



Who Pays? When Manufacturing Goes Awry

March 13, 2024
Munich Re Green Tech Solutions



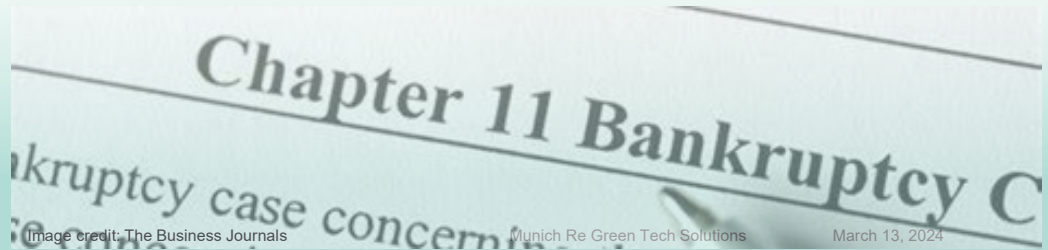
Bankruptcy in Clean Tech



Image credit: The Washington Post



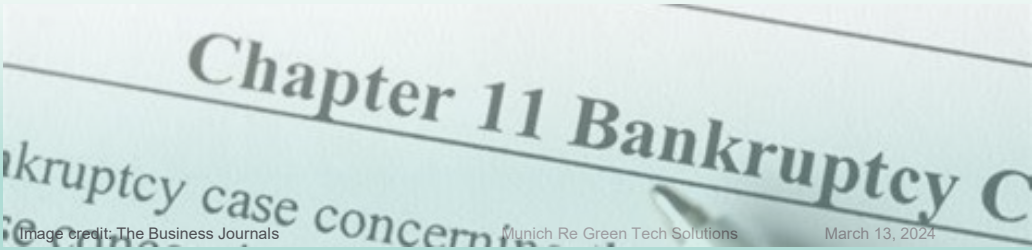
Bankruptcy in Clean Tech



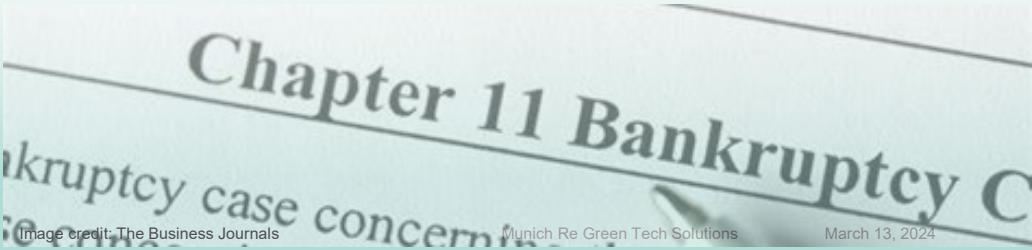
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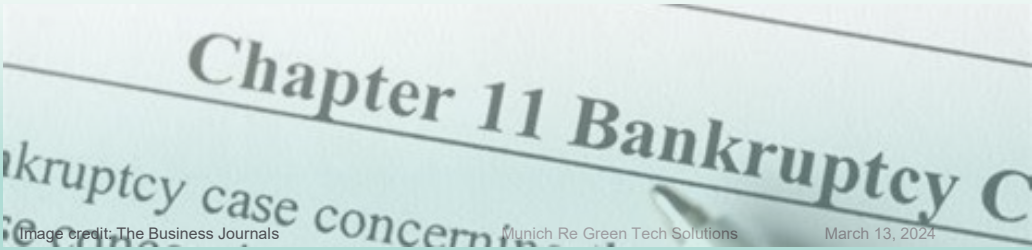
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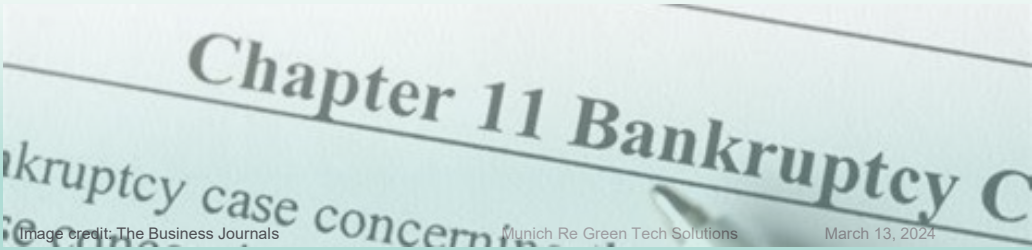
Bankruptcy in Clean Tech




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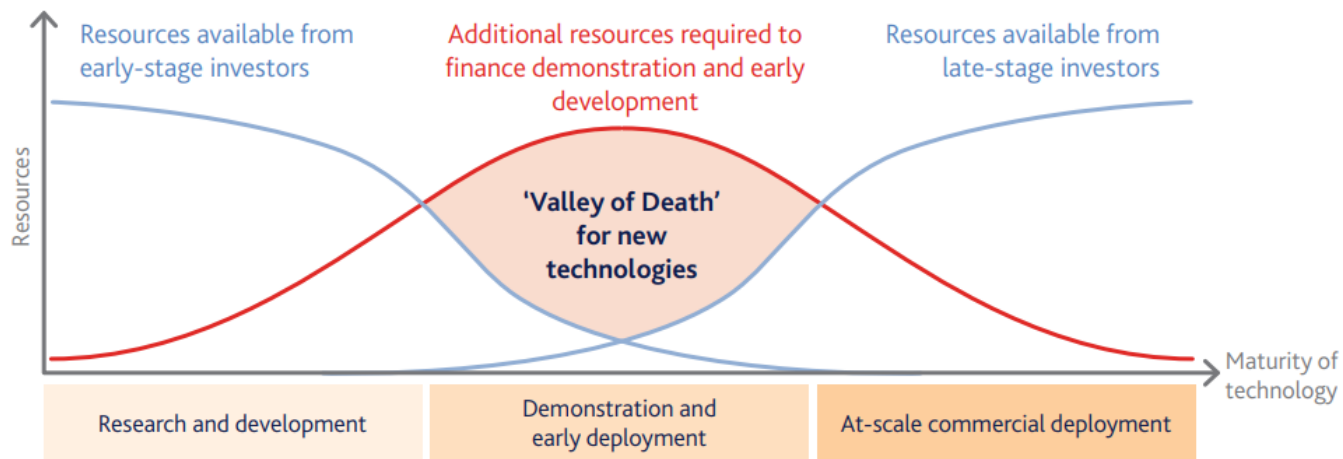
Bankruptcy in Clean Tech





Bankruptcy happens and companies fail,
impacts ripple across stakeholders.

FIGURE 6: THE VALLEY OF DEATH – THE MAJOR INVESTMENT GAP IN THE COMMERCIALISATION PATHWAY OF NEW TECHNOLOGIES



Source: The Geneva Association (revised from WEF)

An aerial photograph of a dense green forest with a prominent, winding river that meanders through the landscape. The river is a vibrant blue-green color, contrasting with the deep green of the trees. The forest appears to be a mangrove or a similar wetland environment, with the water channels creating a complex, organic pattern.

Renewable energy technologies require large capital

investment during a time when

there is *uncertainty about profitability,*

Renewable energy technologies require large capital

investment during a time when

there is *uncertainty about profitability, especially while crossing*

*the **Valley of Death:**
Demonstration + Early Deployment*

Insurance can support investment decisions and bankability of equipment suppliers.



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Trillions of USD
invested in new
green technologies



Project Financing
Parties

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 Lack of trust
Will the new technology
perform in the long run?



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**Project Financing
Parties**

Uncertainty and lack of trust reduce
financing opportunities
for renewable energy projects.

Risk Transfer Solutions
motivate investments in
renewable energy projects.

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Our insurance supports companies moving through the Valley of Death.



Risks emerge amidst rapid market growth.

Market Demand

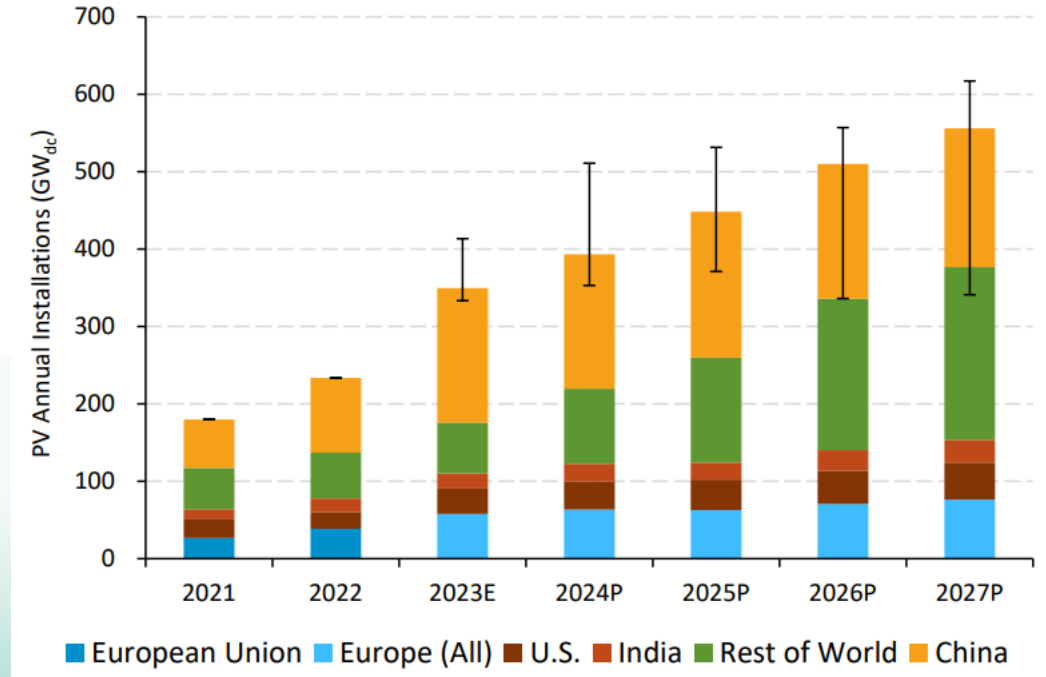
Annual Global PV Installations: 2021-2027

350-610 GW

annual installation capacity in 2027
(NREL, Jan 2024)

14% GW

US average annual growth until 2028
(Wood Mackenzie, Dec 2023)



US Installed BESS Capacity: 2023-2030

520-720 GWh

to be installed by 2030

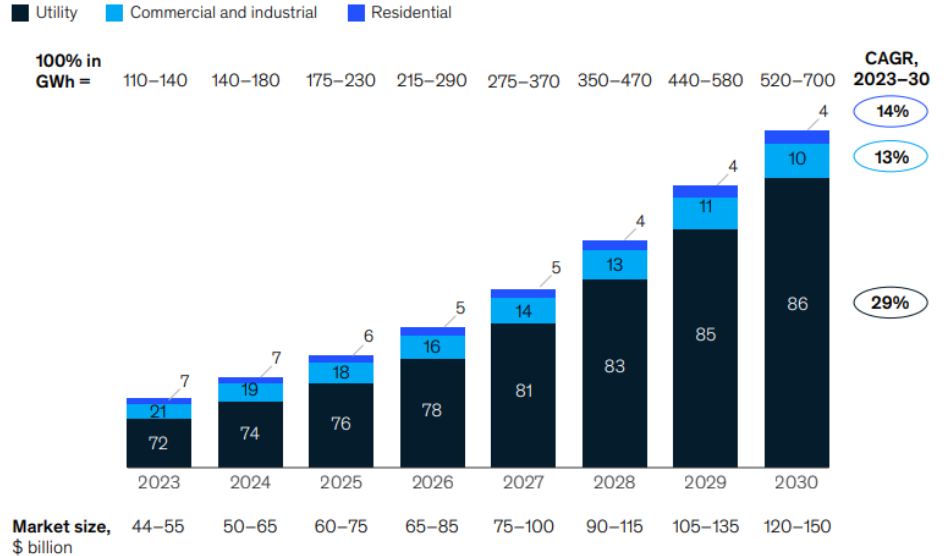
\$120-150B

market size

Exhibit 2

Battery energy storage system capacity is likely to quintuple between now and 2030.

Annual added battery energy storage system (BESS) capacity, %



Note: Figures may not sum to 100%, because of rounding.
Source: McKinsey Energy Storage Insights BESS market model

McKinsey & Company

US Hydrogen Demand: 2021-2040

30 MT

in demand by 2040

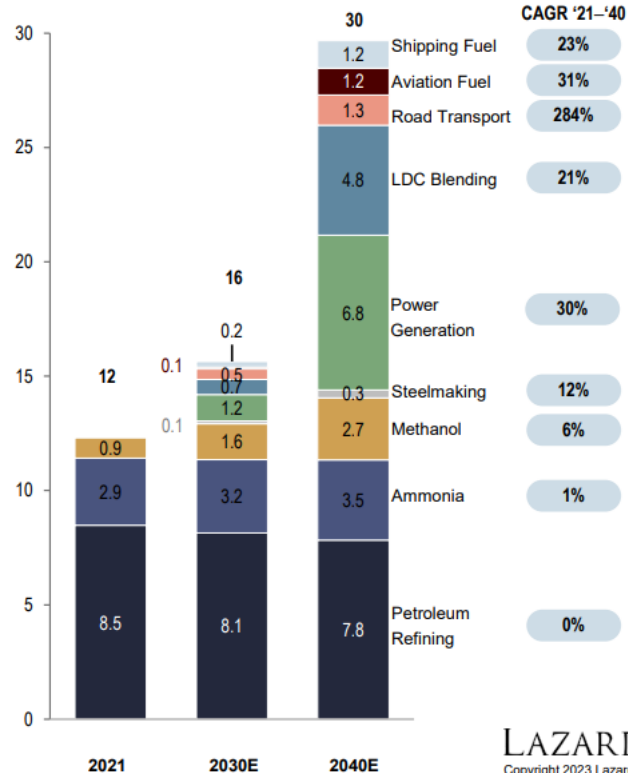
Road Transport

Aviation Fuel


Power Gen

top 3 growth rates from 2021-2040

Forecasted U.S. Hydrogen Demand (million tons)



LAZARD
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Technology risk and impacts of bankruptcy are mitigated through insurance.

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Insurance for renewable energy technology



2009



2009



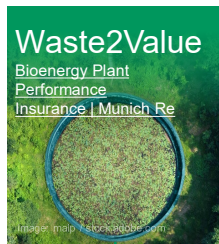
2019



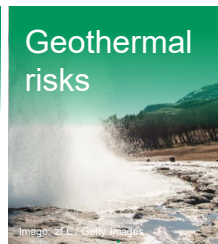
2022



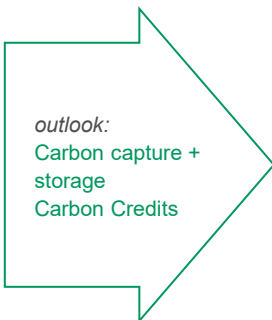
2022



>2022



>2023



Green Tech Solutions (GTS)
... is Munich Re's centre of excellence for risks arising from new and green technologies

... offers in-depth technical expertise due to **in-house industry experts** and **own test fields** at research centres

... has **world-class partnerships** with industry associations research and certification institutes, e.g., **Fraunhofer, TÜV, VDE, ...**



More than \$**2.7** bn exposure in green technologies

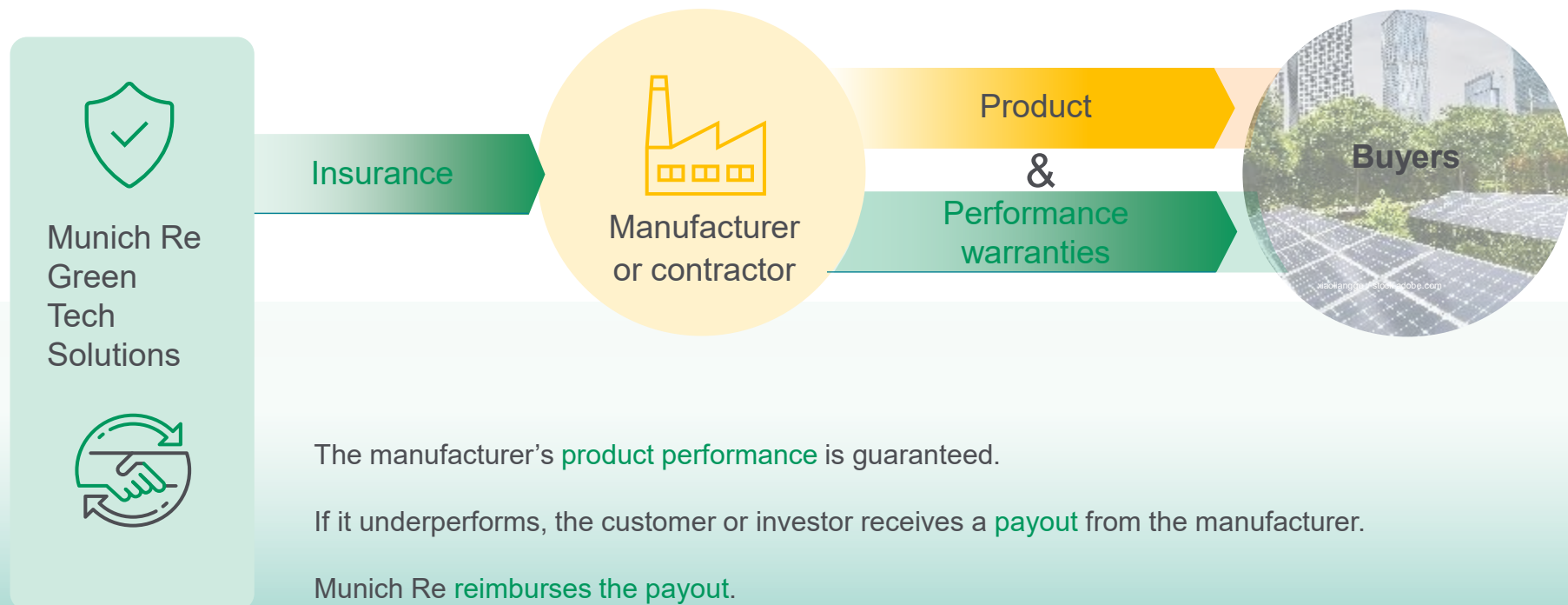


Long term protection up to **30** years



Over **900** insured projects and manufacturers, in **90** countries **75** GW insured

Our insurance helps to reduce insolvency and technical risks and secures financiers' investments

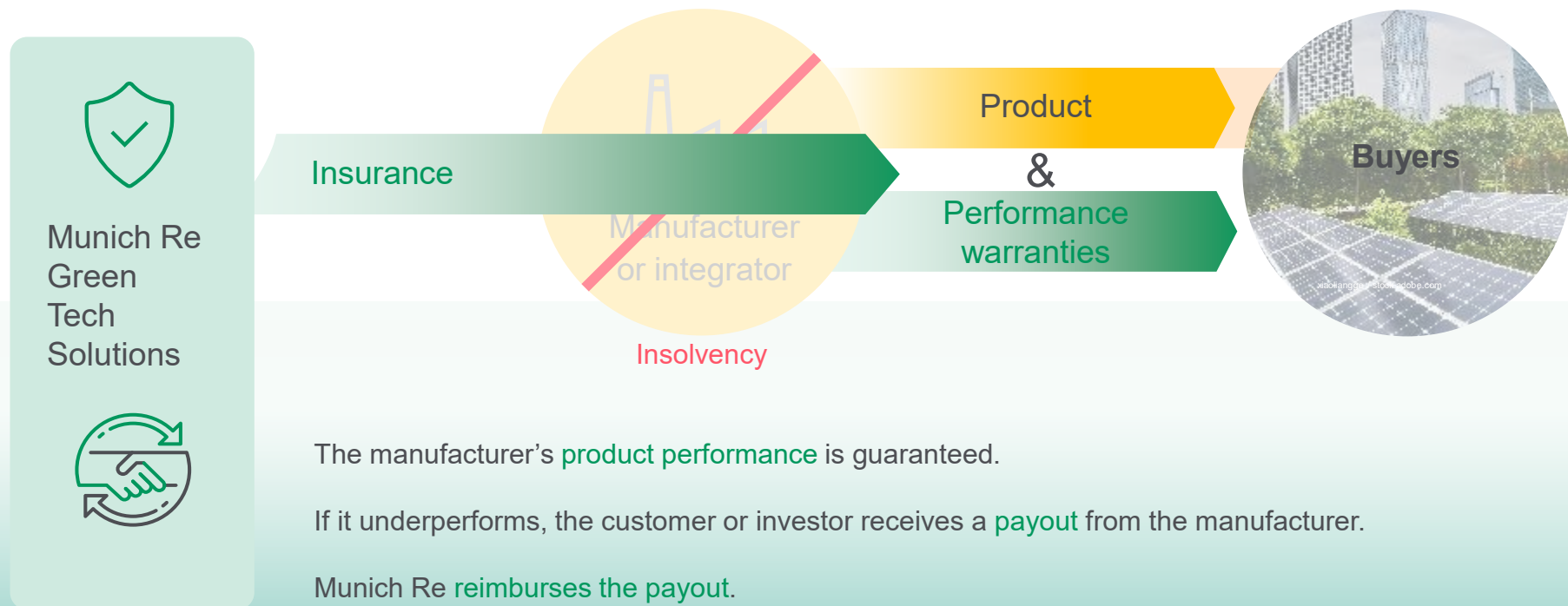


The manufacturer's **product performance** is guaranteed.

If it underperforms, the customer or investor receives a **payout** from the manufacturer.

Munich Re **reimburses the payout**.

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PV Warranty Insurance

Green Tech Solutions



Munich Re's PV Warranty Insurance

Helps project developers to receive financing

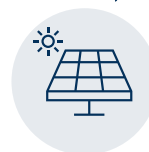


PV Warranty Insurance



PV Module Manufacturer

buys
PV Warranty Insurance



Project Developer
needs financing



PV Warranty Insurance

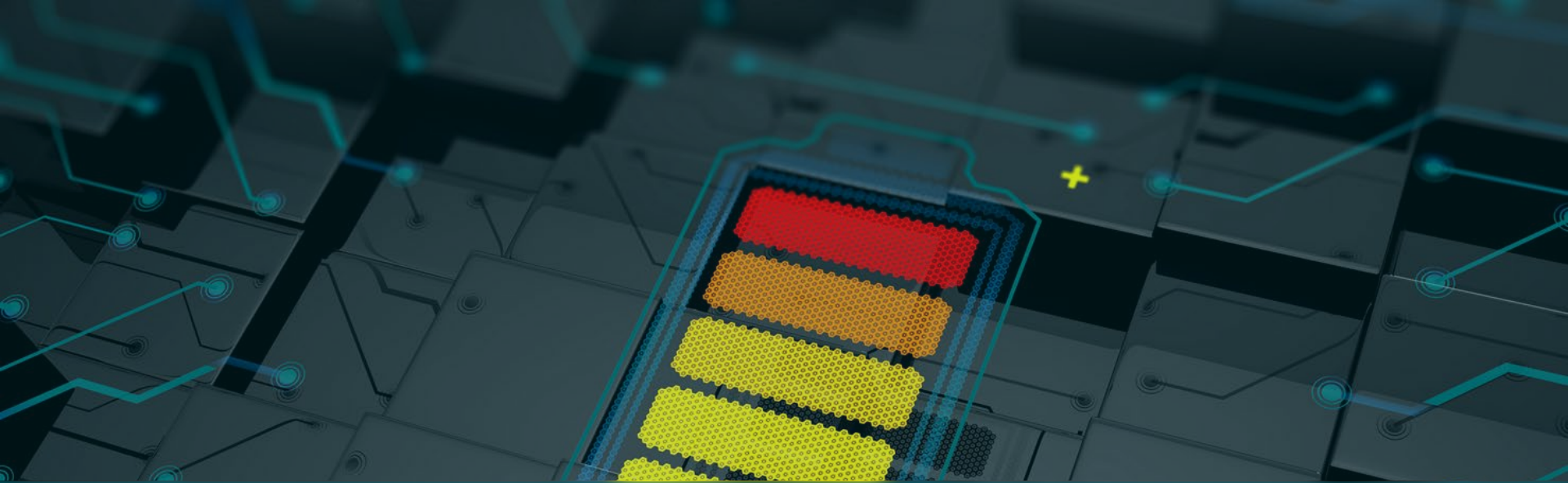
Bank & Investor
requests
PV Warranty Insurance



Munich Re's PV Warranty Partners

PV panel manufacturers insured by Munich Re





ESS Warranty Insurance

Green Tech Solutions

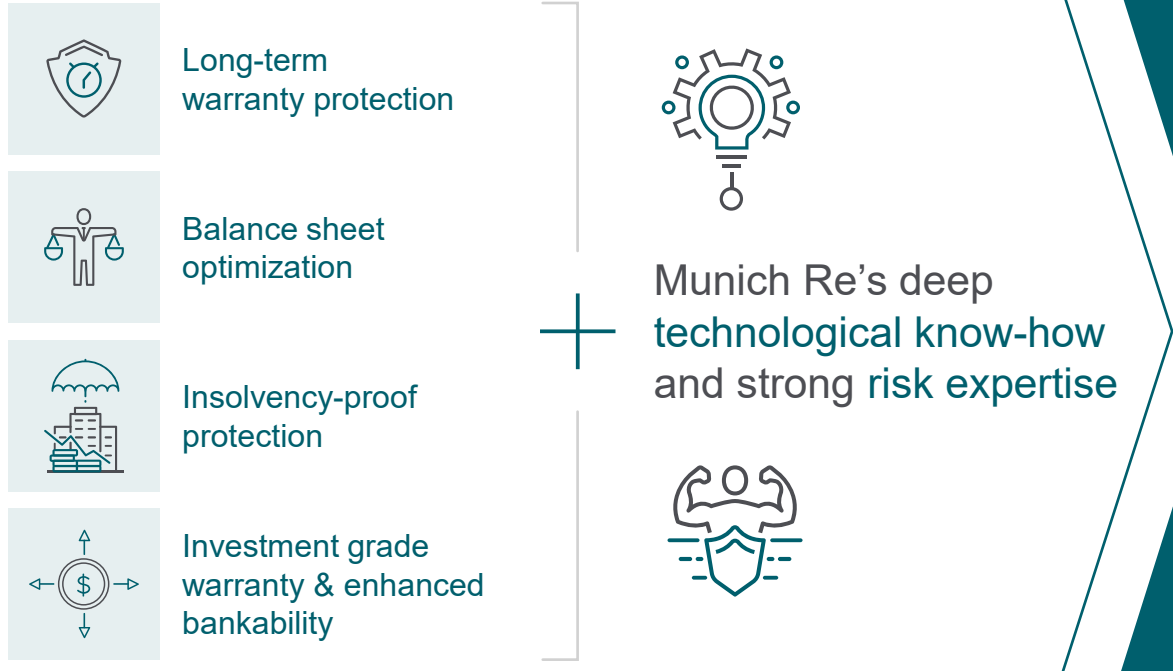


Which financial challenges does the industry face with long-term warranties?



Industry's long-term warranties come with 3 major risks

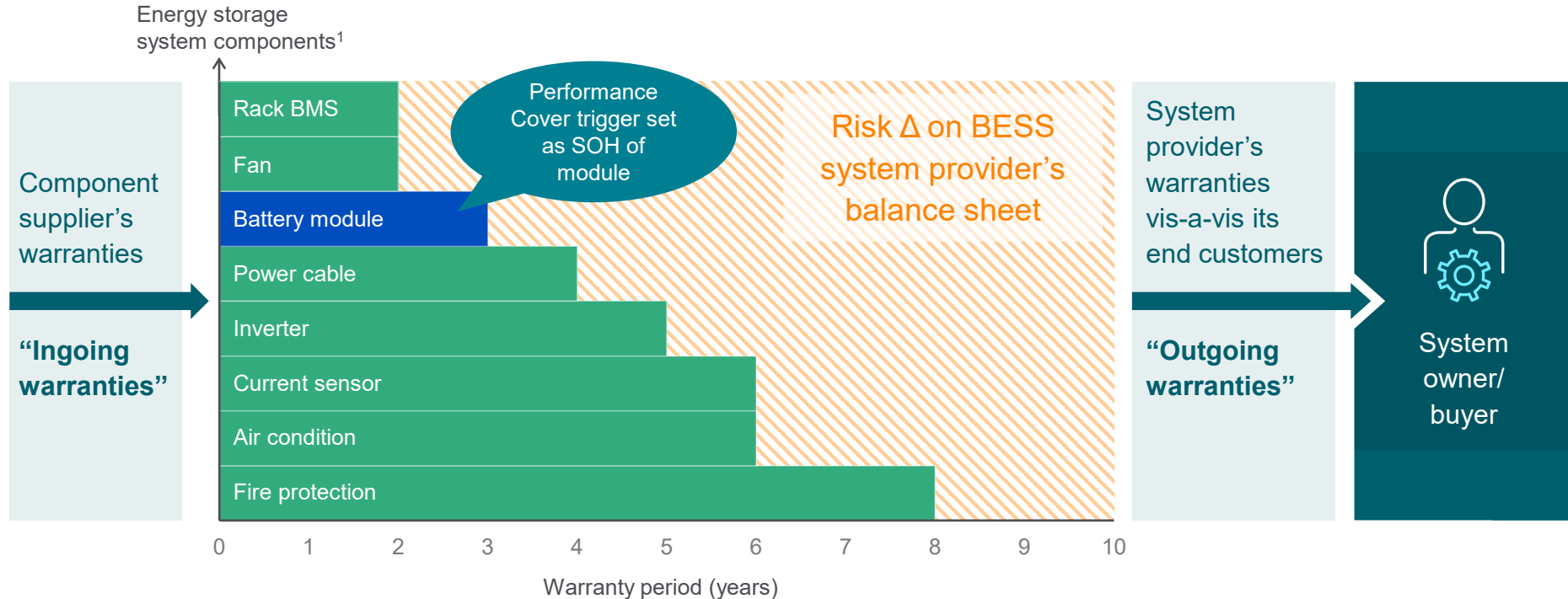
Munich Re's solution includes all important features for insured engagement in the energy storage business



Together, we assure and accelerate your energy storage business

Up to 15 years of warranty insurance for BESS

Covering the gap between ingoing and outgoing warranties

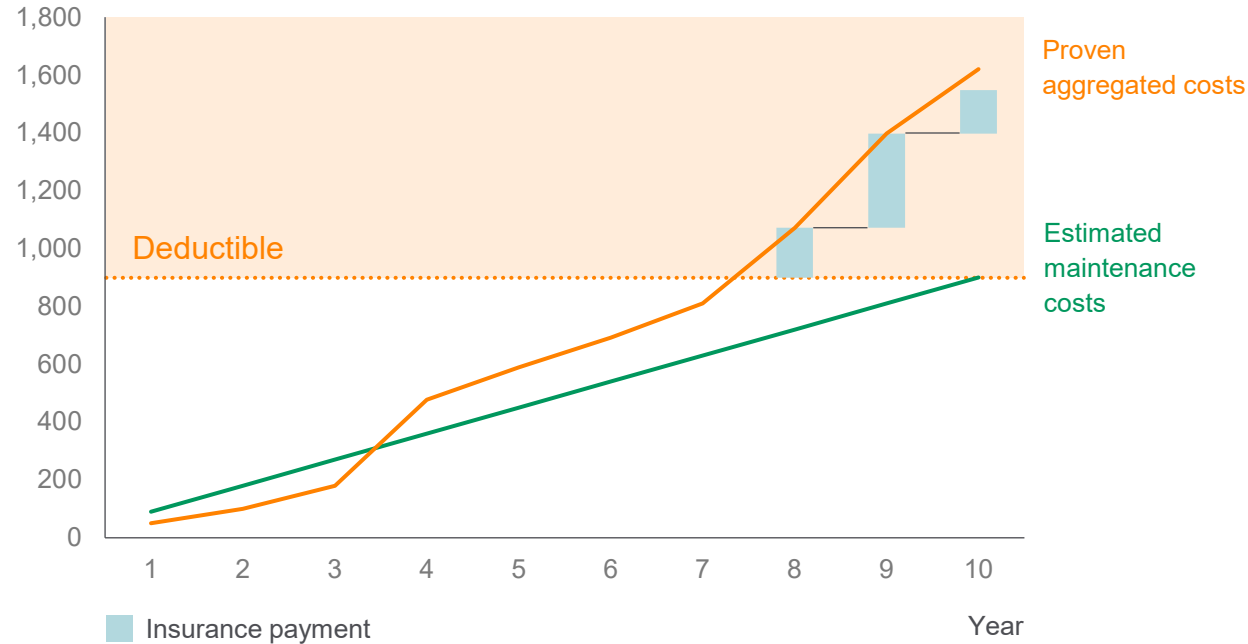


¹ Every bar in the energy storage system components axis represents one component with its respective number of ingoing warranty years by the original component supplier.

Munich Re BESS Warranty Insurance

Sharing the burden of excessive warranty costs

Maintenance spending
(in K US\$)



Excessive maintenance costs are covered by insurance

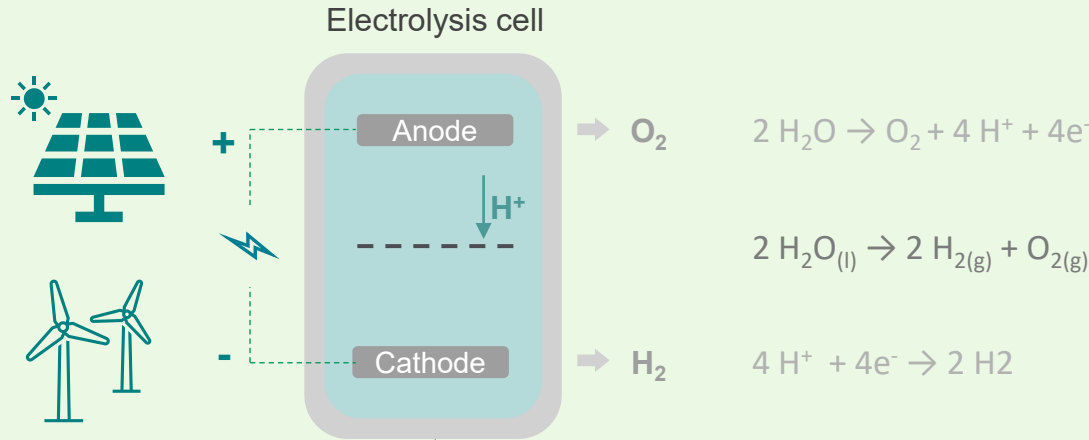
Planned maintenance is provided by system provider

A dynamic splash of water against a light teal background, with numerous bubbles and droplets scattered throughout the scene.

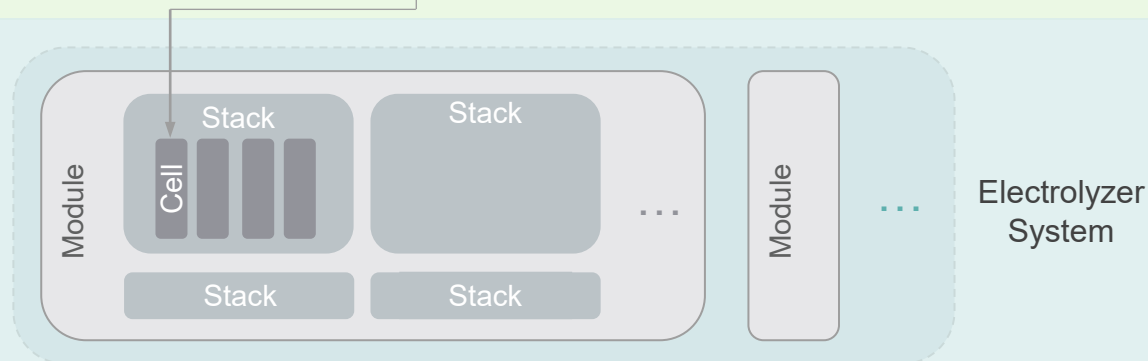
HySure

Green Tech Solutions

Technical view: green hydrogen production



- Different electrolyzer technologies
- Limited Technological Maturity
- Complex, non-linear aging behaviour
- Limited experience on larger-scale projects



HySure - Innovative insurance solutions cover risks that will enable sustainable business growth

HySure



Product Warranty

- ✓ Protection against part breakdown
- ✓ Coverage of maintenance and replacement intervals
- ✓ Cost overrun O&M plan



Performance Warranty

- ✓ Protection against underperformance
- ✓ H2 Production Rate
- ✓ Efficiency/Cell voltage



Availability Warranty

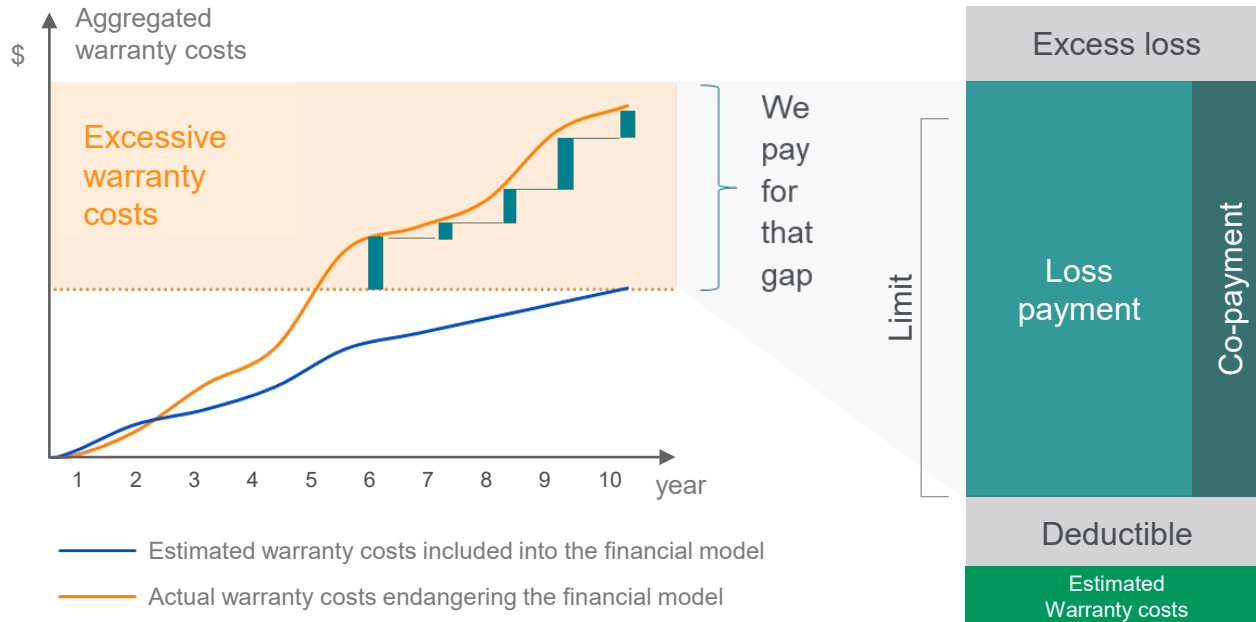
- ✓ Protection against under-availability
- ✓ Coverage of downtime
- ✓ Project-specific/on site spare parts

Excluding outside factors s. a. grid

Long-term protection for electrolyzer and fuel cell systems

Warranty insurance can be adjusted to cater to specific risk transfer needs

Long-term protection in case actual warranty costs are excessive.



Limit

Risk capacity provided by the insured.

Co-Payment

Claims-proportional co-payment by the insured, in case any valid warranty claim exceeds the deductible.

Deductible

Amount of risk the insured is willing to bear himself. Powerful lever to balance own risk appetite & attractive premium level.

Munich Re Green Tech Solutions

Insurance for renewable energy technology



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Green Solutions' Business Pillars

A portfolio of worldwide markets and solutions: ONE team, FOUR business pillars

Renewable Energy Solutions

- Wind, solar, battery and alternative energies
 - Traditional construction and operational risks
 - Target clients: Mainly project developer / owner
- **Operational and construction related insurance**

Carbon Market Solutions

In development

- Compliance and voluntary carbon markets, forestry, nature-based solutions
 - Target clients: All from investors to buyers
- **Provide quality and trust to carbon markets to scale finance in decarbonisation**

Green Tech Solutions

- Wind, solar, battery
 - Product and performance warranties
 - Target clients: OEMs
- **Specialized and long-term risk policies**

Blended Finance Solutions

In development

- Leverage public and private funds to countries or sub-national entities to close their protection gap
 - Target clients: internal & external capital investors
- **Expand insurance coverage to new areas and policyholders**

Be in touch!



Prentiss Darden

Business Development
North America

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