

# **2018 Base Case Projections of New EGUs, Other Point Sources, and Area Sources**



**Implementation Workgroup  
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# Topics in this talk

- **Phase II O&G EI project**
- **EGUs in 2018**
- **Other point sources in 2018**
- **Area sources in 2018**
- **Call for action**

# **Tasks for Phase II O&G EI project**

- 1. 2002 EI Improvements**
- 2. Projection of Baseline Emissions from 2002 to 2005**
- 3. Control Strategy Evaluation**
- 4. 2018 Emissions Forecasts and Potential Control Strategies by State**
- 5. SO<sub>2</sub> Emissions Forecasts for Oil & Gas-related Point Sources**

## Recommended ranking and description of Phase II emission inventory improvements

Rank	Emissions Source	Improvements to Phase I Emissions Estimates
1	Drilling Rigs	<ul style="list-style-type: none"> <li>• Update and improve estimate of drilling times by using actual drilling stop times</li> <li>• Improve estimates of engine type, make/model, and inventory based on information from producers</li> <li>• Use producer information to better estimate engine load factors.</li> <li>• Incorporate projected emissions from air-assist packages.</li> <li>• Incorporate PM and SOx emissions factors to estimate PM and SOx emissions from drilling rig engines.</li> </ul>
2	Compressor Engines	<ul style="list-style-type: none"> <li>• Use information from producers on actual wellhead compression activity to better estimate mix of wellhead, lateral and centralized compression on a basin level.</li> <li>• Use average field pressure over a basin to better estimate actual compressor engine load.</li> <li>• Incorporate PM emissions factors to estimate PM emissions from compressor engines.</li> </ul>
3	VOC Fugitives/Venting	<ul style="list-style-type: none"> <li>• Utilize analysis in NMED inventory to improve estimates of venting and fugitive emissions.</li> <li>• Determine usage of glycol dehydrators on a field basis and estimate emissions from these units based on producer information.</li> </ul>
4	Fugitive Dust	<ul style="list-style-type: none"> <li>• Investigate availability of information on vehicle activity and road construction in fields and basins with high levels of production.</li> <li>• Determine and recommend an approach to estimating fugitive dust emissions from well sites.</li> </ul>

## Major O&G producers in the WRAP region contacted to date

Operator	Regions and Operation Type	Contacted? (Y/N)
BP	Southeast NM (oil, gas) Northwest NM (gas, CBM) Four Corners Area (CBM) Southwest WY (gas, CBM)	Y
Chevron	Southeast NM (oil, some gas) Four Corners Area (CBM) Northwest CO (oil) Southwest WY (gas) Central WY Alaska (oil)	Y
Duke Energy	Southeast NM (gas)	Y
Conoco/Phillips	Northwest NM (gas) Southeast NM (oil) Southwest CO (gas)	Y

# Phase II O&G EI project schedule

Task	Milestone	Subtask	Due Date
1	Updated 2002 Emissions Inventory	Major producers' emissions inventory questionnaire distributed	November 15, 2006
		Producer information on activity by basin provided to ENVIRON	January 10, 2006
		Development of improved 2002 emissions inventory and memorandum to WRAP on preliminary findings	February 15, 2007
2	Update Baseline Emissions from 2002 to 2005	Development of 2005 baseline emissions from scale-up of 2002 improved inventory	February 22, 2007
3	Control Strategy Evaluation	Development of control strategies white papers. Summary of white papers in technical memorandum to WRAP	January 5, 2007
4	2018 Emissions Projections	2018 projection growth factors developed.	March 1, 2007
		Control strategy implementation scenarios for 2018 developed.	March 15, 2007
		Technical memorandum on 2018 emissions projections to WRAP	March 22, 2007
5	SO <sub>2</sub> Point Source Emissions Projections	Major gas plant operators contacted and questionnaire distributed	January 5, 2007
		Title 5 Permits obtained and analyzed	February 1, 2007
		Technical Memorandum on revised SO <sub>2</sub> point source projection factors to WRAP	February 8, 2007
6	Draft Final Report	Draft Final Report to WRAP for comments	April 1, 2007
7	Final Report		Two weeks after receipt of comments on draft report

# 2018 Base Case Projection for Point and Area Sources

- Completed 12/05, ERG lead contractor, results used in “base18” series of emissions and visibility modeling
- Projected from 2002 point and area EIs, provided and QA’ed by state staff
- Projection methods:
  - State and source contacts for coal EGUs
  - EPA EGAS model for other point and all area sources
- Applied “rules on the books as of 12/04” and growth projections using available population data and industry-sector (SCC-level) controls/growth
- [http://www.wrapair.org/forums/ssjf/documents/eictts/docs/WRAP\\_2018\\_EI-Version\\_1-Report\\_Jan2006.pdf](http://www.wrapair.org/forums/ssjf/documents/eictts/docs/WRAP_2018_EI-Version_1-Report_Jan2006.pdf)

# Future Coal EGUs

Table 4-4. Allocation of Future Coal EGUs

State	2002 Existing (MW)	2004 New (MW)	Under Construction (MW)	Permitted (MW)	Total (MW)	Fraction	No. of Plants	Modified No. of Plants
AZ	3,341	0	0	760	4,101	0.109	1.65	2 <sup>a</sup>
CO	5,075	0	0	750	5,825	0.155	2.35	2 <sup>a</sup>
ID	0	0	0	0	0	0.000	0.00	1 <sup>b</sup>
MT	2,567	0	910	0	3,477	0.092	1.40	1 <sup>a</sup>
NM	2,105	0	0	0	2,105	0.056	0.85	1 <sup>a</sup>
NV	2,769	0	0	200	2,969	0.079	1.20	1 <sup>a</sup>
OR	601	0	0	0	601	0.016	0.24	0 <sup>c</sup>
UT	4,745	0	0	1,220	5,965	0.158	2.41	2 <sup>a</sup>
WA	1,460	0	0	0	1,460	0.039	0.59	0 <sup>c</sup>
WY	5,995	88	380	0	6,463	0.172	2.61	3 <sup>a</sup>
Tribes (Navajo)	4,678	0	0	0	4,678	0.124	1.89	2 <sup>a</sup>
ND	4,185	0	0	0	4,185	0.902	2.42	3 <sup>d</sup>
SD	456	0	0	0	456	0.098	0.26	0 <sup>c</sup>
Western (excluding ND/SD)	33,336	88	1,290	2,930	37,644		15.19	15
ND/SD	4,641	0	0	0	4,641		2.69	3

<sup>a</sup>Number of units rounded.

<sup>b</sup>Number of units set to 1 based upon input from state air agency.

<sup>c</sup>Number of units set to 0 to reflect the unlikely siting of coal-fired EGU.

<sup>d</sup>Number of units rounded up.

# **How were the future coal EGUs spatially allocated for EIs and modeling?**

After allocation of the future coal-fired EGUs at the state-level, the EGUs were then allocated to specific counties. The basis of this allocation was based upon two factors:

- Announcements of plans to build coal-fired EGUs
- Locations of existing coal-fired EGUs & associated infrastructure

The two future coal-fired EGUs allocated to Navajo Nation were split between the Arizona and New Mexico portion of that reservation. The county location of the 18 future coal-fired EGUs is presented in Table 4-5.

**Table 4-5. County-Level Allocation of Future Coal-Fired EGUs**

<b>Assigned EGU Name</b>	<b>State (County FIPS)</b>
Arizona A	AZ (001)
Arizona B	AZ (003)
Colorado A	CO (099)
Colorado B	CO (087)
Idaho A	ID (053)
Montana A	MT (013)
New Mexico A	NM (031)
Nevada A	NV (033)
Utah A	UT (015)
Utah B	UT (047)
Wyoming A	WY (005)
Wyoming B	WY (037)
Wyoming C	WY (009)
Navajo Nation A	AZ
Navajo Nation B	NM
North Dakota A	ND (055)
North Dakota B	ND (057)
North Dakota C	ND (065)

The emission rates used to develop emission estimates for these future new coal-fired EGUs, as well as those currently under construction or being permitted, are below.

**Table 4-6. Emission Rates for Future New Coal-Fired EGUs**

Pollutant	lb/ton	lb/MMBtu <sup>a</sup>	lb/MWh <sup>b</sup>	Source
NO <sub>x</sub>	n/a	0.0900	0.9000	BACT <sup>c</sup>
SO <sub>2</sub>	n/a	0.0900	0.9000	BACT <sup>d</sup>
VOC	0.06	0.0022	0.0222	AP-42, Table 1.1-19 (U.S. EPA, 1995)
CO	n/a	0.1500	1.5000	BACT <sup>e</sup>
PM <sub>10</sub> -PRI	n/a	0.0180	0.1800	BACT <sup>f</sup>
PM <sub>2.5</sub> -PRI	n/a	0.0047	0.0470	AP-42, Table 1.1-6 (U.S. EPA, 1995)

<sup>a</sup> Converted from lb/ton to lb/MMBtu using conversion factor of 13,500 Btu/lb coal.

<sup>b</sup> Converted from lb/MMBtu to lb/MWh using conversion factor of 10,000 Btu/kWh.

<sup>c</sup> Obtained from range of values (0.06 to 0.1) from 12 Western facilities (U.S. EPA, 2005b); value selected with input from Projections Work Group.

<sup>d</sup> Obtained from range of values (0.038 to 0.11) from 12 Western facilities (U.S. EPA, 2005b); value selected with input from Projections Work Group.

<sup>e</sup> Obtained from range of values (0.012 to 0.52) from 12 Western facilities (U.S. EPA, 2005b); value selected with input from Projections Work Group.

<sup>f</sup> Obtained from range of values (0.1 to 0.16) from 12 Western facilities (U.S. EPA, 2005b); value selected with input from Projections Work Group.

## **Use of EGAS Model to develop 2018 base case projections**

- For non-EGU point and all area sources, growth factors were obtained from the EGAS growth factor model
- U.S. EPA's Economic Growth and Analysis System growth factor model (EGAS) Version 5.0 generates SCC-specific growth factors for a specified geographic areas:
  - 2002 (used to project future)
  - 2018 base case (including assumptions described previously)
- Various socio-economic data were used: (EPA, 2004; Abt, 2004)
- Rules on the books are included
- At present, the EGAS model run with default data can only generate growth factors at the state-level
- County-level growth factors can be generated by EGAS if detailed county-level socio-economic data are input into the model
- This was not done for this analysis because these data were not available

## **Call to action**

- **Review of 2018 base case projections needed**
- **States to review and provide needed input or adjustments for existing 2018 projections:**
  - **Rules on the books since 12/04**
  - **Oil & Gas (WRAP SSJF project + local/state info)**
  - **Population factors**
  - **Area sources (QA)**
- **2018 CA emissions controls by ARB**
- **“Outside-of-WRAP” changes**