



WAREHOUSE ISR WORKING GROUP

3/3/2020



AGENDA & GOALS

- Background - WAIRE Program & Points
- Updates to WAIRE Menu
 - Updated emissions and cost analysis
 - Technical Report
- Stringency Discussion - Proposed Analytical Approach
- Stringency Discussion - Examples & Calculator
- Next Steps & Schedule

BACKGROUND - PROPOSED RULE 2305

- Preliminary draft PR 2305 released in Nov. 2019
- PR 2305 requires operators of warehouses with $\geq 100k$ sf in warehousing activities to earn XX Points every year, based on the WAIRE Menu
- Each operator's annual **Warehouse Points Compliance Obligation (WPCO)** is tied to the **Weighted Annual Truck Trips (WATTs)**, the stringency, and an annual variable
 - $WPCO = WATTs \times \text{Stringency} \times \text{Annual Variable}$
 - Stringency and Annual Variable have not yet been defined

PROPOSED RULE 2305 WAREHOUSE INDIRECT SOURCE RULE -
WAREHOUSE ACTIONS AND INVESTMENTS TO REDUCE EMISSIONS
(WAIRE) PROGRAM

- (a) Purpose
The purpose of this rule is to reduce local and regional emissions, and to facilitate local and regional emission reductions associated with warehouses and the mobile sources attracted to warehouses.
- (b) Applicability
This rule applies to owners and operators of warehouses located in the South Coast Air Quality Management District (South Coast AQMD) with greater than 100,000 square feet of indoor floor space in a single building.
- (c) Definitions
For the purpose of this rule, the following definitions shall apply:
- (1) ALTERNATIVE ENERGY GENERATION EQUIPMENT means systems capable of generating electricity without the use of diesel or gasoline.
 - (2) ALTERNATIVE-FUELED VEHICLE means a vehicle or engine that is not powered by gasoline or diesel fuel.
 - (3) ALTERNATIVE FUELING STATION means fuel dispensing equipment for alternative-fueled vehicles.
 - (4) CLASS 4 TRUCK means a truck with a Gross Vehicle Weight Rating (GVWR) of 14,001 to 16,000 pounds.
 - (5) CLASS 5 TRUCK means a truck with a GVWR of 16,001 to 19,500 pounds.
 - (6) CLASS 6 TRUCK means a truck with a GVWR of 19,501 to 26,000 pounds.
 - (7) CLASS 7 TRUCK means a truck with a GVWR of 26,001 to 33,000 pounds.
 - (8) CLASS 8 TRUCK means a truck with a GVWR of greater than 33,001 pounds.
 - (9) ELECTRIC CHARGER means an electric charging station for vehicles. Each unique plug that can charge an individual vehicle at any time.

2305-1

BACKGROUND - WAIRE MENU

- Preliminary draft WAIRE Menu released in Dec. 2019
- WAIRE Points in the Menu based on three subcomponents: incremental cost of ZE/NZE technology, regional emission reductions (NOx), and local emission reductions (DPM)
- Preliminary stakeholder feedback:
 - Additional information needed about WAIRE Menu calculation approach
 - Menu items should not be capped at 5 Points for cost or emission reductions
 - Emission reductions should be associated with acquiring ZE/NZE vehicles
 - PR 2305 should do more to address local impacts



WAIRE MENU UPDATES

- Staff has continued to evaluate potential emission reductions and costs associated with each WAIRE Menu item
- Updated WAIRE Menu available
 - Truck trip lengths now based on SCAG travel demand model instead of EMFAC
 - Updates to some cost estimates
 - Cost and emission reduction points now uncapped for each Menu item
 - Acquisition of ZE/NZE vehicles now earn regional emission reduction Points (Moyer cost eff.)
 - Menu items that directly reduce regional and local emissions (e.g., truck visits) increased by factor of three

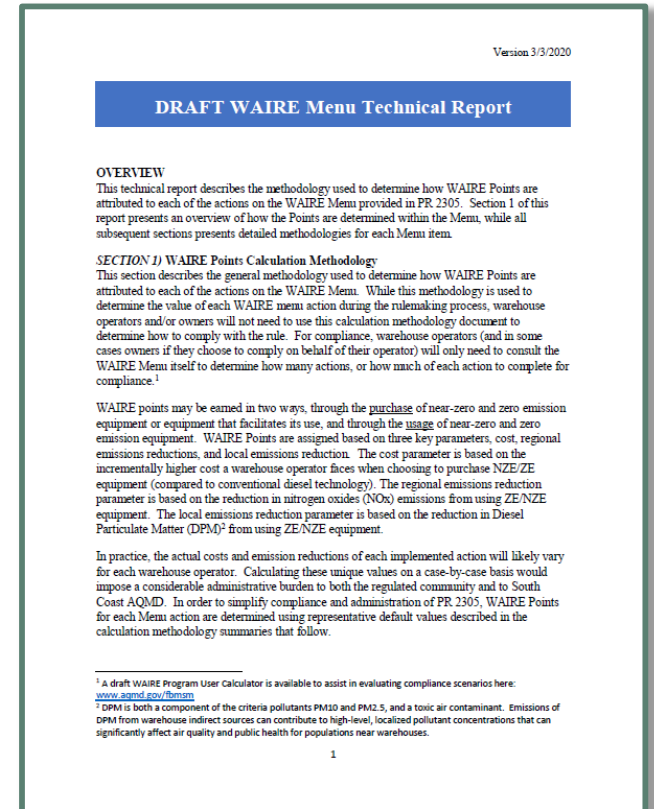
DRAFT WAIRE MENU

(VERSION 3-3-2020)

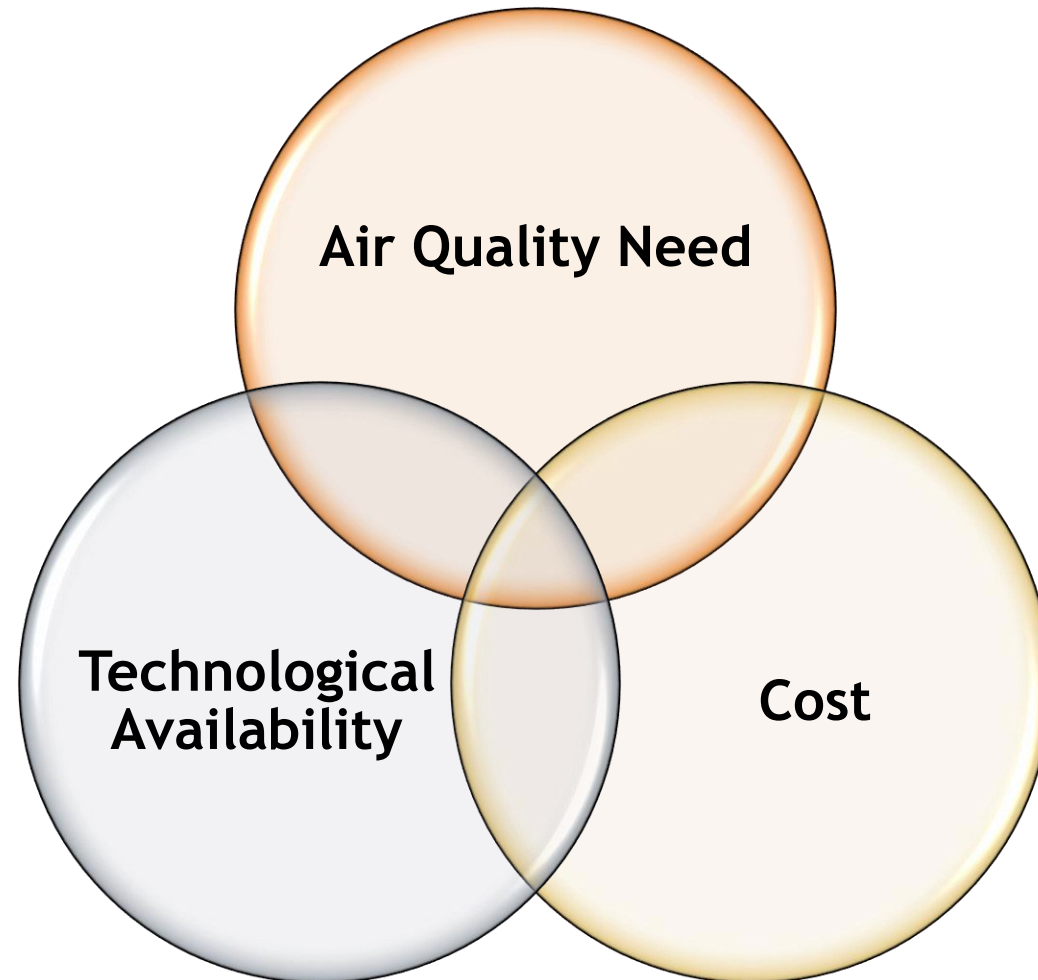
WAIRE Menu Item	WAIRE Menu Sub-Item		Annualized Unitary Metric	Cost	Regional	Local	WAIRE Points	
Acquire NZE/ZE Trucks in Warehouse Operator Truck Fleet	Purchase Truck	Class 8 Truck	NZE	1 truck purchased	3	52	0	55
		Class 4 - 7 Truck			2	24	0	26
		Class 8 Truck	ZE		6	120	0	126
		Class 4 - 7 Truck			4	64	0	68
NZE/ZE Truck Visits	Truck Visits	Class 8 Truck	NZE	365 truck visits	3	21	18	42
		Class 4 - 7 Truck			3	6	3	12
		Class 8 Truck	ZE		9	24	18	51
		Class 4 - 7 Truck			3	6	3	12
Acquire ZE Yard Truck	Purchase Yard Truck		ZE	1 truck purchased	9	168	0	177
Use ZE Yard Truck	Onsite Yard Truck Use		ZE	1000 hours	3	48	240	291
Install onsite ZE charging or fueling infrastructure	Electric Charger	Level 5	EVSE Purchase	1 EVSE Purchased	6	112	0	118
		Level 4			3	48	0	51
		Level 3			2	24	0	26
		Level 2			1	4	0	5
		TRU Plug			1 Plug Purchased		TBD	TBD
		Level 3, 4, or 5	Construction Mobilization	1 construction project	1	8	0	9
		Level 2			1	8	0	9
		TRU Plug			TBD	TBD	TBD	TBD
		Level 3, 4, or 5	Final Permit Sign Off & Charger Energization	1 construction project	3	56	0	59
		Level 2			1	8	0	9
	TRU Plug	TBD			TBD	TBD	TBD	
	Hydrogen Station	Liquid or Gaseous H ₂		1 700 kg/day project	80	1600	0	1680
Use onsite ZE charging or fueling infrastructure	Electric Charger	Car or truck charging		165,000 kWh	2	22	18	42
		TRU Plug		TBD	TBD	TBD	TBD	TBD
	Hydrogen Station	Car or truck fueling		6,152 kg	3	22	18	43
Install onsite energy systems	Solar Panels	TBD		TBD	TBD	TBD	TBD	TBD
	Battery Storage	TBD		TBD	TBD	TBD	TBD	TBD
Usage of onsite energy systems	Solar Panels	TBD		TBD	TBD	TBD	TBD	TBD
	Battery Storage	TBD		TBD	TBD	TBD	TBD	TBD
Community Benefits	Air Filters for Sens. Receptors	Stand-alone systems		25 systems	3	52	0	55
		Filters		200 filters	3	48	0	51

WAIRE MENU - DRAFT TECHNICAL REPORT

- Draft technical analysis that describes WAIRE Menu Point system released March 3
 - Requesting preliminary comments by April 3
 - Additional time will be available for comment during later stages of rulemaking
- Draft technical analysis includes summary description of WAIRE Point system and supplemental discussion for each menu item
 - Additional options for TRUs, solar, and onsite energy storage options are anticipated

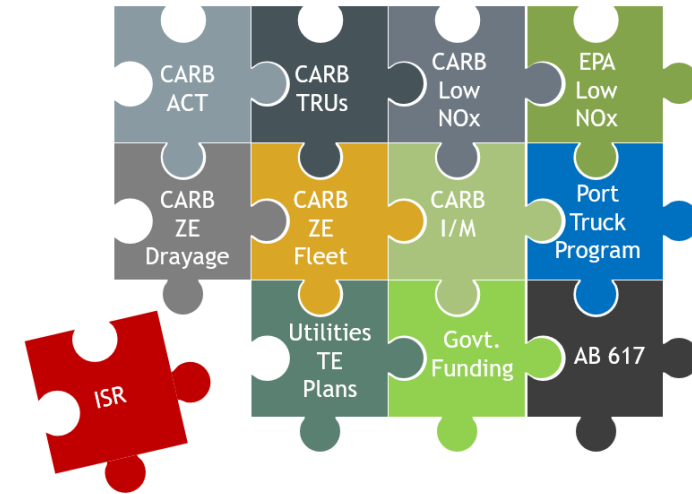


ISR STRINGENCY DISCUSSION - PART 1

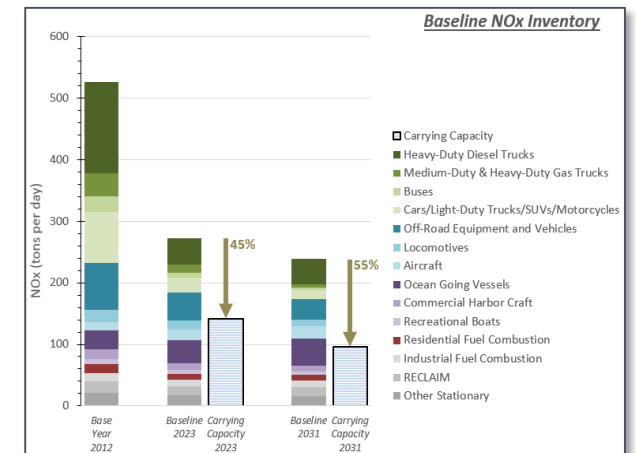


REVIEW OF NEED FOR ISR TO IMPROVE REGIONAL AIR QUALITY

- Significant NOx reductions are needed to meet air quality standards
 - \$16.5 billion annual public health benefits from meeting these standards
- Warehouse ISR can contribute to reducing emissions and can facilitate/enhance other emission reduction strategies
 - Other regulations and incentive strategies are also necessary

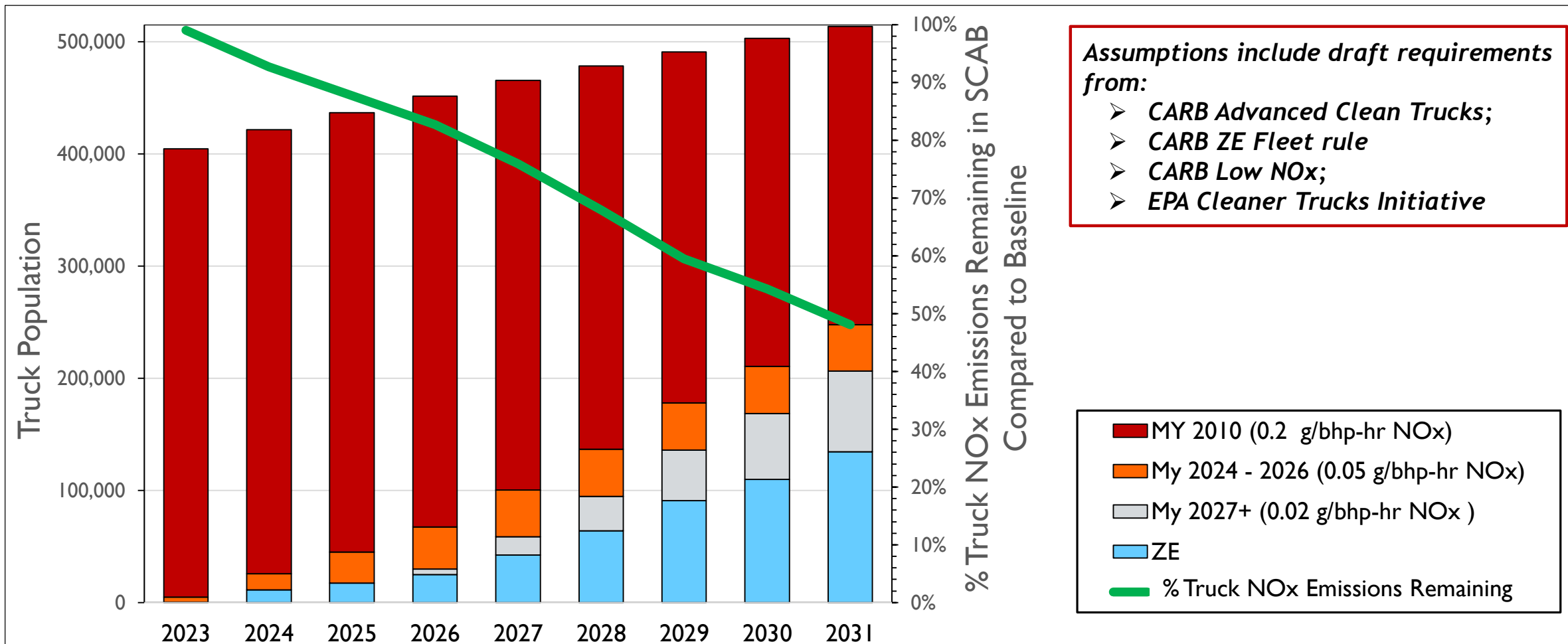


NOx Emissions (tpd)	2023	2031
Baseline South Coast Air Basin	269	239
Total reductions needed to meet air quality standards	135	143
<i>Defined Emission Reduction Strategies</i>	52	55
<i>Reductions that depend on new funding, federal actions, and/or other new strategies</i>	83	88
'Universe' of ISR warehouse emissions in baseline*	34	36



*Based on updates to staff analysis conducted in 2018

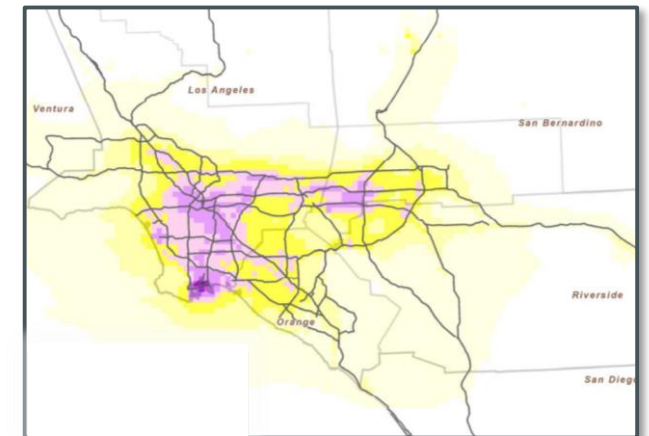
POTENTIAL EFFECT* OF NEW CARB AND EPA PROPOSED REGULATIONS ON TRUCK EMISSIONS AND POPULATIONS WITHOUT ISR OR INCENTIVES



*Draft analysis. More refined estimates to be developed by CARB/EPA during rulemaking for each regulation.

REVIEW OF BENEFITS THAT ISR CAN ALSO PROVIDE TO IMPROVE LOCAL AIR QUALITY

- Many stakeholders have raised concerns in working group and through AB 617 process about localized air quality impacts from warehousing
 - Health risks from diesel exhaust to nearby sensitive receptors
 - Cumulative impact from multiple warehouses in same neighborhood
- Air quality cancer risks are decreasing from industry actions to comply with regulations (e.g., CARB Truck and Bus Rule)
 - 2016 AQMP estimated that DPM emissions will reduce ~70% between 2012 and 2031
 - If risks reduce at same level, average risk across the air basin is still >250/million*
 - Local areas near intense diesel activity will be higher



*Assuming 897 per million risk in 2012 from MATES IV study

ANALYSIS OF COST OF ISR

- Socioeconomic analysis will analyze costs to industry and potential industry response
 - Potential jobs and economic impact
 - Potential for relocation of warehousing outside of South Coast AQMD
 - Ports' economic study evaluated potential cargo diversion to other ports due to update to Clean Truck Program
 - Study determined that \$140 rate per 40' container yields 1.4% diversion to other ports
 - South Coast AQMD study is focused on local effect by evaluating the potential for warehousing to relocate to nearby markets (e.g., High Desert, Las Vegas, Arizona, etc.)

ANALYSIS OF COST OF ISR AND ITS POTENTIAL IMPACT ON INDUSTRY - CONTINUED

- Potential ISR costs can be converted into dollars per square foot and compared to industry response to other cost increases
 - Example: Inland Empire lease rates ~doubled since 2011 while ~20 million sf of new warehousing added each year*
 - Developable land for new warehouses decreasing in South Coast AQMD, and growth expected to decline in coming years regardless of regulations**
- Socioeconomic analysis will consider how ISR may impact goods movement industry
 - Study will seek to separate any impacts from larger macroeconomic trends from potential impacts from ISR
 - U.S.-China trade policy, Coronavirus, etc.

* <http://voitco.com/market-reports/>

** https://www.scag.ca.gov/Documents/Task4_UnderstandingFacilityOperations.pdf

COST ESTIMATES

- Default cost estimates in WAIRE Menu are conservative
 - Actual costs experienced by industry are not reported for ISR compliance
- Many warehouse operators will be able to earn Points for much lower cost
 - Usage menu items includes unincentivized incremental total cost of ownership for ZE/NZE compared to diesel
 - Electric charging and H2 fueling costs assume no cost recovery from users of stations
 - No rebates from LCFS included
 - Costs for ZE/NZE vehicles should reduce through time, but are not accounted for due to uncertainty of timing and scale
 - Reducing truck trips through efficiency measures will reduce compliance obligation

ISR STRINGENCY DISCUSSION - PART 2

- Stringency of rule measured in Points per Weighted Annual Truck Trips (WATTs)
 - Annual Variable will control phased-in stringency of rule
- Proposing to analyze stringency in the range of **0.0001 - 0.005 Points/WATT**
 - Mitigation Fee → \$1,000/Point
- Examples illustrate potential compliance pathways (*next slides*)
- Draft WAIRE Compliance Calculator available to test different compliance scenarios: www.aqmd.gov/fbmsm

The screenshot displays the 'WAIRE User Calculator' spreadsheet. The 'User Inputs' section (rows 1-10) includes:

Input	Value
Stringency (Point/WATT)	0.001
Warehouse Size (square feet)	1,000,000
Annual Class 8 Truck Visits	
Annual Class 4-7 Truck Visits	
Use Default Trip Rate?	<input checked="" type="checkbox"/>
Cold Storage?	<input type="checkbox"/>

The 'WAIRE Menu Action' section (rows 11-24) lists various actions and their resulting points:

WAIRE Menu Action	Units	User Input	Resulting Points
Mitigation Fee	\$		0
NZE Class 8 Truck Visits	# of Annual Visits		0
NZE Class 8 Truck Acquisitions	# of Trucks		0
ZE Class 8 Truck Visits	# of Annual Visits		0
ZE Class 8 Truck Acquisitions	# of Trucks		0
NZE Class 4-7 Truck Visits	# of Annual Visits		0
NZE Class 4-7 Truck Acquisitions	# of Trucks		0
ZE Class 4-7 Truck Visits	# of Annual Visits		0
ZE Class 4-7 Truck Acquisitions	# of Trucks		0
H2 Station Installations	# of 700 kg/day Stations		0
H2 Station Usage	Annual kg dispensed		0
Level 2 Charger Installations	# of Chargers Installed		0
Level 3 Charger Installations	# of Chargers Installed		0
Level 4 Charger Installations	# of Chargers Installed		0
Level 5 Charger Installations	# of Chargers Installed		0
Charger Usage	Annual kWh dispensed		0
ZE Hostler Acquisitions	# of Trucks		0
ZE Hostler Usage	Annual Hours of Use		0
Filter System Installations	# of Installations		0
Filter Purchases	# of Filters		0
Total			0

Summary values from the spreadsheet:

WATT	346,750
Default Average Daily Class 8 Visits	330
Default Average Daily Class 4-7 Visits	120
WPCO	346.8

COMPLIANCE EXAMPLE - 1 MILLION SF WAREHOUSE

- WATTs=346,750*
Class 8 = 165 visits/day
Class 4-7 = 60 visits/day

- Stringency = 0.001
Annual variable = 1

WPCO = 347

*Default truck trip rate
Actual truck trips must be reported

<i>WAIRE Menu Item Compliance Options</i>	<i>Level of Implementation</i>	<i>Potential Annual Cost</i>	<i>Potential NOx Reduction During Compliance Year</i>	<i>WAIRE Points Earned During Compliance Year</i>
Acquire Class 8 NZE	7 trucks	\$455,000	-	385
Class 8 NZE Truck Visits	9 visits/day	\$31,581	0.7 tpy	378
Acquire Class 8 ZE	3 trucks	\$450,000	-	378
Class 8 ZE Truck Visits	7 visits/day	\$369,864	0.6 tpy	357
Acquire Class 4-7 NZE	14 trucks	\$420,000	-	364
Class 4-7 NZE Truck Visits	29 visits/day	\$402,473	0.4 tpy	348
Acquire Class 4-7 ZE	6 trucks	\$480,000	-	408
Class 4-7 ZE Truck Visits	29 visits/day	\$20,250	0.4 tpy	348
H2 Station Installation	1 station	\$2,000,000	-	1680
H2 Station Usage	136 kg/day	\$496,094	2.2 tpy	347
50 kW Charger Installation	11 chargers	\$410,000	-	354
350 kW Charger Installation	3 chargers	\$500,000	-	422
Charger Usage	3,732 kWh/day	\$245,202	2.2 tpy	347
Acquire ZE Yard Truck	2 trucks	\$420,000	-	354
Use ZE Yard Truck	3.3 hrs/day	\$7,447	0.2 tpy	347
Mitigation Fee	\$347,000	\$347,000	-	347

Some values in table are rounded

COMPLIANCE EXAMPLE - 1 MILLION SF WAREHOUSE

- WATTs=346,750*
Class 8 = 165 visits/day
Class 4-7 = 60 visits/day

- Stringency = 0.0001
Annual variable = 1

WPCO = 35

*Default truck trip rate
Actual truck trips must be reported

<i>WAIRE Menu Item Compliance Options</i>	<i>Level of Implementation</i>	<i>Potential Annual Cost</i>	<i>Potential NOx Reduction During Compliance Year</i>	<i>WAIRE Points Earned During Compliance Year</i>
Acquire Class 8 NZE	1 truck	\$65,000	-	55
Class 8 NZE Truck Visits	1 visit/day	\$3,158	0.1 tpy	42
Acquire Class 8 ZE	1 truck	\$150,000	-	126
Class 8 ZE Truck Visits	1 visit/day	\$36,986	0.1 tpy	51
Acquire Class 4-7 NZE	2 trucks	\$60,000	-	52
Class 4-7 NZE Truck Visits	3 visits/day	\$40,247	0.04 tpy	36
Acquire Class 4-7 ZE	1 truck	\$80,000	-	68
Class 4-7 ZE Truck Visits	3 visits/day	\$2,025	0.04 tpy	36
H2 Station Installation	1 station	\$2,000,000	-	1680
H2 Station Usage	14 kg/day	\$49,609	0.2 tpy	34
50 kW Charger Installation	1 charger	\$110,000	-	94
350 kW Charger Installation	1 charger	\$220,000	-	186
Charger Usage	373 kWh/day	\$24,520	0.2 tpy	35
Acquire ZE Yard Truck	1 trucks	\$210,000	-	177
Use ZE Yard Truck	0.3 hrs /day	\$745	0.02 tpy	35
Mitigation Fee	\$35,000	\$35,000	-	35

Some values in table are rounded

COMPLIANCE EXAMPLE - 1 MILLION SF WAREHOUSE

- WATTs=346,750*
Class 8 = 165 visits/day
Class 4-7 = 60 visits/day

- Stringency = 0.005
Annual variable = 1
WPCO = 1,734

<i>WAIRE Menu Item Compliance Options</i>	<i>Level of Implementation</i>	<i>Potential Annual Cost</i>	<i>Potential NOx Reduction During Compliance Year</i>	<i>WAIRE Points Earned During Compliance Year</i>
Acquire Class 8 NZE	32 trucks	\$2,080,000	-	1760
Class 8 NZE Truck Visits	42 visits/day	\$157,903	3.4 tpy	1764
Acquire Class 8 ZE	14 trucks	\$2,100,000	-	1764
Class 8 ZE Truck Visits	34 visits/day	\$1,849,320	3.0 tpy	1734
Acquire Class 4-7 NZE	67 trucks	\$2,010,000	-	1742
Class 4-7 NZE Truck Visits	145 visits/day	\$2,012,364	1.9 tpy	1740
Acquire Class 4-7 ZE	26 trucks	\$2,080,000	-	1768
Class 4-7 ZE Truck Visits	145 visits/day	\$101,251	2.1 tpy	1740
H2 Station Installation	2 stations	\$4,000,000	-	3360
H2 Station Usage	680 kg/day	\$2,480,472	10.8 tpy	1734
50 kW Charger Installation	65 chargers	\$2,030,000	-	1758
350 kW Charger Installation	15 chargers	\$2,180,000	-	1838
Charger Usage	18,661 kWh/day	\$1,226,009	11.0 tpy	1734
Acquire ZE Yard Truck	10 trucks	\$2,100,000	-	1770
Use ZE Yard Truck	16.3 hrs / day	\$37,237	1.2 tpy	1734
Mitigation Fee	\$1,734,000	\$1,734,000	-	1734

*Default truck trip rate
Actual truck trips must be reported

Some values in table are rounded

COMPLIANCE EXAMPLE - 100K SF WAREHOUSE

- WATTS=24,445*
Class 8 = 11 visits/day
Class 4-7 = 7 visits/day

- Stringency = 0.0001
Annual variable = 1

WPCO = 2

*Default truck trip rate
Actual truck trips must be reported

<i>WAIRE Menu Item Compliance Options</i>	<i>Level of Implementation</i>	<i>Potential Annual Cost</i>	<i>Potential NOx Reduction During Compliance Year</i>	<i>WAIRE Points Earned During Compliance Year</i>
Acquire Class 8 NZE	1 truck	\$65,000	-	55
Class 8 NZE Truck Visits	2 visit/month	\$223	0.005 tpy	2
Acquire Class 8 ZE	1 truck	\$150,000	-	126
Class 8 ZE Truck Visits	1 visit/month	\$2,609	0.004 tpy	2
Acquire Class 4-7 NZE	1 truck	\$30,000	-	26
Class 4-7 NZE Truck Visits	6 visit/month	\$2,838	0.003 tpy	2
Acquire Class 4-7 ZE	1 truck	\$80,000	-	68
Class 4-7 ZE Truck Visits	6 visit/month	\$143	0.003 tpy	2
H2 Station Installation	1 station	\$2,000,000	-	1680
H2 Station Usage	30 kg/month	\$3,499	0.02 tpy	2
50 kW Charger Installation	1 charger	\$110,000	-	94
350 kW Charger Installation	1 charger	\$220,000	-	186
Charger Usage	780 kWh/month	\$1,729	0.02 tpy	2
Acquire ZE Yard Truck	1 truck	\$210,000	-	177
Use ZE Yard Truck	0.7 hrs /month	\$53	0.002 tpy	2
Mitigation Fee	\$2,000	\$2,000	-	2

Some values in table are rounded

COMPLIANCE EXAMPLE - 100K SF COLD STORAGE

- WATTs=79,205*
Class 8 = 38 visits/day
Class 4-7 = 15 visits/day

- Stringency = 0.001
Annual variable = 1

WPCO = 79

*Default truck trip rate
Actual truck trips must be reported

<i>WAIRE Menu Item Compliance Options</i>	<i>Level of Implementation</i>	<i>Potential Annual Cost</i>	<i>Potential NOx Reduction During Compliance Year</i>	<i>WAIRE Points Earned During Compliance Year</i>
Acquire Class 8 NZE	2 trucks	\$130,000	0	110
Class 8 NZE Truck Visits	2 visit/day	\$7,214	0.2 tpy	84
Acquire Class 8 ZE	1 truck	\$150,000	0	126
Class 8 ZE Truck Visits	2 visits/day	\$84,485	0.2 tpy	102
Acquire Class 4-7 NZE	4 trucks	\$120,000	0	104
Class 4-7 NZE Truck Visits	7 visit/day	\$91,933	0.1 tpy	84
Acquire Class 4-7 ZE	2 trucks	\$160,000	0	136
Class 4-7 ZE Truck Visits	7 visits/day	\$4,626	0.1 tpy	84
H2 Station Installation	1 station	\$2,000,000	0	1680
H2 Station Usage	31 kg/day	\$113,318	0.5 tpy	79
50 kW Charger Installation	1 charger	\$110,000	0	94
350 kW Charger Installation	1 charger	\$220,000	0	186
Charger Usage	853 kWh/day	\$56,009	0.5 tpy	79
Acquire ZE Yard Truck	1 truck	\$210,000	0	177
Use ZE Yard Truck	0.8 hrs /day	\$1,701	0.05 tpy	79
Mitigation Fee	\$7,900	\$7,900	0	79

Some values in table are rounded

EXAMPLES DISCUSSION

- In these examples, costs for some options vary between <\$0.01/sf to >\$6/sf
 - At highest stringency, lowest cost option <\$0.05/sf for non-cold storage warehouses
- At higher stringencies, some options cannot be used alone for compliance
- Some technologies may not be available at scale in early years of ISR implementation with high stringency

NEXT STEPS ON ISR STRINGENCY

- Receive feedback on proposed approach
- Continue analysis of range of stringencies and Menu approach
 - Socioeconomic analysis
 - Include total compliance costs, including reporting, recordkeeping, administrative fees, etc.
 - Air quality analysis
 - Technological availability
 - Annual Variable
- Develop staff recommendation for ISR stringency and annual variable

SCHEDULE

Milestone	Anticipated Date
Community Meeting in Inland Empire	March 18
ISR Status Update to Governing Board	April 3
Draft CEQA Notice of Preparation	Mid March
Working Group Meeting	May 6
Draft CEQA Environmental Assessment	Mid May
Community Meeting in Los Angeles County	Early June
Draft Rule, Staff Report, Socioeconomic Report	June 19
Working Group Meeting	July 23
Draft Final Rule, Staff Report, Socioeconomic Report	July 29
Set Hearing	August 7
Mobile Source Committee	August 21
Public Hearing	September 4

CONTACT

- Ian MacMillan, Planning & Rules Manager
imacmillan@aqmd.gov
- Victor Juan, Program Supervisor
vjuan@aqmd.gov