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Local Action Plan for Marseille



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Port of Marseille Fos – Eastern Harbour Area

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INTRODUCTION

To respect the European Directive, the French “Grenelle de l’environnement” has set an ambitious target for France to reduce by 30% $PM_{2.5}$ for 2015. To achieve this target, France has set up in July 2010 the Particles Plan which has to set up measures in domestic, industrial, tertiary, transport and agricultural sectors. This plan has a regional adaptation with the development of Atmosphere Protection Plans (PPA) submitted to the prefectural decision. PPA concretely defines different actions in order to ensure compliance with limit values for cities with more than 250 000 inhabitants and where excesses of these values are monitored or feared. The aim of regional plans is to design the most adapted measures in each area with significant differences in term of geographic, climate, emission, population. To take them in consideration, the spatial frame of these plans varies for each area. For Marseille, PPA is designed at the departmental scale (Figure 1). These plans are governed by L222-4 to L222-7 and R222-13 to R222-36 articles and will include some regulatory (norm, control ...) and incentive (financial contribution, development of low emission area ...) actions. At the end of 2012, a new plan for the Marseille department will be enacted by prefectural order.

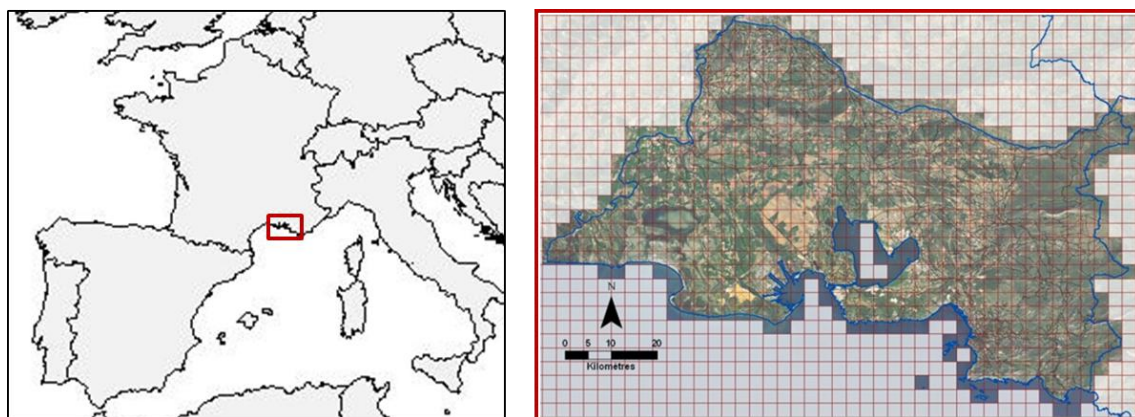


Figure 1: Location of the PPA area

During the development and monitoring phase of the plan, a strong leadership of State is required by the way of the public and regal power to involve each stakeholder. Also, it is very important to obtain the strong politic involvement from State, regional and local authorities, elected representatives ... As an identification of leaders and stakeholders will be done, this involvement is very important. A competence sharing has to be making with technical stakeholders: air, transport, urban management ... To set up and to monitor the actions, it is very important to improve the communication between State and local authorities. Also, a real control after the setting up of actions is a main issue. This control will have to be done independently. At the interested area scale, a sustainable working between stakeholders linked with structural actions has to be planed.

The aim of this plan is to reduce pollutant concentrations to reach levels below than limit values with a priority for particulate matter and nitrogen oxides. In terms of emissions, it aims to reach the ambitious targets defined in the French “Grenelle de l’environnement”. At last, it aims to decrease the population exposition and to define specific actions for residual hot spot in terms of pollution.

Each action which composes this PPA are issue from a cooperation done in a technical working group brought together stakeholders from State, local authorities, economical stakeholders and qualified people get together six times between March 2011 and January 2012. Actions have been validated by a steering committee piloted by Prefect and get together four times between April 2011 and March 2012.

To reach the initial targets, this plan includes 36 sectorial actions and 1 transverse action. A short description of these actions is given in Table I.

Table I : Description of the local action plan for Marseille

Number	Action	Type
Diffuse dust emission reduction		
1.1	To improve the knowledge about emissions and to define target actions (installations with TSP emissions > 5 tons/year)	Regulatory
1.2	To improve the knowledge about emissions and to define target actions for quarry (production > 150 000 t/y)	Regulatory
1.3	To set up a logistic plan for transport and freight	Regulatory
Canalized dust emissions reduction		
2.1	To realize technical and economic studies and to set suitable reduction actions (installations with TSP emissions > 5 tons/year)	Regulatory
Reduction of PM and NO_x emissions		
3.1	To reduce emissions from combustion installations up to 20MW	Regulatory
3.2	To reduce emissions from combustion installations between 2 and 20MW	Regulatory
Reduction in VOC and PAH emissions		
4.1	To reinforce the action of inspection for the listed installation over the multi-pollutant critical spots	Regulatory
Improvement of road traffic management		
5.1	Speed reduction over the Bouches-du-Rhône area after a first technical feasibility study	Regulatory

5.2	To insert the air problematic into the dynamic regulation of the road traffic for the highway between St Maximin and Aix en Provence	Regulatory
To improve air quality consideration with the land planning		
6.1	To insert the air problematic into urban plans and to require some urban control actions to limit the population exposition over areas with some risks to excess NO _x or PM limit values	Regulatory
6.2	To define criteria in relation with the air quality problematic for the impact studies	Regulatory
To encourage the public transport development and active mode		
7.1	To set up different plans for the companies and for the schools	Regulatory
7.2	To impose air quality targets in the new urban displacement plan	Regulatory
To improve the performances of vehicles		
8.1	To set a target of 30% for the fleet turnover (private and public fleet > 50 vehicles)	Regulatory
To reduce the emissions from ports and airport		
9.1	To reduce the GPMM emissions with the OPS solution	Regulatory
9.2	To reduce the Marseille Provence airport emissions	Regulatory
To reduce the emissions from infrastructures as “urban tunnel”		
10.1	To treat the emissions for road traffic into current and future urban tunnels	Regulatory
Low emission zone		
11.1	To set up air quality targets inside low emission zone	Regulatory
To reduce the emissions from combustion installations		
12.1	To set emission limit values for the combustion installations	Regulatory
To reduce the emissions from installations using wood fuel		
13.1	To limit the emissions from combustion installations (< 400kw) used for home heating	Regulatory
To reduce the emission due to open fire		
14.1	To limit the emissions of PM and PAH during outside open fires	Regulatory
To improve road traffic management		
15.1	To set-up no stop ways along tall road	Voluntary

15.2	To set up or to increase size of carpool parking	Voluntary
To improve air quality consideration with the land planning		
16.1	To insert air quality into the application of new projects as public transport over clean area	Voluntary
To encourage the public transport development and active mode		
17.1	To promote the plan for the urban public transport	Voluntary
17.2	To give the priority to the public transport over the urban expressway	Voluntary
17.3	To develop regional railway project	Voluntary
17.4	To promote soft displacement	Voluntary
17.5	To develop the information for transport user	Voluntary
To improve the transport of goods		
18.1	To support the diversification of transport mode of goods for the GPMM	Voluntary
18.2	To set up and to drive some thinking group about the diversification of transport	Voluntary
18.3	To develop the setting up of CO2 charter	Voluntary
To reduce the environmental impact of building site		
19.1	To define a common guide of “good practice” for building site, demolition ...	Voluntary
Integration Air-Climate		
20.1	To ensure a good connection between PPA and local climate-energy plan	Voluntary
To reduce the emissions from installations using wood fuel		
21.1	To set up an aid grant for combustion installations which obtain a certificate in relation to air quality	Voluntary
Action of knowledge improvement		
22.1	To improve the knowledge about particulate matter, persistent organic pollutants ...	Incentive
Formation / awareness / pedagogy		
23.1	To set up formation, awareness and pedagogy processes for stakeholders involved in the setting up of the PPA and for public people.	Incentive

The reduction of emissions has to reach the national targets in 2015, which are: -40% for NO_x , -15% for PM_{10} and -30% for $\text{PM}_{2.5}$. To evaluate the compliance of the plan with these targets, a future scenario, including national measures, has been calculated. This scenario gives regional reductions by -30%, -21% and -21% for NO_x , PM_{10} and $\text{PM}_{2.5}$ respectively. The actions developed in the PPA have to complete this reduction to reach the initial targets. Three configurations are possible to evaluate these actions:

- Calculable actions from data given by stakeholders involved in the actions: an estimation of emission reduction is available.
- Calculable actions from sensitive tests or/and from benchmark: a range of emission reduction is available
- Non calculable actions: reduction targets are available.

The assessment of measures for each large activity sector over the PPA area is given in the Table II. In association with the national measures, the setting up of this plan allows a total reduction of emissions by -29%, -22% and -28% for NO_x , PM_{10} and $\text{PM}_{2.5}$ respectively over the PPA area. For the NO_x emissions, the main reductions are issue from road/non-road transport and energy sectors, whereas the main reductions for PM_{10} and $\text{PM}_{2.5}$ are issue from road transport, residential and energy sectors.

Table II : Improvement of the emissions issue from the actions for different activity sectors over the PPA area

		NO_x	PM_{10}	$\text{PM}_{2.5}$
Industry / waste / energy production and supply	Current emissions (kt/y)	29,9	3,6	2,1
	Reduction (kt/y)	0,7	0,1	0,1
	Relative reduction	-2,4	-3,5	-3,7
Road and non-road transport	Current emissions (kt/y)	26,9	2,5	1,9
	Reduction (kt/y)	1,6	0,1	0,1
	Relative reduction	-5,8	-4,1	-4,3
Residential heating, tertiary and open fire	Current emissions (kt/y)	2,1	1,1	1,1
	Reduction (kt/y)	0,002	0,01	0,02
	Relative reduction	-0,1	-1,3	-1,4

Both a chemical transport model and an urban model have run to estimate the population exposition using the future scenario and the whole of actions issue from the PPA. The parameters used to

compute an estimation of the population exposed are the daily PM_{10} concentration, with a percentile higher than $50\mu g/m^3$ and the annual NO_2 concentration higher than $40\mu g/m^3$. For each city, the most negative criterion is selected to compute this estimation.

The setting up of the whole PPA allows a significant contribution to the national targets of reduction of particles and NO_x emissions and to reduce by more than 90% the residential population exposed to a limit NO_2 or PM_{10} concentration (Table III).

Table III : Evolution of population exposed to a limit value using current and future + PPA emissions over the PPA area

Total population	Current situation		Future scenario + PPA		Gains	
	NO_2	PM_{10}	NO_2	PM_{10}	NO_2	PM_{10}
1 349 000	243 000	277 000	10 400	5 700	96%	98%



Port of Marseille Fos – Western Harbour Area

MEASURES ANALYSIS AND IMPLEMENTATION

In this section a first part details the result of a previous work to rank different actions provided by Veneto Region for each APICE partner and a second section focus on three actions implemented in the framework of the local plan thanks to the APICE outputs.

General ranking

In the framework of APICE project, 47 different actions provided by the Veneto region have been evaluated by a group of experts in Marseille using the Delphi methodology previously described. The general ranking of these measures is provided in Table IV. From this evaluation, the most interesting actions to improve air quality in Marseille are the on-shore power supply solution during the hotelling phase, the modification of fuel type by using liquefied natural gas (LNG) and the update of emissions inventories. The detail of the evaluation for these three actions according the different criteria is provided in Table V.

Table IV: General ranking of the measures updated with assessment

Description of the action	Final ranking		Sub-ranking		
	Ranking	Total evaluation	6 criteria	3 criteria	1 criteria
Hotelling - Shore power	1	314.13	1	1	1
Alternative fuel (LNG)	2	276.85	2	2	2
Update inventoring emissions	3	269.45	4	6	3
Data Sharing	4	255.45	3	4	4
Environmental excellence certification for trucks	5	239.46	9	9	5
Increase rail ratio through economic incentives	6	237.4	6	5	6
Improvement of rail system	7	223.85	5	3	7
Port Air Quality Steering/Working Committee/Group	8	221.4	7	7	8
Automated cargo handling systems	9	216.68	10	10	9
Accelerated fleet turnover	10	203.29	12	11	10
Communication strategy	11	191.68	8	8	11
Air emissions inspection on board	12	189.07	11	13	12
Improvement of road system	13	175.79	13	12	13
Accelerated fleet turnover	14	152.18	14	14	14
Displacement of port activities	15	126.11	15	15	15

As this evaluation has been provided by a group of experts mainly issue from the port authority, the actions with the best results directly concerned ships and vessels. The second group concerns the improvement of air quality knowledge. From the initial table provided by the Veneto region, several actions have not been evaluated as no expert has been available in the group.

To explain the three first criteria, Table V gives details about their evaluation. The “Hotelling – shore power” reaches the first ranking as it combines a high emission reduction with and good technical feasibility and would be quickly implement in Marseille. The “Alternative fuel” action gets a high total but needs additional development to be better ranked as there is no current network to supply LNG fuel inside the port area.

Table V: Details of the evaluation for the three first actions

Criteria	Weight	Hotelling - Shore power	Alternative fuel (LNG)	Update inventoring emissions
Cost-effectiveness	9.28	4	3	3
Implementability	9.00	5	4	3
Emissions reduction potential	8.67	5	4	2
Technical feasibility	8.39	5	5	5
Costs	8.22	2	2	4
Enforceability	8.17	1	2	2
Co-benefits	8.00	5	3	5
Potential funding opportunities	8.00	3	2	1
Measurable results	7.22	5	5	5
Timeframe	5.50	4	5	4

The action to update the emission inventories allows an improvement of the knowledge of each area and to design efficient scenario. For Marseille experts, this action is a necessary action before to implement a local plan to improve air quality. Also, the data sharing between the different partners allows an additional improvement of local knowledge.

From the general ranking, only the first action will be implemented in the local adaptation plan for Marseille, named PPA (Atmospheric Protection Plan), as this plan is defined at the regional scale to tackle the PM pollution at a global scale as advised by the previous APICE studies about source apportionment.

For the other actions, some of them have been studied in the framework of the evaluation of scenarios supporting coast development strategies. The outcomes have displayed positive results as in the case of the alternative fuel for ships. Due to the timing required to design the local adaptation plan for Marseille, some actions have not been able to discuss during the development of this plan but outcomes of APICE project will be shared for the next local plans.

Measures analysis

Measure 9: Ships emissions

State of the art

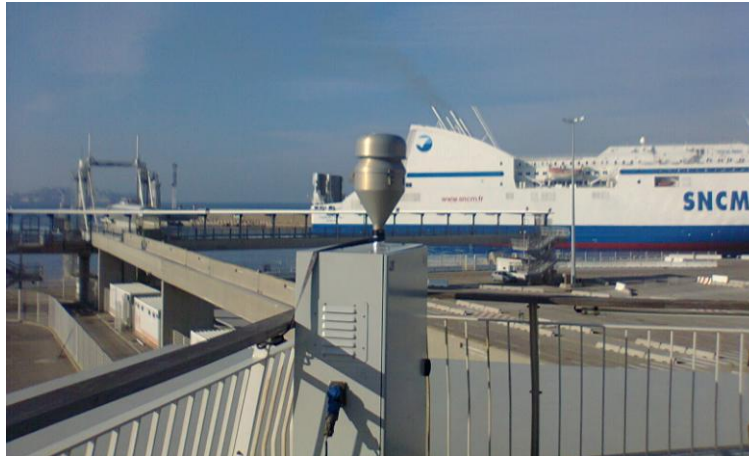
From the reference year of 2007, ship emissions contribute to 17%, 4% and 5% of total emission for NO_x , PM_{10} and $\text{PM}_{2.5}$ respectively over the APICE domain for Marseille which centered over Marseille port with an area of 100 x 100km. As discussed in the previous task about the future scenario, Port Authority of Marseille forecasts a significant increase of the maritime activity by doubling the passenger traffic in 2020. Combined with the cargo activity, emissions from passenger ships will contribute to a quarter of total maritime emissions and will be the first activity in terms of emissions over the eastern part of Marseille port. On the other hand, hotelling phase for all the maritime activities will represent more than one half of the total emission distributed between hotelling, maneuvering and cruising phases. From the outcomes of the study about source apportionment, the contributions of maritime activity to PM_{10} and $\text{PM}_{2.5}$ concentrations are estimated between 9% and 6% at the location of an urban background site downtown in Marseille (Table VI).

Table VI : Source apportionment for the maritime activity as the percent of the total concentrations of $\text{PM}_{2.5}$ and PM_{10} during both winter and summer period at the urban background site of “5 Avenues” and at the port site

	$\text{PM}_{2.5}$		PM_{10}	
Site position	Summer	Winter	Summer	Winter
Urban Background	9%	7%	7%	6%
Port	10%	7%	8%	6%

Description of the measure

As the hotelling phase is located inside the port, related emissions directly impact surroundings population. The aim of this measure is to reduce emissions of hotelling phase from passenger ships located inside the eastern part of Marseille port.



Port of Marseille Fos – Measure in Eastern Harbour Area

Action 9.1: On-shore Power Supply solution

To reduce the contribution of ship emissions to the air pollution, this action proposes to apply the on-shore power supply (OPS) solution which should lead to switch off emissions of ships during the hotelling phase thanks to a connection with the terrestrial electrical network to supply energy. This action allows a maximal emission reduction inside the port area. In several European ports, this action has been already implemented and several feasibility studies are in progress. In Marseille, this action is considered by the port authority and the CNM Company, owner of passenger ships. A first study has been introduced to the French Environment and Energy Management Agency (ADEME). However, this action is very expensive as a financial invest is required by both port authority and ship owners.

Thanks to APICE project, this action has been simulated for three passenger ships in rotation between Marseille and Corsica, using an urban air quality model. The output results have shown a significant local improvement of the NO_2 concentration. In terms of emissions, the application of the OPS solution allows a light decrease of emissions, lower than 1% of the maritime emissions as this solution concerns only three ships even if the duration of their hotelling phases is important (Table VII). However, if only hotelling emissions are considered, this action allows a gain of 0.8% and 1% for the port emissions of NO_x and PM respectively and a respective gain of 2.8% and 3% for NO_x and PM emissions if only the emissions of the hotelling phase inside the eastern port are considered. The evaluation of this scenario in terms of resulting concentrations needs to compute it with an urban model. The area with a significant improvement is located close to the terminal involved. The maximal improvement in terms of monthly concentrations is $0.25\mu\text{g}/\text{m}^3$ and $3.4\mu\text{g}/\text{m}^3$ for $\text{PM}_{2.5}$ and NO_2 respectively.

The implementation of this action needs to consider the impact of the energy production which will be used to supply ships during their hotelling phases. To be a good mitigation action, this energy should be provided by a non-pollutant and renewable energy. Also, it will be necessary to share a technical standard at the European scale and beyond to allow a connection of ships inside every port.

Table VII: Emissions from ships and vessels activities inside the APICE domain (100 x 100km²) without or with the application of the OPS solution.

Emission [Mg/year]	CO	NO _x	SO ₂	NM VOC	PM ₁₀	PM _{2.5}
Base future (2025)	29 533	22 107	30 119	6 384	553	553
OPS solution	29 260	22 044	29 848	6 321	550	550

In Marseille local plan, this action is piloted by Marseille Port Authority with the collaboration of several stakeholders as the Regional direction for environment, development and accommodation (DREAL), the Facilities, Transport and Maritime General Direction (DGITM), the ADEME, the Regional authority (CG13) and ship companies as CNM. To evaluate this action, the local plan forecasts to provide a criterion based on the number of ships using the OPS solution and to monitor the evolution of this criterion. This action is regulatory and would be implemented between 2012 and 2016.

This action is supported by the European Commission which has introduced a project of directive by the 15th July 2011, aiming to reduce fine particulate emissions by around 80%, by the annex 4 of the MARPOL convention and by European recommendation (2006/339/EC) which promotes the using of terrestrial electrical networks for the ships during their hotelling phase inside European ports and encourages member states to propose economic incentives for ownerships to use these terrestrial networks, to awareness local, maritime and port authorities and to exchange about the best practices to supply energy by the terrestrial network and to standardize procedures.

Measure 13: Emissions reduction from small installations using wood fuel

State of the art

Residential sector contribute to 4%, 14% and 20% of NO_x, PM₁₀ and PM_{2.5} emissions respectively over the PPA area. For this sector, biomass burning represents 9%, 93% and 93% of NO_x, PM₁₀ and PM_{2.5} emissions respectively.

The APICE project has allowed the development of new tools in Marseille to estimate the contribution of each pollution source for PM₁₀ and PM_{2.5} concentrations. Over Marseille area, two chemical transport models with two different approaches have been used to get this evaluation.

CHIMERE model has been updated with a “zero-out” methodology and CAMx has run with a tracer approach thank to PSAT module.

During the winter time, residential sector, dominated by biomass burning emissions, displays a significant contribution to PM concentrations at an urban background site downtown in Marseille (Table VIII). For the total PM_{2.5} concentrations, this sector displays the highest contribution and is the second for the total PM₁₀ concentrations.

Table VIII : Source apportionment for the residential sector as the percent of the total concentrations of PM_{2.5} and PM₁₀ during both winter and summer period at the urban background site of “5 Avenues” using CAMx and CHIMERE models.

	Winter		Summer	
	CHIMERE	CAMx	CHIMERE	CAMx
PM ₁₀	30 %	20 %	11 %	5 %
PM _{2.5}	38 %	24 %	19 %	6 %

Description of the measure

This measure aims to reduce the emissions from installations using wood fuel to decrease the contribution of biomass burning emissions associated to residential sector for the PM concentrations during the winter time. It concerns the domestic combustion installations.

Action 13.1: To limit the emissions from combustion installations (< 400kw) used for home heating

This action provides a new regulation to limit the number of wood fireplaces of old generation. The open wood fireplace will be forbidden for a house transaction and each new wood fireplace will have to obtain the “Blue Flame” label or to respect the following criteria: CO rate < 0.12% and performance > 70%.

An information point will be done by notaries during the house transaction and by assurance companies in the framework of the decree n°2011-36 dated from the 10th January 2011 which forecasts the obligation for each occupant to give at the home assurance a certificate which guaranties the presence of a smoke detector before the 8th March 2015.

The performance improvement of individual combustion installations using wood fuel allows a significant improvement of the air quality mainly for PM and NO_x and also for VOC and PAH. By increasing the performance of installations, the energy conservancy and the resource conservation are also considered. Also, removing open wood fireplace improves the indoor air quality and reduces health impact.

Over the PPA area, this action contributes to reduce the global emissions issue from the residential sector by -1.3%, -1.4% and -0.1% for PM₁₀, PM_{2.5} and NO_x respectively.

This action would be supported by the setting up of a network to salvage old installations organized by the ADEME. Also, this action would be combined with a financial support.

This action will be piloted by the ADEME, the DREAL and the Energy information area (EIE) network with a more particular implication of DREAL. This action is regulatory and would be implemented during 2013. It will be evaluated by the number of installations with the “Blue Flame” label.

Measure 14: To reduce the emission due to open fire

State of the art

Source apportionment based on monitoring campaigns in Marseille has also highlighted a significant contribution of biomass burning to PM_{2.5} concentration using organic tracers and chemical markers. From analysis of these results and with a local knowledge of Marseille surroundings, a part of the biomass burning contribution is associated to open fire. There are some difficulties to reproduce these emissions in the inventories as no data are available for this activity because it is forbidden since several years whatever season or location.

To explain the necessity of this action and to illustrate the impact of open fires, it is reminded that an open fire with 50 kg of green waste is equivalent to a ride of 22 000 km in a current car or 5 days of wood heating for a house with an insert fireplace set up after 1996 or 1 month of heating with wood boiler with an high performance or a half of season of heating with oil boiler.

Description of the measure

This action aims to confirm the prohibition to burn green wastes and agricultural waste, to precise the practices for managed open fires and to obtain an exemption to burn green wastes and agricultural waste except during particulate pollution events.

Action 14.1: To limit the emissions of PM during outside open fires

The article 84 of the regional health regulation prohibits open fire of green and domestic wastes. Green waste from park and garden are considered as domestic wastes. They are mainly made up of wood coming from garden cleaning and greenery coming from grass-cutting. This prohibition is implemented for private and professional people. Green wastes will be recycled by individual composting, in the form of woodchips or collected thanks to a system set up by local authorities.

The managed open fires concern the vegetables burns by farmers to clean an area or by fireman or forester before summer to prevent wildfire.

To burn agricultural green wastes needs a prefectural permission which have to be given for agronomical or health reasons only (Article D615-47 and D681-5 of the rural code).

By the forest code, the forest management includes the removal by burning or incineration of a part of vegetable issue from forest interventions as forest cut, processing after a storm, infected vegetables or prevention of wildfire.

This action confirms the prohibition to burn green and wastes from household or local authorities over the PPA area. Eventually, some exemptions to burn agricultural green wastes in the framework of managed open fires or in the framework of requirements to clean wild areas will be given during periods without pollution event and during periods with a thermal instability: between 11h and 15h30 during December, January and February and between 10h and 16h30 for the other months except for the months with a wildfire risk.

Over the PPA area, this action contributes to reduce the global emissions issue from the residential sector by -1.3%, -1.4% and -0.1% for PM₁₀, PM_{2.5} and NO_x respectively.

This action is regulatory and piloted by prefect and mayor with the collaboration of DDTM (land and maritime local direction), SDIS (Emergency and Firefighting Local Service), ONF (National Forest Office), URVN (Local Union for Life and Nature) and DREAL. It will be implemented in 2012 and will be set up with the action number 23 about communication and awareness.



Port of Marseille Fos – Eastern Harbour Area – Cruise Terminal

MAINSTREAMING OF LOCAL ADAPTATION PLAN FOR YOUR CITIES

Thanks to the APICE project, a new collaboration between the port authority of Marseille (GPMM) and the regional air quality observatory (AirPACA) has been set up. This collaboration has allowed sharing precise data about the maritime activity to calculate a new accurate maritime emission inventory over the port area and surroundings.

This new maritime emission inventory has been included in the updated regional emissions inventory over the PACA region. At the same time, the first technical working groups brought together stakeholders from State, local authorities, economical stakeholders and qualified persons to define concrete actions in the framework of the local atmosphere protection plan (PPA) to reduce PM and NO₂ concentrations. During these technical working groups, the on-shore power supply (OPS) scenario which forecasts to switch off emissions of ships during the hotelling phase has been introduced. As this action displayed positive results in terms of reduction of both PM and NO_x emissions, this APICE scenario has been successfully integrated in the local action plan as a regulatory action. Also, the CNM Company, ownership of passenger vessels in rotation between Marseille and Mediterranean cities has submitted this project to the French Environment and Energy Management Agency (ADEME) to receive a financial support.

In the framework of the study about source apportionment, APICE project has allowed a significant improvement of the knowledge on PM pollution origins. Over Marseille area, two chemical transport models have been updated to analyze the contributions of pollutant sources. Also, long monitoring and intercomparison campaigns have allowed to identify source pollution and to quantify them. The main outcomes of these studies have displayed the significant contribution of the residential sector, mainly due to the biomass burning, during the winter time. From these results, a first regulatory action has been designed to reduce the contribution of emission from heating installations using wood fuel. Also, a second regulatory action has been integrated in the local action plan to confirm the prohibition to burn green wastes to reduce PM concentrations.

As the source apportionment studies have also displayed significant contributions of road transport, industry-energy activities and long-range transport of pollution, their conclusions advise to consider PM pollution at a large scale and to set up a cluster of actions related to the whole of pollutant sources to reduce PM concentrations at a local scale and to be accepted by everybody.

In the framework of design and evaluation of scenarios supporting coast development strategies in Marseille, several scenarios have been tested as an alternative fuel for passenger ships or the displacement of a terminal to move hotelling ship emissions away from the city center. Although these scenarios have not been retained for the local action plan, they have provided interesting results which will be able to be discussed and shared during the development of future local plans after the end of the APICE project.