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Insurance Coverage for Contracted Power Generation Agreements

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Insurance Coverage for Contracted Power Generation Agreements

Working Group Members:

Eldred Clark - ACE Group, London – Chairman.

Nigel Chapman - Clyde and Company, London.

Michael Graf - Munich Re, Munich.

Flemming Jenson - Matson Driscoll, London.

Carlos Leon - Munich Re.

Paulo Mantovani - Marsh, Brazil.

Wolfram Pazur - Allianz Group, Germany.

Hari Radhakrishnan - HDFC Ergo.

Mike Robertson - Liberty International Underwriters, London.

Hugh Sparks - Integra, London.

Jean-Guy Turmel - Allianz Group.

Executive Committee Sponsor: Hans Poettker, Allianz Group, Germany

Insurance Coverage for Contracted Power Generation Agreements

Working Paper Overview:

- Introduction
- Purpose and Definition
- History and Evolution
- Financial Components, Risk and Characteristics
- Risk Assessment
- Policy Implications and Alignment - Deductible Application
- Case Studies

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Introduction:

- Most domestic electricity markets have historically operated as state owned or regionally empowered monopolies.
- In more recent times, markets have liberalised and independent power producers have begun to produce electricity for profit.
- This process was accelerated due to a number of contributing factors:
 - increasing demand for electricity due to population growth and industrial expansion.
 - technological advancement given competition between the leading original equipment manufacturers.
 - increasing availability, treatment efficiency and ease of transmission of fuel at relatively competitive cost.
 - reluctance of governments to finance state owned power generation.
 - legislation to increase competitiveness and to decrease retail prices.

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Purpose and Definition:

- A power purchase agreement (PPA) is a legal contract between the electricity generator (the seller) and a power purchaser (the buyer).
- Unlike a 'regulated' utility, the electricity generator under the terms of a PPA is typically an independent power producer.
- There are various forms of PPA but the structure and content are often dictated by the electricity market, jurisdiction, technology employed and source of fuel e.g. coal, oil, gas.
- The most important elements are: the price of electricity, availability and capacity and the terms of the contract.
- The terms of the PPA outline responsibilities, deliverables, liability and penalties should the availability/ supply rates not be met.
- In contrast to PPA arrangements, 'merchant' operators are remunerated on the basis of actual electricity 'delivered' into the electricity market.

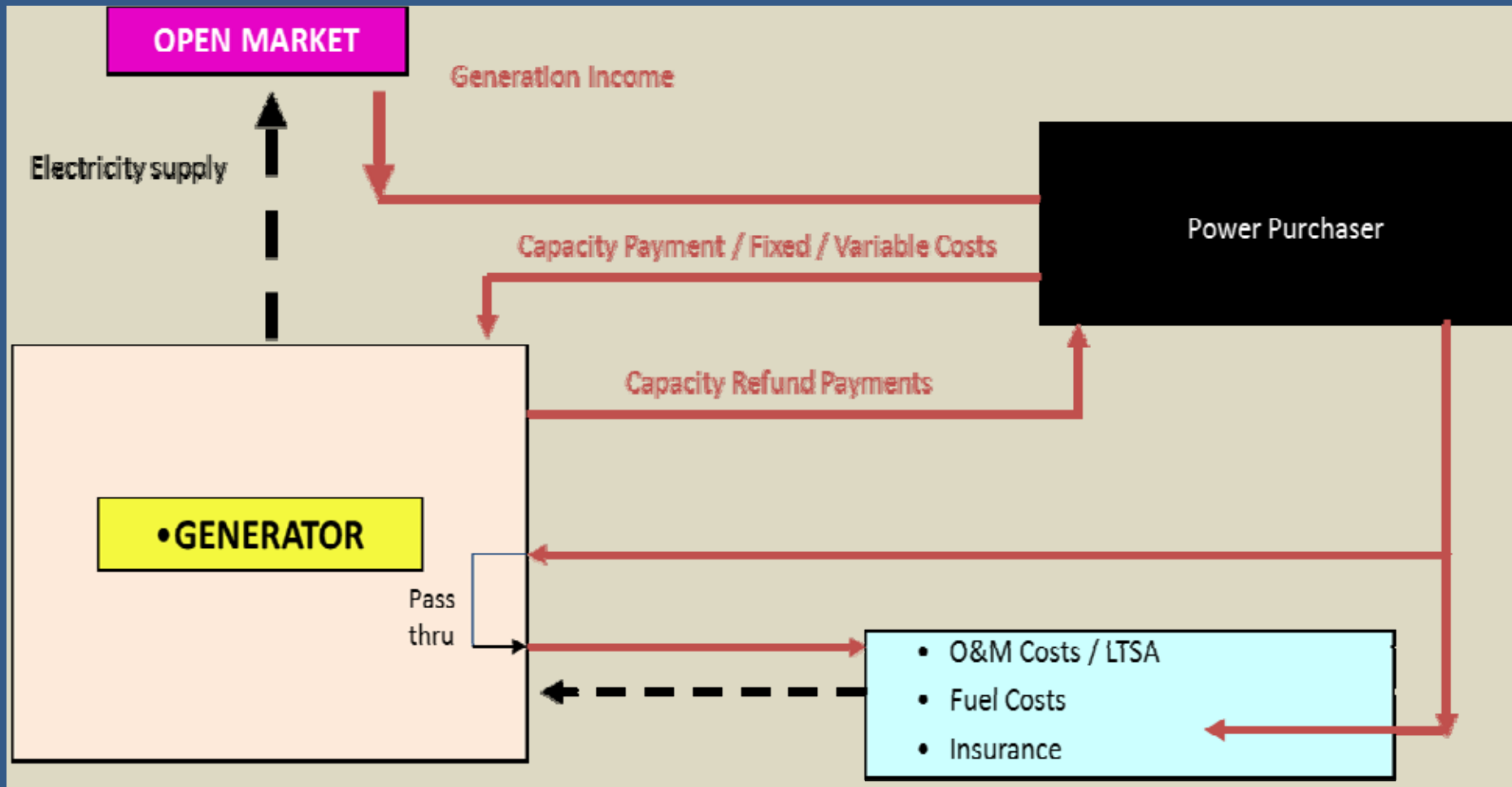
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History and Evolution:

- PPA's have usually been relatively straight forward in structure - electricity generators are paid for 'availability' and Energy 'delivered'.
- However, modern PPA's have become more complex and innovative to achieve greater operational flexibility and enhance financial reward :
- The liberalised, de-regulated and more volatile electricity markets are demanding more regular real-time on-line dispatch.
- Significant global investment in the 'renewables' sector - wind and solar power - while government subsidies continue to reduce.
- Global warming and unpredictable weather patterns combine e.g. drought conditions, impact provision of a consistent generating profile.
- This mean that existing technologies have to operate with greater flexibility and often not in accordance with original design.

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Power Purchase Agreement Operation - Example



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Financial Components, Risk and Characteristics:

- Majority of PPA's compensate the Operator for 'availability' and the provision of Energy 'delivered'.
- Payment for 'availability' becomes relevant where power demand varies significantly according to customer demand and requirement.
- Generators require the certainty of a fixed payment to cover the initial high capital construction costs even though the facility is not fully utilised.
- Incorporates provision to earn an availability fee equal to the Operator's fixed cost including: operational, maintenance and debt service elements.
- Payment for Energy 'delivered' will include a fuel component as well as an allocation for variable operational and maintenance expenses.
- When aggregated, the payments should provide compensation for fuel consumed, variable generation costs, maintenance expense, debt servicing, return on capital invested and profit.

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Power Purchase Agreement – Annual Profit and Loss Statement

Type	Description	February 2012
		<i>USD</i>
Availability	Power Availability	99.38%
Revenue	Power Availability	26,842
	Power Output	4,119
	Back Up Fuel Income/(loss)	2,488
	Other Income	895
	Total Income	34,344
Fixed Cost	O&M Fees	590
	Labour Costs	1,900
	Maintenance	219
	Plant Insurance	420
	Administrative	300
	Safety/Training	73
	Total Fixed Costs	3,502
Variable Cost	Fuel	3,328
	Chemicals	885
	Back Up Fuel Expense	1,289
	Total Variable Costs	5,502
	Total Costs	9,004
Other Cost	Financing Cost	8,100
	Depreciation	4,482
	Spares/Obsolescence	23
	Total Other Costs	12,605
Profit for Period		12,735

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Financial Components, Risk and Characteristics:

- PPA provision is made for anticipated future changes within the electricity market.
- PPA's often make reference to the main contractual insurance requirements, both insured and uninsured provisions.
- Non delivery of electricity generally provides the greatest risk - a review of the 'liabilities' involved for a failure to supply should be reviewed.
- Energy payments are frequently made on a 'rolling basis' rather than fixed term so the policy wording should reflect these considerations.

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Risk Assessment:

Risks that impact the integrity of the PPA during Construction and Operation:

- Increases in construction and financing costs.
- Delay in completion of the power plant and associated facilities.
- Plant inability to meet design performance specifications.
- Outage of the plant due to damage to machinery and equipment.
- Failure of the generator or purchaser to meet contractual obligations.
- Forced outage, de-rating or temporary shortfall in generating capacity through external influence e.g. infrastructure constraints.
- Increased fuel costs, fluctuating operation and maintenance expenses.

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Policy Implications and Alignment:

- Gross Profit
- Fixed and Variable Costs
- Increased Cost of Working
- Cost of Replacement Power
- Contingent Business Interruption - Customer's and Supplier's
- Types of deductible and practical application

Insurance policy should be drafted to reflect the salient points within the PPA based on a fixed contract for an Operator's availability or generated power.

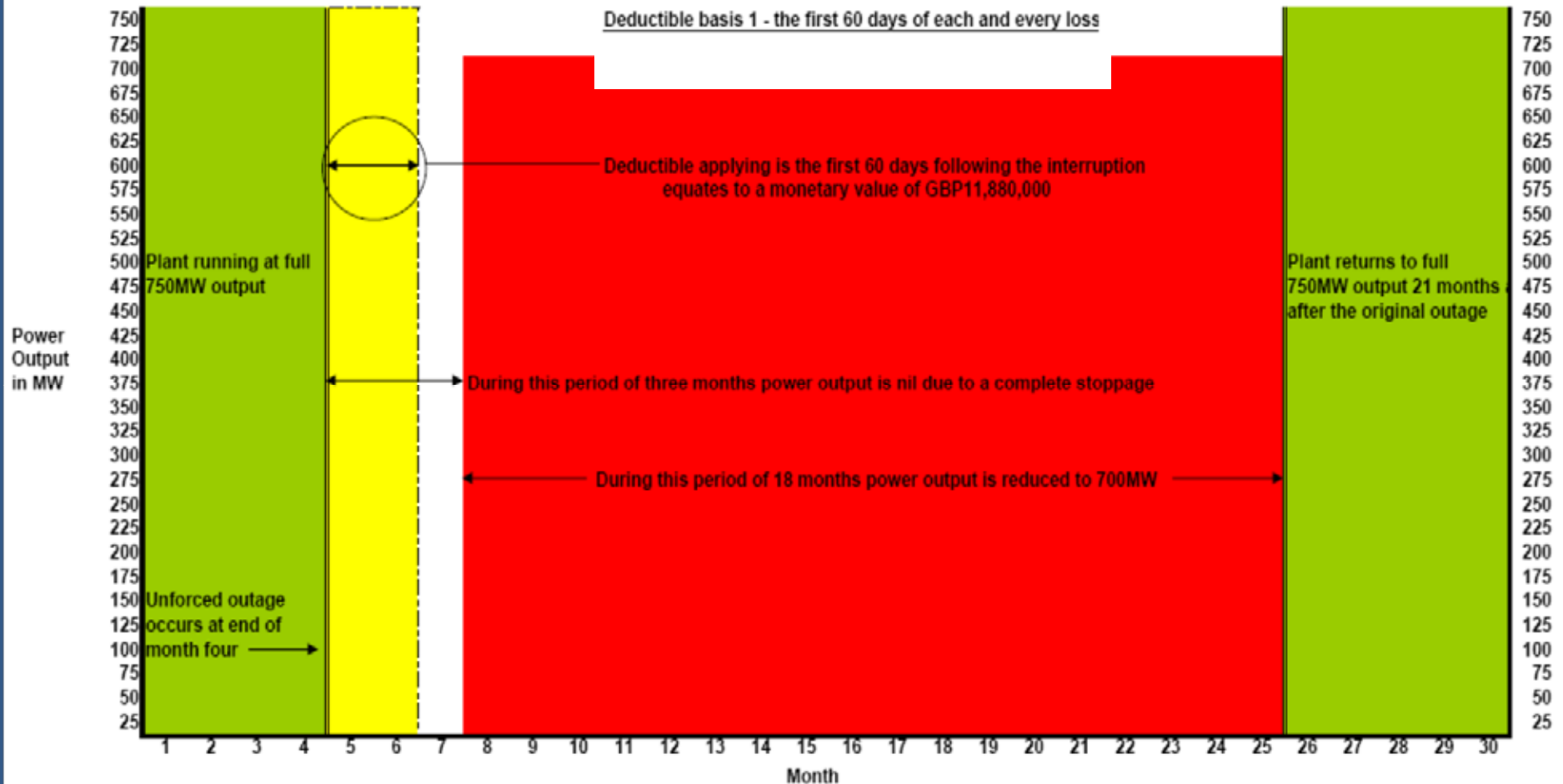
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Types of Deductible and Application: Practical Example

- Combined cycle power station - two gas turbines (250mw each) and one steam turbine (250mw).
- Station remunerated under the terms of a PPA for 'availability', the terms being established at £11 per MWh over a 24 month indemnity period.
- The business interruption sum insured is £144,540,000:
 $\text{£11 (MWh)} \times 24 \text{ hours} \times 365 \text{ days} \times 2 \text{ years} \times 750 \text{ MW}.$
- Insured suffers a forced outage following blade damage to the steam turbine leading to a three month shutdown while the unit is repaired.
- Once repaired, the unit runs in a serviceable condition but is down-rated to 200MW for 18 months pending the availability of a new rotor.
- The plant returns to full service after 21 months showing a loss of £25mm.

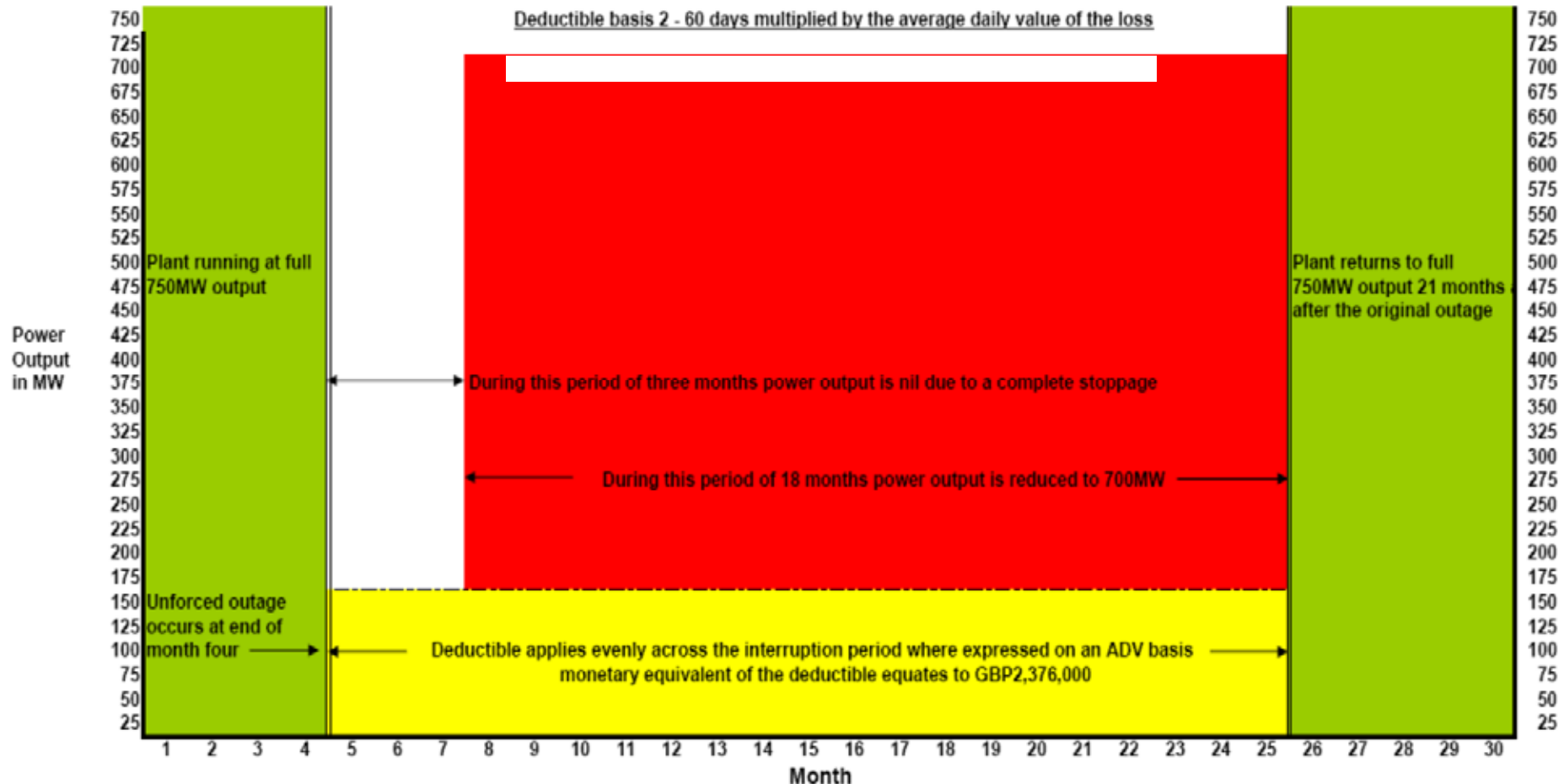
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Deductible Basis 1 – the first 60 days of each and every loss



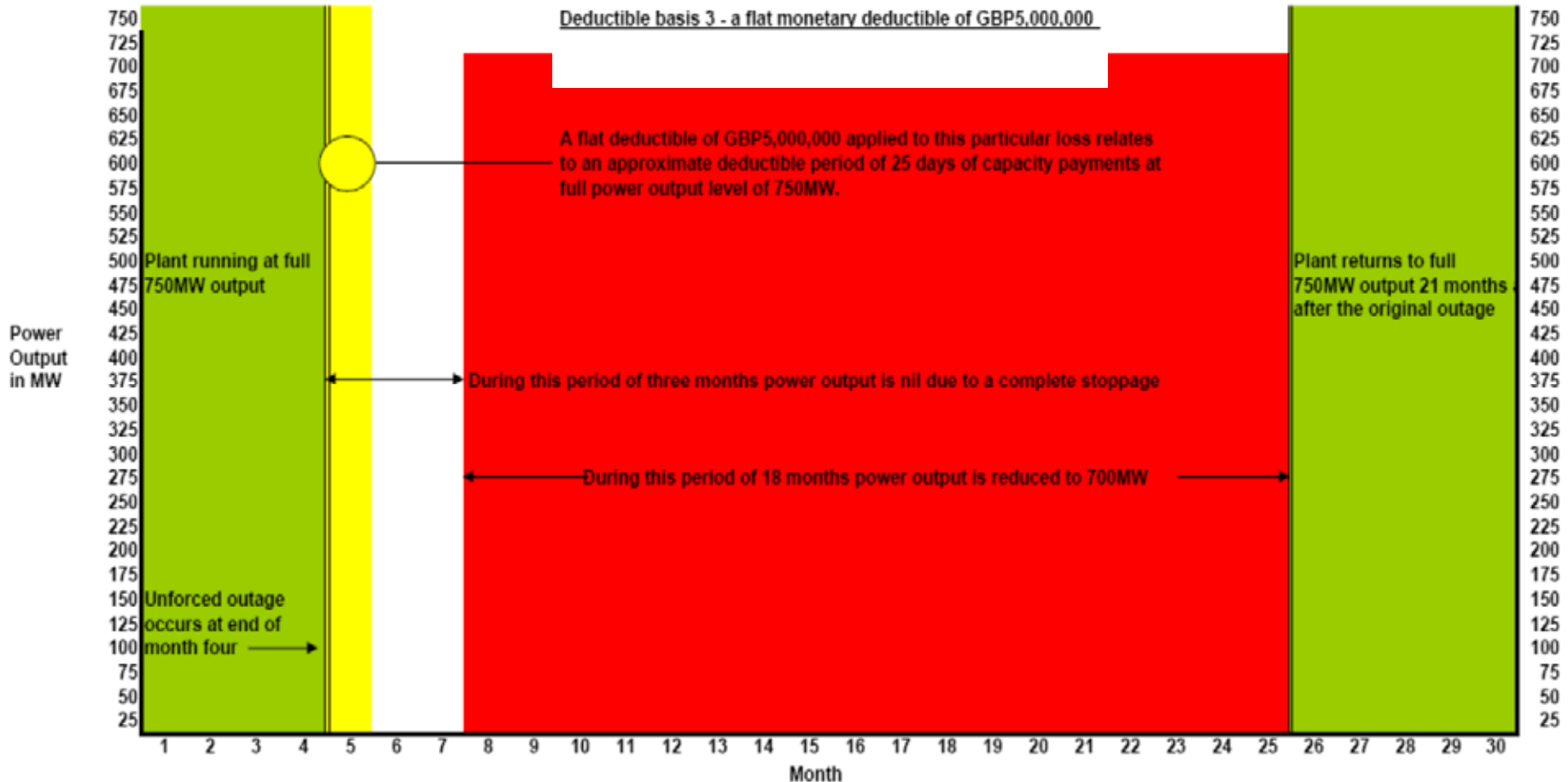
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Deductible Basis 2 – 60 days multiplied by the average daily value of the loss



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Deductible Basis 3 – a flat monetary deductible of GBP 5,000,000



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Coal Fired Power Plant, Australia

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Case Study:

Circumstances:

- Short circuit experienced by a transformer at a coal fired plant in Australia with PPA electricity rates agreed with variations according to availability.
- Where peak/off peak availability targets are not achieved, the Generator is required to reimburse the Purchaser.
- Capacity payments are calculated on a three month rolling basis and given seasonal demand, the PPA represents a non-linear BI availability exposure.
- The incident occurred during the first month of the 90 day rolling average period, lead time was only 17 days to return to full production yet the generator failed to meet capacity availability targets.

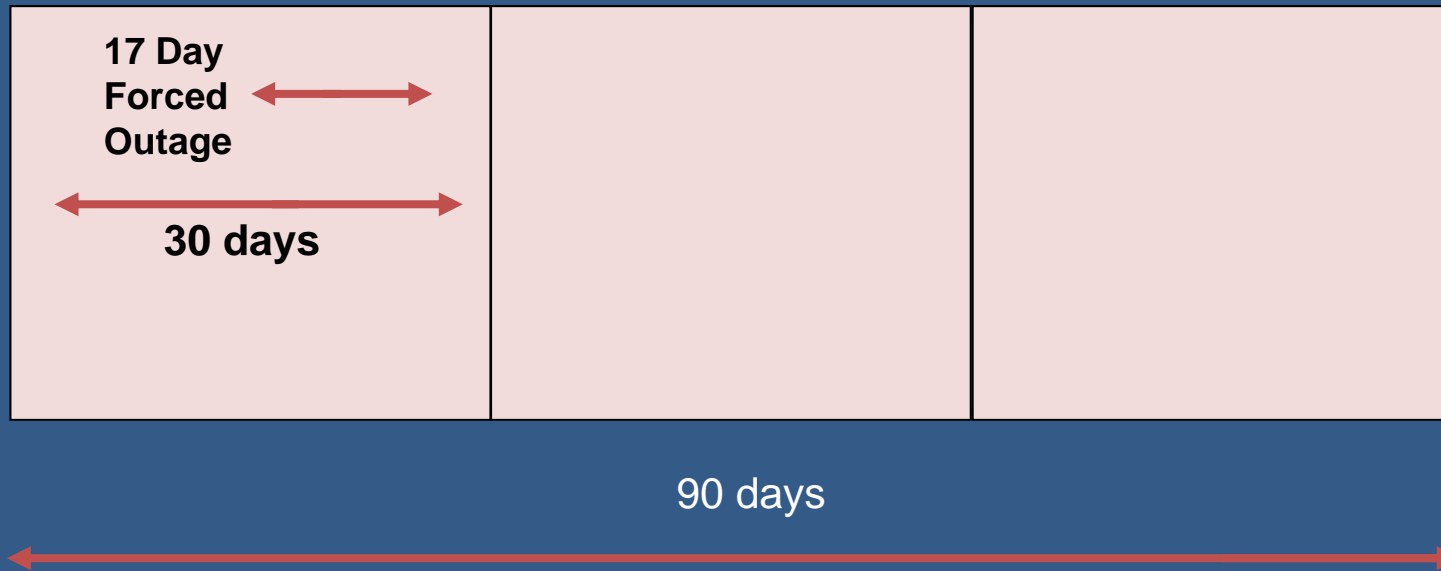
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Example of Rolling Availability Impact

1st Month - \$1m
capacity refund
payment

2nd Month - \$1.5m
capacity refund
payment

3rd Month - \$1m
capacity refund
payment



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Lessons Learned:

- Policy coverage implications suggest disconnect between underwriting intent and application where the 17 day outage produced a BI loss.
- Capacity availability targets: 1st month: \$1.00mm; 2nd month: \$1.50mm and 3rd month: \$1mm equal to \$3.50mm in all.
- The BI deductible equated to 30 days times the actual daily value divided by the total number of days during the indemnity period:
- $\$3.50\text{mm}/90 \text{ days} \times 30 \text{ day average daily loss} = \1.16mm so appears to benefit underwriters in this instance.
- However, the deductible wording was expressed in terms of 'the impact of an interruption to the business' rather than referencing the 'the period of the interruption' itself.

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Practical Conclusions:

- The terms of a PPA will vary but this is more usually dictated by the electricity market, jurisdiction and technology employed.
- The most important elements are: the price of electricity, availability and capacity and the term of the contract.
- The terms of the PPA outline responsibilities, deliverables, liability and penalties should the availability and/or supply rates not be met.
- Certain physical risks will be apparent that could significantly impact the integrity of the PPA during Construction and Operational phases.
- It is essential to appreciate the salient terms of the PPA when approaching the granting of insurance cover within the proposed policy wording.



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