From ADEME's perspectives:

Overview of actions promoting phytomanagement of contaminated sites

h progra implementations and perspectives

French Environment and Energy Management Agency

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ADEME in brief

ADEME is active in the implementation of public policy in the areas of the environment, energy and sustainable development.

The Agency provides expertise and advisory services to businesses, local authorities and communities, government bodies and the public at large, to enable them to establish and consolidate their environmental action.

As part of this work ADEME helps finance projects, from research to implementation.

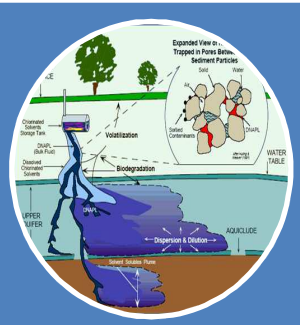
ADEME is a public agency under the joint authority of the Ministry for Environment, Energy and Sea and the Ministry for National Education, Higher Education and Research.

ADEME has over 900 employees split between regional divisions and 3 central sites (Angers, Paris, Valbonne), 3 offices in French overseas territories and 1 office in Brussels.

ADEME activities in the field of contaminated sites and soils

3 missions

MOSP



Research

Brownfields renewal

ADEME activities in the field of contaminated sites and soils

3 missions

MOSP

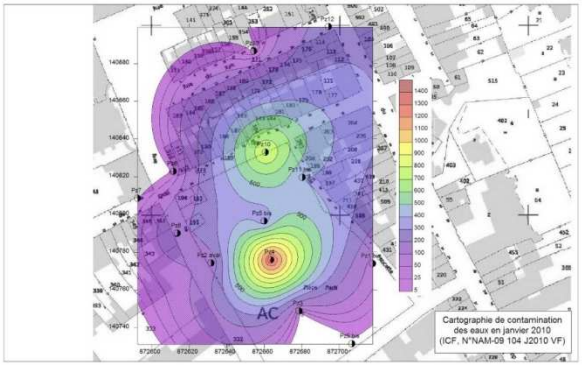
Operations to secure contaminated sites

- Orphaned sites following decisions made by the government
- Entrusted by prefectoral decree
- 267 sites with on going operations (one or more)
- Average 18 to 20 M€ a year
- Highly diverse operations

Operations to secure contaminated sites

Highly diverse operations

- Removal and elimination of waste
- Monitoring of surroundings
- Risk assessments
- Clean up



ADEME activities in the field of contaminated sites and soils

3 missions

Brownfields renewal

Brownfields renewal

- Sustainable land management needs to prevent urban sprawl and soil sealing in a competitive world for land uses
- Brownfields as potential resources
- Decision making support aids
- Financial support to clean up operations which aims to unlock brownfields renewal
  - 2010 – 2016 : hundred of operations, 65% completed
  - Related call for projects

ADEME activities in the field of contaminated sites and soils

3 missions

Coordination and support for research work

- Main research topics cover
  - Characterization techniques
  - Knowledge on how pollutants evolved in the surroundings
  - Analysis and management of environmental risks
  - Assessement and development of remediation for contaminated sites and soils
- Supports closer partnerships between final users and researchers
- Average 2 M€ for 10 to 15 projects a year
- Related calls for projects : GESIPOL & GRAINE

Research on phytotechnologies

From phytoremediation to phytomanagement

In 4 steps

Illustration with 3 ADEME examples

2012: Guide

2017: Guide

Phytoremediation 2000 - 2005	Phytotechnologies 2006 - 2010	Phytotechnologies 2011 - 2015	Phytomanagement 2016 - 2020

2004 - 2006 : Salsigne
EXAMPLE 1

2008 - 2016 : Les Avinières
EXAMPLE 3

2016 - 2018 : Carnoulès
EXAMPLE 2

Phytoremediation to clean up pollution

Phytoremediation
2000 - 2005

Research are

- mainly at **lab scale** or field experiment with very low scale (m^2)
- **endless** : plants / amendments / soil / pollutants – **with combinaisons for ever**
- **not enough representative** : methodologies based on hydroponics, sparked pollution

at an early stage of faisability assessment

- Biomass (considered as contaminated) is not of interest and should be managed as a waste

Dynamic research *vs* low interest or demand from the private sector (environment consultants, clean up companies…) or sites' owners (public or private)

Phytotechnologies stage I : out of labs

Phytotechnologies
2006 - 2010

- 2004 -2006 : Salsigne
- 2008 : law « Grenelle » - art 38 and the buzz
- ADEME defined its strategy
  - **Out of labs** : large scale fiels experiments
  - **Focus on phytostabilisation and aided phytostabilisation and related issues** : implementation and efficiency assessment
  - **Biomass** management to consider from early stages in phytotechnologies implementation
  - Add economic and social dimensions to projects
- Start of several projects with private companies : **PHYTOPERF**, PHYTENER, PHYSAFIMM, PHYTOSED, PHYTOPOP…

Phytotechnologies stage II : sharing lessons learned

Phytotechnologies
2011 - 2015

- Salsigne : 1st application in Europe
- 2012 : publication
- AB GREENLAND project (FP7 2011 – 2014) → DST
- ADEME applied the same strategy and add
  - Scale transfer issues : availability in industrial quantities of plants and amendements tested, materials to use, implementation protocols non site specific, monitoring…
  - Biomass issues : extend suitable valorization options (chimistry, biobased materials…), legal status

- Move from remediation to risk management
- With a clear definition of operating windows for phytostabilisation
  - Risk management
  - Low to moderate levels of contamination
  - On large scale
  - Without time constraint

Phytomanagement : a step further to sustainable land management

Phytomanagement
2016 - 2020

- Biomass management is seen as an objective / a driver and no more as a constraint
- 2017

- Call for projects GRAINE : regional scale, land use conflicts,…

Remaining locks

- Field transfer : operational guidelines and wider range of phytotechnologies
- Long-term efficiency assessment
- Integrated approach
- Regulatory uncertainties on biomass