South Coast AQMD SOON & Moyer Incentive Programs

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Carl Moyer and SOON Grant Programs

- Incentive funds for replacing older engines with new cleaner engines
- Will fund repower, replacement, and retrofit projects
- Funding awarded based on cost effectiveness
- Emission reductions must be surplus to those required by any rule or regulation
- Requires minimum number of hours of operation in South Coast District Boundaries

Traditional Moyer Program

- Surplus
  - At least 3 years in advance of regulation or rule compliance date
    - Large fleet – very limited opportunity
    - Medium fleet – until 2009
    - Small fleet – PM until 2011; NOx no time limit

Traditional Moyer Program

- PM retrofits required and funded by Program – funds up to 100% of cost of retrofit including maintenance
- Repowers – up to 85% of repower cost
- Replacement – up to 80% of cost
- Voluntary participation

SOON Program

- Participation in program mandatory for largest fleets
  - >20,000 HP statewide, operate vehicles in district, and >40% T0 and T1 vehicles
- Voluntary for all other fleets
- Largest fleets must apply for funding when funding is offered by District
- If awarded funding, fleet must implement project

SOON Program

- Compliance Plan required
  - Guarantees surplus emissions
- SOON funded vehicle assumed to emit at old emission rate for purposes of regulation compliance (until end of contract)
- PM retrofit not required nor funded

SOON Program

- Funds repower costs only (may be used for replacement or repower)
- Large Fleet – SOON only incentive funding available
- Medium Fleet - Traditional Moyer or SOON funding until 2009; SOON only after 2009
- Small Fleet - Traditional for PM until 2011; SOON or Traditional Moyer for NOx – no time limit

What Makes a Competitive Moyer/SOON project?

- Older equipment (pre-1996)
- Sufficient hours of operation in district (at least 750 to 1000 hrs/year)
- Larger engine (greater than 150 hp)

What can AQMD do to help?

- AQMD/CARB Fleet Calculator
- Compliance plan template
- AQMD assistance program
  - Meet with fleet

AQMD/CARB Fleet Calculator

Fleet Calculator

- Extension of CARB's fleet calculator
- Includes SOON specific calculations
- Integral part of Compliance plan development and submittal

Fleet Average Emission and Target Calculation Example

- NOx calculation as an example
- PM calculation is the same
- Fleet Average Emission based on engine age and horsepower
- Fleet Average Target based on compliance year and horsepower

Crawler Tractor/Dozer	Scraper	Wheel Loader
Model year: 1991	Model year: 1980	Model year: 2004
400 HP	280 HP	170 HP
From Appendix A:	From Appendix A:	From Appendix A:
NOx = 8.9 g/bhp-hr	NOx = 12.5 g/bhp-hr	NOx = 4.3 g/bhp-hr
PM = 0.490 g/bhp-hr	PM = 0.780 g/bhp-hr	PM = 0.22 g/bhp-hr

$$\text{NOx Index} = \frac{8.9\ \text{g/bhp-hr} \times 400\ \text{hp} + 12.5\ \text{g/bhp-hr} \times 280\ \text{hp} + 4.3\ \text{g/bhp-hr} \times 170\ \text{hp}}{(400\ \text{hp} + 280\ \text{hp} + 170\ \text{hp})}$$

NOx Index = 9.17 g/bhp-hr

Step 1: Input your equipment into the Fleet Calculator

Hp Repowered	Percent Tier 0's + Tier 1's	Hp PM Retro =	Hp Turnover Credit for NOx Retro =	PM Fleet Average =	NOx Fleet Average =
0.0	#DIV/0!	0.0	0.0	#DIV/0!	#DIV/0!

Baseline

Equipment Name	Equipment Type	Is this vehicle in the SOON fleet? (Y/N)	Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower	Twin-engine vehicle? (NOT AUX.)	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	PM Exhaust Retrofit Level (Enter 1, 2, 3, or NA)	NOx Exhaust Retrofit (Enter % Reduction or NA)	Fleet Average PM Factor (g/bhp-hr)	Fleet Average NOx Factor (g/bhp-hr)	
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07
									NA	NA			07

Equipment Name	Equipment Type	Is this vehicle in the SOON fleet? (Y/N)	Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower
Sample1	Crawler Tractors	Y	1991	N	400
Sample2	Scrapers	Y	1980	N	280
Sample3	Rubber Tired Loaders	Y	2004	N	170

Fleet Calculator looks up engine tiers and emission factors

Hp Repowered	Percent Tier 0's + Tier 1's	Hp PM Retro =	Hp Turnover Credit for NOx Retro =	PM Fleet Average =	NOx Fleet Average =
0.0	66.67%	0.0	0.0	0.53	9.2

Baseline

Equipment Name	Equipment Type	Is this vehicle in the SOON fleet? (Y/N)	Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower	Twin-engine vehicle? (NOT AUX.)	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	PM Exhaust Retrofit Level (Enter 1, 2, 3, or NA)	NOx Exhaust Retrofit (Enter % Reduction or NA)	Fleet Average PM Factor (g/bhp-hr)	Fleet Average NOx Factor (g/bhp-hr)	
Sample1	Crawler Tractors	Y	1991	N	400	N	N	T0	NA	NA	0.490	8.900	07
Sample2	Scrapers	Y	1980	N	280	N	N	T0	NA	NA	0.780	12.500	07
Sample3	Rubber Tired Loaders	Y	2004	N	170	N	N	T2	NA	NA	0.220	4.300	07
									NA	NA			07
									NA	NA			07
									NA	NA			07
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Engine Tier	PM Exhaust Retrofit Level (Enter 1, 2, 3, or NA)	NOx Exhaust Retrofit (Enter % Reduction or NA)	Fleet Average PM Factor (g/bhp-hr)	Fleet Average NOx Factor (g/bhp-hr)
T0	NA	NA	0.490	8.900
T0	NA	NA	0.780	12.500
T2	NA	NA	0.220	4.300

Fleet Calculator

Hp Repowered	Percent Tier 0's + Tier 1's	Hp PM Retro =	Hp Turnover Credit for NOx Retro =	PM Fleet Average =	NOx Fleet Average =
0.0	80.95%	0.0	0.0	0.54	9.2

Baseline

Equipment Name	Equipment Type	Is this vehicle in the SOON fleet? (Y/N)	Model Year	Has this Vehicle been Repowered with a New Engine? (Y/N)	Horsepower	Twin-engine vehicle? (NOT AUX.)	Does this Vehicle Have an On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	PM Exhaust Retrofit Level (Enter 1, 2, 3, or NA)	NOx Exhaust Retrofit (Enter % Reduction or NA)	Fleet Average PM Factor (g/bhp-hr)	Fleet Average NOx Factor (g/bhp-hr)	
Sample1	Crawler Tractors	Y	1991	N	400	N	N	T0	NA	NA	0.490	8.900	07
Sample2	Scrapers	Y	1980	N	280	N	N	T0	NA	NA	0.780	12.500	07
Sample3	Rubber Tired Loaders	Y	2004	N	170	N	N	T2	NA	NA	0.220	4.300	07
Sample 4	Excavators	N	1986	N	250	M	N	T0	NA	NA	0.780	12.500	07
Sample5	Scrapers	Y	1984	N	550	Y	N	T0	NA	NA	0.680	11.900	07
Sample6	Crawler Tractors	N	1984	N	550	N	N	T0	NA	NA	0.680	11.900	07
Sample7	Scrapers	Y	1984	N	400	Y	N	T0	NA	NA	0.680	11.900	07
Sample8	Scrapers	Y	1990	N	400	Y	N	T0	NA	NA	0.490	8.900	07
Sample9	Scrapers	Y	1990	N	250	Y	N	T0	NA	NA	0.540	9.300	07
Sample10	Other Construction Equipment	N	1991	N	73	N	N	T0	NA	NA	0.980	9.900	07
Sample11	Other Construction	N	1991	N	73	N	N	T0	NA	NA	0.980	9.900	07
Sample12	Tractors/Loaders/Backhoes	Y	1993	N	320	N	N	T0	NA	NA	0.490	8.900	07
Sample13	Tractors/Loaders/Backhoes	Y	1993	N	320	N	N	T0	NA	NA	0.490	8.900	07
Sample14	Crawler Tractors	Y	1993	N	450	N	N	T0	NA	NA	0.490	8.900	07
Sample15	Off-Highway Trucks	N	1993	N	600	N	N	T0	NA	NA	0.490	8.900	07
Sample16	Rollers	Y	1994	N	175	N	N	T0	NA	NA	0.540	9.300	07
Sample17	Rollers	Y	1994	N	175	N	N	T0	NA	NA	0.540	9.300	07
Sample18	Other Construction Equipment	Y	1994	N	73	N	N	T0	NA	NA	0.980	9.900	07
Sample19	Other Construction Equipment	Y	2000	N	73	N	N	T1	NA	NA	1.090	6.900	07
Sample20	Other Construction Equipment	Y	2000	N	73	N	N	T1	NA	NA	1.090	6.900	07
Sample21	Other Construction	Y	2000	N	37	N	N	T1	NA	NA	0.600	6.200	07
Sample22	Rubber Tired Loaders	N	2004	N	275	N	N	T2	NA	NA	0.150	4.300	07
Sample23	Tractors/Loaders/Backhoes	Y	2004	N	340	N	N	T2	NA	NA	0.150	4.200	07
Sample24	Cranes	Y	2004	N	180	N	N	T2	NA	NA	0.150	4.300	07
									NA	NA			07

OUT OF COMPLIANCE

Select actions to meet fleet target or BACT turnover requirements

2010

(Actions completed between March 1, 2009-March 1, 2010)

Previous Action	Select Action	Model Year	Horsepower	Is this vehicle in the SOON	Does this Vehicle Have an On-Road Engine or Electric	Engine Tier	PM Exhaust Retrofit Level (Enter 1, 2, 3	NOx Exhaust Retrofit (Enter % Reduction	Fleet Average PM Factor	Fleet Average NOx Factor (g/bhp-hr)
09										900
09										.500
09										300

Fleet Calculator calculates emission targets and emission indices for your fleet

2010

(Actions completed between March 1, 2009-March 1, 2010)

Previous Action	Select Action	Model Year	Horse	Is this	Does this	Engine Tier	PM Exhaust Retrofit Level (Enter 1, 2, 3, or NA)	NOx Exhaust Retrofit (Enter % Reduction or NA)	Fleet Average PM Factor (g/bhp-hr)	Fleet Average NOx Factor (g/bhp-hr)
09		1991	4			T0	NA	NA	0.490	8.900
09		1980	2			T0	NA	NA	0.780	12.500
09		2004	1			T2	NA	NA	0.220	4.300
09		1986	2			T0	NA	NA	0.780	12.500
09		1984	5			T0	NA	NA	0.680	11.900
09		1984	5			T0	NA	NA	0.680	11.900
09		1984	4			T0	NA	NA	0.680	11.900

Retire
Repower
PM Retro
NOx Retro
SOON
New
Rep+Retro

Retire
Repower
PM Retro
NOx Retro
SOON
New
Rep+Retro
New+Retro
Retro+Retro
SOON+Retro

OUT OF COMPLIANCE

NOx Requirements Fulfilled?	YES

NOx Requirements (Comply with either Fleet Average or BACT)

Fleet Average		BACT	
NOx Fleet Target =	6.0	Needed Hp Turnover =	519.0
NOx Fleet Average =	8.7	Current Hp Turnover =	680.0

PM Requirements Fulfilled?	NO

PM Requirements (Comply with either Fleet Average or BACT)

Fleet Average		BACT	
PM Fleet Target =	0.22	Needed Hp Retrofit =	1297.4
PM Fleet Average =	0.51	Current Hp Retrofit=	280.0

					fleet? (Y/N)	Motor? (Enter ON or E)		or NA)	or NA)	(g/bhp-hr)	(g/bhp-hr)	
09		Repower	2009	400	Y	N	T3	NA	NA	0.150	2.600	10
09		Retire	R		Y	N		NA	NA			10
09			2004	170	Y	N	T2	NA	NA	0.220	4.300	10
09			1986	250	N	N	T0	NA	NA	0.780	12.500	10
Sample9	Scrapers	09			1990	250	Y	N	T0	NA	NA	0.540	9.300	10
Sample10	Other Construction Equipment	09			1991	73	N	N	T0	NA	NA	0.980	9.900	10
Sample11	Other Construction	09			1991	73	N	N	T0	NA	NA	0.980	9.900	10
	Tractors/Loaders/Backh	09												10
Sample23	Tractors/Loaders/Backhoes	09			2004	350	Y	N	T2	NA	NA	0.150	4.200	10
Sample24	Cranes	09			2004	180	Y	N	T2	NA	NA	0.150	4.300	10
		09								NA	NA			10

Repowered 1 crawler tractor and retired 1 requirement

NOx requirement is satisfied, but fleet is out of compliance for PM!

IN COMPLIANCE

NOx Requirements Fulfilled?	YES	PM Requirements Fulfilled?	YES

NOx Requirements (Comply with either Fleet Average or BACT)				PM Requirements (Comply with either Fleet Average or BACT)			
Fleet Average		BACT		Fleet Average		BACT	
NOx Fleet Target =	6.0	Needed Hp Turnover =	519.8	PM Fleet Target =	0.22	Needed Hp Retrofit =	1299.4
NOx Fleet Average =	8.6	Current Hp Turnover =	680.0	PM Fleet Average =	0.49	Current Hp Retrofit=	1305.0

YES

er Fleet

1299.4

1305.0

	Previous Action	Select Action	Model Year	Horsepower	in the SOON fleet? (Y/N)	On-Road Engine or Electric Motor? (Enter ON or E)	Engine Tier	Retrofit Level (Enter 1, 2, 3, or NA)	Retrofit (Enter % Reduction or NA)	Fleet Average PM Factor (g/bhp-hr)	Fleet Average NOx Factor (g/bhp-hr)	
09		Rep+Retro	2009	400	Y	N	T3	3	NA	0.023	2.600	10
09		Retire	R		Y	N		NA	NA			10
09			2004	170	Y	N	T2	NA	NA	0.220	4.300	10
	Sample8	Scrapers	09			1990	400	Y	N	T0	NA	NA	0.490	8.900	10
	Sample9	Scrapers				1990	350	Y	N	T0	NA	NA	0.540	0.200	10
	S													00	10
	S													00	10
	S													00	10
	S													00	10
	S													00	10
	S													00	10
	S													00	10
	S													00	10
	S													00	10
	Sample19	Other Construction Equipment	09			2000	73	Y	N	T1	NA	NA	1.090	6.900	10
09			2000	37	Y	N	T1	NA	NA	0.600	6.200	10
09		PM Retro	2004	275	N	N	T2	3	NA	0.023	4.300	10
09		PM Retro	2004	350	Y	N	T2	3	NA	0.023	4.200	10
09			2004	180	Y	N	T2	NA	NA	0.150	4.300	10
09								NA	NA			10

Fleet is now in compliance with both NOx and PM requirements for 2010

Year	Baseline	2010	2011	2012
Fleet Size (HP)	6497	6217	6217	6217
NOx Fleet Average	9.2	8.6	6.8	5.7
NOx Fleet Target	NA	6.0	5.6	5.2
PM Fleet Average	0.54	0.49	0.35	0.27
PM Fleet Target	NA	0.22	0.22	0.17
Total Repowers		1	2	2
Total New Vehicles		0	0	0
Total PM Retrofits		3	4	1
Total NOx Retrofits		0	0	0

Equipment Name	Equipment Type	HP	Engine Tier	2010	2011	2012
Sample1	Crawler Tractors	400	T0	Repow /T3+PM		
Sample2	Scrapers	280	T0	Retire		
Sample3	Rubber Tired Loaders	170	T2		PM Retro	
Sample 4	Excavators	250	T0		New /T3+PM	
Sample5	Scrapers	550	T0			
Sample6	Crawler Tractors	550	T0		Repow /T3+PM	
Sample7	Scrapers	400	T0		Repow /T3+PM	
Sample8	Scrapers	400	T0			Repow /T4I
Sample9	Scrapers	250	T0			Repow /T4I
Sample10	Other Construction	73	T0			
Sample11	Other Construction	73	T0			
Sample12	Tractors/Loaders/Backhoe	320	T0			New /T4I
Sample21	Other Construction	31	T			
Sample22	Rubber Tired Loaders	275	T2	PM Retro		
Sample23	Tractors/Loaders/Backhoe	350	T2	PM Retro		
Sample24	Cranes	180	T2			PM Retro

Year	2020	2021	Grand Total
Fleet Size (HP)	5617	5617	
NOx Fleet Average	2.4	2.0	
NOx Fleet Target	2.0	2.0	
PM Fleet Average	0.02	0.02	
PM Fleet Target	0.03	0.03	
Total Repowers	0	1	8
Total New Vehicles	0	0	0
Total PM Retrofits	0	0	8
Total NOx Retrofits	0	3	3

Equipment Name	Equipment Type	2020	2021	No. of vehicle modifications
Sample1	Crawler Tractors			1
Sample2	Scrapers			1
Sample3	Rubber Tired Loaders			1
Sample 4	Excavators			1
Sample5	Scrapers			1
Sample6	Crawler Tractors			1
Sample7	Scrapers			1
Sample8	Scrapers			1
Sample9	Scrapers			1
Sample10	Other Construction			1
Sample11	Other Construction			1
Sample12	Tractors/Loaders/Back			1
Sample13	Tractors/Loaders/Back			1
Sample14	Crawler Tractors			1
Sample15	Off-Highway Trucks			1
Sample16	Rollers			1
Sample17	Rollers			1
Sample18	Other Const			1
Sample19	Other Const			1
Sample20	Other Const			1
Sample21	Other Const		pow /T4	1
Sample22	Rubber Tire		x Retro	2
Sample23	Tractors/Loa		x Retro	2
Sample24	Cranes		x Retro	2

This sheet can be used to get an overall view of annual fleet actions and potential costs

Compliance Plan

- SOON funding applications require submission of a compliance plan
- Compliance plan helps CARB determine that fleet can comply with State Regulation when receiving SOON funding
- The AQMD Fleet Calculator can be used to generate a compliance plan for SOON funding applications
- Compliance plans show *potential* actions and may be updated as fleet changes

Incentive Funding Basics

Moyer	Small	Medium	Large
Min/Max Contract	3/5	3/3	**
Retrofit Required	Yes	Yes	Yes

SOON	Small	Medium	Large
Min/Max Contract	6/7	6/7	6/7
Retrofit Required	No	No	No

- AQMD is offering individual fleet assistance:
  - Explain incentive options
  - Compliance plan formulation and reporting

AQMD Contacts

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- AQMD – SOON program
  - www.aqmd.gov/tao/Implementation/SOONProgram.htm