



Maintenance Overview

Azeez Ahamat

Maintenance Systems Engineer

Snowy Hydro Limited

Presentation Overview

- **Introduction**
- **Asset Management Overview**
- **Maintenance Philosophy**
- **Maintenance Tools/ Systems**
- **Maintenance Improvement Opportunities**
- **Summary**

Asset Management Overview

- **Two levels**
 - **Short to Medium Term (0 to 5 years)**
 - **Medium to Long term (5 years +)**
- **Responsibility shared between**
 - **Production Group**
 - **Engineering and Projects Group**

Asset Management Overview

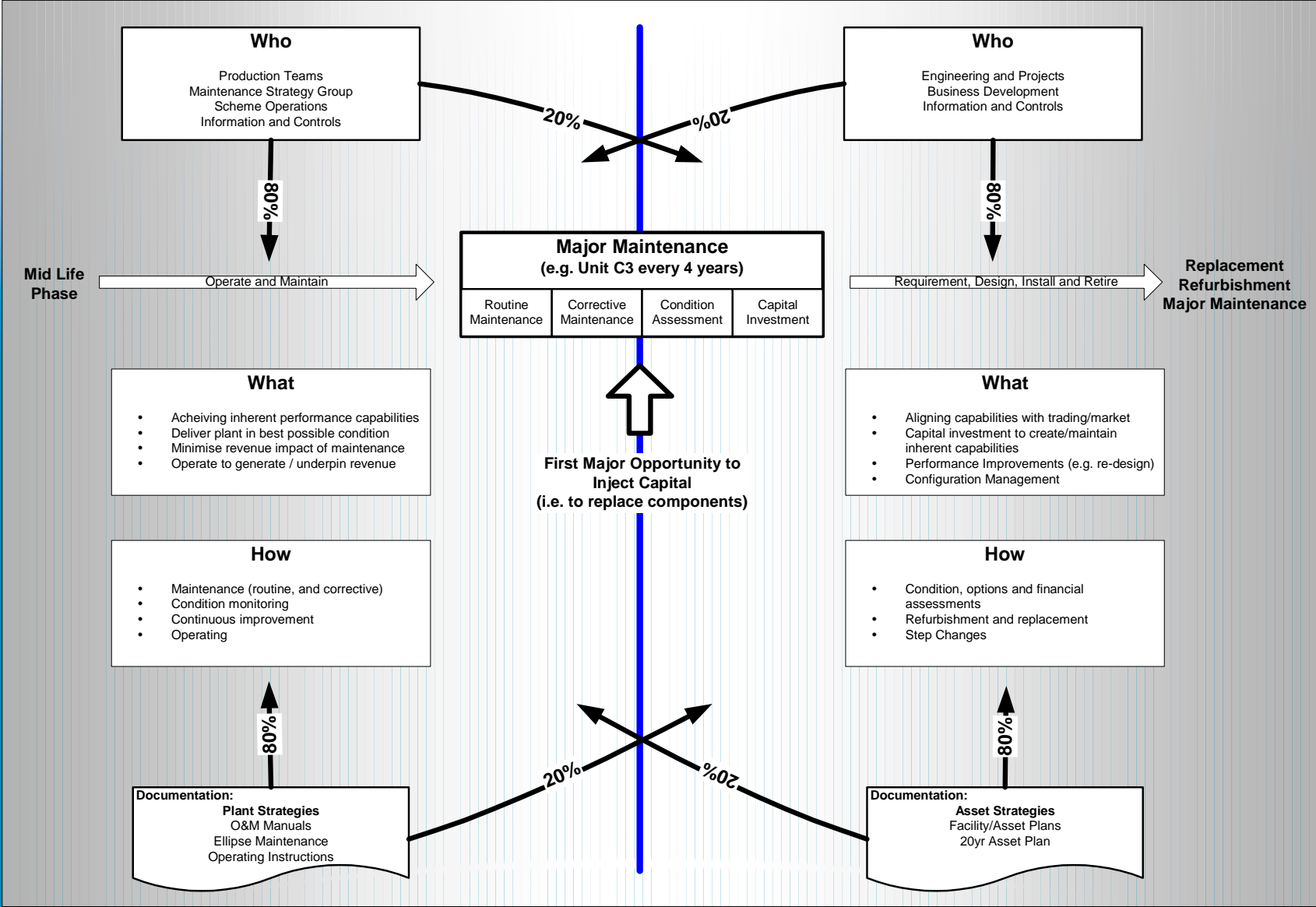
- **Asset Strategy**
 - Long term capability planning
 - Based on Condition Assessments
 - Asset replacement, life extension and upgrades
- **Plant Strategy**
 - Managing existing capability
 - Operations and maintenance regimes
 - Delivery of current asset capability to meet market demands

Asset Management Overview

- **Asset Strategy**
 - **Asset details (description, performance objectives, criticality)**
 - **Current Asset Status (maintenance history, asset condition, major risks)**
 - **Asset Strategy (operational, maintenance and condition monitoring, major works)**
 - **Performance expectations**
 - **Background Information (strategy options analysed, integration with other asset strategies, references)**
 - **Future Actions (strategy development tasks, major work programs)**

Asset Management Overview

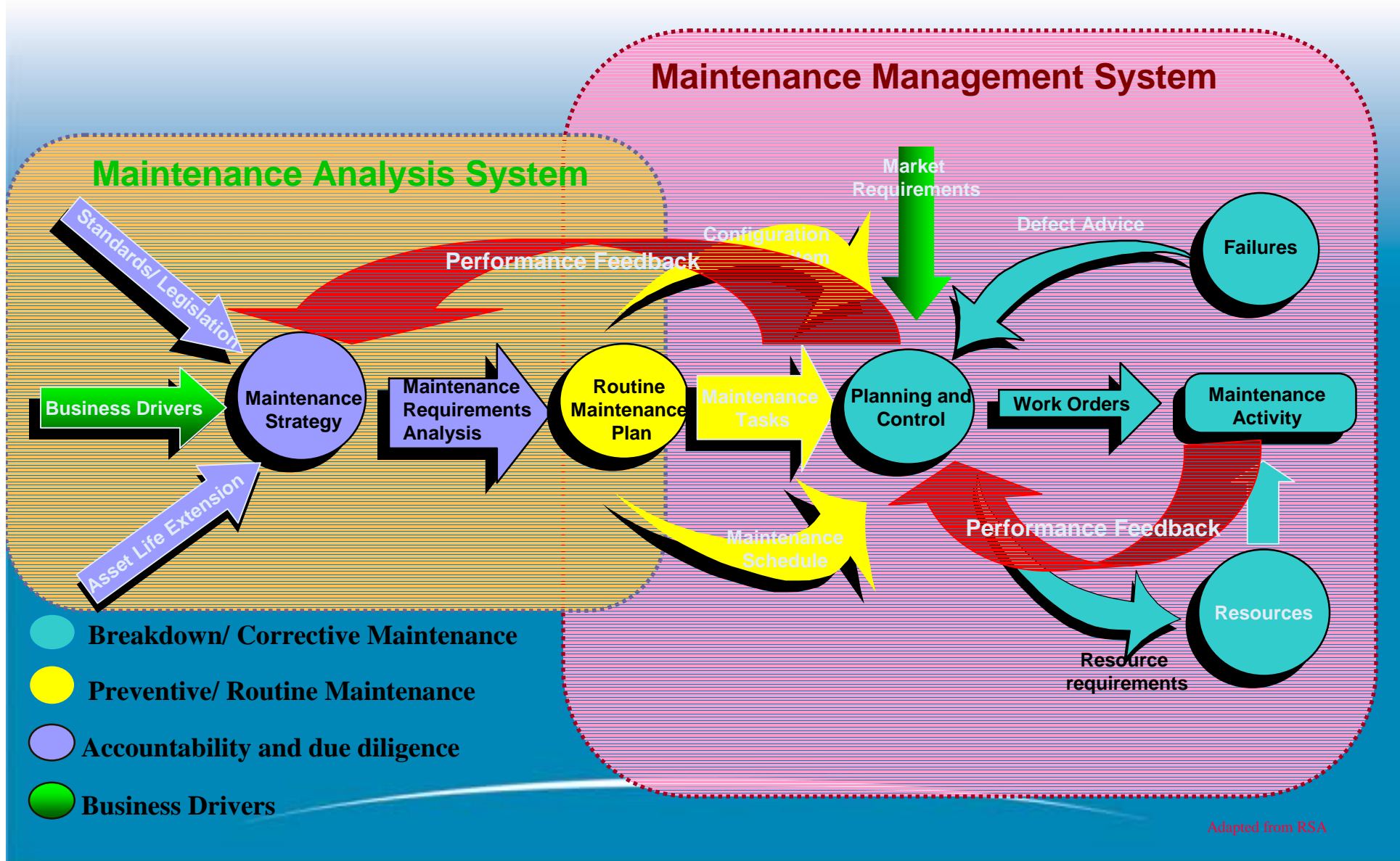
- **Plant Strategy**
 - **Function of the item (value to the business)**
 - **Expected annual performance levels**
 - **Operational regime (Operating guidelines, limits and restricted operations)**
 - **Maintenance regime (Key failure data and consequences, Maintenance risk, Maintenance plans and types, condition monitoring limits, critical spare parts list)**
 - **Work management (Training, procurement, hazard mgt, resourcing)**
 - **Link to all historical data and locations of all reference materials (drawings, O&M manual, test reports etc.)**



Maintenance Philosophy

- **Legislative and Regulatory drivers**
- **Safety and environmental drivers**
- **Business Drivers**
- **Analysis of Maintenance Requirements based on RCM Principles**
- **Maintenance Strategy optimised against market drivers**
- **Continuous Improvement principles**

Maintenance Management Model



Maintenance Tools (Processes/ Systems)

- **Reliability Centred Maintenance (RCM)**
 - **Process for identifying maintenance requirements based on criticality of equipment function**
 - **Initial analysis carried out in mid 1990's**
 - **Current maintenance programs based on this analysis with improvements where gaps are identified**
 - **Focus on maintaining alignment with market drivers**
- **RCM Turbo/ RCM Cost software tools**

Maintenance Tools (Processes/ Systems)

- **Enterprise Asset Management System**
 - **Mincom Ellipse System**
 - **Integrated Maintenance, Stores, Finance & HR system**
 - **Maintenance Strategy is deployed through Standard Jobs and Scheduled Tasks**
 - **Workplanner module provides functionality to plan and schedule work from short to long term and interface with SHL Outage Mgt System**
 - **Records data/ plant history for analysis/ reporting and continuous improvement program**

Maintenance Tools (Processes/ Systems)

- **Defects/ Incident Management System**
 - **Report all Defects and Incidents**
 - **Accessible to all**
 - **Evaluate and prioritise**
 - **Analyse and identify root causes**
 - **Track corrective actions through Defects / Incident Mgt system and Ellipse**
 - **Close off**
 - **Technical/ Safety alert**
 - **Technical directives**

Maintenance Tools (Processes/ Systems)

- **TRIM Corporate Records Management System**
 - Documents/ Drawings/ Reference data
 - Electronic/ hard copy
 - Version control
 - Access directly or via other systems (eg Ellipse)

Maintenance Tools (Processes/ Systems)

- **Performance Analysis and Reporting**
 - **CorVu software tool**
 - **Monthly Performance Reports based on KPI's**
 - **Quarterly Asset and Maintenance Performance Review**
 - **LOA System to track plant outages**
 - **Root Cause Analysis of plant failures to identify opportunities for improving maintenance program**

Maintenance Outcomes/ Results

- **Improvement in plant reliability**
 - **Forced Outage Factor down from 1.6% (1995) to <0.2%(2005)**

- **Improvement in plant availability**
 - **Availability Factor up from 86% (1995) to >96% (2005)**

Definitions

Forced Outage Factor (%) = $\frac{\text{MWh out of service due to forced outage} \times 100 \%}{\text{Installed plant capacity (MW)} \times 8760 \text{ hours}}$

Maintenance Opportunities

- **Ellipse enhancements**
 - **CM data collection/ storage**
 - **APL**
- **Application of CI principles**
 - **CI on a page**
 - **Strategic CI teams**
- **Knowledge Management**



Maintenance Overview

Questions?

