 <p>eni S.p.A. Exploration & Production Division</p>	<p>Doc. SICS 199 Studio di Impatto Ambientale "Pozzo esplorativo Carpignano Sesia 1"</p>	<p>Allegato 5.1</p>
--	--	---------------------

ALLEGATO 5.1

METODOLOGIE DI CALCOLO DELLE EMISSIONI IN ATMOSFERA IN FASE DI CANTIERE



1. TRANSITO DI VEICOLI DA/PER L'AREA POZZO - VEICOLI LEGGERI

Da EMEP/Corinair – <i>GROUP 7 road transport - Diesel Light Duty Vehicles</i>																																																						
Descrizione	Procedura																																																					
Procedura per il calcolo emissioni da Diesel Light Duty Vehicles	<p>8.7 Diesel light duty vehicles</p> <p>Diesel light duty vehicles are treated as passenger cars. Hot emission factor speed dependencies have been developed in the framework of older COPERT exercises (Conventional vehicles) and in the MEET project (Euro I and later vehicles) and are quoted in Table 8-26 for pollutants of Group 1. Cold start over-emissions up to Euro 1 are calculated by equation (6), where e^{COLD}/e^{HOT} ratios are selected from Table 8-14. Emission factors of post-Euro 1 vehicle classes are calculated by the functions corresponding to Euro I vehicles by introducing the reduction factors given in Table 8-27 both for hot and cold start emissions (equations (25) and (24), respectively).</p>																																																					
Calcolo E_{HOT}	$E_{HOT; i, j, k} = N_j \times M_{j, k} \times e_{HOT; i, j, k} \quad (4)$ <p>where,</p> <p>$E_{HOT; i, j, k}$: emissions of the pollutant i in [g], produced in the reference year by vehicles of class j driven on roads of type k with thermally stabilised engine and exhaust aftertreatment system</p> <p>N_j: number of vehicles [veh.] of class j in circulation at the reference year</p> <p>$M_{j, k}$: mileage per vehicle [km/veh.] driven on roads of type k by vehicles of class j</p> <p>$e_{HOT; i, j, k}$: average fleet representative baseline emission factor in [g/km] for the pollutant i, relevant for the vehicle class j, operated on roads of type k, with thermally stabilised engine and exhaust aftertreatment system</p> <p>and,</p> <p>i (pollutants): 1-36 for the pollutants of Group 1 and Group 3 (Section 3.4)</p> <p>j (vehicle class): 1-230 for the vehicle classes defined in the vehicle split (Table 3-6)</p> <p>k (road class): 1-3 for "urban", "rural", and "highway" driving.</p>																																																					
Calcolo E_{HOT} Fattori di emissione ("a caldo") – Euro 1	<p>Table 8-26: Speed dependency of emission and consumption factors for diesel light duty vehicles <3.5 t</p> <table border="1"> <thead> <tr> <th>Pollutant</th><th>Vehicle Class</th><th>Speed Range [km/h]</th><th>Emission Factor [g/km]</th><th>R²</th></tr> </thead> <tbody> <tr> <td rowspan="2">CO</td><td>Conventional</td><td>10-110</td><td>$20E-05V^2 - 0.0256V + 1.8281$</td><td>0.136</td></tr> <tr> <td>Euro 1</td><td>10-110</td><td>$22.3E-05V^2 - 0.026V + 1.076$</td><td>0.301</td></tr> <tr> <td rowspan="2">NOx</td><td>Conventional</td><td>10-110</td><td>$81.6E-05V^2 - 0.1189V + 5.1234$</td><td>0.402</td></tr> <tr> <td>Euro 1</td><td>10-110</td><td>$24.1E-05V^2 - 0.03181V + 2.0247$</td><td>0.0723</td></tr> <tr> <td rowspan="2">VOC</td><td>Conventional</td><td>10-110</td><td>$1.75E-05V^2 - 0.00284V + 0.2162$</td><td>0.0373</td></tr> <tr> <td>Euro 1</td><td>10-110</td><td>$1.75E-05V^2 - 0.00284V + 0.2162$</td><td>0.0373</td></tr> <tr> <td rowspan="2">PM</td><td>Conventional</td><td>10-110</td><td>$1.25E-05V^2 - 0.000577V + 0.288$</td><td>0.0230</td></tr> <tr> <td>Euro 1</td><td>10-110</td><td>$4.5E-05V^2 - 0.004885V + 0.1932$</td><td>0.224</td></tr> <tr> <td rowspan="2">Fuel Consumption</td><td>Conventional</td><td>10-110</td><td>$0.02113V^2 - 2.65V + 148.91$</td><td>0.486</td></tr> <tr> <td>Euro 1</td><td>10-110</td><td>$0.0198V^2 - 2.506V + 137.42$</td><td>0.422</td></tr> </tbody> </table>				Pollutant	Vehicle Class	Speed Range [km/h]	Emission Factor [g/km]	R ²	CO	Conventional	10-110	$20E-05V^2 - 0.0256V + 1.8281$	0.136	Euro 1	10-110	$22.3E-05V^2 - 0.026V + 1.076$	0.301	NOx	Conventional	10-110	$81.6E-05V^2 - 0.1189V + 5.1234$	0.402	Euro 1	10-110	$24.1E-05V^2 - 0.03181V + 2.0247$	0.0723	VOC	Conventional	10-110	$1.75E-05V^2 - 0.00284V + 0.2162$	0.0373	Euro 1	10-110	$1.75E-05V^2 - 0.00284V + 0.2162$	0.0373	PM	Conventional	10-110	$1.25E-05V^2 - 0.000577V + 0.288$	0.0230	Euro 1	10-110	$4.5E-05V^2 - 0.004885V + 0.1932$	0.224	Fuel Consumption	Conventional	10-110	$0.02113V^2 - 2.65V + 148.91$	0.486	Euro 1	10-110	$0.0198V^2 - 2.506V + 137.42$	0.422
Pollutant	Vehicle Class	Speed Range [km/h]	Emission Factor [g/km]	R ²																																																		
CO	Conventional	10-110	$20E-05V^2 - 0.0256V + 1.8281$	0.136																																																		
	Euro 1	10-110	$22.3E-05V^2 - 0.026V + 1.076$	0.301																																																		
NOx	Conventional	10-110	$81.6E-05V^2 - 0.1189V + 5.1234$	0.402																																																		
	Euro 1	10-110	$24.1E-05V^2 - 0.03181V + 2.0247$	0.0723																																																		
VOC	Conventional	10-110	$1.75E-05V^2 - 0.00284V + 0.2162$	0.0373																																																		
	Euro 1	10-110	$1.75E-05V^2 - 0.00284V + 0.2162$	0.0373																																																		
PM	Conventional	10-110	$1.25E-05V^2 - 0.000577V + 0.288$	0.0230																																																		
	Euro 1	10-110	$4.5E-05V^2 - 0.004885V + 0.1932$	0.224																																																		
Fuel Consumption	Conventional	10-110	$0.02113V^2 - 2.65V + 148.91$	0.486																																																		
	Euro 1	10-110	$0.0198V^2 - 2.506V + 137.42$	0.422																																																		



**Calcolo E_{HOT} -
post Euro 1**

$$e_{HOT; i, j, k} = (100 - RF_{ij}) / 100 \times e_{HOT; i, Euro 1, k} \quad (25)$$

**Fattori di
riduzione
post Euro 1**

Table 8-27: Emission reduction percentage for future diesel light duty vehicles applied to vehicles complying with directive 93/59/EEC

Emission Standard	CO [%]	NO _x [%]	VOC [%]	PM [%]
Euro 2 - 96/69/EC	0	0	0	0
Euro 3 - 98/69/EC Stage 2000	18	16	38	33
Euro 4 - 98/69/EC Stage 2005	35	32	77	65
Euro 5 - EC 715/2007	35	51	77	98.25
Euro 6 - EC715/2007	35	78	77	98.25

**Calcolo E_{COLD}
- Euro 1**

$$E_{COLD; i, j} = \beta_{i, j} \times N_j \times M_j \times (100 - RF_{ij}) / 100 \times e_{HOT; i, Euro 1} \times (e^{COLD} / e^{HOT}_{i, Euro 1} - 1) \quad (24)$$

where,

$E_{COLD; i, j}$: cold start emissions of pollutant i (for the reference year), produced by vehicle class j ,

$\beta_{i, j}$: fraction of mileage driven with cold engines or catalyst operated below the light-off temperature for pollutant i and vehicle category j

N_j : number of vehicles [veh.] of class j in circulation,

M_j : total mileage per vehicle [km/veh.] in vehicle class j ,

$e^{COLD} / e^{HOT}_{i, j}$: cold over hot ratio for pollutant i , relevant to vehicles of class j .


**Calcolo E_{COLD}
- Euro 1
Sovraemissione per
avviamento a
freddo**

Table 8-14: Over-emission ratios e^{COLD} / e^{HOT} for diesel passenger cars (temperature range -10°C to 30°C)

Pollutant	e^{COLD} / e^{HOT}
CO	$1.9 - 0.03 \ t_a$
NO _x	$1.3 - 0.013 \ t_a$
VOC	$3.1 - 0.09 \ t_a^{(1)}$
PM	$3.1 - 0.1 \ t_a^{(2)}$
Fuel Consumption	$1.34 - 0.008 \ t_a$

⁽¹⁾ VOC: if $t_a > 29^\circ\text{C}$ then $e^{COLD} / e^{HOT} > 0.5$

⁽²⁾ PM: if $t_a > 26^\circ\text{C}$ then $e^{COLD} / e^{HOT} > 0.5$

	eni S.p.A. Exploration & Production Division	Doc. SICS 199 Studio di Impatto Ambientale "Pozzo esplorativo Carpignano Sesia 1"	Allegato 5.1 Pag. 3 di 12
--	---	--	------------------------------

2. TRANSITO DI VEICOLI DA/PER L'AREA POZZO - VEICOLI PESANTI


Descrizione	Procedura
Procedura per il calcolo emissioni da per diesel heavy duty vehicles	<p>8.9 Diesel heavy duty vehicles and busses</p> <p>Speed dependencies of emission factors for diesel heavy duty vehicles have been built on the results provided by the <i>Artemis</i> Project. Similarly, the methodology provides hot emission factors for urban busses and coaches. The emission factors are provided for conventional, Euro I to Euro V standards. Due to the large number of data required to calculate emissions from those categories, all relevant information can be found as an Annex to this guidebook chapter. The emissions covered by the methodology are CO, VOC, NO_x, PM and Fuel Consumption (FC).</p> <p>Equations (27) to (36) represent the main equations used to calculate the emission factors, while the Annex contains the necessary parameters in a specific structure. The name of the files in the Annex is "EFs_GXX%_LYYY%.xls", where XX is the road gradient and YYY is the load factor of the vehicle. The sheet names correspond to the emission factors described in the file, namely CO, THC (VOC), NO_x, and PM.</p> <p>For each sheet, column G describes the function while columns I to M contain the factors used in the equation. As an example, file "EFs_G00%_L050%.xls" contains the emission factors for a road gradient 0% and a load factor of 50%. Sheet "FC" describes the fuel consumption emission functions. The equation for Euro I, <15t midi Urban Buses is:</p> $EF = 1 / (((c \times (V^2)) + (b \times V)) + a)$ <p>where <i>EF</i> is the emission factor, <i>V</i> is the vehicle speed and the different parameters are found in the columns I to M in the <i>Annex</i> file, namely: a= 0.00094 – b= 0.00017 – c= -0.000001.</p> <p>Equations (27) to (36), describe all the different equations that are potentially used in the <i>Annex</i> to calculate heavy duty vehicle and bus emission factors.</p> $EF = (a + (b \times V)) + (((c - b) \times (1 - \exp((-1) \times d) \times V))) / d \quad (27)$ $EF = (e + (a \times \exp((-1) \times b) \times V)) + (c \times \exp((-1) \times d) \times V) \quad (28)$ $EF = 1 / (((c \times (V^2)) + (b \times V)) + a) \quad (29)$ $EF = 1 / (a + (b \times (V^c))) \quad (30)$ $EF = 1 / (a + (b \times V)) \quad (31)$ $EF = a - (b \times \exp((-1) \times c) \times (V^d)) \quad (32)$ $EF = a + (b / (1 + \exp(((1) \times c) + (d \times \ln(x)) + (e \times V)))) \quad (33)$ $EF = c + (a \times \exp((-1) \times b) \times V) \quad (34)$ $EF = c + (a \times \exp(b \times V)) \quad (35)$ $EF = \exp(a + (b / V)) + (c \times \ln(V)) \quad (36)$
Calcolo fattori di emissione da diesel heavy duty vehicles	<p style="text-align: center;">Cfr Tab. seguente</p>



Da EMEP/Corinair – Group 7 road transport – Diesel/ heavy duty vehicles Road Transport Annex: HDV accompanying files Formule e Parametri										
ID Subsegment	Subsegment	Gradient (%)	Load (%)	Pollutant	Formula (y: g/km; x: km/h)	a	b	c	d	e
1423710	RT >28-32t Euro-1	0	0	CO	$y=((e+(a \cdot \exp((((c-1)^b \cdot x))))+(c \cdot \exp((((c-1)^d \cdot x))))))$	6.25104	0.053778	6.411478	0.245642	1.208688
1423710	RT >28-32t Euro-1	0	0	THC	$y=(a+(b/(1+\exp((((c-1)^c)+(d \cdot \ln(x))))+(e \cdot x))))$	0.390063	6.184444	1.576362	0.913504	0.020659
1423710	RT >28-32t Euro-1	0	0	NOx	$y=((e+(a \cdot \exp((((c-1)^b \cdot x))))+(c \cdot \exp((((c-1)^d \cdot x))))))$	16.46951	0.065776	89.12681	0.549641	7.047358
1423710	RT >28-32t Euro-1	0	0	PM	$y=((e+(a \cdot \exp((((c-1)^b \cdot x))))+(c \cdot \exp((((c-1)^d \cdot x))))))$	1.248691	0.051176	2.001457	0.185037	0.235349
1423710	RT >28-32t Euro-1	0	0	FC	$y=1/((((c \cdot (x^2)))+(b \cdot x))+a))$	0.00095	0.000109	-7.6E-07	#N/A	#N/A
1423710	RT >28-32t Euro-1	0	1	CO	$y=((e+(a \cdot \exp((((c-1)^b \cdot x))))+(c \cdot \exp((((c-1)^d \cdot x))))))$	6.850895	0.047597	20.21805	0.394769	1.845905
1423710	RT >28-32t Euro-1	0	1	THC	$y=((e+(a \cdot \exp((((c-1)^b \cdot x))))+(c \cdot \exp((((c-1)^d \cdot x))))))$	2.221232	0.047428	2.811216	0.170428	0.469402
1423710	RT >28-32t Euro-1	0	1	NOx	$y=(((((c \cdot (x^3)))+(b \cdot (x^2))))+(c \cdot x))+d)$	-4.7E-05	0.008683	-0.60659	26.09428	#N/A
1423710	RT >28-32t Euro-1	0	1	PM	$y=((e+(a \cdot \exp((((c-1)^b \cdot x))))+(c \cdot \exp((((c-1)^d \cdot x))))))$	1.369503	0.049874	2.880008	0.288299	0.349348
1423710	RT >28-32t Euro-1	0	1	FC	$y=((e+(a \cdot \exp((((c-1)^b \cdot x))))+(c \cdot \exp((((c-1)^d \cdot x))))))$	538.1442	0.035916	1841399	1.635556	252.8507

Legenda

RT : tipologia veicoli = non articolato
>28-38 t : capacità veicoli = tra 28 e 32 t
Gradient : pendenza strada (%)
Load: carico (0 = carico a vuoto; 1 = pieno carico)
x = Velocità veicoli (km/h)
y = Fattore di emissione (g/km)
Pollutant: inquinanti considerati (CO, THC, NOx, PM) e consumo gasolio (FC)

 eni S.p.A. Exploration & Production Division	Doc. SICS 199 Studio di Impatto Ambientale "Pozzo esplorativo Carpignano Sesia 1"	Allegato 5.1 Pag. 5 di 12
--	--	------------------------------

3. FUNZIONAMENTO MEZZI IN CANTIERE

Da EMEP/Corinair – <i>GROUP 8 road transport - Diesel Light Duty Vehicles</i>	
Descrizione	Procedura
Procedura per il calcolo emissioni da Other mobile sources & machinery	<p>5 DETAILED METHODOLOGY</p> <p>The simple methodology outlined under section 4 makes use of fuel statistics, to be multiplied with bulk emission factors accordingly expressed. In fact, at first glance it seems to be an easy way to estimate (by order of magnitude) the emissions of off-road machinery and equipment taking estimated average emission factors (see, for example, OECD 1991) and to multiply them by the statistical fuel consumption. Unfortunately, this is quite often not feasible, because the statistical fuel consumption data are not available in the required detail. For most countries, only for the sector 'Railways' and the sub-part 'Goods Carrying Vessels', which is part of the sector 'Inland Waterways', fuel consumption data seem to be specific enough to be used for an order of magnitude estimate.</p> <p>Therefore, in the following, a more detailed methodology is described, which is mainly based on the US-EPA method for estimating off-road emissions (US-EPA 1991). The following basic formula is used to calculate emissions:</p> $E = N \times HRS \times HP \times LF \times EF_i \quad (5)$ <p>where:</p> <ul style="list-style-type: none"> E = mass of emissions of pollutant i during inventory period N = source population (units) HRS = annual hours of use HP = average rated horsepower LF = typical load factor EF_i = average emissions of pollutant i per unit of use (e.g. [g/kWh])



eni S.p.A.

Exploration & Production
DivisionDoc. SICS 199
Studio di Impatto Ambientale
"Pozzo esplorativo Carpignano Sesia 1Allegato 5.1
Pag. 6 di 12Scelta del
livello di
controllo
delle
emissioni da
considerare
nei calcoliAnalisi delle
direttive
comunitarie
applicabili

Table 8-2b: EU Emission directives pertinent to various source categories of mobile sources and machinery.

Source Category	EU Regulation(s)	Implementation date
Road transport	91/441/EEC, 94/12/EEC & 98/69/EC for Euro I to IV for vehicles < 3.5 tonnes 91/542/EEC & 99/69/EC for Euro I to IV for vehicles > 3.5 tonnes	
Industry	Non-road mobile machinery regs apply Directive 97/68/EC (Stages I and II) Directive 2004/26/EC (Stage IIIa)	1/7/98 (I); 1/1/00 - 1/1/03 (II) 1/7/05 - 1/1/07 (IIIa)
Agriculture	Dominated by agricultural tractor regs Directive 2000/25/EC (Stages I and II) Directive 2005/13/EC (Stage IIIa)	1/1/01 (I); 1/1/01 - 1/1/03 (II) 1/1/06 - 1/1/07 (IIIa)
Inland navigation	Non-road mobile machinery regs apply from stage IIIa (2004/26/EC)	1/7/05 - 1/1/07
Railways	Non-road mobile machinery regs apply from stage IIIa (2004/26/EC)	1/7/05 for Railcars 1/1/06 - 1/1/08 for locomotives

The consequence of the above is that the emission factors best suited to other mobile sources and machinery, when using the advanced approach, depend on the source category and its year of manufacture. The data are in the tables as summarised below.

Industry	Pre July 1998, i.e. pre Stage I	Table 8.3
	July 1998 – around Jan 2001, i.e. Stage I	Table 8.4
	Around Jan 2001 – around Jan 2006, Stage II	Table 8.5
	After around Jan 2006, Stage IIIa	Table 8.5b
Agriculture	Pre Jan 2001, i.e. pre Stage I	Table 8.3
	Jan 2001 – around Jan 2002, i.e. Stage I	Table 8.5c
	Around Jan 2002 – around Jan 2006, Stage II	Table 8.5c
	After around Jan 2006, Stage IIIa	Table 8.5d
Inland Navigation	Before around July 2005, i.e. pre Stage I	Table 8.3
	After around Jan 2006, Stage IIIa	Table 8.5e
Railways	Before around Jan 2006, i.e. pre Stage I	Table 8.3



eni S.p.A.

Exploration & Production
Division

Doc. SICS 199
Studio di Impatto Ambientale
"Pozzo esplorativo Carpignano Sesia 1

Allegato 5.1
Pag. 7 di 12

Calcolo
emissioni

Fattori di
emissione
per macchine
che
rispondano
alla Direttiva
europea
97/68/EC
(Stage II)

Table 8-5: Baseline emission factors for NRMM stage II (for $20 \leq P < 560$ kW)
controlled diesel engines in [g/kWh], irrespective of engine type

POLLUTANT [g/kWh]	Power Range in kW							
	0-20 0-18	20-37 18-37	37-75	75-130	130-300	300-560	560-1000	>1000
Implementation date (see footnote)	N/A	1/1/ 2000	1/1/ 2003	1/1/ 2002	1/1/ 2001	1/1/ 2001	N/A	N/A
NO _x	14.4	8.50	8.00	7.00	7.00	7.00	14.4	14.4
N ₂ O	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
CH ₄	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
CO	8.38	5.50	5.00	5.00	3.50	3.50	3.00	3.00
NM/VOC	3.82	1.50	1.30	1.00	1.00	1.00	1.30	1.30
PM	2.22	0.80	0.40	0.30	0.20	0.20	1.10	1.10
PM _{2.5}	2.09	0.75	0.38	0.28	0.19	0.19	1.03	1.03
NH ₃	0.002	0.002	0.002	0.002	0.002	0.002	0.002	0.002
FC	271	269	265	260	254	254	254	254

4. EMISSIONI POLVERI

4.1 SINTESI RISULTATI

Cod. Attività	Descrizione Attività	Riferimento	Parametri	Fattore di emissione				A Fattore d'attività	Emissioni Complessiva (kg)		
				PTS	PM10	PM2.5	u.m.		PTS	PM10	PM2.5
A01	Scotico	AP-42 11.9-4 Topsoil removal	-	2.90E-02	1.74E-02	1.74E-02	kg/Mg rimosso	12800	371.20	222.72	222.72
A02	Movimentazione scotico	AP-42 13.2.4 (Material handling)	M=18% u=2,2 m/s	5.46E-05	2.58E-05	3.91E-06	Kg/Mg movimentati	12800	0.70	0.33	0.05
A03	Trasporto scotico all'interno del cantiere *	AP-42 13.2.2-4 (Unpaved Road)	s=5% w=20 t	1.76E+00	4.52E-01	4.52E-02	kg/VKT	213	161.12	41.40	4.14
A04	Accumulo scotico	AP-42 13.2.4 (Material handling)	M=18% u=2,2 m/s	5.46E-05	2.58E-05	3.91E-06	Kg/Mg movimentati	12800	0.70	0.33	0.05
A05	Trasporto materiale da cava *	AP-42 13.2.2-4 (Unpaved Road)	s=5% w=20 t	1.76E+00	4.52E-01	4.52E-02	kg/VKT	454	342.80	88.08	8.81
A06	Movimentazione materiale da cava	AP-42 13.2.4 (Material handling)	M=0,5% u=2,2 m/s	8.25E-03	3.90E-03	5.91E-04	Kg/Mg movimentati	30600	252.32	119.34	18.07
A07	Livellamento e compattazione	13.2.3-1 (Bulldozing equation 11.9-2)	s=2%; M=2%	2.39E+00	3.62E-01	2.51E-01	kg/h di attività	100	239.32	36.17	25.13
A08	Scavo Cantina e Vasconi	AP-42 13.2.4 (Material handling)	M=18% u=2,2 m/s	5.46E-05	2.58E-05	3.91E-06	Kg/Mg movimentati	630	0.03	0.02	0.00
A09	Realizzazione argini in terra	AP-42 13.2.4 (Material handling)	M=18% u=2,2 m/s	5.46E-05	2.58E-05	3.91E-06	Kg/Mg movimentati	725	0.04	0.02	0.00
A10	Transito betoniere per calcestruzzo *	AP-42 13.2.2-4 (Unpaved Road)	s=2% w=15 t	8.13E-01	1.74E-01	1.74E-02	kg/VKT	120	41.95	8.98	0.90
A11a	Erosione del vento 1	USEPA, 1989	s = 5% f = 4% A=2ha	1.69E+00	8.44E-01	1.33E-01	kg/ha/day	30	101.33	50.67	8.00
A11b	Erosione del vento 2	USEPA, 1989	s = 2% f = 4% A=2ha	6.76E-01	3.38E-01	5.33E-02	kg/ha/day	30	40.53	20.27	3.20
A11c	A10c Erosione del vento 3	USEPA, 1989	s = 2% f = 4% A=1ha	6.76E-01	3.38E-01	5.33E-02	kg/ha/day	30	20.27	10.13	1.60
A12	Emissione dai veicoli a motore	EMEP/CorinAir, 2007 - Other mobile sources & machinery (Cfr. Stima impatti)							52.9	52.9	49.9
* emissioni mitigate tramite moderazione della velocità di transito											
									PTS	PM10	PM2.5
	Area Complessiva (m2):	20227			Emissione Complessiva (kg)				1625	651	343
	Durata complessiva attività (giorni):	90			Emissione Specifica (kg/m²/mese)				0.022	0.009	0.005



4.2 ATTIVITÀ DI COMPATTAZIONE

Heavy Construction Operation - Site P preparation (earth moving) - compacting/bulldozing												
Emission Factor Equation				Riferimento				Parametri				
$E_{TSP} = k * 0.45 * 5.7 * s^{1.2} / M^{1.3}$				AP-42 11.9-2 (November 2006)				PM2.5				
$E_{PM15} = k * 0.45 * s^{1.5} / M^{1.4}$				AP-42 11.9-2 (November 2006)				PM10				
E = fattore di emissione in kg/h di attività di bulldozing												
k = fattore di moltiplicazione in funzione del diametro particelle considerato												
s = contenuto di limo (<0.075mm)												
M = umidità terreno (%)												
Attività				k				Fattore di emissione (kg/h)				
TSP				PM15	PM10	PM2.5	M (%)	TSP	PM15	PM10	PM2.5	
A07 Livellamento e compattazione				1	1	0.75	2.00	2.39	0.48	0.36	0.25	
Attività				Emissione - Uncontrolled				Emissione - Controlled (kg)				
h complessive di attività di bulldozing				TSP	PM15	PM10	PM2.5	TSP	PM15	PM10	PM2.5	
A07 Livellamento e compattazione				100.0	239	48	36	25	0	239	48	36
totale				100.0	239.3	48.2	36.2	25.1	239.3	48.2	36.2	

4.3 TRANSITO DI MEZZI SU FONDO STERRATO

[illegible]



4.4 MOVIMENTAZIONI DI TERRA, OPERAZIONI DI CARICO/SCARICO

Material Handling																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
-------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

4.5 SOLLEVAMENTO EOLICO

[illegible]