

## LIVELLI DI ATTIVITA'

I livelli di attività, riportati nelle tabelle seguenti, sono i dati utilizzati nel formato del modello RAINS-Italy, per calcolare le emissioni di composti organici volatili (COV) e ammoniaca (NH<sub>3</sub>), per la preparazione del Programma Nazionale di Riduzione della NEC.

Nel corso dei colloqui bilaterali tra Italia e IIASA (Dicembre 2003, aprile 2004), nell'ambito del Programma CAFE, sono stati forniti a IIASA, ulteriori dati tecnici concernenti la penetrazione delle tecnologie di abbattimento, la composizione chimico fisica dei combustibili, livelli di produzione industriale etc., che sono tuttora ritenuti validi e che verranno aggiornati per la prossima revisione delle Direttiva NEC, prevista nel corso del 2005.

**Tabella 1** – Livelli di attività, per settore, relativi al periodo 2000- 2020, per i COV

Activity sectors	Activ. indicator unit	2000	2005	2010	2015	2020
Stubble burning and other agricultural waste	Kt VOC	12,494	12,494	12,494	12,494	12,494
Architectural use of paints	Kt paint	125,928	129,706	133,484	136,153	138,876
Manufacture of automobiles- old	Kvehicles	57,387	28,694	0,000	0,000	0,000
Manufacture of automobiles- new	Kvehicles	2811,967	2840,656	2869,354	2869,354	2869,354
Degreasing- old	Kt solvent	25,895	12,948	0,000	0,000	0,000
Degreasing- new	Kt solvent	0,000	9,780	19,560	19,560	19,560
Domestic use of solvents (other than paint)	Mln inhabitants	57,844	55,912	53,981	54,520	55,066
Domestic use of paints	Kt paint	420,000	428,400	436,800	445,536	454,447
Dry cleaning- old	Kt solvent	0,000	0,000	0,000	0,000	0,000
Dry cleaning- new	Ktsolvent	103,000	103,000	103,000	103,000	103,000
Extraction, processing and distribution of gaseous fuels- old	Kt VOC	31,534	27,986	24,439	24,928	25,426
Extraction, processing and distribution of gaseous fuels- new	Kt VOC	0,000	7,491	14,981	15,281	15,586
Extraction, processing and distribution of liquid fuels- old	Kt VOC	13,061	6,531	0,000	0,000	0,000
Extraction, processing and distribution of liquid fuels- new	Kt VOC	0,000	6,922	13,845	14,122	14,404
Food and drink industry	Mln inhabitants	57,844	57,844	57,844	57,844	57,844
Application of glues and adhesives in industry	Kt VOC	20,000	20,600	21,200	21,624	22,056
Other industrial use of solvents	Kt VOC	31,789	32,743	33,696	34,370	35,058
Other industrial sources	Kt VOC	15,660	15,660	15,660	15,660	15,660
Other industrial use of paints	Kt paint	289,500	298,185	306,870	313,007	319,268
Inorganic chemical industry	Kt VOC	9,408	9,408	9,408	9,408	9,408
Organic chemical industry , processes	Kt VOC	9,090	9,249	9,408	9,596	9,788
Organic chemical industry , storage	Kt VOC	2,801	2,850	2,899	2,957	3,016
Pharmaceutical industry	Kt solvent	112,689	114,661	116,633	118,966	121,345
Products incorporating solvents	Kt product	1224,735	1246,168	1267,601	1292,953	1318,812
Products not incorporating solvents	Kt VOC	11,256	11,4530	11,650	11,883	12,121
offset Printing - old	Kt ink	0,000	0,000	0,000	0,000	0,000
offset Printing - new	Kt ink	28,177	29,022	29,868	30,465	31,074
Flexography/rotogravure in packaging- old	Kt ink	0,000	0,000	0,000	0,000	0,000
Flexography/rotogravure in packaging - new	Kt ink	33,623	34,632	35,640	36,353	37,080
Rotogravure in publication- old	Kt ink	0,000	0,000	0,000	0,000	0,000
Rotogravure in publication- new	Kt ink	25,257	26,015	26,772	27,308	27,854
Screen printing- old	Kt ink	0,000	0,000	0,000	0,000	0,000
Screen printing- new	Kt ink	44,698	46,039	47,380	48,327	49,294
Air transport (LTO)	Kt VOC	0,801	0,801	0,801	0,801	0,801
Vehicle refinishing- old	Kt solvent	8,497	3,714	0,000	0,000	0,000
Vehicle refinishing-new	Kt solvent	15,779	21,048	25,247	25,752	26,267
vehicles dewaxing	Mln inhabitants	57,844	57,844	57,844	57,844	57,844
Waste treatment and disposal	Kt VOC	14,497	14,497	14,497	14,497	14,497
Preservation of wood- old	Kt VOC	0,000	0,000	0,000	0,000	0,000
Preservation of wood- new	kt VOC	0,000	0,000	0,000	0,000	0,000
<b>Liquid fuel consumption related sectors</b>						
Refineries - process	Mt crude oil	97,60	95,50	90,30	90,30	
Gasoline distribution - transport and depots- light fuels	PJ light fuel	796,50	789,50	570,30	568,90	
Gasoline distribution /transport/depots- medium distillates	PJ medium distallates	1068,90	1148,30	1316,00	1332,20	

Gasoline distribution - service stations	PJ light fuel	796,50	789,50	570,30	568,90	
Evaporative emissions from cars	PJ light fuel	796,50	789,50	570,30	568,90	
Transport road - two-stroke engines	PJ light fuel	35,70	31,80	29,00	22,90	
Transport other - two-stroke engines	PJ light fuel	17,50	17,70	17,70	17,20	
Transport other, medium size ships	PJ medium distillates	9,10	10,80	10,80	14,90	
Transport other, large size ships- medium distillates	PJ medium distillates	0,00	0,00	0,00	0,00	
Transport other, large size ships- heavy fuels	PJ heavy fuels	82,80	82,80	83,30	82,80	
<b>Industrial and residential combustion</b>						
Power plants, existing wet bottom	PJ fuels total	0,00	0,00	0,00	0,00	
Power plants, existing other	PJ fuels total	1719,40	1340,60	1099,90	599,70	
New power plants	PJ fuels total	404,30	1099,9	1367,90	1972,80	
Conversion	PJ fuels total	406,20	414,80	388,70	395,90	
Industrial boilers	PJ fuels total	361,70	352,10	379,40	401,10	
Other industrial combustion	PJ fuels total	258,64	341,30	361,96	424,73	
Combustion in residential and commercial sector	PJ fuels total	1330,90	1345,20	1380,20	1355,60	
<b>Other transport sectors</b>						
4-stroke gasoline engines	PJ light fuel	741,40	790,60	756,60	768,90	
Diesel powered passengers cars and Light Duty Trucks	PJ medium distillates	355,20	411,30	436,40	489,50	
Diesel powered Trucks/Busses and other off-road machinery	PJ medium disti	523,70	568,60	604,20	628,50	

**Tabella 2** – Livelli di attività, per settore, relativi al periodo 2000-2020, per l’NH3

Activity sectors	Activity unit	2000	2005	2010	2015	2020
Dairy cows	Thousand animals	2065	2065	2065	2065	2065
Other cattle	Thousand animals	5180	5180	5180	5180	5180
Pigs	Thousand animals	6828	6999	7169	7313	7459
Laying hens	Thousand animals	44781	45005	45229	46134	47056
Other poultry	Thousand animals	126562	127195	127828	130384	132992
Sheep	Thousand animals	12464	12277	12090	12090	12090
Horses	Thousand animals	313	313	313	313	313
Fur animals	Thousand animals	230	230	230	230	230
Urea use	Kt N	352	352	352	352	352
Other nitrogen fertilizer use	Kt N	438	438	438	438	438
Fertilizer production	Kt N	427	427	427	427	427

## SCENARIO ENERGETICO

Lo scenario energetico e' stato sviluppato da APAT e da ENEA mediante il Modello MARKAL-Italy e quindi convertito nel formato utilizzato in RAINS-Italy, che è del tutto simile a quello utilizzato in RAINS-Europa.

I dati si riferiscono alla versione dello scenario energetico sviluppata nell'aprile 2004, per le finalità degli scenari emissivi nel Programma CAFE della Commissione Europea.

Si riporta di seguito una tabella riassuntiva, tratta dalla documentazione ufficiale IIASA, dei settori di attività e dei combustibili considerati nello scenario. La categorizzazione di seguito riportata si riferisce a quella utilizzata per calcolare le emissioni di SOx e NOx.

### Categorie di sorgenti stazionarie (Stationary Sources) in RAINS

Primary	RAINS sector Secondary	CORINAIR SNAP97 code
<b>Power plants and district heating plants (PP)</b>	<ul style="list-style-type: none"> <li>- New boilers (PP_NEW)</li> <li>- Existing boilers, dry bottom (PP_EX_OTH)</li> <li>- Existing boilers, wet bottom (PP_EX_WB)</li> </ul>	0101, 0102
<b>Fuel production and conversion (other than power plants) (CON)</b>	<ul style="list-style-type: none"> <li>- Combustion (CON_COMB)</li> <li>- Losses (CON_LOSS)</li> </ul>	0103, 0104, 0105, 05
<b>Domestic (DOM)</b>	- Residential, commercial, institutional, agriculture	02
<b>Industry (IN)</b>	<ul style="list-style-type: none"> <li>- Combustion in boilers, gas turbines and stationary engines (IN_BO)</li> <li>- Other combustion (IN_OC)</li> <li>- Process emissions (IN_PR)<sup>2</sup></li> </ul>	0301  03 exc. 0301 <sup>1</sup> 04
<b>Non-energy use of fuels (NONEN)</b>	- Use of fuels for non-energy purposes (feedstocks, lubricants, asphalt)	
<b>Other emissions (OTHER)</b>	- Other sources: (air traffic LTO cycles, waste treatment and disposal, agriculture)	080501, 080502, 09, 10

### Categorie di sorgenti mobili (Mobile Sources) in RAINS

RAINS sector	RAINS code	NFR category	SNAP sector
<b>Road transport</b>			
Heavy duty vehicles (trucks, buses and others)	TRA_RD_HD		0703
Motorcycles, four-stroke	TRA_RD_M4		0704
Motorcycles and mopeds (also cars), two-stroke	TRA_RD_LD2	1A3b	0704
Light duty cars and vans, four-stroke	TRA_RD_LD4		0701-02
Light duty cars, four-stroke, gasoline direct injection	TRA_RDXLD4		0701-02
<b>Off-road transport</b>			
Two-stroke engines	TRA_OT_LD2	1A4b	
Construction machinery	TRA_OT_CNS	1A2	
Agricultural machinery	TRA_OT_AGR	1A4c	0801-02,
Rail	TRA_OT_RAI	1A3c	0806-10
Inland waterways	TRA_OT_INW	1A3d	
Air traffic (LTO)	TRA_OT_AIR	1A3a	
Other; four-stroke (military, households, etc.)	TRA_OT_LB	1A4c	
<b>Maritime activities, ships</b>			
Medium vessels	TRA_OTS_M		0803,
Large vessels	TRA_OTS_L	1A3d	080402-03

### Categorie di combustibili in RAINS (Fuel categories)

Fuel type	Abbreviation
Brown coal/lignite, grade 1	BC1
Brown coal/lignite, grade 2	BC2
Hard coal, grade 1	HC1
Hard coal, grade 2	HC2
Hard coal, grade 3	HC3
Derived coal (coke, briquettes)	DC
Other solid-low S (biomass, waste, wood)	OS1
Other solid-high S (incl. high S waste)	OS2
Heavy fuel oil	HF
Medium distillates (diesel, light fuel oil)	MD
Light fractions (gasoline, kerosene, naphtha, LPG)	LF
Natural gas (incl. other gases)	GAS
Renewable (solar, wind, small hydro)	REN
Hydro	HYD
Nuclear	NUC
Electricity	ELE
Heat (steam, hot water)	HT
No Fuel use	NOF

Scenario Energetico nel formato RAINS-Italy per l'anno 2010 – Sono omessi alcuni settori per i quali non esistono dati specifici (ad es. TRA-OT-RAI).

		PP_EX	PP_	CON_	CON_	IN_BO	IN_OC	DOM	NONEN	TRA-RD	TRA-RD	TRA_	TRA_	TRA_OT	TRA_OT	TRA_	TRA_	Totale	
		_OTHER	NEW	COMB	LOSS		TOT			_LD2	_LD4	_RD	_OT	_AGR	_LB	_AIR	OTS_M	OTS_L	
FUELS	Fuel abb.			ov.,blast	f.	industry	industry	residen.	non	cars+ light	heavy	off-	agri-	land	medium	large			
								comm.	energy	2-stroke	4stroke	road	colture	based	LTO, all	vessels	vessels		
Brown coal/lignite, grade 1	BC1																		0,00
Hard coal, grade1, S=1%	HC1		236,19	14,23			70,76												321,17
Hard coal, grade 2, S=0.6%	HC2	130,32						0,88											131,20
Hard coal, grade 3	HC3																		0,00
Derived coal (coke, briquettes)	DC						128,17	7,91	0,42										136,50
Other solid-low S (biomass, wood, biodiesel)	OS1		20,92					210,04				8,37							239,32
Other solid-high S (high S biomass, industrial and municipal waste)	OS2	47,95	31,97				12,55												92,47
Heavy fuel oil	HF1	278,76	196,12	121,05		18,80	96,75											41,63	753,12
petrol. coke	HF2						34,33												34,33
Medium distillates (diesel, light fuel oil)	MD	3,20	3,32				1,67	141,42			390,37	507,23		122,21	29,68		14,13	41,63	1254,86
Gasoline, kerosene, naphtha	GSL								377,40	31,73	609,50		19,02		2,64	23,13			1063,41
Liquified petroleum gas + refinery gas	LPG	4,81	4,98	71,10			23,01	121,34			67,15								292,38
Methanol	MTH										0,00								0,00
Ethanol	ETH										0,00								0,00
Hydrogen	H2											0,00							0,00
Natural gas (incl. coal gases)	GAS	496,22	1005,83	71,55		150,39	376,46	941,82	19,58		39,87	2,94							3104,66
Renewable (solar, wind, small hydro)	REN	248,53																	248,53
Hydro	HYD	173,00																	173,00
Nuclear	NUC																		0,00
Electricity	ELE	-628,02	-514,63	15,45	110,71		655,15	580,00			2,51				27,20				248,36
Heat (steam, hot water)	HT	-161,50					109,62	51,88											0,00
	TOT	593,28	984,71	293,37	110,71	169,18	1508,49	2055,28	397,40	31,73	1109,39	518,53	19,02	122,21	59,51	23,13	14,13	83,26	8093,32