

somewhat  
different

# Market Consistent Embedded Value 2011

*hannover* **re**<sup>®</sup>

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## Introduction

Hannover Rückversicherung AG's (Hannover Re) 2011 Market Consistent Embedded Value (MCEV) disclosure generally complies with the European Insurance CFO Forum Market Consistent Embedded Value Principles<sup>®</sup> (MCEV Principles) published in June 2008. The single exception is the non-disclosure of the Group Market Consistent Embedded Value.

The CFO Forum published a revised version of the MCEV Principles in October 2009 which allow for the inclusion of a liquidity premium in addition to the reference rates. However, the discussion regarding the products to which a liquidity premium should be applied to is still ongoing. Hannover Re has therefore decided not to include a liquidity premium in the calculation of the base results. A sensitivity showing the impact of a liquidity premium of 10bps on our business has been analysed.

As of MCEV 2010 Hannover Re's embedded value report is presented net of non-controlling interest ('after minorities').

All amounts in the result tables are shown in million EUR rounded to one decimal place. Small differences may therefore appear between the totals and the sum of the individual amounts.

The directors of Hannover Re acknowledge their responsibility for the preparation of the supplementary information in accordance with the Market Consistent Embedded Value Principles.

B&W Deloitte GmbH, actuaries and consultants, has been retained to review the Market Consistent Embedded Value results. The scope and conclusions of this review are shown at the end of this document.

The embedded value disclosure should not be viewed as a substitute for Hannover Re's primary financial statements.

## 1. Covered Business

The business covered includes the business reported in the Life and Health segment of Hannover Re's published financial statements.

All worldwide reinsurance activities of Hannover Re in the life, annuity and health (including personal accident) insurance lines are combined under the brand name 'Hannover Life Re' (HLR).

This disclosure document generally shows total results as well as a breakdown for the Domestic and Foreign Operations.

The Domestic Operations include the business written directly by Hannover Re and E+S Rück in Hannover and also the business written by the branches. Business retroceded by the Foreign Operations to Hannover Re is also included under Domestic Operations. The life business written by the subsidiary Hannover ReTakaful in Bahrain has been included under Domestic Operations because it is managed together with the Domestic Operations. Details of the Domestic Operations are shown in *Appendix IV - Overview of Domestic Operations*.

The Foreign Operations include the life reinsurance subsidiaries of Hannover Re in South Africa, the United States, Australia, Bermuda, Ireland and the UK. Details are shown in *Appendix V - Overview of Foreign Operations*.

Hannover Life Re writes the following lines of business:

Individual life and group life, unit linked as well as conventional business, annuities (standard, impaired and enhanced), disability income, critical illness, long-term care, medical supplement, medicare, and special (personal accident) risks.

All values shown in the disclosure are net of intra-group retrocessions and external retrocessions. In the case of intra-group retrocessions, this means that the retroceded business is excluded from the retroceding company's results and included in the results of the retrocessionaire. The values shown are post tax.

The consolidated results allow for the elimination of the book values for all six subsidiaries of Hannover Life Re for which a Market Consistent Embedded Value has been determined.

All formulae, abbreviations and notations are provided in *Appendix III - Formulae and Abbreviations*.

## 2. Market Consistent Embedded Value 2011 and its Components

### 2.1. Performance 2011

The following table shows the key figures for the Market Consistent Embedded Value (MCEV) 2011 and 2010.

<b>Table 1: Performance Market Consistent Embedded Value (MCEV) - after minorities</b>					
in m. EUR	2011			2010	
	Before consolidation		Total	After consolidation <sup>1)</sup>	After consolidation <sup>1)</sup>
	Domestic Operations	Foreign Operations		Total	Total
Market Consistent Embedded Value (MCEV)	2,006.5	2,238.4	4,244.9	3,065.8	2,568.3
Return on Market Consistent Embedded Value (MCEV) <sup>2)</sup>			11.7%	16.2%	19.8%
Value of New Business (VNB)	74.2	166.4	240.6	240.6	149.3
New Business Margin (NBM)	1.6%	7.2%	3.4%	3.4%	2.9%

1) The book values of the subsidiaries that have determined MCEV results have been eliminated.

2) Excluding opening and closing adjustments

The main drivers for the increase in the MCEV from 2010 to 2011 are:

- Excellent Value of New Business
- Expected existing business contribution (planned roll forward of the MCEV from last year to the current year)
- Higher investment returns than expected in the reporting year

For details please refer to section 4 - *Analysis of Change*.

The return on MCEV is almost at the same high level as in the previous year. The main drivers for the excellent Value of New Business (VNB) as well as the increase in the New Business Margin are detailed in section 3 - *New Business*.

## 2.2. Comparison: Market Consistent Embedded Value 2010 and 2011

Table 2 shows the components of the Market Consistent Embedded Value (MCEV) as well as the MCEV before and after consolidation adjustments.

<b>Table 2: Market Consistent Embedded Value (MCEV) 2011 and 2010 - after minorities</b>						
in m. EUR	2011			2010		
	Domestic Operations	Foreign Operations	Total	Domestic Operations	Foreign Operations	Total
Free Surplus (FS)	512.9	374.4	887.3	420.3	456.4	876.7
Required Capital (RC) <sup>1)</sup>	537.6	878.6	1,416.2	518.1	719.3	1,237.4
<b>Shareholder Net Worth (SNW)</b>	1,050.5	1,253.0	<b>2,303.5</b>	938.3	1,175.8	<b>2,114.1</b>
Present Value of Future Profits (PVFP)	1,108.5	1,360.9	2,469.3	1,016.9	1,194.6	2,211.5
Cost of Residual Non Hedgeable Risks (CoRNHR)	-124.6	-290.3	-414.9	-105.6	-350.3	-455.9
Frictional Costs of Required Capital (FCoRC)	-20.6	-78.8	-99.4	-22.2	-80.9	-103.2
Financial Options and Guarantees (FOGs)	-7.3	-6.4	-13.7	-12.3	-7.0	-19.2
<b>Value In-Force (VIF)</b>	956.0	985.3	<b>1,941.3</b>	876.8	756.5	<b>1,633.3</b>
<b>Market Consistent Embedded Value (MCEV) before consolidation</b>	2,006.5	2,238.4	<b>4,244.9</b>	1,815.1	1,932.2	<b>3,747.4</b>
Consolidation <sup>2)</sup>			-1,179.1			-1,179.1
<b>Market Consistent Embedded Value (MCEV) after consolidation</b>			<b>3,065.8</b>			<b>2,568.3</b>

1) Sum of local Required Capital (RC) before allowing for diversification between the entities of Hannover Life Re

2) Book values of the subsidiaries that have determined MCEV results

### 2.3. Value In-Force - 2011 Breakdown

The breakdown of the Value In-Force (VIF) by type of risk covered is:

<b>Table 3: Value In-Force (VIF) by type of risk covered - after minorities</b>			
in m. EUR	Domestic Operations	Foreign Operations	Total
Life	755.1	934.9	1,690.0
Annuity	144.7	40.5	185.2
Health and Personal Accident	56.2	9.9	66.1
<b>Total</b>	<b>956.0</b>	<b>985.3</b>	<b>1,941.3</b>

The product lines shown above include a wide variety of different reinsurance contracts. In comparison to 2010 the annuity portion of the VIF under Domestic Operations has further increased due to block deals in the United Kingdom. The structure of the new business under Foreign Operations has led to an increase of the Life business portion.

Aside from differentiating the business by the type of risk covered, it is also possible to distinguish between treaties providing risk cover and those including a financing component to cover the ceding companies' acquisition expenses or to purchase blocks of business. This split is shown in the following table:

<b>Table 4: Value In-Force (VIF) split in risk and financing treaties - after minorities</b>			
in m. EUR	Domestic Operations	Foreign Operations	Total
Risk Treaties	400.7	846.4	1,247.1
Financing Treaties	555.3	138.9	694.2
<b>Total</b>	<b>956.0</b>	<b>985.3</b>	<b>1,941.3</b>

In comparison to 2010 the portion of financing treaties under Domestic Operations increased, whereas under Foreign Operations the portion of risk treaties increased.

The increase of the VIF for financing treaties under Domestic Operations is mainly caused by new treaties in the Chinese and UK markets as well as positive effects from changes in discount rates. The strong increase of the VIF with respect to the risk treaties under Foreign Operations results from new traditional life business written by the US subsidiary. Furthermore, model improvements due to recalibration of the internal model led to a decrease of the Economic Capital and the related lower Cost of Residual Non Hedgeable Risks (CoRNHR).

### 2.4. Financial Options and Guarantees, Look Through and Pension Deficits

#### 2.4.1. Financial Options and Guarantees

Most of the significant time value of Financial Options and Guarantees (FOGs) in Hannover Life Re's portfolio originates from the US market and is mainly due to guarantees under interest sensitive products. The value of FOGs shown for the Domestic Operations stems from the internal retrocessions from the United States' subsidiary and one of the retrocession treaties from the South



African subsidiary. The other treaties with interest guarantees either have assets matching the liabilities or are not material.

in m. EUR	2011	2010
Domestic Operations	7.3	12.3
Foreign Operations	6.4	7.0
<b>Total</b>	<b>13.7</b>	<b>19.2</b>
in % of Market Consistent Embedded Value (MCEV)	0.4%	0.7%

The FOG costs are still insignificant for Hannover Re. The model improvements as well as a revision of the dynamic management interaction rules caused reduction of the Financial Options and Guarantees. These positive effects exceed the negative impact of the capital market development. The summary of the overall FOG costs under the baseline scenario is shown in Table 5.

In contrast to the procedure in 2010, for each treaty the initial FOG costs were determined based on financial models as of 30<sup>th</sup> November 2011. The result was adjusted to reflect the change in the market between 30<sup>th</sup> November 2011 and 31<sup>st</sup> December 2011. This decision was made in order to achieve a more efficient and accelerated process of the MCEV calculation.

#### 2.4.2. Participating Business

Hannover Life Re has a few reinsurance treaties where the returns to the reinsurer are dependent on the policyholder profit participation in the underlying products. The gross written premium and the contribution to the Value In-Force from these treaties are not material. The profit participation elements have therefore not been modelled explicitly.

#### 2.4.3. Look Through

The level of services provided by affiliated companies within Hannover Re is not material. Consequently, the MCEV calculations do not explicitly allow for the profits generated within such service companies.

#### 2.4.4. Pension Deficits

Pension liabilities for the majority of the pension obligations are based on a defined contribution scheme or reinsured outside of the group. Pension Deficits only arise from a small part of the pension liabilities for the subsidiary in Australia. They are determined as the difference between the respective IFRS and statutory pension liability and are not material for Hannover Re.

in m. EUR	2011	2010
Pension Deficits	1.0	0.7

### 3. New Business

#### 3.1. Value of New Business

The Value of New Business (VNB) for the year 2011 is shown below.

<b>Table 7: Value of New Business (VNB) - after minorities</b>			
in m. EUR	Domestic Operations	Foreign Operations	Total
Profit/Loss on New Business during year (P/L)	-133.1	-31.4	-164.5
Present Value of New Business Profits (PVNB)	237.9	250.3	488.2
Cost of Residual Non Hedgeable Risks (CoRNHR)	-26.6	-35.3	-61.9
Frictional Costs of Required Capital (FCoRC)	-4.0	-17.2	-21.2
Financial Options and Guarantees (FOGs)	0.0	0.0	0.0
<b>Value of New Business (VNB)</b>	<b>74.2</b>	<b>166.4</b>	<b>240.6</b>

The new business contribution in 2011 for the Domestic Operations is dominated by longevity swaps with insurers located in the UK, individual life business written in the Asian branches as well as Australian and US group life and individual life business assumed from the subsidiaries in Australia and the US. The Value of New Business from the Foreign Operations has nearly doubled compared to 2010. Important new business contribution stems from a block deal of traditional mortality business in the US and innovative structured Yearly Renewable Term (YRT) transactions.

#### 3.2. New Business Margins

The New Business Margin (NBM) and the Annual Premium Equivalent Margin (APEM) are defined as the Value of New Business (VNB) in percent of the discounted new business premiums (New Business Premium in 2011 (NBP) plus Present Value of New Business Premiums (PVNBP)) and in percent of the Annual Premium Equivalent (APE), respectively. The following table shows the New Business Margins separately for the Domestic and Foreign Operations.

<b>Table 8: New Business Margins - after minorities</b>			
in m. EUR and %	Domestic Operations	Foreign Operations	Total
<b>Value of New Business (VNB)</b>	<b>74.2</b>	<b>166.4</b>	<b>240.6</b>
New Business Premium in 2011 (NBP)	1260.6	287.9	1548.5
Present Value of New Business Premiums (PVNBP)	3508.8	2015.4	5524.2
New Business Regular Premium (NBRP)	340.9	244.5	585.4
New Business Single Premium (NBSP)	919.6	43.4	963.0
<b>New Business Margin (NBM)<sup>1)</sup></b>	<b>1.6%</b>	<b>7.2%</b>	<b>3.4%</b>
<b>Annual Premium Equivalent Margin (APEM)<sup>1)</sup></b>	<b>17.1%</b>	<b>66.9%</b>	<b>35.3%</b>

1) The statutory accounting principles in Bermuda and Ireland are similar to IFRS, i.e. deposit accounting treaties are shown with zero premium in the local financial statements. The premiums shown above also include the fees under these deposit accounting treaties.

For the Domestic Operations the New Business Margins are stable in comparison to the previous year.

The increase in the New Business Margins for the Foreign Operations is driven by the subsidiaries in Ireland and in the US. A significant amount of the new business for the Foreign Operations arises from deposit accounting treaties where the premiums in the calculation of the margins are set equal to the fees.

#### 4. Analysis of Earnings

The following table shows the key drivers for the change in the Market Consistent Embedded Value (MCEV) from the beginning to the end of the reporting year.

<b>Table 9: Analysis of Market Consistent Embedded Value (MCEV) Earnings – after minorities</b>					
in m. EUR	Before consolidation				After consolidation
	Free Surplus	Required Capital	Value In-Force	Market Consistent Embedded Value	Market Consistent Embedded Value
<b>Opening Market Consistent Embedded Value (MCEV)</b>	<b>876.7</b>	<b>1,237.4</b>	<b>1,633.3</b>	<b>3,747.4</b>	<b>2,568.3</b>
Opening adjustments	-28.6	10.4	25.5	7.2	18.7
Dividend payments	-11.5	0.0	0.0	-11.5	0.0
Change in currency exchange rates	-5.5	10.4	25.5	30.3	30.3
Other implications	-11.6	0.0	0.0	-11.6	-11.6
<b>Adjusted opening Market Consistent Embedded Value (MCEV)</b>	<b>848.1</b>	<b>1,247.8</b>	<b>1,658.7</b>	<b>3,754.6</b>	<b>2,587.0</b>
Value of New Business (VNB)	-448.9	284.4	405.1	240.6	240.6
Expected existing business contribution (reference rate)	9.4	17.0	81.6	108.0	97.4
Expected existing business contribution (in excess of reference rate)	15.7	22.4	0.0	38.1	22.3
Transfers from Value In-Force (VIF) and Required Capital (RC) to Free Surplus (FS)	356.1	-190.9	-165.2	0.0	0.0
Experience variances	-101.7	13.1	50.4	-38.3	-38.3
Assumption changes	-7.2	1.7	-92.3	-97.8	-97.8
Other operating variance	-27.6	19.6	107.7	99.7	99.7
Model changes	-16.0	7.8	113.1	105.0	105.0
Other operating variance	-11.6	11.8	-5.4	-5.3	-5.3
<b>Operating MCEV earnings</b>	<b>-204.2</b>	<b>167.3</b>	<b>387.2</b>	<b>350.3</b>	<b>323.9</b>
Economic variances	189.2	0.0	-104.4	84.8	89.7
Other non operating variance	4.8	1.1	-0.1	5.8	5.8
<b>Total MCEV earnings</b>	<b>-10.2</b>	<b>168.4</b>	<b>282.6</b>	<b>440.9</b>	<b>419.4</b>
<b>Closing adjustments</b>	<b>49.4</b>	<b>0.0</b>	<b>0.0</b>	<b>49.4</b>	<b>59.4</b>
Capital injection	141.8	0.0	0.0	141.8	141.8
Dividend payments	-92.5	0.0	0.0	-92.5	-82.5
<b>Closing Market Consistent Embedded Value (MCEV)</b>	<b>887.3</b>	<b>1,416.2</b>	<b>1,941.3</b>	<b>4,244.9</b>	<b>3,065.8</b>

## 4.1. Opening Adjustments

### Dividend payments

The subsidiaries in Australia and Bermuda paid dividends to Hannover Re. However, this effect is removed in the consolidation.

### Change in currency exchange rates

The Euro weakened during 2011 relative to most of the important currencies.

### Other implications

Companies that are not writing life and health business, but allocated to the IFRS Life and Health segment, were included 'at equity' in the past. As of 2011 these companies are included in the IFRS Non-life segment and are therefore no longer relevant for the MCEV.

## 4.2. Expected Existing Business Contribution

### At the reference rate

This includes the unwinding for one year of the discount rates (i.e. the reference rates) in respect of the Value In-Force (VIF) and a release from risk for the Cost of Residual Non Hedgeable Risks (CoRNHR) and the Frictional Costs of Required Capital (FCoRC). The expected contribution on the Free Surplus (FS) and the Required Capital (RC) is equal to the reference rates less tax.

### In excess of the reference rate

This reflects the management's best estimate of the expected investment returns in the year to the valuation date.

## 4.3. Experience Variances

The negative experience variances result from the sum of a negative effect on the Shareholder Net Worth (SNW) and a positive effect on the Value In-Force (VIF). The negative effect on the SNW is caused by adverse mortality and morbidity experience under certain treaties in the reporting year. This effect was mainly caused by a few very large claims for mortality treaties in the US. In addition a downward trend in lapse rates in the US has been observed over the last three years. As a consequence the assumptions under these treaties were adjusted as discussed below. Lapse rates lower than expected lead to lower reserve releases resulting in lower underwriting results in the reporting year.

The positive effect on the VIF mainly originates from a change of business mix under Domestic Operations as well as associated lower Cost of Residual Non Hedgeable Risks (CoRNHR).

## 4.4. Assumption Changes

The negative impact on the Value In-Force (VIF) due to assumption changes mainly arises from an adjustment of mortality and lapse assumptions under certain mortality treaties in the US market as mentioned under Experience Variances. Furthermore, the morbidity assumptions were strengthened for Australian Disability Income Insurance (DII) business. The subsidiary in the US has strengthened the expense assumptions.

## 4.5. Other Operating Variance

### Change of model

The increase in Required Capital (RC) and decrease in Free Surplus (FS) is mainly caused by model refinements for the subsidiary in South Africa. The strong positive effect on the Value In-Force (VIF) can be explained by lower Cost of Residual Non Hedgeable Risks (CoRNHR) due to enhancements and a recalibration of the internal model as well as model refinements for several treaties.

### Other operating variance

The management has decided to increase the Required Capital (RC) for the subsidiary in Australia to reflect expected future regulatory requirements. The Free Surplus (FS) is reduced accordingly; the Frictional Costs of Required Capital (FCoRC) increased.

## 4.6. Economic Variances

The main drivers for the positive economic variances are higher than expected investment returns for the current year as well as an increase of the market value of the Shareholders Net Worth (SNW) due to the decrease of the yield curves.

Furthermore, the decrease in interest rates leads to an increase in Present Value of Future Profits (PVFP) for Domestic Operations due to lower discount rates. The assets backing most of the liabilities are deposited back with the ceding companies where a fixed interested rate is guaranteed by the ceding company. However, the total impact for Hannover Re is negative. The Foreign Operations suffer from the decreased interest rates due to lower future investment returns, which exceed the positive impact of lower discount rates.

## 4.7. Other non Operating Variance

The Required Capital (RC) has increased (and the Value In-Force slightly decreased because of higher Frictional Costs of Required Capital (FCoRC) due to increased regulatory capital requirements for the subsidiary in Bermuda. Furthermore residual amounts are shown under this position.

## 4.8. Closing Adjustments

### Capital injection

The capital injection includes the increase in the intra-company bridge financing (for details see section 6 - *Reconciliation of IFRS Equity to Market Consistent Embedded Value / Embedded Value not Recognised*) as well as a net increase of surplus notes and subordinated loans included in the MCEV of the US and UK subsidiaries.

### Dividend payments

The dividend payments show the Hannover Life Re part of the dividends paid by Hannover Rückversicherung AG to the shareholders. In addition dividends have been paid by the Irish subsidiary to Hannover Re. However, this effect is removed in the consolidation.

## 5. Sensitivities

### 5.1. Sensitivities of Market Consistent Embedded Value

The following table shows the sensitivity of the Market Consistent Embedded Value (MCEV) to changes in specified economic and non-economic assumptions. The sensitivities are described in the Appendix *Sensitivities*. The following table shows the absolute deviation from the base value.

<b>Table 10: Sensitivities of the Market Consistent Embedded Value (MCEV) - after minorities</b>				
in m. EUR	Before consolidation			After consolidation
	Domestic Operations	Foreign Operations	Total	Total
<b>Basic Market Consistent Embedded Value (MCEV)</b>	2,006.5	2,238.4	4,244.9	3,065.8
<b>Sensitivities to economic assumptions</b>				
Interest rate environment +100 bps	-37.4	12.5	-24.9	-24.9
Interest rate environment -100 bps	40.1	-68.6	-28.5	-28.5
Equity/property market value -10%	-1.4	-1.8	-3.2	-3.2
Swaption implied volatilities +25%	-3.3	-3.8	-7.1	-7.1
<b>Sensitivities to non-economic assumptions</b>				
Expenses -10%	20.3	34.9	55.2	55.2
Lapse +10%	-45.5	-345.8	-391.3	-391.3
Lapse -10%	45.8	71.8	117.6	117.6
Mortality/morbidity +5%	-75.5	-826.4	-901.9	-901.9
Life/disability business only	-165.0	-838.5	-1,003.5	-1,003.5
Annuity business only	89.5	12.1	101.6	101.6
Mortality/morbidity -5%	67.4	851.7	919.1	919.1
Life/disability business only	163.7	864.4	1,028.1	1,028.1
Annuity business only	-96.3	-12.7	-109.0	-109.0
<b>Required Capital (RC)</b>				
Required Capital (RC) = Minimum solvency capital	0.0	14.3	14.3	14.3

Only non-symmetric sensitivities are shown in both directions.

The asymmetry of the interest rate sensitivities under Foreign Operations is mainly caused by model improvements of the Dynamic Management Interactions under special treaties in the US market. Especially a contractual agreed limitation of the allowed premium increase in case of poor capital market developments was implemented.

The sensitivities for mortality and morbidity indicate that the business benefits from the diversification between financing and risk treaties. The impact of this sensitivity is lower within the Domestic

Operations due to a larger proportion of financing business. The increase in the mortality and morbidity as well as lapse sensitivities is mainly caused by model improvements (time of exercise the option of premium adjustments) and changes of the mortality and lapse assumptions for US business.

The asymmetry of the lapse sensitivities is caused by conservative modelling of certain Life Traditional treaties in the US market.

The mortality and morbidity sensitivities on annuity business have a stronger impact on the Domestic Operations in comparison to the previous year due to the high proportion of annuity business within the new business written in 2011. This also leads to a higher diversification effect for the combined mortality and morbidity sensitivities.

The impact of a liquidity premium of 10 bps was analysed for the MCEV 2011, but since the result is immaterial (about one percent of the MCEV) it is not shown.

## 5.2. Sensitivities of Value of New Business

Sensitivities have also been calculated for the Value of New Business (VNB). The following table shows the absolute deviation from the base value.

<b>Table 11: Sensitivities of Value of New Business (VNB) - after minorities</b>			
in m. EUR	Domestic Operations	Foreign Operations	Total
<b>Basic Value of new business (VNB)</b>	74.2	166.4	240.6
<b>Sensitivities to economic assumptions</b>			
Interest rate environment +100 bps	-13.4	15.4	2.1
Interest rate environment -100 bps	19.6	-14.8	4.8
Equity/property market value -10%	0.0	0.0	0.0
Swaption implied volatilities +25%	0.0	0.0	0.0
<b>Sensitivities to non-economic assumptions</b>			
Expenses -10%	19.7	5.8	25.5
Lapse +10%	-8.5	-38.2	-46.7
Lapse -10%	9.5	5.8	15.4
Mortality/morbidity +5%	-9.7	-50.6	-60.2
Life/disability business only	-31.8	-51.5	-83.3
Annuity business only	22.2	0.9	23.1
Mortality/morbidity -5%	5.2	49.1	54.3
Life/disability business only	28.5	50.1	78.5
Annuity business only	-23.3	-1.0	-24.2
<b>Required Capital (RC)</b>			
Required Capital (RC) = Minimum solvency capital	0.0	3.3	3.3



## 6. Reconciliation of IFRS Equity to Market Consistent Embedded Value / Embedded Value not Recognised

Hannover Life Re is specialised in writing financing reinsurance business. The acquisition of large volumes of financing business is only possible due to the financial support provided by the Non-life segment of Hannover Re.

Within the segmental reporting this historic financing is shown as an inter-segmental liability from the Life and Health segment to the Non-life segment ('bridge financing'). The impact of the bridge financing on the Hannover Re Group balance sheet is neutral as the liability for the Life and Health segment and the asset for the Non-life segment cancel each other out.

Bridge financing on an after minority basis is EUR 850.7 million in 2011 compared to EUR 721.0 million in 2010. Bridge financing is shown as an asset for the Non-life segment in the IFRS segment reporting. It is, however, not treated as a liability within the embedded value for the Life and Health business because the Market Consistent Embedded Value (MCEV) is based on local statutory accounts.

The 'intra-company surplus notes' are the subordinated debt issued by the Non-life segment to the Hannover Life Re subsidiaries. Under IFRS the Non-life segment does not show this subordinated debt as an asset and therefore the subordinated debt is included in the IFRS equity for the Life and Health segment. A part of this subordinated debt is included in the Shareholder Net Worth (SNW) of the US and UK subsidiaries, and therefore in the MCEV. The subordinated debt that is not included in the SNW has to be deducted to achieve the reconciliation between the IFRS equity and the MCEV.

Table 12 shows the reconciliation of the IFRS equity for the Life and Health segment to the MCEV. The Embedded Value not Recognised (EVNR) quantifies the shareholder interest in the Life and Health business in excess of the IFRS equity.

in m. EUR	2011	2010
<b>IFRS equity before minorities</b>	<b>1,823.3</b>	<b>1,496.4</b>
thereof minority capital	56.3	55.3
<b>IFRS equity</b>	<b>1,767.0</b>	<b>1,441.1</b>
Intra-company surplus notes	-327.3	-219.0
Bridge financing	850.7	721.0
<b>Adjusted IFRS equity</b>	<b>2,290.3</b>	<b>1,943.1</b>
Valuation differences	-1,184.9	-993.1
Value In-Force (VIF)	1,941.3	1,633.3
Other adjustments	19.0	-14.9
<b>Embedded Value not Recognised (EVNR)</b>	<b>775.4</b>	<b>625.2</b>
<b>Market Consistent Embedded Value (MCEV)</b>	<b>3,065.8</b>	<b>2,568.3</b>

## 7. Assumptions

### 7.1. Economic Assumptions

#### 7.1.1. Swap rates

The reference rates have been calibrated to the swap curves as shown below. A risk neutral approach has been applied and all asset classes are assumed to yield the reference rates. The reference rates do not include any liquidity premium.

in %	EUR	USD	GBP	AUD	ZAR
1 Year	1.41	0.67	1.35	4.07	5.57
2 Years	1.31	0.72	1.33	4.05	5.84
3 Years	1.36	0.82	1.36	4.02	6.19
4 Years	1.54	0.99	1.44	4.22	6.51
5 Years	1.72	1.21	1.56	4.30	6.80
6 Years	1.89	1.41	1.72	4.40	7.02
7 Years	2.07	1.61	1.87	4.50	7.25
8 Years	2.17	1.75	2.01	4.53	7.36
9 Years	2.28	1.88	2.15	4.57	7.47
10 Years	2.38	2.02	2.29	4.60	7.59
20 Years	2.69	2.50	2.84	4.80	7.66
30 Years	2.56	2.59	3.01	4.61	7.62

For the Market Consistent Embedded Value (MCEV) 2010 the following swap rates were used.

in %	EUR	USD	GBP	AUD	ZAR
1 Year	1.31	0.44	1.13	5.17	5.51
2 Years	1.56	0.78	1.51	5.34	5.90
3 Years	1.89	1.27	1.96	5.54	6.34
4 Years	2.20	1.73	2.32	5.76	6.77
5 Years	2.49	2.16	2.63	5.86	7.08
6 Years	2.71	2.48	2.87	5.93	7.29
7 Years	2.93	2.80	3.11	6.00	7.50
8 Years	3.06	2.99	3.25	6.03	7.59
9 Years	3.19	3.18	3.40	6.06	7.68
10 Years	3.32	3.36	3.54	6.09	7.77
20 Years	3.70	3.98	3.95	6.12	7.75
30 Years	3.50	4.09	3.92	5.84	7.57

### 7.1.2. Volatilities

Hannover Life Re's portfolio includes Financial Options and Guarantees (FOGs) in the United States and in South Africa. The economic scenarios for calculating the FOGs were generated using the 2 Factor Black Karasinski Model with 1,000 scenarios.

The economic scenarios were calibrated using the following swaption implied volatilities. As described in section 2.4.1. - *Financial Options and Guarantees* the FOGs were calculated based on economic assumptions as at end of November 2011. The result was adjusted to reflect the change in the market between 30<sup>th</sup> November 2011 and 31<sup>st</sup> December 2011.

in %	Swap term										
option period	1 year	2 years	3 years	4 years	5 years	7 years	10 years	15 years	20 years	25 years	30 years
1 year	44.35	44.18	44.73	44.30	44.11	42.62	39.39	35.56	32.91	30.08	28.02
2 years	44.04	43.78	44.29	43.75	43.49	41.87	38.58	34.84	32.24	29.42	27.39
3 years	43.55	43.19	43.68	43.05	42.73	41.04	37.72	34.08	31.55	28.72	26.72
4 years	42.87	42.41	42.91	42.22	41.86	40.17	36.84	33.33	30.83	28.04	26.02
5 years	42.01	41.48	42.02	41.31	40.94	39.26	35.98	32.57	30.10	27.37	25.31
7 years	39.93	39.39	40.06	39.40	39.03	37.40	34.29	31.06	28.62	26.03	23.81
10 years	36.67	36.25	37.13	36.61	36.34	34.80	31.93	28.89	26.49	24.02	21.65
15 years	32.23	31.99	33.08	32.76	32.63	31.27	28.58	25.80	23.44	21.01	18.62
20 years	29.09	28.96	30.09	29.91	29.81	28.58	25.84	23.22	20.89	18.56	16.29
25 years	26.78	26.69	27.78	27.65	27.54	26.39	23.56	21.06	18.76	16.55	14.51
30 years	24.93	24.85	25.88	25.78	25.66	24.52	21.60	19.22	17.01	14.97	13.15

The FOGs for the MCEV 2010 were calculated based on volatilities as at 31<sup>st</sup> December 2010. These volatilities are also model-based.

in %	Swap term										
option period	1 year	2 years	3 years	4 years	5 years	7 years	10 years	15 years	20 years	25 years	30 years
1 year	23.71	23.49	23.22	22.93	22.62	21.91	20.81	19.27	18.06	17.11	16.31
2 years	24.34	24.14	23.90	23.64	23.34	22.68	21.71	20.31	19.18	18.26	17.47
3 years	24.10	23.91	23.68	23.42	23.13	22.51	21.61	20.30	19.23	18.34	17.58
4 years	23.60	23.40	23.16	22.89	22.60	22.02	21.18	19.93	18.91	18.05	17.31
5 years	23.27	23.04	22.78	22.49	22.20	21.62	20.81	19.60	18.59	17.73	17.00
7 years	22.02	21.74	21.44	21.14	20.83	20.22	19.36	18.09	17.04	16.16	15.41
10 years	21.21	20.93	20.63	20.33	20.04	19.45	18.59	17.26	16.10	15.13	14.32
15 years	19.69	19.38	19.08	18.78	18.48	17.90	17.06	15.79	14.70	13.79	13.03
20 years	18.89	18.61	18.33	18.03	17.74	17.14	16.28	14.93	13.75	12.77	11.97
25 years	18.14	17.88	17.62	17.35	17.07	16.50	15.67	14.38	13.29	12.38	11.65
30 years	16.49	16.22	15.93	15.64	15.35	14.79	13.96	12.70	11.64	10.78	10.10

### 7.1.3. Currency Exchange Rates

The following closing values were used for consolidation purposes:

<b>Table 17: Equivalent in EUR of 1 unit of the original currency</b>				
Year	USD	GBP	AUD	ZAR
2011	0.772457	1.195829	0.785953	0.095420
2010	0.754478	1.164822	0.765222	0.113757

### 7.1.4. Credit Risk on Assets

The credit risk on assets is reflected in the initial market value of the assets. All assets are then assumed to earn risk free returns.

### 7.1.5. Counterparty Risk

Counterparty risk under the reinsurance treaties is reflected within the Cost of Residual Non Hedgeable Risks (CoRNHR). These risks mainly reflect the possible loss of unamortised initial financing in case the ceding company becomes insolvent.

### 7.1.6. Tax

The currently applicable average tax rates are:

<b>Table 18: Tax rates in percentages</b>					
Australia	China	France	Germany	Hong Kong	Ireland
30.00	25.00	36.10	31.93	16.50	12.50
Korea	Malaysia	South Africa	Sweden	UK	US
24.20	25.00	36.23	26.30	26.00 <sup>1)</sup>	23.72

1) For the projection of the business the future tax rate of 25.00% was applied.

The tax rate in Bermuda is 0.00% and the tax rate used for the business written by the Bahrain subsidiary is equal to the French tax rate.

The projections allow for tax losses to be carried forward.

## 7.2. Non-economic Assumptions

### 7.2.1. Cost of Residual Non Hedgeable Risks

The cost of capital approach is described in Appendix I - Methodology. The capital charge was set up to 4.5% and the capital was determined at the 99.5% confidence level.

### 7.2.2. Mortality Improvements

Mortality improvements under products covering death benefits have been assumed within the Foreign Operations mainly for certain reinsurance treaties covering UK term assurances and traditional risk reinsurance business in the United States.

## 7.3. Expenses

The total administration expenses for the year 2011 have been taken into account in deriving the expense assumptions. The expenses have been allocated to the treaties and projected into the future allowing for expense inflation.

## Appendix

### I. Methodology

Hannover Re has adopted the MCEV Principles. The embedded value calculations are performed using market consistent economic assumptions. Investment returns for all asset classes are assumed to be equal to the reference rates and explicit allowance is made to cover the Cost of Residual Non Hedgeable Risks (CoRNHR).

#### General Assumptions

- All calculations are based on the going concern approach, i.e. all entities remain in operation and continue writing new business.
- The Market Consistent Embedded Value (MCEV) is calculated using best estimate assumptions.
- All values are post-tax.
- Expense inflation was recognised for the MCEV calculations. For part of the business it has been assumed that efficiency gains will partly compensate expense inflation.
- Overhead expenses are included within the administrative expenses.
- No future new business is included in the calculations.
- No productivity gains are considered, except for those compensating the expense inflation.

#### New Business

New business is defined as new reinsurance treaties written or new policies written under existing treaties during the year. External retrocession of new business treaties is assumed to be negative new business.

The Value of New Business (VNB) is calculated at the point of sale and includes the profit or loss during the year in which the new business was sold.

#### Shareholder Net Worth

The Shareholder Net Worth (SNW) corresponds to the consolidated market value of the assets backing shareholders' funds after deduction of intangible assets, subordinated debt and any other element accounted for the in-force business. The SNW is divided into Required Capital (RC) and Free Surplus (FS).

The SNW is derived from the consolidation of the Net Asset Values of the following companies:

- Domestic Operations:
  - Hannover Rückversicherung AG (Hannover Re) – Life and Health segment
  - E+S Rückversicherung AG (E+S Rück) – Life and Health segment
- Foreign Operations (life subsidiaries):
  - Hannover Life Re Africa, Johannesburg
  - Hannover Life Re America, Orlando FL
  - Hannover Life Re Australasia, Sydney

- Hannover Life Re Bermuda, Hamilton
- Hannover Life Re Ireland, Dublin
- Hannover Life Re UK, Virginia Water/London

Hannover Re holds 100% of the shares of all life subsidiaries with the exception of the Life and Health segment of E+S Rück in which the shareholding is 63.69%.

Hannover Re and E+S Rück are both composite reinsurance companies writing Life and Non-life reinsurance business. The Net Asset Value of the companies included in the scope of the Market Consistent Embedded Value (MCEV) has been derived by making adjustments to the IFRS equity for the Life and Health segment.

### Required Capital

The Required Capital (RC) is the amount of capital required to support covered business, i.e. the market value of the assets required to back liabilities for covered business being restricted in regards to distribution to shareholders.

The RC is always at least equal to the local Statutory Minimum Solvency Margin. The level of the RC for each business centre is set equal to the maximum of:

- The level of capital at which the local regulators are empowered to take action
- The level of capital required by rating agencies (in order to maintain the desired rating)
- The target capital level of the business unit
- Any other level of capital to achieve internal management objectives

The RC was set between 100% and 250% of the local Statutory Minimum Solvency Margin. The RC for the US and the UK subsidiaries includes intra-company surplus notes from the Non-life segment to the extent that these are required to meet the target RC.

### Free Surplus

The Free Surplus (FS) is the market value of any assets allocated to, but not required to support the covered business.

### Present Value of In-Force Business

The Present Value of In-Force Business (VIF) consists of

- Present Value of Future Profits (PVFP)
- Time Value of Financial Options and Guarantees (FOGs)
- Cost of Residual Non Hedgeable Risks (CoRNHR)
- Frictional Costs of Required Capital (FCoRC)

### Present Value of Future Profits

The Present Value of Future Profits (PVFP) is the present value of projected statutory shareholders' profits (net of taxes) from the covered business in-force calculated on a certainty equivalent basis. The

discount rates are spot rates derived from the reference rates. Pension Deficits and Look Through are included in the PVFP.

### **Time Value of Financial Options and Guarantees**

The majority of treaties either do not have significant Financial Options and Guarantees (FOGs) or the assets and liabilities are well matched. The Present Value of Future Profits (PVFP) for these treaties has been calculated using deterministic projections.

Stochastic models have been used to estimate the FOGs for the United States and South African business with minimum interest guarantees. The time value of the FOGs is derived as the difference between PVFP on a certainty equivalent basis and the arithmetic mean of PVFP derived from a large number of stochastic scenarios.

In order to improve run times a simplified stochastic model is in use to determine the FOGs. The assets are modelled as cash rather than using a synthetic bond portfolio. This approach increases the volatility of investment returns as well as the duration gap in the model. The simplified model produces a reasonable estimate of the FOGs.

### **Cost of Residual Non Hedgeable Risks**

The MCEV Principles require an allowance for the cost of non hedgeable risks not already allowed for in Financial Options and Guarantees (FOGs) or Present Value of Future Profits (PVFP).

The Cost of Residual Non Hedgeable Risks (CoRNHR) has been determined based on a cost of capital approach using an internal economic capital model. The capital has been determined consistent with a 99.5% confidence level over a one year time horizon. Diversification benefits have been allowed within the non hedgeable risks, but not between hedgeable and non hedgeable risks. The economic capital is projected forward using appropriate risk drivers (e.g. the premiums or mathematical reserves) and the present value is calculated using the reference rates.

The CoRNHR covers the following non financial risks:

- Mortality risk
- Longevity risk
- Morbidity risk
- Disability risk
- Lapse risk
- Expense risk
- Pandemic risk
- Operational risk

as well as cedants counterparty risk and non hedgeable financial risks.

### **Frictional Costs of Required Capital**

The Frictional Costs of Required Capital (FCoRC) are defined as the tax on the projected investment returns and investment costs on asset backing the Required Capital (RC) over the projected lifetime of the underlying risks.

## Sensitivities

### Interest rate environment +/- 100 bps

Under this sensitivity a parallel shift in the risk free yield curve is assumed. As a consequence current market values of fixed interest assets and future reinvestment rates also change. This sensitivity is not performed in isolation, but there are associated impacts on most other economic assumptions.

### Equity/property market value - 10%

This sensitivity indicates the impact of a sudden fall of the market values of these assets.

### Swaption implied volatilities + 25%

This sensitivity shows the impact of an increase in swaption implied volatilities on the cost of options and guarantees.

### Liquidity Premium + 10 bps

This sensitivity shows the impact of a liquidity premium of 10 bps applied on the forward rate for products where a liquidity premium could be earned.

### Expenses - 10%

This sensitivity applies to the projected level of expenses without a change in the expense inflation.

### Lapse +/- 10%

Hereunder a 10% proportional increase/decrease in lapse rates is applied, i.e. a multiplicative change in lapse rates.

### Mortality/morbidity +/- 5%

The sensitivity has been performed for three different situations:

1. Mortality and Morbidity are proportionately reduced for all classes of business at the same time.
2. The sensitivity is performed only for life, disability, medical insurances and related products.
3. Mortality is changed only for the annuity policies.

### Required Capital

For the sensitivity 'Required Capital = minimum solvency capital' the amount of Required Capital (RC) is set equal to the level of solvency capital at which the supervisor is empowered to take any action.



## II. Glossary

APE	Annual Premium Equivalent
APEM	Annual Premium Equivalent Margin
CoRNHR	Cost of Residual Non Hedgeable Risks Explicit allowance for residual non hedgeable financial and non financial risks
EVNR	Embedded Value not Recognised Shareholder interest in the Life and Health business in excess of the IFRS equity
FCoRC	Frictional Costs of Required Capital Taxation and cost of asset management on the assets backing the Required Capital
FOGs	Financial Options and Guarantees Time value of financial options und guarantees; determined on stochastic techniques consistent with the methodology and assumptions used in the underlying Market Consistent Embedded Value (MCEV)
FS	Free Surplus The market value of any capital and surplus allocated to, but not required to support, the in-force covered business at the valuation date
MCEV	Market Consistent Embedded Value Defined as the present value of future distributable earnings of the business in-force plus the portion of capital and surplus that is not needed to support the business in-force; Methodology in line with the Market Consistent Embedded Value (MCEV) Principles of the CFO-Forum
NBM	New Business Margin
NBP	New Business Premium current year
NBRP	New Business Regular Premium
NBSP	New Business Single Premium
P/L(NB)	Profit or Loss on New Business during the year
PVFP	Present Value of Future Profits The present value of future shareholder profits projected to emerge from the assets backing liabilities of the in-force covered business
PVNB	Present Value of New Business Profits
PVNBP	Present Value of New Business Premium
RC	Required Capital Assets attributed to the covered business over and above that required to back liabilities for covered business whose distribution to shareholders is restricted
SNW	Shareholder Net Worth Free Surplus plus Required Capital
VIF	Value In-Force The present value of future shareholder profits projected to emerge from the in-force covered business and the assets backing the associated liabilities after allowance for FOGs, CoRNHR and FCoRC
VNB	Value of New Business

### III. Formulae and Abbreviations

<b>MCEV = SNW + VIF</b>	
MCEV	Market Consistent Embedded Value
SNW	Shareholder Net Worth
VIF	Value of In-Force covered business
<b>SNW = FS + RC</b>	
SNW	Shareholder Net Worth
FS	Free Surplus
RC	Required Capital
<b>VIF = PVFP – CoRNHR – FOGs – FCoRC</b>	
VIF	Value of In-Force covered business
PVFP	Present Value of Future Profits based on a certainty equivalent approach including Pension Deficits and Look Through
CoRNHR	Cost of Residual Non Hedgeable Risks
FOGs	Time Value of Financial Options and Guarantees
FCoRC	Frictional Costs of Required Capital
<b>CoRNHR = CoCF * EC</b>	
CoRNHR	Cost of Residual Non Hedgeable Risks
CoCF	Cost of Capital Factor (percentage)
EC	Economic Capital (present value) based on the 99.5% percentile confidence level
<b>FOGs = PVFP – Mean Stochastic PVFP</b>	
FOGs	Time Value of Financial Options and Guarantees
PVFP	Present Value of Future Profits based on a certainty equivalent approach including Pension Deficits and Look Through
Mean Stochastic PVFP: derived from a large number of stochastic scenarios	
<b>Return on MCEV = <math>\frac{\text{Closing MCEV} - \text{Closing Adjustments} - \text{Adjusted Opening MCEV}}{\text{Adjusted Opening MCEV}}</math></b>	
<b>VNB = P/L + PVNB – CoRNHR – FOGs – FCoRC</b>	
VNB	Value of New Business
P/L	Profit or Loss on New Business during the current year
PVNB	Present Value of New Business future profits
CoRNHR	Cost of Residual Non Hedgeable Risks on New Business
FOGs	Value of FOGs on New Business
FCoRC	Frictional Costs of Required Capital on New Business
<b>NBM = <math>\frac{\text{VNB}}{\text{NBP} + \text{PVNBP}}</math></b>	
NBM	New Business Margin
VNB	Value of New Business
NBP	New Business Premium during the current year
PVNBP	Present Value of New Business future Premium
<b>APEM = <math>\frac{\text{VNB}}{\text{APE}} = \frac{\text{VNB}}{\text{NBRP} + 10\% \text{NBSP}}</math></b>	
APEM	Annual Premium Equivalent Margin
VNB	Value of New Business
APE	Annual Premium Equivalent
NBRP	New Business Regular Premium
NBSP	New Business Single Premium

## IV. Overview of Domestic Operations

### Covered business Domestic Operations

Hannover Rückversicherung AG, Hannover

E+S Rückversicherung AG, Hannover

Hannover Rückversicherung AG Succursale Française, Paris

Hannover Rückversicherung AG Tyskland filial, Stockholm

Hannover Rückversicherung AG Malaysian Branch, Kuala Lumpur

Hannover Rückversicherung AG Hong Kong Branch, Hong Kong

Hannover Rückversicherung AG Korea Branch, Seoul

Hannover Rückversicherung AG Shanghai Branch, Shanghai

Hannover Re Takaful B.S.C. (c), Bahrain

## V. Overview of Foreign Operations

### Covered business Foreign Operations

Hannover Life Reassurance Africa Ltd, Johannesburg

Hannover Life Reassurance Company of America, Orlando

Hannover Life Re of Australasia Ltd, Sydney

Hannover Life Reassurance Bermuda Ltd, Hamilton

Hannover Life Reassurance (Ireland) Ltd, Dublin

Hannover Life Reassurance (UK) Ltd, Virginia Water

## VI. Summary of Tables

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- Table 18: Tax rates in percentages

## VII. Disclaimer

The information provided in this report does in no way whatsoever constitute legal, accounting, tax, or other professional advice.

While Hannover Re has endeavoured to include in this report information it believes to be reliable, complete and up-to-date, the company does not make any representation or warranty, express or implied, as to the accuracy, completeness or updated status of such information.

Some of the information in this report may be forward-looking information or information on future expectations based on currently available information. Such information naturally is subject to risks and uncertainties. Factors such as the development of general economic conditions, future market conditions, unusual catastrophic loss events, changes in the capital markets and other circumstances may cause the actual events or results to be materially different from those anticipated by such information. Hannover Re assumes no obligation to update any forward-looking information contained in this report.

It should be noted that all calculations are based on data reported by the ceding companies of Hannover Re and its subsidiaries, mainly bulk data, which do not allow exact specifications on the portfolio composition.

Therefore, in no case whatsoever will Hannover Re and its affiliated companies or directors, officers or employees be liable to anyone for any decision made or action taken in conjunction with the information in this report or for any related damages.

## VIII. Letter of Opinion (B&amp;W Deloitte GmbH)



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Dear Sirs,

23<sup>rd</sup> April 2012

**Review of the Market Consistent Embedded Value of the Life & Health segment of Hannover Rückversicherung AG as at 31st December 2011**

The Life and Health Reinsurance business of Hannover Rückversicherung AG ("Hannover Re"), as reported under the "life and health reinsurance" segment in the primary financial statements, is written by Hannover Rückversicherung AG and E+S Rückversicherung AG, together with their subsidiaries, branches and offices (together "Hannover Life Re" or "HLR").

Hannover Re has determined the Market Consistent Embedded Value ("MCEV") results of HLR for 2011 as set out in the Statements of Market Consistent Embedded Value (together "the Statements") on a basis consistent with the requirements of the European Insurance CFO Forum Market Consistent Embedded Value Principles<sup>(1)</sup> ("MCEV Principles"). These Statements, the methodologies applied and the assumptions underlying them are each the sole responsibility of the Board of Directors ("the Directors") of Hannover Re.

The Statements have been prepared by Hannover Re as the aggregate of separate Market Consistent Embedded Values determined for each significant operating unit making due allowance for inter group transactions including retrocessions, any minority interests together with the elimination of the book values of the businesses for which an MCEV has been calculated.

The calculation of MCEVs necessarily makes numerous assumptions with respect to economic conditions, operating conditions, taxes, and other matters, many of which are beyond Hannover Re's control. Although the assumptions used represent estimates which the Directors believe are together reasonable, actual experience in future may vary from that assumed in the calculation of MCEV and such variation may be material. Deviations from assumed experience are normal and are to be expected.

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The resulting MCEV does not purport to be a market valuation of Hannover Re and should not be interpreted in that manner since it does not purport to encompass all of the many factors that may bear upon a market value.

**Scope of B&W Deloitte's Review**

We have reviewed the methodology adopted and assumptions and calculations made by the Directors to determine the MCEV for the businesses concerned and their aggregation into the consolidated MCEV of HLR.

The non hedgeable risk based capital, which is the basis for the calculation of the cost of residual non hedgeable risks, has been determined by HLR using an internal capital model. We have not reviewed the internal model or the level of non hedgeable risk based capital. Hannover Re has decided to not publish the Group Embedded Value as required by the MCEV Principles.

Our work was conducted in accordance with generally accepted actuarial practices and processes. It comprised a combination of such reasonableness checks, analytical review and checks of clerical accuracy as we considered necessary to provide reasonable assurance that the Statements have been compiled free of significant error. However, we have relied upon the completeness and accuracy of the data and information supplied by Hannover Re and its subsidiaries, including the book value of the net assets as disclosed in Hannover Re's financial statements on which the Statements are based. Accordingly, as is customary, we have not audited, verified or otherwise substantiated that data and information.

**Opinion**

In our opinion, with the exceptions highlighted in the scope of the B&W Deloitte review above, the MCEV methodology as approved by the Directors of Hannover Rückversicherung AG is appropriate, the assumptions taken together are reasonable and the estimate of the Market Consistent Embedded Value have been accurately compiled consistent with the "MCEV Principles".

This report is made solely to Hannover Rückversicherung AG's Directors as a body. To the fullest extent permitted by law we do not accept or assume responsibility to anyone other than Hannover Rückversicherung AG's Directors as a body for our work in respect of this report or for the conclusions that we have reached.

Yours faithfully

B&W Deloitte GmbH

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