Environmental risk management in Europe and the United States
美国、欧盟环境风险管理经验

Some highlights from the report "Tackling environmental risk with environmental planning: International experiences", by Vista Analysis, CICERO and CAEP 2014.

基于Vista Analysis, CICERO 和环保部规划院共同完成的《通过环境规划应对环境风险国际经验报告》

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Beijing, 22. October 2014
The 5th Forum for Environmental Risk and Damage Assessment

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1. How the EU reduced pollution from hazardous substances
   欧盟如何减少有害物质污染

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How the EU reduced pollution of hazardous substances
欧盟如何减少有害物质污染

- 1950s/1960s: Early warnings of impacts from man-industrial and man-made chemicals (e.g. DDT).
- 20世纪50年代-60年代: 工业或人造化学物质影响的早期警告 (比如： DDT).

- 1970s: Public engagement and political response
  - The Helsinki Convention (Baltic Sea), 1974
  - EU Dangerous Substances Directive, 1976
- 20世纪70年代: 公众参与及政治响应
  - 1974年的赫尔辛基公约(波罗的海)
  - 1976年的欧盟危险物质指令

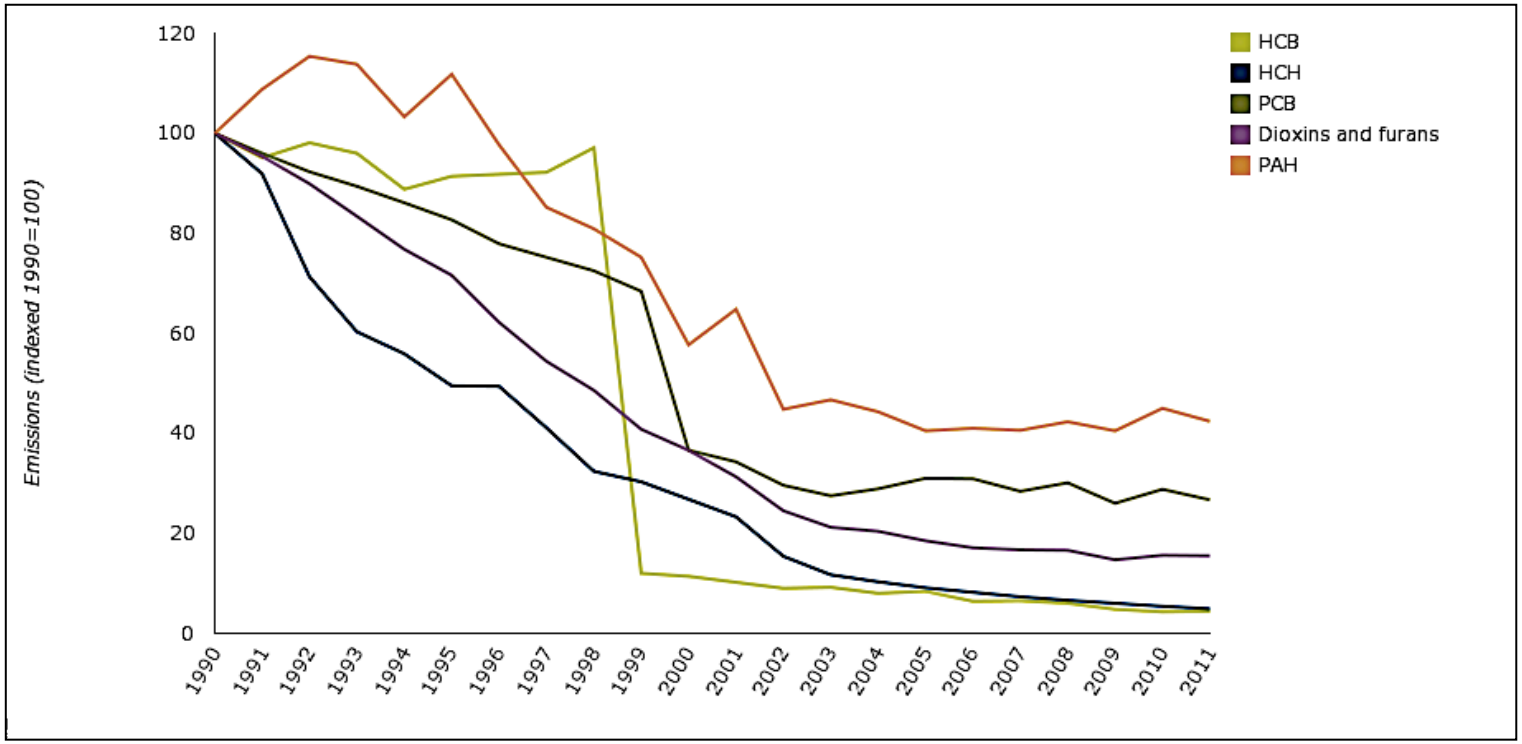
- Since 1970s a range of legislation, policies and conventions, that successfully have reduced pollution from hazardous substances
- 自20世纪70年代起，一系列法律、政策和法规的运用，成功减少了有害物质污染。

Emission trends of persistent organic pollutants in the EU

(National emissions reported to the Convention on Long-range Transboundary Air Pollution)

欧盟持久性有机污染物的排放趋势

(向《远程跨界空气污染公约》报备的国家排放)



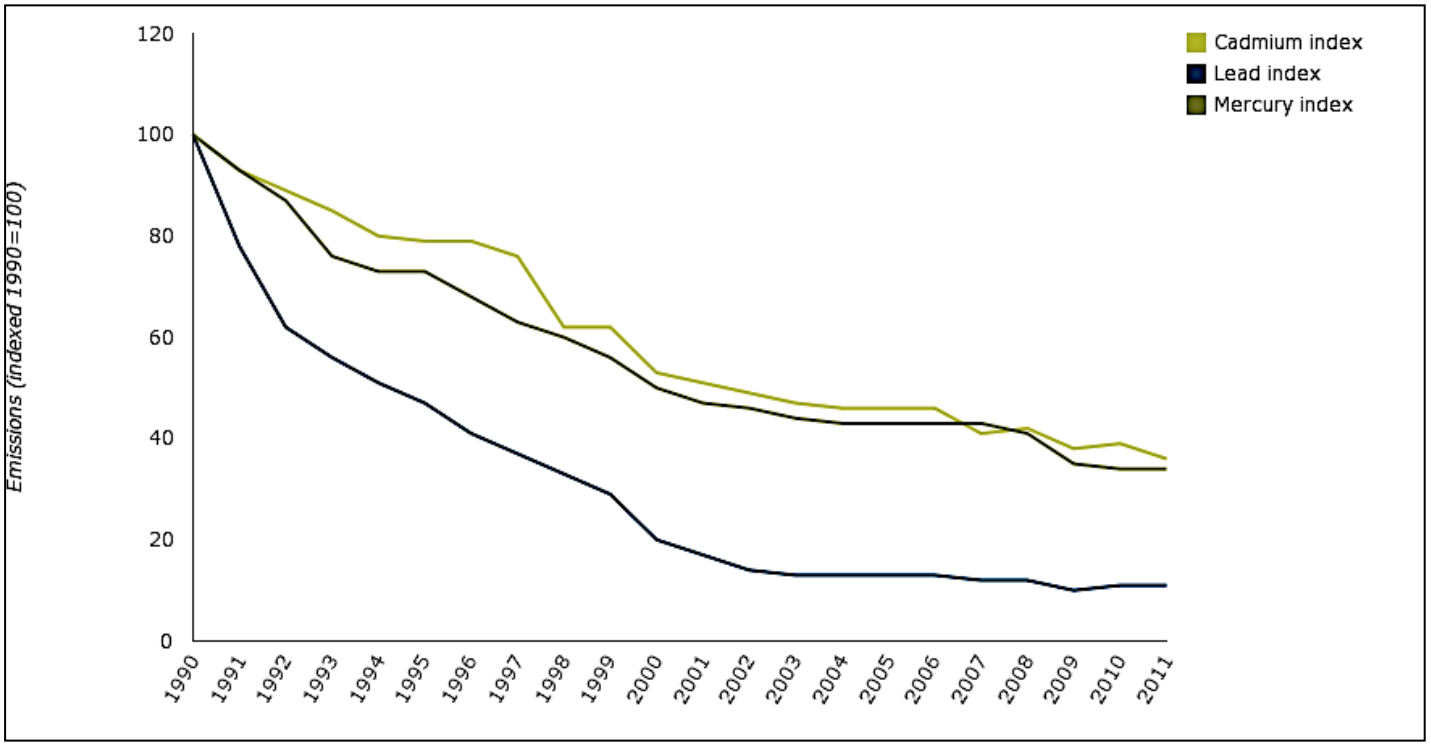
Source: European Environment Agency (EEA. 2014)
http://www.eea.europa.eu/data-and-maps/daviz/emission-trends-of-persistant-organic

Emission trends of heavy metals in the EU

(National emissions reported to the Convention on Long-range Transboundary Air Pollution)

欧盟重金属排放趋势

(向《远程跨界空气污染公约》报备的国家排放)



Source: European Environment Agency (EEA. 2014)
http://www.eea.europa.eu/data-and-maps/daviz/emission-trends-of-heavy-metals#tab-chart_1

Input of hazardous substances (via riverine loads and direct discharges) into the North-East Atlantic 1990 to 2008
1990年-2008年间，有害物质输入（通过河流的输送和直接排放）到东北大西洋

Source: OSPAR.

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Tools 工具

The policies, legislation and measures involves:
政策、措施、法律：

- Product substitution产品替代
- Restrictions on marketing and use销售和使用的限制
- Setting of emissions and environmental quality standards and monitoring
- 排放和环境质量标准和监控设置
- Requirements to demonstrate clean production process and use of Best Available Techniques in applications for industrial permits
- 要求说明清洁生产工艺，在工业许可申请中使用最佳可行技术
- Fiscal instruments (environmental taxes etc.)
- 财政政策工具（环境税等）
- Actions to raise public awareness
- 提高公众意识的行动

Key legislation主要法律

- EU regulation No 1272/2008 on 'Classification, labelling and packaging of chemical substances and mixtures' (**CLP**), which provides a harmonised classification and labelling system incl. a code system spanning various effects (e.g. flammable, carcinogenic).
- 欧盟法规1272 / 2008号规定化学物质和混合物（CLP）的分类、标签以及包装，这里提供了一个统一的分类和标签系统包括了涉及各种效果（如易燃，致癌）的系统生成代码。

- Regulation No 1907/2006 on registration, evaluation, authorisation and restriction of chemicals (**REACH**), which makes industry responsible for assessing and managing the risks posed by chemicals and providing appropriate safety information to users.
- 欧盟法规1907 / 2006号规定化学品的注册、评估、授权和限制（REACH），使行业承担负责评估和管理化学品的风险，为用户提供适当的安全信息。

Key legislation主要法律

- Water Framework Directive 2000/60/EC (**WFD**) Directive 2008/105/EC on environmental quality standards (**EQS**), which sets standards for content of 33 priority substances or groups of substances in European water bodies.

- 关于环境质量标准（EQS）的2008 / 105 / EC指令，水框架指令2000 / 60 / EC（WFD）规定了欧洲水域33个优先物质或群体的内容标准。

* For a full list of EU regulation involved in reducing pollution from hazardous substances, see the report ”Tackling environmental risks with environmental planning: International experiences”, 2014.

*如要查看完整的欧盟法规参与减少有害物质污染的列表，可查看报告《通过环境规划应对环境风险国际经验报告》2014版

Remaining challenges
仍存在的挑战

- Discharge of hazardous substances has fallen significantly, but due to high historical use and/or the persistence and capacity to bioaccumulate, levels in sediments and biota are still high.
- 有害物质排放明显下降，但由于历史的使用和/许多物质生物积累的持续性或能力，使这些物质在沉积物和生物群的水平仍然很高。

- In spite of a relatively well-developed system for reporting emissions of hazardous pollutants to air and water, there are still remaining issues preventing a comprehensive account of such emissions.
- 虽然在一个相对发达的系统中报告有害污染物向空气和水中的排放，仍有问题存在，无法完全得到这些排放物的数量。

- The focus upon a few pre-selected priority substances bears a strong risk of missing other problematic substances. In addition, such an approach disregards the effects of chemical mixtures (“coctail effect”).
- 将重点放在一些预先选定的优先物质会带来忽视其他问题物质的风险。此外，这种方法忽略了化学混合物的影响（“鸡尾酒效应”）。

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Background
背景

- In 1976 an industrial accident occured in Seveso, Italy, when a chemical plant caught fire leading to high exposure of dioxins to residential populations.
- 1976年，意大利塞韦索发生首个工业事故。当时，一个化工厂失火导致二恶英向居民区的高度泄漏。

- In1982, stricter industrial safety regulations were enforced in the EU with the name ”Seveso Directive”. The directive has been updated and amended several times, the latest version being ”Seveso III” (2012).
- 1982年，欧盟开始实行严格的工业安全条例，名为《塞韦索指令》。该指令已被更新和修订多次，最新版本为《塞韦索协议III》（2012）。

- The Seveso Directives oblige EU countries to ensure that industry operators and relevant authorities have policies and systems in place to prevent and handle major accidents. (The larger the quantities of dangerous substances present within an establishment, the stricter the rules.)
- 《塞韦索指令》强制欧盟各国保证其工业经营者和相关管理部门的有关政策和系统准备就绪，以防止和处理重大事故。（在某一区域能存在的威胁物质的数量越多，规定就越严格）。

Tools 工具

- Notification *
- Major Accident Prevention Policy (MAPP) *
- Safety reports
- Emergency plans
- Land-use planning
- Information to the public
- Public consultation and participation in decision-making
- Inspections *

- 报告*
- 重大事故防御措施(MAPP) *
- 安全报告
- 紧急计划
- 土地利用计划
- 公共信息
- 决策制定过程公众咨询与参与
- 检查*

Upper-tier establishments (i.e. high risk, due to bigger quantities) need to comply with all the requirements above.
即高风险企业需要遵守所有上述要求。

Lower-tier establishments (i.e. low risk, due to lower quantities) only need to comply with Notification, MAPP, and Inspections.
低风险企业只需要遵守通知、MAPP和检查。

Notification: 报告

- Operators are required to **notify competent authorities** about the dangerous substances they use, and a description of the nearby environment incl. factors that may cause or increase consequences of a major accident.
- 经营者必须对他们使用的危险物质向主管部门报备并描述这些物质附近的环境包括可能造成或增加重大事故后果的因素。

Major Accident Prevention Policy (MAPP):主要的事故预防政策

- **A written document describing a safety management system and an internal emergency plan**. The MAPP is to be revised at least every 5 years. National legislation may require that the MAPP is submitted to the relevant authority.
- 描述安全管理系统的书面文件和内部应急计划。MAPP 至少每5年须修订一次。国家立法可能要求向相关主管部门递交 MAPP 。

Safety report 安全报告

- To be **sent regularly to the responsible national authorities**
- 须按时向相关国家机关报告
- Shall show that a MAPP and a safety management system for implementing it have been established
- 须表明MAPP以及执行它所需的安全管理系统已被设定
- Shall show that major-accident hazards and major-accident **scenarios** have been identified and that necessary **measures** have been implemented to prevent accidents and limit their consequences
- 须表明重大事故危害和可能的重大事故场景已被确认，必需的措施已被执行，以防止事故发生并限制这些事故的后果
- Shall show that adequate safety and reliability have been accounted for in **design, construction, operation and maintenance** of for instance equipment, infrastructure and storage facilities
- 须表明设计、建设、运行和维护中以确保安全性和可靠性，例如：设备、基础设施和存储设备
- Shall show that **internal emergency plans** are in place and that **information to facilitate an external emergency plan** is provided
- 须表明内部应急预案准备就绪，并提供便于外部应急预案执行的信息
- Shall provide sufficient information to the national authority to enable decisions to be taken with regard to the **siting of new activities** or development around existing establishments
- 须为国家有关机构提供足够信息，以确保新活动选址或现有设施附近发展决策的制定

Emergency plan　应急预案

- **Internal emergency plan** with measures to be taken inside the establishment, including measures **to restore and clean up** following an accident. It shall also contain necessary information for authorities to be able to draw up an **external emergency plan**.

- 内部应急预案，事故发生后需要采取的措施，包括事故后的恢复和清理。还包括监管部门制定外部应急预案所需要的信息。

Land-use planning 土地利用规划

- The Seveso directive requires EU countries to ensure that land-use policies ensure **appropriate distances** between establishments and residential areas / areas of public use / areas of national interest.
- Seveso指令要求欧盟国家确保土地利用政策中要求在设施和居民区、公共设施区域等之间保持适当距离

- A guideline document lists principles and “typical” **safety distances**, e.g.
- 原则和典型的安全距离规定
  - *Plastic industry: 200 meters*
  - *塑料行业：200米*
  - *Paper mill: 500 meters*
  - *造纸行业：500米*
  - *Non-organic chemical industry: 1 000 meters*
  - *非有机化工行业：1000米*
  - *Oil refinery: 1 500 meters*
  - *炼油行业：1500米*

Information to the public / public consultation公众

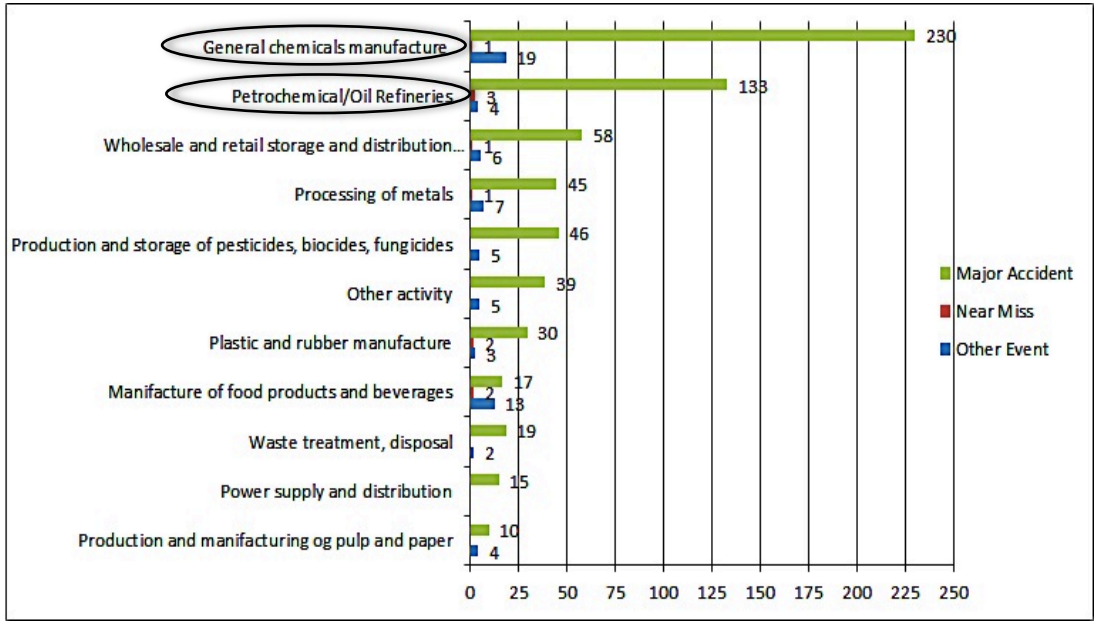
- Make information about hazards and have to behave if an accident occurs **available** to the public
- 有关危害的说明以及事故发生时如何应对
- Grant the public **consultative rights** in the decision-making progress
- 决策过程中公众有

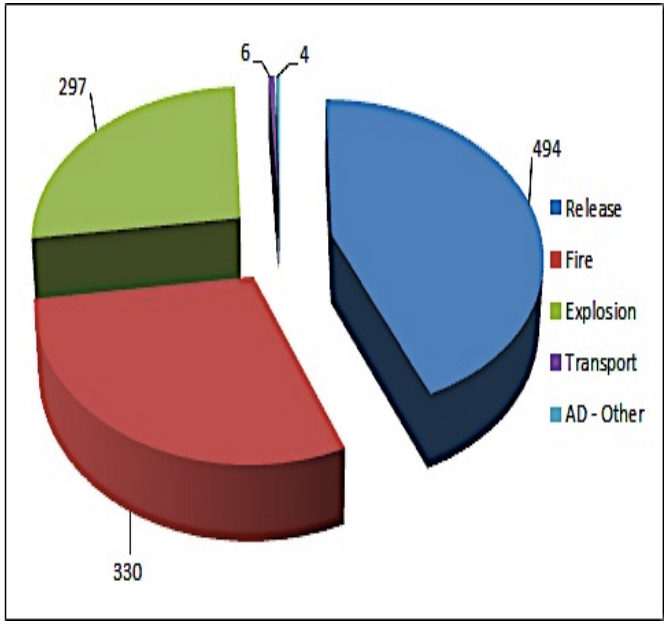
Inspections by national authorities国家监管部门检查

- For upper-tier establishments, **every year**
- 高风险企业，每年
- For lower-tier establishments, **every 3 years**
- 低风险企业，每三年
- **Non-routine inspections** are carried out to investigate serious complaints, serious accidents and “near misses” accidents
- 非常规检查主要针对严重的投诉、事故以及几乎发生的事故的企业
- If the inspection reveals shortcomings, the establishment has to implement the actions proposed by the authorities.
- 如果检查发现问题，企业需要按照监管部门的要求进行整改

EU statistics 1979-2011
欧盟统计1979-2011

- In the EU, the number of reported accidents at Seveso establishments has been relatively stable since the directive was established, while the number of establishments have grown.
- Tendency: Safety levels are improving, but number of establishments are increasing...
- 在欧盟，企业数量增长的前提下，Seveso指令实施后工业事故的数量保持相对稳定





Source: European Commission/eMars (www.jrc.ec.europa.eu)

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Chemical parks in Europe, 2012
欧盟化工园区，2012

In the EU, the chemicals industry is primarily located in clusters, which are considered to foster competetiveness and a high security and risk management level.
化工园区是化工企业的聚集区，通过聚集提高竞争力、安全性和风险管理水平。

Source: CHEManager http://www.chemanager-online.com/en/topics/industrial-sites/european-chemical-industry-parks

Benefits 好处

A chemical park = a site accomodating several chemical companies that are legally separate entities. 化工园区=多个独立化工企业的聚集

Chemical sites become bigger, because larger sites offer; 企业聚集可以提供

- economy of scale, 规模经济
- opportunities to make optimal use of energy and materials (eco-ind. parks),
- 能源和物料的优化配置（生态工业园区）
- opportunities to share infrastructure such as waste treatment facilities,
- 公用设施的共享
- reduced land use and transportation costs,降低土地和运输成本
- clustering and synergy effects.集聚和协同效应

Larger sites also offer opportunities to standardize safety, security and emergency management in an efficient manner.

较大规模的园区还可以高效的实现安全和应急管理

Government perspective:政府的视角

Similar risk factors (here chemicals) are easier to handle in one or a few sites than scattered in many places; allows for higher expertise and effective zoning.

相似的风险因素在聚集状态下比分散状态下更易防范

Challenges 挑战

- Increased risk of interactive and domino effects (internal ”safety distances” important). + High risk site = risk of terrorism.
- 增加多米诺效应风险（内部安全距离+点风险=区域风险）

- Potential problems with identifying which entity is responsible for a specific pollution incidents (e.g. pollution to soil)
- 不易追踪确定事故风险源

- Complicated legal structure between entities in the park; who is liable for what?
  园区内企业责任关系复杂
- Different standards; many big companies have their own internal risk management systems that may not ”communicate well” with others
- 标准存在差异：许多大企业有自己的风险管理体系，存在与其他企业衔接的问题

- Fragmented information; many different entities have information relevant for assessing overall risk – how to get it?
- 信息分散：不同企业的风险信息存在差异

- Fragmentation of responsibility due to many legal entities involved; who has overall responsibility?
- 责任分散：多个企业之间的责任履行不易协调

Solutions 解决方法

- High degree of information exchange and cooperatioon
- 信息交流和合作

- Shared services; security, emergency services, communication.
- 共享安全、应急服务

- Clear contractual relationships between entities, incl. between companies generating pollution and those treating it.
- 明确企业关系，包括产生污染的企业和处理污染的企业

- Establishment of internal and external roles and responsibilites, and allocation of overall risk management responsibility to a single entity.
- 清晰界定不同企业的内部和外部职责
- *Usually the main operator takes overall responsibility internally and externally, or it is ”outsourced” to a managing infrastructure company.*
- 主要运营方者负总责任，或基础设施的运营企业“外包”

- Inspections and audits must target the entity level according to regulation (Seveso), but also the overall park level.
- 检查或评估不仅针对单个企业，也对园区总体进行

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Background 背景

- ”APELL = Awareness and Preparedness for emergencies at the Local Level”
- 地方应急意识和准备
- UNEP initiative (1986 – on-going) to help governments to reduce the occurrence of risks and harmful effects of accidents and emergencies.
- 1986年由联合国环境署发起，旨在帮助政府降低事故风险和危害

- Supported by inter-governmental partners such as the EU Commission, the International Atomic Energy Agency, World Health Organization.
- 受欧盟委员会、国际原子能机构、世界卫生组织等的支持
- Supported by industries, such as the International Council of Chemical Associations and the International Council on Mining and Metals.
- 受化学联盟国际委员会、采掘和金属国际委员会支持

- Introduced in more than 30 countries and over 80 industrialized communities.
- 在30多个国家和80多个园区试点

Approach 方法

- APELL provides a structured process for the development of coordinated emergency response plans involving industry, government, and the local community.
- APELL为企业、政府以及公众应急响应计划制定提供结构化流程

- APELL shall ensure that all existing plans contribute to an overall integrated and co-operative plan, and (if necessary) that coordinated emergency plans are developed.
- APELL有助于确保已有计划、预案的协调、集成，必要时制定协调预案

- Establishment of a multi-stakeholder Coordinating Group is at the core of the process and crucial to increase community preparedness.
- Improving dialogue between stakeholders locally helps reduce risk, improves effectiveness of response and allows ordinary people to react appropriately during emergencies.
- 促进相关者之间的沟通，降低风险，提高响应有效性，帮助公众在紧急状况下做出适当的应对

10 steps of APELL / 10个步骤

1. Identify the emergency response participants and establish their roles, resources and concerns.识别应急响应参与方，明确角色、资源和关心点
2. Evaluate the hazards and risks that may result in emergency situations in the community. 评估可能造成应急情形的危害和风险
3. Have participants review their own emergency response plans to ensure a co-ordinated response.评估已有应急预案，以保证预案间的协调
4. Identify the required response tasks not covered by existing plans. 识别现有预案中未包含的响应任务
5. Match these tasks to the resources of the identified participants. 实施任务所需要匹配的资源
6. Make the changes necessary to improve existing plans, integrate them into an overall community plan, and gain agreement. 将改进后的预案纳入到一个总体的计划/预案，并达成一致
7. Commit the integrated community plan to writing and obtain approval from local governments. 总体计划/预案通过地方政府通过
8. Educate participating groups about the integrated plan and ensure that all emergency responders are trained. 就总体计划/预案对参与方进行宣教，确保所有的应急响应方收到培训
9. Establish procedures for periodic testing, review, and updating of the plan. 建立周期性演练、评估和计划/预案更新程序
10. Educate the community about the integrated plan. 对公众进行总体计划/.预案宣教

Tools 工具

A number of APELL handbooks have been made, providing more detailed advice for different sectors. Some examples:

制定了许多APELL的手册，对不同行业提供了许多具体建议和案例

- ”APELL Multi-Hazard Training Kit” APELL多危害培训工具包
- ”APELL Handbook for Industries” APELL行业手册
- ”APELL Handbook for Mining” APELL采掘业手册
- ”APELL for Dangerous Goods Transport APELL危险货物运输手册

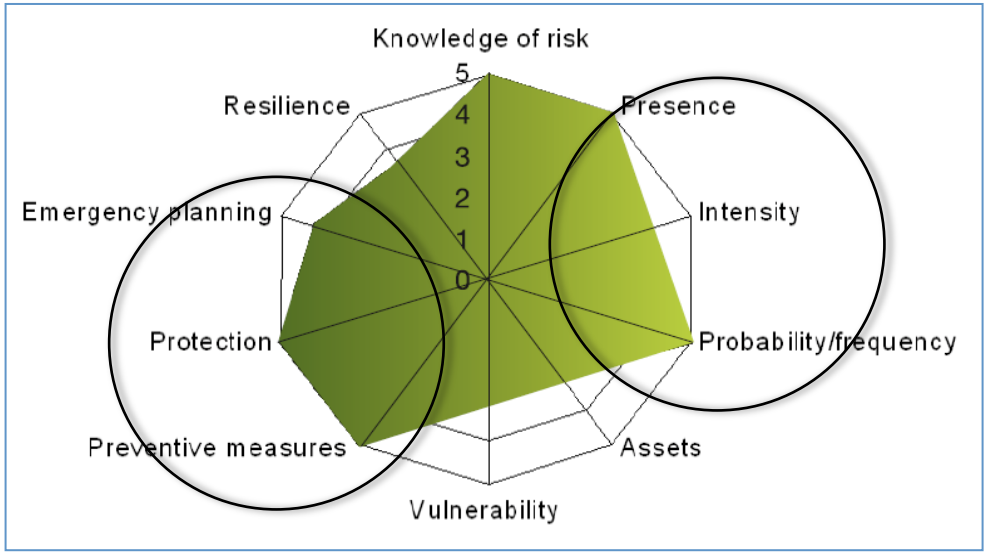
Two additional programs: 两个补充项目

- ”Flexible Framework Initiative for Chemical Accident Prevention and Preparedness”.
- 化学事故预防和准备柔性框架
- ”Responsible Production approach for chemical Hazards Management”.
- 化学危害管理责任履行方法

Tools are available at: http://apell.eecentre.org/ 更多信息请访问

Multi-hazard matrix graph 多危害矩阵

- Assessment of each hazard source according to 10 different risk criteria, each scored from 1-5.
- 根据10个风险标准，对每一个危险源进行评估，分值1-5
- The bigger the coloured map, the more serious risk. 有颜色的区域面积越大，风险越高



- Upper right part: The ”characteristics” of the hazard 右上：危害特征
- Left side: Risk reduction and control measures 左侧：风险防控措施
- Lower part: The vulnerability of the community and assets 下侧：周边设区、设施的敏感性

Source: ”APELL Multi-Hazard Training Kit”

APELL in China - APELL在中国

Introduced in China in 1990s.
上世纪90年代引入

”Global APELL 25 Years Anniversary Forum”, held in Beijing 2013. (Sponsored by UNEP, MEP, Renmin University, Dow and Petrobras.)

2013年，UNEP、环保部、人民大学、道化学公司在北京举办APELL 25周年大会

2006: APELL partnership between UNEP, SEPA and Dow Chemical (Zhangjiagang) Company.
2006年，UNEP、原国家环保总局、道化学公司（张家港）签订协议

Case Study on APELL Implementation in China: ”Promoting Safer Operations and Emergency Preparedness in the Value Chain of the Chemical Sector”, 2011.
中国案例：促进化工行业价值链运行安全和应急准备

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