



**Engineers and Soil Scientists**

# Sustainability & Carbon Verification Services



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# Why AWT?

AWT maintains a staff of professional engineers and verification professionals with decades of experience in waste management and carbon offset projects. Since 2011, AWT has worked with project developers to verify carbon offset projects, verify low carbon fuel projects, and develop carbon footprints and corporate sustainability plans. AWT understands that getting your project done right is just as important as getting it done on time.



# CARB Offset Project Verification

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## CARB Livestock and Digester Projects

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AWT started as a small engineering firm that focused on livestock waste management. Our focus has always been in helping farms maintain environmental compliance of their operations AND improving operations that could provide a financial benefit for their farms. Therefore, helping farmers and project developers navigate through the carbon offset verification process is a natural fit for AWT.

AWT's verification staff all have agricultural engineering degrees, have experience in the design and evaluation of manure management systems and have provided verification services for over 100 carbon offset projects. Having this experience and knowledge allows AWT to quickly understand the historical baseline of the project as well as how the project operations and monitoring are performed.



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## CARB Mine Methane Capture (MMC) Projects

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AWT has credentialed lead verifiers to perform third-party verifications for CARB mine methane capture projects. AWT works with project owners to ensure a smooth verification of the capture and destruction of methane that would otherwise be vented from mining operations at active underground and surface coal/trona mines. We also can verify the emissions from abandoned underground coal mines. AWT's engineers understand the monitoring systems involved and can efficiently work through the site audit and desk audit portions of the verification.



# CARB Low Carbon Fuel Standard Verifications and Oregon Clean Fuels Program

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## Validation and Verification of Fuel Pathways

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AWT provides verification services for CARB LCFS and Oregon CFP projects using a systematic approach that make the process efficient and less frustrating for the project developers. Our verification team has the background and credentials necessary to get the job done right and on time.

The validation/verification of a fuel pathway report is a life cycle analysis for a renewable fuel that tracks the carbon intensity of the fuel from the production to the utilization of the fuel (well to wheel analysis). Since livestock projects offer one of the most advantageous Carbon Intensity (CI) scores, a large percentage of the early projects relate to livestock waste (dairy and swine). Since this is our expertise, we are uniquely qualified to perform this work.



"AWT was great to work with throughout the process. Having deep experience verifying Ag-based projects, they easily knew their way around the information making the process quick and efficient"

-Mark M.

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## Verification of Quarterly Fuel Transaction Reports

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All LCFS projects which inject RNG/CNG into a common carrier pipeline to be delivered in California must have an annual verification of fuel transaction reports. We review the transaction logs from the injection point and track the gas to its dispensing location.

AWT works with both the fuel producer and the fuel offtake company to ensure an efficient and complete verification of these transactions.



# Voluntary Carbon Offsets

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## Verification of Livestock and Waste Handling & Disposal Projects

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AWT is an ANAB accredited verification body under ISO 14065 (Greenhouse Gas Verifications) for scopes 5 & 6, Livestock and Waste Handling & Disposal projects.

**We operate under the following registries:**

- Climate Action Reserve (CAR)
- Verified Carbon Standard (VCS)
- American Carbon Registry (ACR)
- Others, As Needed

We follow ANAB and internal protocols for all approved project types to streamline the verification process. Our verification staff understands that a delay in the issuance of credits is a serious problem. That is why our staff provides an upfront schedule of milestones so it will be easy to know when to expect things to be completed. We also offer regular project update calls or virtual meetings to ensure everyone stays up-to-date on the process.

AWT can perform verifications for Landfill, Livestock, Organic Waste Disposal, Organic Waste Composting, and Mine Methane Capture Projects via voluntary carbon offset programs.



# Our Team



## Hal Langenbach, PE

*VP Agriculture and Environmental Services*

With 20+ years experience in agricultural engineering and waste management optimization, Hal understands waste-to-energy projects. Hal has been working in the carbon offset realm for over 15 years. He has verified projects through CARB Offset Verifications, and voluntary market offset projects. He has performed CARB LCFS Validations & Verifications since the inception of that verification program. Hal is also credentialed as an Oregon CFP verifier.



## Chris Mosley, PE

*CEO*

Chris is an accredited lead verifier, whose background in agricultural engineering helps streamline the verification process. Chris has been performing carbon offset verifications alongside Hal for 15 years including Livestock, Landfill, Organic Waste Digestion, Organic Waste Composting, & Coal Mine Methane projects. Chris is also a lead verifier for CARB offsets, LCFS V/Vs and Oregon CFP.



## Travis Sexton, EMIT

*Assistant Project Engineer*

Travis is a CARB accredited verifier with years of experience performing verification services, specializing in data review and management. He is an integral part of the team and will be applying for CARB offset and LCFS lead verifier status in 2022.



## Katie Cross, EI

*Assistant Project Engineer*

Katie is a recent addition to the team and aids in the desk audit and error identification for verifications. She is currently working towards becoming a CARB accredited lead verifier for Landfill gas collection and destruction projects and is enrolling in LCFS verifier training in 2022.

California Air Resources Board Carbon Offsets

Individual	Role	Executive Order
AWT, Inc.	Verification Body	H2-19-012
Chris Mosley	Lead Verifier	H2-19-205
Hal Langenbach	Lead Verifier	H2-19-104
Travis Sexton	Non-Lead Verifier	H2-20-244

CARB Low-Carbon Fuel Standard

Individual	Role	Executive Order
AWT, Inc.	Verification Body	H3-20-002
Chris Mosley	Lead Verifier	H3-20-099
Hal Langenbach	Lead Verifier	H3-20-084
Travis Sexton	Non-Lead Verifier	H3-20-190

California Air Resources Board Carbon Offsets MRR

Individual	Role	Executive Order
Chris Mosley	Lead Verifier	H-20-074
Hal Langenbach	Lead Verifier	H-20-059

Oregon Clean Fuels Program

Individual	Role	Executive Order
AWT, Inc.	Verification Body	CFPVB-001
Chris Mosley	Lead Verifier	CFPV-019
Hal Langenbach	Lead Verifier	CFPV-018



# Projects We Have Verified

## Project Names

A1 Keenesburg (CAR796)	LP Gill Landfill (455)
A1 Moapa (CAR869)	Maple Leaf Dairy East (CAR1156/CALS5156)
Adirondack Dairy (CAR1298/CALS5398)	Maple Leaf Dairy West (CAR1155/CALS5155)
AgPower Jerome RNG Project (F0077)	Maple Valley (CAR866)
Alliance Dairy (ACR234/CALS5134)	New Energy One (F00231)
AR-Joy Farm Dairy Digester (CAR1324/CALS6324)	New Energy One Livestock Project (CAR1022/CALS5032)
Aurora Ridge Dairy (CAR1152/CALS5152)	Optima KV, LLC (CAR1340/CALS6340)
Big Sky Dairy (ACR190/CALS5023)	Pagel's Ponderosa Dairy Methane Reduction Project (CAR1049/CALS5097)
Big Sky Dairy Digester (F00329)	Patterson Farms COP (CAR1137/CALS5144)
Blue Ridge Landfill (456)	Peninsula (CAR796)
Bridgewater Dairy (CAR1122/CALS5122)	Remley Family Farms (CAR1321/CALS6321)
Brook View Dairy Methane Reduction Project (CAR1036/CALS5041)	RES Ag - DM2-1 LLC (CAR1133/CALS5133)
Cedar Grove Composting (CAR825)	RES Ag - DM4-3 LLC (CAR1133/CALS5133)
Central Sands Dairy (CAR1123/CALS5123)	Riverview Dairy (CAR449)
Chaput Family Farms (CAR1275/CALS5375)	Robeson County Landfill (426)
Clean Fuel Partners Dane County Biodigester (ACR390/CALS5390)	Rosendale Anaerobic Digester (ACR283/CALS5223)
Coronado Dairy Farm (F00009)	Scenic View Dairy Methane Reduction Project (CAR1035/CALS5040)
Cottonwood Dairy Livestock Gas Capture Project (CAR393/CALS0124)	Sioux Falls (462)
Cow Poo Digester (ACR353/CALS5353)	Spruce Haven Farm COP (CAR1184/CALS5284)
CSE Arizona Facility (CAR1076/CALS5074)	Statz Bros Home Farm Anaerobic Digester (ACR322/CALS5322)
Dairy Dreams (CAR994/CALS5109)	Storms Hog Power (CAR1145/CALS5175)
Dairyland Digester (CAR969/CALS5021)	Stotz Dairy Facility (F00155)
Deer Run Digester (CAR982/CALS5020)	Stotz Southern Generation (CAR1078/CALS5077)
District 45 Dairy (CAR775)	Sunny Knoll Farms Anaerobic Digester (CAR1033/CALS5042)
Double A Dairy (ACR233/CALS5108)	Sunnyside Farms COP (CAR1138/CALS5145)
Dry Creek Dairy (ACR232/CALS5107)	Swiss Valley Farms (CAR1283/CALS5325)
Dry Creek RNG 2021 LCFS Validation (F00342)	Synergy Biogas (CAR957/CALS0096)
Edaleen Cow Power LLC (ACR239/CALS5139)	Synergy Dairy (ACR235/CALS5135)
Fair Oaks Dairy Farm GHD Designed Digester (CAR1120/CALS5120)	T&M Bos Dairy (CAR1055/CALS5044)
Fiscalini Farms Anaerobic Digester (CAR1142/CALS5142)	T&M Herema Dairy (CAR1056/CALS5045)
Four Hills Farm (CAR1281/CALS5324)	T&M Hidden View Dairy (CAR1057/CALS5046)
Gardeau Crest Dairy (ACR241/CALS5181)	T&M Windy Ridge Dairy (CAR1058/CALS5047)
George DeRuyter and Sons Dairy Methane Reduction Project (CAR1080/CALS5094)	Triple G Facility (F00156)
Greater Lebanon Refuse Authority Landfill Gas Collection and Combustion Project	Vander Haak Dairy COP (CAR1101/CALS5101)
Green Meadows (ACR236/CALS5136)	Vanderhyde Dairy (CAR944)
Green Valley Dairy Methane Reduction Project (CAR1106/CALS5180)	Verwey Hanford Dairy Digester (CAR1265/CALS5365)
Greenwood Dairy Anaerobic Digester	Wakker Digester (CAR989/CALS5019)
Grotegut Dairy Farm, Inc. (CAR1135/CALS5143)	Washington Beef OWD (1008)
High Island Dairy (ACR313/CALS5263)	West River Dairy (CAR450)
Hilltop Sand and Gravel Landfill GHG Project (CAR829)	West River Farm Anaerobic Digester Project (CAR1126/CALS5126)
Holsum Elm Dairy (CAR1153/CALS5153)	Willet Dairy (CAR977/CALS0094)
Holsum Irish Dairy (CAR1154/CALS5154)	Willow Point Dairy (CAR1124/CALS5124)
Homestead Green Energy Project (ACR259/CALS5289)	Winchester Landfill Gas Project
Ideal Family Farms Digester Project (CAR1002/CALS5025)	Woodcrest (CAR1246/CALS5346)
Kettle Butte Digester (ACR349/CALS5349)	WTE S&S Ag Enterprises (CAR965/CALS5030)
Lambs Dairy (CAR1253/CALS5139)	WTE-Dallmann, LLC (CAR1143/CALS5146)
Lawnhurst Farms Methane Reduction Project (CAR1274/CALS5374)	Yippee Farms (CAR1232/CALS5332)
Lenz Composting (CAR1096)	Z Best Food Waste Composting (CAR801)
Linde (CAR1077/CALS5075)	

## Read the Case Studies for More Information



# CASE STUDY: OPTIMA KV, LLC

Location: Kenansville, NC

## CARB Compliance Offsets Livestock Protocol

## Highlights

To operate under the California Air Resources Board (CARB) Protocol for Carbon Offset Credits a project must undergo an annual 3rd Party Verification. AWT has been verifying this project since the beginning of its crediting period to ensure compliance with CARB rules and regulations. AWT's unique staff of agricultural engineers allows for efficient verification due to our background knowledge of farm operations, allowing us to meet ambitious deadlines set within the verification plan. AWT follows our standard verification services including a desk review of all relevant data, a site audit to review monitoring & destruction equipment, and a final verification statement/ report.

### Background:

The anaerobic digestion of manure within lagoons releases methane gas, which is a greenhouse gas **25x** more potent than CO<sub>2</sub>. The project developer has utilized anaerobic digestion and biogas collection systems to reduce emissions and make a renewable fuel, while also improving the quality of life for those living near the farms.

This system utilized is more complex than typical systems due to the number of digester cells and the level of biogas conditioning that must occur before the biomethane is injected into a pipeline. The project developer made a large financial investment in this project and is using carbon offsets to recoup some of the investment.

### Project Description:

Optima KV connects 5 swine farms to a central biogas upgrading station where the methane gas is upgraded into pipeline-quality renewable natural gas. Each swine farm diverts its waste into a covered lagoon, where it undergoes anaerobic digestion. The microbes release methane which, as a lower density gas, inflates the lagoon cover. The biogas is then pumped out of the covered lagoon into a pipeline and sent to the upgrading facility where it undergoes further purification. The product is high-quality renewable natural gas (RNG) which is injected into a utility-owned pipeline. AWT engineer, Hal Langenbach, used his extensive knowledge of agricultural waste management and the carbon offsets protocol to aptly verify the project's data, monitoring, and methodology achieving the client's goal timeline.



Over  
**15,000 tCO<sub>2</sub>**  
Emissions Reduced Annually  
Equivalent to Removing Over  
**3,000**  
Vehicles from the Road

"AWT was great to work with throughout the process. Having deep experience verifying Ag-based projects, they easily knew their way around the information making the process quick and efficient. I cannot recommend AWT for verification services enough."

—Mark M.

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