Environmental Market Value of Agricultural Methane
Karbone is a full service firm specializing in renewable energy and environmental markets. We offer integrated brokerage, project finance, research and advisory services to a wide range of market participants. This unique combination of services all under the same roof ensures that we add real value to our clients’ projects along each segment of the project lifecycle.

From our offices in New York, London, and Istanbul, and strategic partnerships in California, Canada, South America, and China, our range of project experience spans across nearly every relevant environmental market around the globe.

**Recent Awards**

#1 US Voluntary Carbon Offset Broker
#2 US Renewable Energy Credit Broker
#3 US Biofuels Broker
- Energy Risk Magazine

**Top North American Carbon Broker**
- World Finance Magazine

**Top 10 Sustainability Consultant**
- Verdantix

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Our Role in Carbon

Early stage market advisory and project financing

Mid-stage carbon development management and carbon financing

Commercial-stage marketing and sales of carbon and other commodities
Voluntary

- Non-policy reliant
- Less rigid oversight

Compliance

- Deeper and more liquid
- Greater demand, low market risk
- Higher value $$$

Plus some other topics…

Thanks to Point Carbon for data
California AB32 Program

• AB32 will establish the total amount of GHG emissions that major sources in California are allowed to emit. Air Resources Board (ARB) will distribute tradable allowances to emit GHGs. Each allowance permits the holder to emit **one MTCO2e** of GHG.

• Entities emitting more than **25,000 MTCO2e** per year are covered by the program, to be phased into the program based on industrial type.

<table>
<thead>
<tr>
<th>Phase in Year</th>
<th>Industry Type</th>
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<tbody>
<tr>
<td>Phase I: 2013</td>
<td>Electricity generation (including imports)</td>
</tr>
<tr>
<td></td>
<td>Large stationary sources: refineries, cement production facilities, oil and gas production facilities, glass manufacturing facilities, food processing plants, etc.</td>
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<tr>
<td>Phase II: 2015</td>
<td>Transportation and other fuel providers</td>
</tr>
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<td></td>
<td>Natural gas providers</td>
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<tr>
<td></td>
<td>Combustion of other fossil fuels not covered directly at large sources in the initial phase of the program</td>
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</tbody>
</table>
• Of the 600 facilities who currently report their GHG emissions in CA, over 300 emitted above the 25,000 ton threshold in at least one year between 2008-2010, making them covered entities. These facilities are in turn owned by at least 186 companies operating in-state facilities. In addition, about 50 more companies import power into California and thus face an obligation. A few other oil and gas firms who do not own production/refining facilities in-state will join in 2015.
Supply/Demand: Allowances

Gap = Theoretical Demand

- Emissions
- Allowances
To satisfy their required program reductions, regulated emitters may use allowances and a set proportion of **offset credits** created by pollution cuts from unregulated sources. A maximum of **8% of a regulated entity’s compliance obligation** can be met using offsets.

- The four initial ARB offset protocols cover: 1) forestry; 2) urban forestry; 3) removal of ozone-depleting substances; 4) agricultural methane.
# Offset Demand Gap

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<tbody>
<tr>
<td>Net cap</td>
<td>160</td>
<td>157</td>
<td>378</td>
<td>366</td>
<td>355</td>
<td>332</td>
<td>321</td>
<td>310</td>
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<tr>
<td>Emissions</td>
<td>162</td>
<td>161</td>
<td>383</td>
<td>378</td>
<td>373</td>
<td>368</td>
<td>362</td>
<td>357</td>
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<tr>
<td>Offset quota</td>
<td>14</td>
<td>14</td>
<td>33</td>
<td>32</td>
<td>31</td>
<td>29</td>
<td>28</td>
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<tr>
<td>Sectoral offset quota</td>
<td>4</td>
<td>4</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>15</td>
<td>14</td>
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<td>Offset supply*</td>
<td>20</td>
<td>6</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>10</td>
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<tr>
<td>Theoretical offset shortage</td>
<td>-6</td>
<td>9</td>
<td>27</td>
<td>25</td>
<td>23</td>
<td>20</td>
<td>19</td>
<td>17</td>
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<tr>
<td>Period shortage</td>
<td>3</td>
<td>75</td>
<td>56</td>
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</tbody>
</table>

*2013 supply volumes include projected early offset credits. Volumes are for the four currently approved protocols and REDD

Source: Point Carbon
Industry rule-of-thumb is that offsets trade at a 25-50% discount to allowances.

Offsets trade at a discount due to the 8% limit on offset use and the risks from buyer liability for revoked offsets. This discount varies as credit supply and demand fluctuate, and also across risk profiles of different offset types.

**Karbone California Carbon Allowance Prices**

- **Vin 13 - Dec 13**
- **Vin 14 - Dec 14**
Pricing Forecasts

- Forecasted Offset Pricing
  - CP1: $6-12
  - CP2: $12-25
  - CP3: $25-48

Source: Point Carbon
Alternative Value: Voluntary Market

- Three major voluntary programs in the US

- $ value anywhere from $1 -3 for more generic or industrial projects, $3 -7 for more socially charismatic projects

- 3 major types of buyers:
  - Wholesale and retail carbon aggregators
  - Corporate and non-profit CSR or “mission” buyers
  - Speculators for compliance carbon

Backstop to compliance carbon value
Additional Value Drivers

Power
- Renewable power generation
- Biogas export
- Renewable energy credits (RECs)

Land and Soil
- Tipping fees for receiving waste manure
- Soil amendments created by treating digestate
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