



REBELLION
P H O T O N I C S



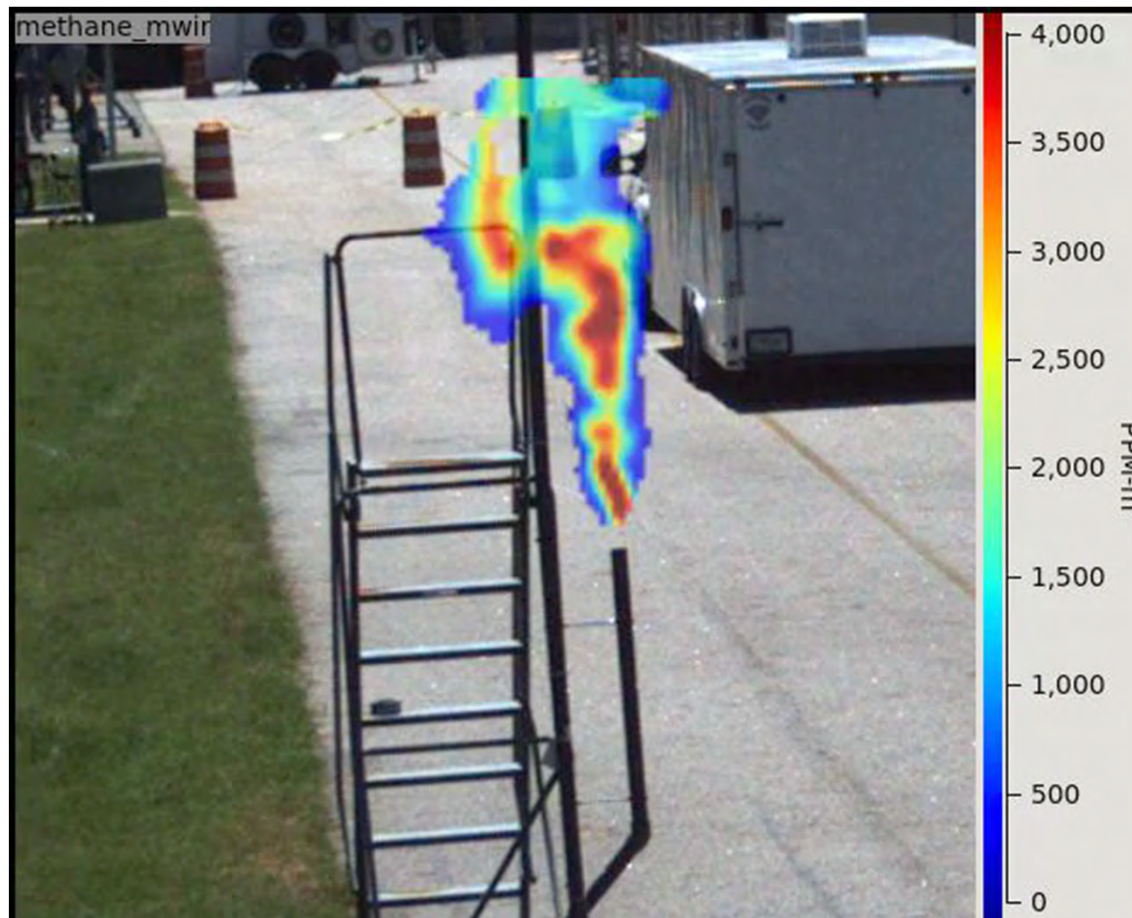
Gas Cloud Imaging

IR camera and sniffer in one!

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Rebellion Photonics

Gas Cloud Imaging



2

- Measure concentration, volumes, type of gas



Truck Mounted Emissions Monitoring



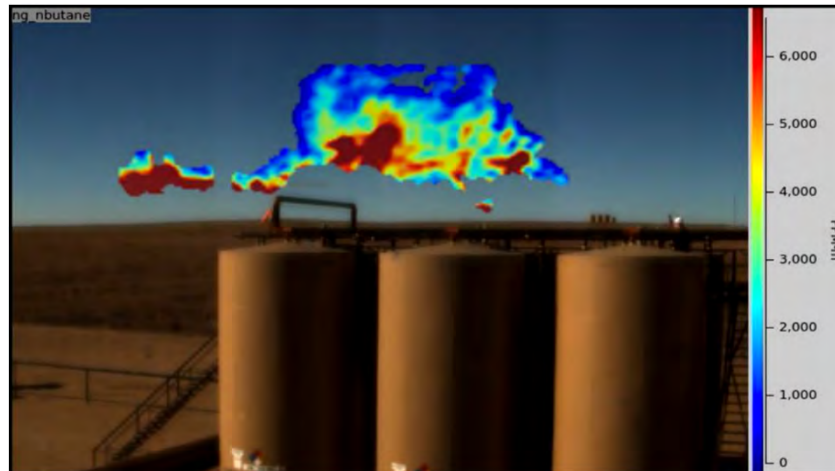
- Triage your maintenance
- Easy to implement
- Inexpensive



GCI- for Safety



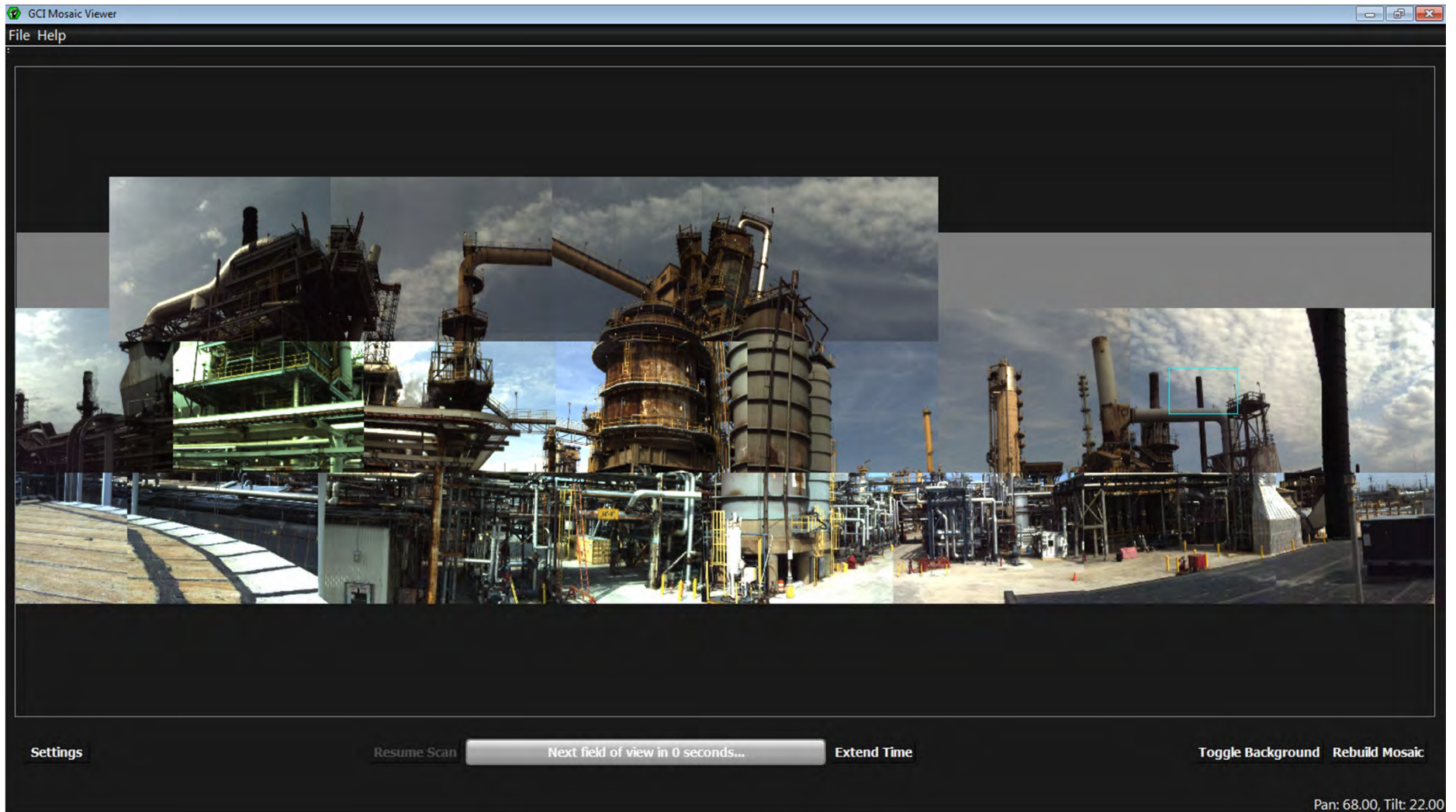
- Traditional detectors do not give an accurate picture
- GCI Install at average refinery?
 - 1000 alerts in the 1st week
 - 100 alerts/week after a month
 - ~1 explosive level leak a day



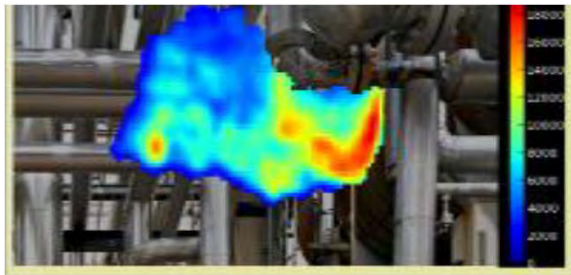
“It’s like turning the lights on”



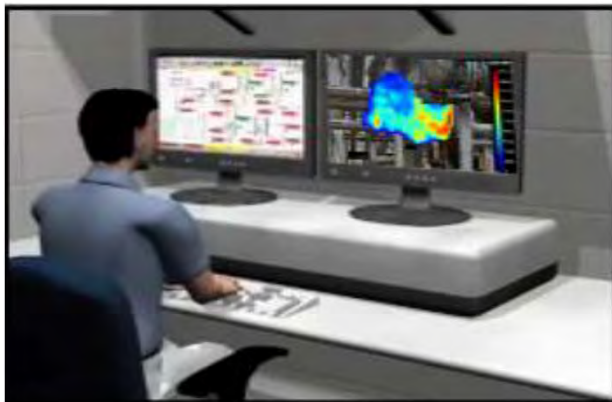
1 GCI = 4 Million Line Detectors



GCI System Diagram



GCI view



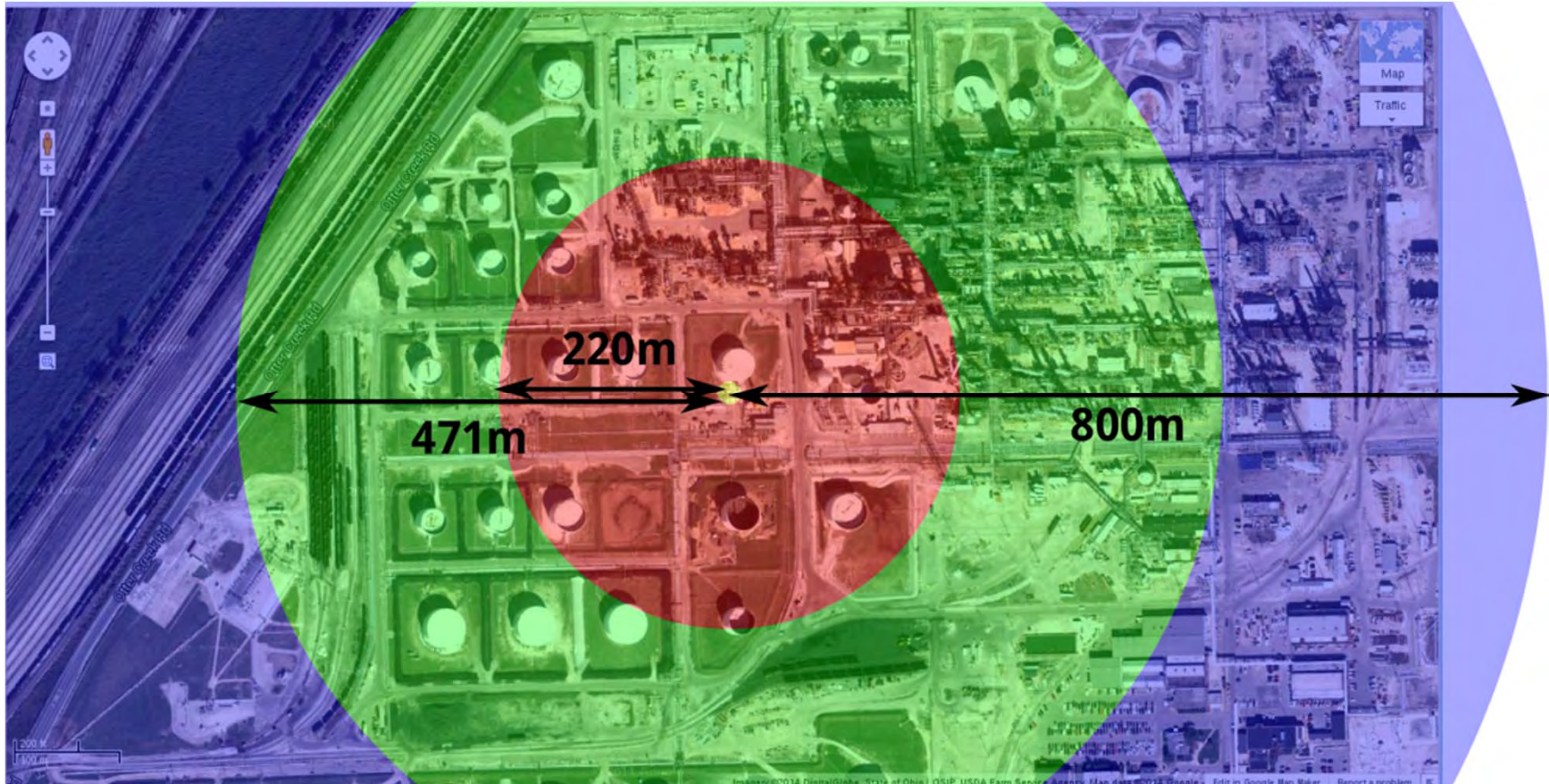
Control room view

Smartphone view



Very Efficient Solution

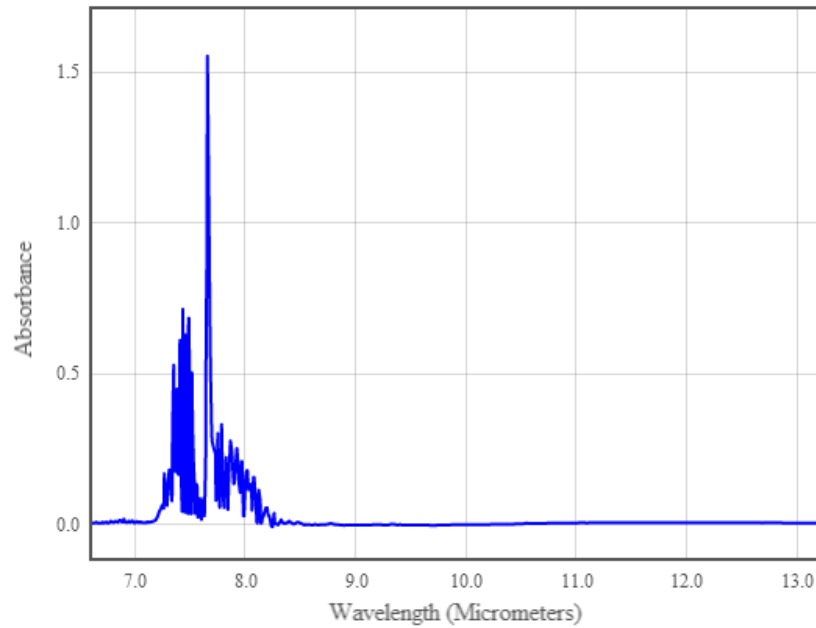
(Only a few cameras required per site)



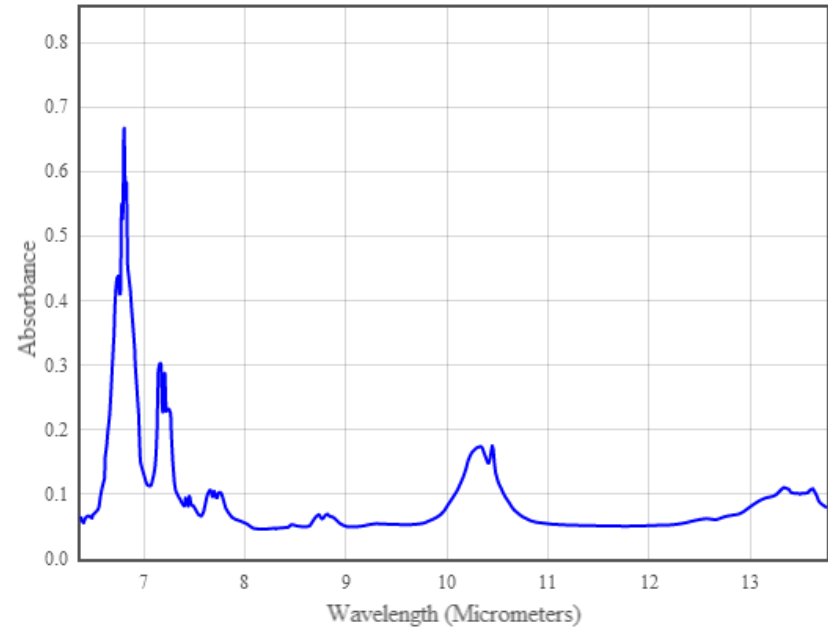
Gas Cloud Minimum Volume Detected: Red Area = 1 m^3 , Green = 10 m^3 , Blue = 100 m^3



How does it work?



Methane

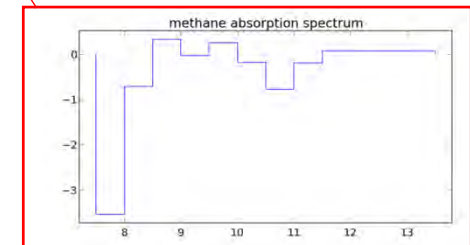
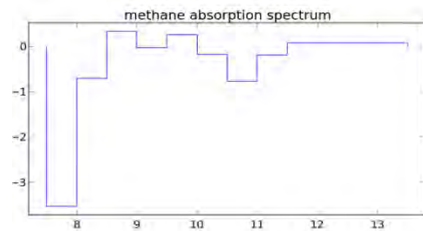
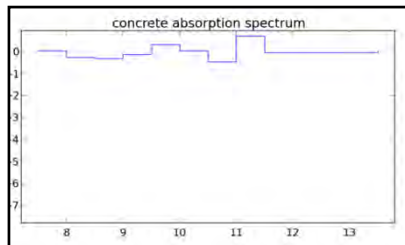


Butane

Rebellion's GCI "sees" Barcodes at Every Pixel



Detection in 1/15th of a second



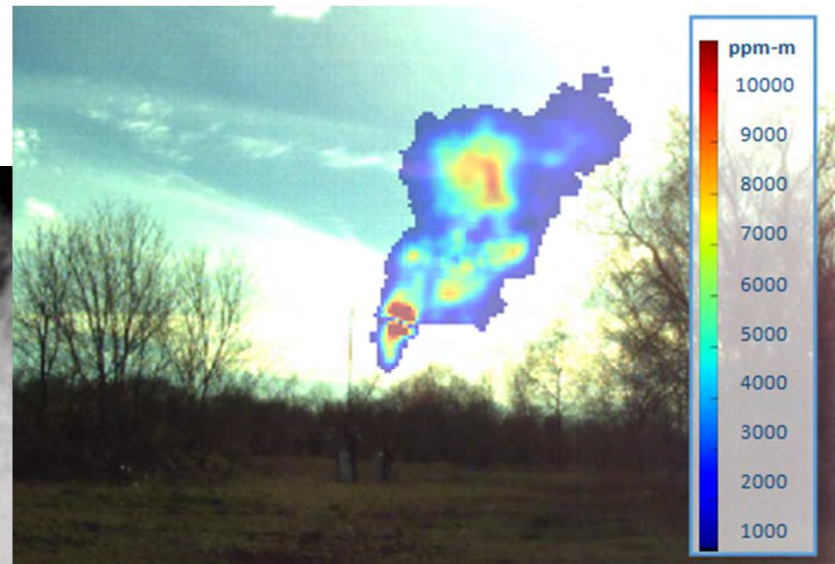
Collect absorption spectrum from every pixel.

Highlight pixels matching gas.



Side by side with regular IR

- GCI is much easier to see and gives concentration values
- GCI does not need a human to monitor screen



GCI Sensitivity Table

Table 1: Cloud Imaging Camera Gas Detection Sensitivity Table

No.	Gas Species	Minimum Detection Level (ppm-m)
1	Acetic acid	180
2	Ammonia	13.5
3	Benzene	125
4	Butadiene	125
5	Butane	250
6	Carbon Dioxide	1079
7	Chlorobenzene	25
8	Dichlorobenzene*	50
9	1,2 dicholoroethane	125
10	Ethane	250
11	Ethanol	15
12	Ethylene	250
13	Hydrazine	125
14	Iso-Butylene	125
15	Iso-Pentane	40
16	Methane	250
17	Methanol	10
18	N-Pentane	20
19	Propane	500
20	Propylene	125
21	Propylene Oxide	200
22	Sulfur Dioxide	20
23	Sulfur Hexafluoride	7
24	Toluene	150
25	Vinyl Chloride	2.5
26	p- or m-Xylene	20



Next Steps?

- Free Site-specific proposals
- Short-term pilots available
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JOIN THE REBELLION!

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