Corporate responsibility in (re)insurance business

October 2013
Munich Re

Corporate responsibility in (re)insurance business, 15 October 2013

Agenda

Munich Re key figures

Corporate responsibility at Munich Re

Corporate responsibility product examples from Munich Re’s three business fields

Reinsurance

Primary insurance

Munich Health

Integrated risk management

Responsible investments – MEAG

Climate change – Risks and opportunities

Munich Re’s investment case

Munich Re’s investment case

Key financial data

---|---|---
Shareholders’ equity | €bn | 27.4 | 23.3 | 23.0
Strategic debt | €bn | 5.8 | 5.2 | 6.4
Gross leverage (%) | | 17.4 | 18.3 | 19.0
Net profit | €bn | 3.2 | 0.7 | 2.4
ROE (%) | | 12.6 | 3.3 | 10.4
ROIC (%) | | 13.2 | 3.2 | 13.5
CAGR 2005 – 2012 | | 4.0 | 16.6 | 17.0
GWP | €bn | 7.1
EPS | € | 18.6
DPS | € | 17.0
BVPS | € | 7.1

Premium breakdown by geography

Europe 27.6 (53%)
Asia and Australia 5.0 (10%)
North America 16.8 (32%)

Total 2012 52.0bn

Premium breakdown by segment

Re – Life 11.1 (21%)
Re – P & C 17.1 (33%)
PI – Life 6.7 (13%)
PI – Health 5.3 (11%)
PI – P & C 5.8 (11%)

Munich Re

Key share data

2012 | 2011 | 2010
---|---|---
EPS (€) | 17.98 | 3.94 | 13.06
DPS (€) | 7.60 | 6.25 | 6.25
BVPS (€) | 152.25 | 120.86 | 126.31
Share price (€) | 136.00 | 94.75 | 113.45
Beta | 0.9 | 0.9 | 0.7
P/E | 7.6 | 24.1 | 8.7
P/B | 0.9 | 0.7 | 0.9
Market capitalisation (€bn) | 24.4 | 17.0 | 21.4
Dividend yield (%) | 5.2 | 6.8 | 5.5
Avg. daily trading volume (‘000) | 796 | 1,167 | 1,089

Type of share | No-par-value registered shares
Votes | Each share entitles the holder to one vote
Dividend | Paid out once per year in cash
Trading venues | All German stock exchanges plus Xetra
Shares outstanding | 179,341,212

Key company data

Sector | Insurance
Currency | Euro
Country | Germany
Accounting principles | IFRS

Rating

State: AA rating from all agencies since 2006

Securities codes

Reuters | MUVGn
Bloomberg | MUV2
ISIN | DE0008430026

1 Beta 330 relative to DAX (daily, raw).
2 In relation to the year-end share price.
Munich Re – Key figures

Munich Re and our shares

<table>
<thead>
<tr>
<th>Munich Re1,2</th>
<th>2012</th>
<th>2011</th>
<th>2010</th>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross premiums written €bn</td>
<td>52.0</td>
<td>49.5</td>
<td>45.5</td>
<td>41.4</td>
<td>37.8</td>
</tr>
<tr>
<td>Operating result €m</td>
<td>5,350</td>
<td>1,180</td>
<td>3,978</td>
<td>4,721</td>
<td>3,634</td>
</tr>
<tr>
<td>Taxes on income €m</td>
<td>866</td>
<td>−552</td>
<td>692</td>
<td>1,264</td>
<td>1,372</td>
</tr>
<tr>
<td>Consolidated result €m</td>
<td>3,211</td>
<td>712</td>
<td>2,430</td>
<td>2,564</td>
<td>1,579</td>
</tr>
<tr>
<td>Thereof attributable to minority interests €m</td>
<td>16</td>
<td>10</td>
<td>8</td>
<td>43</td>
<td>24</td>
</tr>
<tr>
<td>Investments €bn</td>
<td>213.8</td>
<td>201.7</td>
<td>193.1</td>
<td>182.2</td>
<td>174.9</td>
</tr>
<tr>
<td>Return on equity %</td>
<td>12.6</td>
<td>3.3</td>
<td>10.4</td>
<td>11.8</td>
<td>7.0</td>
</tr>
<tr>
<td>Equity €bn</td>
<td>27.4</td>
<td>23.0</td>
<td>23.0</td>
<td>22.3</td>
<td>21.1</td>
</tr>
<tr>
<td>Off-balance-sheet reserves3 €bn</td>
<td>11.0</td>
<td>5.7</td>
<td>3.6</td>
<td>3.2</td>
<td>2.5</td>
</tr>
<tr>
<td>Net technical provisions €bn</td>
<td>186.1</td>
<td>181.2</td>
<td>171.1</td>
<td>163.9</td>
<td>157.1</td>
</tr>
<tr>
<td>Staff at 31 December</td>
<td>45,437</td>
<td>47,206</td>
<td>46,915</td>
<td>47,249</td>
<td>44,209</td>
</tr>
</tbody>
</table>

Our shares

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Earnings per share €</td>
<td>17.98</td>
<td>3.94</td>
<td>13.06</td>
<td>12.95</td>
</tr>
<tr>
<td>Dividend per share €</td>
<td>7.00</td>
<td>6.25</td>
<td>6.25</td>
<td>5.75</td>
</tr>
<tr>
<td>Amount distributed €m</td>
<td>1,254</td>
<td>1,110</td>
<td>1,110</td>
<td>1,072</td>
</tr>
<tr>
<td>Share price at 31 December €</td>
<td>136.00</td>
<td>94.78</td>
<td>113.45</td>
<td>108.67</td>
</tr>
<tr>
<td>Market capitalisation at 31 December4 €bn</td>
<td>24.4</td>
<td>17.0</td>
<td>21.4</td>
<td>21.5</td>
</tr>
<tr>
<td>No. of shares at year-end (ex own shares) m</td>
<td>178.5</td>
<td>177.6</td>
<td>180.4</td>
<td>191.9</td>
</tr>
</tbody>
</table>

1 Previous year’s figures adjusted owing to IAS 8; see “Changes in accounting policies and other adjustments”.
2 In 2012, our segment reporting was modified and no longer has a consolidation column. The figures for the previous year have been adjusted accordingly. Comparability with the years 2009 and 2010 is thus limited.
3 Including amounts attributable to minority interests and policyholders.
4 This includes own shares earmarked for retirement.

Agenda

Munich Re key figures

Corporate responsibility at Munich Re

Astrid Zwick

Head of Corporate Responsibility

Corporate responsibility product examples from Munich Re’s three business fields

- Reinsurance
  - Christian Scharrer
- Primary insurance
  - Stephan Hermann
- Munich Health
  - Josep Santaacreu Bonjoch

- Integrated risk management
  - Markus Hummel
- Responsible investments – MEAG
  - Holger Kerzel
- Climate change – Risks and opportunities
  - Peter Höppe
Corporate responsibility is an integral part of our corporate strategy

<table>
<thead>
<tr>
<th>Main message</th>
<th>Corporate responsibility is part of the core principles and corporate strategy of Munich Re, providing business opportunities and enhancing risk management.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why this event</td>
<td>A growing interest – also among mainstream investors – in the topic shows the need for a proactive dialogue to present Munich Re’s approach and discuss a new dimension in business still shaped by best practice.</td>
</tr>
<tr>
<td>Our SRI targets</td>
<td>Increase the attractiveness of Munich Re shares through our competence in providing the best business solutions to our customers and managing all types of risks, enhancing sustainable value creation.</td>
</tr>
<tr>
<td>Why invest in Munich Re</td>
<td>Strong partner for clients and reliable for shareholders, delivering on our promises. Our shares are a stable, attractive investment in the insurance sector, with a balanced risk-return profile and high overall yield.</td>
</tr>
</tbody>
</table>

Structure of the day – Corporate responsibility at Munich Re

<table>
<thead>
<tr>
<th>Introduction to corporate responsibility at Munich Re</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corporate responsibility at Munich Re</td>
</tr>
<tr>
<td>Strategy, organisation and action fields</td>
</tr>
</tbody>
</table>

Corporate responsibility in core business covers opportunities (2) and risks (3)

<table>
<thead>
<tr>
<th>Products and services</th>
<th>Integrated risk management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples from (a) reinsurance (b) primary insurance (c) Munich Health</td>
<td>Handling emerging risks and reputational risks</td>
</tr>
</tbody>
</table>

Corporate responsibility in asset management

| Responsible investment – MEAG |

Focus topic: Climate change – Societal and business challenge

| Climate change strategy – Risks and opportunities |
Corporate responsibility at Munich Re – Introduction

Table of contents

1 Corporate responsibility at Munich Re Group
2 Product examples from Munich Re’s three business fields
   (a) reinsurance, (b) primary insurance, (c) Munich Health
3 Integrated risk management:
   Handling emerging risks and reputational risks
4 Responsible investments – MEAG
5 Focus topic: Climate change – Risks and opportunities

Corporate responsibility at Munich Re – Overview

Munich Re’s international cooperation –
A strong commitment towards corporate responsibility

Examples

- **UNEP FI**
  Munich Re has signed the climate declaration of the UNEP FI and is active member of the UNEP FI Climate Change Working Group.
  - since 1999

- **Principles for Responsible Investment (PRI)**
  Munich Re has actively developed and signed the UN Principles for Responsible Investment (PRI) as first German company in April 2006.
  - since 2006

- **UN Global Compact**
  Munich Re is member of the UN Global Compact since August 2007. The ten principles of Global Compact are a guidance for action in our business and set the basis for our Corporate Responsibility activities.
  - since 2007

- **Principles for Sustainable Insurance (PSI)**
  Involvement since 2007, first holding the chair in the UNEP FI – PSI Team, now active as member of the PSI Board, as well as founding signatory since June 2012.
  Aim: to anchor ESG criteria into core business along the value chain.
  - since 2012
The core principles of Munich Re include our responsible approach ...

Core business
I. Our core business is the management of insurable risks – excellence in risk management and underwriting as well as active risk diversification are our ambition

Cooperation with clients and sales partners
II. We base our actions on our clients’ and sales partners’ needs and offer them the best solutions – through our knowledge, our innovative power and close cooperation

Disciplined financial management
III. We manage our Group in a disciplined and value-oriented way – with liability-driven investments and consistent capital management

Group-wide human resources management
IV. We use the management potential and knowledge within the Group – by promoting diversity, flexibility and a unifying leadership culture

Responsible approach
V. Our responsible approach creates sustainable value – for our clients, staff, shareholders and society

Source: Group Conference 2012

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... and are detailed in our Corporate Responsibility Strategy

Core principles and goals

Core principles
CR is an integral part of our corporate strategy and relevant for all business areas and operations:
- We actively incorporate ecological, social and ethical aspects in our insurance business and asset management.
- We pursue active environmental management at our locations and aim to achieve climate neutrality.
- Munich Re fulfills its responsibility as a member of society (corporate citizen) through involvement in issues closely related to its core business and, at its locations, in social and cultural areas.

Goals
We contribute to ...
- an increase in reputation and attractiveness for all stakeholders;
- potential early identification of business risks and opportunities;
- educated decisions on global risks and problems;
- a strengthening of Munich Re’s share price.

Overall KPI:
Inclusion in major sustainability indices and scoring among the top 50%
## Corporate responsibility at Munich Re – Overview

### Five action fields in one Group-wide CR programme

#### Enabling Framework

<table>
<thead>
<tr>
<th>Strategy &amp; Governance</th>
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</thead>
<tbody>
<tr>
<td>Corporate responsibility strategy</td>
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<tr>
<td>Corporate responsibility governance</td>
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<tr>
<td>Compliance to UN Global Compact</td>
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</tbody>
</table>

#### Core activities

<table>
<thead>
<tr>
<th>Corporate Responsibility in Business</th>
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<tbody>
<tr>
<td>Integration of corporate responsibility issues into (re) insurance business (PSI)</td>
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<table>
<thead>
<tr>
<th>Environmental Management System</th>
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<tr>
<td>Global CO2 neutrality</td>
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<tr>
<td>Global Environmental Management System policy and management</td>
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<tr>
<th>Corporate Citizenship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donations</td>
</tr>
<tr>
<td>Corporate Volunteering</td>
</tr>
<tr>
<td>Foundations</td>
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<tr>
<td>Impact Assessment</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Reporting &amp; Communication</th>
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</thead>
<tbody>
<tr>
<td>Annual update of corporate responsibility portal</td>
</tr>
<tr>
<td>Global corporate responsibility reporting</td>
</tr>
<tr>
<td>Position in major SRI ratings</td>
</tr>
</tbody>
</table>

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1. UNGC = United Nations Global Compact (adopted by Munich Re in 2007)  
2. PSI = UN Principles for Sustainable Insurance (signed by Munich Re in 2012)  
3. PRI = UN Principles for Responsible Investment (signed by Munich Re in 2006).

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### The Corporate Responsibility department is a central function at Munich Re

#### Structure

<table>
<thead>
<tr>
<th>CEO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Communications</td>
</tr>
<tr>
<td>Corporate Strategy</td>
</tr>
</tbody>
</table>

**“Guideline competency”**

Business units implement strategy at local level with CR departments/coordinators, environmental managers, etc.  
CR is a central function located in Group Development which directly reports to the CEO  
CR triggers, monitors, controls, enables and manages Group-wide CR-related tasks

---

**New Group Corporate Responsibility Committee (GCRC) as panel to monitor CR strategy and as Group Task Force for sensitive business issues**
### Corporate responsibility goals are part of the three-year performance of all Board Members

#### Three-years CR objectives of Board Members

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>- Standards to purchase Group-wide CO₂ certificates</td>
<td>- Inclusion in major SRI ratings</td>
</tr>
<tr>
<td>- CO₂ emission reduction of 10 % per employee by 2015</td>
<td>- Development and implementation of integration of ESG⁴ aspects in core business</td>
</tr>
<tr>
<td>- Environmental management system covering at least 75% of all employees by 2014</td>
<td>- Fulfillment of the CR commitments (UN Global Compact, PRI, PSI)</td>
</tr>
</tbody>
</table>

The objectives are broken down into:

#### Munich Re business fields and central divisions

² ESG = Environmental social and governance.

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### Principles for Sustainable Insurance (PSI) – A voluntary and aspirational global framework for the insurance industry

#### Principles for Sustainable Insurance

1. Embed ESG in decision-making along the value chain
2. Work together with clients and business partners to raise awareness, reduce risk and develop solutions
3. Engage with governments, regulators and other key stakeholders
4. Demonstrate accountability and transparency
### PSI signatory companies – Have combined total assets of over US$ 5 trillion

1. Achmea (Netherlands)
2. AEGON (Netherlands)
3. ASR Nederland (Netherlands)
4. Atlanticlux (Luxemburg)
5. Aviva (UK)
6. AXA (France)
7. Bradesco Seguros (Brazil)
8. Continental Re (Nigeria)
9. Custodian & Allied (Nigeria)
10. Delta Lloyd (Netherlands)
11. FATUM Schadeverzekering (Suriname)
12. Grupo Segurador Banco do Brasil e MAPFRE (Brazil)
13. HSBC Insurance (UK)
14. ING (Netherlands)
15. Insurance Australia Group (Australia)
16. Interamerican Hellenic Insurance Group (Greece)
17. Itau Seguros (Brazil)
18. La Banque Postale (France)
19. MAPFRE (Spain)
20. Mitsui Sumitomo Insurance (Japan)
21. Mongeral AEGON (Brazil)
22. Munich Re (Germany)
23. Porto Seguro (Brazil)
24. RSA Insurance Group (UK)
25. Santam (South Africa)
26. Santam (South Africa)
27. SCOR (France)
28. Seguradora Lider (Brazil)
29. Sompo Japan Insurance (Japan)
30. Sovereign (New Zealand)
31. Storebrand (Norway)
32. SulAmerica (Brazil)
33. Swiss Re (Switzerland)
34. TAL (Australia)
35. Terra Brasil Resseguros (Brazil)
36. The Co-operators Group (Canada)
37. Tokio Marine and Nichido Fire Insurance (Japan)
38. Zwitserleven (Netherlands)

**Status:** October 2013
Corporate responsibility at Munich Re – Corporate responsibility in business

Corporate responsibility in business at Munich Re
selected solutions to societal challenges … some examples

1. Products and services according to business field specialty

**REINSURANCE**
- Climate change
  - Nathan Risk Suite
  - Agro Systems
  - New coverage concepts in the area of renewable energy
- Public-private partnership
  - Weather-index-based insurance
- Desert power
  - CO2-free power generation in North Africa

**MUNICH HEALTH**
- Access to insurance
  - Managed care & prevention
  - Pilot product example: specific solutions for special groups such as Down (DKV Integral Sin Barreras)
- Inclusive business model
  - Fundación Integralia

**ERGO**
- Life insurance
  - Unit-linked life insurance with investment in SRI products
- Motor insurance
  - 10% premium rebate for environmentally friendly cars
- Microinsurance
  - Range of insurance products (e.g. property, personal accident, crop)
  - Mobile-phone-based insurance solutions

**MEAG**
- Sustainability anchored in General Investment Guidelines
- Investment in renewables and infrastructure
- Provision of sustainability funds for third parties
- ESG country rating

**MUNICH HEALTH**
- Access to insurance
  - Managed care & prevention
  - Pilot product example: specific solutions for special groups such as Down (DKV Integral Sin Barreras)
- Inclusive business model
  - Fundación Integralia

2. Risk management across the business fields

**REINSURANCE**
- **Enterprise risk management:**
  - Quantitative risk management
    - Internal risk model
    - Limit and trigger system
    - Risk capital allocation

**ERGO**
- **Enterprise risk management:**
  - Quantitative risk management
    - Internal risk model
    - Limit and trigger system
    - Risk capital allocation

**MEAG**
- **Qualitative risk management**
  - Risk governance
  - Internal control system
  - Emerging risk management
  - ESG aspects and sensitive business issues
  (part of reputational risk management)

**MUNICH HEALTH**
- **Qualitative risk management**
  - Risk governance
  - Internal control system
  - Emerging risk management
  - ESG aspects and sensitive business issues
  (part of reputational risk management)
Definition of environmental, social and governance (ESG) aspects at Munich Re

- Pollution
- Natural resources and biodiversity
- Political context and public awareness
- Labour and working conditions
- Health, safety and security for the community
- Displacement of people
- Cultural heritage
- Responsible and correct planning and evaluation
- Compliance
- Consultation and transparency

Corporate responsibility at Munich Re – Corporate responsibility in business

Environment
- Avoiding and reducing emissions
  - We consistently avoid and reduce emissions wherever possible (from business travel, energy, water, paper and waste). We establish the highest technical standards wherever economically reasonable. We consider environmental principles while choosing materials, suppliers and service providers.

Social
- Raising staff awareness
  - We consistently heighten environmental awareness and responsibility of all staff members and motivate them to actively protect the environment

Governance
- Improving performance
  - We monitor and develop our environmental measures with the aim of continuously improving the environmental performance of our business operations

- Communication with stakeholders
  - We communicate openly and inform our stakeholders about our environmental activities and environmental performance on a regular basis. We raise awareness and share information on environmental issues where appropriate. Thus we promote a culture of environmental protection.

Group policy specifies the Munich Re corporate responsibility core principles – for environmental protection

Avoiding and reducing emissions
We consistently avoid and reduce emissions wherever possible (from business travel, energy, water, paper and waste). We establish the highest technical standards wherever economically reasonable. We consider environmental principles while choosing materials, suppliers and service providers.

Raising staff awareness
We consistently heighten environmental awareness and responsibility of all staff members and motivate them to actively protect the environment

Improving performance
We monitor and develop our environmental measures with the aim of continuously improving the environmental performance of our business operations

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We communicate openly and inform our stakeholders about our environmental activities and environmental performance on a regular basis. We raise awareness and share information on environmental issues where appropriate. Thus we promote a culture of environmental protection.
Corporate responsibility at Munich Re – Environmental management

Environmental management system in practice – Achieving carbon reduction

Best practice at Munich Re America:
- 7,660 solar panels with an installed capacity of 2.5 megawatts (built in 2012)
- Reduction of annual electricity costs by almost $500,000

Objective of DKV Seguros:
- Add value to the products by making carbon neutrality tangible
- Encourage the customer to buy a carbon-neutral product

Corporate responsibility at Munich Re – Corporate citizenship

Corporate Citizenship concept of Munich Re: Responsibility for the community

Focus: natural catastrophes, science and education, environment, demographic change, health, cultural and social community projects

- A new concept designed to link our commitment more closely to the challenges facing society
- Project-based approach supported by the work of our three corporate foundations
Fresh water accessibility – Water Benefit Certificates

- Private-public partnership (PPP) founded in 2011 to develop an innovative financing mechanism to create Water Benefit Standard
- Aim: To create sustainable water management in regions with great water shortages

Overview of Corporate Citizenship (CC) expenses 2012

Munich Re (Group) CC-Spending in 2012: approx. €5,000,000

<table>
<thead>
<tr>
<th>Category</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science/Education</td>
<td>35</td>
</tr>
<tr>
<td>Social</td>
<td>24</td>
</tr>
<tr>
<td>Health</td>
<td>20</td>
</tr>
<tr>
<td>Culture &amp; Arts</td>
<td>7</td>
</tr>
<tr>
<td>Society &amp; Demographic Change</td>
<td>3</td>
</tr>
<tr>
<td>Environment</td>
<td>1</td>
</tr>
<tr>
<td>Natural Catastrophes</td>
<td>9</td>
</tr>
<tr>
<td>Not Classified</td>
<td>1</td>
</tr>
</tbody>
</table>

Project examples:

- Disaster prevention – Landslide mitigation in Aizawl, India
  - Partnership with GeoHazards International (2012)
  - Two-year disaster prevention project in northern India
- Fresh water accessibility – Water Benefit Certificates
  - Private-public partnership (PPP) founded in 2011 to develop an innovative financing mechanism to create Water Benefit Standard
  - Aim: To create sustainable water management in regions with great water shortages

Agenda

Munich Re key figures

Corporate responsibility at Munich Re - Astrid Zwick

Corporate responsibility product examples from Munich Re's three business fields

<table>
<thead>
<tr>
<th>Business Field</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reinsurance</td>
<td>Christian Scharrer</td>
</tr>
<tr>
<td>Primary insurance</td>
<td>Stephan Herrmann</td>
</tr>
<tr>
<td>Munich Health</td>
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</tr>
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<td>Climate change – Risks and opportunities</td>
<td>Peter Höppe</td>
</tr>
</tbody>
</table>
Existing insurance policies and the pipeline

With Green Tech Solutions, Corporate Insurance Partner pools expert resources and know-how in the field of renewable energies. Innovative solutions offer all participants along the value chain the stability and security they need to master the changing requirements of the energy landscape.

Photovoltaic industry
- Performance warranty for solar modules
- Performance cover for solar parks
- Performance warranty for concentrated solar power

Wind industry
- Performance warranty for Wind turbines (serial loss cover)
- Coverage for offshore logistic delays

Further solutions
- Performance warranty for lithium ion batteries
- LED performance warranty cover

Photovoltaic industry
- Performance warranty for solar modules
- Performance cover for solar parks
- Performance warranty for concentrated solar power

Wind industry
- Performance warranty for Wind turbines (serial loss cover)
- Coverage for offshore logistic delays

Further solutions
- Performance warranty for lithium ion batteries
- LED performance warranty cover

Product development in Green Tech Solutions
continually increasing

- PV performance warranty for photovoltaic modules
- Performance cover for photovoltaic parks (option cover)
- Performance warranty for wind turbines (serial loss cover)
- LED performance warranty cover
- Performance warranty for concentrated solar power
- Performance cover for photovoltaic inverter and module optimiser devices
- Biomass performance warranty
- Coverage for offshore logistic delays
- Performance warranty for energy storage

The product development and implementation process is continually improving
Need and content of warranty coverage

<table>
<thead>
<tr>
<th>Investor’s revenue risk</th>
<th>Investor’s performance risk</th>
<th>Manufacturer’s risk1 (company perspective)</th>
<th>Project performance risk (investor’s perspective)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed-in tariff for 25 years</td>
<td>Performance warranty 25 years</td>
<td>Extended warranty insurance for manufacturers (corporate cover)</td>
<td>Extended warranty insurance for investors and banks (option cover)</td>
</tr>
<tr>
<td>Guaranteed energy sales price</td>
<td>Guaranteed minimum performance</td>
<td>Balance sheet protection against excessive warranty claims</td>
<td>Protection against low module performance in case of manufacturer’s insolvency</td>
</tr>
</tbody>
</table>

1 Through excessive warranty claims.

Our pioneering risk solutions for the wind industry

- **Serial loss cover for wind turbines**: Covers the risk of large technical loss in the wind industry
  - Manufacturers and component suppliers

- **Offshore logistics delays**: Delays of offshore projects due to adverse weather conditions are covered
  - Project developers and offshore firms

- **Lack of wind**: Protection against loss of revenues in low-wind years
  - Project developers and investors
The new tailor-made serial loss cover for the wind industry provides comprehensive coverage

We treat a serial loss1 as a single insured event.
Most cost items related to a serial loss can be covered

Serial loss event
The costs of all individual serial failures are aggregated:

**Physical damage**
- Pro-active repairs for all defective components in the series (retrofits)
- Component suppliers' warranty default
- Availability guarantees (onshore)
- Offshore logistics costs (limit per affected turbine)

---

1 Failure of a minimum number of wind turbine components with a similar root cause.

---

How does the serial loss cover work?

Cover structure for settlement of a serial loss claim

<table>
<thead>
<tr>
<th>Start of wind farm operation</th>
<th>Serial loss event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component supplier warranty</td>
<td>Turbine manufacturer warranty</td>
</tr>
<tr>
<td>Serial loss cover</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Terms and conditions:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Multi-year (max. 5 years) cover written for each production year (onshore) or project (offshore)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Claims do not entitle insurer to cancel the cover</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Any serial loss is fully allocated to the year in which the first loss occurs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
We are committed to our corporate responsibility and to sustainable business practices.

Thinking and acting for the long term is at the heart of our business.

- Codes of conduct for in-house staff and sales agents
- Compliance unit to ensure compliance with internal and external guidelines

- Majority of fixed-interest bonds and shares invested sustainably
- Investment focus on fixed-interest securities
- Broad spread of investments minimises risks

- Eco-friendly property-casualty products
- Insurance cover for renewable energies
- Sustainable funds for individual old-age provision and wealth building

- Guidebooks, services, information for customers
- Fair and transparent advice
Primary insurance – Sustainable products at ERGO

Products: Sustainability is integrated into our portfolio (I)

Sustainable Products

- Responsibility is an essential part of ERGO’s corporate strategy. Our business – protection against risks – is a promise for the future and thus cannot be separated from acting responsibly and in a prudent way.
- Sustainability is also reflected in our insurance solutions. We consider the protection of the environment and changing customer needs, which are integrated into our product development. E.g. in India, we help people to safeguard their livelihoods at affordable conditions.

- Insurance with ecological aspects
- Innovative insurances
- Microinsurance in India

Primary insurance – Sustainable products at ERGO

Products: Sustainability is integrated into our portfolio (II)

- Minimum revenue insurance and D&O insurance for photovoltaic installations
- Environmental impairment insurance for corporate clients for damaged ecological systems
- Household insurance which assumes the extra costs for more eco-friendly appliances in the event of a claim
- Reduced motor insurance tariffs for cars with low CO₂ emissions
- ERGO Balance Protect provides specific support after traumatic events
- It is possible to take out the post-treatment insurance of ERGO Tarif even if the event insured has already occurred
- ERGO Zahn-Ersatz-Sofort: dental supplementary insurance without exclusions
- ERGO has developed micro-insurance products in collaboration with specialists on the grassroots level, ranging from life, accident and property insurance to cover against the loss of important livestock, health insurance and life insurance.
### Primary insurance – Sustainable products at ERGO

#### A few examples of products in the non-life segment

<table>
<thead>
<tr>
<th>Tariff for environmentally-friendly cars</th>
<th>ERGO became one of the first German insurers to implement an environmental tariff based on CO₂ emissions.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• A product for electric vehicles, recognising that E-mobility clients need specific product features, such as extended battery coverage and special assistance in case of technical issues</td>
</tr>
<tr>
<td></td>
<td>• The tariff does not differentiate between hybrid, gasoline, diesel or natural-gas engines; instead, the CO₂ emissions in connection with the vehicle class are binding</td>
</tr>
<tr>
<td></td>
<td>• there are currently about 50 different models</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ERGO engineering insurance</th>
<th>We accompany our domestic and international clients with the insurance of photovoltaic systems.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• End of the 1980s: ERGO already started to deal with the topic of renewable energy</td>
</tr>
<tr>
<td></td>
<td>• 2005: Developing special covers for all renewable energy technologies</td>
</tr>
<tr>
<td></td>
<td>• 2008: ERGO was the first provider of reduced-yield insurance for photovoltaic systems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Industrial property (insurance of energy supply systems)</th>
<th>An additional component in industrial buildings insurance. We cover against property insurance risks for systems which supply the insured building:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• photovoltaic and solar thermal systems</td>
</tr>
<tr>
<td></td>
<td>• block-type thermal power stations</td>
</tr>
<tr>
<td></td>
<td>• heat pumps</td>
</tr>
<tr>
<td></td>
<td>• ventilation and air-conditioning systems</td>
</tr>
</tbody>
</table>

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### Agenda

- Munich Re key figures
- Corporate responsibility at Munich Re: Astrid Zwick
- Corporate responsibility product examples from Munich Re’s three business fields
  - Reinsurance: Christian Scharrer
  - Primary insurance: Stephan Herrmann
  - Munich Health: Josep Santacreu Bonjoch, CEO of DKV Seguros
- Integrated risk management: Markus Hummel
- Responsible investments – MEAG: Holger Kerzel
- Climate change – Risks and opportunities: Peter Höppe
DKV Seguros – Key figures

<table>
<thead>
<tr>
<th>Year</th>
<th>Gross written premium €m</th>
<th>Combined ratio %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>388</td>
<td>93.1</td>
</tr>
<tr>
<td>2009</td>
<td>402</td>
<td>96.0</td>
</tr>
<tr>
<td>2010</td>
<td>453</td>
<td>94.2</td>
</tr>
<tr>
<td>2011</td>
<td>503</td>
<td>91.3</td>
</tr>
<tr>
<td>2012</td>
<td>90.9</td>
<td></td>
</tr>
</tbody>
</table>

DKV Seguros is one of the leading health insurance companies in Spain, committed to people and oriented to a sustainable development.

DKV 360º is a holistic approach to integrating CR in the company focusing on health (WHO definition: Health is a state of complete physical, mental and social well-being and not merely the absence of disease).

Healthy professionals
- Employees
- Collaborators

Healthy companies
- Clients
- Organisation

Healthy society
- Planet
- Social integration
- Promoting health

DKV 360º objective is to create value in our relationships for all our stakeholders.
Munich Health – Relevance of CR within DKV Seguros

Customers

Responsible products and social innovation

- Extended the entrance limit until 70 years (75 in Jan 2014)
- Policy for life: commitment to keep the agreement with all 3-years-customers
- Adopted children
- Commitment to not increase for a higher frequency of use.

Pilot product example: we develop solutions to special groups such as Down (DKV Integral Sin Barreras)

Responsible services

- www.dkvhablaclaro.com
- Fair and transparent advice using clear language in our contracts plus other specific actions such as workshops, guides, etc.
  - Clarity certificate (UCE)
  - Client and mediator decalogue
  - Web dkvhablaclaro.com
  - UNESPA transparency guide

A pilot product example: Green product innovation pilot in burial insurance

- Ecufuneral ERGO Family Protection is the first policy that offers certified ecofunerals (by Terra Foundation)
- This project, piloted in Barcelona, is a worldwide pioneer and developed in collaboration with the funeral provider group Mémora
- Green burial (biodegradable urns, reminders on recycled paper, certified wood coffins without varnish, etc.) also facilitating the responsible funeral planning aspects of the funeral
- Also includes collaboration with the environmental improvement of surroundings so customers can see the results
- Pilot already recognised as a Global Compact Spain (UN) award finalist
- 383 insured members in September 2013
COMUNIDAD VIVE LA SALUD: First insurance social network online provides a forum for clients, best doctors and patients' associations to support people with information and same experiences (diabetes, pregnancy, etc.)

MI PLAN DE VIDA SALUDABLE: Prevention plans: obesity, heart, cancer, stress …

General public and customers

Responsible services: Enhancing health and well-being among general public and customers

- Contact centre created 13 years ago
- Excellent service: 94% effectiveness, 7,419 calls per day
- Serving other organisations (Unilever, Novartis, Oxfam …)
- Employees: 241. Total DKV disabled people: 23% (first company). Ex-employees working in other companies: 112
- Non-employees trained and working in other companies: 27
- Low staff turnover rate (3.69%) and low absenteeism (50% less than call-center sector)
- Excellence and social impact awards
- Employee pride of belonging
- Social innovation easily understandable and highly valued by our main stakeholders (clients, agents, doctors)
- 2013: IESE business school case

DKV INTEGRALIA FOUNDATION: Integration of people with disabilities in the workplace
**Munich Health – Relevance of CR within DKV Seguros**

**Transparency: We are a leading company in reporting, ethics and environmental audit**

**Ethical management**
- Codes of conduct for in-house staff and other stakeholders
- Compliance responsible for ensuring compliance with internal and external guidelines

**Transparency – open organisation**
- 11 sustainability reports since 2001
- 2002: First insurance company to adopt GRI
- 2002: UN Global compact member
- 2002: First insurance company to have KPMG triple audit
- 2003: Good governance information included
- 2005: Top 6 Best sustainability report in Spain by Instituto de censores jurados de cuentas de España (ICJCE)
- Actual level of reporting: G3 (A+ Accordance), AA1000APS e ISAE3000.
- 2007: First insurance company to offset CO2 (carbon-neutral products zero CO2) + SGE21 (ESG in management, governance)
- 2010: ISO14001 + first insurance company EthSI seal (ethical investments)
- 2011: EMAS
- Feb 2012: Carbon footprint per product PAS 2050 (first insurance co. in Europe)
- 2012: ISO14001 in two commercial offices

**Munich Health – Relevance of CR within DKV Seguros**

**Reputation KPIs: Reptrak™ results**

Scale 0-100

2012

1 RepTrak™ measurement and tracking system has been analysing DKV’s reputation among the general public, customers, DKV employees, insurance agents and doctors since 2010. It also makes it possible to analyze the strengths and weaknesses as well as the supportive behaviour of the main insurance companies towards each stakeholder, describing which are the most relevant variables for each of these groups when evaluating these companies’ reputation.
Agenda

Munich Re key figures

Corporate responsibility at Munich Re  
Astrid Zwick

Corporate responsibility product examples from Munich Re’s three business fields

Reinsurance  
Christian Scharrer

Primary insurance  
Stephan Herrmann

Munich Health  
Josep Santacreu Bonjoch

Integrated risk management  
Markus Hummel  
Head of Risk Identification & Control

Responsible investments – MEAG  
Holger Kerzel

Climate change – Risks and opportunities  
Peter Höppe

Integrated risk management at Munich Re – Organisational framework

Clear segregation of underwriting responsibilities and controls

Board of Management

- Specifies the business and risk strategy
- Defines risk appetite and sets limits based on risk-bearing capacity
- Monitors business and risk profile (e.g. based on risk report)

First line of defence – Risk takers

- Responsible for the treatment and control of the business units’ risks, especially for the identification, analysis and management of all significant risks within the business unit
- Reports exposures to independent risk management function

Second line of defence – ERM\(^1\) functions

- Independent risk identification and analysis on at least an aggregate level
- Challenge and provide input for risk strategy and risk decisions
- Recommends limits and monitors compliance with limits
- Designs and implements risk control processes

Third line of defence – Internal audit

Independent verification that effective controls are in place and functioning properly

Segregation between business units and risk controlling up to management

\(^1\) Enterprise Risk Management.
Integrated risk management (IRM) at Group level

<table>
<thead>
<tr>
<th>Risk Identification &amp; Control</th>
<th>Risk Analytics &amp; Reporting</th>
<th>Risk Strategy/Asset &amp; Liability Management</th>
<th>Solvency Consulting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging risk management</td>
<td>Development and maintenance of risk models</td>
<td>Risk strategy</td>
<td>Enable operational units to display the value of reinsurance</td>
</tr>
<tr>
<td>Accumulation control</td>
<td>Legal entity models</td>
<td>Strategic Asset &amp; Liability Management</td>
<td>Strengthen client relationship through Solvency II-related advice and service</td>
</tr>
<tr>
<td>Operational risk management</td>
<td>Risk capital calculations</td>
<td>Limit and trigger-system</td>
<td></td>
</tr>
<tr>
<td>Risk disclosure</td>
<td>Allocation of risk capital for steering purposes</td>
<td>Risk governance</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risk reviews and new product approval</td>
<td></td>
</tr>
</tbody>
</table>

Peripheral risk management with mandate from Group IRM

<table>
<thead>
<tr>
<th>Segments/lines of business:</th>
<th>Legal entity:</th>
<th>Asset management:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property &amp; casualty, life, health, credit</td>
<td>e.g. ERGO-IRM, CRO North-America Life &amp; Non-Life</td>
<td>MEAG Investment Controlling</td>
</tr>
</tbody>
</table>

Structure aligned with risk control process. Functional reporting lines between Group IRM and Enterprise Risk Management functions established

Risk management components are designed to achieve Munich Re’s objectives

- All types of risks are explicitly addressed by risk management tools
- All regulatory requirements are explicitly addressed by Munich Re’s risk management tools
- The various risk management components are consistent and build upon each other
- Tools take into account Munich Re’s complex business operations

Balance regulatory requirements with business objectives and culture
What are emerging risks?

Emerging risks are newly developing or changing risks. They include trends and potential shock events with:

- a high degree of uncertainty (occurrence probability, loss amount), and
- a substantial potential impact on an organisation.

What we want to achieve …

Overarching objective: Protect the Group reputation and enable it to sustainably optimise and protect shareholder value.
Emerging risk committees

The Emerging Risk (ER) process is managed by the ER Core Team (Steering Committee) … supported by the international ER Community

Life
Claims
Non-Life
Claims
W
Non-Life
W
ERGO
Group-/R I Dev.

Monthly meetings
Regular conference calls

The ER Think Tank is an international, heterogeneous and inter-disciplinary team of specialists …

Integrated approach via integration of inter-disciplinary teams

Identify
How can we ensure that we know all significant emerging risks?
Prioritised list of emerging risks

Analyse
How can we ensure that we understand these ER well enough?
Fact sheet, internet monitoring tool (IMT) analysis

Manage
How can we manage these ER appropriately?

- Internal controls
- UW guidelines, best practices, topic papers
- Adjust MRCM1, risk limits
- Strategic business plan
- New service or products

Reporting (annual ER report, internal/external risk report)

Emerging risk process designed to create management impact

1 MRCM: Munich Re Capital Model.
Emerging risks – Examples of successful identification and management

- Pandemics
- Demographic change and longevity
  
  Found direct way into risk modelling and risk strategy

- US housing bubble in 2005 and subsequent subprime crisis
- Global financial crisis following the subprime crisis and recession scenarios
- Social unrest as a consequence of the financial crisis
- Heat and drought scenarios
  
  Analysis lead to reduction in certain risk exposures

Recent emerging risks topics

Focus topic cyber risks

- Dependency on IT infrastructure
- Cyber liability
- IT viruses
- Cloud computing
- Cyber war

Related publications

Selected topics discussed in 2012/2013

- Technology at the limits of controllability
- Biometrics
- Social media
- Artificial intelligence
- Privatisation of government responsibilities
- Obesity
- Scarcity of resources
- Protectionism
- Migration of species
- Loss of biodiversity
- Contentious diseases
- Autonomous vehicles
- Counterfeit products
- Distressed cities
- Food security and safety
- Wind turbines
- Hydrofracking
- Social unrest
Reputational risks

Reputational risk is the risk of a loss resulting from damage to the Group’s public image (for example with clients, shareholders or other parties).

<table>
<thead>
<tr>
<th>Process-related reputational risks (How do we conduct business?)</th>
<th>Core business related reputational risks (What business do we do?)</th>
</tr>
</thead>
</table>
| • Operating issues, e.g.  
  • Fraud  
  • System security  
  • Product flaws | • (Re)insurance business, e.g.  
  • Polluting projects  
  • With enterprises that abuse human rights  
  • Investments, e.g.  
  • Soft commodity trading  
  • Derivative trading |

Different aspects of reputational risks need to be addressed

The responsibility to avoid, identify and report reputational risks is up to all employees.

Internal control system (ICS)

Holistic management of operational risks, inter alia arising from reputational risks

Whistle-blower procedures

The whistle-blowing system enables to report reputational risk issues — anonymously if desired

Ad-hoc process

New significant risks that arise between the regular risk reports have to be reported without delay — timely communication is key
### Reputational risk committees

**Group compliance committee (GCC)**
- Dealing with compliance and reputational risks at Group level
- Uniform analysis and handling of risks throughout the Group
- Focus on reputational risks that arise from one or more specific cases or are subject of enquiries from business units affecting the entire Group

**Group corporate responsibility committee (GCRC)**
- Evaluating and prioritising “sensitive issues”
- Submitting decision proposals to the Group Committee to clarify Group position

**Reputational risk committee (RRC)**
- Evaluation of actual cases that could involve reputational issues
- RRCs exist on segment level

### Organisation

<table>
<thead>
<tr>
<th>Implementation in Reputational Risk Committees (RRC)</th>
<th>Group Compliance Committee (GCC)</th>
<th>Primary insurance</th>
<th>Munich Health</th>
<th>Asset management (MEAG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Segment</td>
<td>Central Divisions</td>
<td>Separate RRC</td>
<td>Separate RRC</td>
<td>Separate RRC</td>
</tr>
<tr>
<td></td>
<td>Reinsurance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group Communications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group Development (Corporate Responsibility)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Integrated Risk Management</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corporate Underwriting</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Group Legal/Compliance Officer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business Units</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Life</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Non-Life</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>International Organisation</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>(branches)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

**Interdisciplinary aspect of reputational risk management is key**
Operation mode of Reputational risk committee's

Reputational risk committee (RRC)

**Mission**
- Consultation of business segments
- Analysis and assessment of individual cases

**Examples of requests**
- Investment / Insurance of specific entities / Groups
- (Re)Insurance of potentially polluting projects
- (Re)Insurance of projects in specific countries
- Insurance of clinical trial participants
- Critical products

**Working mode**
- Reporting of critical issues prior to closing of a deal
- RRC responds within 48 hours, giving clear guidance
- Escalation to Board of Management by RRC coordinator in case of non-compliance

Reputational risks are monitored and steered within RRCs

---

**Agenda**

Munich Re key figures

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Corporate responsibility product examples from Munich Re’s three business fields

- Reinsurance: Christian Scharrer
- Primary insurance: Stephan Herrmann
- Munich Health: Josep Santacreu Bonjoch
- Integrated risk management: Markus Hummel

Responsible investments – MEAG: Holger Kerzel (Managing Director at MEAG)

Climate change – Risks and opportunities: Peter Hippipe
Responsible investments – MEAG

MEAG is a global player with international presence

- New York
  - Bonds
    - Canada
    - USA

- Munich
  - Equities | Bonds
  - Forex | Real estate
  - Alternative investments
    - Australia
    - Canada (Equities)
    - Eurozone
    - Japan
    - New Zealand
    - Eastern Europe
    - Switzerland
    - Scandinavia
    - South Africa
    - UK
    - USA (Equities)
    - Brazil/Mexico

- Hong Kong
  - Equities | Bonds
  - China
  - Hong Kong
  - Korea
  - Malaysia
  - Taiwan
  - Singapore

Deep expertise and experienced staff in major capital markets

Assets under management at MEAG

- Development
- Asset classes
  - Participations 9%
  - Bonds 79%
  - Real estate 4%
  - Equities 3%
  - Alternative investments 1%
  - Cash 4%

1 Figures as at 30 June 2013.
**Definition: Sustainable investments**

In addition to the traditional investment goals of return, risk and liquidity, sustainable investments take into account the **sustainability of the issuers of securities**, i.e. the degree to which they fulfill:

- Environmental criteria
  (energy consumption, environmental management, data release on environmental performance)
- Social criteria
  (employee relations, staff programmes, social standards and reports)
- Governance criteria
  (risk management systems, transparency guidelines)

**The "Magical Square" of investment**

<table>
<thead>
<tr>
<th>Return</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
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</tbody>
</table>

**Sustainability**

**Munich Re: History as a sustainable investor**

- Munich Re has been considering sustainability in its securities investments since 2002
- In 2005, Munich Re implemented principles of sustainability in the form of General Investment Guidelines (GIG)
- Munich Re was the first German company to sign the (UN) Principles for Responsible Investment (PRI)
- Strong commitment to incorporate ESG criteria into investment decisions
Commitment to the Principles for Responsible Investment (PRI)

- As institutional investors, it is our duty to act in the best long-term interests of our customers
- We believe that environmental, social and corporate governance (ESG) topics can influence the returns and risks of an investment portfolio
- ESG topics affect the assessment of the value of companies, regions, sectors and investment classes to varying extents
- Taking ESG topics into account leads to a more complete understanding of companies and should ultimately lead to higher returns and/or lower risk
- Using these principles harmonises the company’s investments with its goals and improves long-term returns in particular

What are the Principles for Responsible Investment?

The Principles for Responsible Investment¹:

- Are a catalogue of voluntary best-practice standards proposed by the United Nations (UN)
- Serve as a guideline for institutional and private investors and for investment consultants for taking into account sustainability criteria in their capital investments
- Worldwide more than 1,200 signatories have committed to upholding the Principles
- The total amount of all investments involved here is around US$ 34 trillion
Growth in PRI signatories and investment volume

1,226 signatories and US$ 34 trillion in assets under management

Source: PRI Association, figures as of 30 June 2013

Munich Re as a sustainable investor

- The sustainability demands are anchored in the MEAG mandate (policy paper)
- Most of Munich Re’s investments meet sustainability criteria
- Sustainability criteria for equities, corporates, covered bonds and government bonds already in place
- RENT und commercial real estate built after 2010 have been incorporated into the calculation of the sustainability ratio
- Integration of ESG criteria for infrastructure investments intended
- MEAG management strives for active ESG shareholder dialogue with companies
- PRI status report (annual survey) shows significant improvement in sustainability ratio
Munich Re: The definition of sustainability

Calculating the sustainability ratio

<table>
<thead>
<tr>
<th>Equities</th>
<th>Corporates</th>
<th>Government bonds</th>
<th>Real estate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Based on the criteria of major sustainability indices</td>
<td>Same as for equities (issuers); bank debt and covered bonds are evaluated on the basis of oekom research rating</td>
<td>Sustainability is assessed on the basis of a Munich Re approach, taking into account criteria from the fields of environment/climate protection, human/civil rights and corruption</td>
<td>Guiding principles with environmental criteria for the purchase, construction and renovation of real estate</td>
</tr>
</tbody>
</table>

Munich Re: Sustainability in real estate development projects

WESTGATE Cologne
- Awarded the EU Green Building Certificate for low energy consumption
- Geothermic seasonal heat storage
- Use of ground water from the building's own well for heating and cooling

Cologne Oval Offices
- MEAG’s first EU Green Building Certificate
- Use of the Rhine bank filtrate to cool the building
- Primary energy requirement of 105 kilowatt hours per square metre per year
Munich Re as a provider of sustainable investment products

Sustainable special funds for Munich Re Group and institutional investors:

- Custom-tailored investment concepts (equity, bond and balanced funds) for foundations (e.g. Munich Re Foundation, defensive balanced fund since 2002), churches, pension funds, etc.
- Individual sustainability criteria (index-based or external research providers)

Sustainable mutual funds:

- **MEAG Nachhaltigkeit**
  - A global equity fund focusing on large caps (best-in-class); launched in 2003
- **MEAG FairReturn**
  - Investment focus on European bonds (equities blended), with the goal of achieving positive returns on an annual basis; launched in 2009

**MEAG Nachhaltigkeit – A sustainable global equity fund**

**Fund concept**

- **A global equity fund focusing on large caps**
  - Global blue chips from the Dow Jones Sustainability World ex all universe (best-in-class approach)

**Exclusion criteria**

- Tobacco, alcohol, arms, weapons, gambling

**Country weightings**

- **Euroland**
  - 20.4%
- **UK/Ireland**
  - 15.7%
- **Switzerland**
  - 9.4%
- **Australia**
  - 5.7%
- **North America**
  - 31.3%
- **Japan**
  - 4.1%
- **Other**
  - 13.4%
MEAG FairReturn – A sustainable balanced fund

**Fund concept**
- Constant returns
- Capital preservation
- Limited risk

**Product character**
- Proven "absolute return concept"
- Taking ESG criteria into account

**Exclusion criteria**
- Alcohol, gambling, green gene engineering, pornography, armaments manufacturer, tobacco, animal testing

**Sustainability screening by ekom research**

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash/Time deposits/Forex</td>
<td>1.8%</td>
</tr>
<tr>
<td>Bonds</td>
<td>87.2%</td>
</tr>
<tr>
<td>Equities</td>
<td>10.9%</td>
</tr>
</tbody>
</table>

Two direct investment programmes:

**Infrastructure and renewables (RENT)**

**Infrastructure**
- Intended investment: €1.5bn
- Focus primarily on Europe and North America
- Launched in 2012
- Sustainability criteria to be incorporated

**RENT**
- Intended investment: €2.5bn
- Focus primarily on Europe and North America
- Launched in 2011
# Infrastructure investments: Characteristics

<table>
<thead>
<tr>
<th>Assets meet basic needs that are independent of economic conditions</th>
<th>Low correlation to other asset classes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable and stable long-term cash flows</td>
<td>Providing current yield</td>
</tr>
<tr>
<td>(Quasi-)monopolistic market position and high barriers for entry</td>
<td>Low risk of competition</td>
</tr>
<tr>
<td>Inflation protection</td>
<td>Real yields</td>
</tr>
<tr>
<td>Long lasting concessions/Long-term horizon</td>
<td>Long duration with projectable yields But: Capital tied up over the long term</td>
</tr>
<tr>
<td>Regulation with various horizons</td>
<td>Creation of market-oriented framework But: Dependence on political parameters and changes</td>
</tr>
</tbody>
</table>

# Infrastructure investments: Activity areas

<table>
<thead>
<tr>
<th>Economic infrastructure</th>
<th>Utilities</th>
<th>Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transportation</td>
<td>Energy production</td>
<td>Cable network</td>
</tr>
<tr>
<td>Airports</td>
<td>Energy transport</td>
<td>Cell towers</td>
</tr>
<tr>
<td>Toll roads</td>
<td>Energy storage</td>
<td>Mobile communications</td>
</tr>
<tr>
<td>Ports</td>
<td>Water and waste management</td>
<td></td>
</tr>
<tr>
<td>Bridges/Tunnels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rail/Rolling stock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car parks</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Social infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitals</td>
</tr>
<tr>
<td>Schools</td>
</tr>
<tr>
<td>Universities</td>
</tr>
<tr>
<td>Public transport</td>
</tr>
</tbody>
</table>
Since 2010, Renewable Energy and New Technologies (RENT) has been part of Munich Re’s new strategic investment orientation and an enlargement of its investment spectrum, considering sustainable investments with manageable risk and attractive returns.

The emphasis lies on non-fossil power generation. RENT also takes into account issues such as energy efficiency, energy distribution and storage.

RENT’s investment focus currently lies primarily on the segments of photovoltaic, wind, solar thermal and geothermal.

REN offers a wide investment universe

Renewable energy

- Wind
- Biomass
- Geothermal
- Solar
- Hydro

New technology

- Energy efficiency
- Resources
- Components
- Grids
- Storage
Excursus: Incentive systems for renewable energy

Feed-in tariff model
- Power produced is sold and incentivised with a defined pricing mechanism
  - Possibly adjusted for inflation
  - Principle of legitimate expectations: Introduced and not changed for existing plants
  - "German model"

Quota model
- A given amount of (tradable) "green certificates" is allocated based on the quantity of power produced
  - Higher market risk
  - Amounts often adjusted by legislation (e.g. by setting lower price limits)
  - "UK model"

Plus additional sale of power produced in the market

Opportunities with RENT investments

- RENT investments offer long-term, stable and projectable returns
- Attractive yields in the current low-yield environment, inflation protection
- Low correlation to other asset classes; hence diversification benefits
- Favourable regulatory framework in several countries
- Strategic partnerships with professional and fundamentally sound developers add value
- Preventing the formation of CO₂ will reduce insurance claims over the long term, and contributes to Munich Re's own CO₂-neutrality
- Competitive advantage thanks to close cooperation with Munich Re's technical experts
  - Deal sourcing
  - Know-how concerning technical risks and location
  - Development and other know-how for new insurance products
Responsible investments – MEAG
Portfolio map RENT

Great Britain wind
102 MW\(^1\)

Spain solar
182 MW\(^1\)

Tenerife

France wind
321 MW\(^1\)

Germany wind
120 MW\(^1\)

Italy solar
54 MW\(^1\)

Sweden wind
30 MW\(^1\)

Wind

Solar

1 Refers to total installed power irrespective of size of equity stake.

Agenda

Munich Re key figures

Corporate responsibility at Munich Re
Astrid Zwick

Corporate responsibility product examples from Munich Re’s three business fields

Reinsurance
Christian Scharer

Primary insurance
Stephan Hermann

Munich Health
Josep Santacreu Bonjoch

Integrated risk management
Markus Hummel

Responsible investments – MEAG
Holger Kerzel

Climate change – Risks and opportunities
Peter Höppe
Head of Geo Risk Research/Corporate Climate Centre
Climate change – Risks and opportunities

Natural catastrophes worldwide 1980–2012
89% of insured losses were weather related

<table>
<thead>
<tr>
<th>Insured losses in 2012 values: US$ 970bn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climatological events</td>
</tr>
<tr>
<td>8% (extreme temperature, drought, forest fire)</td>
</tr>
<tr>
<td>Geophysical events</td>
</tr>
<tr>
<td>11% (earthquake, tsunami, volcanic eruption)</td>
</tr>
<tr>
<td>Hydrological events</td>
</tr>
<tr>
<td>9% (flood, mass movement)</td>
</tr>
<tr>
<td>Meteorological events</td>
</tr>
<tr>
<td>72% (storm)</td>
</tr>
</tbody>
</table>

Climate change – Risks and opportunities

Munich Re the first alerter to global warming

Munich Re publication, 1973

most significant. Such investigations involve a study of thermodynamic processes such as, for example, the rising temperature of the earth’s atmosphere (as a result of which glaciers and the polar caps recede, surfaces of lakes are reduced and ocean temperatures rise) changes in the earth’s atmosphere, e.g. rise of the CO₂ content of the air causing a change in the absorption of solar energy, especially as—as far as we know—its conceivable impact on the long-range risk trend has hardly been examined to date.
Based on a survey of over 1,000 experts from industry, government, academia and civil society that examines 50 global risks

<table>
<thead>
<tr>
<th>Risk</th>
<th>Likelihood</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe income disparity</td>
<td>Very unlikely</td>
<td>4.14</td>
</tr>
<tr>
<td>Chronic fiscal imbalances</td>
<td>Almost certain</td>
<td>3.99</td>
</tr>
<tr>
<td>Rising greenhouse gas emissions</td>
<td>Almost certain</td>
<td>3.91</td>
</tr>
<tr>
<td>Water supply crisis</td>
<td>Almost certain</td>
<td>3.85</td>
</tr>
<tr>
<td>Mismanagement of population ageing</td>
<td>Almost certain</td>
<td>3.83</td>
</tr>
</tbody>
</table>

Source: World Economic Forum

State of the climate 2012/2013 (source NOAA)

- The year 2012 was the tenth-warmest year since records began in 1880. Including 2012, all 12 years to date in the 21st century (2001–2012) rank among the 14 warmest in the 133-year period of record.
- 2012 was the warmest year in the 1895–2012 period of record for the USA.
- The period January–August 2013 globally was the fifth-warmest on record.
Climate change – Risks and opportunities

State of the climate 2012 (source NOAA)

Annual Global Temperature Anomalies – 1950-2012

Global warming is real!
Continental temperature changes (IPCC AR5, 2013)
Temporal course of CO₂ concentration at Mauna Loa, Hawaii (1958–2011)

In March 2013, 400 ppm was reached for the first time!

Source: http://keelingcurve.ucsd.edu/

Observed changes in sea surface temperature in tropical ocean basins with TC activity (1968–2012)

Five-year running mean

Source: Munich Re, May 2013
Data source: HadISST, MetOffice, 2013
Climate model based studies: Increase has to be expected from anthropogenic climate change (Willett et al., 2010, Environ. Res. Letter, 5; Santer et al., 2007, PNAS, 104)

Specific humidity has risen in large parts of northern hemisphere

Change in near-surface specific humidity over time in the northern hemisphere 1973–2012

Black dots: trends significant at the 95% level

Climate model based studies: Increase has to be expected from anthropogenic climate change (Willett et al., 2010, Environ. Res. Letter, 5; Santer et al., 2007, PNAS, 104)


Record minimum arctic sea ice extent

September 2012 – Record minimum arctic sea ice extent

Norther Hemispere Extenet Anomalies August 2013

Source: National Snow & Ice Data Centre, 2013
Minimum of Arctic Sea ice cover

The yellow line shows the average minimum extent from the period covering 1979–2010

Source: NASA, Goddard Space Flight Center, 2013
http://svs.gsfc.nasa.gov/Gallery/ArcticSeaIceResources.html

Climate change – Risks and opportunities

Minimum of Arctic Sea ice cover

The yellow line shows the average minimum extent from the period covering 1979–2010

Source: NASA, Goddard Space Flight Center, 2013
http://svs.gsfc.nasa.gov/Gallery/ArcticSeaIceResources.html
Climate change – Risks and opportunities

Historic increase in sea level

Global average sea level change

![Graph showing historic increase in sea level](image)

(IPCC, AR5, 2013)

Climate change – Risks and opportunities

Expected increase in sea level for different CO₂ scenarios

Global mean sea level rise

![Graph showing expected increase in sea level](image)

(IPCC, AR5, 2013)
Climate change – Risks and opportunities

**Wildfires/Heat wave, Russia**

**June – August 2010**

Study published in November 2011 by Rahmstorf et al. in PNAS concludes that there is a 80% probability that this heat wave has been caused by global warming!

<table>
<thead>
<tr>
<th>Country affected</th>
<th>Overall losses</th>
<th>Insured losses</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>US$ &gt;3,600m</td>
<td>US$ 22m</td>
<td>130 (wildfires)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>56,000 (heat wave, smoke)</td>
</tr>
</tbody>
</table>

Source: Reuters

**Climate change – Risks and opportunities**

**Summer 2012: Heat records and drought in the US**

**July 2012 warmest month in US since start of measurements**

**July 2013**

<table>
<thead>
<tr>
<th>Region</th>
<th>Total losses</th>
<th>Insured losses</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>US$ 20bn</td>
<td>US$ 16bn</td>
<td>100</td>
</tr>
</tbody>
</table>

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Temperature records

Worldwide

The number of local record-breaking monthly temperature extremes is now on average 5 times larger than expected in a climate with no long-term warming.

Regional differences

Summertime records, which are associated with prolonged heatwaves, increased by more than a factor of 10 in some continental regions including parts of Europe, Africa, southern Asia and Amazonia.

New study by Potsdam Institute for Climate Impact Research on future heatwaves

Multifold increase in heat extremes by 2040

08/15/2013 – Extremes such as the severe heat wave last year in the US or the one 2010 in Russia are likely to be seen much more often in the near future. A few decades ago, they were practically absent. Today, due to man-made climate change monthly heat extremes in summer are already observed on 5 percent of the land area. This is projected to double by 2020 and quadruple by 2040, according to a study by scientists of the Potsdam Institute for Climate Impact Research (PIK) and the Universidad Complutense de Madrid (UCM). A further increase of Heat extremes in the second half of our century could be stopped if global greenhouse-gas emissions would be reduced substantially.
**Climate change – Risks and opportunities**

**Floods, Queensland, Australia**

December 2010 to January 2011

Australia rainfall anomalies (Oct-Dec 2010)

<table>
<thead>
<tr>
<th>Region</th>
<th>Total losses</th>
<th>Insured losses</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland, Australia</td>
<td>US$ 7.3bn</td>
<td>US$ 2.4bn</td>
<td>35</td>
</tr>
</tbody>
</table>

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Queensland floods – Is there a link to climate change?

- December sea surface temperature in the Australian region has been the highest on record
- There is a relation between precipitation and the sea surface temperature in Australia

**Sea surface temperature is rising due to climate change**

Source: Bureau of Meteorology (Australia)

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### Cyclone Yasi (Cat 5), Queensland, Australia
February 2011

<table>
<thead>
<tr>
<th>Region</th>
<th>Total losses</th>
<th>Insured losses</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland/Australia</td>
<td>US$ 3,500m</td>
<td>US$ 500m</td>
<td>2</td>
</tr>
</tbody>
</table>

### Floods, Thailand, September to October, 2011
The most expensive flood disaster in history!

July 2012

<table>
<thead>
<tr>
<th>Region</th>
<th>Total losses</th>
<th>Insured losses</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>US$ 43bn</td>
<td>US$ 10bn</td>
<td>813</td>
</tr>
</tbody>
</table>
### Floods in Europe in May/June 2013

The second most expensive nat cat in Germany

<table>
<thead>
<tr>
<th>Region</th>
<th>Total losses</th>
<th>Insured losses</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany, Austria, Czech Republic</td>
<td>&gt;US$ 16bn</td>
<td>≈US$ 3.9bn</td>
<td>22</td>
</tr>
</tbody>
</table>

May/June 2013

### Weather pattern trough over central Europe

The number of days with the weather pattern trough over central Europe has increased

- One reason is that weather patterns in general are moving more slowly from west to east, leading to a longer persistence
- Scientific findings indicate that climate-change-driven Arctic warming is responsible for the reduced propagation (Francis and Vavrus 2012)

#### Duration of weather patterns (10-year running mean)

- Year
- Summer
- Winter

New studies show causal associations between climate change and weather extremes

Human contribution to more-intense precipitation extremes
Seang Pui Min, Xiantao Zeng, Enrico M. Zanen & Caterina C. Negret
Affiliation | Contributions | Corresponding author

"… Here we show that human-induced increases in greenhouse gases have contributed to the observed intensification of heavy precipitation events found over approximately two-thirds of data-covered parts of Northern Hemisphere land areas. Changes in extreme precipitation projected by models and thus the impacts of future changes in extreme precipitation, may be underestimated because models seem to underestimate the observed increase in heavy precipitation with warming."

Climate change – Risks and opportunities

2011, a record year for tornadoes in the US

- Most observed tornadoes in a month: 748, April
- Largest number of tornadoes in a day: 226, 27 April
- Most EF5 tornadoes in a year: 6 (tied for first with 1974)
- Late April (Alabama) and May (Joplin) outbreaks each caused insured losses in excess of $6 billion, and are among the top 10 largest natural catastrophe losses in US history.
Climate change – Risks and opportunities

Convective loss events in the US

Number of events 1980–2012 – As at April 2013

Overall and insured losses 1980–2012

Average insured convective losses have increased sevenfold since 1980 – As at April 2013

Analysis contains: straight-line winds, tornadoes, hail, heavy precipitation, flash floods, lightning.

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Corporate responsibility in (re)insurance business, 15 October 2013
New Munich Re scientific paper on US thunderstorm trends

Published online on 18 March 2013

Rising variability in thunderstorm-related U.S. losses as a reflection of changes in large-scale thunderstorm forcing

J. Sander, H. J. Eichner, E. Feist and M. Steuern

Published in: Weather, Climate, and Society

doi: 10.1175/WCAS-12-00023.1

Major results of new Munich Re convective storm study

- Study examines convective (hail, tornado, thundersquall and heavy rainfall) events in the US with normalised losses exceeding US$ 250m in the period 1970-2009 (80% of all losses)
- Past losses are normalised to currently exposed values
- After normalisation there are still increases in losses
- Increases are correlated with the increase in the meteorological potential for severe thunderstorms and its variability
- For the first time, it could be shown that climatic changes have already influenced US thunderstorm losses!
Hail event on 27/28 July 2013 in Germany

Most expensive hail event in Germany, 4th expensive nat cat

Region | Total losses | Insured losses | Fatalities
--- | --- | --- | ---
Baden-Württemberg, NRW, Lower Saxony | €2.3bn$^1$ | €1.5bn$^1$ | 1

$^1$ Loss assessments still ongoing.

Hurricane Sandy – October 22-30, 2012

2nd most expensive hurricane in US history

Region | Total losses | Insured losses | Fatalities
--- | --- | --- | ---
USA | US$ 69 bn | US$ 30 bn | 110
Climate change – Risks and opportunities

Sea surface temperatures

Sea surface temperature anomalies (20 October)

Sea surface temperatures (28 October)

Hurricane Sandy, the 18th tropical storm of the 2012 season

Formation on 22 October in the Caribbean Sea
A strong high-pressure blocking pattern prevented Sandy from steering northeast and out to sea.

Sandy was supercharged with energy derived from a southward dip in the jet stream.

“There is increasing evidence that the loss of summertime Arctic Sea ice due to greenhouse warming stacks the deck in favor of

(1) larger amplitude meanders in the jet stream,
(2) more frequent invasions of Arctic air masses into the middle latitudes,
(3) more frequent blocking events of the kind that steered Sandy to the west.”


The Sandy scenario was described in the Munich Re book published several weeks before the event.

A stronger hurricane, like the 1938 Great New England Hurricane, would easily cause more extensive wind damage throughout the region and generate a storm surge that could devastate coastal communities, and the financial hub of the United States, causing losses several times higher than Irene’s. Irene should serve as a wake-up call for the region, and lessons learned should be used to help protect against losses from bigger storms in the future.
Hurricanes and tropical storms in North America
Observed and projected changes

- Year-to-year variability in the number of hurricane landfalls is linked to the ENSO phenomenon: Landfalls are more frequent during La Niña phases.
- On a time scale of decades, tropical cyclone frequency is dependent on AMO (Atlantic Multidecadal Oscillation) phases.
- AMO phases represent the long-term variation of the North Atlantic sea surface temperature.

Multidecadal swing of the North Atlantic sea surface temperature anomalies 1870–2011, indicative of the AMO.

Source: Munich Re – Severe weather in North America, 2012

Climate-change – Risks and opportunities

Global warming will intensify hurricanes

Several recent models suggest that the frequency of Atlantic tropical cyclones could decrease as the climate warms. However, these models are unable to reproduce storms of category 3 or higher intensity. We explored the influence of future global warming on Atlantic hurricanes with a downscaling strategy by using an exceptional hurricane-prediction model that produces a realistic distribution of intense hurricane activity for present-day conditions. The model projects nearly a doubling of the frequency of category 4 and 5 storms by the end of the 21st century, despite a decrease in the overall frequency of tropical cyclones, when the downscaling is based on the ensemble mean of 25 global climate-change projections. The largest increase is projected to occur in the Western Atlantic, north of 26N.

1 National Oceanic and Atmospheric Administration/Geophysical Fluid Dynamics Laboratory, 201 Ferrell Road, Princeton, NJ 08540, USA.
2 Center for Coastal Physical Oceanography, Old Dominion University, 4111 Monarch Way, Norfolk, VA 23568, USA.
**Reasons for globally increasing losses caused by natural disasters**

- **Rise in population**
- **Better standard of living**
- **Increasing insurance density**

- **Settlement in extremely exposed regions**
- **Increased vulnerability of modern societies and technologies to natural hazards**
- **Change in environmental conditions – climate change**

---

**Natural catastrophes worldwide 1980–2012**

<table>
<thead>
<tr>
<th>Number of events with relative trend – As at January 2013</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>500%</td>
<td></td>
</tr>
<tr>
<td>400%</td>
<td></td>
</tr>
<tr>
<td>300%</td>
<td></td>
</tr>
<tr>
<td>200%</td>
<td></td>
</tr>
<tr>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

- **Geophysical events** (earthquake, tsunami, volcanic eruption)
- **Meteorological events** (storm)
- **Hydrological events** (flood, mass movement)
- **Climatological events** (extreme temperature, drought, forest fire)
Evaluating the economics of climate risks and opportunities in the insurance sector

Collaboration between Munich Re and the London School of Economics

Trend analysis of normalised insured damage from natural disasters
First study of this kind!
Paper by Barthel and Neumayer (Climatic Change, 2012)
LSE, London

Normalisation by insurance premiums
Insurance premiums used: subset of property and engineering premiums plus motor physical damage, which are affected by natural disasters

Normalised insured losses of non-geophysical disasters in the US
## Climate change – Risks and opportunities

### Climate change is a strategic topic for Munich Re

The three pillars of Munich Re’s climate change strategy

<table>
<thead>
<tr>
<th>Risk assessment</th>
<th>Business opportunities</th>
<th>Asset management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research of natural hazards and climate change impacts</td>
<td>Growing demand for risk transfer solutions such as renewable energy covers</td>
<td>Integration of sustainability criteria into investment strategies</td>
</tr>
<tr>
<td>Climate liability issues</td>
<td>Performance covers for solar modules</td>
<td>Significant expansion of renewable energy investments where frameworks are appropriate (target €2.5bn)</td>
</tr>
<tr>
<td>Prospective risk management (also considering weather oscillations such as El Niño)</td>
<td>&quot;Delivery guarantees&quot; for wind and sun</td>
<td></td>
</tr>
</tbody>
</table>

### Becoming carbon-neutral

- Supporting several climate initiatives (GCF, UNEP FI, …)
- Initiating flagship projects such as the Dii GmbH and MCII

### Future regional vulnerability of human populations to climate change

**Global climate-demography vulnerability index (CDVI)**

Regions with a high CDVI are expected to be most negatively impacted by climate change. The CDVI is based on ecological and demographic models.


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The insured and non-insured world

Property insurance premium per capita – Overview

Insurance groups
- Highly insured countries (>US$ 1,000)
- Well insured countries (US$ 101-1,000)
- Basically insured countries (US$ 11-100)
- Inadequately insured countries (<US$ 10)
- No data

Objectives of MCII:

Development of risk transfer solutions to support adaptation mechanisms to global warming in developing countries within the framework of the UNFCCC process.

MCII was founded in 2005 on the initiative of Munich Re together with Germanwatch, International Institute for Applied Systems Analysis (IIASA), Munich Re Foundation, Potsdam Institute for Climate Impact Research (PIK), Tyndall Centre, World Bank and independent experts.
Recent successes of MCII

- Essentials of MCII proposal have made it into the UNFCCC negotiation texts
- Agreement in Cancun on two-year “Loss and Damage” programme, including insurance solutions
- MCII partnering with UNFCCC in organisation of this programme; (2013) binding decisions on results expected at COP19
- MCII has received funding from the German Environmental Ministry (€2m) for pilot projects in the Caribbean (project partners CCRIF, MicroEnsure). Development of Livelihood Protection (launched in St. Lucia in May 2013) and Lender Portfolio Protection covers in Jamaica, Grenada and St. Lucia

MCII submission for COP18 in Doha

- Climate change – Risks and opportunities
- Insurance solutions in the context of climate change-related loss and damage
In 2009, together with the Desertec Foundation, Munich Re initiated the foundation of the Desertec industrial initiative (Dii GmbH)

Vision:
Providing Europe (EU), the Middle East and North Africa (MENA) with a sustainable supply of renewable energy by the year 2050

“Within six hours, deserts receive more energy from the sun than humankind consumes within a year.”
(Dr. Gerhard Knies)

Dii shareholders and Associated Partners

19 Dii Shareholders

17 Dii Associated Partners

As of September 2013
The first and second milestones were reached in June 2012 and June 2013.

“Desert Power 2050” addresses the target picture, “Getting Started” the pathways to implementation.

**Target picture**
(summer 2012)

“Desert Power 2050: Perspectives on a sustainable power system for EUMENA”

Which technological and geographical mix of RE is best suited to provide the EUMENA region with a sustainable, reliable and affordable power system?

**Pathways to implementation**
“Getting Started” (June 2013)

“Desert Power 2050: Getting Started”

Actionable recommendations on all key aspects of implementing a fully integrated EUMENA power system based on RE:

- Ramp-up of MENA RE
- Grid infrastructure/electricity highways connecting MENA and Europe
- Public support (design, phase-out)
- Institutional framework
- Socio-economic effects
Climate change – Risks and opportunities

Munich Re publication "Energy Situation, Problems with Commodities and Insurance" dated 1978

Risks of renewable energies

- Market perspective: Many technologies with short commercial experience; warranty/performance risks for manufacturers
- Investor perspective: New risks = investment barrier

The role of the insurance industry in the implementation of new technologies

- Helping to commercialize new technologies via risk transfer solutions (e.g. commercial satellite)
- Covering the long-term technology risk of renewable energy manufacturers via performance and delivery guarantees \(\rightarrow\) increasing project bankability

Business opportunities

- Increase in demand for nat cat covers, new groups of clients
  - Increasing frequencies and intensities of extreme weather events and corresponding rise of risk awareness will trigger increasing demand for nat cat covers (e.g. flood cover penetration in Germany has increased significantly)
  - More and more countries are insuring their sovereign risks (e.g. CCRIF, Fonden)
  - Pool solutions and PPP mechanisms open up chances for innovative nat cat insurance products
Climate change: Munich Re positions (1)

Science

Climate change is real. Drivers are both natural (e.g. cyclic) and anthropogenic (increasing greenhouse gas emissions). On a decadal to centennial timescale, anthropogenic drivers are most relevant.

Climate science is best represented by IPCC reports (“state of knowledge”). Munich Re is engaged in dialogues with sceptical scientists, but so far basically no criticism of the concept of anthropogenic climate change has stood up to the challenges of peer reviewing.

The vast majority of scientific studies on climate change and nat cat indicate that during the coming decades both frequency and intensity of nat cat will increase in many regions.

Climate change: Munich Re positions (2)

Insurance/risk management

The frequency of weather-related catastrophes worldwide has increased much faster than those of geophysical events during last 30+ years. On a regional/peril basis, significant differences have been observed.

Increase in financial losses (economic and insured) can in part be explained by socio-economic factors; however, recent scientific studies indicate that loss trends in some regions are already being adversely influenced by climate change.

Wherever there are risks, there are opportunities for the insurance industry. Munich Re has the experience and expertise to find solutions for these risks and is willing to provide significant capacity.
Appendix

Financial calendar

**FINANCIAL CALENDAR**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 November 2013</td>
<td>Interim report as at 30 September 2013</td>
</tr>
<tr>
<td>4 February 2014</td>
<td>Preliminary key figures 2013 and renewals</td>
</tr>
<tr>
<td>20 March 2014</td>
<td>Balance sheet press conference for 2013 financial statements</td>
</tr>
<tr>
<td>21 March 2014</td>
<td>Analysts’ conference with videocast</td>
</tr>
<tr>
<td>30 April 2014</td>
<td>Annual General Meeting, ICM – International Congress Centre Munich, exhibition center, München-Riem</td>
</tr>
<tr>
<td>8 May 2014</td>
<td>Interim report as at 31 March 2014</td>
</tr>
<tr>
<td>7 August 2014</td>
<td>Interim report as at 30 June 2014, Half-year press conference</td>
</tr>
<tr>
<td>6 November 2014</td>
<td>Interim report as at 30 September 2014</td>
</tr>
</tbody>
</table>

Appendix

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Appendix

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Figures up to 2010 are shown on a partly consolidated basis. "Partly consolidated" means before elimination of intra-Group transactions across segments.

Appendix

Disclaimer: MEAG (I)

Note on the MEAG FairReturn: Extended investment limits
Securities and money market instruments from the following issuers may account for more than 35 % of the fund assets: The Federal Republic of Germany; The German federal states: Baden-Württemberg, Bavaria, Berlin, Brandenburg, Bremen, Hamburg, Hesse, Mecklenburg-Vorpommern, Lower Saxony, North-Rhine Westphalia, Rhineland Palatinate, Saarland, Saxony, Saxony-Anhalt, Schleswig-Holstein, Thuringia; European communities: European Coal and Steel Community, EURATOM, European economic communities, European Community; Other member states of the European Union: France, Greece, Great Britain and Northern Ireland, Ireland, Italy, Holland, Austria, Portugal, Sweden, Spain; other member states of the OECD, that are not members of the European Economic Area: Japan, Switzerland, United States of America.

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MEAG MUNICH ERGO Kapitalanlagegesellschaft mbH
Oskar-von-Miller-Ring 18
80333 Munich
Germany
Internet: www.meag.com
Appendix

Disclaimer: MEAG (II)

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