



Energy and Carbon Management for the Cable & Telecommunications Industry:

Harnessing the Carbon Audit to Drive Energy Efficiency and True Cost Savings

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The Energy Management Predicament

Risks to the Cable Industry

- Energy prices are volatile and are expected to increase over time
- Energy availability and pricing could inhibit growth
- Most operators are insufficiently prepared to manage their operational energy data.
- Energy and emissions are becoming part of the financial disclosure landscape



The Energy Management Predicament

Getting the Right Perspective

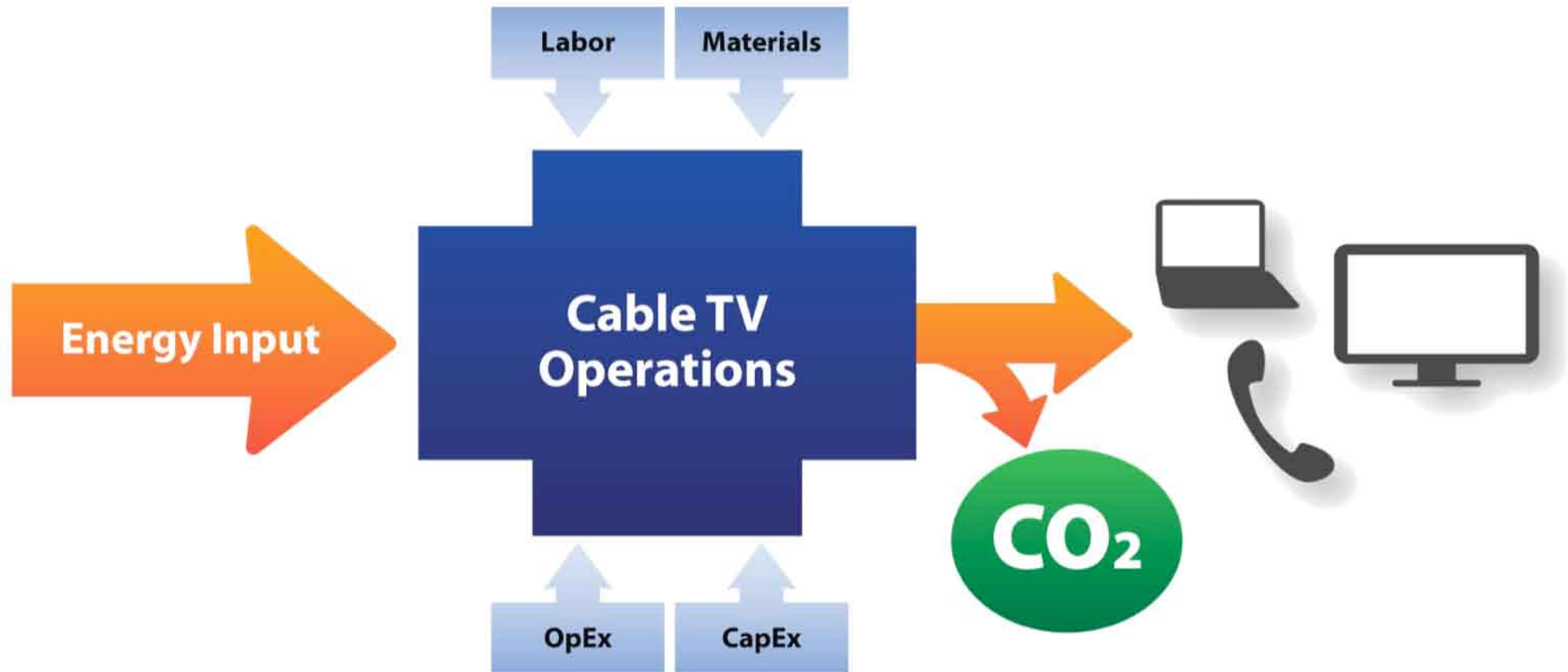
Building business intelligence through the lens of **carbon management** can mitigate risks and positively impact the enterprise bottom line.



Image: mattmangum via Flickr CC

The Business of Carbon

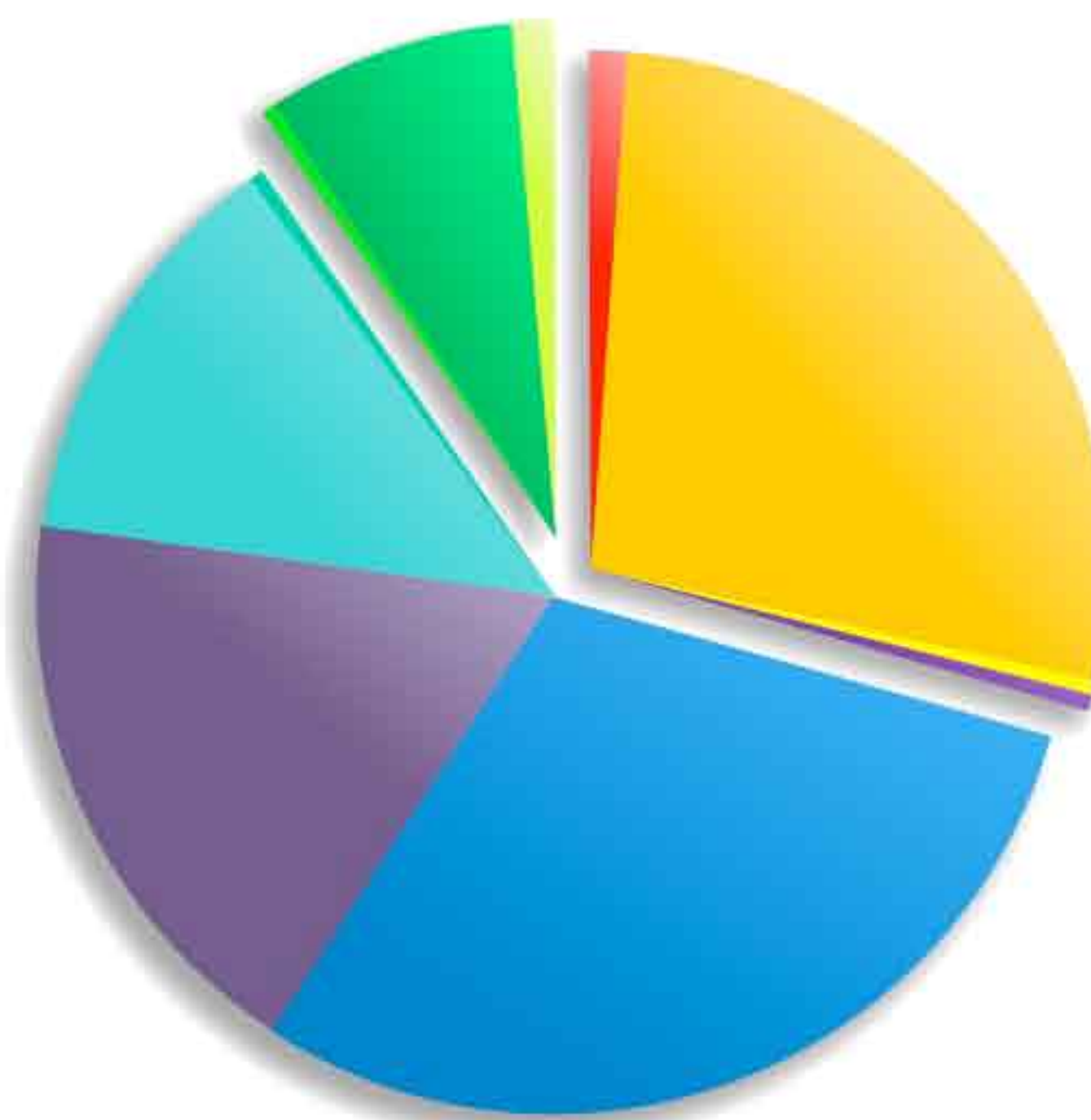
Monetize energy waste to realize cost savings



The Business Case for Carbon

Sample MSO Carbon Footprint

- An MSO's Carbon Footprint represents energy spend across all operations
- Excess carbon emissions signal:
 - Energy Waste
 - Potential Regulatory Liability
- Significant opportunities for energy and cost savings



Scope 1: 29%

- Generators & Heating Gas: 4%
- Fleet Vehicles: 94%
- Corporate Aircraft: <1%
- Fugitive Emissions (A/C): 1%

Scope 2: 61%

- Outside Plant Electricity: 49%
- Critical Facility Electricity: 29%
- Non-Critical Facility Electricity: 21%
- Purchased Steam: <1%

Scope 3: 10%

- Business Travel: 4%
- Employee Commuting: 84%
- Waste: 12%

Harness Carbon to Drive Savings

Energy + Carbon Relationship

- Energy and carbon are different sides of the same coin.
- Reduce energy use to reduce carbon emissions.
- Carbon is a common method for energy “accounting”
- Allows for conversion of different types of energy usage into a common “currency”



Potential kWh Energy Savings	Potential Energy Cost Savings	Equivalent Carbon Savings (Lbs. CO ₂ e)
1,000	\$100	1,530
10,000	\$1,000	15,300
100,000	\$10,000	153,000
1,000,000	\$100,000	1,530,000
10,000,000	\$1,000,000	15,300,000

The Baseline Carbon Audit

Mapping Energy Spend and Emissions

Leverage the analytical capacity of the Baseline Carbon Audit to gain an enterprise-perspective of your **operational energy efficiency**

1

Map **energy spend** and associated emissions across the entire operational footprint.

2

Create a **benchmark**.
Set target energy or carbon emissions reduction **goal**.

3

Generate **metrics** to support development of **abatement plan**.

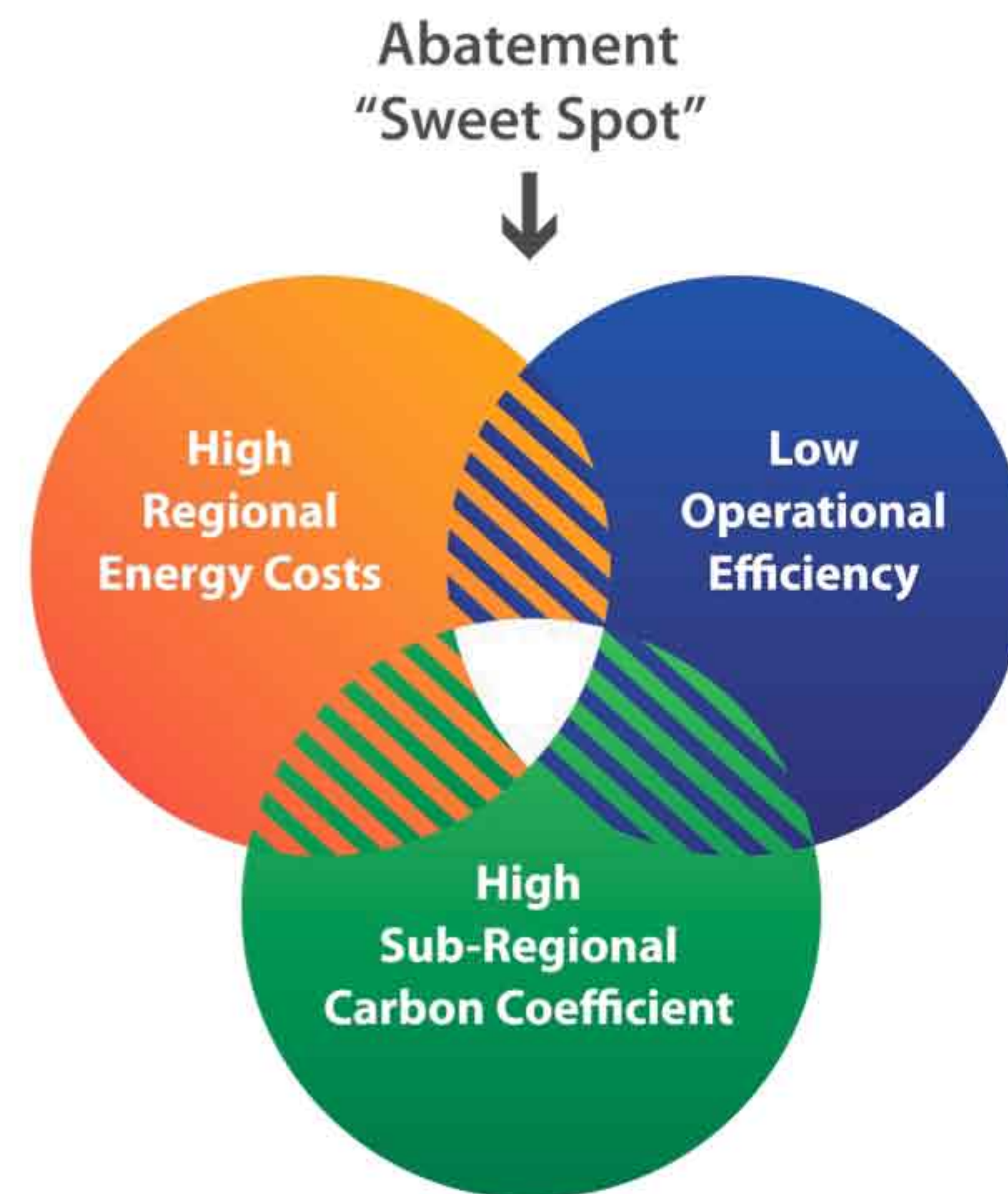
The Carbon Abatement Plan

Where to Go:

- Specific markets to be selected for abatement implementation based on:
 - Regional Energy Costs (i.e. electricity rates and vehicle fuel prices)
 - Sub-regional Carbon Coefficients (i.e. electricity)

What to Do:

- Target the most inefficient operations within the most energy intensive contributors to the MSO footprint :
 - Outside Plant Electricity
 - Facility Electricity
 - Fleet Vehicle Fuel Use



No Two Footprints are the Same

An MSO's operational energy profile depends on a number of variables:

- Organization size
- Condition of critical facility & network infrastructure
- Size of vehicle fleet
- Total number of power supplies
- Local utility's fuel mix
- Geography and urban density
- Impact of local climate

U.S. State	Commercial Electricity Rate (\$/kWh)	Gasoline Fuel Rate (\$/gallon)	Sub-Regional Carbon Coefficient (Lbs. CO ₂ e/kWh)
California	\$0.13	\$3.86	0.68
New York	\$0.15	\$3.80	0.69
Texas	\$0.09	\$3.43	1.26
Ohio	\$0.09	\$3.51	1.56
Hawaii	\$0.34	\$4.14	1.63
U.S. Average	\$0.10	\$3.58	1.30

Abatement Plan Methodology

- Create operational efficiency metrics for OSP, Facilities & Fleet
- Compare each operational efficiency metric against a specific operational efficiency evaluation benchmark (industry best practice or company averages)
- Potential savings determined by bringing the operational efficiency metric back to the “average” with energy efficiency abatement projects

$$\left(\begin{array}{l} \text{Area Operational Efficiency Metric} \\ - \text{Efficiency Evaluation Benchmark} \end{array} \right) = \begin{array}{l} \text{Energy Efficiency Savings} \\ \text{(converted to energy units)} \end{array} \times \begin{array}{l} \text{Cost of Energy} \\ \text{(\$/energy unit)} \end{array}$$

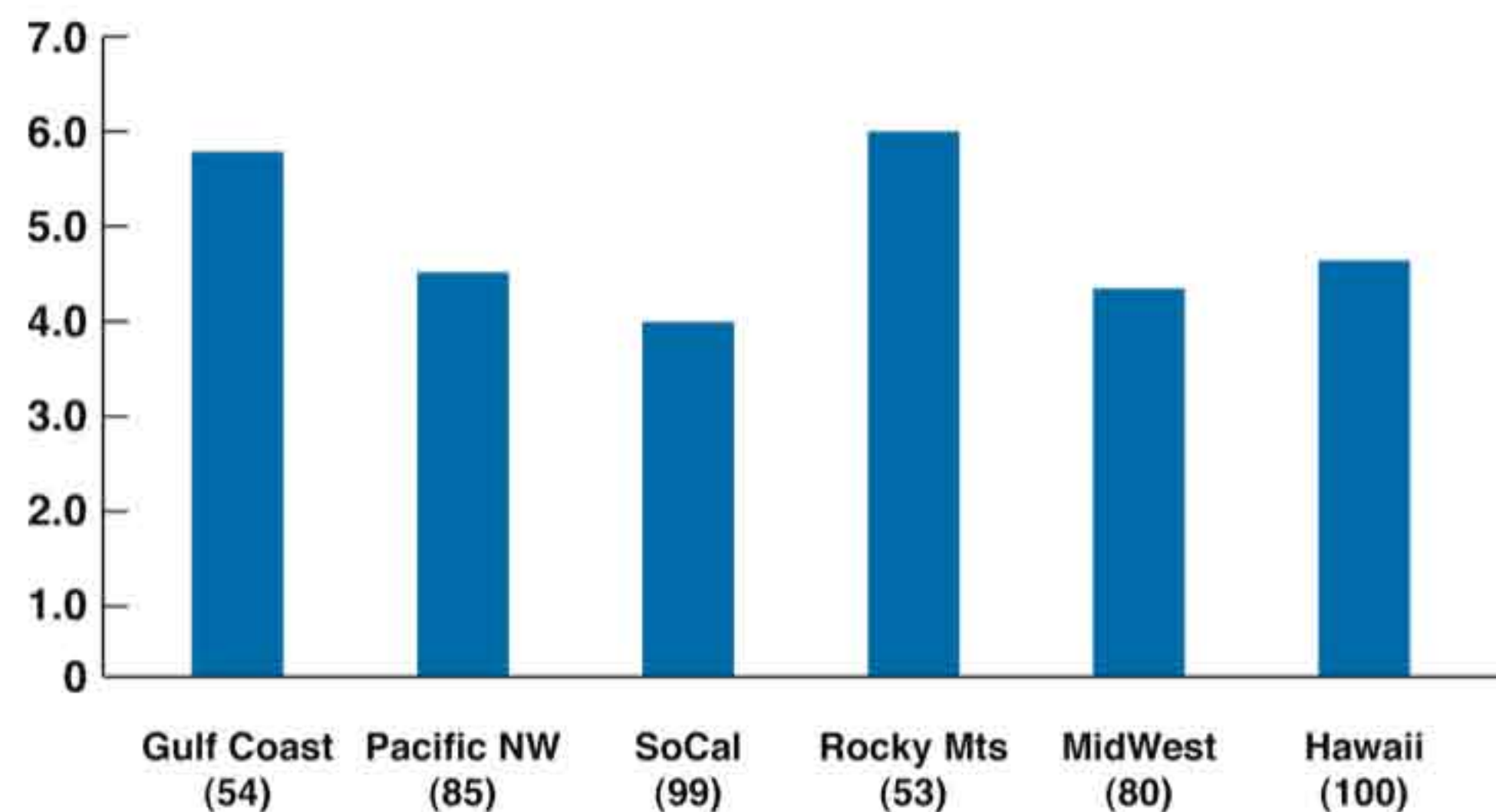
Total Potential Operational Savings (\$)

The Carbon Abatement Plan

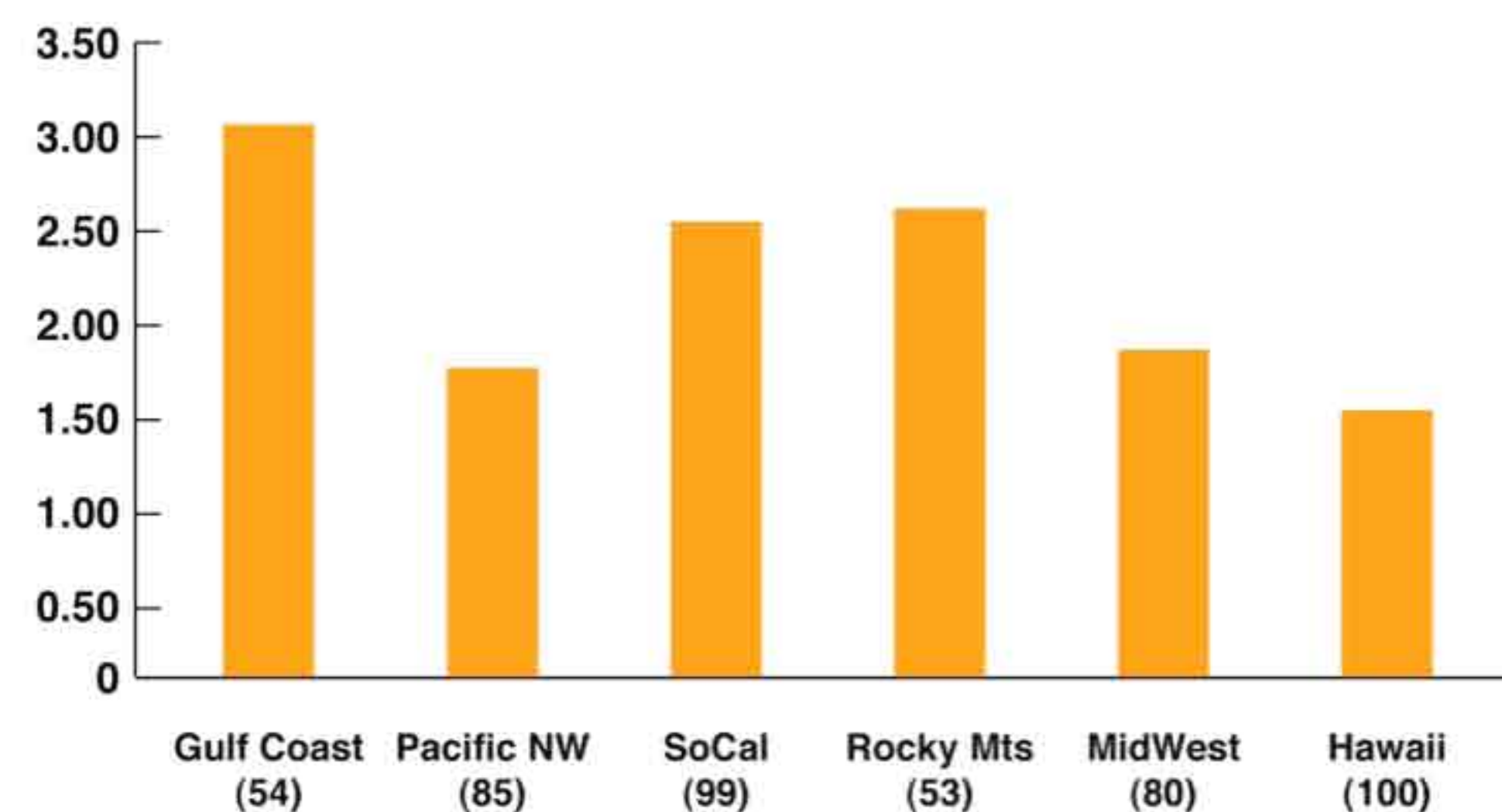
Market Ranking Tool Results

Rank	Market/Area	HP/Mile	Electricity		Fuel
			Facility Efficiency Criterion	OSP Efficiency Criterion	Fleet Efficiency Criterion
1	Gulf Coast	54			
2	Pacific Northwest	85			
3	Southern California	99			

Sample Electricity Metric



Sample Fleet Fuel Metric



The Carbon Abatement Plan

Evaluating Actionable Solutions

	List of "Big Win" Operations	Total Potential Savings
1	Gulf Coast Fleet	\$4 M
2	Gulf Coast OSP	\$1.5 M
3	Pacific Northwest Facilities	\$1 M
4	Pacific Northwest Fleet	\$800,000
5	Southern California OSP	\$500,000

RESULTS:

Gulf Coast: Average Energy \$ + Below Average Efficiency = High Cost Savings

Pacific Northwest: Low Energy \$ + Average Efficiency = Moderate Cost Savings

Southern California: High Energy \$ + Above Average Efficiency = Low Cost Savings

The Carbon Abatement Plan

Prioritizing Actionable Solutions

Fleet Solutions

- Fleet Telematics Software with GPS
- Anti-Idling Campaign & Driver Behavior Incentivization
- Replace aging vehicles with fuel efficient alternatives

**Improve Fuel Efficiency,
Reduce Miles Driven**

Critical & Non-Critical Facility Solutions

- Facility cooling upgrades
- Lighting retrofits or upgrades
- Install building control systems at largest facilities

**Upgrade & Retrofit
Building Systems and
Infrastructure**

OSP Solutions

- Repower to eliminate power supplies loaded at less than 20%
- Repower OSP to 90V where appropriate
- Utilize smaller batteries

**Optimize the Plant,
Effectively Utilize
Power Supplies**

Embark on A Sustainable Path

ENABLE ENERGY MANAGEMENT

- Facilitate access to data to drive energy efficiency innovation
- Build in mechanisms to measure, manage and monitor your energy spend and resource consumption across your operations

EMPLOY CARBON AS A COST SAVINGS TOOL

- Establish an operational energy baseline to prioritize savings opportunities
- Engage in abatement efforts to monetize energy waste and carbon emissions

IMPROVE EFFICIENCY, RELIABILITY & ACCOUNTABILITY

- Improve network reliability via more energy efficient and well-managed infrastructures
- Plan for implementation of both short- and long-term solutions to build sustainability into business objectives

MITIGATE POTENTIAL RISK

- Ensure that uncertain energy availability and pricing does not inhibit future growth
- Gain fluency in “carbon” to speak with and better understand regulators



Thank You.

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