Comparison of MOBILE6.2 and MOVES Emissions
Annual Emissions in Tons/Year

Key Assumptions:

Travel Demand Modeling: Based on Peninsula Model as of July, 2011.
Network & TAZ Data: WILMAPCO: July, 2010
Dover/Kent MPO: Summer, 2009
Sussex County: Winter 2009.
CUBE Voyager: Version 5.1.3 (March 2011).

Emissions Modeling:
MOBILE 6.2: Based on Input Files for Above Conformity Determinations.
MOVES: Based on DNREC Input Files & Excel Spreadsheet Process.

October 13, 2011

DelDOT
Delaware Department of Transportation

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Comparison of MOBILE 6.2 & MOVES for Delaware *("Where Are We Today ?"):*

Mobile Source Emissions Model Development Process:

December, 2010 – March, 2011:
  1) Generate VMT & VHT Speed Bin Collation Process in CUBE
       Voyager to Support DNREC SIP Work (2008 & 2009).

April – August, 2011:
  1) Input **DNREC "MOVES Process"** into DelDOT/MPO Peninsula
       Travel Model (CUBE Voyager 5.1.3).
  2) Generate Annual Emissions.
  3) QA/QC Among WRA/DelDOT/DNREC as to Process Inputs & Outputs.

August – September, 2011:
  1) Refine & Adapt CUBE/MOVES Process Daily Emissions.
  2) Generate Daily Emissions.
  3) QA/QC Among WRA/DelDOT/DNREC as to Process Inputs & Outputs.

October, 2011:
  1) Refine Process, Continue QA/QC.
  2) Review Sussex County Emissions Results.
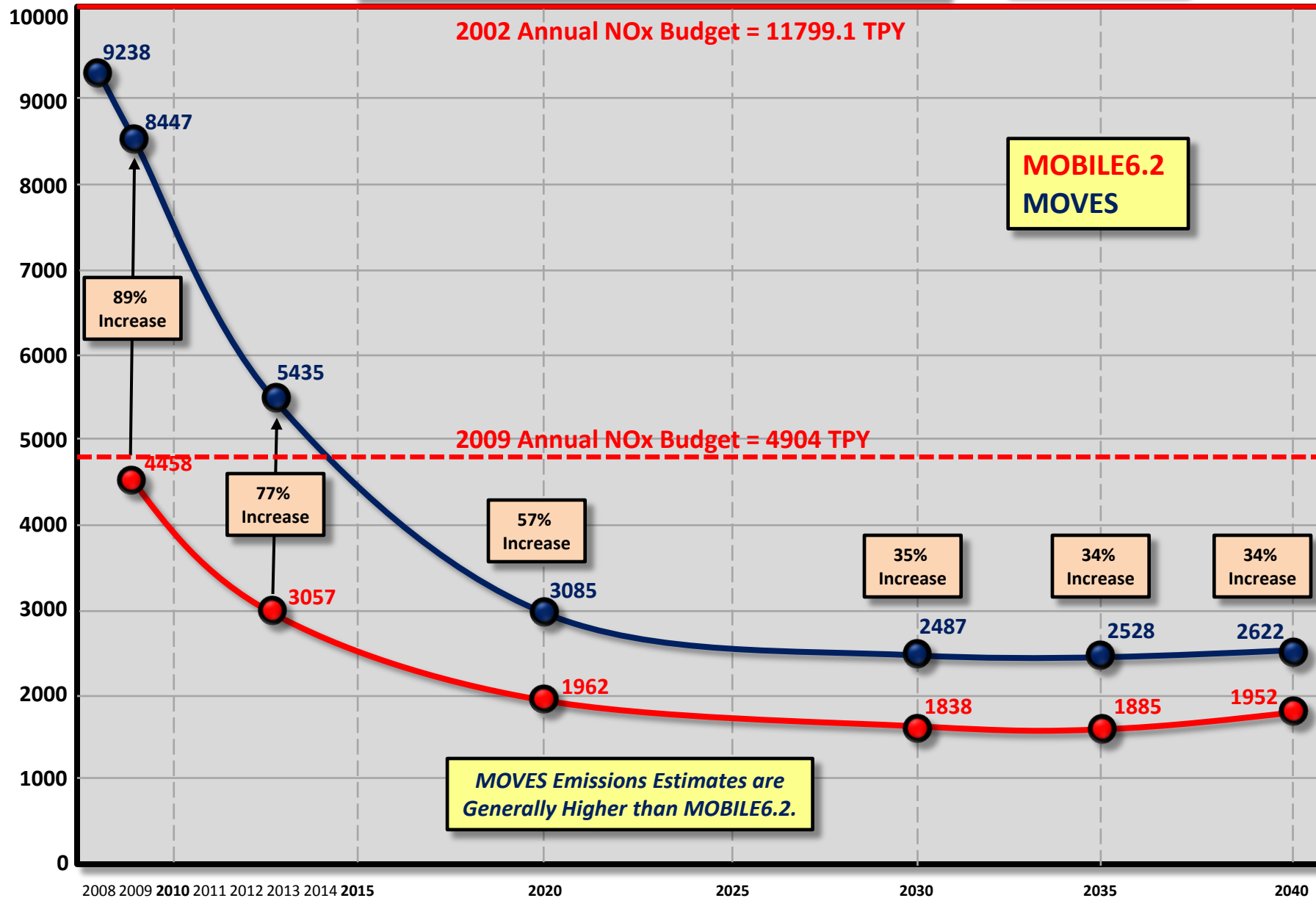
Comparison of MOBILE 6.2 & MOVES for Delaware:

Quick Review of Emissions Software:

	MOBILE 6.2	**MOVES**
Author:	EPA	EPA
Release Date:	July, 2001	March 12, 2010
Previous Version:	MOBILE 5a/5b	MOBILE 6.2
Main Output:	Emission Factors (Specific & Composite) for 1 mph Increment Speeds.	Emission Factors for 16 Speed Bins. (VHT Based on VMT Allocation to Bins).
Output Form:	Only Emission Rates	Emission Rate & Inventory Possible.
User Data:	Limited User-Provided Data	Able to Accommodate State Data
GUI:	No: User-Specified ASCII File	Yes: Has GUI
Geographic Scale:	County & Nation	Project, County, Multi-County, Nation
Data Analysis	Pre-1994 Vehicle Fleet	Larger data set (Pre-1999 Fleet?)
Travel Model Input:	VMT Based Speed Distribution	VHT Based Speed Distribution
Particulates:	PM data with No Temperature Effects	PM data with LDV & Temp. Effects
Heavy Vehicles:	HDV without Speed Effects, No Crankcase, Start or Extended Idle Emissions.	HDV with Speed Effects and Other Processes.

Source: EPA Website.

Comparison of MOBILE6.2 and MOVES Emissions
New Castle County – Annual NOx Tons/Year

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2002 Annual NOx Budget = 11799.1 TPY

MOBILE6.2
MOVES

9238
8447
5435
3085
2487
2528
2622

4458
3057
1962
1838
1885
1952

89% Increase
77% Increase
57% Increase
35% Increase
34% Increase
34% Increase

2009 Annual NOx Budget = 4904 TPY

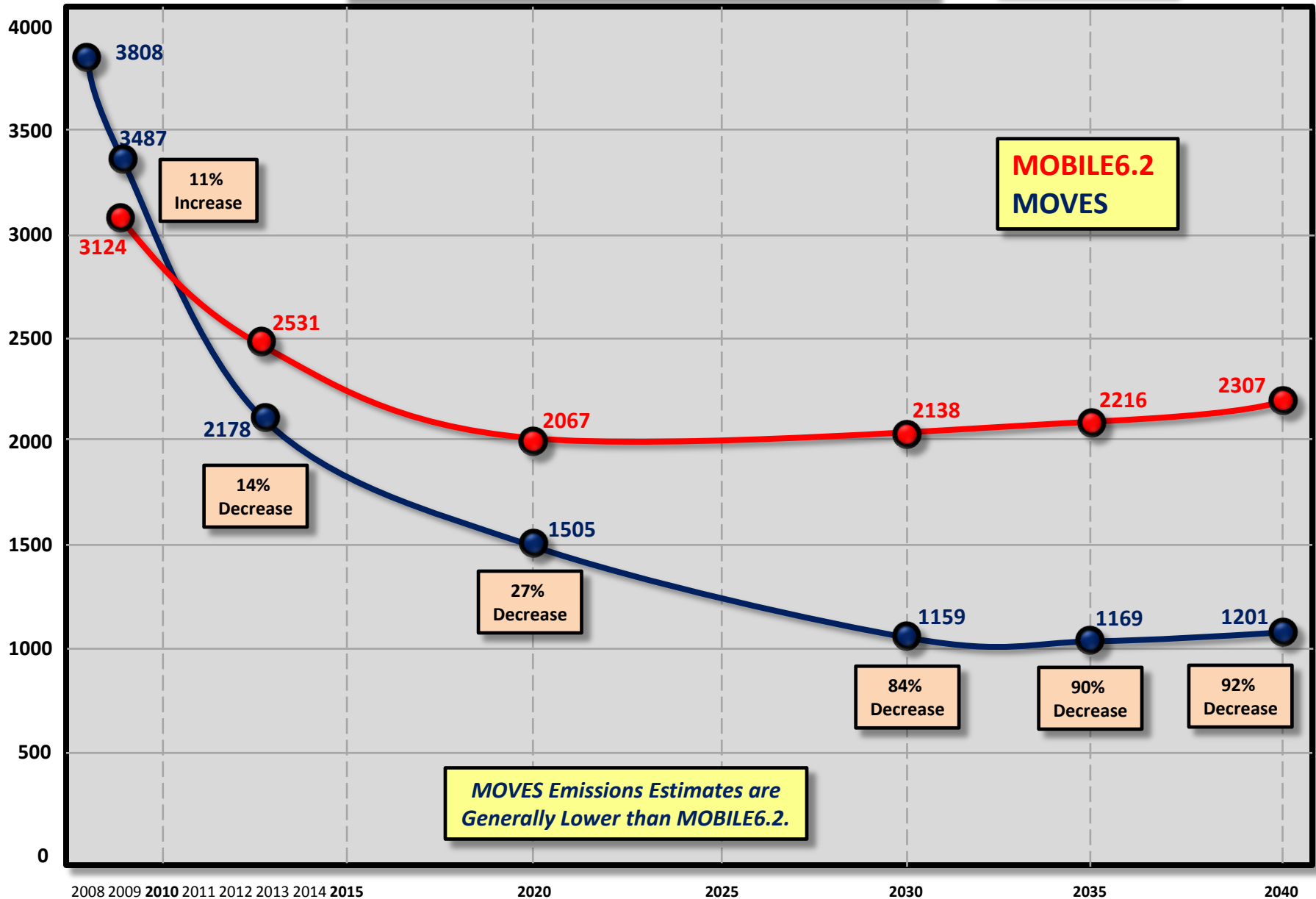MOVES Emissions Estimates are Generally Higher than MOBILE6.2.

Prepared by DelDOT Planning / WRA   7-28-11
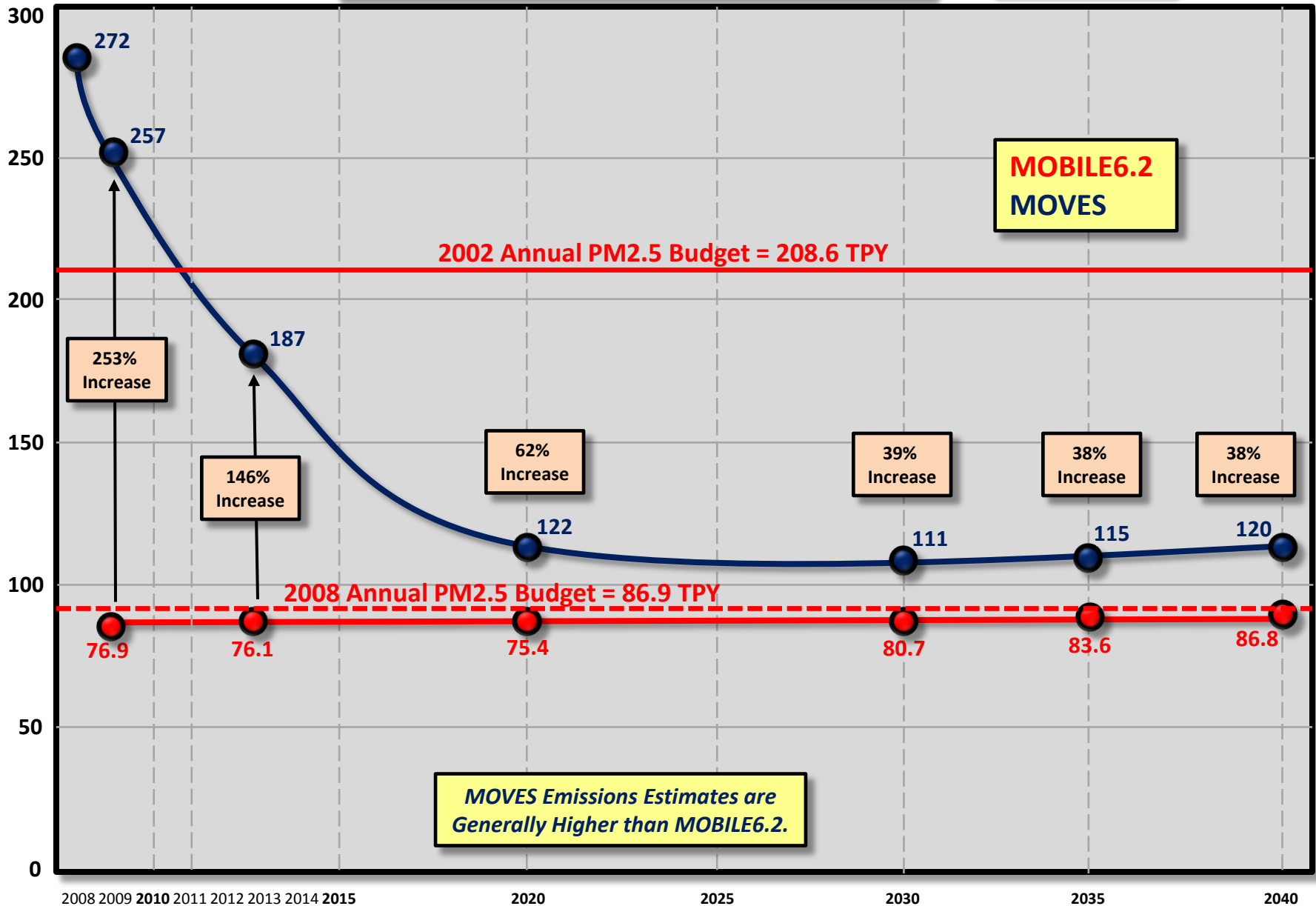
Comparison of MOBILE6.2 and MOVES Emissions
New Castle County – Annual VOC Tons/Year

DRAFT

MOBILE6.2
MOVES

MOVES Emissions Estimates are Generally Lower than MOBILE6.2.

Prepared by DelDOT Planning / WRA   7-28-11

Comparison of MOBILE6.2 and MOVES Emissions
New Castle County – Annual PM2.5 Tons/Year

DRAFT

MOBILE6.2
MOVES

2002 Annual PM2.5 Budget = 208.6 TPY

2008 Annual PM2.5 Budget = 86.9 TPY

272
257
187
122
111
115
120

253% Increase
146% Increase
62% Increase
39% Increase
38% Increase
38% Increase

76.9
76.1
75.4
80.7
83.6
86.8

MOVES Emissions Estimates are Generally Higher than MOBILE6.2.

2008 2009 2010 2011 2012 2013 2014 2015 2020 2025 2030 2035 2040

Prepared by DelDOT Planning / WRA   7-28-11

Comparison of MOBILE6.2 and MOVES Emissions
Kent County – Annual NOx Tons/Year

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MOBILE6.2
MOVES

3849
3787
105% Increase
96% Increase
2402
119% Increase
1354
128% Increase
128% Increase
127% Increase
1062
1084
1148

1845
1224
618
465
474
505

MOVES Emissions Estimates are Generally Higher than MOBILE6.2.

2008 2009 2010 2011 2012 2013 2014 2015   2020   2025   2030   2035   2040

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Comparison of MOBILE6.2 and MOVES Emissions
Kent County – Annual VOC Tons/Year

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MOBILE6.2
MOVES

10% Increase
5% Increase
5% Decrease
27% Decrease
28% Decrease
31% Decrease

1471
1337
1215
968
916
635
601
632
458
667
465
710
485

MOVES Emissions Estimates are Higher and Lower than MOBILE6.2.

2008 2009 2010 2011 2012 2013 2014 2015 2020 2025 2030 2035 2040

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Comparison of MOBILE6.2 and MOVES Emissions
Sussex County – Annual NOx Tons/Year

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MOBILE6.2
MOVES

MOVES Emissions Estimates are Generally Higher than MOBILE6.2.

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Comparison of MOBILE6.2 and MOVES Emissions
Sussex County – Annual VOC Tons/Year

DRAFT

MOBILE6.2
MOVES

MOVES Emissions Estimates are Generally Lower than MOBILE6.2.

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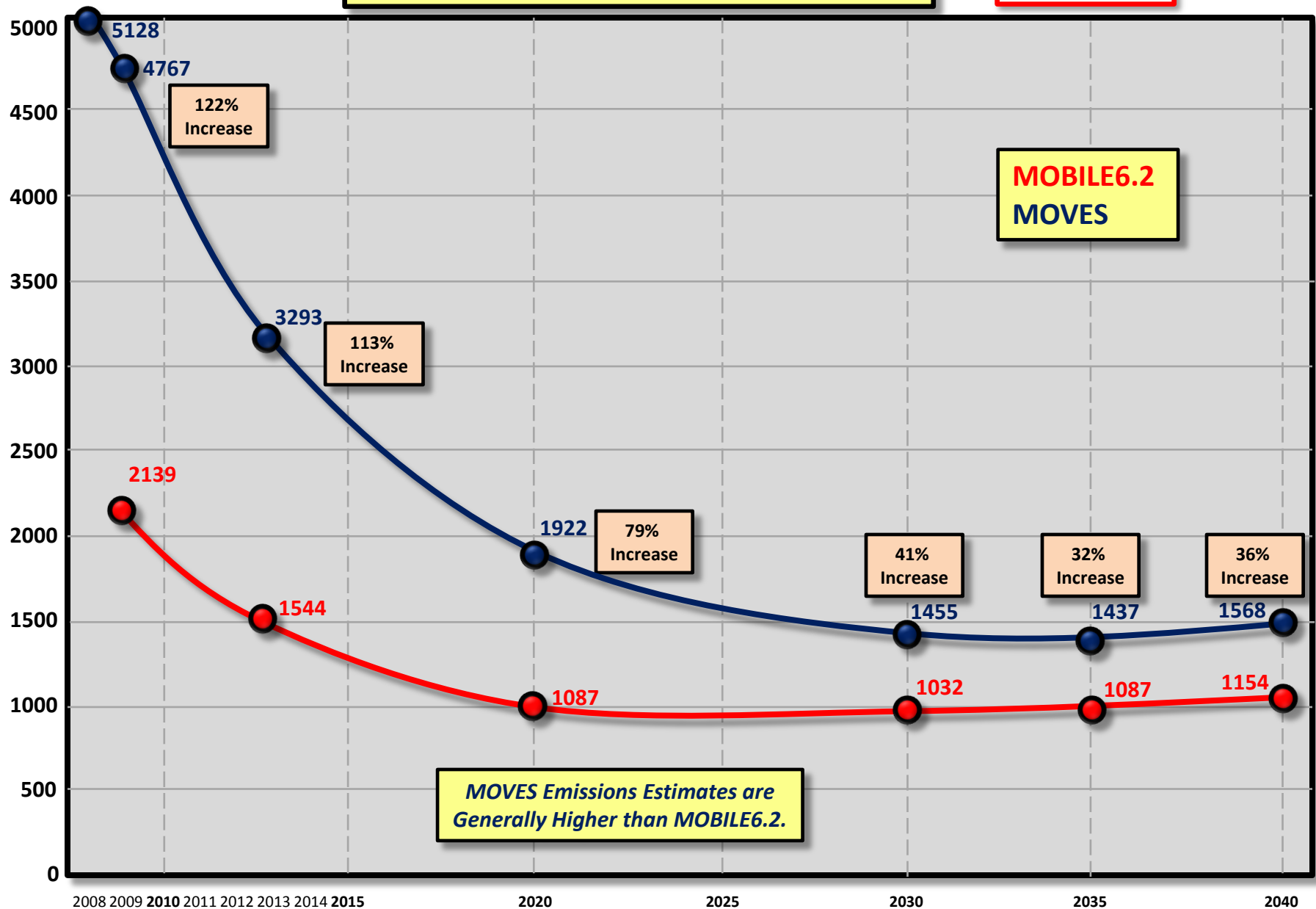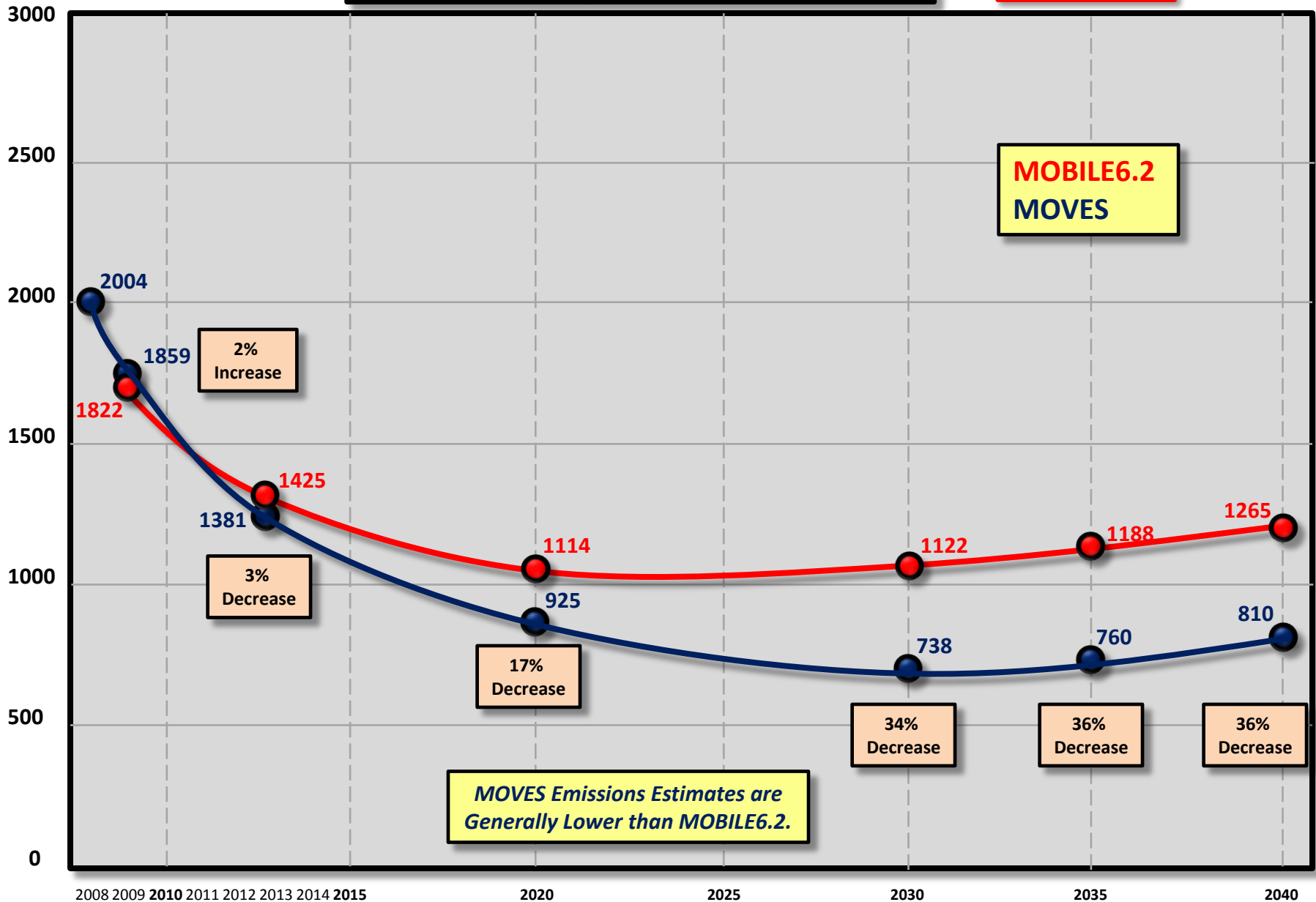
Comparison of MOBILE6.2 and MOVES Emissions
Daily Emissions in Tons/Day

Key Assumptions:

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Emissions Modeling:

MOBILE 6.2: Based on Input Files for Above Conformity Determinations.

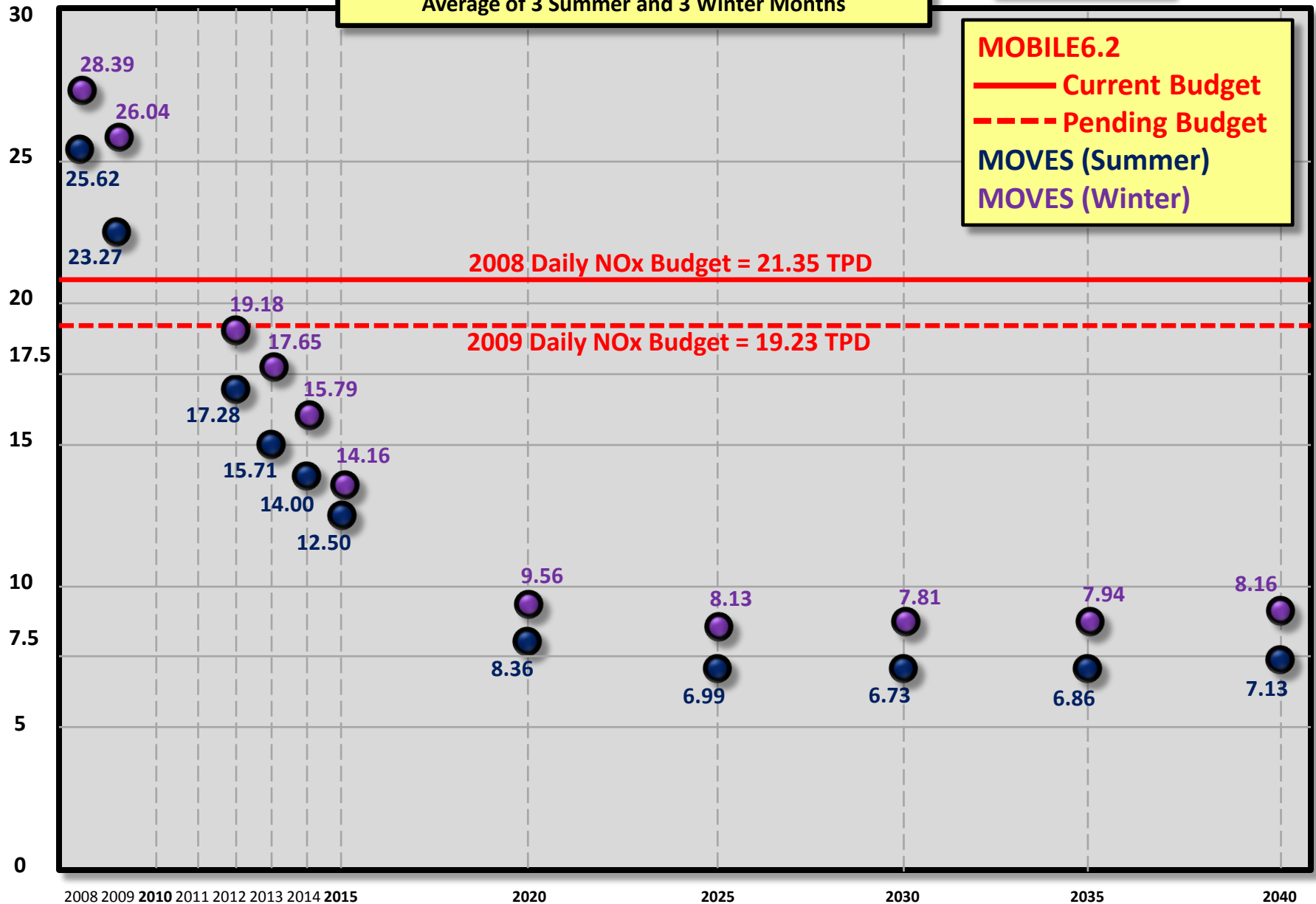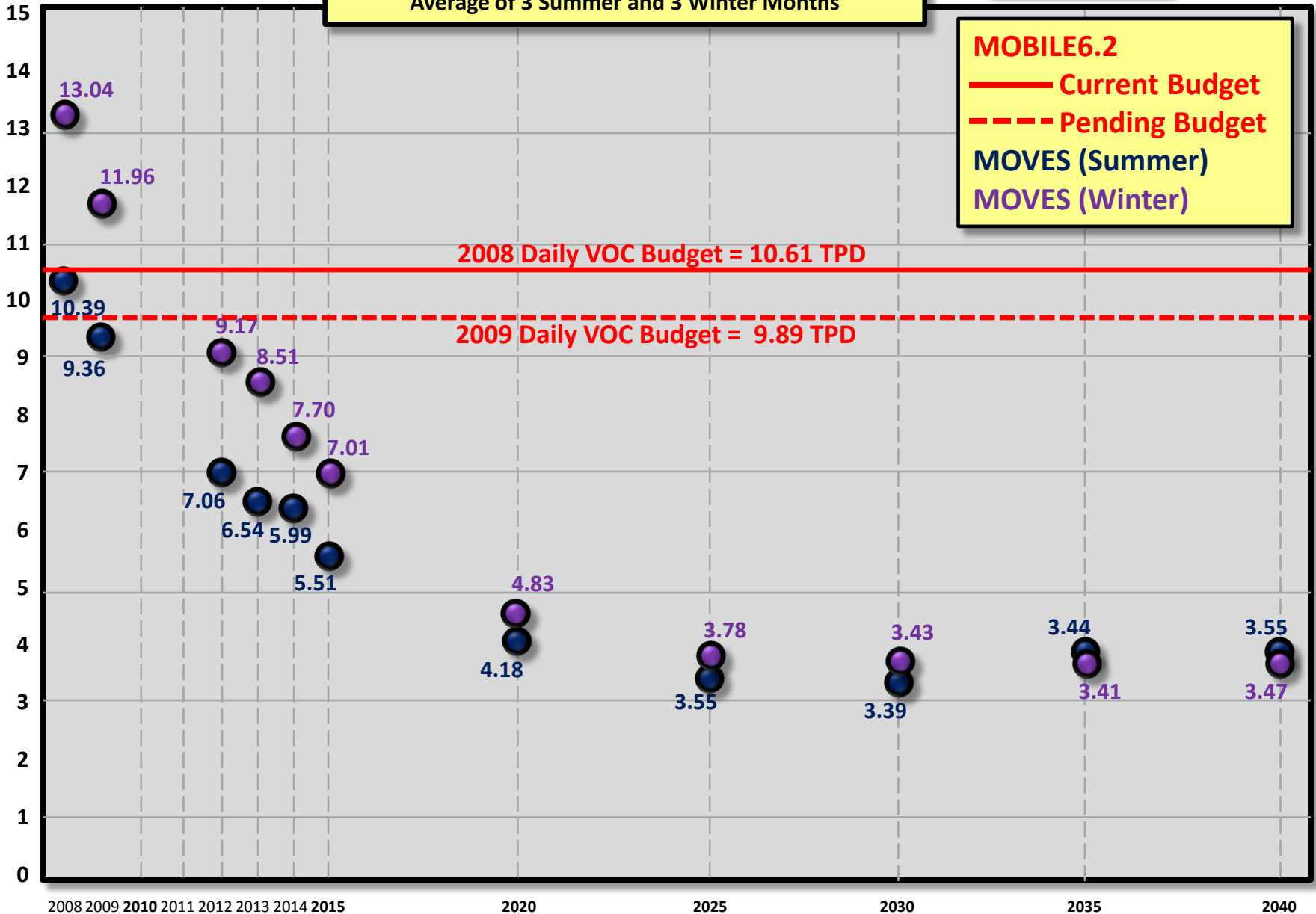**MOVES:** Based on DNREC Input Files & Excel Spreadsheet Process.

September 27, 2011

DelDOT
Delaware Department of Transportation

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Comparison of MOBILE6.2 and MOVES Emissions
New Castle County – Weekday NOx Tons/Day
Average of 3 Summer and 3 Winter Months

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MOBILE6.2
—— Current Budget
- - - Pending Budget
MOVES (Summer)
MOVES (Winter)

28.39
26.04
25.62
23.27

2008 Daily NOx Budget = 21.35 TPD

19.18
17.65
17.28
15.79
15.71
14.16
14.00
12.50

2009 Daily NOx Budget = 19.23 TPD

9.56
8.36
8.13
6.99
7.81
6.73
7.94
6.86
8.16
7.13

2008 2009 **2010** 2011 2012 2013 2014 **2015**   2020   2025   2030   2035   2040
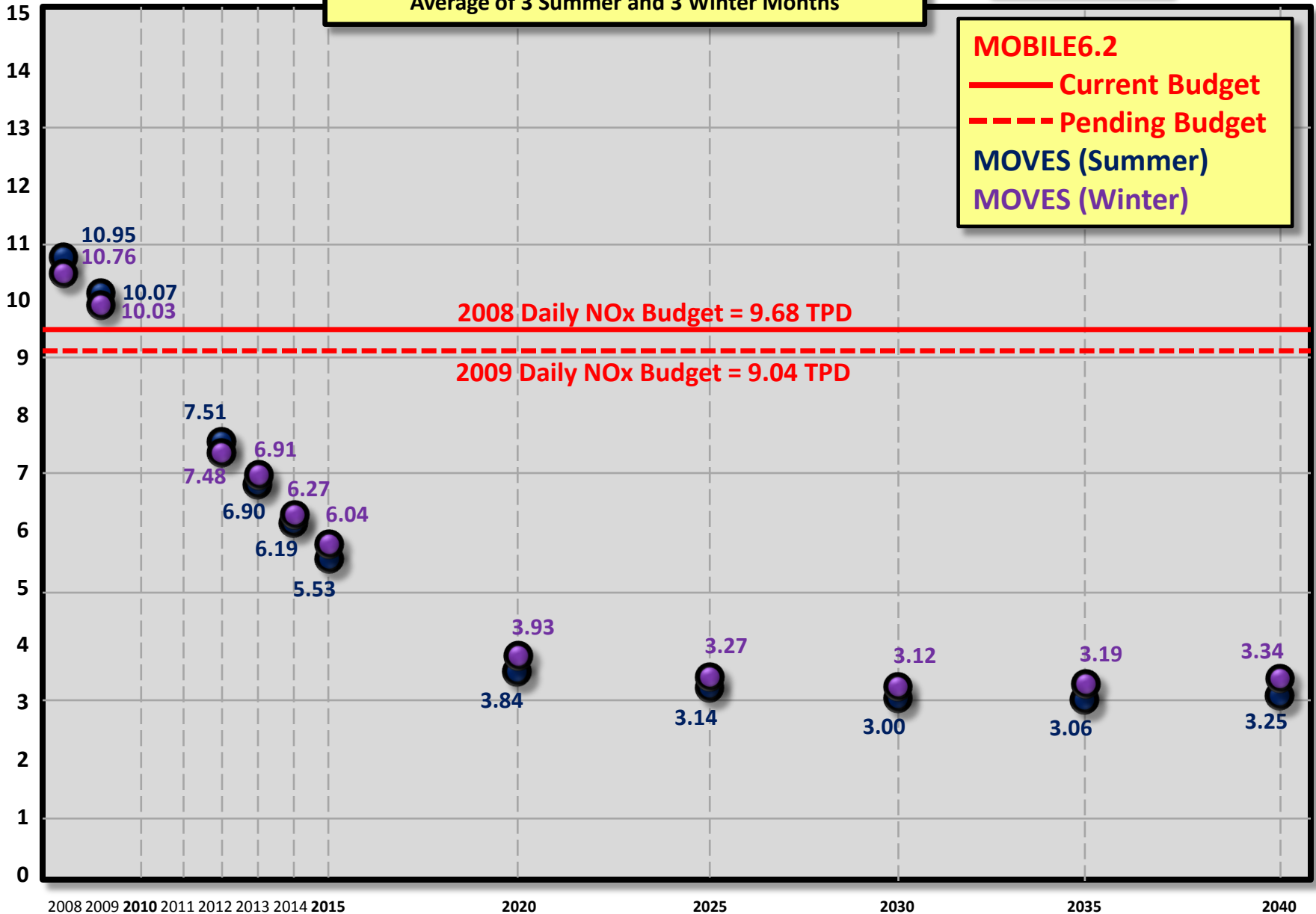
Prepared by DelDOT Planning / WRA 9-27-11

Comparison of MOBILE6.2 and MOVES Emissions
New Castle County – Weekday VOC Tons/Day
Average of 3 Summer and 3 Winter Months

DRAFT

MOBILE6.2
Current Budget
Pending Budget
MOVES (Summer)
MOVES (Winter)

2008 Daily VOC Budget = 10.61 TPD

2009 Daily VOC Budget = 9.89 TPD

13.04
11.96
10.39
9.36
9.17
8.51
7.70
7.01
7.06
6.54
5.99
5.51
4.83
4.18
3.78
3.55
3.43
3.39
3.44
3.41
3.55
3.47

Prepared by DelDOT Planning / WRA   9-27-11

Comparison of MOBILE6.2 and MOVES Emissions
Kent County – Weekday NOx Tons/Day
Average of 3 Summer and 3 Winter Months

DRAFT

MOBILE6.2
— Current Budget
--- Pending Budget
MOVES (Summer)
MOVES (Winter)

2008 Daily NOx Budget = 9.68 TPD

2009 Daily NOx Budget = 9.04 TPD

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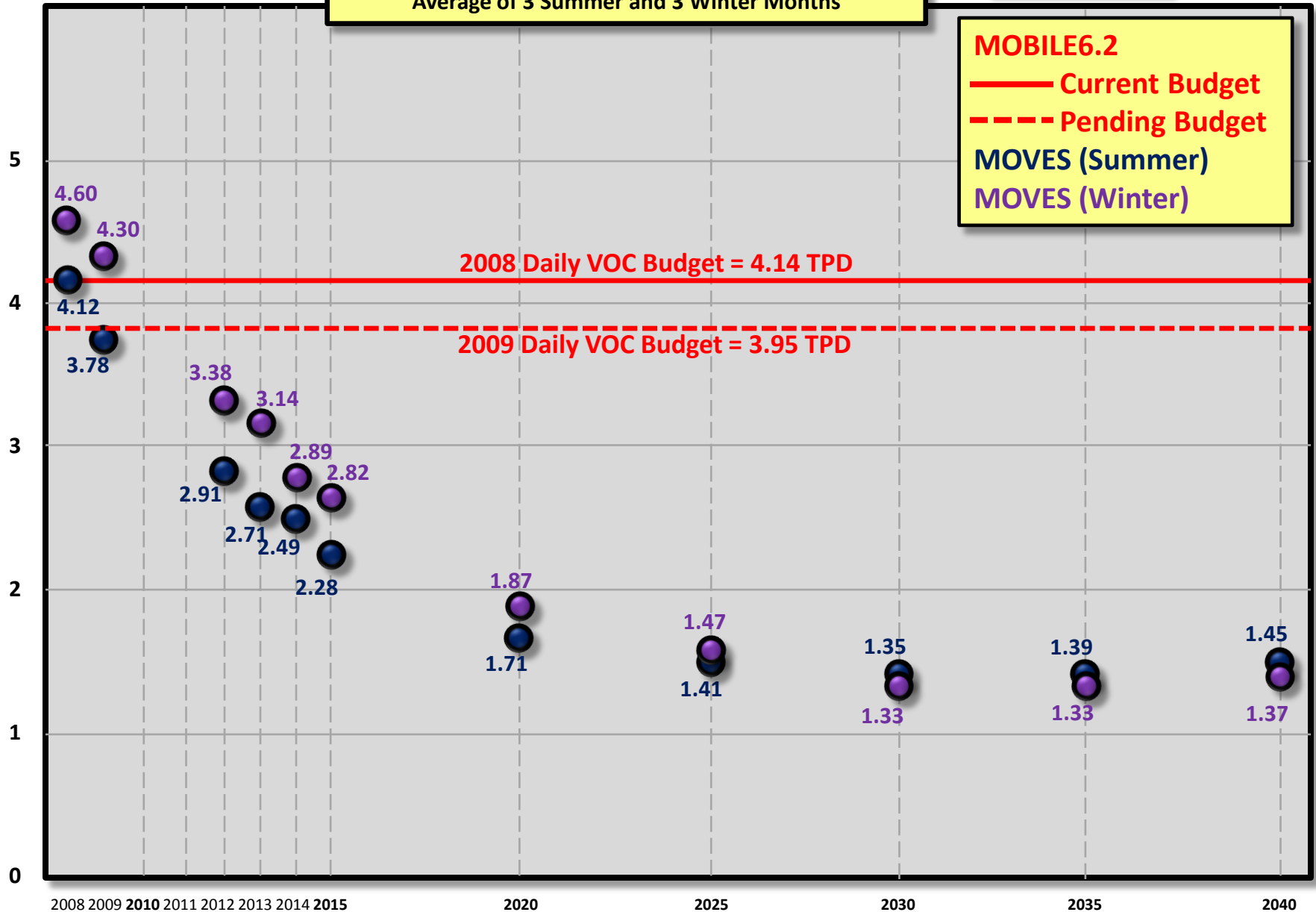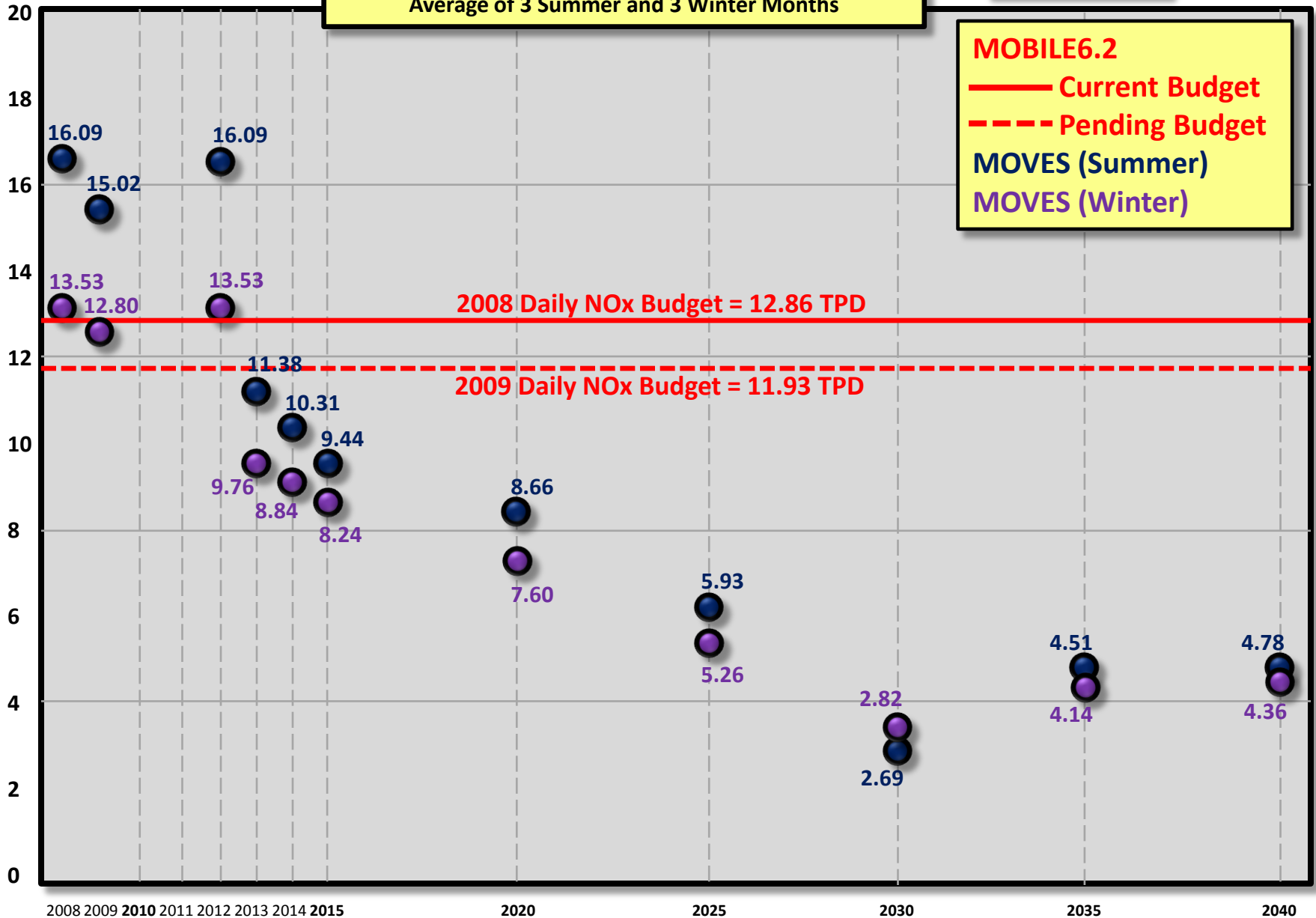
Comparison of MOBILE6.2 and MOVES Emissions
Sussex County – Weekday NOx Tons/Day
Average of 3 Summer and 3 Winter Months

DRAFT

MOBILE6.2
——— Current Budget
- - - Pending Budget
MOVES (Summer)
MOVES (Winter)

2008 Daily NOx Budget = 12.86 TPD
2009 Daily NOx Budget = 11.93 TPD

16.09   16.09
15.02
13.53   13.53
12.80
11.38
10.31
9.76   9.44
8.84   8.66
8.24
7.60
5.93
5.26
4.51   4.78
2.82   4.14   4.36
2.69

2008 2009 **2010** 2011 2012 2013 2014 **2015**   2020   2025   2030   2035   2040

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Comparison of MOBILE6.2 and MOVES Emissions
Sussex County – Weekday VOC Tons/Day
Average of 3 Summer and 3 Winter Months

DRAFT

MOBILE6.2
Current Budget
Pending Budget
MOVES (Summer)
MOVES (Winter)

2008 Daily VOC Budget = 7.09 TPD
2009 Daily VOC Budget = 7.05 TPD

6.11
5.74
5.96
5.50

6.11
5.96

4.62
4.34
4.29
4.05
4.01
3.74

3.77
3.48

2.82
2.69

2.33
2.16

2.47
2.27

0.18 0.16

2008 2009 2010 2011 2012 2013 2014 2015   2020   2025   2030   2035   2040

Prepared by DelDOT Planning / WRA   9-27-11