

MANAGING RISK THROUGH UNCERTAINTY ACCESS TO THE GRID

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Radu Mustata

Business Development Coordinator
Bucuresti

ON SHORE WIND PROJECTS TYPICAL RISKS

RENEWABLE POWER AND CLEAN TECH PRACTICE



- Gearbox Failure**
Wear and Tear / Design Issues
- Nacelle Fire**
Electrical Fault / Lube Oil Leak
- Yaw System Failure**
Critical Items (e.g. Sub-stations), Grid Connection
- Blade Damage**
Physical Damage (e.g. Sub-stations) Grid Connection
- Foundation Integrity**
- Business Interruption Risks**
Critical Items (e.g. Sub-stations) Grid Connection
- Lack of wind**
Revenue loss / Hedging options
- Natural Perils**
Storm, Flood, Earthquake, Ice, Subsidence
- Physical Damage During Construction Phase**
- Regulatory Risk**
(e.g. Change in Tariff)
- Terrorism and Political Risks**
- Transportation Logistics**
Construction Phase O & M Activities
- Warranty Coverages**
Period / breadth of cover? Financial strength of provider?

OFFSHORE WIND PROJECTS TYPICAL RISKS



Blade and Turbine Technology Issues
Resilience, Design Issues

Physical Damage During Construction Phase
e.g. Blade / Nacelle Damage During Heavy Lifts,
Anchor Drag on Sub-sea cable

Foundation Design

Business Interruption Risks
Critical Items (e.g. Sub-stations) Grid Connection

Natural Perils
Storm, Earthquake, Subsidence, Aggressive Offshore
environment

Onshore Manufacturing Risks

**Project Delay Due to Extreme Wave
Conditions and Lack of Wind**
Revenue Loss / Hedging Options

Regulatory Risk
(e.g. Change in Tariff Support Regime)

Terrorism and Political Risks

Transportation Logistics
Construction Phase O & M Activities

Warranty Coverages
Period / breadth of cover? Financial strength of provider?

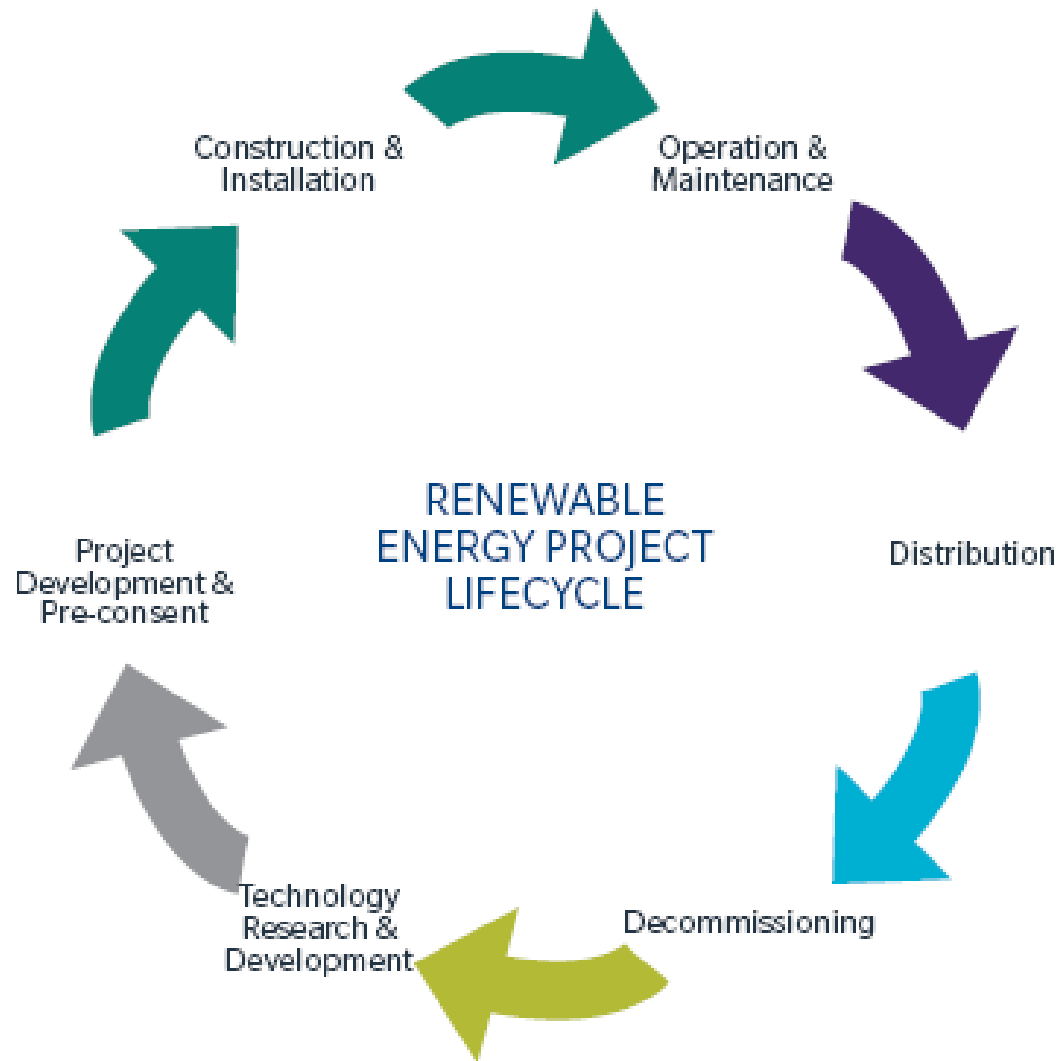
SOLAR PV Projects TYPICAL RISKS

RENEWABLE POWER AND CLEAN TECH PRACTICE



Lack of Sunlight Revenue Loss / Hedging Options
Natural Perils Storm, Flood, Earthquake, Ice, Landslip / Subsidence, Hail
Business Interruption Risks Critical Items (e.g. Sub-stations), Grid Connection
Faulty Inverters Design / Manufacturing Issues
Liabilities Third Parties, Employees, Contractors, Environmental
Physical Damage Risks
Professional Design Risks and Others
Regulatory Risk (e.g. Change in Tariff Support Regime)
Terrorism and Political Risks
Theft (e.g. PV Panels from Temporary Construction Storage Area)
Transportation Logistics Construction Phase O & M Activities
Warranty Coverages Period / breadth of cover? Financial Strength of provider?

Understanding the lifecycle of REN Projects



PV Projects – Solution Timeline & Structure



Development stage

- Title insurance
- Professional Liability
- Surety Bonds
- D&O
- Risk Due Diligence- lender's Insurance advisory

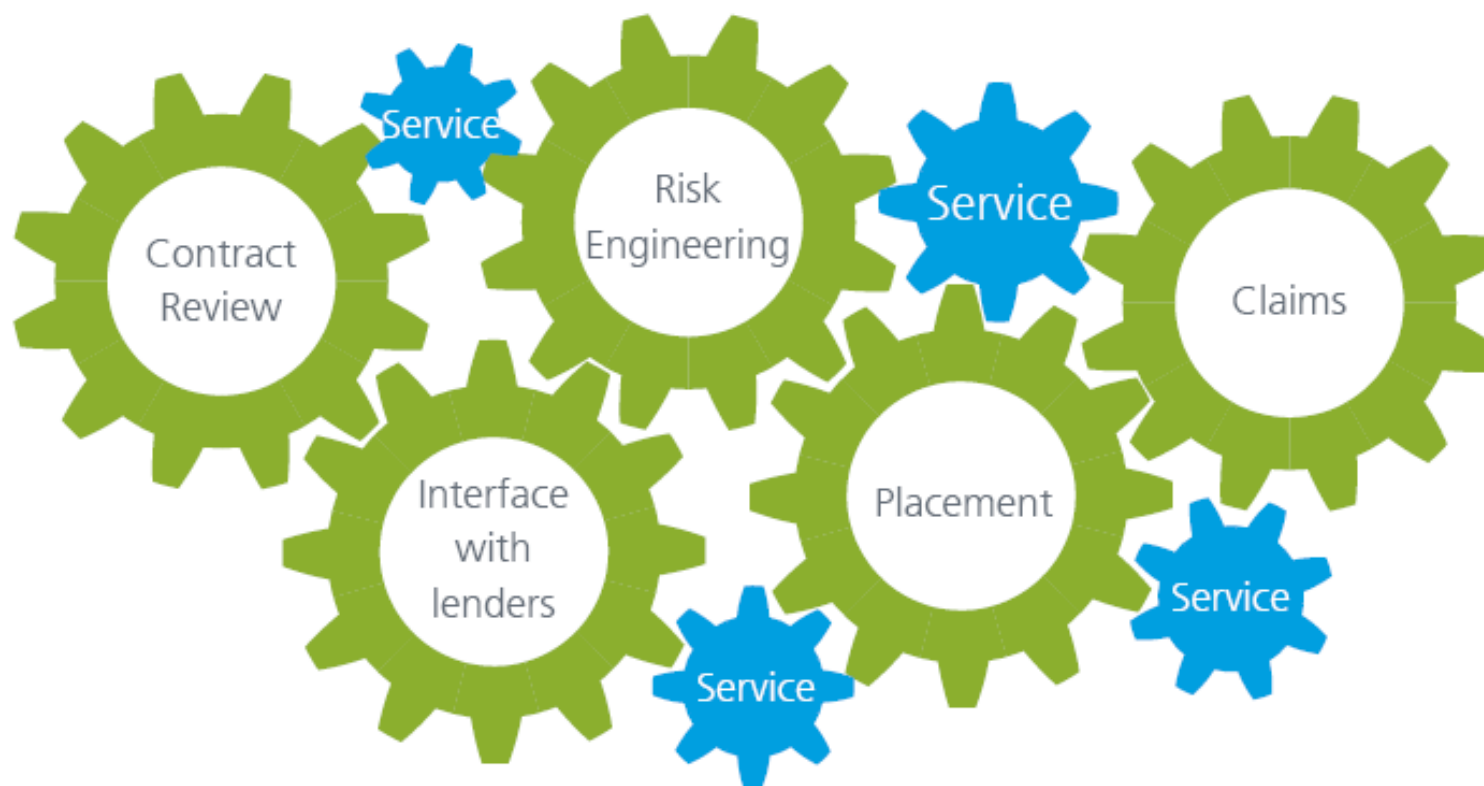
Construction

- Contractor's All Risks
 - Property Damage
 - Third Party Liability
 - Advanced Loss of Profits
- Personnel Accidents
- Performance Bonds

Post Construction

- Operational All Risks
 - Property Damage & BI
 - Electronic Equipments coverage
 - Third Party Liability
- Maintenance Bonds

Risk management solutions in aggregate



Claims examples

- Property damage - over speed.
Claim: Nacelle, upper section of the tower, foundation

Estimated claim: 700.000 EUR + BI



Claims examples – storm & snow load



Storm damaged modules - demonstrate that many plants were not capable of withstanding the occurring exposure.

Claims examples



OVERVOLTAGE: short circuit in one electrical panel.

Source:

bad connection on one power cable

lightning

Estimated claim: 45.000 EUR + BI



Exemple de daune



- MACHINERY BREAKDOWN: lack of lubrication/grease in between the axel and ball bearing. 1 MW generator
- Estimated claim: 145.000 EUR + BI

Claims examples - theft



- Adequate security fencing and CCTV shall be provided for ground mounted PV plants.
- SCADA monitoring

- Product should be securely installed against theft (also roof mounted PV plants).
- Theft proof screw connection should always be used.



Claims examples – rodent bites



- Not completely avoidable, still, security measures for preventing rodent bites need to be in force.

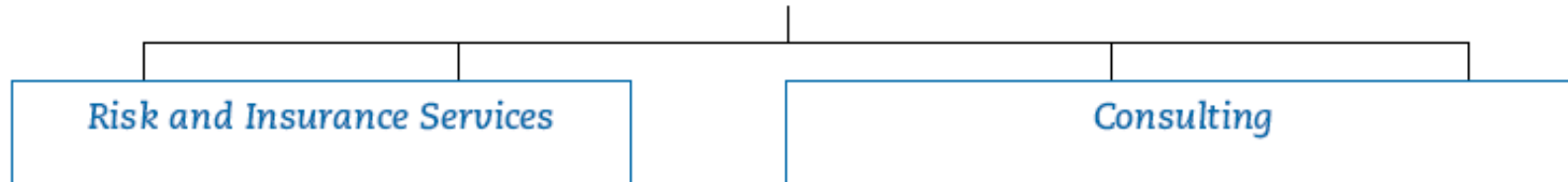
WHY MARSH?



Why MARSH?

- Global capabilities, local actions
- Market leader in Romania in the field of risk management for over a decade
- The best available local expertise with proven experience for renewable energy
- Industry wide, in depth understanding of renewable energy trends and challenges
- Access to top international insurance companies and risk management solutions
- Multiple connexions in the renewable energy sphere:
 - Developers
 - EPC and subcontractors
 - Financiers and lenders
 - Suppliers
 - Consultants, etc.

About Marsh & McLennan Companies



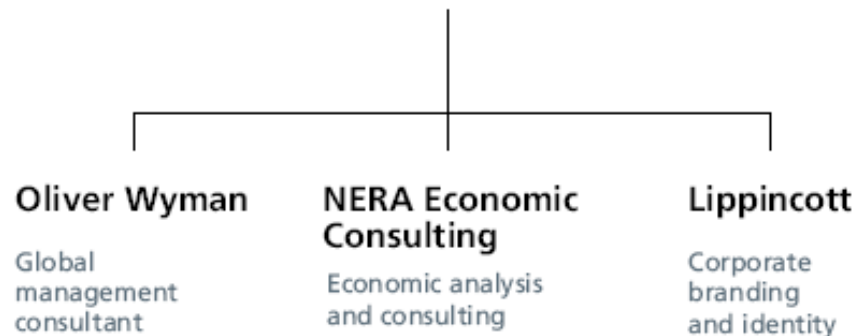
Marsh
Risk and insurance services

Guy Carpenter
Risk and reinsurance

Oliver Wyman Group
Advisory services through three operating units

Mercer
HR consulting, outsourcing, and investment services

52.000 Employees
Active in over 100 countries
Turnover: 12 BLN. USD
MMC is a FORTUNE 500 company



Marsh Romania - Overview

- Marsh Broker de Asigurare-Reasigurare (www.marsh.ro) is the Romanian subsidiary of Marsh Inc. (www.marsh.com), New York, world-wide risk specialist and insurance broker
- Leader of the insurance brokerage and risk consulting market in Romania
- Offices in Bucharest, Cluj and Timisoara
- 80 employees, specialized on industries and insurance lines



Marsh Romania - Overview

- Approx. **US\$ 8 million turnover** and over US\$ 60 million premiums placed (2010)
- Over **500 clients**, 50% multinational companies
- Easy access to **MMC network's resources** and expertise
- Founding member of **UNSICAR** - Romanian National Association of Insurance Brokers and Consultants
- Authorised by **CSA** - Insurance Supervisory Commission, according to the current legislation



THANK YOU

RADU MUSTATA

Phone: (4021) 232-1874

Mobile: (40721) 201-399

Radu.Mustata@marsh.com

MARSH

Floreasca Business Park, Corp A1,
Calea Floreasca , Nr 169A, Bucuresti



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