

Webinar

Environmental Compliance for Data Centers

March 12, 2025

Presented by



mapistry



Today's Speakers



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Cofounder



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Today's Agenda

1. Intro to ALL4 Expertise
2. Data Center Overview
3. Air Quality Trends & Strategies
4. Storage Tank, Waste, & Water Considerations
5. Intro to Mapistry Software
6. Air Emissions Tracking & Automations
7. Spill Prevention, Control, and Countermeasure (SPCC) & Waste Inspections
8. Site Maps
9. Q&A





About Data Centers

- ❑ Provide a home for server racks (e.g., Cloud, AI)
- ❑ Power: Typically use backup generators in conjunction with uninterruptible power supply (UPS)
- ❑ Cooling: Use combination of air-cooling and liquid-cooling for servers
- ❑ Several environmental programs – air, storage tanks, water, hazardous materials, waste, and more
 - Results in numerous notifications, inspections, records, and reports to schedule/send/maintain!
- ❑ Focused on meeting today's needs while future-proofing for tomorrow's advancements and demands





Air Quality

STRATEGY WITH SOLUTION.



PARTNERSHIP WITH A PURPOSE.



Air Quality – Typical Air Requirements

□ Typical Air Requirements for Data Centers with Generators

- Obtain air permit/registration prior to generator installation
- Minimum compliance obligations:
 - Log each generator operation, date/duration/reason
 - Track hours of operation per month, year, and 12-month rolling total
 - Fuel delivery documentation
 - U.S. EPA certified engines
 - Generator maintenance records
 - Minimize visible smoke

Month	Operating Hours ^(H)		Fuel Usage (gal) ^(H)		NO _x ^(B)		PM/PM ₁₀ /PM _{2.5}	
	Monthly Total	12-Month Rolling Total	Monthly Total	12-Month Rolling Total	Monthly Total	12-Month Rolling Total	Monthly Total	12-Month Rolling Total
Units	hr/month	hr/yr	gal/month	gal/yr	ton/month	ton/yr	ton/month	ton/yr
Jan-23	0.70	7.60	25.70	417.60	3.85E-03	0.06	2.06E-04	3.35E-03
Feb-23	0.45	7.55	17.40	415.70	2.60E-03	0.06	1.40E-04	3.33E-03
Mar-23	0.55	7.60	19.70	417.60	2.95E-03	0.06	1.58E-04	3.35E-03
Apr-23	0.50	7.60	18.00	416.90	2.69E-03	0.06	1.44E-04	3.34E-03
May-23	0.50	7.55	19.10	416.20	2.86E-03	0.06	1.53E-04	3.34E-03
Jun-23	0.20	7.15	8.20	404.70	1.23E-03	0.06	6.58E-05	3.25E-03
Jul-23	0.20	6.85	6.00	393.30	8.98E-04	0.06	4.81E-05	3.15E-03
Aug-23	0.20	6.60	6.90	381.50	1.03E-03	0.06	5.53E-05	3.06E-03
Sep-23	0.15	6.25	6.30	369.40	9.43E-04	0.06	5.05E-05	2.96E-03
Oct-23	0.34	6.09	191.80	543.90	0.03	0.08	1.54E-03	4.36E-03
Nov-23	0.15	4.34	6.90	343.40	1.03E-03	0.05	5.53E-05	2.75E-03
Dec-23	0.10	4.14	6.30	337.30	8.43E-04	0.06	6.06E-05	2.67E-03

What works for 10 to 25 generators may not work for 100, 200, or more generators – must manage this data at scale

Air Quality – Site Selection

- As Data Centers Increase in Size (and Generator Quantity)
 - Site Selection is critical
 - Fiber, power, natural gas (turbines), economics and incentives, labor force, etc.
 - AND**
 - Key emissions thresholds and other air permitting requirements
 - Environmental Justice
 - State/Regional nuances
 - Example: 100 tons/year vs. 25 tons/year = 300% difference!

Recommend an air permitting study EARLY to summarize requirements, develop permitting strategy, and identify risks and timelines

Air Quality – Emissions Controls

- Air Pollution Control Devices (APCD)
 - APCD maximize number of generators or allowable operating time
 - Large quantities of generators more likely to trigger automatic APCD requirement
 - APCD support Sustainability initiatives to decrease emissions
- APCD Recordkeeping
 - Inlet or exhaust temperatures
 - Differential pressure
 - NOx concentrations
 - Urea consumption/injection rate
 - *If automating data collection, is there space to add these parameters and are the right monitoring devices installed?*

Air Quality - Modeling

- Air Dispersion Modeling More Likely
 - Large quantities of generators more likely to trigger modeling requirements
 - Increases permitting timeline
 - May result in additional operating constraints
 - APCD may be needed to pass modeling
 - Example: DPFs needed to pass PM_{2.5} modeling



If modeling may be needed, recommend preliminary assessment EARLY to plan for or mitigate impacts where possible

Air Quality – Permitting Strategies

- Permitting Strategies
 - Agency engagement
 - Emissions calculations (vary by state)
 - Operational limits are often used
 - Emergency generator hours of operation restricted by Federal rules
 - Consider fuel consumption-based limits, but check:
 - On-board fuel consumption calculators vs. external flow meters?
 - Does accuracy swing in fuel consumption estimation impact total emissions allowed?
 - *If automating data collection, is there space to add fuel consumption?*

Air Quality – What else?

□ Changing Environmental Landscape

- Environmental Justice (Still Going Strong at State/Local Level)
 - Consider as part of site selection
 - Community engagement and public comment will add time to air permitting
 - Air dispersion modeling may be required in EJ areas
- Modeling requirements in general are on the rise, and with an increased focus on air toxics
- Lowered PM_{2.5} threshold and Area Redesignations
 - If area changes designation status, impacts current and future builds at site
- Increased public and government scrutiny on Data Centers



Other Environmental Considerations



Storage Tanks

- ❑ Diesel-Fired Equipment = A LOT of Diesel/Oil Storage
 - SPCC Plans
 - Most Data Centers need SPCC for diesel and transformer oil
 - Perhaps motor oil (big generators), hydraulic fluid
 - Spill kits, annual training, and monthly and annual inspections of containers
 - Permitting/Registration
 - Every state and local jurisdiction is different
 - Varies by tank type



Water



□ Data Center Relationship to Water Is Evolving

- During Construction, stormwater permitting and plans
- Coordination for incoming potable water and sanitary discharge
- Cooling towers (if used) discharge - sanitary or stormwater?
- How is water used in cooling?
 - Data Centers constantly revisit their water use, particularly in water-stressed areas or as part of Sustainability goals

Hazardous Materials and Waste

□ Hazardous Materials

- Hazardous Materials Management Plans
- Emergency Planning Community-Right-to-Know Reporting

□ Waste

- Electronic Waste (e-waste) - large stream to manage
- Hazardous Waste is uncommon, except of California and used oil/oily waste
- Universal Waste - very common for Data Centers
 - Top 3 types: Fluorescent bulbs (if applicable), used batteries (mostly lead acid and lithium ion), used oil (generators)
 - Storage restrictions to monitor include marked storage locations and for no longer than 1 year



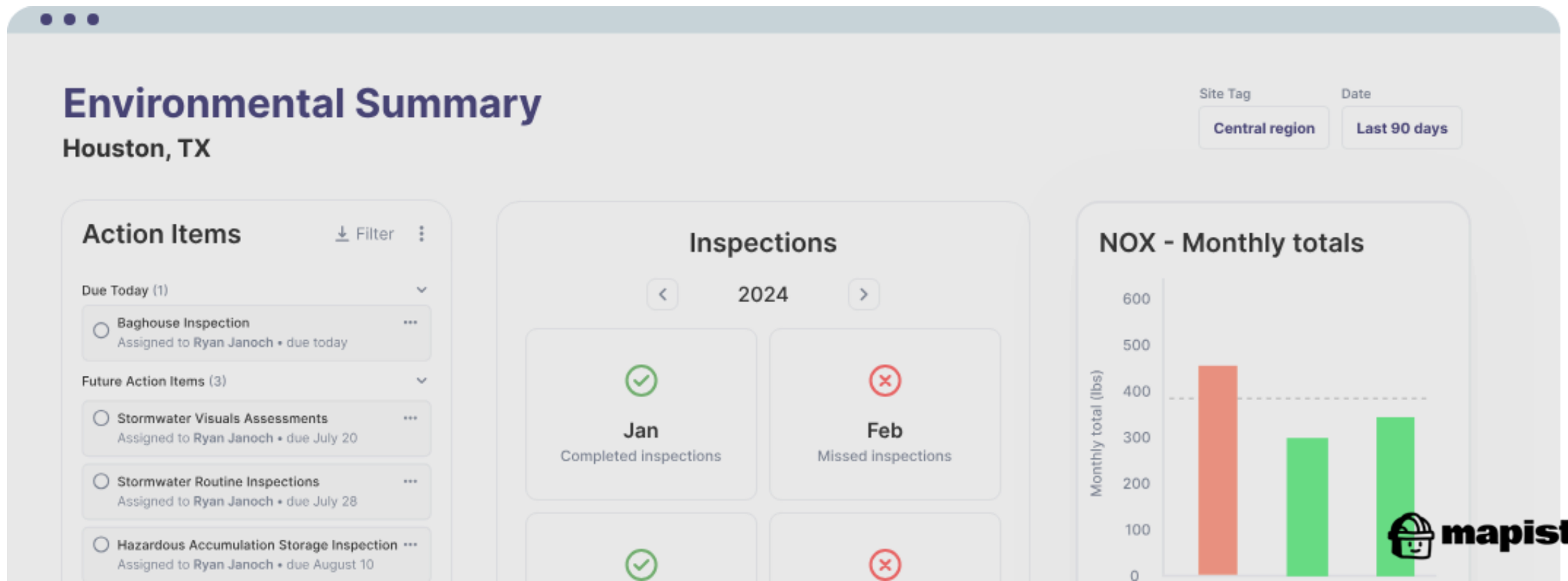


Sustainability

- Environmental Compliance is One Facet of Sustainability but There is So Much More!
 - Reporting on Sustainability or Carbon metrics
 - Tracking/Trending Performance to Benchmarks
 - Greenhouse Gas emissions
 - Quantifying/tracking/trending
 - Determining Scope 3 and beyond and how to track key information for vendors, materials, etc.
 - Environmental Justice and Community Engagement



Mapistry Environmental Compliance Platform for Data Centers



We replace spreadsheets, paper forms, Outlook reminders, and more.....

Documented Waste Characterization Number	Date	Repair Order Number	Specific Commodity Cleaned or Service Related Waste	Amount (In Gallons)	Employee Number	Date Container Full

Date (include year)	Repair or Job Order #, Car Type w/License #	Coating Trade Name, Code # & Type	Catalyst Type (Code #)	Reducer Type (Code #)	Mix Ratio	Amount Sprayed	Paint Amount Wasted, if applicable	Painter's Initials
6/24/20	1851	Amerlock 2/400 White	Amerlock 2 CURE	Amerlock 928	1 to 1	1 1/4 GAL.		J.S.
"	"	International/Interline 850	TLA 956	AMERCOAT 928	2 to 2	1/4 GAL.	 	
6/24/20	1851	International/Interline 850	TLA 956	AMERCOAT 928	2 to 2	1/4 GAL.		
7-10-20		AMERLOCK 2/400 WHITE	AMERLOCK 2 CURE	AMERCOAT 928	2 to 2	1/2 GAL.		
8-21-20	1802	AMERCOAT 68 H3	AMERCOAT 68 H3 CURE	AMERCOAT 928	3 PART KIT	2 GAL.		
8-24-20	1802	AMERLOCK 2/400	AMERLOCK 2 CURE	AMERCOAT 928	1 to 1	1 GAL.		
8-25-20	1802	AMERSHIELD VOC YELLOW	AMERSHIELD CURE	AMERCOAT 928	4 to 1	1 GAL.		
8-28-20	2001	MACRO POWS 646 A	MACRO POWS 646 CURE B	R7 K 711	1 to 2	2 1/2 GAL.		
8-31-20	2001	MACRO POWS 646 A	MACRO POWS 646 CURE B	R7 K 711	1 to 1	2 GAL.		
9/01/20	2001	Sher-Loxane 800	Sher-Loxane 300 830 V500		4 to 1	1 1/2 GAL.		

Chronic Toxic Screening Analysis		Annual Emissions
Toxic Pollutant	Chronic Trigger (lb/year)	2020
Methyl Ethyl Ketone	N/A	0.2848
Ethyl Benzene	N/A	0.0199
Toluene	12000	0.5671
Xylene	27000	0.0288
Lead Phosphite	3.2	0.0199
Strontium Chromate	0.00077	0.0081

.....so you can **conduct, monitor, and analyze**
environmental compliance **in one place**



The Environmental Compliance Platform

Analytics Dashboards
with scheduled delivery & alerts

Map Builder

annotate, embed photos, & import imagery

Compliance Calendar

task assignment & reminders

Inspections

assignment, reminders, & corrective actions

Numerical Data

collection, calculations, limit monitoring, & reports

System Integration Use Case

Numerical Data Collection

We address it three ways

Ideal way!

API

Connect to other
systems

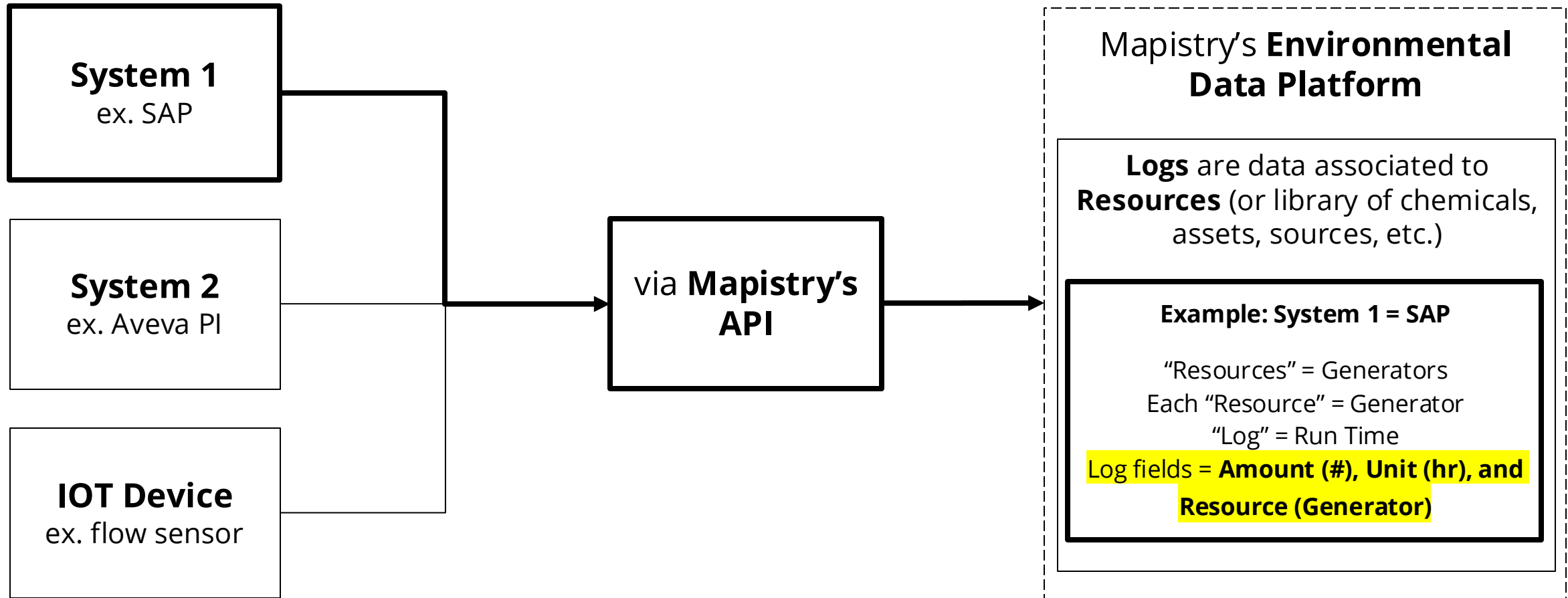
File Upload

AI processing of
spreadsheets

Manual Entry

Mobile App
Web App

Example: Data Flow via the Mapistry API



Questions?



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About ALL4

Four Practices:

- Air Quality
- Environmental, Health, and Safety
- Sustainability
- Digital Solutions



ALL4 Global Map

- ALL4 Office Locations
- ALL4 Regional Support

ALL4 Offices

United States

- California - Rancho Cucamonga
- Georgia - Kennesaw / ATL
- Kentucky - Lexington
- Kentucky - Louisville
- Massachusetts - Marlborough / BOS
- North Carolina - Durham/ RAL
- ★ Pennsylvania - Kimberton / HQ
- Pennsylvania - Philadelphia
- Texas - Stafford / HOU
- Virginia/ Washington, D.C. - Herndon / WAS DC
- Washington - Bellingham / WAS

International

- Spain - Madrid

Local and Regional Support

United States

- | | | |
|-----------|---------------|----------------|
| Alabama | Minnesota | Oregon |
| Arizona | Missouri | South Carolina |
| Colorado | Nebraska | Tennessee |
| Florida | New Hampshire | Utah |
| Illinois | New Jersey | Vermont |
| Indiana | New Mexico | |
| Louisiana | New York | |
| Michigan | Ohio | |

International

- Brazil
- Canada
- Chile
- Columbia
- Mexico

www.all4inc.com/about-us/locations/

