

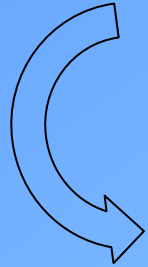


Mitigation Air Pollution in the Mediterranean Port Cities The results of CAIMANs Project

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Venice, 12th June 2015





PM10
contribution of portual emissions
is 2 - 7 % on insular Venice
in autumn
and 15 - 25 % on Marghera area
port in summer

0. Liquid Natural Gas

For cruise ships over 40.000 t:

- 1.Scenario 1 – Contorta Channel (Malamocco direction)
- 2.Scenario 2 – On Power Supply
- 3.Scenario 3 – New terminal at Punta Sabbioni (including OPS)

The Results of CAIMANs



punto di massima ricaduta		AQL	Base 2013	Base 2020	OPS	Contorta	Punta Sabbioni
Inquinante	Parametro						
NO ₂ (µg/m ³)	media annua	40	3.6	3.2	1.8	3.1	1.6
NO ₂ (µg/m ³)	19° massimo	200	174.0	154.6	101.3	151.7	103.2
SO ₂ (µg/m ³)	media annua	20	0.5	0.5	0.5	0.6	0.5
SO ₂ (µg/m ³)	25° massimo	350	31.4	28.7	28.4	31.1	28.6
SO ₂ (µg/m ³)	4° massimo giorn.	125	5.2	5.8	5.8	5.2	5.5
PM10 (µg/m ³)	media annua	40	0.3	0.3	0.2	0.3	0.3
PM10 (µg/m ³)	36° massimo giorn.	50	1.0	1.0	0.8	0.9	1.0
PM2.5 (µg/m ³)	media annua	25	0.3	0.3	0.2	0.3	0.3
Pb (ng/m ³)	media annua	500	0.02	0.02	0.01	0.02	0.01
As (ng/m ³)	media annua	6	0.01	0.02	0.02	0.02	0.02
Ni (ng/m ³)	media annua	20	0.5	0.7	0.7	0.9	0.7
Cd (ng/m ³)	media annua	5	0.002	0.001	0.001	0.001	0.001
B(a)P (ng/m ³)	media annua	1	0.001	0.001	0.001	0.001	0.001

Population exposure within the port area



arpav

CROCIERE > 40 KT					ALL PASSENGERS				
Scenario	Max ricaduta	Popolaz_exp			Scenario	Max ricaduta	Popolaz_exp		
		5% AQL	10% AQL	50% AQL			5% AQL	10% AQL	50% AQL
Base 2013	124.3	233,302	142,068	-	Base 2013	171.9	250,503	214,741	2,422
Base 2020	117.9	227,666	137,779	-	Base 2020	152.8	250,663	199,632	176
OPS	55.0	143,222	47,689	-	OPS	99.3	235,829	133,477	-
Contorta	114.8	224,536	112,964	-	Contorta	149.8	251,464	206,269	176
Terminal crociere a Punta Sabbioni	88.5	19,014	1,835	-	Terminal crociere a Punta Sabbioni	100.3	172,547	79,534	-
LNG	12.5	-	-	-	LNG	16.2	2,493	-	-

The main results of APICE + CAIMANs



1. Main Pollutant NO_2 (the second SO_2)
2. European choices are efficacious (fuels, scrubbers, new technologies and ...)
3. General solutions with local solutions (rout choice, dock location and ...)
4. LNG is the best Scenario



Thank You



Programme cofinancé par le Fonds Européen de Développement Régional
 Programme cofinanced by the European Regional Development Fund



MED MARITIME
 INTEGRATED PROJECTS
 CAIMANS



*... and for the future ?
I hope to work together again !*





Thank you for your presence

