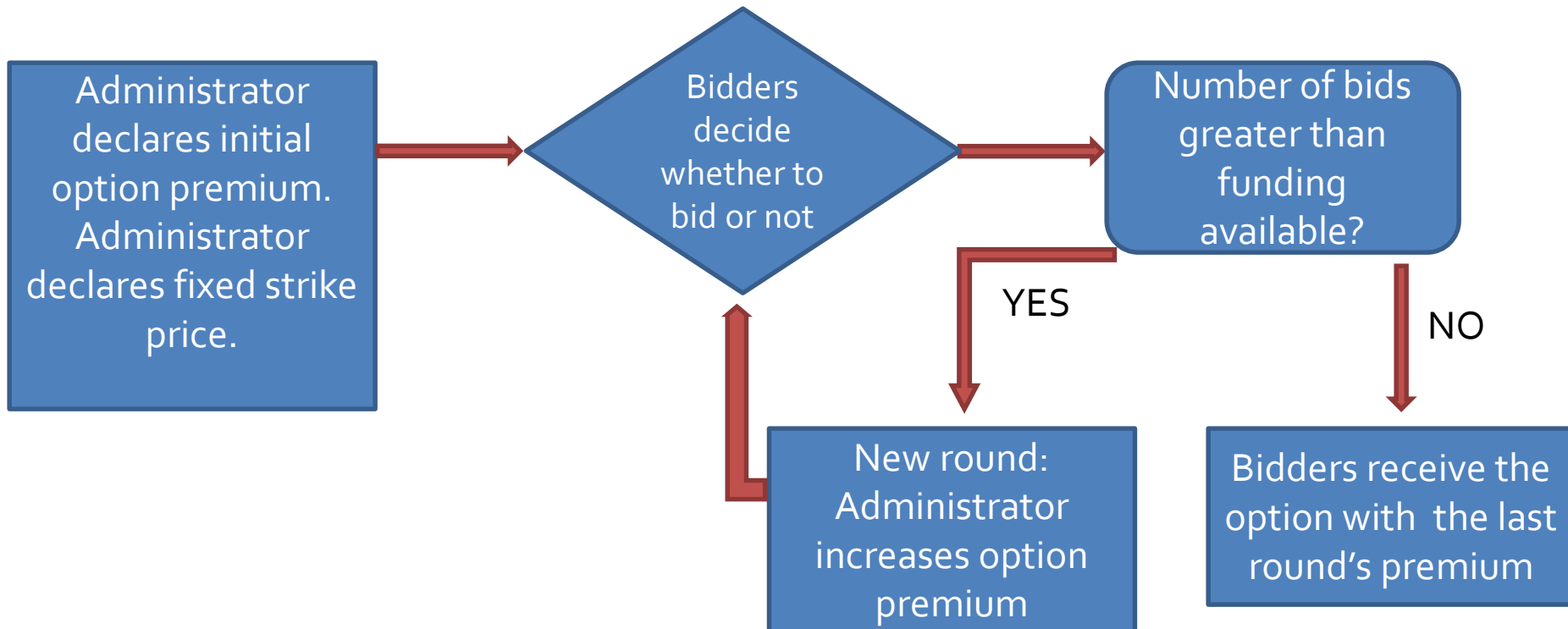
Determination of Strike Price

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



Alternative Approach: Determination of Put Option Premium

- An alternative for Put Options only could be to fix a strike price, and determine the option premium by a forward auction



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.

Determination of Market Price

- **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 a 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:

Strike Price	Needed Funding
\$60	\$4.0 million
\$70	\$4.7 million
\$80	\$5.3 million
\$90	\$6.0 million
\$100	\$6.7 million

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:

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Please send your comments to:

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