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Total Cost of Environmental Losses: Origin, Impact, Lines of Business Concerned, Consequential Costs

Gerhard Schmid

Total cost of environmental losses

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- Origin of environmental losses
- Impact of EL
- Lines of business concerned
- Consequential costs



Total cost of environmental losses

Origin of environmental losses

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The many faces of environmental damage

Property loss on the basis of sudden and accidental pollution: An accident occurs that causes an uncontrolled discharge of acid. The company's processes are disrupted by the plumes of acid (first party loss).

Liability loss on the basis of sudden and accidental pollution: An emission at a factory. The wind and the resulting cloud of toxic smoke affect people and property in the vicinity of the industrial plant (third party loss).

Liability loss caused by gradual pollution: The sewage plant is defective - food and/or waste water from the factory slowly but surely pollutes a nearby river and kills aquatic and plant life.

Property/liability loss due to an open natural environment: An oil spill. The oil and derivatives on the company's premises and in the surrounding area. The damage is not discovered until much later (third-party pollution).

Product liability from the use of an agricultural product: Excess use of crop protection chemicals or herbicides causes ecological damage to sensitive soil plants.

Total cost of environmental losses

Origin of environmental losses

Example: Major industrial polluters

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Greater London -protected areas, EPER facilities, industrial accidents-

Legend

CORINE land use

- Continuous urban land use
- No continuous urban land use
- Industry and businesses
- Mining

IUCN protected areas

- IUCN CAT
- IUCN CAT

Natura 2000 sites

- Natura 2000 sites

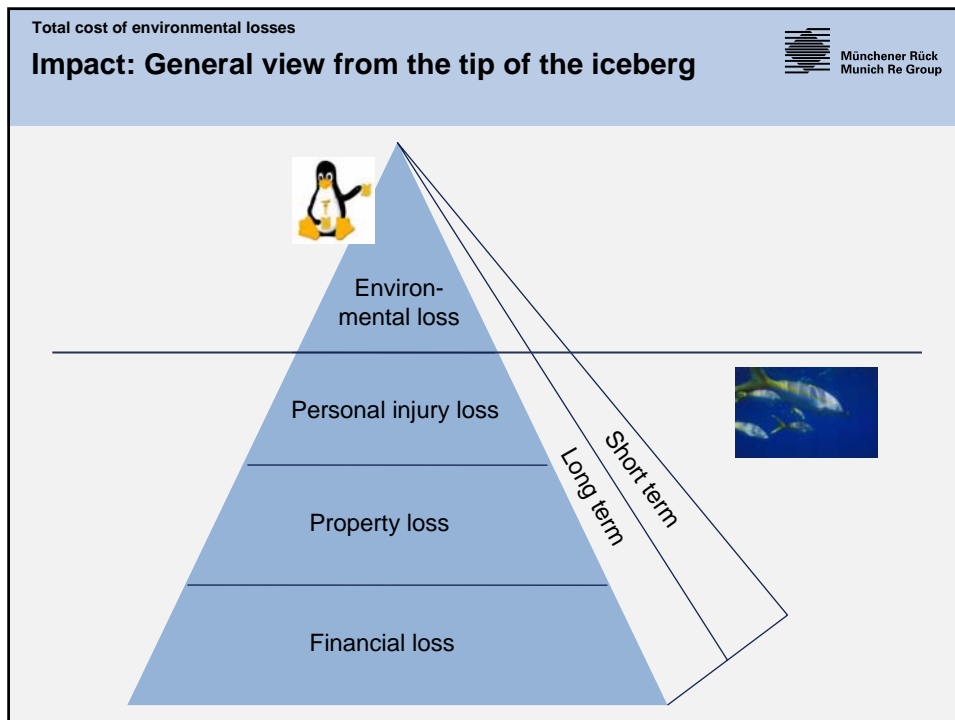
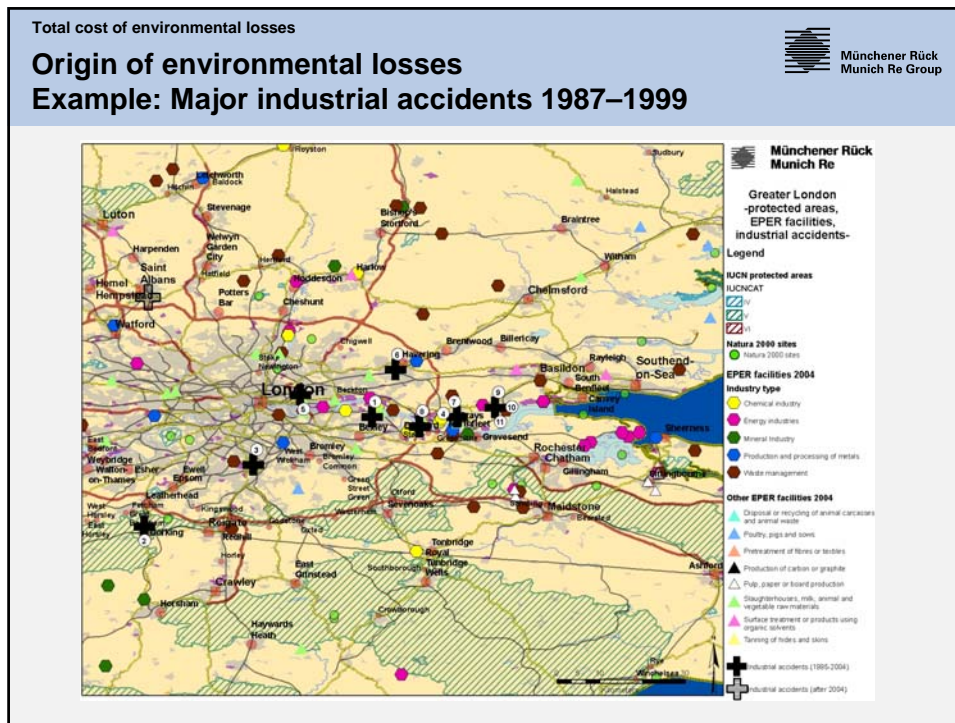
EPER facilities 2004

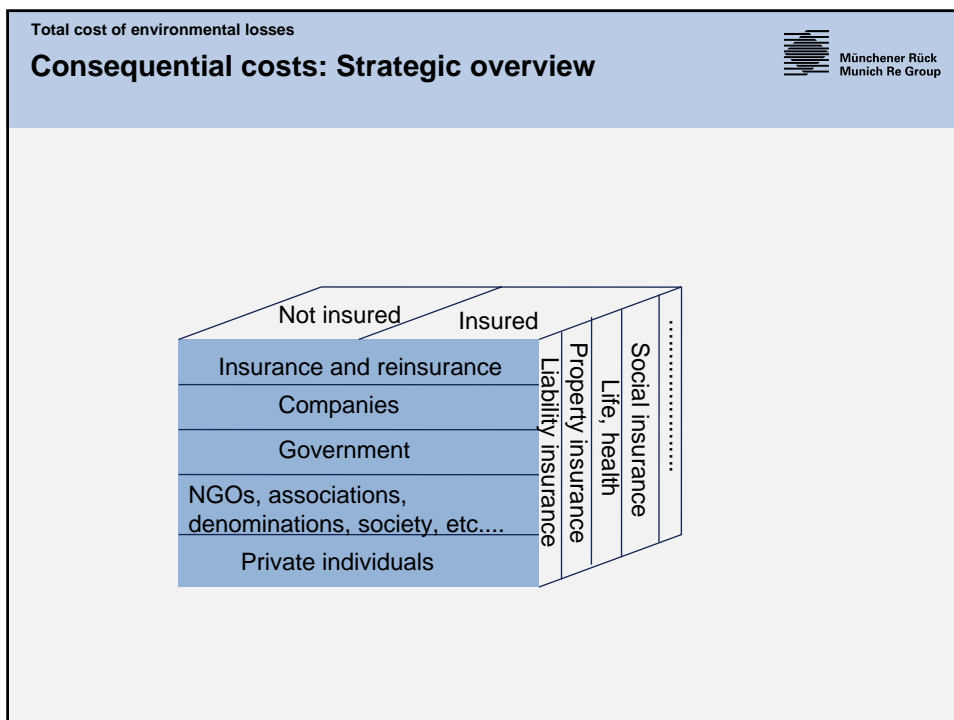
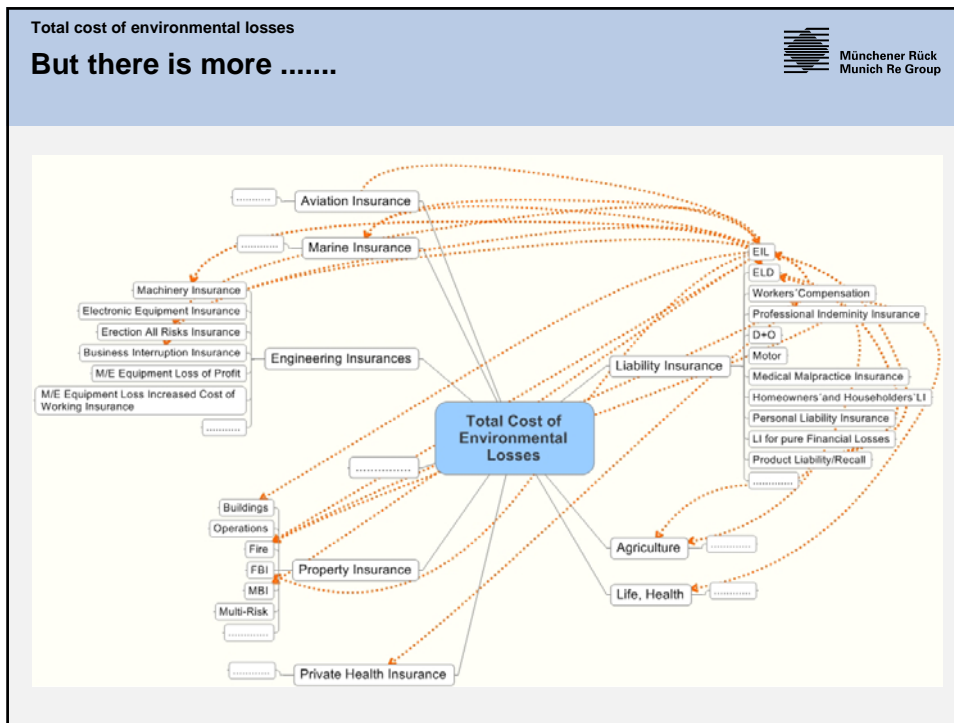
Industry type

- Chemical industry
- Energy industries
- Mineral industry
- Production and processing of metals
- Waste management

Other EPER facilities 2004

- Disposal or recycling of animal carcasses and animal waste
- Poultry, pigs and cows
- Pre-treatment of fibres or textiles
- Production of carbon or graphite
- Pulp, paper or board production
- Slaughterhouses, milk, animal and vegetable raw materials
- Surface treatment of products using organic solvents
- Tanning of hides and skins





Total cost of environmental losses

**Example MR research:
Costs of remediation of ELD losses**

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Compensatory measures (land acquisition, creation, maintenance):

- Wild grassland:	90,000 €/ha
- Reforestation:	85,000 €/ha
- Reforestation in the mountains:	250,000–500,000 €/ha

Flat-rate ecological account of municipalities:

- Munich:	340,000 €/ha
- Fürstentfeldbruck:	50,000–100,000 €/ha

Compensatory measures (creation):

- TU Munich: Wild grassland:	100,000 €/ha
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Total cost of environmental losses

MR research: Case of Illertissen (map) attempt to determine the loss amount for EL with the help of GIS

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Legend

- EmissionPoint
- SAC
- SPA
- Pie
- corine2000
 - Continuous urban fabric
 - Discontinuous urban fabric
 - Industrial or commercial units
 - Road and rail network and associated land
 - Port areas
 - Ports
 - Mineral extraction sites
 - Dump sites
 - Construction sites
 - Open urban areas
 - Sport and leisure facilities
 - Non-irrigated arable land
 - Permanently irrigated land
 - Rice fields
 - Unirrigated
 - Hard trees and berry plantations
 - Olive groves
 - Pastures
 - Complex cultivation patterns
 - Land principally occupied by agriculture, with significant areas of natural vegetation
 - Wooded areas
 - Continuous forest
 - Mixed forest
 - Natural grasslands
 - Moor and heathland
 - Traditional woodland/shrub
 - Beaches, dunes, sands
 - Bare rocks
 - Sparsely vegetated areas
 - Burnt areas
 - Glaciers and perpetual snow
 - Inland marshes
 - Peat bogs
 - Salt marshes
 - Saltlakes
 - Intertidal flats
 - Water courses
 - Water bodies
 - Coastal lagoons
 - Estuaries
 - Sea and ocean
 - no data
 - 0

Data used for this calculation: CORINE Land Cover 2000, SAC Areas of Germany

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Total cost of environmental losses

Case of a refinery near Karlsruhe (table)

OBJECT ID	direction	SAC / SPA	CLC	Total	Proportion SAC / SPA	Proportion CLC
606	N	69157993.0	61002259.7	130160252.7	53.13%	46.87%
607	WNW	65657235.0	63654487.4	129311722.4	50.77%	49.23%
608	NW	101421025.0	78671557.3	180092582.3	56.32%	43.68%
609	WNW	138164371.0	70431361.6	208595732.6	66.24%	33.76%
610	W	175741718.0	82783692.2	258525410.2	67.98%	32.02%
611	WSW	189243290.0	96579161.2	285822451.2	66.21%	33.79%
612	SW	195110524.0	83051961.2	278162485.2	70.14%	29.86%
613	SSW	221530590.0	93096569.9	314627159.9	70.41%	29.59%
614	S	253730470.0	73030534.6	326761004.6	77.65%	22.35%
615	SSE	223234102.0	91360627.2	314594729.2	70.96%	29.04%
616	SE	223267420.0	83839254.1	307106674.1	72.7%	27.3%
617	ESE	226090946.0	104785725.1	330876671.1	68.33%	31.67%
618	E	256096331.0	78573876.3	334670207.3	76.52%	23.48%
619	ENE	308266762.0	86184094.5	394450856.5	78.15%	21.85%
620	NE	388285609.0	83944287.7	472229896.7	82.22%	17.78%
621	NNE	421878189.0	76882256.6	498760445.6	84.59%	15.41%
Sum		3456876575	1307871706	4764748281	72.55%	27.45%

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Total cost of environmental losses

Table of consequential costs of environmental losses

Segment	Main topic	Topic	Insured	Not insured
Insurance	Liability	ELD	Remediation, protected species, habitats	Gradual pollution
		EIL	Bodily injuries, property damage	BI, deliberation
	
	Agriculture
Companies	Major risks	Loss of reputation	?	?
	
Government	Responsibility	Economic situation	?	?
	
Private individuals	Protection of private assets	Current market prices of houses	?	?
	

Total cost of environmental losses

MR research is only the first step





Table of CCoEL shows that the major part of the chart is empty


The consequential next step could be an extended risk analysis of the neighbourhood

Scenario planning



Total cost of environmental losses

Summary



Very diversified data for single objects

Extremely difficult to collect all relevant GIS data and extended information

Questions:

- Is it a question relating to the insurance industry or science?
- What is the mercantile approach?
- Is it a business opportunity for the insurance industry to offer new policies?
- What is the benefit?