

RISK MANAGEMENT ANALYTICS

STEVEN JONES

Senior Vice President, Head of U.S. Analytics Sales
Marsh, Inc.

2016 PHC



EMPOWERING CONFIDENT DECISION MAKING IN AN UNCERTAIN WORLD

Marsh Analytics Platform: MAP

2016 PHC



How are Marsh's clients leveraging data and analytics to improve their **risk management strategy** and **cost reduction efforts**?

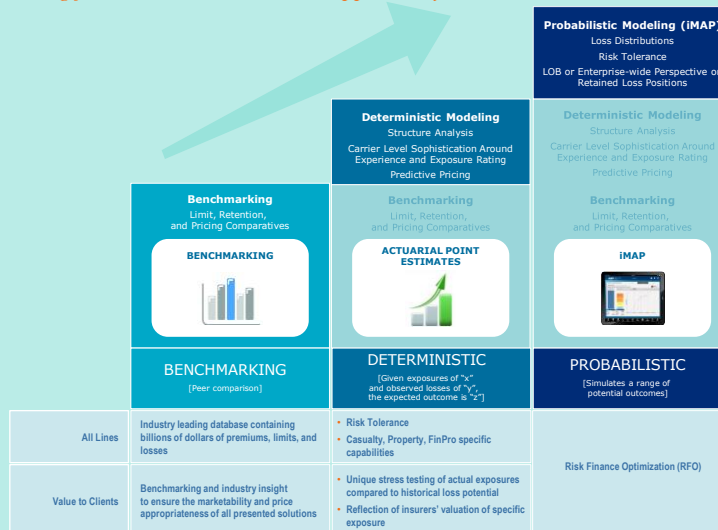
- Improved decision support
- Risk identification
- Risk quantification
- Informing insurance program structures
- Identifying and addressing costs of retained risks

2016 PHC



RISK ASSESSMENT Evolution

Moving from Relative to Absolute Opportunity

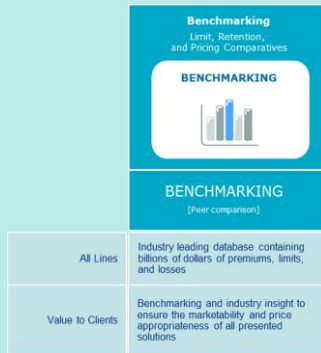


2016 PHC



BENCHMARKING

A Relative View of Your Risk and Structure



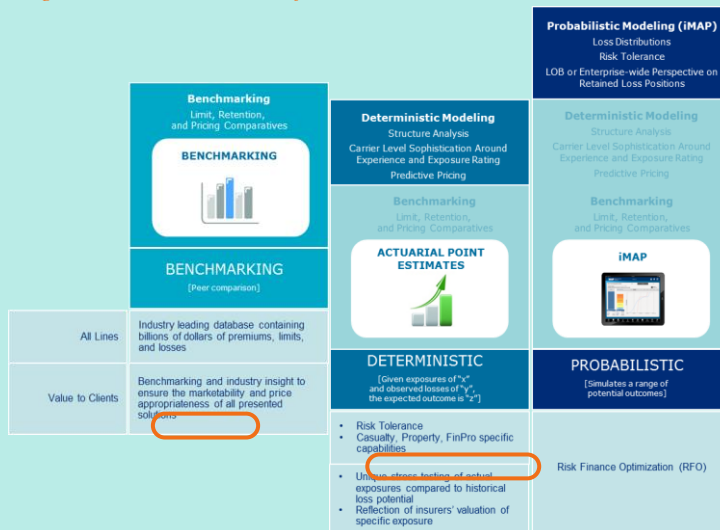
- How do your limits and retentions compare to your peers?
- How does your pricing compare to your peers?
- What is the loss potential in your industry?

2016 PHC



MODELING *Loss Potential*

Using Claims to Assess Value of Insurance



2016 PHC



KEY ANALYTICS *Questions*

1 >

How much risk can your company tolerate?

- What are your company's sources of capital and how do you prefer to deploy those resources to deal with unexpected losses?
- Are there regulatory pressures on the amount of risk your company can take?

2 >

Is your company adequately protected against risk?

- Are your company's limits and deductibles appropriate?
- Does your insurance structure reflect corporate risk tolerance?

3 >

Is your company getting the expected value from its insurance purchase?

- Cost of retaining risk vs. cost of transferring risk (premium)?
- Whose capital is cheaper: your company's or your insurance carrier's?

2016 PHC



KEY ANALYTICS *Questions*

1 >

How much risk can your company tolerate?

- What are your company's sources of capital and how do you prefer to deploy those resources to deal with unexpected losses?
- Are there regulatory pressures on the amount of risk your company can take?

Earnings Miss The Equity Holders' View

- Estimates the volatility built into earnings estimates
- Arrives at an earnings miss that might cause a drop in share value
- Typically discounts intangible assets

Debt Coverage The Bondholders' View

- Emphasis on interest coverage
- Looks at earnings miss required for one or more notch rating downgrade(s).
- Might look at other loan covenants

Key Performance Indicators (KPIs) Qualitative View

- KPIs are selected from:
 - Balance sheet
 - Income statement
 - Access to other funds
- Flexibility allows for reflection of company culture
- Appropriate for private companies

2016 PHC

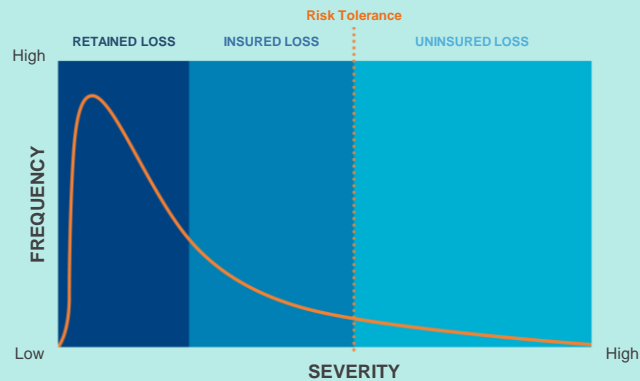


KEY ANALYTICS *Questions*

2

Is your company adequately protected against risk?

- Are your company's limits and deductibles appropriate?
- Does your insurance structure reflect corporate risk tolerance?



2016 PHC

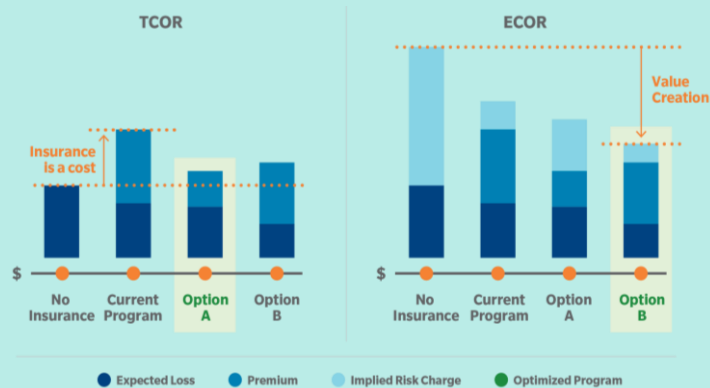


KEY ANALYTICS *Questions*

3

Is your company getting the expected value from its insurance purchase?

- Cost of retaining risk vs. cost of transferring risk (premium)?
- Whose capital is cheaper: your company's or your insurance carrier's?



2016 PHC

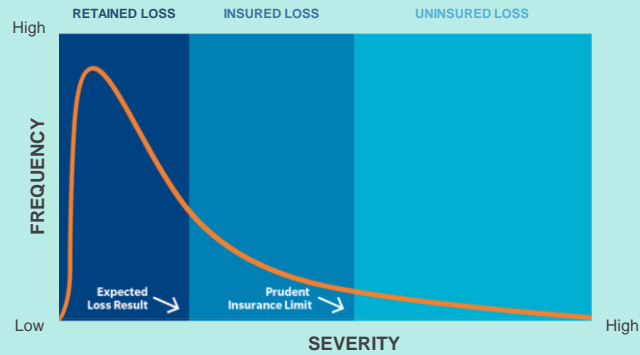


BUILDING A 12-MONTH *Picture of Loss Potential*

A Comprehensive View of Risk

3

Is your company getting the expected value from its insurance purchase?



2016 PHC

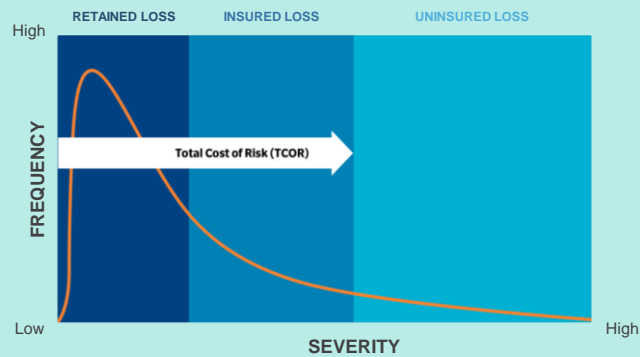
AEGIS®

TOTAL COST *of Risk*

Looks at Direct Costs Like Premiums and Budgeted Losses

3

Is your company getting the expected value from its insurance purchase?



2016 PHC

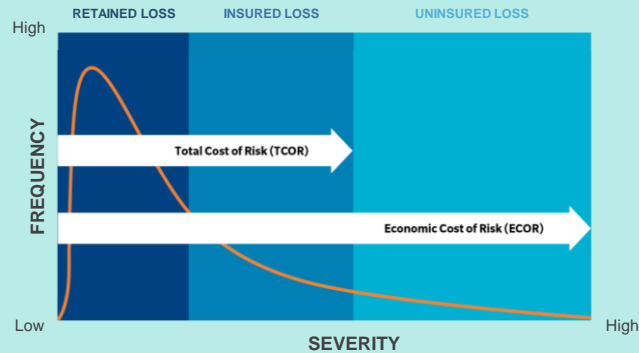
AEGIS®

ECONOMIC COST of Risk

A More Comprehensive View Including the Cost of Volatility

3

Is your company getting the expected value from its insurance purchase?



2016 PHC

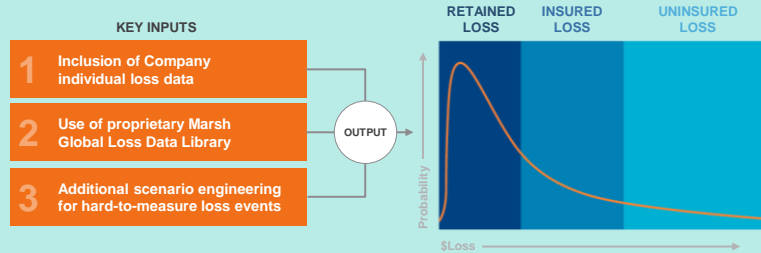


RISK FINANCING Optimization

Exploring Loss Potential

3

Is your company getting the expected value from its insurance purchase?



Potential Considerations Include:

Casualty / Financial / Professional Liability:

- Revenues / customers by business unit
- Changes in loss exposure
- New risk initiatives
- Historical loss activity
- Extreme scenario analysis
- Litigation potential by country
- Market capitalization

Property Indemnity:

- Statements of values (COPE, location, valuations)
- Business Interruption Assessment
- Extra Expense & Penalties in Case of Outage
- Loss control
- Property engineering
- Natural catastrophe exposure
- Construction potential
- Data quality

2016 PHC

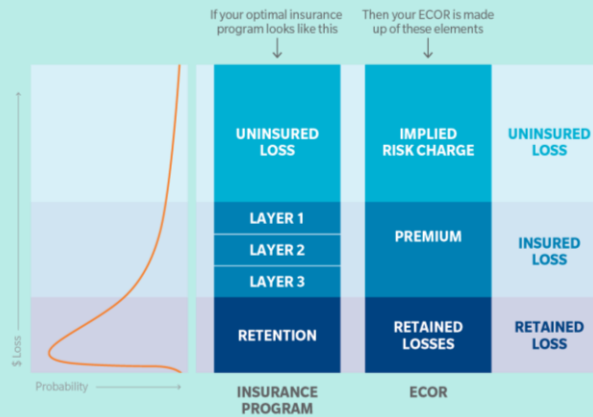


OVERLAYING INSURANCE STRUCTURE

and Calculating ECOR Understand How Insurers
Price Your Risk

3

Is your company getting the expected value from its insurance purchase?



2016 PHC



RISK FINANCING Optimization

Risk Financing Optimization allows you to evaluate the trade-off regarding retaining risk on your company's balance sheet as compared to paying a premium to transfer the risk.

3

Is your company getting the expected value from its insurance purchase?

Key Statistics		Before Insurance	Retained After Insurance	(Cost) / Benefit
Average Annual Losses		5,506,858	3,780,731	726,127
Standard Deviation		23,875,866	13,111,817	
Coefficient of Variation		5.30	3.40	

1 in 1.33 Years	25% Perc	0	3,020,342	-3,020,342
1 in 2 Years	50% Perc	0	3,020,342	-3,020,342
1 in 4 Years	75% Perc	0	3,020,342	-3,020,342
1 in 10 Years	90% Perc	1,619,223	3,270,342	-1,651,119
1 in 100 Years	99% Perc	85,679,570	3,520,342	82,159,228
1 in 250 Years	99.6% Perc	151,915,728	34,936,070	116,979,658

Economic Cost of Risk (ECOR)		No Insurance	Current Program	Option A	Option B
Sign	Components				
+	Discounted Average Retained Losses	5,146,309	3,402,658	3,814,605	3,938,994
+	Premium	0	3,020,342	2,416,274	2,265,257
+	Implied Risk Charge	2,036,577	510,399	572,191	669,629
+	Collateral and Other Admin Costs	110,000	45,000	57,000	70,000
=	Economic Cost of Risk	7,292,886	6,978,399	6,860,070	6,943,880

2016 PHC



RISK FINANCING Optimization

Risk Financing Optimization allows you to evaluate the trade-off regarding retaining risk on your company's balance sheet as compared to paying a premium to transfer the risk.

3

Is your company getting the expected value from its insurance purchase?

Key Statistics		Before Insurance	Retained After Insurance	(Cost) / Benefit
Average Annual Losses		5,506,858	3,780,731	726,127
Standard Deviation		23,875,866	13,111,817	
Coefficient of Variation		5.30	3.40	
1 in 1.33 Years	25% Perc	0	3,020,342	-3,020,342
1 in 2 Years	50% Perc	0	3,020,342	-3,020,342
1 in 4 Years	75% Perc	0	3,020,342	-3,020,342
1 in 10 Years	90% Perc	1,619,223	3,270,342	-1,651,119
1 in 100 Years	99% Perc	85,679,570	3,520,342	82,159,228
1 in 250 Years	99.6% Perc	151,915,728	34,936,070	116,979,658

Economic Cost of Risk (ECOR)

Sign	Components	No Insurance	Current Program	Option A	Option B
+	Discounted Average Retained Losses	5,146,309	3,402,658	3,814,605	3,938,994
+	Premium	0	3,020,342	2,416,274	2,265,257
+	Implied Risk Charge	2,036,577	510,399	572,191	669,629
+	Collateral and Other Admin Costs	110,000	45,000	57,000	70,000
=	Economic Cost of Risk	7,292,886	6,978,399	6,860,070	6,943,880

2016 PHC



RISK FINANCING Optimization

Risk Financing Optimization allows you to evaluate the trade-off regarding retaining risk on your company's balance sheet as compared to paying a premium to transfer the risk.

3

Is your company getting the expected value from its insurance purchase?

Insurance looks like only a cost when you don't have losses	Key Statistics	Before Insurance		Retained After Insurance		(Cost) / Benefit
		Average Annual Losses	5,506,858	3,780,731	726,127	
Insurance begins to pay off	Standard Deviation	23,875,866		13,111,817		
		Coefficient of Variation	5.30	3.40		
Substantial benefit, multiples of premium paid	1 in 1.33 Years	25% Perc	0	3,020,342	-3,020,342	
	1 in 2 Years	50% Perc	0	3,020,342	-3,020,342	
	1 in 4 Years	75% Perc	0	3,020,342	-3,020,342	
	1 in 10 Years	90% Perc	1,619,223	3,270,342	-1,651,119	
	1 in 100 Years	99% Perc	85,679,570	3,520,342	82,159,228	
	1 in 250 Years	99.6% Perc	151,915,728	34,936,070	116,979,658	
Economic Cost of Risk (ECOR)						
Sign	Components	No Insurance	Current Program	Option A	Option B	
+	Discounted Average Retained Losses	5,146,309	3,402,658	3,814,605	3,938,994	
+	Premium	0	3,020,342	2,416,274	2,265,257	
+	Implied Risk Charge	2,036,577	510,399	572,191	669,629	
+	Collateral and Other Admin Costs	110,000	45,000	57,000	70,000	
=	Economic Cost of Risk	7,292,886	6,978,399	6,860,070	6,943,880	
				Optimized Program		

2016 PHC

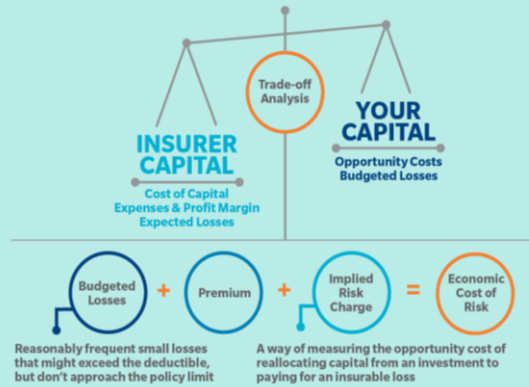


RISK FINANCING Optimization

Risk Financing Optimization allows you to evaluate the trade-off regarding retaining risk on your company's balance sheet as compared to paying a premium to transfer the risk, e.g., insurance carrier

3

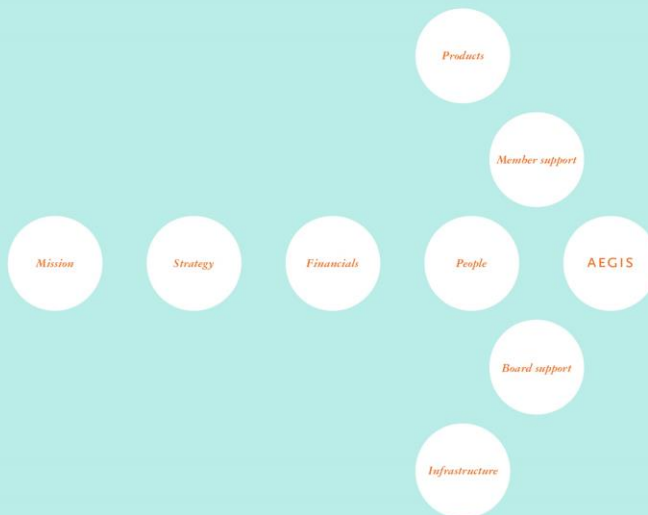
Is your company getting the expected value from its insurance purchase?



2016 PHC



2016 PHC



RISK MANAGEMENT ANALYTICS

RICHARD LAPETER

Manager, Risk Insurance & Claims

Pinnacle West Capital Corporation

2016 PHC



POWER & UTILITY

Drivers for Increased Use of Analytics – Adding Value

- The electric utility industry has experienced a continuous evolution toward strategic planning, transparent and repeatable processes, meaningful metrics, and rigorous cost management.
- Not surprisingly, this evolution has shined a light on the risk and insurance management function and challenged the traditional approaches. Company decision makers ask whether and how the insurance purchases add economic value and how the insurance portfolio supports achieving strategic goals.
- Pinnacle West Capital Corporation (PNW) had recent experience with the Marsh-NEIL RFO process and the PNW decision makers were comfortable with the rigor and the decision support value of the process.
- Given that, PNW and Marsh teamed up to address three different analytic opportunities
- Optimization of the FINPRO / Exec lines of coverage
- Deep dive into wildfire liability risk
- Broad property insurance RFO

2016 PHC



CASE STUDY POWER & UTILITY

Optimization of FINPRO / Exec Lines of Coverage

THE CHALLENGE

PNW maintained a stable portfolio of coverage with quality insurers

The challenge was to develop objective evidence that the structure of the various lines of coverage were meeting PNW's evolving needs, were fully aligned with what the markets were offering and reflected PNW's excellent loss history.

THE SOLUTION

To achieve this, PNW needed to better understand its own risk profile across each line of coverage.

The Marsh team leveraged the IDEAL tool from the Marsh Global Analytics team and developed a detailed PNW-specific risk profile for each line of coverage.

The analysis was integrated into a renewal strategy with specific recommendations for changes to optimize the lines.

THE RESULT

The result was an actionable plan for restructuring of certain coverage towers and a prioritization of certain higher priority coverage issues to resolve.

PNW was able to increase certain limits, broaden certain coverage and eliminate or minimize non-concurrencies to optimize the FINPRO / Exec lines.

2016 PHC



CASE STUDY POWER & UTILITY

Deep Dive into Wildfire Liability Risk

THE CHALLENGE

PNW had recently conducted an MFL for its excess liability tower and determined that coverage was appropriate.

The PNW Executive Risk Committee challenged the Risk and Insurance Management team to dig deeper into the wildfire events in California and ensure that PNW was adequately addressing this risk.

THE SOLUTION

The PNW and Marsh team engaged the Marsh Global Analytics team and several PNW business units to better understand both the inherent and residual risk for PNW and to focus on the legal liabilities associated with wildfires in Arizona.

The teams developed PNW-specific scenarios, integrating internal and external data and trending, to accurately describe the current risk and forecast how these types of events might change in the future based on evolving operations.

THE RESULT

The result was that the analysis provided objective evidence of the effectiveness and efficiency of the PNW risk controls and the excess liability coverage tower.

The study was shared with the Executive Risk Committee and improved PNW's understanding of the way in which liability would flow from this type of event in AZ.

2016 PHC



CASE STUDY POWER & UTILITY

Broad Property Insurance RFO

THE CHALLENGE

PNW had recently restructured its property insurance program and successfully addressed certain tactical business needs. Now, PNW needed to develop a strategic approach to managing the property program for the future.

There was a large volume of anecdotal and benchmarking information about how other electric utilities were structuring their programs and PNW wanted to ensure that its program balanced coverage, loss control support and cost.

THE SOLUTION

PNW and the Marsh team developed the scope of a property RFO as a component of the post-renewal review.

The RFO would examine the existing program; refreshing PNW's asset values and risk exposures and establish a baseline to identify options to evolve the program and ensure it remained flexible and aligned with the Company's Integrated Resource Plan.

THE RESULT

The result was that the analysis (still in progress) has already resolved certain questions related to limits and deductibles and has begun to identify certain specific opportunities for the future of the program.

The analysis enables PNW to more effectively engage with and support the Company's operational business units - providing more strategic support for their future projects.

2016 PHC



KEY SUMMARY

Takeaways

- Many US risk management teams are using analytics to advance their influence and effectiveness in their organizations
- Benchmarking doesn't provide your company's risk profile (know yourself)
- Seeking an economic cost of risk and describing the value added aligns your risk management strategies with company-wide strategic goals
- Data and analytics provide a common language for risk management teams to communicate the nuances of insurance with the line organizations they support
- Risk finance optimization is an effective tool for building support for line organizations' loss control initiatives

2016 PHC





RISK MANAGEMENT ANALYTICS

BILL HILLMAN

Senior Vice President, Underwriting
AEGIS Insurance Services, Inc.

2016 PHC

RISK MANAGEMENT ANALYTICS

- Perspective
- Resources
- Implementation

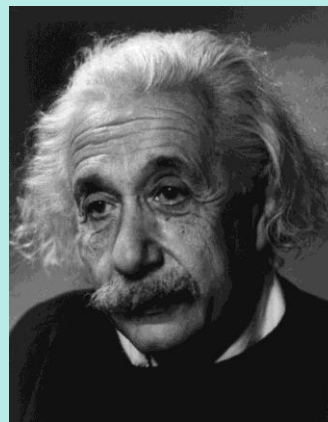
2016 PHC



RISK MANAGEMENT ANALYTICS *Perspective*

- Value in dual perspectives
- Assumptions and method impact
 - Famous New Jerseyan

“Assumptions are made and most assumptions are wrong.”
- Albert Einstein



2016 PHC



RISK MANAGEMENT ANALYTICS *Resources*

- Robust data resources
- 40 years of claims history across a wide range of exposures
 - 47,000 reported claims
 - 8,000 paid claims
 - \$11.1 billion in paid claims
 - \$12.4 billion in incurred claims
- Provides actuarial and statistical credibility

2016 PHC



RISK MANAGEMENT ANALYTICS *Implementation*

- Participate in the analysis process
- Support any revised structure development
- Range of support for any customized structure
 - Reinsure to captive
 - Access reinsurance capacity
 - Access alternative capital capacity
 - Loss-sensitive pricing
 - Partner on new coverage

2016 PHC



