Comparison of EMFAC2000 and MOBILE6

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Background

- EMFAC2000 final version became available last Fall
- MOBILE6 will soon be available
- The models predict emissions for the same vehicles
  - future evap standards a little different
  - warranty a little different

Model Comparison (Light Duty)

- EMFAC2000
  - updated basic emission rates
  - impacts of OBD
  - aggressive driving impacts
  - updated speed correction factors
  - a/c effects
- MOBILE6
  - updated basic emission rates
  - impacts of OBD
  - aggressive driving impacts
  - updated speed and facility correction factors
  - a/c effects

Focus

- Passenger cars
  - Exhaust: Tier 1, LEV I LEV, LEV II LEV
  - Evap: Enhanced and “Near-Zero”

Development of Emission Rates

Item	MOBILE	EMFAC
Emitter Regimes	2	5
Effect of Standards on Regimes	Reduces emission of normals only	Reduces emissions of all
Effect of Onboard Diagnostics	85% effective; 90% response rate first 36K miles, 10% after 36K miles	No high emitters first 70 K miles
Effect of I/M	90% response rate after 36 K miles	With OBD, finds high emitters after 70 K miles

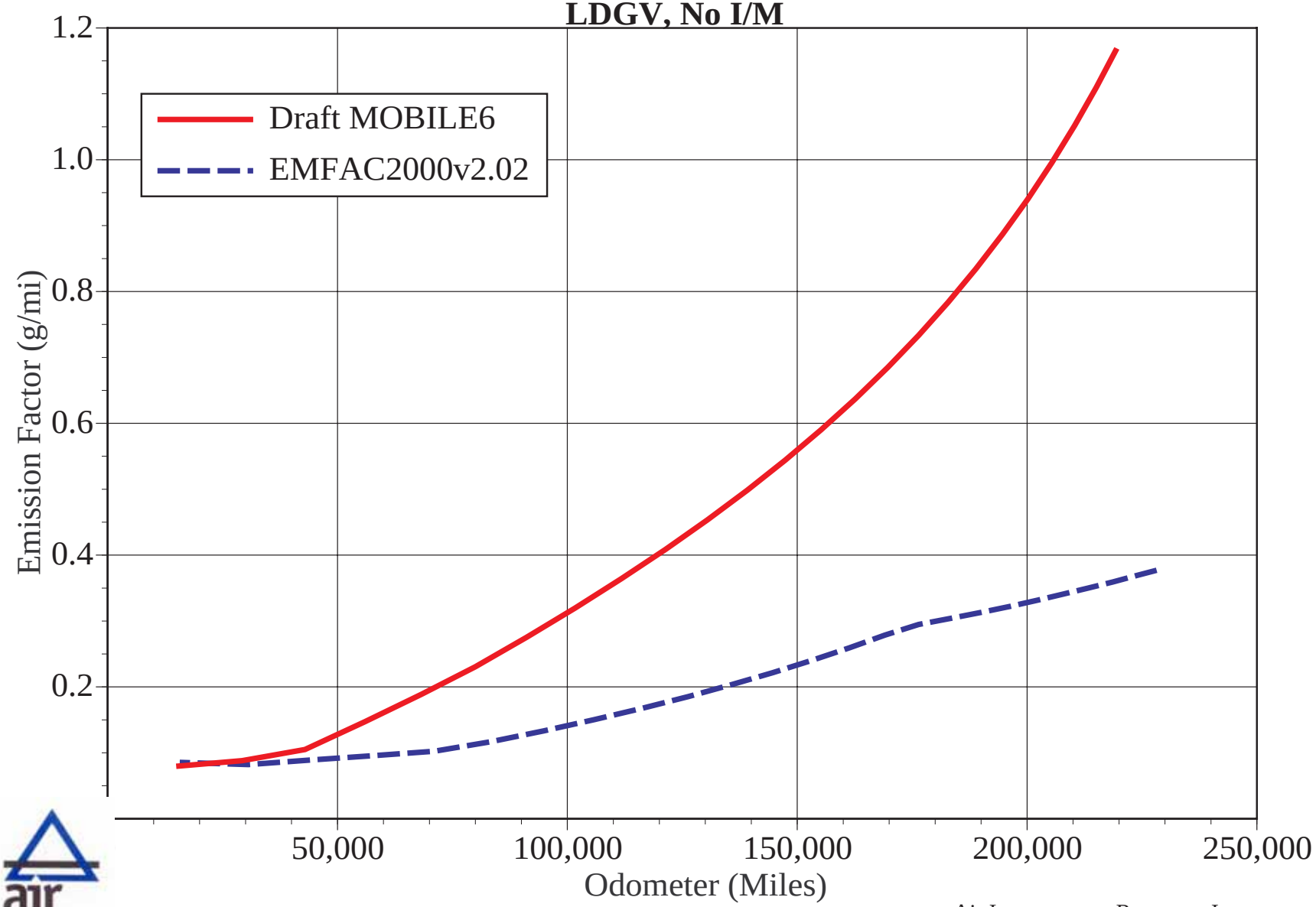
Method

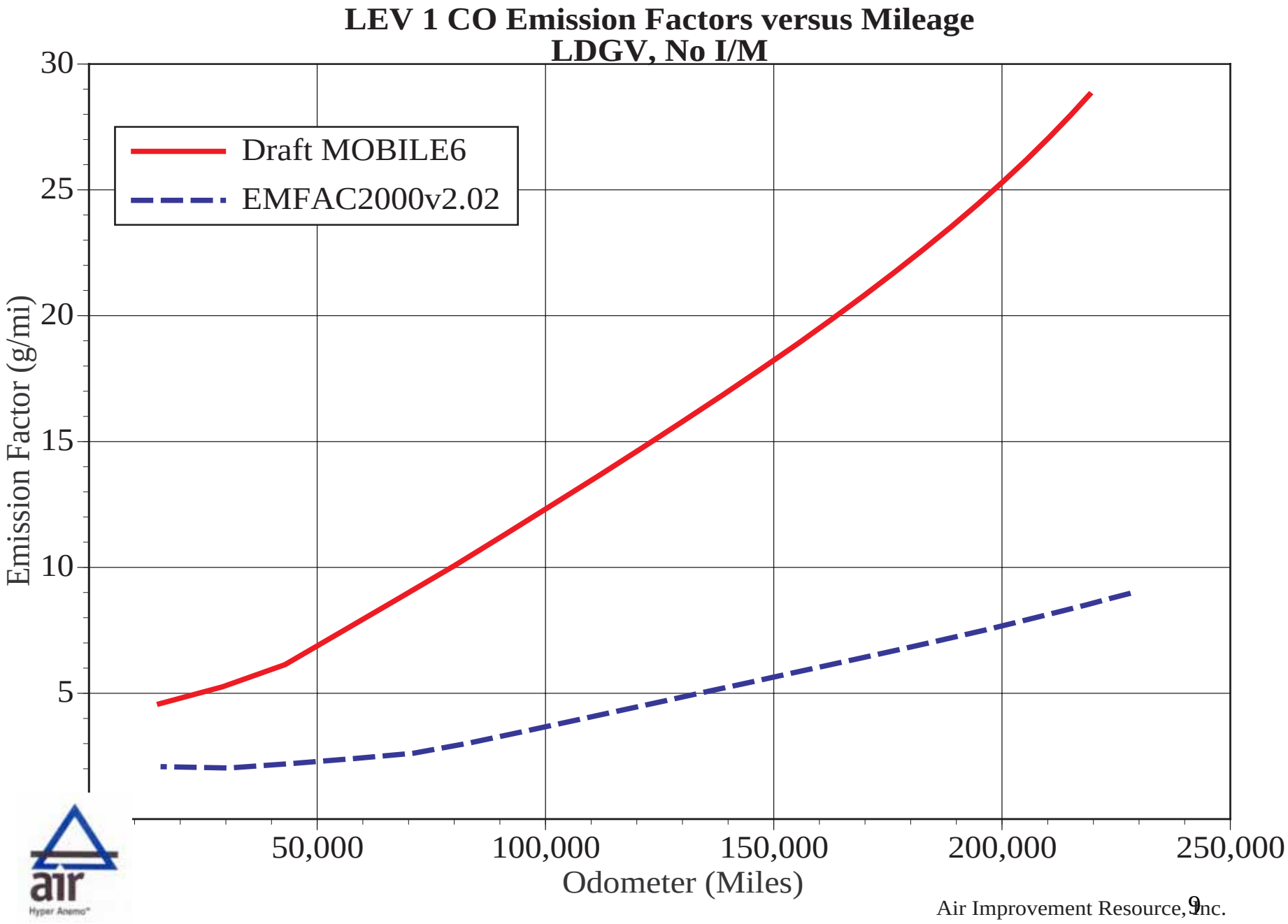
- Harmonized technologies
  - 1994-2000: Tier 1
  - 2001-2003: LEV I LEV (NLEV)
  - 2004+: LEV II LEV (Tier II)
- Harmonized temperatures and I/M
  - Lake County: close to no I/M (change of ownership)
  - SCAB: enhanced
- Harmonized speeds, registration distributions, and VMT vs age distributions
- Not harmonized
  - start distribution

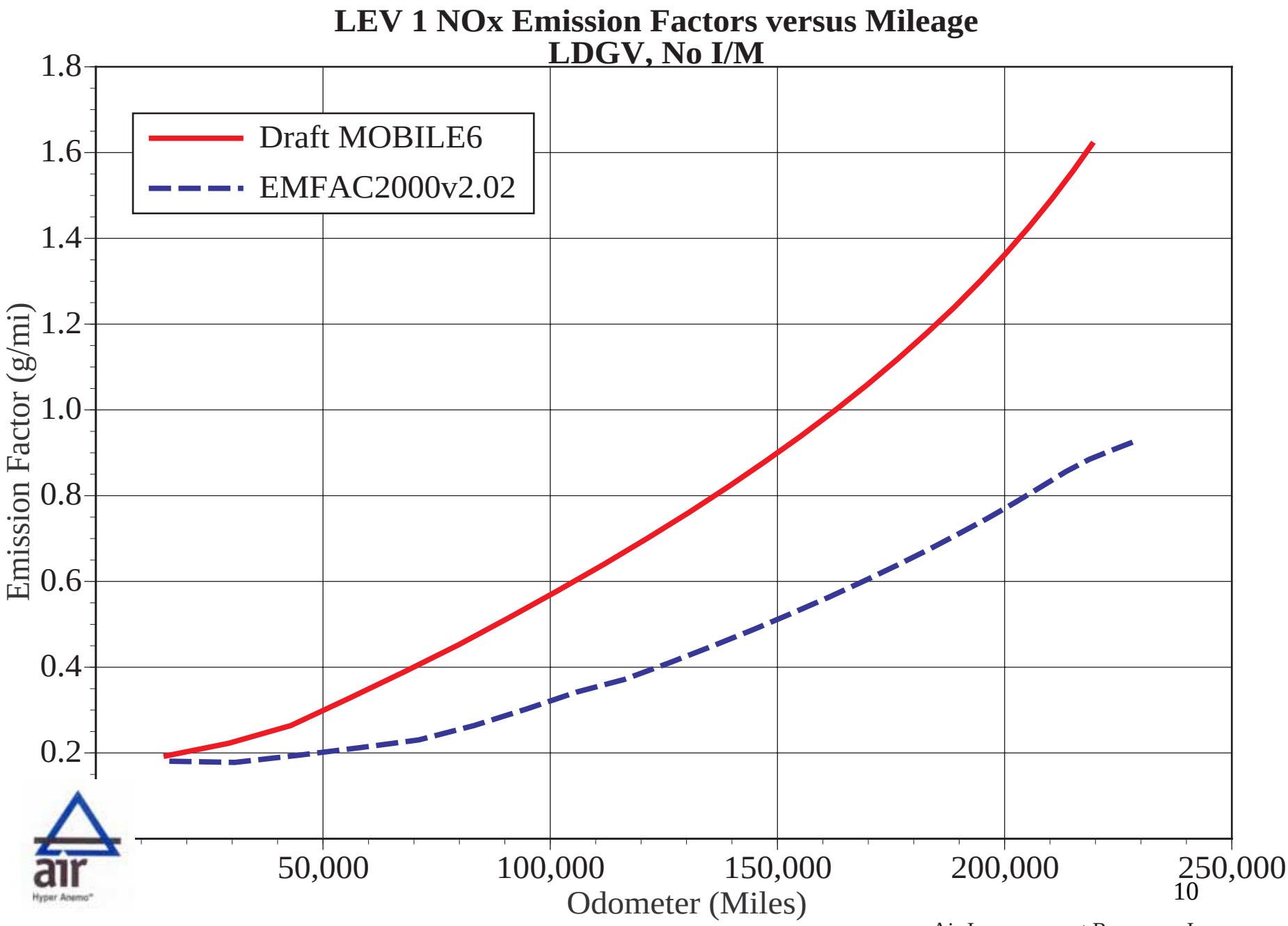
Comparisons

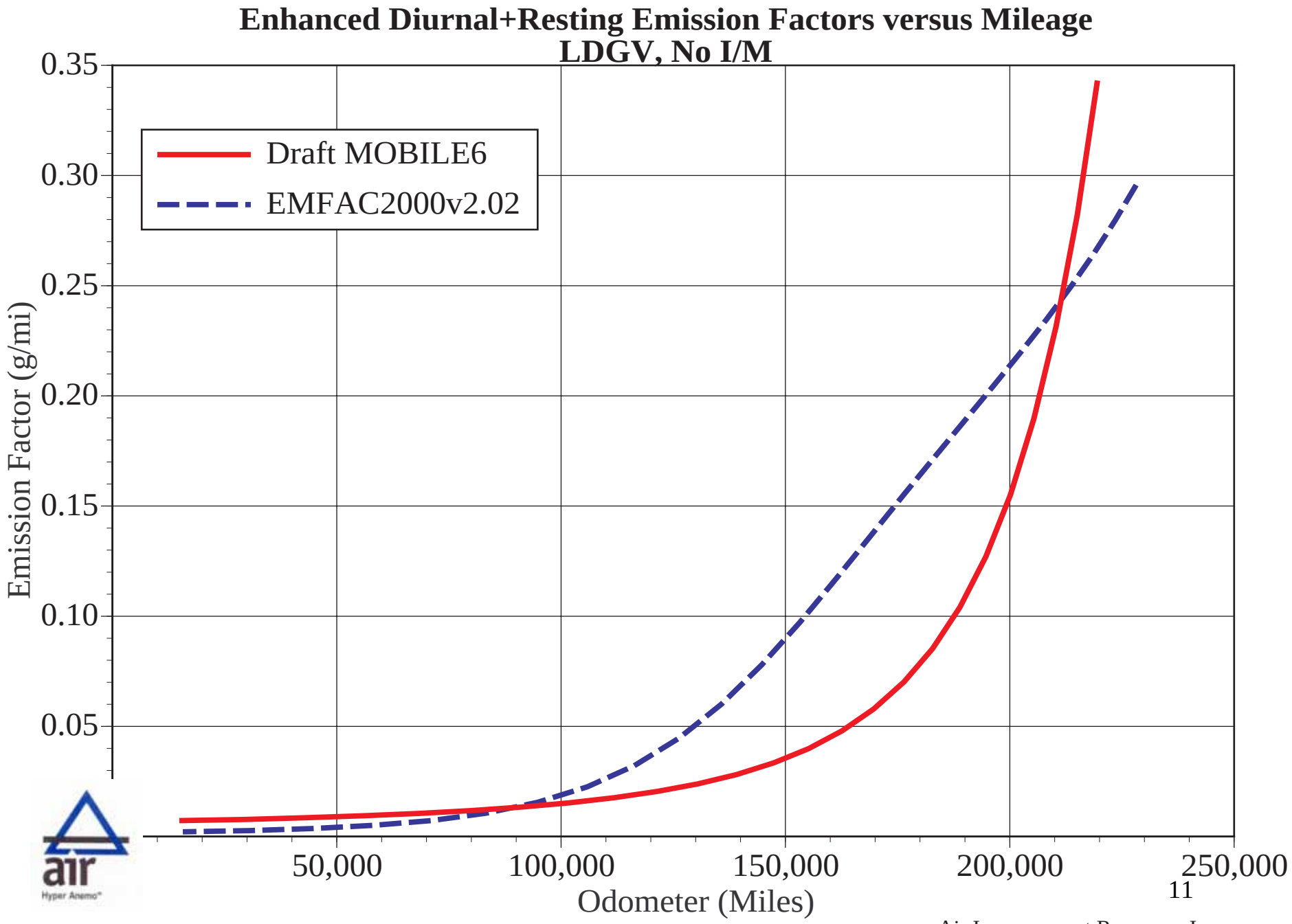
- Emissions vs mileage (deterioration)
- 1990-2020 g/mi, no I/M

LEV 1 THC Exhaust Emission Factors versus Mileage
LDGV, No I/M

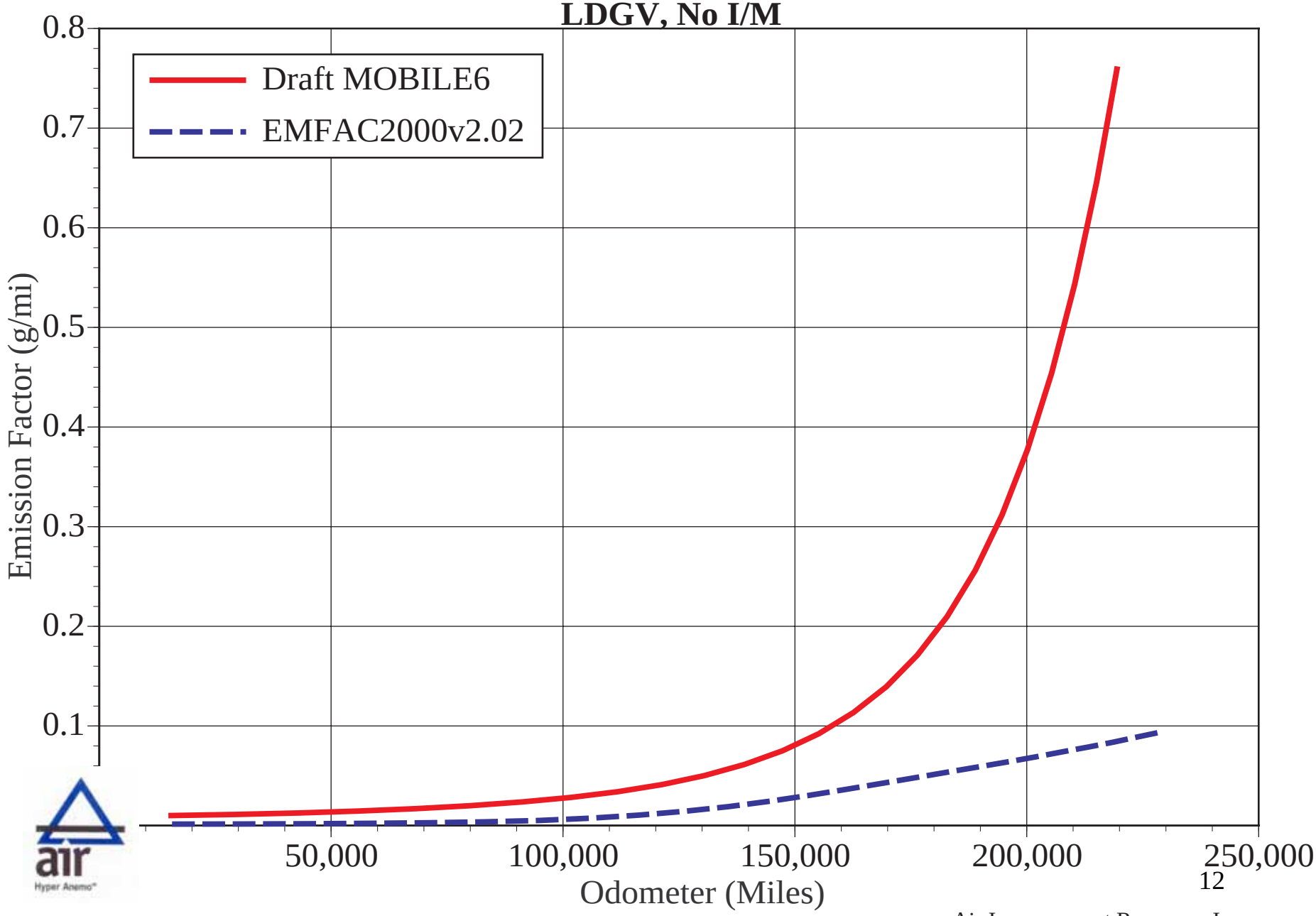



LEV 1 CO Emission Factors versus Mileage
LDGV, No I/M
Draft MOBILE6
EMFAC2000v2.02
Emission Factor (g/mi)
30
25
20
15
10
5
50,000
100,000
150,000
200,000
250,000
Odometer (Miles)

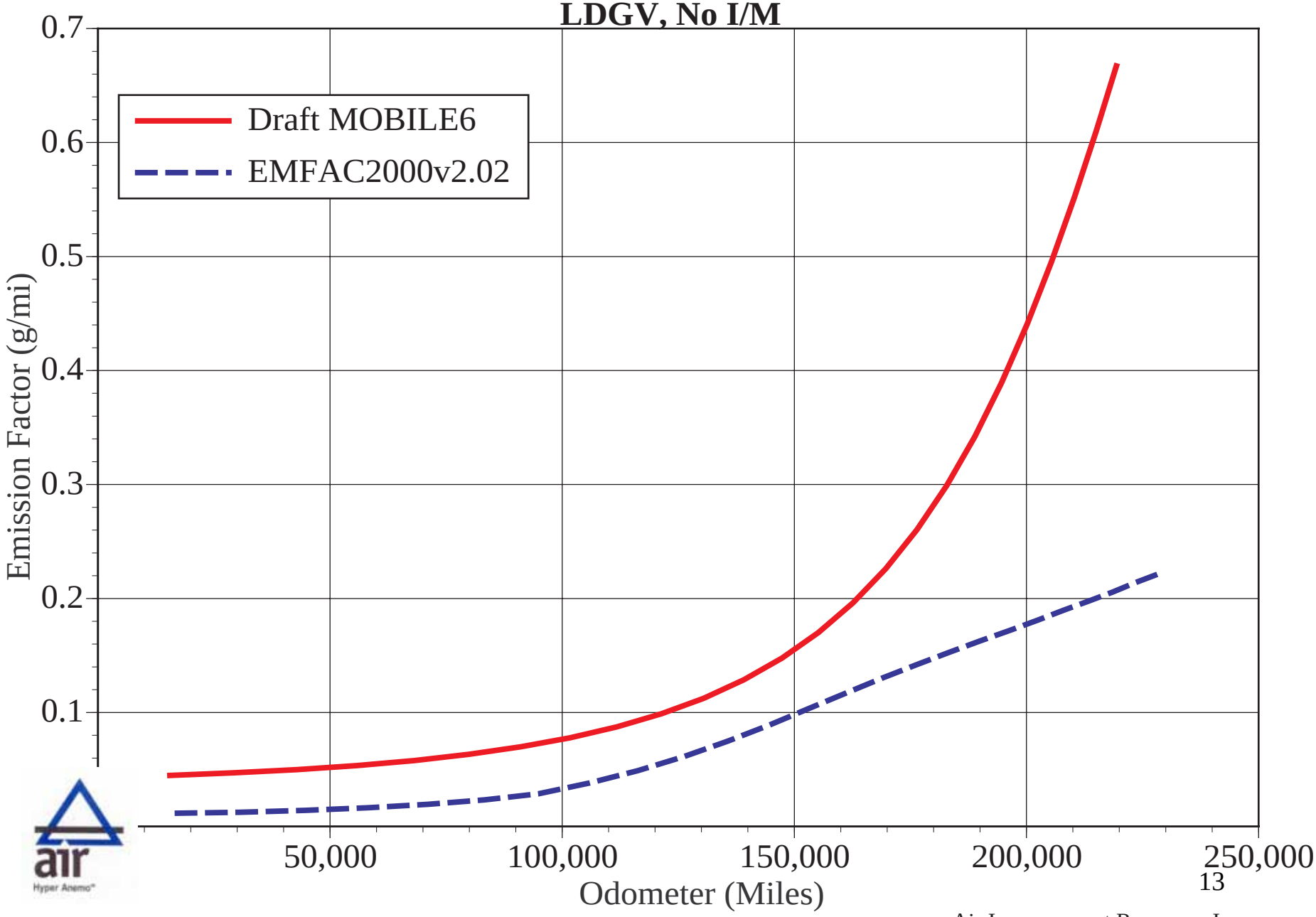

LEV 1 NOx Emission Factors versus Mileage
LDGV, No I/M
Draft MOBILE6
EMFAC2000v2.02
Emission Factor (g/mi)
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
50,000
100,000
150,000
200,000
250,000
Odometer (Miles)

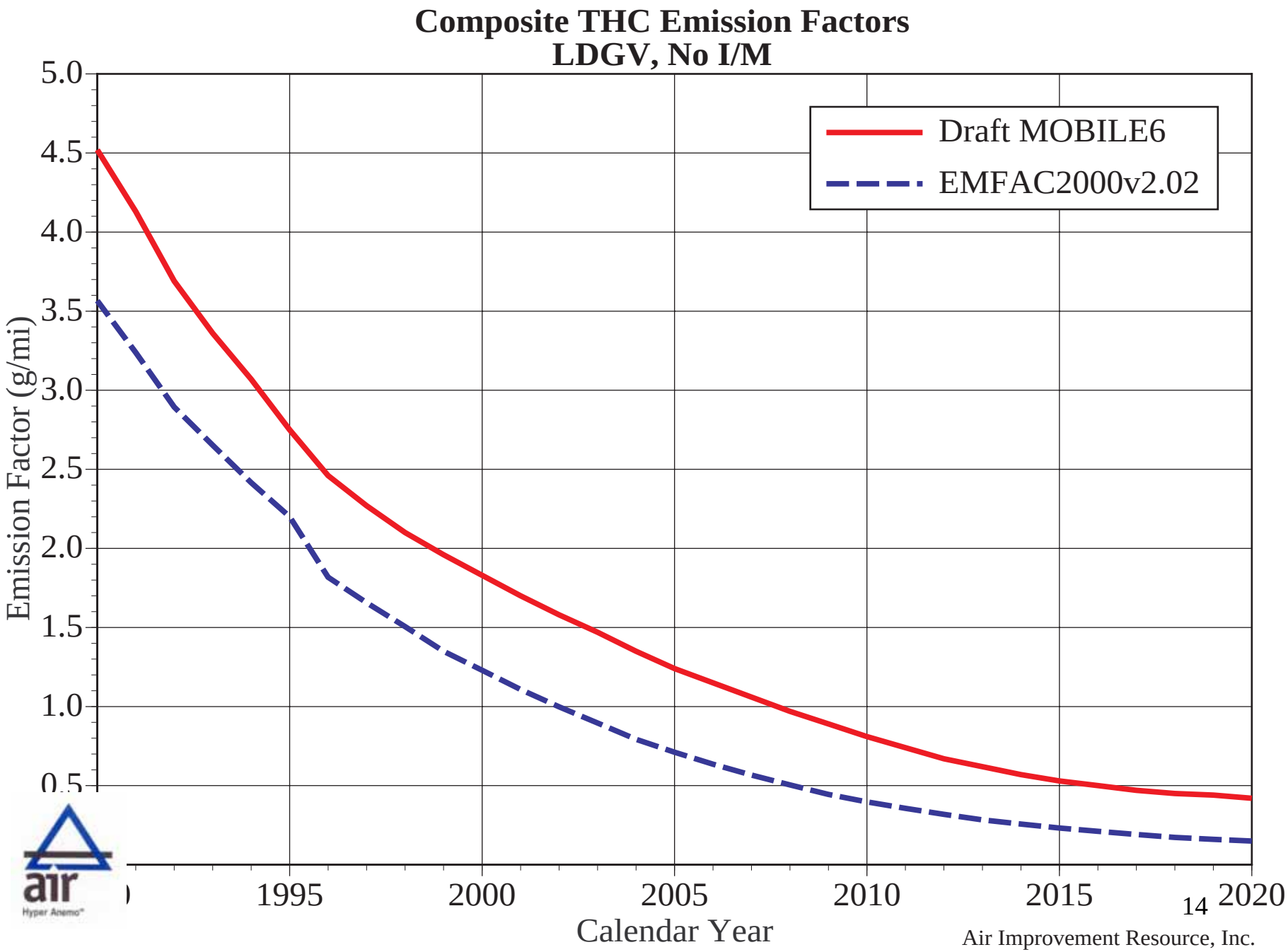

Enhanced Diurnal+Resting Emission Factors versus Mileage
LDGV, No I/M
Draft MOBILE6
EMFAC2000v2.02
Emission Factor (g/mi)
0.35
0.30
0.25
0.20
0.15
0.10
0.05
50,000
100,000
150,000
200,000
250,000
Odometer (Miles)

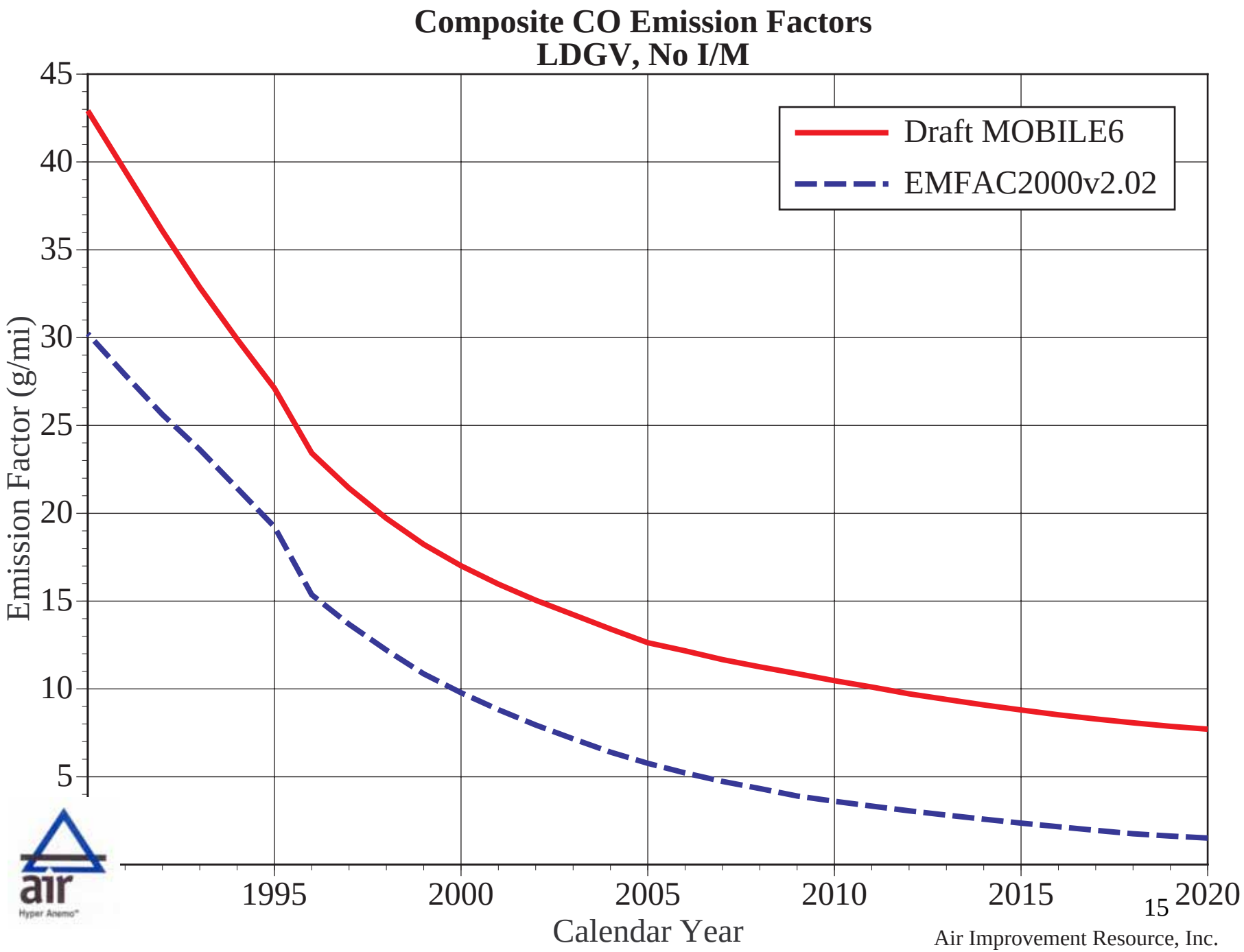
Enhanced Hot Soak Emission Factors versus Mileage
LDGV, No I/M



Enhanced Running Loss Emission Factors versus Mileage
LDGV, No I/M




Composite THC Emission Factors
LDGV, No I/M
Draft MOBILE6
EMFAC2000v2.02
Emission Factor (g/mi)
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
1995
2000
2005
2010
2015
2020
Calendar Year



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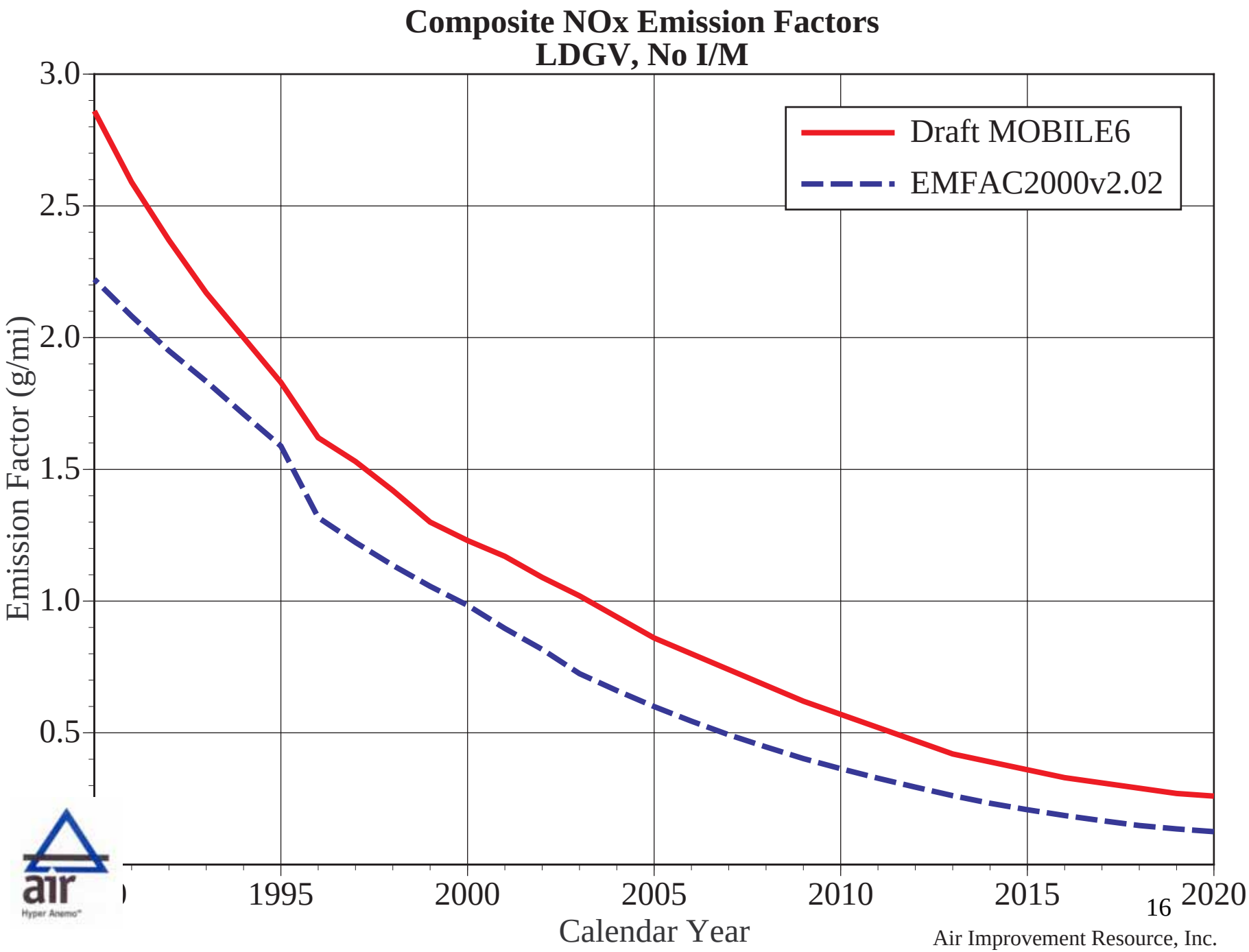
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Draft MOBILE6
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Emission Factor (g/mi)
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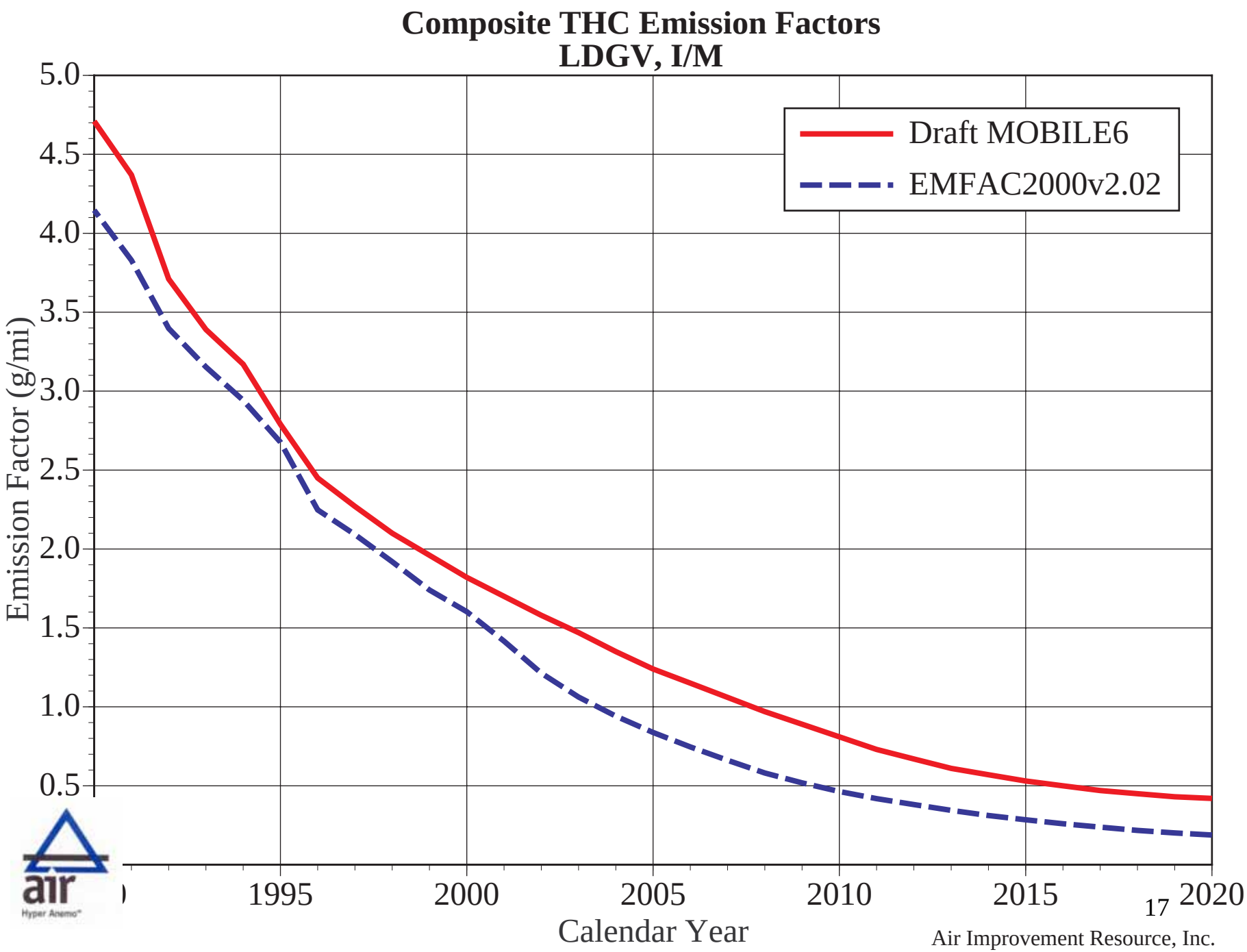
2.5
2.0
1.5
1.0
0.5
1995
2000
2005
2010
2015
2020
Calendar Year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3.5
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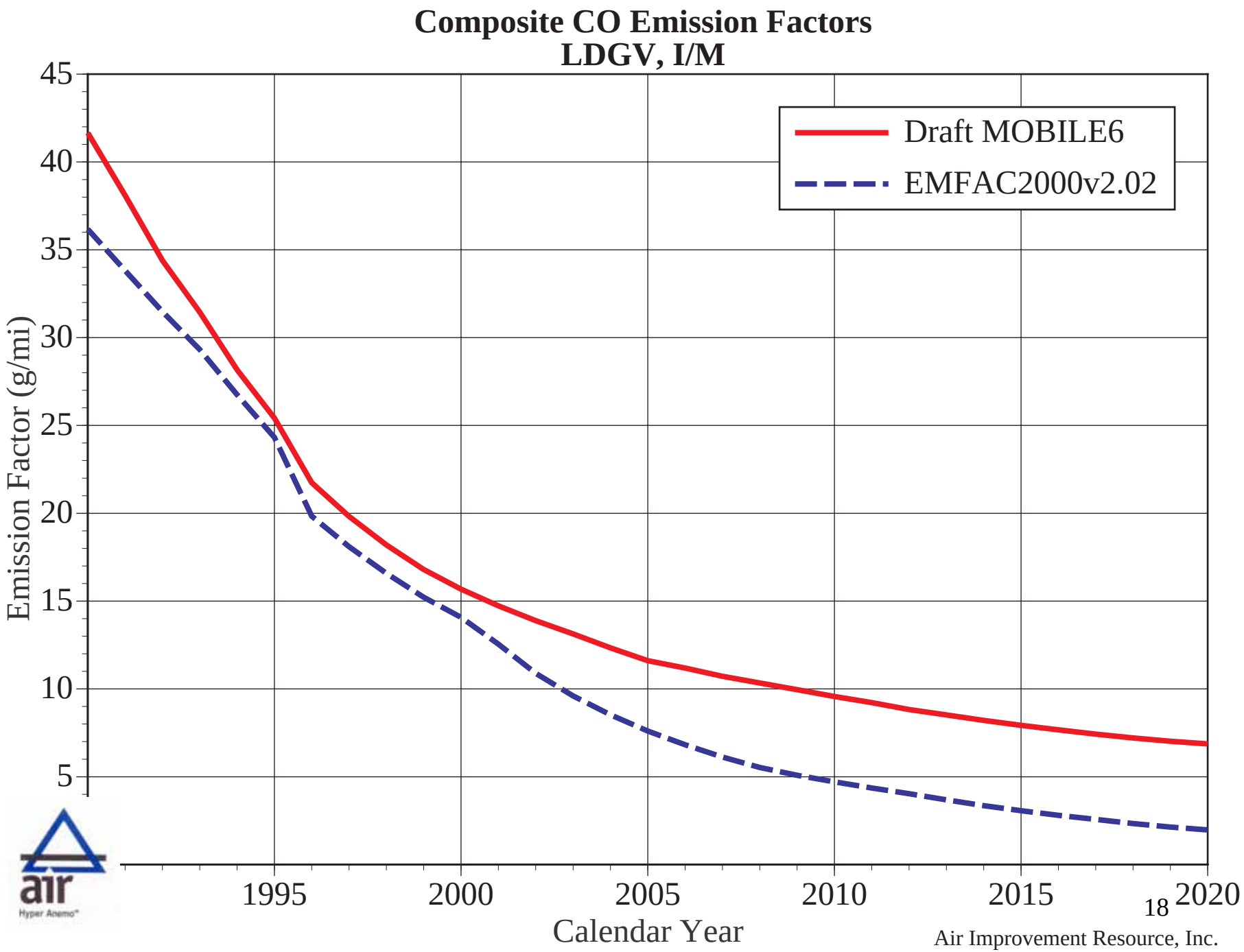
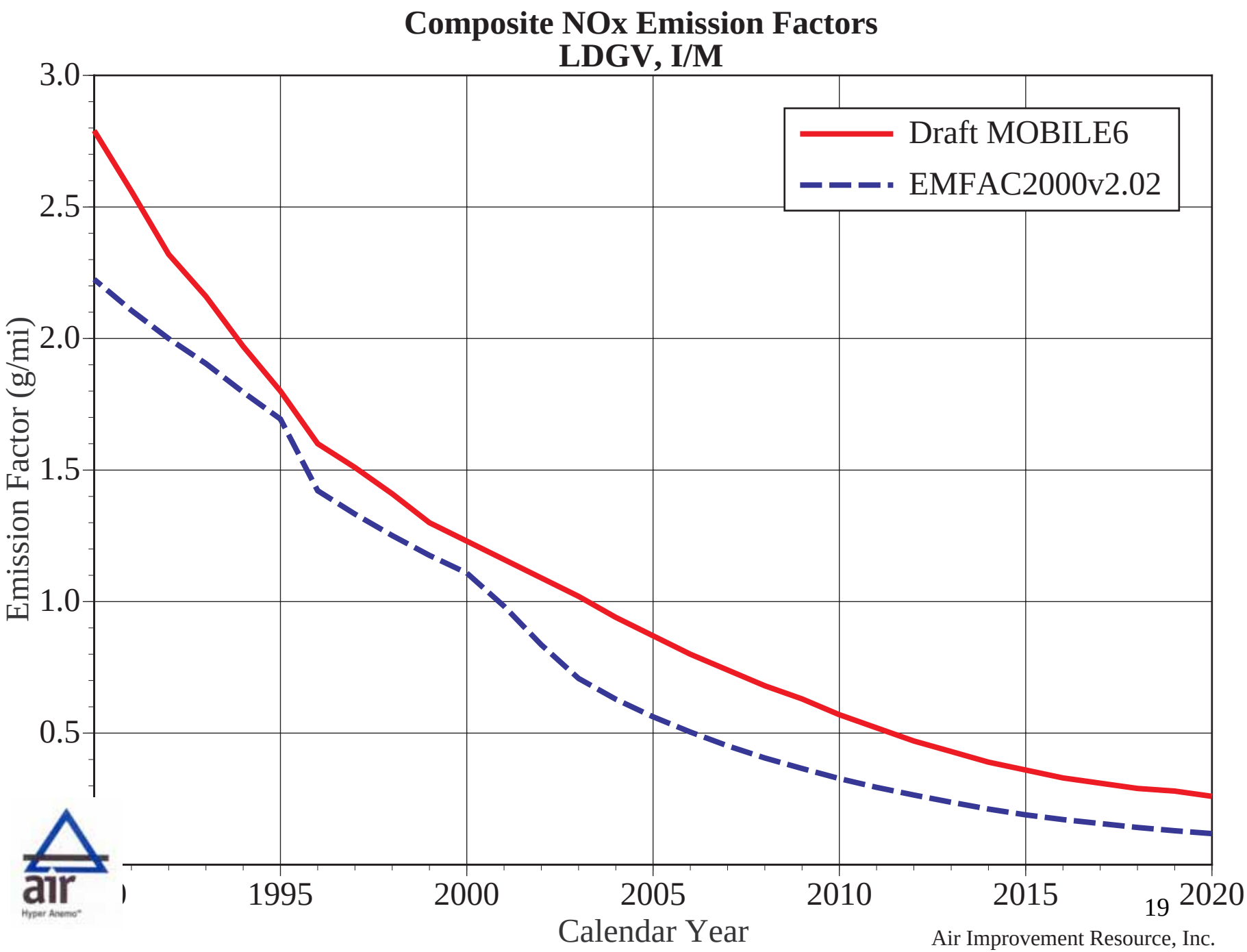
2.5
2.0
1.5
1.0
0.5
1995
2000
2005
2010
2015
2020
Calendar Year


Composite CO Emission Factors
LDGV, I/M
Draft MOBILE6
EMFAC2000v2.02
Emission Factor (g/mi)
45
40
35
30
25
20
15
10
5
1995
2000
2005
2010
2015
2020
Calendar Year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2.5
2.0
1.5
1.0
0.5
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Conclusions

- Critical differences in assumptions
  - Response of high emitters to emission standards
  - OBD effectiveness
- Concerns:
  - won't have enough data in near future to resolve differences
  - SIP credits for California standards will be different in different states
  - emissions are either underpredicted in California, or overpredicted elsewhere