WAREHOUSE ISR WORKING GROUP

12/10/2019

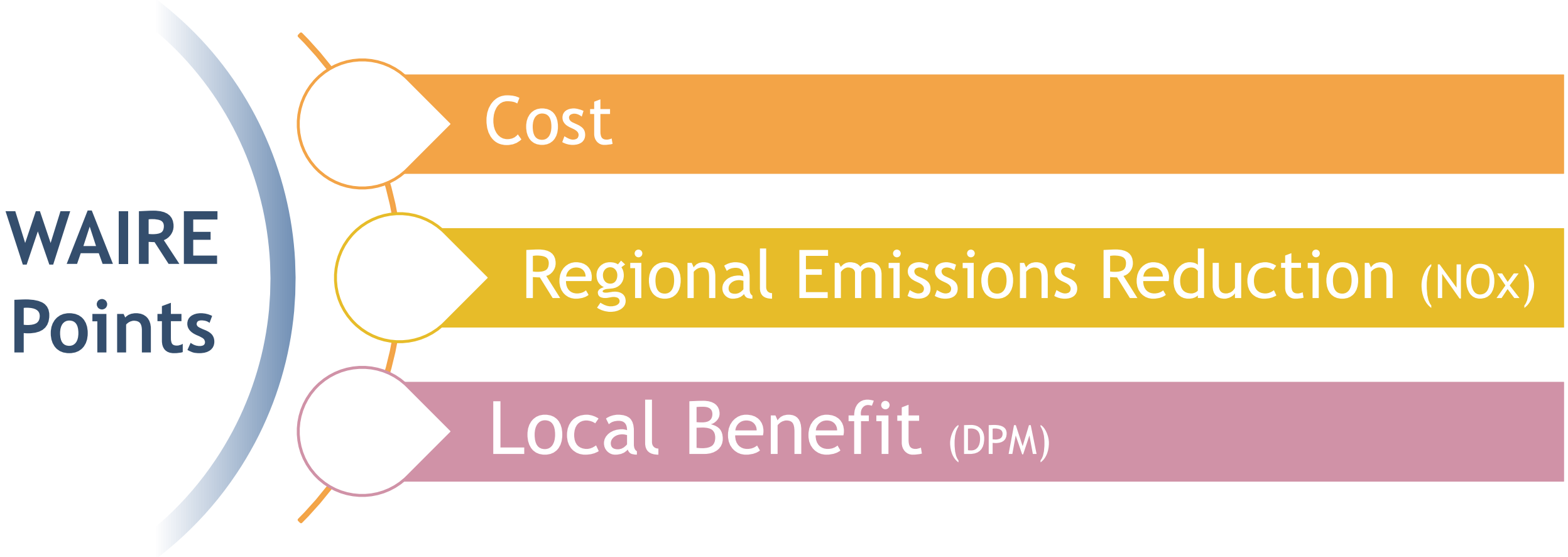
AGENDA & GOALS

- Background
- Draft WAIRE Menu Point System Approach
  - Examples
  - Discussion
  - Overview of technical analysis of menu items
- Potential Approach to Developing Rule Stringency
- Comments received
- Next Steps

BACKGROUND

- First discussion draft of rule released for previous Working Group on Nov. 13
  - www.aqmd.gov/docs/default-source/planning/fbmsm-docs/warehouse-isr_prelim-1st-draft.pdf
- Discussion draft laid out the proposed structure of the rule
- Key details will continue to be developed with Working Group today and in future meetings
  - WAIRE Menu Point values
  - Potential stringency of rule

BACKGROUND
COMPONENTS USED IN WAIRE POINT SYSTEM DESIGN



POTENTIAL POINT SYSTEM APPROACH

Cost ($/year)	Regional Emission Reduction (NOx lb/year)	Local Benefit (DPM lb/year)
1 $0 - $25k	1 0 - 25	1 0 – 0.25
2 $25k - $50k	2 25 – 50	2 0.25 – 0.5
3 $50k - $75k	3 50 – 75	3 0.5 – 0.75
4 $75k - $100k	4 75 – 100	4 0.75 – 1.0
5 $100k+	5 100+	5 1.0+

= WAIRE Points

Example:

1. A $20,000 action
+
3. 60 lbs NOx reduced
+
2. 0.4 lbs DPM reduced

6 WAIRE Points

KEY INPUTS

- Annualize costs, regional emission benefits, and local benefits
- Equal weighting for costs, regional emission benefits, and local benefits
- Bins (0-5) simplify comparison between menu items
- Incremental differences compared to conventional diesel
- Costs assume no financial incentives

Seeking feedback on proposed approach

DRAFT WAIRE MENU

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	0	0	3
		Class 4 - 7 Truck			2	0	0	2
		Class 8 Truck	ZE		5	0	0	5
		Class 4 - 7 Truck			4	0	0	4
NZE/ZE Truck Visits	One-way trips	Class 8 Truck	NZE	365 truck visits	1	4	5	10
		Class 4 - 7 Truck			1	2	4	7
		Class 8 Truck	ZE		1	4	5	10
		Class 4 - 7 Truck			1	2	4	7
Acquire ZE Yard Truck	Purchase Yard Truck		ZE	1 truck purchased	5	0	0	5
Use ZE Yard Truck	Onsite Yard Truck Use		ZE	2000 hours	0	4	5	9
Install onsite ZE charging or fueling infrastructure	Electric Charger	Level 5	EVSE Purchase	1 EVSE Purchased	5	0	0	5
		Level 4			3	0	0	3
		Level 3			2	0	0	2
		Level 2			1	0	0	1
		TRU Plug		1 Plug Purchased	TBD	TBD	TBD	TBD
		Level 3, 4, or 5	Construction Mobilization	1 construction project	1	0	0	1
		Level 2			1	0	0	1
		TRU Plug			TBD	TBD	TBD	TBD
		Level 3, 4, or 5	Final Permit Sign Off & Charger Energization	1 construction project	3	0	0	3
		Level 2			1	0	0	1
		TRU Plug			TBD	TBD	TBD	TBD
	Hydrogen Station	Liquid or Gaseous H_2		1 700 kg/day project	5	0	0	5
Use onsite ZE charging or fueling infrastructure	Electric Charger	Car or truck charging		165,000 kWh	2	5	3	10
		TRU Plug		TBD	TBD	TBD	TBD	TBD
	Hydrogen Station	Car or truck fueling		6,172 kg	4	5	3	12
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	0	1	4
		Filters		200 filters	3	0	1	4

EXAMPLES USING ANNUALIZED UNITARY VALUES

- Example 1
  - Acquire a Class 8 NZE truck = 3 WAIRE Points
  - Use the same NZE truck for one delivery per day on average at that warehouse for an entire year (365 visits) = 10 WAIRE Points
- Example 2
  - Have one delivery per day on average for an entire year from Class 8 NZE trucks (365 visits) = 10 WAIRE Points
- Example 3
  - Acquire a Class 5 ZE truck = 4 WAIRE Points
  - Use the same ZE truck for one delivery per day at that warehouse for an entire year (365 visits) = 7 WAIRE Points

EXAMPLES USING ANNUALIZED UNITARY VALUES CONTINUED

- Example 4
  - Purchase one 50 kW charger (EVSE) = 5 WAIRE Points
  - Begin construction of charger station = 1 WAIRE Points
  - Complete construction of charger station = 3 WAIRE Points
  - *Total if all completed in one year* = *9 WAIRE Points*
- Example 5
  - Use one 50 kw charger for about 10 hours/day for an entire year (165,000 kWh) = 10 WAIRE Points

EXAMPLES USING NON-UNITARY VALUES

- Example 6
  - 100 class 8 NZE truck visits in one year → (100 ÷ 365) × 10 = 2.7 WAIRE Points
- Example 7
  - Install five 19 kW chargers in one year → (5 × 1) + 1 + 1 = 7 WAIRE Points
  - Use five 19 kW chargers to dispense 90,000 kWh in the same year (five trucks charging 100 kWh/day for 180 days) → (90,000 ÷ 165,000) × 10 = 5.45 WAIRE Points
  - 900 class 5 ZE truck visits in the same year (five trucks visiting once per day for 180 days) → (900 ÷ 365) × 7 = 17.26 WAIRE Points
  - *Total = 7 + 5.45 + 17.26 = 29.7 WAIRE Points*

EXAMPLES FOR TRANSFERRED WAIRE POINTS

- Example 8
  - Warehouse owner installs one 350 kW charger in a compliance year and transfers all the WAIRE Points to the operator = 9 WAIRE Points
  - Warehouse operator dispenses 90,000 kWh in that compliance year = 5.45 WAIRE Points
  - Total WAIRE Points the operator may use at that site = 14.5 WAIRE Points

EXAMPLES FOR TRANSFERRED WAIRE POINTS CONTINUED

- Example 9
  - Warehouse operator has 365 truck visits from class 8 NZE trucks in one year = 10 WAIRE Points (5 Points from Local Benefit)
  - Total WAIRE Points the operator may use at that site = 10 WAIRE Points
  - Maximum amount of WAIRE Points the operator may transfer for use at another site under the control of that operator = 10 – 5 = 5 WAIRE Points

DISCUSSION

- Open to questions and comments on the proposed WAIRE Points valuation
  - Initial reactions to the relative weighting between WAIRE Menu items?
  - Are there additional WAIRE Menu items that should be considered?
  - Alternative approaches?

KEY TECHNICAL APPROACHES TO DEVELOPING WAIRE MENU

WAIRE Menu Item	Cost	Regional Emission Reduction	Local Benefit
Acquire NZE/ZE truck	Incremental cost	N/A	N/A
NZE/ZE truck visits	Incremental total cost of ownership (per trip)	NOx reductions from default EMFAC trip length	DPM reductions within 1 mile from EMFAC
Acquire ZE yard truck	Incremental cost	N/A	N/A
Use ZE yard truck	Incremental fueling cost	NOx reductions from ORION data	DPM reductions within 1 mile from ORION data
Install ZE fueling/charging infrastructure	Cost of installation	N/A	N/A
Use ZE fueling/charging infrastructure	Cost of fuel/electricity	NOx reductions based on kWh/mi or kg/mi efficiency	DPM reductions within 1 mile based on kWh/mi or kg/mi efficiency
Acquire/Use ZE TRUs	TBD	TBD	TBD
Install onsite energy systems (solar or battery)	Cost of installation	N/A	N/A
Use Install onsite energy systems (solar or battery)	TBD	TBD	TBD
Install HVAC filters/systems	Cost of filters/systems	N/A	Smallest bin to account for some reduced exposure

Draft WAIRE Menu with Technical Parameters Included

WAIRE Menu Item	WAIRE Menu Sub-Item			Reporting Metric	Annualized Unitary Metric	Annualized Incremental Cost ($/metric)	Annualized Regional Emissions Reduction (lb NOx/metric)	Annualized Local Benefit (lb DPM/metric)	Cost	Regional	Local	WAIRE Points
Acquire NZE/ZE Trucks in Warehouse Operator Truck Fleet	Purchase Truck	Class 8 Truck	NZE	Number of trucks	1 truck purchased	$65,000	0	0	3	0	0	3
		Class 4 - 7 Truck				$30,000	0	0	2	0	0	2
		Class 8 Truck	ZE			$150,000	0	0	5	0	0	5
		Class 4 - 7 Truck				$80,000	0	0	4	0	0	4
NZE/ZE Truck Visits	One-way trips	Class 8 Truck	NZE	Number of trips	365 truck visits	$314	82.1	1.2	1	4	5	10
		Class 4 - 7 Truck				$1,051	38.3	0.8	1	2	4	7
		Class 8 Truck	ZE			$1,124	91.3	1.2	1	4	5	10
		Class 4 - 7 Truck				$58	42.6	0.8	1	2	4	7
Acquire ZE Yard Truck	Purchase Yard Truck		ZE	Number of yard trucks	1 truck purchased	$185,000	0	0	5	0	0	5
Use ZE Yard Truck	Onsite Yard Truck Use		ZE	Hours of use	2000 hours	$0	76.0	2.8	0	4	5	9
Install onsite ZE charging or fueling infrastructure	Electric Charger	Level 5	EVSE Purchase	Number of EVSE purchased	1 EVSE Purchased	$140,000	0	0	5	0	0	5
		Level 4				$60,000	0	0	3	0	0	3
		Level 3				$30,000	0	0	2	0	0	2
		Level 2				$5,000	0	0	1	0	0	1
		TRU Plug			1 Plug Purchased	TBD	TBD	TBD	TBD	TBD	TBD	TBD
		Level 3, 4, or 5	Construction Mobilization	First day of construction	1 construction project	$10,000	0	0	1	0	0	1
		Level 2				$10,000	0	0	1	0	0	1
		TRU Plug				TBD	TBD	TBD	TBD	TBD	TBD	TBD
		Level 3, 4, or 5	Final Permit Sign Off & Charger Energization	The latter of the final permit sign off or charger energization	1 construction project	$70,000	0	0	3	0	0	3
		Level 2				$10,000	0	0	1	0	0	1
		TRU Plug				TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Hydrogen Station	Liquid or Gaseous H_2		Total kg of dispensed H_2 capacity per day	1 700 kg/day project	$2,000,000	0	0	5	0	0	5
Use onsite ZE charging or fueling infrastructure	Electric Charger	Car or truck charging		kWh of dispensed electricity	165,000 kWh	$29,700	825	0.6	2	5	3	10
		TRU Plug		kWh of dispensed electricity beyond CARB requirements	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Hydrogen Station	Car or truck fueling		Total kg of dispensed H_2	6,172 kg	$86,408	825	0.6	4	5	3	12
Install onsite energy systems	Solar Panels	TBD		Estimated annual production (kWh)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Battery Storage	TBD		Total capacity (kWh)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Usage of onsite energy systems	Solar Panels	TBD		Estimated annual production (kWh)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
	Battery Storage	TBD		Total capacity (kWh)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
Community Benefits	Air Filters for Sensitive Receptors	Stand-alone systems		Number of systems	25 systems	$65,000	0	0	3	0	1	4
		Filters		Number of filters	200 filters	$60,000	0	0	3	0	1	4

TECHNICAL ANALYSIS

- Full technical analysis will be provided with draft staff report
- Key data sources:
  - Input from industry stakeholders
  - CARB's EMFAC and ORION emissions data
  - South Coast AQMD incentive program data
  - CARB Advanced Clean Trucks Standardized Regulatory Impact Assessment
  - Port Drayage Truck Feasibility Study
  - Utility rate programs
  - Rocky Mountain Institute From Gas to Grid Report

POTENTIAL APPROACH TO DEVELOP RULE STRINGENCY

- Warehouse size is a common metric for evaluating costs (e.g., $ per square feet)
- Stringency of rule may be set based on $ per square foot and then converted to $ per annual truck trips using default truck trip rates
- Potential approach
  - Default Daily Weighted Truck Trip Rate of 0.95 trips/thousand sq.ft./day & 365 days/yr
  - Default Weighted Annual Truck Trip Rate = 0.95 × 365 = 347 trips/tsf/yr
  - Draft WAIRE Menu shows $25,000 = 1 WAIRE Point
- For illustration purposes, if stringency* is set at $1/sf/yr (or $1000/tsf/yr), then $1,000/tsf/yr ÷ 347 trips/tsf/yr = **$2.88/trip**

**The warehouse ISR stringency level is not being proposed at this time*

POTENTIAL APPROACH TO DEVELOP RULE STRINGENCY - EXAMPLE

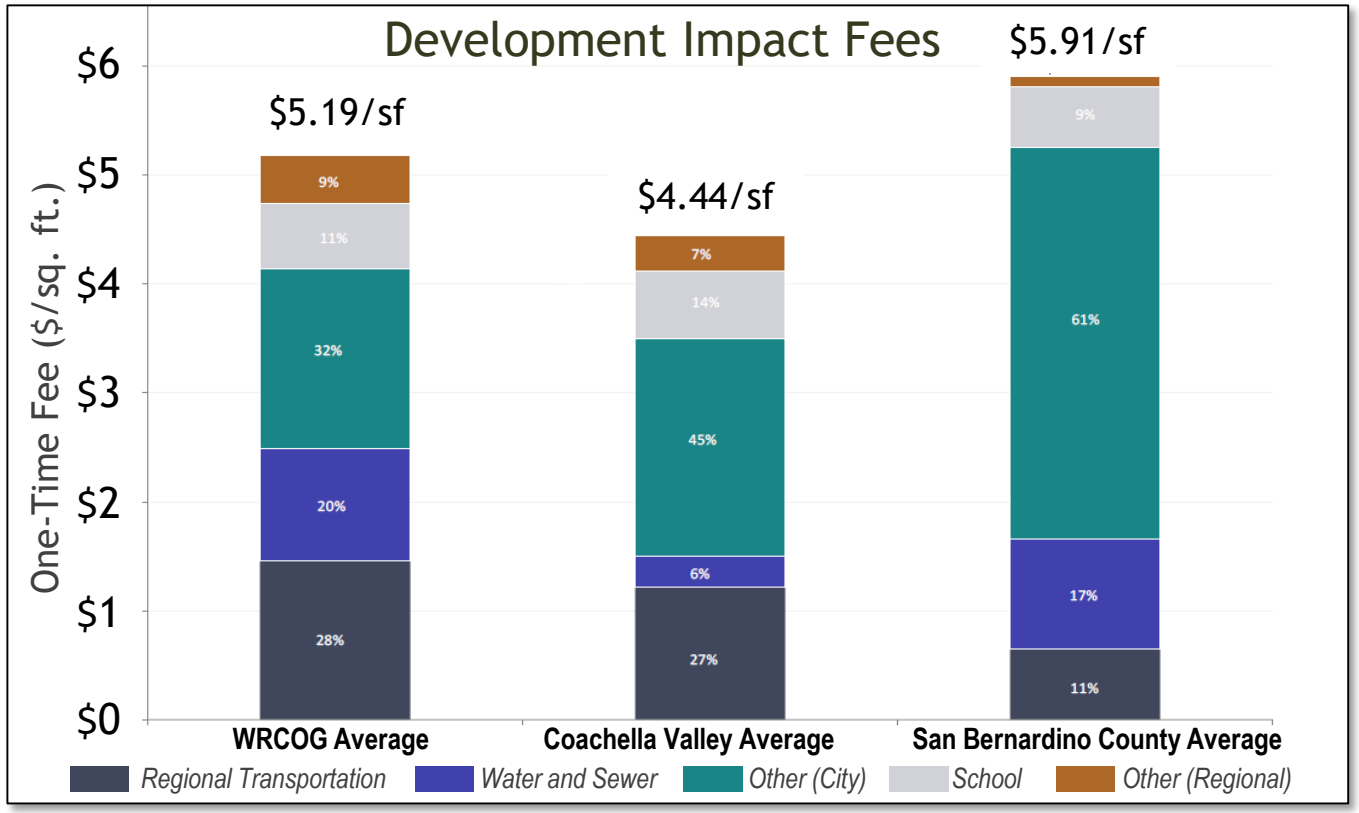
Example using $2.88/trip illustration

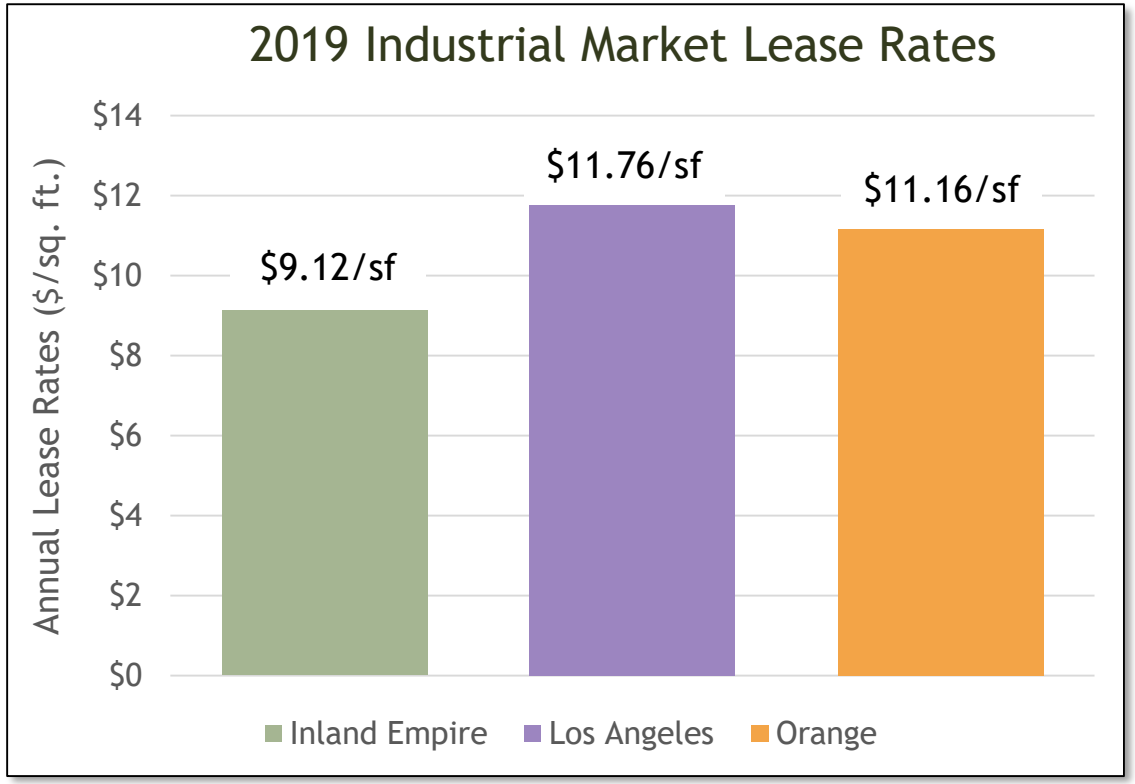
- 500,000 sf high cube warehouse with default 173,375 annual weighted truck trips
- 173,375 × $2.88 = $499,320
- If $25,000 = 1 WAIRE Point, the compliance obligation would be:
  $499,320 ÷ $25,000 = **20 WAIRE Points**
- Warehouse operator could comply with:
  - Two NZE/ZE truck visits/day on average (20 WAIRE Points)
  - Acquire seven NZE trucks (21 WAIRE Points)
  - Install three Level 3 chargers and acquire three ZE class 4 trucks (22 WAIRE Points)
  - Etc.

KEY PARAMETERS TO DETERMINE STRINGENCY

Other?

SOME EXISTING ONE-TIME AND RECURRING COSTS FOR WAREHOUSES





Other One-Time Cost Examples

- South Coast AQMD settlement agreement:
  World Logistics Center Project = $0.64/sq. ft.
- Riverside County Air Quality Mitigation Fee:
  San Gorgonio Crossing Project = $0.32/sq.ft.

Other Ongoing Cost Examples

- Property taxes:
  Can be $0.50 - $2.00+ per sq. ft.
- Employee Payroll:
  Can be $15 - $80+ per sq. ft.

Sources: *Updated Analysis of Impact Fees in Western Riverside County, WRCOG 2019;* www.voitco.com;
Economic Impacts of Commercial Real Estate, NAIOP 2019; www.johnhusing.com; *UCR Center for Social Innovation; Costar data*

SAMPLE PRELIMINARY DRAFT RULE COMMENTS RECEIVED

- Revise the warehouse size applicability to reflect "greater than or equal to 100,000 square feet" throughout the draft rule
- Require initial reporting from all the warehouse size categories sooner
- Define the WAIRE Point values for the different WAIRE Menu Actions and Investments
- Set the mitigation fee to be proportionally higher than the cost of the WAIRE Menu Actions and Investments
- Only include Zero-Emissions technology on the WAIRE Menu
- Ensure that Near-Zero Emissions technology can be used for all WAIRE Menu items

SAMPLE PRELIMINARY DRAFT RULE COMMENTS RECEIVED(CONT'D)

- Revise the definition of Near-Zero Emissions (NZE) trucks to include "commercially available"
- Concern about costs to industry and compliance burden
- The stringency of the Warehouse ISR needs to be defined
- Include SIP credible emission reductions in the WAIRE Points calculation to help prioritize the importance of meeting the 2023 attainment goals
- Add a mechanism to the WAIRE Points calculation to reward Early Action by warehouses
- Maintain the current schedule and bring the Warehouse ISR before the South Coast AQMD Board by May 2020 or sooner

NEXT STEPS

- Continue to receive feedback and revise draft proposed rule as appropriate
- Continue to develop rule stringency concept and report back to Working Group
- January 2020
  - Next Working Group meeting
  - Mobile Source Committee Update

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