APPLICATION OF THE BALANCED SCORECARD FRAMEWORK TO OBJECTIVES OF AN INDUSTRIAL PRODUCER

by

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ABSTRACT

The goal of this study is to use the balanced scorecard framework to improve the alignment of departmental and plant objectives, and to provide guidance for implementation of strategic objectives for a large aluminum smelter. The analysis has three main parts: a situational analysis, a review of the balanced scorecard framework, and a discussion of how the framework may assist in identifying objectives to support implementation of strategy. Opportunities were identified by attempting to qualitatively map present plant and departmental objectives into balanced scorecard framework and by discussing features of the resultant structure. The main finding is that a balanced scorecard framework can highlight opportunities for implementation of strategic activities, although the process is largely qualitative and difficult to validate. In this specific case, suggestions to improve vision, mission, objectives and measures of current plant and departmental performance metrics are presented. Risks of misapplication using the balanced scorecard are mentioned.

DEDICATION

To family and friends.

ACKNOWLEDGEMENTS

I would like to thank Dr. Mark Selman for championing the MBA program and assisting me during the writing of this project. Thanks goes to Dr Michael Parent, Ernie Urbanowski and to my supervisors Mike Long and Allen Veasey. Who can forget Michel Roy also for helping to initiate this program, without his leadership I would be not have written this study. Thanks to Paul Henning and Rick Maksymetz for explaining perspectives and challenges of operationing large industrial facilities from a senior management level.

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1 INTRODUCTION AND REMARKS

In the early 1990's the Balanced Scorecard approach was introduced by Robert S. Kaplan, a professor at Harvard and David P. Norton President of Renaissance Solutions, an international consulting firm. The balanced scorecard is a management conceptual framework that reflects the status of organizational strategy, and acts as a bridge to make strategy actionable. The framework provides a vehicle for translating an organization's mission, vision, and strategy into a set of strategic performance measures and actions. In doing so the framework often provides organizational clarity, transparency, and accountability, enables change management and supports a strategic alignment of organizational culture. In addition, the use of the balanced scorecard tends to focus on long-term sustainable value creation rather than on short-term financial gains. The balanced scorecard approach, through its integration and visibility, helps break down "silo" mentality and builds consensus among organizational functional groups.

The balanced scorecard is a tool primarily used for strategy implementation and not for strategy formulation. It can be used also to formulate alternatives since this framework defines key areas that require considerations when formulating a strategy, such as: financial performance, customers, internal processes, and innovation. The framework can be expanded to other perspectives of external stakeholders or employees. Although the balanced scorecard approach gives a systematic process for implementing strategy and gathering feedback, as such, it is not a silver bullet, and needs to be applied with an awareness of its limitations. Another common approach to strategic planning involves selecting market and customer segments, choosing the critical internal business processes that are required to deliver value to customers, and identifying individual and organizational capabilities required to achieve the internal, customer, and financial

objectives [1]. The balanced scorecard approach to strategy implementation can be complemented by other strategic approaches such as Porter's diamond, fulcrum analysis, internal analysis, external analysis and Complexity Grid analysis. This report briefly looks at internal processes of an aluminum smelter and external analysis of the aluminum primary metal industry to identify key strategic drivers and attempts to apply balanced scorecard principles to identify strategic implementation opportunities.

The balanced scorecard framework uses four main perspectives to measure performance: financial, customers, internal business processes, and learning and growth. The balanced scorecard enables companies to not only track financial performance but also simultaneously to monitor performance in building capabilities and intangible assets required for long-term value creation and sustainability. According to Norton and Kaplan [1], no longer can companies be merely managing financial assets and liabilities. Moreover Norton and Kaplan made a number of assumptions about how the business landscape has changed and that the rules that were applicable in the early 20th century for industrial enterprises have shifted. These assumptions include:

1. Greater Cross Functionality: Present businesses operate more as integrated units that combine the benefits of functional expertise with the quality, speed, and efficiency of an integrated organization.

2. Increased linkages in the Supply Chain: Information Technology enables greater integration of the supply chain

3. Customer Segmentation: Customers favor greater customization

4. Globalization: National boundaries offer decreased barriers to entry from competitors

5. Innovation: Continuous improvement in processes and products is critical. Product life cycles are decreasing.

The above factors have placed additional pressure on companies to re-invent themselves in order to stay viable and superior relative to their competitors. Norton and Kaplan state that for organizations to adequately perform, performance measures beyond financial metrics are required to assure long-term sustainability and viability.

Norton and Kaplan state that financial performance determinants such as economic value added cannot be used as the sole predictors of long-term success. Instead, they argue that other performance indicators play also a material role in organizational performance and long-term viability. These include: indicators of core competencies, process capabilities, employee skills, motivation, flexibility, customer loyalty, and systems. Financial performance is related to the fit and synergies of these various intangible factors. The balanced scorecard strives to better account for these intangible success factors than using only financial performance metrics. The balanced scorecard also highlights where resources should be allocated to maintain or improve financial performance in the short and long term. Near the heart of the balanced scorecard concept is its top down strategic approach and its transparency throughout all levels of an organization. This means that the balanced scorecard is not only limited as for use as a snapshot of organizational performance, but also it can be used as an information system that enables all organizational personnel, from the frontlines through to senior management, to see how their actions impact the organization's strategy. This arguably is its greatest attribute.

Table 1-1 Balanced Scorecard Main Functions [1]

1. Clarify and translate vision and strategy
2. Communicate and link objectives and measures
3. Plan, set targets, and align strategy
4. Enhance strategic learning and feedback

These aspects are integrated into the balanced scorecard model is shown below in Figure 1.1.

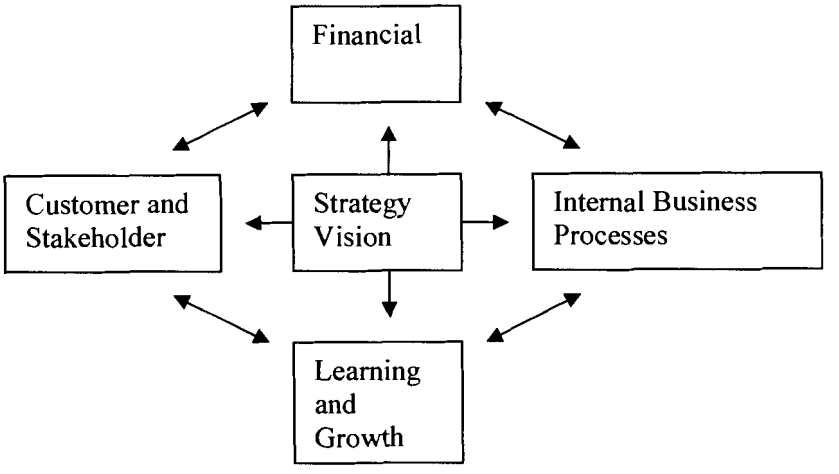

Figure 1-1 Balanced Scorecard Conceptual Framework Structure, [1]

Norton and Kaplan stated that a dash board is not a balanced scorecard as referenced by the following passage.

> [balanced score card] "should be a flight simulator, not dashboard of instrument dials. Like a flight simulator, the scoreboard should incorporate the complex set of cause and effect relationships among the critical variables, including leads, lags and feedback loops, that describe the trajectory, the flight plan, all the strategy. The linkages should incorporate both cause and effect relationships, and mixtures of outcome measures and performance drivers."(Norton and Kaplan, 1996, p.30)

Norton and Kaplan suggest that the balanced scorecard is not simply a dashboard of indicators that reflect internal or external business process outputs or measures. Moreover, the scorecard should not be used as metric for control of key business performance factors and outputs. Instead, the measures selected are intended to link through causality, to be relatively few in number and independent, and to support the strategy and vision of the organization. Metrics of the scorecard are not a comprehensive reflection of the key internal performance metrics of an organization, but rather are a select few critical success measures that reflect and support the four main perspectives of the balanced scorecard model. The scorecard should illustrate a causal chain of events and linkages that depicts the position of the business and its strategy. The balanced scorecard framework can act as a systematic process for implementing, directing, and keeping strategic issues on course. Another reason for using balanced scorecard principles is to overcome common barriers of strategic plan implementation. These barriers are stated in Table 1.2.

Table 1-2 Barriers to Strategic Plan Implementation

1. *Vision barrier* - no one in the organization understands or can see the vision
2. *People barrier* - personnel have objectives not linked with the strategy of the organization
3. *Resource barrier* – time, effort, and funding are not allocated to critical-strategic success factors to the organization.
4. *Management barrier* - management spends too little time and effort on strategy and long-term decision-making.

A model depicting how the balanced scorecard can be used to overcome these barriers is shown in Figure 1.2

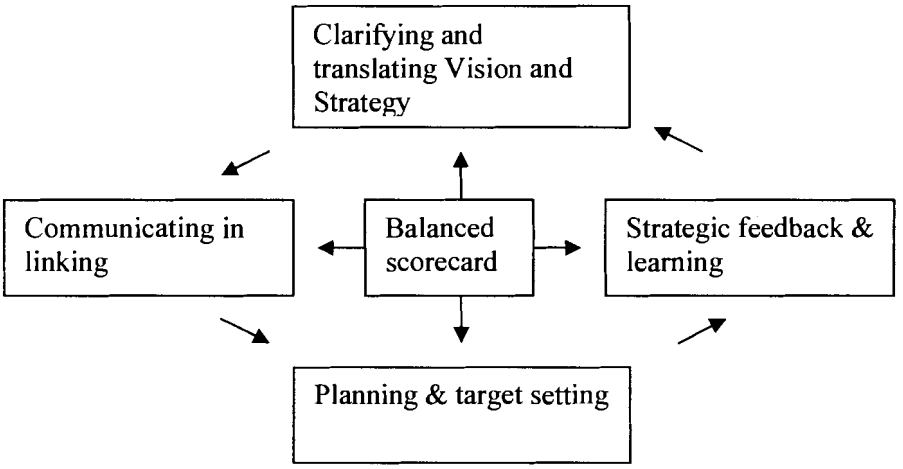

Figure 1-2 Balanced Scorecard as a Strategic Framework for Action, [1]

It may be relevant to ask whether the balanced scorecard approach actually worked in the business environment, and what are its limitations. In a study of more than 200 major private-sector companies in 22 industry sectors, a balanced approach focused on customers, shareholders, employees, and leadership outperformed firms that are more singularly focused by huge margin [2]. However there are also failures for this model to deliver value creation [3], [4], [5]. In a

study of more than 2400 companies using the balanced scorecard, up to 70 percent reported not deriving material benefits from its use [6]. The most common reasons for poor performance appear to be a misapplication of scorecard principles such as using too many indicators, or using strategies that are not actionable or relevant to value creation [7]. This should not imply that balanced scorecards provide little value. The evidence does suggest that the creation, implementation, maintenance and value creation from a scorecard system is not a simple matter of creating and monitoring a few critical success metrics. Norton and Kaplan suggest that the balanced scorecard needs to be checked periodically to ensure that the metrics chosen are material for organizational success as defined by an organization's of strategy and thus enable value creation.

Despite these limitations, momentum for the adoption of the balanced scorecard appears to be increasing. It is difficult to state whether this phenomenon will persist or whether the balanced scorecard will subsequently lose its appeal as have many previous and temporary fashionable management systems. A recent a survey of more than 700 companies on five continents found that 62% of the responding organizations were using the balanced scorecard, a higher rate of adoption than other with management tools such as Total Quality Management, Supply Chain Integration or Activity Based Management [8]. As with many business tools, the balanced scorecard can lead to sustainable value creation if it is used judiciously within its intended purpose.

This project intends to investigate the key themes of the balanced scorecard and apply these themes to a set of stated objectives for a large aluminum producer and its departments. The intent of the investigation is to use the balanced scorecard as an approach to identify opportunities and make recommendations to improve organizational performance. This study will focus on applying the main principles of the scorecard framework to an actual set of plant and departmental objectives. The analysis is limited to balanced scorecard principles, and attempts to

build a balanced scorecard during the course of analysis shall be for reference purposes only. Actual construction of a balanced scorecard for the plant is beyond the scope of this report. The balanced scorecard and its implementation usually requires input from top management and other inputs from across an organization.

For confidentiality reasons not all the quantitative details of the organization's targets and measures are stated and those that are stated may not reflect actual values. The analysis can be interpreted as a case study into how well the balanced scorecard framework may be applied to a set of objectives in order to generate opportunities and identify potential opportunities for further review and discussion. The aim is to see if this analysis can point to opportunities for implementing strategy with the potential of value creation in an industrial plant environment.

2 PROBLEM STATEMENT

The lens of the balanced scorecard framework is applied to compare the differences between actual organizational objectives and those suggested by using a balanced scorecard approach. Because there is no standard balanced scorecard that can be applied for this investigation, only the general principles of the balanced scorecard are considered to determine whether these differences appear material and can serve as opportunities to implement strategy and to potentially create value.

Table 2-1 Problem Statement

"Can the Balanced Scorecard perspective highlight gaps and opportunities when applied to a stated list of departmental or plant objectives of a large industrial producer?"

The perspective of the analysis is from the plant level, and not the business unit level or corporate level, even though the corporate and business unit level have a strong influence on the success factors that lead to short and long-term value creation in the plant. These factors are analyzed in Section 5.0.

3 METHOD

The project proceeds by identifying important factors in the environment of the plant and in the balanced scorecard framework. and then by applying the balanced scorecard framework to plant and selected departmental objectives to highlight gaps and opportunities. Because of the complexity and broadness of this subject, the scope for discussion is limited to key strategic drivers and not to details within the environment. This report is divided into three main parts: 1) a situational analysis to define the operating environment of industry and the plant, 2) a discussion regarding balanced scorecard principles, and 3) the application of the balanced scorecard to the plant and departmental objectives.

For Part I, the items used to discuss the business environment at the plant level are shown in Table 3.1. The main focus of the discussion and analysis is taken from the plant's senior management's point of view. As such, the corporate strategy can be considered as external to the plant's perspective, since corporate strategy is largely outside the direct control of the plant. Table 3.1 lists a number of key factors that depict the present operating environment of the plant. These factors are discussed in greater detail in Section 4.

Table 3-1 List of Key Situational factors

External Factors	1. Industry definition and dynamics 2. Industry Supply Chain 3. Porters Forces 4. Competitors 5. Corporate objectives
Internal Factors	1. Plant Financials 2. Resource Analysis 3. Plant Value Chain 4. Plant Stakeholders 5. Plant Sustainability 6. Plant Structure 7. Plant and Departmental Objectives

After the external and internal operational context is set, further discussion about the key strategic drivers of the balanced scorecard is presented in Part II. Part II looks at the balanced scorecard framework as a strategic tool. It describes the main components of the scorecard including vision, mission, innovation and learning, process, customers, stakeholder and financial components. These components are shown in Table 3 .2. Part II sets the stage so that this information can be used as a set of qualitative measures for understanding the plant and departmental objectives in Part III using the balanced scorecard perspective.

Table 3-2 Key Determinants of the Balanced Scorecard

1. Vision 2. Mission 3. Innovation 4. Process 5. Customer and Stakeholder 6. Integration and alignment 7. Action through the strategic scorecard framework

Discussion of the impacts and benefits, risks, and costs of using the balanced scorecard are also discussed in Part III. In Part III, discussion revolves around applying the balanced scorecard principles and information from the internal and external analysis to key plant and departmental objectives. This analysis is largely a qualitative discussion of plant and departmental objectives. Suggested opportunities for value creation are also discussed in Part III, as well as final concluding remarks and recommendations.

PART – I SITUATIONAL ANALYSIS

4 KEY FACTORS

The following subsections briefly point out a number of principal industry drivers of the primary aluminum industry. The goal of this section is to elucidate a select number of key strategic determinants of the industry to set the context for application of the balanced scorecard to plant and departmental objectives.

4.1 External Factors

4.1.1 Industry and Overview

This section defines a number of industries which are used in the production of aluminum at the smelter. The smelter produces primarily aluminium goods along with surplus electrical power, thus produces goods for two different industries, which are described below:

1) The aluminium industry can be defined as a industry that smelts aluminum primary and value added ingots, and supplies these goods to the global marketplace. Aluminum is light-weight, high-strength, recyclable, and has many diverse uses. Significant customers include manufacturers of alloying and cast facilities for the automobile, packaging, and construction industries. Primary Aluminum is a global commodity, which is traded in the international markets such as the London Metal Exchange. Competition is based on mainly price with small percentage premiums for value added products. Limitations to growth of the aluminium industry may include factors such as environmental concerns, power supply, and government policies.

2) The electrical power production industry as defined for this report produces electrical power in North America. The industry provides power to a power distributor that services a broad range of industrial, commercial, and residential customers. However, power line losses from the aluminum producer limit power distribution to northern British Columbia. Electrical power is considered a commodity in which competition is based on price.

The aluminium and electrical power generation industries are capital-intensive, favor economies of scale, with competition is largely based on price. Both industries are considered as mature with many large production facilities and slow sales growth (less then 2% for aluminium world annual production and 7.5% for annual provincial power production). The industry is dominated by a relatively small number of large corporations. Profits tend to vary with costs of inputs, which can additionally create comparative advantages. Because of economies of scale in both industries, producers are faced with high sunk costs.

Despite recent increases in demand primarily driven by growth in eastern Asia, the long-term trend for aluminium real prices is negative act around –1.0% annually[9] over the past 160 years. The industry is subject to price competition. Rivalry inevitably places cost pressure on aluminum producers and creates favored positioning for smelters that have unique access to the scarce resources at attractive prices. Large increases in aluminum supply may be introduced in China with hydropower production increases, which may place even further pricing pressures on the industry, although the increase in electrical power supply may be offset by greater increases demand for electrical power. In North America, the long-term price trend for electrical energy has grown about 7.5% annually, and is forecast to continue to grow. In British Columbia the Utilities Commission regulates the prices of electricity, and sets policies for power generation.

4.1.2 Industry Supply Chain

Figure 4.1 depicts an industry supply chain for the aluminium industry. The main industry inputs are material and human resources, green coke from the petroleum industry, pitch from the steel industry, and electrical power. The outputs are to aluminum sold to industrial customers.

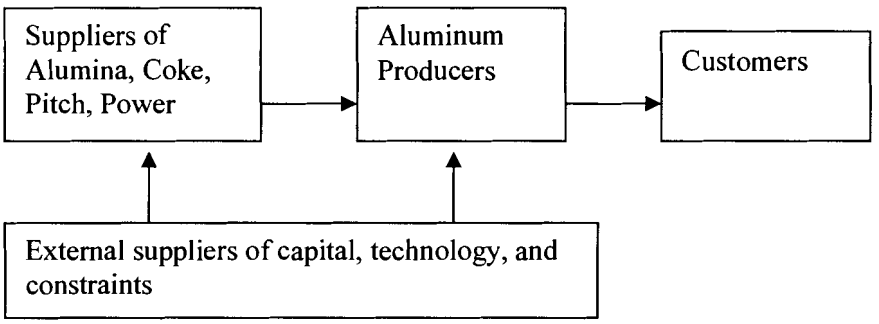

Figure 4-1 Model of the Aluminum Industry Supply Chain

Figure 4.1 exhibits that aluminium producers are vulnerable a potential hold up from their suppliers. Consequently, this is one of the reasons why many aluminium producers are in fact vertically integrated with alumina and power producers. Other inputs such as the availability of both financial and human capital, along with constraining factors such as environmental, health and safety regulations which can inhibit the attractiveness of the industry. Similarly, electrical power producers can face comparable environmental and regulatory constraints.

Human resource and regulatory constraints can vary from one facility to another within the industry since constraining agencies and regulations frequently differ with location and country, whereas accessing capital and technology are subject to globalization, hence not as site-specific [10]. A schematic for the electrical power generation industry is shown in Figure 4.2 below.

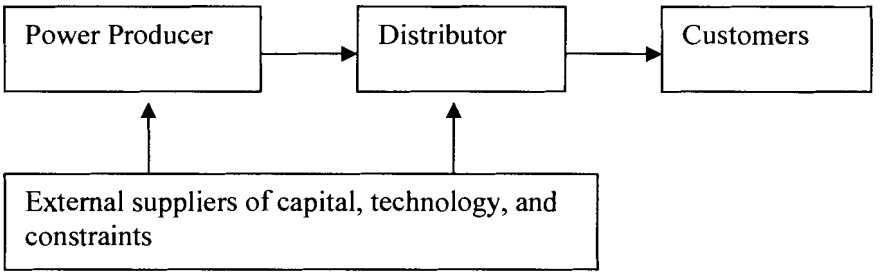

Figure 4-2 Industry Supply Chain for Electrical Power Generation

4.1.3 Porter's Forces and Competitive Position

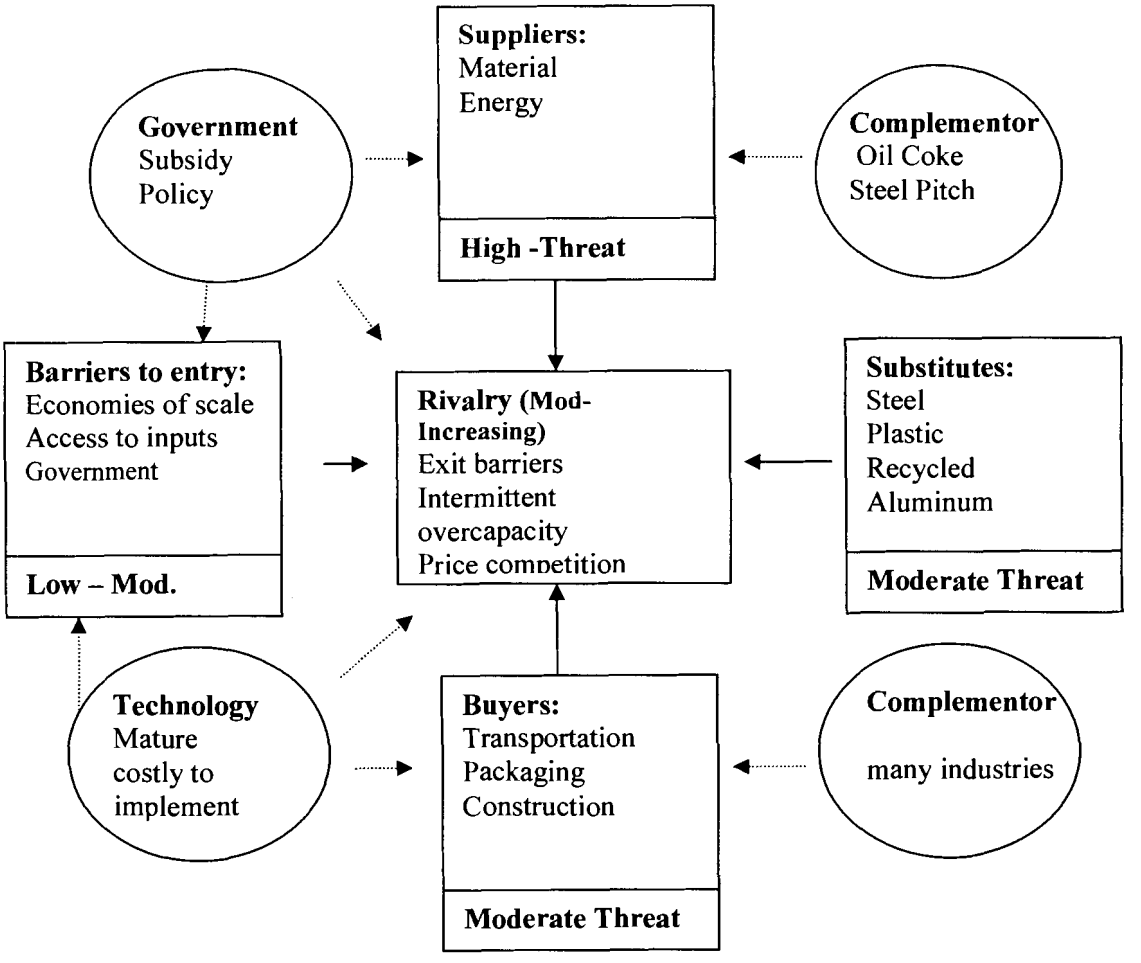

Figure 4-3 Porter Force Analysis Augmented for the Aluminum Industry, Modelled from [11]

According to the Porter analysis above in Figure 4.3, the aluminum industry appears under moderate to high threat from external suppliers, governments, buyers, and substitutes. One positive aspect for the industry has been high barriers to entry and large economies of scale. Outside of North America and Europe many aluminum producers are highly subsidized or government owned, which lowers the barrier to entry and increases rivalry. At a plant level however, threats from Porter's forces become magnified. For example, suppliers can have high

power over an aluminium producers unless the producers can secure long-term supplies of power or raw materials at economical pricing. This was main reason why over 95% of the smelters in the US Pacific Northwest had to shut down in the past few years. Environmental regulations are also having a large effect on the viability of smelters, especially ones having older technologies or higher emissions. This has forced the majority of vertical soderberg smelters to shut down and has placed uncertainty on the viability of the smelter being studied in this analysis.

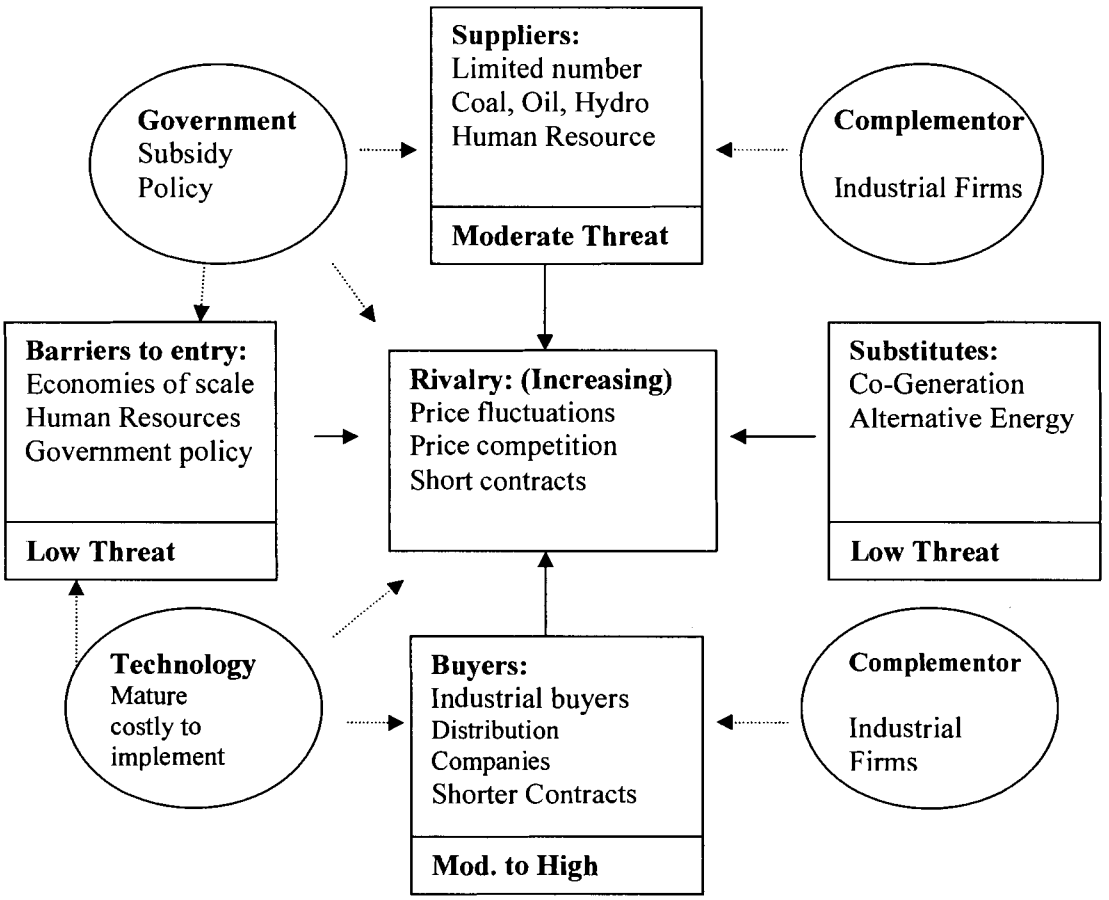

Figure 4-4 Porter Analysis of the Power Generation Industry , Modelled from [12]

Figure 4.4 shows that the electrical power generation industry is in a better position with regard to rivalry and competition than the aluminum industry, which is largely due to lower threats from upstream suppliers, substitutes, competitors and buyers. This suggests that power generation appears more attractive than aluminum production.

The aluminum industry is subject to price competition and intermittent overcapacity. Generally, aluminum cannot be differentiated in any great extent. From the corporate perspective, the industry is dominated by a handful of large producers, such as Alcoa, Alcan, Norskhydro, RusAl, producing the bulk of the world's supply. At the plant level a much larger population of competitors exist. High-cost producers generally have been shutdown as aluminium prices decline in long-term. Rivalry is based on price competition and factor costs - big advantages to those who can acquire raw materials (alumina and power) and labour at low costs. The industry has gone through a round of consolidation with Alcoa's purchase of Reynolds and Alcan's purchase of Pechiney and Alusussie. Production in China is expected to grow in the order of the 8% to 15 % range annually until 2010. This may create large surpluses of aluminium when the rapid growth in China starts to diminish hence increasing competition and placing further price pressure on the commodity. The cost advantage gained from efficient aluminum production is not sufficient to ensure long-term viability, because rivalry can erode competitive advantage.

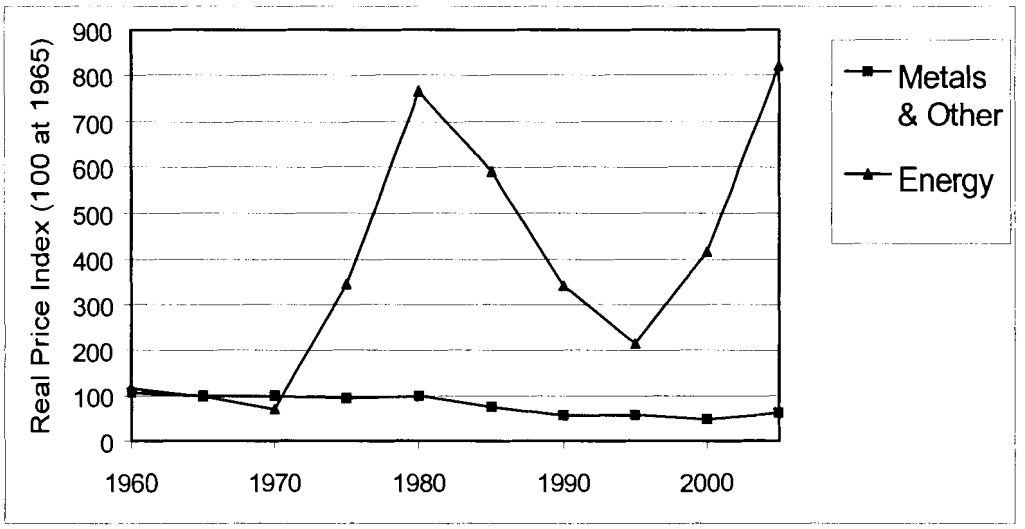

Figure 4-5 Real Prices Energy versus Metals and Other Commodities, Adopted from [13]

Figure 4.5 suggests that real aluminum prices are declining long-term. Some have suggested that aluminum prices have been decreasing well for over 160 years [13]. The decline may be the result of increasing competition, efficiency, over capacity and supply. The price decline experienced in the aluminum industry has not taken place in the energy or power industry where prices have generally been rising despite increases in efficiency and lowering of production costs. Generally, both power and aluminium commodities cannot be greatly differentiated as a product although power price volatility as a function of time can introduce price premiums related to peak demand. The prices of energy have increased far above aluminum prices as shown in Figure 4.5. Reasons for the higher prices may be that demand for energy products is outpacing supply, and that power and energy products are non-renewable.

4.1.4 Production costs

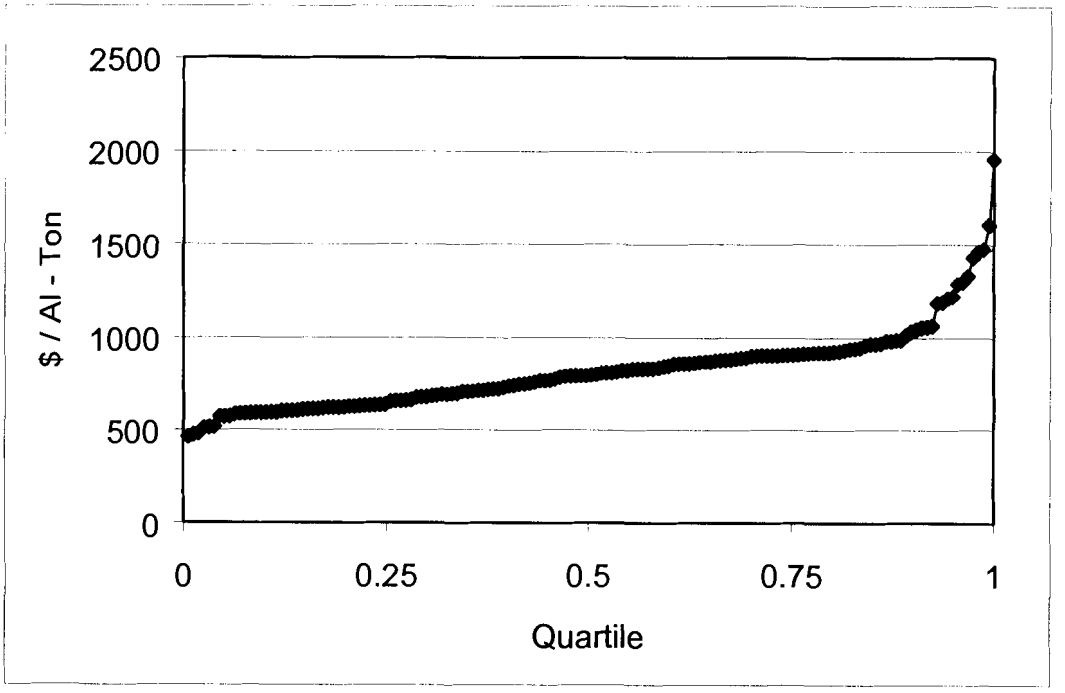

Figure 4-6 Cost Curve for Aluminum Producers, 1993 [14]

Figure 4.6 depicts the supply cost curve for all the aluminum smelters in 1993. At this time production cost at the smelter was near the mid range of the cost curve for producers. Since 1993 many of the high cost quartile producers have had to exit the market because of high production costs. During 2005, production costs of the smelter shifted to the high cost quartile and it seems unlikely that long-term production will be sustainable without additional increases in capital investment to improve efficiencies and decrease labor costs.

4.1.5 Key Success Factors

This section consolidates the main points covered in previous sections 4.1 .1 to 4.1.4, as shown in Table 4.1.

Table 4-1 Key Success Factors for the Aluminum Industry and Power Generation Industry

Aluminum 1. Material, labor and energy cost-- access and secure production inputs at advantageous pricing 2. Sustainable low cost operation – process, resource management, reinvestment 3. Managing Risk - compliance and anticipation of constraining political and regulatory factors 4. Long term relationships or contracts with stakeholders -- governments, suppliers and buyers.
Power Generation 1. Contract management and relationships-- secure long term contracts with distributors and buyers 2. Access to markets 3. Sustainable low cost operation – process and resource management 4. Managing Risk - compliance and anticipation of constraining political and regulatory factors

4.1.6 Corporate Objectives

Table 4.2 lists the corporate objectives that apply to the smelter. It is interesting to note the correspondence between these objectives and the key success factors listed in Table 4.1.

Table 4-2 Corporate Objectives

1. Value maximization (governing objective). To maximize returns for shareholders while ensuring a sustainable future for our stakeholders especially employees and the communities where we operate.
2. Environment health and safety in each operation: this objective is aligned with iso-14001 environmental standards and OHSAS 18001 health and safety standards.
3. Continuous improvement: reduced waste, increase throughput, and improve performance on critical criteria for customers
4. Sustainability: Long-term viability with a minimum environmental impact
5. Human Resource Management: attract and retain talent
6. Integration: linkage between objectives

5 PERSPECTIVES FROM THE PLANT LEVEL

5.1 Plant Financials

Financial statements such as the income statement shown in Table 5-1 from the plant level were not readily available, although the plant uses an extensive array of information technologies to track costs. One reason why consolidated financial information is not published is that creating and publishing such information is perceived to create little value. Because of the lack of access to this information, Table 5-1 shows unofficial estimates of an income statement for the plant along with an estimated EVA. Estimates of other financial information and further analysis is not given because of the lack of access to this information.

Table 5-1 Estimated Selected Finances for the Producer, in $US Millions

Aluminum Revenues	Estimated from 240 t/y at $ US 1700	408
Revenue from Power	Estimated from 150 MW at $ US 25 MWH	33
Cost of goods sold	Estimated & Pro-rated from [14]	240
General operating	Estimated & Pro-rated from [14]	60
Amortization expense	Estimated from Cap-Ex [14]	40
Estimated net operating income		160

Interest expense	Estimated using a 7% charge on 400M of Debt	28
Tax expense	Estimated effective rate at 33 %	43
Net Income		89
Capital Employed	Estimated	700
Estimated EVA	Estimated Net Operating Earnings after taxes – cost of capital	37

Table 5.1 continued

Table 5.1 estimates that presently the plant is in a healthy financial position for this reporting period at present aluminum and electrical power prices. The plant uses Economic Value Added (EVA) as a performance measure. Economic Value Added is frequently used as a measure of shareholder value because it accounts for economic operating profits based on opportunity costs of capital employed. For short time frames, the EVA method can be biased against investment of new capital and can create incentives to under capitalize production assets since EVA increases as capital investments are minimized when operating revenues are not significantly decreased. Hence EVA does not readily support investment in non-core assets. Because of the time lag between under-investment and decreased production, EVA as a performance measure needs to be used with caution, or inevitably short-term EVA increases can lead to wear out of assets, which can result in long term decreases in EVA.

The total operating budget for the plant is estimated at $340 Million. Because this information is not readily available, it is difficult to estimate the plant's financial position. In general, the income and funding that the plant has available for new expenditures are largely influenced by corporate approvals of budgets for capital expenditures. The plant is over 50 years old, consequently modernization is needed to improve efficiency, reduce labor costs, diminish environmental concerns and ensure long-term viability.

Recent increases in aluminum prices largely due to increased demand from China have increased profits moderately. Input costs for raw materials have also risen, thus offsetting revenue gains from increasing aluminum prices. Presently product demand is high for the smelters producing sheet ingot. The production of sheet ingot is ranked by plant customers as superior in quality compared to that of its competitors, which offers some competitive advantage to the smelter. On the other hand, sales of billet from the smelter are presently insufficient to meet capacity. Cost of electrical power is a key input for aluminium production at the plant. Electrical production costs are as low as $3 MWH, one of the lowest production costs in a world, which gives this facility a unique comparative advantage over competitors. However the supply cost curve as seen in Figure 4.6 implies, in spite of cost advantages, the plant is presently is the upper cost quartile of aluminium producers primarily due to high labor costs, both in terms of manpower and units labor rates, to maintain old inefficient technology. As a result, plant operation is expected to face intense pricing pressure to stay viable in the long-term.

5.2 Plant Value Chain

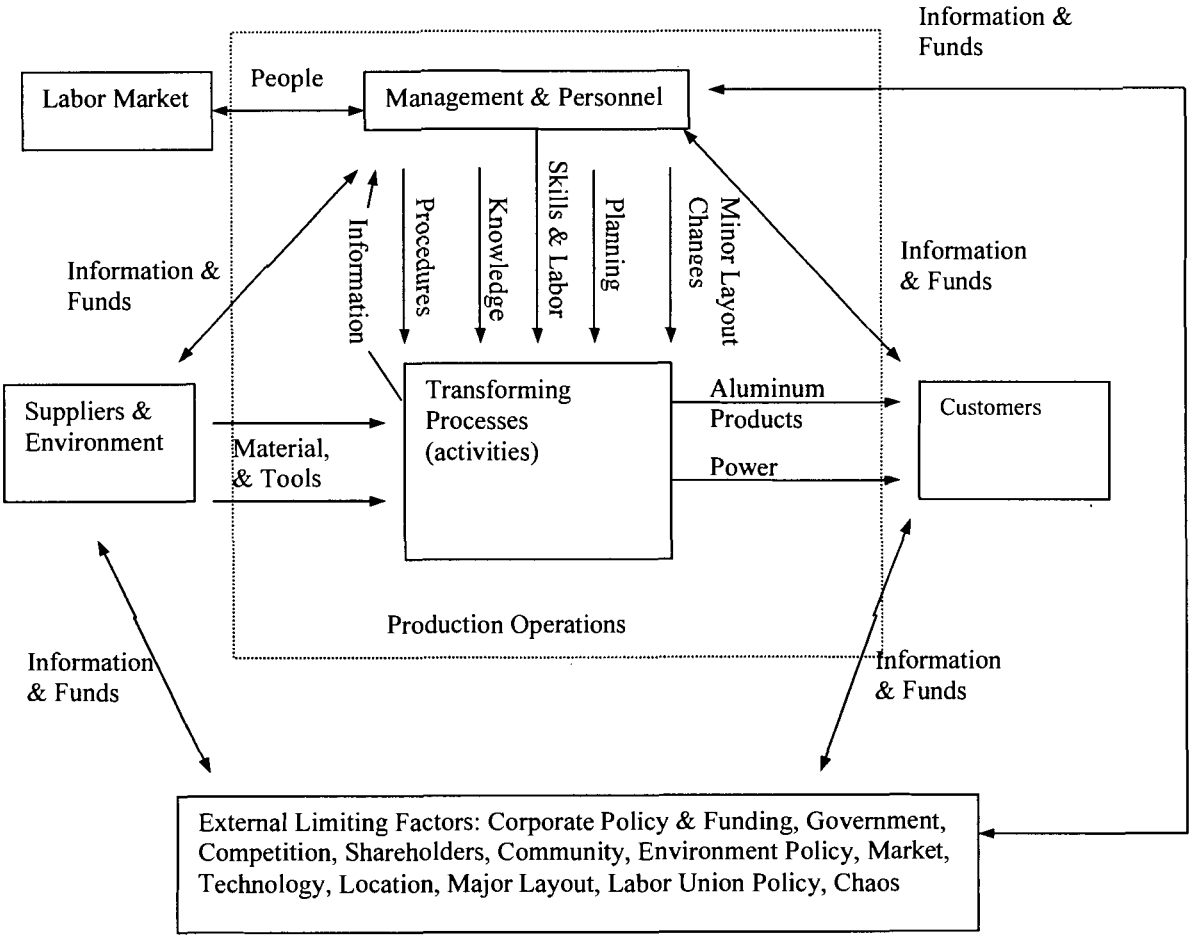

Table 5-2 A Consolidated Diagram of Flows and System Relationships that influence Smelter Operations

Figure 5.2 depicts the main internal and external components of the plant and their relationships to the plant operations. The diagram highlights the core business process as inputs (such as water pressure, Alumina, Coke and Pitch not shown) are transformed into value added aluminum products and power. The figure also shows the principal flows of funds from industrial customers through operations to suppliers and other stakeholders. It is evident that stakeholders can influence core operational processes through management procedures, planning and labor.

Some stakeholders such as corporate executives, government bureaucrats, and union representatives can place limits on the amount of control that management has over operations.

Figure 5.2 does not attempt to illustrate the relative importance or influence that various relationships have on operations and its management. Nonetheless, this diagram offers a simple framework that defines the position of management relative to the core operation processes, and the diagram elucidates the main inputs and outputs of the aluminum plant. These key inputs and outputs and their relationships or impacts on operations should be considered during the development of the balanced scorecard to minimize negative impact risks from these factors.

5.3 Community, Government and Other External Factors

This section briefly points out some of the important external factors that can influence or constrain operations at the plant. Although it may seem at first that many of these factors directly do not apply to a balanced scorecard model, the factors are nonetheless necessary to consider from a risk standpoint when analyzing plant objectives. Only a selected number of factors are mentioned because of the limited scope of this report.

5.3.1 Local External Factors

Community Relations: Ever since corporate headquarters gave the go ahead to build the plant in 1950, smelter operations has been the largest single influence on the local region's economy. In recent years the economy has declined in the surrounding community, because of what some claim is due to an increase of power sales at the expense of smelter jobs. Recently the town coucil has placed a legal claim alleging that the plant's increase in power sales is in contravention to its long-term agreement with the provincial government to use the power for aluminum production. The claim was unsuccessful in court. The residents of the town are divided over whether the town council's tactics was justified. The plant management, under the

direction of new plant manager, has set up a task force comprising of local business and political leaders to attempt to improve community relations and to attempt to resolve the dispute. Subsequently, plant management has also set up sustainability and economic development task forces.

First Nations adjacent to the property of the Smelter: This group forms another key local component of the community surrounding the plant and considers itself an autonomous community, with its own distinct culture. The government grants the community special rights and powers. In general, the native community has strong ties to the land, although recent developments have focused on building business opportunities for group members.. Plant operations actively maintain a positive relationship with this group and has given land and formed partnerships between first nation groups to harvest timber.

Corporate Relations: The corporate office has mandated three main objectives: 1) EVA, value maximization, shareholder maximization, 2) Environment, Health and Safety First, and 3) Continuous Improvement. The smelter's performance is rated on a weighed average of EVA, Health, Safety and Environmental performance. An annual performance bonus for employees in tied into how well the plant meets its performance targets. Corporate head office monitors and sets budgets, approves major expenditures, and ratifies metal-production plans. Planning is commonly done on a five year basis through a strategic plan. More increasingly an electronic scoreboard is being used to monitor and to benchmark performance across various plant departments by tracking indicators such as planning targets or maintenance equipment breakdown statistics and comparing the numbers to other sister smelters. The EVA of the smelter is also measured to assess its financial performance, and to serve as a benchmark between other operations in the business unit and other external operations. At present the smelter is near the end of its design life. The corporate head office has not yet stated whether it sees the smelter as a place to maximize shareholder value and whether it plans continue to invest in a plant

modernization. In part, this has set an uncertain tone about the vision and mission of operations at the smelter. Despite a conflict with the local district council, corporate management desires to present a positive impact on the local community and local first nations. The plant has been actively supporting numerous local community events such as a local telethon and funding for sporting facilities, various local clubs and organizations.

Environmental Policy: As time passes, environmental policy and legislation increases in complexity, both in volume and variety of the conditions that must be met in order to maintain compliance with environmental regulations. Weighing on operations are environmental regulations and agreements that restrict water usage for power generation and regulate activities that impact fish habitat and environmentally sensitive areas. Regulations limit quantities of emissions, and waste generation, handling and disposal. These restrictions have placed a burden on the plant's Vertical Solderberg reduction process. Other vertical Solderberg smelters had to be terminated because of environmental policy concerns. The trend in environmental regulations is to phase out the Vertical Solderberg Process by 2016 in many areas of North America. The smelter has embarked a pollution prevention program where emission targets are monitored for compliance.

Suppliers: Much of the industry is vertically integrated to ensure the supply of key inputs at stable prices. Alumina holds a high percentage input cost and is purchased almost exclusively through long-term contracts in order to avoid hold-up situations. Coke suppliers have moderate influence on aluminum due to the demand for high quality coke that is required for aluminum production. Aluminum producers pay premium prices for high grade coke in order to ensure the best quality is obtained. The coke supplier power is tempered by the low switching costs between suppliers. Recently the plant has changed suppliers because of lack of supply of anode grade coke. Other suppliers of pitch and equipment have low supplier influence because aluminum

producers are generally large compared to suppliers of equipment and consumables and therefore have a bargaining advantage.

The smelter's expectation is for long term normal water inflow from snow and rain, although climatic variation can limit the production of power or aluminum. Presently power production is at normal levels, however this was not the case a few years ago and energy production was cut back because of low reservoir water levels.

Customers: Customers of aluminum value-added products, such as sheet ingot and extrusion billet, are industrial buyers who are located primarily in Japan, and Korea, and to a lesser degree western North America. Customers are sensitive to quality and are willing to pay a price premium for the fitness for purpose of these products. These customers are often also competitors since they buy primary aluminum on the market and add value themselves. Brand name and consistency with the brand also plays an important role to customers. Japanese and Korean buyers prefer to create long term alliances, which works to the benefit of both the plant and its Asian customers. Success at the plant has partly come from the ability of the casting operations to adapt quickly changes in new orders, more so than other competitors, while maintaining quality and competitive pricing. The small number of major customers places a risk of loosing large portion of revenue with the loss of a single customer. A more recent development is that other sisters plants are beginning to complete for the same customers in Asia.

On the power side, the power operations has long-term contracts with a distribution utility and plans to maintain this relationship for the foreseeable future. The smelter's power operations are rated at about 812 MW. Electrical power distribution and pricing is regulated by the utility, forcing the plant to use the utility's distribution network to sell power beyond the local region. This restricts the plant's bargaining position with the utility. Power generated by Power Operations has one of the lowest costs in the world varying from $0.003 to $0.005 per kilowatt-

hour. Large scale power suppliers are limited in number so competition is limited. Energy prices are expected continue to rise. Despite this, the plant has a long term fixed price contract with a power distribution utility. The power lines from the smelter to the market act as a bottleneck rated at about a third the smelter's electrical generation capacity. The transmission line was used at maximum capacity when energy prices were attractive. The power industry may see de-regulation, however attempts to deregulate in other parts of North America have largely failed. In Ontario, for example, the policy to deregulate was reversed because of concern for supply reliability and affordable power prices, so it remains questionable whether regulation of power generation and distribution will change.

Technology: The smelter works uses Vertical Solderberg Reduction Technology to produce aluminum, which is being phased out as a viable form of production. The most efficient and less polluting technology is "prebake" because carbon anodes are prebaked to increase electrical conductivity and carbon uniformity as compared with Vertical Solderberg Anodes. Also organic volatiles and poly aromatic hydrocarbons are more effectively scrubbed by using Prebake technology than by using older technologies such as Vertical Solderberg. With the recent acquisition of a large aluminium producer, the corporate office has acquired leading "prebake" technology. Presently Prebake technology offers the best choice for smelting aluminum. Apparently, investigation is proceeding on a carbon-less anode, but technical difficulties are keeping this technique in research and development mode.

Power generation technology has not had many large step changes since the Tesla's invention of the transformer and induction motor in the late 1800s. More recently high voltage DC transmission technology is being used in some parts of North America to minimize transmission line losses. Most of the improvements to power generation efficiencies have come from a history of continuous improvement and revision of control hardware, control software, and incremental improvements to turbines and generators. The plant uses a high-head-low-flow

Pelton impulse turbine to generate electrical power -- customarily used in modern designs as it was 50 years ago.

Labor Unions: The Canadian Auto Workers Union, CAW, forms largest group of workers at the plant. A collective agreement between the union and management is negotiated every three years, which takes up at least one year of discussion and negotiation preparation work before the deadline to each agreement.

The two previous agreements were not settled before a strike deadline resulting in the unionized workers walking off the job for at least 3 hours. The plant cannot operate for more than a day without the unionized workers. Two recent employee surveys showed low morale in the plant as compared with other sister smelters. Past negotiations have been adversarial in nature and have led to strained relations between management and union employees. This is being partly fuelled by the lack of a certainty above the future of this plant.

Demograhics: It has been estimated, that 50% of the electrical department is expected to retire in the by 2015. This trend is applicable to other trades and other staffing in other key positions across the plant. This implies that the creation of a large shortage of workers in ten to fifteen years, unless the plant is modernized or the operation shuts down. With these retiring workers leaves the knowledge and skill that have been acquired through many years of experience working in various areas of operations. Demographic influences work against the replacement of skilled workers because there is a trend for the general population to move from smaller towns to larger centers, which works against retaining skilled personnel in isolated communities.

Chaotic Factors and Risk Management: Terrorism, computer viruses, accidents, fire, floods, drought and low water levels are unpredictable and random factors and are to a large extend not controllable by the operation. Even though the above factors are not directly

controllable or predictable, operations can limit the impact of such factors by assessing the risks and implementing appropriate measures.

In summary, the above section briefly highlights various external factors the can influence or constrain operations at the smelter. No attempt was made to rank or weigh which of the above factors are most significant, but regardless of this, these factors should be kept in mind when developing a vision and mission statement for plant operations and the balanced scorecard objectives, measures, targets, and initiatives.

5.3.2 Organization Structure and People

Figure 4.8 shows a simplified representation of the organization's structure. Details of the organization have been omitted to reduce complexity and to simply demonstrate that there are at least six hierarchical levels within the plant. The actual number of departmental areas is over 50, employing over 1500 workers and staff.

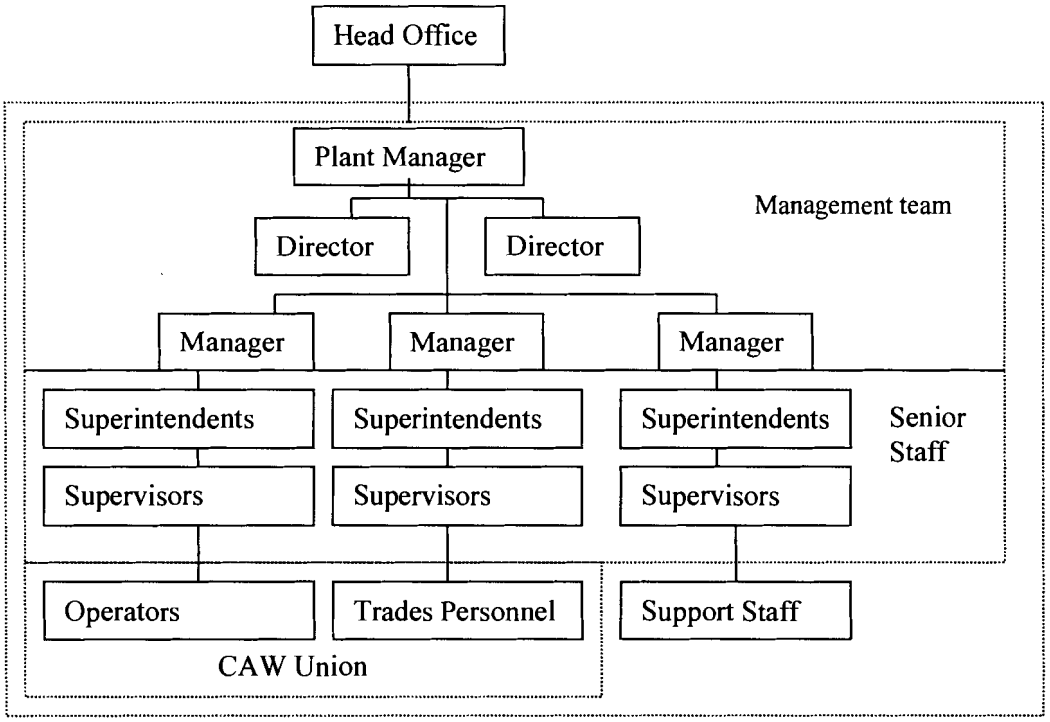

Table 5-3 A Model of the Plant Organization

Because of the vastness of the layout of the plant, its many levels of hierarchy, and its many departments (each with its own set of priorities), internal conflicts between departments are not uncommon. Departmental isolation can work against consistency of processes, effective communication, and a unified mission across the plant. The organizational structure supports the plant's management style where most major decisions are made at the senior levels of the organization and information is distributed down through the hierarchical structure.

During the past 5 years, the turnover of the senior management team has been greater than 50%. Most members of this team have come from outside of the local region which can create perspectives and leadership styles that differ from the local perspectives. This contrasts to the demographic makeup of the union workers who are mostly from the local area and have been working at the plant for over 15 years.

The plant's hierarchical structure has been in place for over 50 years, which makes it highly resistant to change. It was not that long ago that most workers expected to work for life in the plant. This attitude remains with many workers even today. At present the plant is nearing the end of its useful life and no clear indication from management has yet been given as to whether the plant will shut down or modernized. Because of the plant's vast size, labor skill and expertise is divided in special categories. On the union side more than 50 job titles exist. In contrast, the management and administration side has even larger array of job descriptions, with over 100 job titles.

5.3.3 Skills, Activities, Tools and Equipment

The plant uses Vertical Solderberg technology, which has changed little in the past fifty years. Likewise, core processes functionally have not changed much in the past 50 years relative to businesses in other higher growth industries. Incremental improvements in technology have increased efficiency and throughput of both aluminum and electrical power production. Many labor activities that support the above production operations deal with the maintenance, transportation and application of alumina, electricity, and coke to reduction cells called pots.

The latest plant survey indicated that morale was below the average compared to its sister plants. Some personnel mention that suggestions for improvements are not being heard. Another cause of poor morale is the lack certainty over the future of the plant. Although in departments

such as Casting, work and performance are perceived as high while the work ethic and morale is considered good.

A tour through the smelter reveals that many core practices and equipment have not changed significantly in the past 50 years of operation. This contrasts with other parts of the smelter that have been modernized: in the 1970's a value added casting facility was added, while during the mid 1980s an Anode Paste Plant was built at the south end of the plant. Many of the procedures and activities in the plant are repetitive and have changed little in over the history of the operation, although plant objectives and the creation of new policies have been frequent as management priorities change.

Operations uses various electronic application software packages such as Lotus Notes, Integrum, Dbase, various Mircosoft packages, and Maximo to disseminate information and procedures for various processes such as quality control, auditing (to support programs such as ISO 9001, 14000, and 18000), controlling budgets and planning. Most of the plant procedures are documented in a database program called Integrum written by PeopleSoft. Recently, information in a Maximo maintenance planning system started to be tracked by the head office through an electronic Scoreboard. Also in the past two years the corporate head office rolled out Jobs On-line and an Individual Performance Management System along with a Continuous Improvement Program, to train Six Sigma Black and Green Belts.

The skills and experience to perform activities varies greatly across the smelter (many workers in the plant do not have a high school education) however an important issue looming is the disappearance of important hands-on skills through the retirement of workers. A significant percentage of workers, at least 35%, are expected to retire in next ten years.

To improve process and operation knowledge, a training centre was built recently built. MBA and undergraduate business programs were launched with collaboration between Simon

Fraser University and the plant. Recently training activities have increased in frequency to improve skills and processes. A consolidated list of plant and departmental objectives is given Section 7 and Appendix A respectively and serves as a basis for discussion regarding the performance of plant operations and the application of the balanced scorecard.

5.3.4 Plant Management Systems and Support of Core Activities

From the plant's management perspective, cost control and production are key objectives. Budget planning to meet these key objectives is submitted to corporate head office for approval on an annual basis. Once approved, the management team is responsible to meet those plans and management's performance is graded on this basis. Key performance targets whether annual or long-term, are defined and set through an annual operations plan and a long-term 5 year strategic plan. One of the key parameters that determine the reinvestment in the plant is the capital and expense budget. The present the funding approval process is the depicted in Figure 5.1

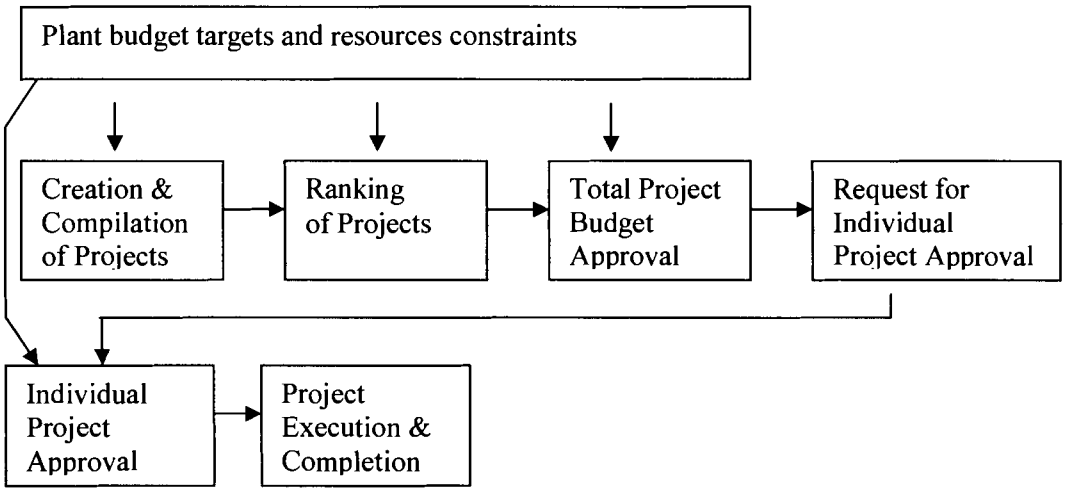

Figure 5-1 Model of Capital and Expense Budgeting Process

A key element of this process is how projects are ranked and approved. Presently the plant uses two parallel systems for project ranking. Both employ key strategic categories such as environmental health and safety, plant processes and maintenance of equipment. The project scores are then ranked and generally higher ranking projects are given a funding budget. The

department sponsoring the project can assist or inhibit the selection of projects depending on its power in the organization. Some projects that are part of a large program or an important plant initiative may bypass the project selection process. The project selection process is agreed on by the senior management team and superintendents. The budget and large-scale projects need approval by the corporate head office. There is a significant delay from the time that the projects are created to the time when of approval, with exception of urgent or high priority projects. In this case, project approval largely bypasses the normal course of this process. Presently, there are discussions to revise the way that projects are ranked. The new methodology would be based on continuous improvement tools, such as a benefit to effort matrix.

5.3.5 Location and Layout

The smelter is located on the west coast of North America giving it access to ports in East Asia, Australia and Western North America. The plant's isolation from its markets makes transport by rail and truck not as attractive as by ship. The majority of the bulk materials are transported to the smelter by ship. A major factor that determined the smelter's location is its access to inexpensive electrical power. This factor coupled with the smelter's huge capital cost implies large barrier to entry from direct competitors and exit from the smelter operation by the plant. Recently, other industries are showing interest in accessing the port. Ocean access along the West Coast of North America is limited, making the land under the plant's control valuable.

The footprint of the smelter extends by roughly 3 km x 1 km, although the land that the smelter controls extends over many thousands of square kilometres. The plant operation has over 50 departments spread out over this vast area and a power generation facility about 80 km from the smelter. The general functional layout of the smelter is depicted in Figure 5.2 below. The smelter has over 70 buildings.

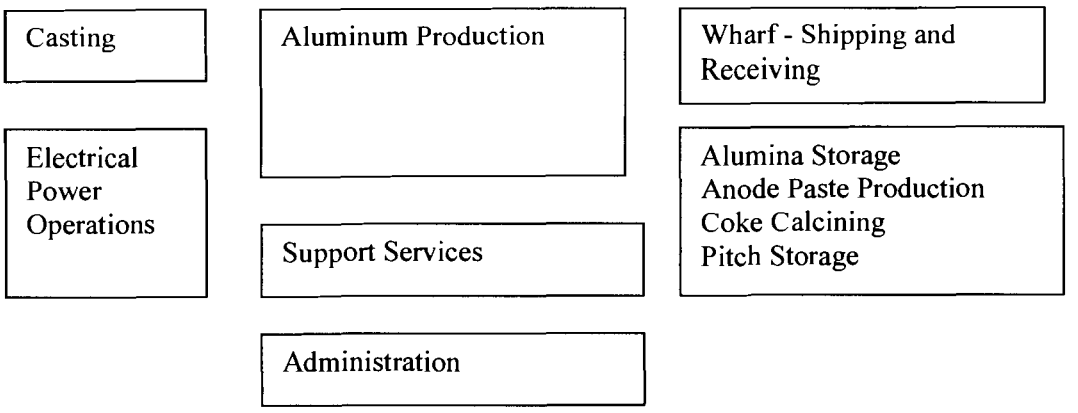

Figure 5-2 Schematic Layout of the Smelter

The smelter's larger scale can act as a barrier to communication, especially face-to-face. Some workers mention that a silo mentally exists, partly due to the isolation and large distances between departments, and causes conflicts between departmental goals and interests. The large plant layout implies that a large amount of cost, time, and activities are associated with moving and handling material. This presents opportunities for leveraging integration, simplification of process steps and logistics through activities such as continuous improvement.

5.4 Summary of Key Success Factors for Sustainable Plant Operations

Table 5.4 consolidates key relevant factors previously mentioned to maintain long term sustainable operations of the plant. The previous discussion suggests that if these factors are weakly supported through short or longer term planning, then based on the present industry environment and the present condition of the plant, the long-term viability of the plant is at risk.

Table 5-4 Key Success Factors for Plant

1. Leadership
2. Strategic and Change Management
3. Sustainable Value Maximization
   a. Strategic Re-investment for new value creation
   b. Manage material, labor and energy cost
   c. Product Quality, Price and Customer Management
   d. Leverage port location and land assets
4. Human resource management
5. Sustainability and Stakeholder Management
6. Environment Health and Safety Compliance
7. Continuous improvement, process, resource, fit, and logistics
8. Risk Management
9. Leveraging learning from sister plants or other producers

PART – II A CLOSER LOOK AT THE BALANCED SCORECARD

6 INTRODUCTION OF THE BALANCED SCORECARD AS A STRATEGIC TOOL

6.1 Introduction

This section describes the main components of the balanced scorecard and how they are integrated together. This offers a context for mapping plant and departmental objectives into the balanced scorecard framework in Part III of this report. The balanced scorecard is composed of four main quadrants with a strategic vision at its heart. These components can be considered the critical success factors of the balanced scorecard conceptual framework.

The rationale behind the balanced scorecard concept is to move beyond financial or cost accounting performance metrics as long-term and short-term strategic drivers. Reasons for this include looking beyond short-term focus and not using solely financial performance indicators, because financial performance alone cannot communicate a company's strategy to its employees and management. The balanced scorecard offers a broad view of success. Its benefits are summarized in Table 6.1.

Table 6-1 Balanced Scorecard Benefits

1. Provides plant staff and management a comprehensive view of business operations.
2. Shows business goals and strategies at all levels of the organization
3. Helps align key performance measures with strategy and planning at all levels
4. Assists in feedback and learning
5. Acts as a bridges between strategy, vision and initiatives and performance

The most common way an organization produces a balanced scorecard is through a consensus process by senior management. In the analysis in this project, this step was omitted, and a sample balanced scorecard was produced, see Figure 6.2, based on the principles found in literature [15], [16].

6.2 Vision and Mission

Vision and mission within the balanced scorecard context are the heart of the balanced scorecard. The vision statement describes an image of where the company or the firm wants to be at some future point in time, ideally in one or two sentences and is aligned with the company values and strategies. The mission statement supports the vision by briefly describing how the vision is attained. Commonly the mission statement contains about three to four sentences. Table 6 .2 shows a suggested example of a vision and mission statement for the plant.

Table 6-2 Sample Vision and Mission Statements

1. Vision: A plant that creates sustainable long-term value for our shareholders.
2. Mission. To achieve our vision, the plant will focus both on short-term and long-term economic profits through strategic investments, by building relationships with key stakeholders and while maintaining environment, health and safety performance initiatives, and by developing our human resources and continuous improvement. These actions shall be achieved through our core values of accountability, integrity, trust and teamwork.

6.3 Innovation and learning quadrant

This quadrant addresses the key question: *To support the vision how should an organization support the ability to change and improve?*

Although there are many ways to answer this question depending on the business model that an organization is using, this quadrant supports learning and innovative processes both short-term and long-term that ensure good operational results, customer satisfaction, and superior financial performance. This implies that expenditures and organizational processes need to support core competencies, learning, and working conditions to sustain human resources and change management processes need to adapt and evolve as the market, customers and business environment conditions change, while simultaneously keeping processes and people aligned with the vision [17].

Metrics in this quadrant often include training, employee satisfaction, competency and budgets to support these activities. Key questions that can be used to help define organizational objectives are as follows. How can integrity, teamwork, pride and trust be fostered and

measured? What research is being conducted to keep up with the trends and how to we keep ahead this long term market and competition? How are we growing as an organization? What new programs have been implemented and budgeted for both internally and externally to support learning? A sample of objectives for the plant that could be placed into this quadrant is shown below in Table 6.3.

Table 6-3 Sample Innovation and Learning Objectives and Metrics

Objectives	Measures
Strategic change management plan	Employee survey results %
Learning & communication from outcomes	Employee survey results %
Training core competencies	Employees trained %
Employee core competencies performance	Survey results %
New Markets	Estimated EVA $

6.4 Process quadrant

The key question that deals with the Process quadrant is: *What must the organization excel at to satisfy customers and shareholders, in order to achieve the vision?*

Operational activities are critical to support customer satisfaction. This component and core competencies focus on a complete value chain of the integrative process rather than just measuring performance within departmental structures. Metrics in this quadrant frequently include: quality, planning, continuous improvement, productivity and efficiency.

The following are examples of key questions to ask when formulating objective for this quadrant. How efficient are we in the key business processes? How do we know? How quickly

and accurately are items processed? What types of communication strategies exist? Are they effective? Many of the key success factors for operations in this example are derived from the internal and external analysis. Table 6.4, below lists a selection of key success factors relevant to operational processes.

Table 6-4 Sample of Process Quadrant Objectives and Metrics

Objectives	Measures
Through-put	Tons/year, GWH/year
Material, labor, energy cost &, working cap.	$, $, $ /year, $
Continuous Improvement EVA	$/year
Overall Equipment Effectiveness	%
Environment, Health and Safety Compliance	Compliance %
Sustainability and Stakeholder Management Activities	Variation from plan %

6.5 Customer and stakeholder quadrant

How should the organization appear to its customers in order to achieve the vision?

Satisfied customers have few reasons to cancel orders given a good financial position and also create an additional marketing force through new referrals and business contacts. How an organization performs from its customer's perspective is clearly a top priority for operations. The key drivers in this quadrant will be critical success factors to the customers that sustain long-term relationships or that may develop new markets. Metrics in this quadrant frequently include: customer acquisition, retention, reacquisition, production price and quality.

Key questions to consider: How to your customers see us? How do we know? What are our customers expectations? Are we meeting those? Which way is the market going?

Table 6-5 Sample of Customer and Stakeholder Quadrant Objectives and Metrics

Objectives	Measures
Customer satisfaction and suggestions	Customer survey score %
Quality Assurance	Compliance %
New customer referrals from customers	#
Survey of Stakeholders	%
Sales & Customer Service Budget	$

6.6 Financial quadrant

To support the vision of how the organization should appear to its shareholders.

The financial objectives serves as the ultimate outcome from the other quadrants and strategy of the organization. Common financial measures found in this quadrant include; profitability, revenue growth, revenue mix, investment mix.

Key questions: are financial resources being used in a responsible way? How do we know? What role does finance play in setting standards? What opportunities exist to incorporate the financial perspective?

Table 6-6 Sample of Financial Quadrant Objectives and Metrics

Objectives	Measures
EVA, EVA %, & EVA growth	Value $, %, growth %
Budget activities aligned with objectives	Weighted performance index %
Cash Flow	$
Long term strategic investments	$ variance from plan %
Actual EVA return / Forecast EVA on from completed CAPEX projects	average ratio %

6.7 Integration and alignment

A key aspects of the balanced scorecard is its use as an integration and alignment tool. In fact, the balanced scorecard is premised on a series of cause and effect relationships that form a strategic map. This logic is based on the idea that these relationships flow from the vision, through the learning and innovation to the process, on to the customer who returns financial value to the shareholder. At a plant level, the balanced scorecard can be used as a communication tool for alignment and integration of the operational processes. As such, it can also be used to overcome four main barriers – vision, people, resource, and management barriers -- that prevent organizations from implementing their strategies.

The visibility of the balanced scorecard at the senior, intermediate, and lower levels of an organization adds clarity and consistency to day-to-day activities. Figure 6.1 shows a strategic map at the plant and departmental levels using the balanced scorecard framework. The figure maps the plant objectives to identify opportunities to improve present performance metrics. Feedback in almost any system is critically important to improve performance. Figure 6.1 shows two feedback loops: 1) the resource feedback loop that supports departments and comes from all

quadrants that feedsback resources; and 2) a strategic feedback loop travels through the plant and corporate headquarters to define the plant's vision and loops through the four quadrants.

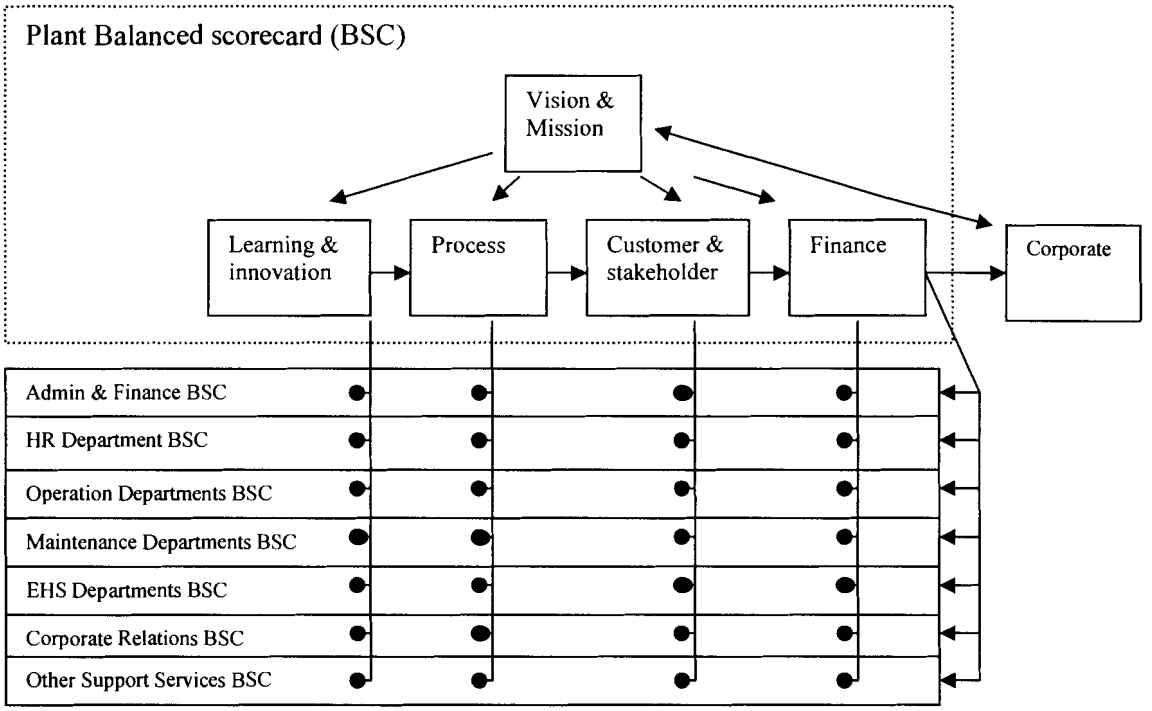

Figure 6-1 Linking Strategy to Plant Structure and Departmental Objectives Using the Balanced Scorecard Framework

6.8 Action through the Balanced Scorecard Strategic Framework

Before closing this section a number of comments will be made about how the balanced scorecard framework may function in an organization. The balanced scorecard framework depends on acquiring measurements and thus creates a measurement overhead. Some argue that this overhead cost can be efficiently managed using computerized IT and measurement systems. On the other hand, it could be argued to create and sustain such an information system is very costly given the information that such a system would supply. For large-scale industrial plants where large fixed assets are not subject to frequent or major modifications, a complex

information-technology-balance-scorecard-system may not be required. Ultimately, the balanced scorecard must show a positive economic return on investment. To quantitatively demonstrate positive benefits solely from implementing the scorecard is not a simple exercise because of the complex nature of cause and effect relationships referred to in the scorecard, long times to implement and observe material changes, inconsistency and difficulty in separating dependent variables or setting up measurement comparative controls. Figure 6.2 shows a sample balanced scorecard for the plant based on the discussion of this section. Part III explores the application of the balanced scorecard as a tool for implementing strategic opportunities for an aluminum producer.

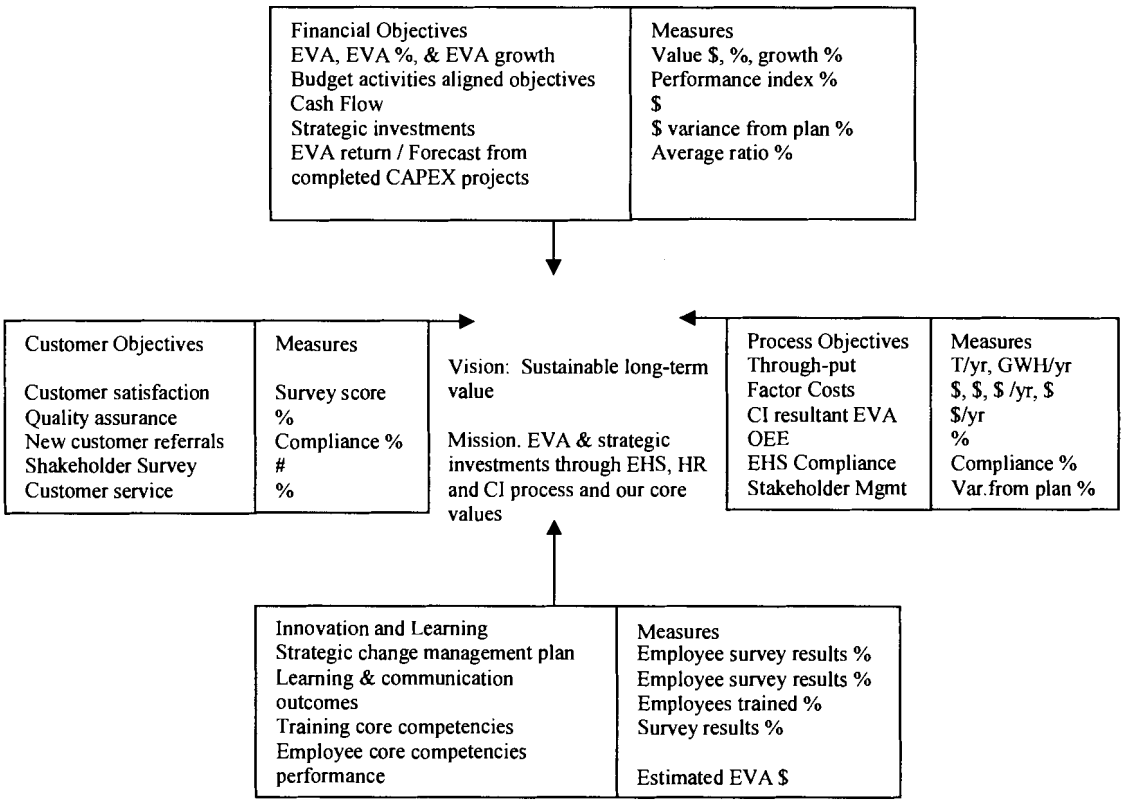

Figure 6-2 A Sample Balanced Scorecard for the Plant

PART – III APPLICATION OF BALANCED SCORECARD TO THE PLANT OBJECTIVES

7 PLANT OBJECTIVES

7.1 Introduction

This section looks at the plant and departmental objectives of an aluminum producer and attempts to map these objectives into a balanced scorecard framework. For confidentiality reasons details of measures, targets, and initiatives are not displayed. Recently, quarterly operational performance targets were published in the plant's risk management system making these targets more transparent. Table 7.1 shows a list of plant objectives at the present time. In this section the application of the balanced scorecard is used to identify opportunities for improving the present plant and departmental objectives. Other frameworks such as TQM, Best Practice, or Complexity Grid studies may also be used to generate similar opportunities for improvement. The balanced scorecard method was chosen because presently it is one of the most common strategic management and implementation tools. The departmental objectives are included in Appendix A and are also referred in the analysis.

Table 7-1The Structure of Plant Objectives*

Strategic Category	Strategic Objective	Operating Objective	Target		Results			
EHS Strategic Objectives					Q 1	Q 2	Q 3	Q 4
Human Resources	Improve communication to improve work climate	Communication Plan	X	Y/N				
		Supervisor EHS Training	X	%				
		Labor Training	X	%				
Health	Employee health	Sampling plan	X	%				
		Hearing Protection compliance	X	%				
		Health Promotion	X	%				
Safety	Reduce Lost Time	Lost Time Injuries	X	#				
		Pedestrian Interact	X	#				
		Recordable injury	X	#				
		Improve Standards	X	Y/N				
	Leadership	Daily Tours	X	days				
		Safety Requests	X	#				
	General	ISO Compliance	X	Y/N				
Environment	Air	Emission	X	g/kg				
	Water	Emission	X	g/kg				
	Waste	Rate	X	g/kg				
	Energy	Consumption	X	J/kg				
	General	Pollution Prevention	X	%				
		ISO Compliance	X	Y/N				
Maximizing Value EVA								
Production	Production A X T Production B X T	Total	X	T				
		Hot Production	X	T				
		Current	X	KA				
		Efficiency	X	%				
		Yield	X	%				
		Purchased	X	T				
Energy	Total Generation	Total Generation	X	MW				
		Availability	X	%				
Calcined Coke	Production	*Plant A*	X	T				
		Plant B	X	T				
Managing Costs								
Hold Budget	Labor	OverTime	X	%				
		Absenteeism	X	%				
	Reduce Inventory	Product A & B	X	T				
	Maintenance	Reduce by	X	$				
	CAPEX	Approvals	X	%				
	General	Reduce Procurement costs	X	$				
		Internal Audits	X	Y/N				
Customer	*Product Quality*	Complaints	X	#				
		Concerns	X	#				
	Service Quality	On time Delviery	X	%				
		Coke	X	Lc				
	General	ISO 9001	X	Y/N				

Table 7.1 The Structure of Plant Objectives Continued								
Continuous Improvement	Deployment	Project selection	X	%				
		Training	X	%				
		Projects complete	X	#				

*various objectives are modified for confidentiality reasons

Table 7 .1 consists of the following categories: human resources, EH&S, maximizing value, managing costs, customer, and continuous improvement. Smelter operations works extensively with various stakeholders groups, although these objectives to manage these groups are not mentioned in the plant objectives. The information in Table 7.1 implies a plant vision, mission and shows objectives that are aligned with the corporate objectives of EH&S, Value Maximization, and Continuous Improvement. Plant objectives for managing costs and customers are also listed in the table. In addition, to the balanced scorecard perspective, the internal and external analysis in Part I suggests that the following objectives can be added to the plant objectives: stating a long-term vision and mission for the plant, leveraging assets especially land, managing stakeholders and external risk management.

Presently the implied operating vision and mission of the plant appears to focus on operations performance and maintenance costs. As suggested in Part I, this type of a strategy carries long-term risk because it appears insufficient to provide the innovation needed to support long-term viability. Global industry rivalry is pushing to increase efficiencies combined with economies of scale in a competitive environment. These industry forces have put a steady downward pressure on aluminum prices, which suggests that operations needs to look beyond internal cost reduction and continuous improvement of production processes to maintain long term viability.

Table 7-2 Mapped Vision and Mission Statements

1. Vision: The Balanced Scorecard Perspective and plant objectives imply the following vision: to maximize EVA, maintain EHS compliance, managing costs and lead with Continuous Improvement.

2. Mission. Similarly, the implied mission suggests that operations should focus on EVA maximization, EH&S initiatives, human resource planning, production and maintenance indicators, managing costs, customer indicators, and continuous improvement.

The list of objectives Table 7 .3 is an attempt to map the plant objective categories into the innovation and learning quadrant using balanced scorecard selection criteria. The following question was used as a selection criterion to determine what plant objectives would fit into the quadrant " *To support the vision how should an organization support the ability to change and improve?* ". Using this method, three plant objectives were selected from the plant objectives as depicted in Table 7 .3.

Table 7-3 Mapped Innovation and Learning Objectives and Metrics*

Objectives	Measures
Leadership	Tours %
Continuous Improvement	Employees trained %
Improve communication to improve work climate	Employees trained %

* heuristic selection criteria = responses (objectives) that could strongly agree with the question: *To support the vision how should an organization support the ability to change and improve?*

Table 7.3 shows a number of objectives to highlight important aspects of learning and innovation. These deal with the leadership, continuous improvement, and training of employees, which offers opportunities for feedback communication and improvements. The measurement of objectives -- continuous improvement and improvement in communication -- appear sufficient conditions for learning and innovation, but perhaps may be improved by measuring how well projects are meeting goals thus ensuring learning or innovation success. In monitoring the success of continuous improvement by measuring the number of projects or the number of people trained it is difficult to measure whether there is success, learning, innovation or value generated from these projects.

Table 7 .4 attempts to map the plant objectives into the process quadrant. The selection criteria used to map the objectives likely to fit into this quadrant: *What must the organization excel at to satisfy customers and shareholders, in order to achieve the vision?* Table 7 .4 shows a number of objectives EH&S initiatives, Human Resource Planning, Production, Maintenance Indicators, Cost Management, and Continuous Improvement. These objectives appear largely aligned with the main functional priorities of the plant and with the corporate objectives. Perhaps, as previously discussed in the industry analysis, listing additional long-term strategic objectives and measures in this quadrant can also add some value. Measures should clearly support the objective and vision. For example, the measure *"sampling in compliance"* appears as an good choice since it offers both lead and lag information, and gives feedback on the success of EH&S objectives. Conversely, using a *"communication plan"* objective with a *"Yes* or *No"* measure makes it difficult to validate success because it remains unclear how the measure can define success. From a balanced scorecard perspective this measure can be improved by stating a critical success measure from the HR communication plan, such as a *"percentage of employees aware"* of the communication plan's central message. This measure can be validated by surveys

and can provide feedback indicating whether the communication plan is understood. Another example of a success measure for human resources may be *percentage of personnel with critical competencies*. This measure is not only relevant to human resources activities but also gives senior management a leading indication on how well personnel can support key activities that are aligned with the vision of the plant.

Production and maintenance objectives are at the heart of the process. Measures such as overall production throughput, inventories, and overall equipment effectiveness can be considered. From the balanced scorecard perspective it is recommended to have scorecards with a few measures for each objective to avoid too many details on the plant scorecard. Detailed objectives for production and maintenance processes can be listed at the departmental level thus avoiding cluttering the plant balanced scorecard.

Another objective assigned to this quadrant is "*Managing cost*". Managing costs is a critical determinant for long-term viability. Much of the value in the production of aluminum is created through low costs of production. This is suggested by the industry analysis, as stated in Section 4, and the hundred-year negative price trend. An equally important determinant of viability lies with the question: *What is the effective way to manage cost and what is the measure of success through cost cutting?* Cost control is a necessary measure yet it is insufficient to support the vision of long term viability. The reason is that cost reduction needs to support long-term value creation. If this is not done then cost reduction leads inevitably to long-term value destruction. The risk is that reducing costs in the short-term to temporarily to increase short-term value creation is at the expense of long-term value creation and operations viability. One way to cut cost while increasing value is to improve the process through increasing efficiencies thus reducing costs through process improvement initiatives. In this way, the process drives the magnitude of cost reduction and value creation.

Table 7.4 lists "*variation from plan*" as a measure for continuous improvement. Although this measure can validate the Continuous Improvement Plan, it offers little information on how successful the plan is in delivering value to the organization. The balanced scorecard perspective implies that "*variation from plan*" measure can be improved by using measures such as "*increases in EVA*", "*increases in throughput*" or "*decreases in waste*" to improve value creation, enabling feedback on how well continuous improvement programs are performing and supporting the plant vision.

In conclusion, for the process quadrant, the plant objectives appear to sufficiently target key process activities to maintain plant operations. Success for some of the objectives may be improved by considering the critical success measures that support relationships between the measures, objectives, and plant strategy.

Table 7-4 Mapped Process Quadrant Objectives and Metrics*

Objectives	Measures
EH&S initiatives	Sampling and Compliance
Human resource planning	Communication Plan Y/N
Production and maintenance indicators	Output and efficiency metrics
Managing costs	$
Continuous improvement indicators	Variation from plan %

* heuristic selection criteria = responses (objectives) that could strongly agree with the question: *What must the organization excel at to satisfy customers and shareholders, in order to achieve the vision?*

Table 7.5 maps the plant objectives into the customer and stakeholder quadrant. The selection criteria used to map from the plant objectives into this quadrant: *How should the organization appear to its customers in order to achieve the vision?* Table 7.5 indicates two

objectives that satisfy this criterion, namely, customer satisfaction and quality assurance. These objectives appear customer focused and identify items that both the plant and customer believe are important.

Table 7-5 Mapped of Customer and Stakeholder Quadrant Objectives and Metrics*

Objectives	Measures
Customer satisfaction and suggestions	Customer survey score %
Quality Assurance	Compliance %

heuristic selection criteria = responses (objectives) that could strongly agree with the question: *How should the organization appear to its customers in order to achieve the vision?*

The "*customer satisfaction and suggestions*" objective serves as a leading indicator of how well the product is serving the customer's needs and also can give indications whether customer's perceptions or the market demand for the product is changing. This information can be used to anticipate these external changes and can create opportunities for necessary improvements or revisions to products. Measuring customer satisfaction using a survey is a practical way to gather qualitative information from customers and can assign a quantitative number to this subjective measure. Similarly, "*quality assurance*" objective is also important both from the customer and process perspectives. This objective reflects that quality standards are being met giving both customers and plant personnel the confidence that the process is delivering the desired product quality. The information from Table 7.5 suggests that the plant is measuring information that validates strategic customer objectives.

Table 7.6 maps the plant objectives into the financial quadrant. The selection criteria question used to map from the plant objectives into this quadrant as follows: *To support the vision of how should the organization appear to its shareholders?* Economic value added (EVA) and environment health and safety (EHS) objectives were selected to map into this quadrant. It

can be argued that from a strict shareholder perspective the EHS objective is not a critical concern because it does not directly increase shareholder value. EHS objectives are included since increasingly these objectives minimize risk of negative consequences to plant operations from stakeholders. The measures for these objectives are $ for EVA and % compliance for EHS. All of these measures are usually lagging. Leading measures such as *change in throughput*, or *new orders* could also be placed into this quadrant to avoid using solely financial lagging measures.

Table 7-6 Mapped Financial Quadrant Objectives and Metrics*

Objectives	Measures
EVA	Value $
EHS	Compliances

*heuristic selection criteria = responses (objectives) that could strongly agree with the question: *To support the vision of how should the organization appear to its shareholders?*

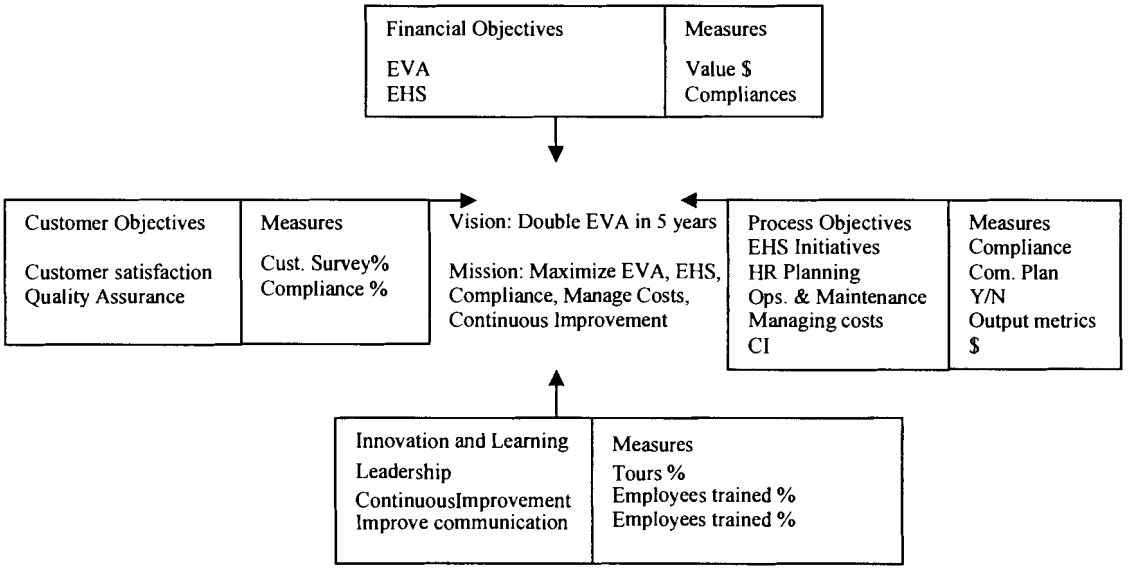

Figure 7-1 Plant Objectives Mapped into Balanced Scorecard Model.

It is interesting to note the differences between the mapped plant balanced scorecard in Figures 7 .1 and the sample balanced scorecard for the plant as shown in Figure 6.2. Figure 7.1

highlights that the plant presently has a number of strategic objectives and measures to support an implied mission and vision. On the other hand, the sample plant balanced scorecard as depicted in Figure 6 .2 implies that additional objectives and measures can be put in place to further elucidate how strategy can be enhanced and implemented through the use of a balanced scorecard. Also it can be noted that if the management at the plant level does not wish to implement a balanced scorecard system, the learnings from this report can be mapped into the format of the current performance measurement system as depicted in Table 7.7.

Table 7-7 Suggested Plant Objectives based on a Balanced Scorecard Approach

Vision: Double EVA in 5 years								
Mission: Maximize EVA while complying with EHS Compliance, Managing Costs, and Continuous Improvement Initiatives through Team Work, Trust, Transparency, Integrity, and Accountability								
Strategic Category	**Operating Objective**	**Measure**	**Target**	**Past Results**				**Responsible**
				Q1	**Q2**	**Q3**	**Q4**	
Finanical	EVA, EVA %, & EVA growth	Value $, %, growth %	X,X, X,X					Financial Department
	Budget activities aligned s	Index	X					Financial Department
	Cash Flow		$X					Financial Department
	EVA return / Forecast		%					Financial Department
Customer	Customer satisfaction	Survey score	X%					Marketing
	Quality assurance	Compliance	X%					Casting
	New customer referrals	#	X					Marketing
	Stakeholder survey	X%	X%					Senior Mgt.
	Customer service budget	$	X					Financial Department
	Customer satisfaction	Survey %	100%					Marketing
	Quality Assurance	X	100%					Casting Department
Process	Through-put	T/yr,GWH/yr	X					Operations
	Factor Costs	$, $, $ /yr, $	X,X,X, X					Purchasing
	CI resultant EVA	$/yr	X					CI Depart.
	OEE	%	X					Operations
	EHS Compliance	Compliance	X%					EHS Dept.
	Stakeholder Mgmt	Variation from plan	X%					Community Relations
Learning & Innovation	Change Management	Survey	X%					HR
	Communication Plan	Survey	X%					HR
	Training employee core competencies	% Complete	X%					HR
	Employee Competencies	Survey results	X5					HR
	New Markets	Estimated EVA	X					Marketing

When comparing Table 7.7 with the plant objectives shown in Table 7.1 a number of items stand out. Objectives in Table 7.7 appear to cover a broader perspective and are not as much process and short term driven as the current plant objectives listed in Table 7.1. This is

highlighted in investments in development of core competencies, new markets, or greater emphasis on the customers and stakeholders, which not do appear in Table 7.1. This does not mean that at present the plant does not manage these important factors, however, the balanced scorecard approach makes success factors visible and attempts to measure performance for these factors and gives performance feedback to management. In addition, the plant objectives in Table 7.1 focus on many detailed operation measures whereas the objectives in Table 7.7 take a much broader perspective addressing customer, stakeholder, and a greater variety of financial measures. Table 7.7 can serve as a sample of what the balanced scorecard approach can produce and offers a starting point for further review of the plant objectives. Ideally management can choose to revise the plant and departmental objectives using a balanced scorecard if desired. Alternatively the balanced scorecard approach can be used to highlight opportunities for improvement using a mapping process as was done in this report.

7.2 Integration and Alignment of Departmental Objectives

A key aspect of the balanced scorecard is its use as an integration and alignment tool. In fact, the scorecard framework is premised on a series of cause and effect relationships that form a strategic map. These relationships flow from the vision, through the learning and innovation to the process, on to the customer who returns financial value to the shareholder. At a plant level, the balanced scorecard can be used as a communication tool for alignment and integration of the operational processes to overcome the four main barriers -- vision, people, resource, and management barriers -- that limit organizations from to implementing strategies. At the departmental level, a departmental balanced scorecard can be structured to input into the plant balanced scorecard. The structure of how the plant scorecard is aligned to departmental scorecards is depicted in Figure 6.1. For comparison purposes, each departmental objective is

mapped into a departmental balanced scorecard to show the vision, mission and critical success factors from innovation and learning, process, customer, and financial quadrants.

The balanced scorecard perspective suggests that objectives should form a strategic map to support the vision, which implies that at least a few objectives should appear in every quadrant of the balanced scorecard. It can be argued that objectives may populate only certain quadrants since the framework that defined the plant and departmental objectives was not the balanced scorecard. This argument appears reasonable because departments by definition focus on specific activities because of economies of scope. However, the linkages between the vision, mission, and quadrants, objective and measures should form a strategic map, by definition. Frameworks that have objectives that do not support strategy by definition cannot form a strategic map. For the purpose of analysis, the plant and departmental objectives are looked at through a strategic map, the balanced scorecard, to assess if present plant objectives appear to support strategy. This implies that it is reasonable that each quadrant should contain a number of objectives. For example, the financial department may have a greater number of financial objectives in the financial quadrant as compared to the production department where production objectives may dominate the process quadrant.

The balanced scorecard framework can be applied, for example, to objectives of the Health Department and the Coke Cal Department, as shown in Figures 7.1 and 7.2. To keep the example simple, only two departments are analyzed, although the same approach can be used for all the departments listed in Appendix A.

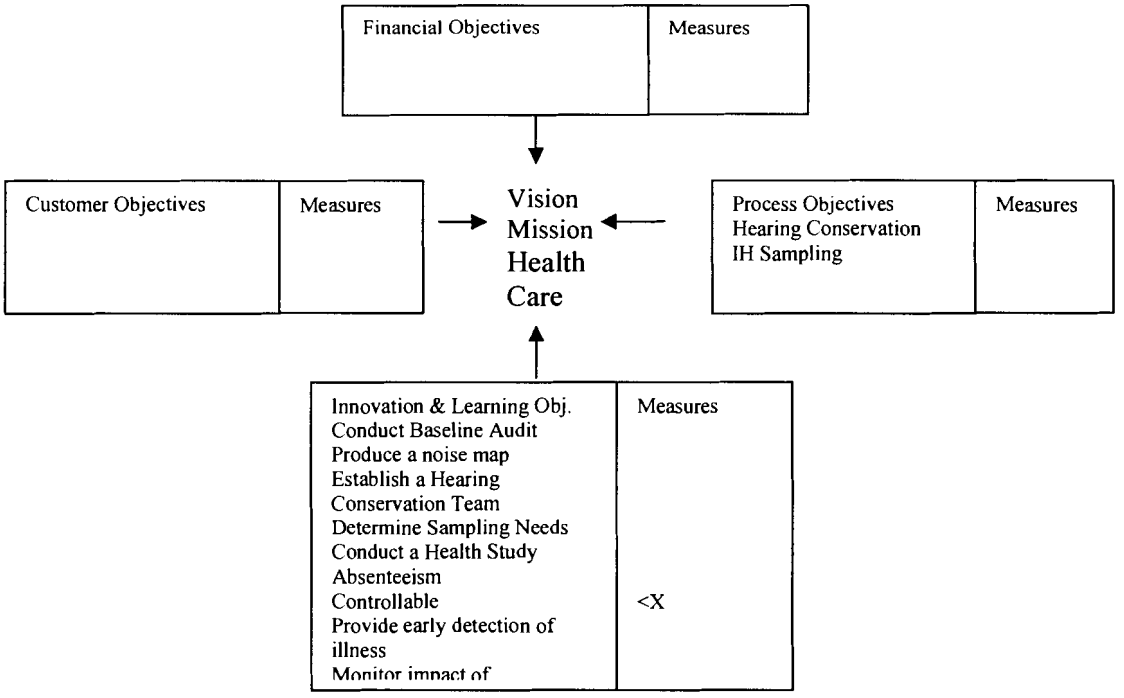

Figure 7-2 Health Departmental Objectives mapped into a Balanced Scorecard Framework

Figure 7 .2 shows a number of mapped Health Department Balanced Scorecard. The title of the department implies the vision: *A Department that provides Health Care for Plant Personnel.* The mapped scorecard shows a large number of objectives studies and audits to support organizational learning. However, only one measure of success is given. In the process quadrant, there are relatively a small number of objectives as compared to the learning quadrant. From the balanced scorecard perspective, this further highlights an imbalance between what the strategy is and how it should be implemented in the department. When mapped into a balanced scorecard framework, few departmental objectives were found that could be assigned into the customer and the financial quadrants. Without financial information such as budgets and success factors related to funding of the health department, it is difficult to measure the financial status or performance of the Health Department. The structure in Figure 7.2 implies that an increase in clarity of vision, mission, and key success objectives to balance out the quadrants may improve accountability and alignment of the overall departmental strategy.

Figure 7.3 illustrates objectives of the second department, the Paste Plant and Coke Cal operation mapped into a balanced scorecard framework. The result is similar to that of the Health Department as illustrated in Figure 7.2. In this case the departmental is focused is on process instead of learning. This should not come is a great surprise since this department is highly production driven. The balanced scorecard suggests opportunities for innovation and learning, customer service, financial performance, and clarity through definition of vision and mission.

Does this mean that the departmental objectives are somehow incorrectly structured after all the objectives were not structured using the balanced scorecard? It can be argued on one hand that the present departmental objectives and performance measures show how well the plant is performing, and are sufficient for this purpose. On the other hand, it can also be suggested that the balanced scorecard approach yields a method to organize objectives and measures into a strategic process map. This results in a structure that can suggest how well objectives and measures are aligned and can support strategy. This framework also provides a means to align a vast array of activities to a common mission and vision. The two illustrative examples of "mapping" the objectives from the Health Department and Coke Cal Departments into balanced scorecard framework show that the additional objectives can be introduced increase the clarity and support of customer and financial objectives, and ultimately plant vision.

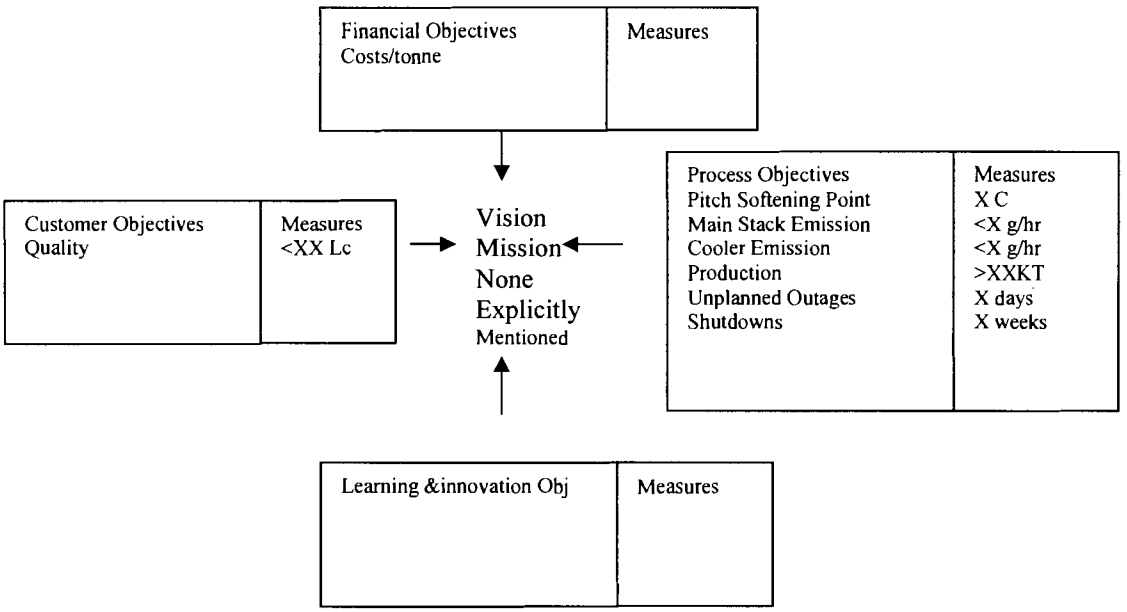

Figure 7-3 Paste Plant and Coke-Cal Department Objectives mapped into a Balanced Scorecard Framework

The application of the balanced scorecard framework to the plant and departmental objectives suggests that the present alignment of objectives can be further improved by using a strategic mapping process such as the balanced scorecard to assign objectives to quadrants. Presently the objectives appear to be assigned by departmental function or the physical layout of the plant. The alignment may be based on the hierarchical reporting structure from which subordinates report to their superiors, that report to superintendents reporting to the plant manager. This type of hierarchical structure can create conflicts if departmental objectives are supported by incentives that are not common across departments.

Three examples of inter-department conflicts are given that demonstrate the result of diversely aligned incentives. Tools such as the balanced scorecard can show high level objectives and as such can assist in resolving conflicting priorities or at least assist in trading off opposing views. In the first example the Stores Department has a mandate to reduce cost and spare parts

inventory. In contrast the Maintenance Department's mandate is to make equipment available to operations. One solution lessen the chance of conflict is to define and apply a higher-level objective that aligns objectives of both departments thus enabling trade-offs of these potentially conflicting objectives. Such an objective, for example, can be that Maintenance and Stores agree on stock minimum spare part levels strategy based on a cost, benefit, and risk analysis. In this way both departmental objectives can be better aligned. Another benefit of such a strategy is that both departments need to become aware of each other's priorities.

The second example describes a conflict among the Environmental, Health, Operations, and Projects Departments. The Environment Department does not wish to introduce any nuisance dust in the outside environment, the Health Department does not want the nuisance dust contained indoors, the Operations group wants the dust problem to be resolved quickly, and Project groups has a limited budget to address the nuisance dust problem. The important point is the various departments may not come up with a cost-effective solution unless the problem is looked at from beyond any particular department level. This suggests that a systems approach that aligns department objectives can create opportunities for priority setting of interdepartmental coordination and clarity – the balanced scorecard framework can assist in establishing clarity and purpose beyond departmental objectives.

The last example deals with the wasting of plant air, which is a cost to the plant. An Operations Department has some faulty equipment in which air is being wasted but does not create any concerns because the equipment still functions normally because the department does not pay for use of the air. The Utilities Department manages the air resource but is not aware that air wastage because it has not received any feedback from Operations about this wastage. For the user of the equipment, the air wastage is not perceived as important, even though it is a cost to the organization. Presently, formal departmental objectives and incentives appear to not be in place for any department to attempt to initiate and resolve such an issue. Visibility, clarity, and

structure of a framework such as the balanced scorecard can counteract the tendency of silo thinking and increase accountability beyond departments. The alignment characteristic feature of the balanced scorecard framework can play a role in overcoming misalignment barriers and get past departmental priority issues. This theme is echoed by the passage in Table 7.8.

Table 7-8 Balanced Scorecard Collaborative[16]

1. Only 5% of the workforce understands the company strategy
2. Only 25% of the managers have incentives linked to the strategy
3. 60% of organizations do not link budgets to strategy
4. 85% of executive teams spend less than one hour per month discussing strategy

http://www.exinfm.com/training/pdfiles/course11r.pdf,

8 OPPORTUNITES FROM THE BALANCED SCORECARD

8.1 Introduction

As indicated in Section 2, the focus of this study is to gauge of whether the Balanced Scorecard perspective highlights opportunities to implement strategy and to potentially create value when applied to a list of stated departmental or plant objectives of a large industrial producer. This section consolidates the main findings of this study and states where the balanced scorecard concepts may be leveraged and where the balanced scorecard framework has limitations. This section highlights opportunities for application of this model to plant and departmental objectives.

8.2 The Opportunity

The net result of misaligned activities in the plant can result in a large lost opportunity and creates wasteful activities and processes. The balanced scorecard can enable alignment of plant processes and activities. From looking at the alignment of the plant and departmental objectives, the balanced scorecard suggests a number of opportunities for greater alignment of objectives to a central plant vision and mission. To improve the present situation, the following is suggested: clarify strategy within the context of the critical success factors for the plant; define vision and mission for both plant and departments; align objectives between departments; "balance" objectives between quadrants; and refine measures and targets to ensure success.

8.3 Benefits using the Balanced Scorecard Framework

Table 5 .4 listed a number of key success factors for the plant beginning with leadership, strategic and change management, sustainable value maximization, human resource management, sustainability and stakeholder management, environment health and safety, compliance, continuous improvement, leveraging learning and risk management. So natural question to ask is, *"What is the relevance of the balanced scorecard framework to support these key success factors?"* The balanced scorecard framework can help answer this question through its structure and relationships between its components and through its use of performance indicators. The above factors, from leadership vision to risk management, can be amalgamated to reside within the balanced scorecard framework. The benefits of such an exercise include the following.

The balanced scorecard can create value by translating strategy into operational tasks and activities. In essence it provides a strategic map for clarifying and implementing vision and mission into a set of critical success factors or objectives along with associated measures, and targets and initiatives. An increase in economic value added would be not unrealistic with an implementation of a balanced scorecard, although there is a debate whether using the balanced scorecard framework can create value [27]. A number of organizations have reported value creation from the use of the Balanced Scorecard framework. These include Mobil Oil, CIGNA, AT & T Canada, Hilton Hotels, Wells Fargo Bank and UPS. From this group of companies, perhaps the most successful implementation was at Mobil's US Marketing and Refining Division. Before application of the scorecard, these divisions had the lowest profitability in their industry group in 1993. As a result of reorganization and application of the balanced scorecard, Mobil moved from last to first in their industry. They retained this position for five consecutive years [28]. Discussions with senior management at a pulp mill near the smelter stated that the balanced scorecard has been useful to support alignment of objectives, to monitor processes within mill and to drive change management. It was also mentioned that the balanced scorecard

framework is not a silver bullet and should not be painted as such. In fact, the majority of praise regarding the balanced scorecard framework is given by consultants. Ironically, little information exists describing actual business cases showing how well the balanced scorecard actually delivers value – despite its present popularity among Fortune 500 companies and management consultants. The balanced scorecard framework can give the aluminium plant opportunities for value creation through new product creation and sales, increases in throughput, cost reduction, waste and improvements in customer and stakeholder relations. At this time it is unreasonable to state that applying the balanced scorecard framework shall necessarily create value. Balanced scorecard initiatives can fail, but often for reasons beyond the balanced scorecard and more likely because of poor management practices. On the other hand, a comparative analysis using the balanced scorecard framework can identify strategic implementation opportunities. Perhaps the largest opportunity to create value is in improving the vision, and strategic linkages to day-to-day operations in the plant by using performance measurement models such as the balanced scorecard. Information from scorecard analysis can also be input into the current (non-balanced scorecard) performance measurement system used in the plant. Visibility and measurement of strategic success factors of internal operations can assist both plant and corporate management in important decision-making.

Value can also be created implementation of best practices and initiatives that support key success factors. Presently plant and corporate initiatives such as continuous improvement activities support benchmarking and best in class processes. From this standpoint, the plant is well positioned to further leverage benchmarking practices using the present performance framework or by adopting a balanced scorecard system. The balanced scorecard offers a systematic approach to support strategic benchmarking activities.

Another way the balanced scorecard provides value is through the reduction of waste and redundant activities through increased clarity, consistency, simplicity and alignment of objectives

and processes. Value can be created through the clarity and structure of the scorecard to communicate the vision and mission statement and offer a focal point for what the plant values, its objectives, measures, targets, and initiatives and how various departments should interact with each other. This leads to better coordination of activities and decreases the risk of waste through redundant or ineffective activities. Presently the balanced scorecard suggests the following improvement opportunities: clarify departmental mission or vision, improve measures of departmental objectives, decrease barriers of communication between departments through alignment, create incentives to align departmental objectives with plant objectives, and survey results that measure the success of the objectives. Section 7 highlighted that many plant and departmental objectives do not have qualitative or quantitative measures. Consequently the tracking of performance success is not readily apparent or manageable.

The balanced scorecard can enhance value through learning, innovation, and continuous improvement that facilitates decision-making to support key strategic processes. This suggests that plant performance indicators should include lead, lag, and feedback indicators, rather than a list of targets or performance outcomes since these are generally lagging indicators. The balanced scorecard enables plant management and personnel to understand how innovation, operations, customers, and financial processes add value as compared to reporting financial information. This can assist management in focusing on priorities that support funding and budgeting for strategic activities.

Value may be increased using the balanced scorecard by supporting intangible assets such as knowledge, skills, and brand. This is especially important when allocating resources, and facilitating strategic thinking at higher levels of the organization. Presently much of the allocation of resources goes towards sustaining assets and maintaining the present operations at a reduced cost. Value is produced through the scorecard by looking past current operational processes toward supporting intangible assets such as knowledge and brand to ensure long-term

sustainability well past the time when the current technology will no longer be viable, in spite of continuous improvement and cost reduction efforts.

Management, using the balanced scorecard, can increase value using a systems approach along with recognizing cause and effect relationships. This implies that funding allocated for discrete projects may not be justified by applying critical success factors to those projects alone. Instead, what is critical is to acknowledge cause and effect relationships along the value chain and to recognize that the solution to problems may not be in the place where problems appear. This fact is readily demonstrated in root tree analysis: -- that treating problem symptoms usually results in value destruction. Because of the necessity to understand how system components interact with each other, the balanced scorecard offers a perspective to better understand key relationships between system components. This can result in opportunities to apply and leverage resources more effectively and to solve root causes instead of disregarding the interaction between system components and allocating resources to resolve unwanted symptoms.

The balanced scorecard can enhance value by driving change management and accountability, thus can be used to change or drive organizational culture. In communicating a vision and mission, objectives, measures, targets, initiatives, and allocation of resources, the balanced scorecard can be used as a change driver. In doing so management can redefine what performance and organizational success should look like. Because the balanced scorecard has measurable targets, accountability and transparency are readily apparent which enables the balanced scorecard to be used as a change tool. Additional comments regarding the implementation of the balanced scorecard are discussed in section 8.3.

The balanced scorecard can produce value by showing transparency to internal and external stakeholders. For this reason, companies and governmental agencies are publishing the balanced scorecard in their annual reports. These enterprises are doing this to gain credibility

with their stakeholders and shareholders. In return the shareholders or stakeholders may be more attracted to these types of enterprises.

Value may be improved by balancing conflicting priorities – for example, between environmental issues and economic value creation. Although one of the main strengths of balanced scorecard is its ability to align various activities, it may still be impossible to eliminate conflicts between objectives to support the strategy and vision. The balanced scorecard framework offers clarity on where to strike the balance between potentially conflicting goals. The main driver is the strategic vision and mission, consequently the scorecard offers a model for compromise between competing objectives so that in the strategic intent can still be fulfilled. In the case of the plant, there can be conflicts between inventory control, maintenance, production, and environmental departments. The balanced scorecard can offer a framework to pass up departmental "silo" thinking by focusing on the larger strategic mission and vision. Does this mean that conflict will significantly be reduced? The answer to this question may depend on the context of the situation. As a minimum the balanced scorecard defines a framework to trade off conflicting priorities.

The potential benefits produced by the implementation and application of the balanced scorecard must be counterbalanced by its costs. The costs of implementation and maintenance of the balanced scorecard can be large enough that value may be destroyed instead of created. Of importance is to leverage the key benefits of the balanced scorecard while keeping the model simple and easy to support and maintain - especially for small organizations or departments. In this way modifying and revising the framework can be inexpensively done. Looking at the outcomes from companies that have applied this tool, results have been mixed, primarily because the tool is misapplied, not supported, and not understood. In summary, it is difficult to place an accurate range of value creation for the plant using this tool. However, from the above

discussion, it should be apparent that the balanced scorecard can provide value if applied judiciously.

8.4 Implementation of the Balanced Scorecard

To overcome misalignment of objectives, and other barriers to implementation of strategic initiatives, the balanced scorecard can enable the following benefits: to clarify the organizational understanding of the vision; to link personnel objectives to the strategy of the organization; to allocate time, effort, and funding toward critical-strategic success factors; and to ensure that management spends time on strategy and long-term decision-making.

To implement the balanced scorecard requires time from senior management, leadership and expert facilitation. The key success factors listed in this report may not necessarily be correct or palatable with senior management at the plant or corporate level. It is suggested therefore that a balanced scorecard can be built in a team setting with management. In building a balanced scorecard, it is not recommended that someone external to senior management builds the scorecard. Involvement of the management team is important to ensure ownership, accountability and sponsorship for the balanced scorecard. The method of constructing the scorecard is fairly straightforward, and since the balanced scorecard presented in this report is not constructed with the full participation of senior management, it should be viewed for reference purposes only and can be revised by the senior management team as required. Many examples are given in literature of how to construct a balanced scorecard [16][18][19][20][21]. A brief description of an implementation program of the balanced scorecard is given below.

First, assign a champion to facilitate the process and establish a senior management team to look at the present corporate and industry position, its strengths, weakness, threats, and opportunities. Next, review opportunities by using the balanced scorecard framework to

validated or revise the present strategic goals, mission and vision. Where major gaps occur, a Pareto chart and Fish Bone analysis can be performed to prioritize and identify causal factors. In this way, organizational resources can be leveraged to improve the most important processes. In fact the structure of the balanced scorecard suggests many opportunities will be found in the learning and innovation areas of the organization, since this area is the foundation and the source of improvement for the organization's systems and processes. Learning and innovation can often be overlooked in mature industrial plants and hence can offer high potential for value creation. The challenges to implement opportunities include: the task to build a useful balanced scorecard and the challenge to implement the scorecard to improve organizational performance. Key inputs to facilitate overcoming these challenges are human knowledge, motivation, leadership, and interaction. Because there are many barriers to attain the vision, perhaps the largest gains come from a change management process supported by strong leadership, management commitment, and communication, that mobilizes workers to change, trust, and work toward a common vision.

The strategic goals, vision and mission may be further divided into objectives, associated measures, and targets. Targets can be benchmarked against best practices to implement improvement, alignment of operational processes, and to drive change management. The net result is a strategic map and framework for the organization. Periodically, objectives of the organization are visited and revised to reflect a balanced and aligned approach as implied by the balanced scorecard framework. The process should be transparent to ensure the members of the organization see the ultimate goals, measures, and targets.

The success of rolling out the scorecard will depend largely on how much direct control and sponsorship management has on the process and the amount of support across the organzation. For example, in a union environment, changes to processes, procedures, and work practices are very difficult because of collective bargaining constraints on the operational system. In addition, the effects on other influential stakeholders can also create a considerable barrier to

change. Presently for the smelter, it is difficult to quantify the measures and targets, or specify best practices because a balanced scorecard requires management's confirmation, which is outside the scope of this project.

8.5 Risks and Limitations of the Balanced Scorecard Framework

8.5.1 Reality Check on the Balanced Scorecard

The balanced scorecard is the useful strategic method of aligning and balancing core processes, which are intended to achieve good financial performance. The model uses measures to assist management to align organizational learning, internal process, customers, and finances with a desirable strategy. The model's ability to be used as a simple metric and to align core processes to achieve performance is its great strength. However, the model has some drawbacks that should be considered.

8.5.2 Risk Management and Constraints.

The balanced scorecard framework tends to focus on the most important factors supporting a strategic map. Such a diagram can miss other important factors that lie outside of the scope of learning, internal process, customers and that can have major impacts on the operation and its financial viability. These factors include the status of the labor market, the power of suppliers, community relations, first nations relations, and government policy, where the focus is on various external risk factors.

For example, can the scorecard measure whether a competitor is creating a risk of shutting down the operation, or of a change in corporate or environmental policy that may shut down production? This is probably fairly difficult because the risk of an unwelcome outcomes is

often not readily measurable or apparent until the event happens. It can be argued that the model does not place priority of these types of outcomes. One way to mitigate these potential negative impacts from unexpected events is to augment the balanced scorecard with a complementary risk analysis and develop a plan to manage the risk as one objective of the scorecard.

The balanced scorecard shows a highly idealized causal flow from learning and innovation to internal processes to customer to financial performance. The actual operational processes in many ways do not resemble this, which can present limitations to the relevance of the balanced scorecard. The application of the balanced scorecard also needs consideration of its limitations. The balanced scorecard is only a tool and as such does not provide direct value and is in fact largely an overhead. To leverage the maximum amount of learning and feedback from the balanced scorecard and to minimize overhead costs in its implementation, a simple direct approach focusing on the critical indicators, while minimizing cost of creating a scorecard or its sustaining costs. This method should provide the maximum benefit to effort. A computerized scorecard can be linked to data acquisition systems and many measures can be indicated in real-time with limited human induced biases.

Empirical studies to attempt to validate some of the above issues have painted a mixed picture regarding value generation from the balanced scorecard. Survey results from an Information Technology study surveying organizations, ranging in size from 22 to 45000 employees, including high tech, engineering, research, IT consulting, and utilities firms found that the majority of respondents thought that a measurement system similar to the balanced scorecard would be beneficial to their departments. The biggest benefits are the heightened focus of key business initiatives and drivers, structure and consistency, clarity of expectations, and the understanding of trade-offs between goals and focus on high level items [23]. Another study [24] surveying over 45 firm across various industries suggested the following key benefits: reduction of redundancies, acceleration of processes, increased process transparency, increased motivation,

enhanced personal knowledge, and increased quality of products and services. However, most respondents did not indicate whether transaction costs or productivity were improved significantly.

Another challenge in implementation is that the organizational structure itself can act as a large barrier to change. The plant has a bureaucratic structure that lends itself to be rigid and resistance to change. Long held or apparently very secure positions disparage motivation or impetus for change. The long history of the smelter, the set ways of internal activities and the union environment inhibit the ability to change. Initially the transition during the change process creates uncertainly and generally creates an impression that no gains are being made, while operational cost increases during implementation. All of these factors can acts as barriers to implementation of change. The results of another study[22] is depicted in Table 8.1. Results show success on various dimensions using performance management systems such as the balanced scorecard.

Table 8-1 Comparison of Success Between Performance Based Management such as the Balanced Scorecard and Non Measurement Based Management Systems [22]

Measure of Success	Measurement-Managed Organizations [%]	Non- Measurement-Managed Organizations [%]
Industry Leaders over the past 3 years	74	44
Reported to be financially ranked in the top third in their industry	83	52
Success in last major change effort	87	57
Agreement on strategy	93	37
Communication of strategy	60	8
Information shared openly and candidly	71	30

Others [25][26][27] suggest that the balanced scorecard delivers little financial value. Based on the above findings, at present, adopting the balanced scorecard model as a major driver of value can succeed or fail -- depending on the skill of the implementation, the structure of the balanced scorecard, the commitment of management, and the quality of the information in the balanced scorecard. From the above evidence, it appears that the balanced scorecard can deliver some value especially if it is focused as organizational alignment, change management, and or as a communication tool to deliver strategy. The evidence is uncertain and it is difficult to ascertain whether the balanced scorecard framework ensures improved financial performance. Some organizations have claimed it has helped their financial performance while others have not seen much benefit. Validations through statistical analytical methods or simulations are difficult

interpret or validate because it is extremely difficult to separate out the large number of the dependent variables and because the balanced scorecard itself is not applied consistently across organizations. Formation of balanced scorecard system depends on soft skills such as leadership, which is difficult to quantify or validate. Regardless of the balanced scorecard's limitations or measurement uncertainties to validate its value, it is one of the few accepted management tools that attempts to bridge the divide between strategy and actionable initiatives to support strategy.

9 SUMMARY OF RECOMMENDATIONS

Based on the previous discussion, a number of key recommendations are listed below. The quantitative benefits from such recommendations are difficult to estimate with a reasonable degree of certainty. Despite this limitation the balanced scorecard framework can still add value to the organization by adding clarity to communicate strategy across an organization. The organization presented in this study is moving toward a scoreboard performance measurement system, featuring many different indicators and performance metrics. Knowledge of the balanced scorecard can help sort-out, prioritize and align these various indicators. The balanced scorecard offers a perspective on how to link the various indicators on the performance dashboard together. The recommendations of this study are listed below in preferred priority, although the order of the recommendations is not necessarily sequential.

1. Review or define plant and departmental vision and mission statements – this perhaps has the largest potential benefit to cost. This can be accomplished through a consensus process involving senior management along with an expert facilitator. A provisional vision and mission statement can be created in less than two days, for about $10K to $50K depending on the fee rates of facilitators and facilities. The proposed vision and mission may still require corporate approval. Even if the corporate head office is not in full agreement to use the balanced scorecard framework, the balanced scorecard can still have merit in validating the present performance management system through a mapping process as was shown in Figure 7.7. The sample vision and mission statements, as stated in Table 6.2, may act as a starting point with little additional cost or delay. Vision or

mission statements are not static and should be reviewed and revised periodically as part of the routine management process.

2. Review the suggested balanced scorecard objectives as listed in Table 7.7 and objectives listed in Table 7.1. Revise current plant and departmental objectives to further account for innovation, process, customer/stakeholder, and financial success factors. The review of the initial objectives, measures, and initiatives may take from two weeks to one year depending on the level of detail and commitment. This process can be driven by leadership from senior management by creating focus stakeholder groups or cross functional teams who's mandate is to refine the objectives of the four main balanced scorecard quadrants. Where warranted, an experienced facilitator can be used. Because of the large variability of time and resources required to review the objectives, a cost estimate is too variable to meaningfully quantify. However, a budgetary cost of $200K during a 6-month time period may not be unrealistic. The full economic benefit may not be immediately recovered because of the large time lag for many performance outcomes. Ironically, the more care that is placed on properly defining objectives, measures, targets and initiatives using the methodologies described in this report, the greater the expected return on investment, since the balanced scorecard is a self-referencing performance management tool by default.

Recommendations 3, 4 and 5 can be considered as inclusive to the activities that encompass the above recommendation 2. As such these recommendations can be consolidated into recommendation 2 without additional cost.

3. Expand communication using a tool such as a balanced scorecard taking into account success factors for the plant as stated in Table 5.4. Presently this is being done for the process quadrant. The implementation process can use cross-functional teams sponsored

by senior management and look at key strategic objectives, such as leveraging port location, using benchmarking from other sister plants for measures and targets, and addressing the sustainability of human resources.

4. Review the balance and alignment of inter and intradepartmental objectives and confirm that the success of these objectives are measurable and validate that the strategy is supported by learning, process, customer, and financial objectives and performance measures. This recommendation deals with improving integration and alignment issues as described in section 7.2. The cross-functional teams can be used to assign at least two objectives to each quadrant of the departmental balanced scorecard to ensure that every critical success quadrant of the balanced scorecard supports the plant objectives.

5. Develop a criterion for success, go-no go milestones to manage risk during the implementation of the balanced scorecard, and an exit strategy if the milestones during the implementation are not successful. This complex activity would likely require the assistance of an experienced facilitator to assist senior management in implementation success measures along with exit strategies.

Once the balanced scorecard or another performance management system is defined, the remainder of the implementation process can be managed through the objectives 6, 7, 8 and 9. Since many of these objectives deal with day to day management practices to improve performance, with the exception of objective 6, the net incremental cost to carry out these objectives appears marginal.

6. Senior management can monitor whether plant personnel are receptive to changes brought about by the implementation of balanced scorecard initiatives. Changes in organizational priorities may create some resistance due to uncertainty in new roles and responsibilities. Senior management can appoint change agents to communicate and

sustain the rationale that supports the balanced scorecard approach along with its new roles and obsolete positions. The costs incurred for such an activities are difficult to quantity because of the many dependent variables including the commitment of management to sustain a performance measurement system and the openness of the organizational culture to change or learn.

7. Use the visibility of balanced scorecard framework to increase interdepartmental alignment and increase understanding of trade-offs between departments. This recommendation is straightforward to implement since it involves making the balanced scorecard visible to plant personnel. This can be achieved, for example, by placing a copy of the latest version of the balanced scorecard along with its measures and targets in hallways, lunch rooms, or on computer screen savers, at a minimal cost. Departmental balanced scorecards cascaded from the main plant balanced scorecard can also be displayed in each departmental area. Presently, the senior management has begun to display the plant performance management system in various hallways around the plant.

8. Use the balanced scorecard as a tool to drive change and to support organizational culture. This recommendation is simple and can be added to routine day to day activities and meetings. Basically it involves displaying the balanced scorecard to personnel and confirming if measures are on target. Actions can be taken to validate the soundness of the objectives and measures, and to take appropriate action to meet targets. Since these actions take place as a part of routine managerial activities, these actions can be created at negligible incremental cost. In this way, the balanced scorecard can highlight wasteful activities, thus may deliver cost savings.

9. Revisit and revise the balanced scorecard. On a weekly or monthly basis, senior or departmental management can measure how well objectives are being met. Whether or not the balanced scorecard is used, this activity tends to be a routine managerial function, thus can be structured to add little additional cost and should in fact show how to improve business processes.

To manage risks that are normally beyond the scope of the balanced scorecard, these risks need to be considered. Objective 10 attempts to address some of these risks.

10. Develop a risk assessment plan that complements the balanced scorecard. This recommendation addresses the plant success factors as listed in Table 5.4 and suggests that a risk matrix can be constructed to assess the likelihood and a consequences of the negative impact to key strategic success factors and to identify mitigating actions. A task force or an external consultant can create the risk matrix, although this is complex task and can take an extensive amount of time at a large cost. On the other hand, the risk matrix may offer guidance to improve strategic risk management in the plant

The final large challenge of implementing the above recommendations is in applying leadership, and recognizing that implementation of changes is made within the structure, history, and limitations of the system that is being changed. The above recommendations, based on balance scorecard framework, offer a method to assist in communicating the strategy of the plant through the vision of leadership and enable the alignment of activities that support this vision.

10 CONCLUSION

This work can be treated as a case study and application of balanced scorecard principles to plant and selected departmental objectives of an industrial producer of aluminum and electrical power. This study has shown that from an industry perspective, the aluminium industry faces strong pricing and competitive pressures, whereas the power generation industry is enjoying a more attractive position. In the past two years the plant has made large progress by establishing a more transparent performance management system under the direction of new management. Because the balanced scorecard is a framework that measures performance it can give insight on how to manage improvement initiatives to increase performance and manage change.

This study suggests that a balanced scorecard approach can supplement the present objectives and measures in the plant. It offers a structured framework to identify opportunities to define vision and mission, to improve objectives and measures, and to support the strategy. The study suggests the current objectives can be simplified in number by cascading detailed information to the departmental level from the plant performance indicators. Some measures can be improved by supporting strategic success rather than measuring the status of plant operations. Examples for opportunities to improve from CI, HR, and the Health departments were given. The balanced scorecard perspective suggests that the customer and financial quadrants can include additional objectives to balance out the strategic map. The current plant objectives make little mention of measuring success from leverage of assets such as land, stakeholder management objectives, and external risk management measures. Including such objectives may help broaden the strategic scope of the plant scorecard by making these key factors visible. This can be done whether or not a balanced scorecard framework is further considered for the plant.

Table 10.1 lists benefits from using a balanced framework. Despite this list, the balanced scorecard framework is not a panacea, and requires careful application and long-term commitment to ensure success.

Table 10-1 Balanced Scorecard Benefits for the Aluminum Plant

1. Translates strategy into operational items, and alignment of plant and subordinate departmental objectives.
2. Can implement best practices that support key success factors.
3. Reduces of waste and redundant activities through increased clarity, consistency, simplicity and alignment of objectives and processes
4. Clarifies the definition of strategic success, vision, implementation, transparency and accountability.
5. Learning, innovation, and continuous improvement facilitates decision-making to support key strategic processes
6. Helps prioritize budgets initiatives and resources to align with strategic value creation
7. Supports intangible assets such as knowledge, skills, and brand
8. Gives a systems approach through cause and effect relationships
9. Aids change management and accountability, thus can be used to change or drive culture
10. Contributes to transparency between internal and external stakeholders
11. Assists to balance conflicting priorities
12. Helps with management and organization personnel buy-in to support strategy

APPENDIX A

Table A - 1 Facsimile of Departmental Objectives*

Description	Objective	Target
Safety		
Management Focus	Monthly Site Safety Tour (Forecast Meeting) 1/month	X per month
	Unsafe Acts and Behaviour, promote reporting	
	Review monthly at Forecast meeting	
	Corrective Action completion	< X outstanding
Department Focus	Supt's & Supervisors	
	Pre use Inspections	> X%
	Task Observations	>X%
	Critical Task Observations	
	Pre Start Meetings	X/Shift
EHS First	Directives	X% Compliance
	Supervisor and OH&S Reps Training	Complete all by end 2004
	Impact projects, follow up and co-ordination	
OH&S Program	Meeting inspections and investigations	> X% Compliance
	Completion of Corrective Actions relating to Audits, WCB & High-potentials	X% Compliance
	Increase Employee Risk Awareness	
	Maintain OHSAS 18001	
	Promote Incident/Near miss reporting	

Health Health Promotion	Hearing Conservation Conduct Baseline Audit Produce a noise map Establish a Hearing Conservation Team IH Sampling Determine Sampling Needs Conduct a Health Study Absenteeism Controllable Monitor impact of Fitness and Re-hab Centre Provide early detection of illness	< X%
Environment Improvement Program Pollution Prevention EHS First	Lagoon Capacity Enhancement 1 Scow Grid Gas stations upgrade Test of a High Softening Point Pitch Get to a conclusion with feasibility of treating SPL Empty the last storage building Define the baseline for consumption for water, air, and waste Review Permit requirements Review P2 (1999-2004) Directives Audit to ensure compliance	X% compliance X% compliance
Continuous Improvement	Deploy CI Complete site assessment Establish list of operations priorities.	XX green belts complete by July 2004

Power Generation		
Water Management	Maintain and control release flows as per program	
Fisheries	Brief corporate on issue & opportunity Develop potential for Hatchery Work with DFO to develop flow profile	
Timber	Develop joint plan with First Nations	
Power Operations	Corrective Actions Implement Power Qualification System Generator Availability Power Supply to Smelter Reliability Optimal Dispatch of Generators Reduce Oil Leaks Re-map Power House Noise Profile Replace Transmission Line Insulators	<X Overdue > X% >X%
Paste plant Calcining	Pitch Softening Point Main Stack Emission Cooler Emission Quality Production Costs/tonne Unplanned Outages Shutdowns	X C <X g/hr X g/T <X g/hr <X g/T <XX Lc <XX Lc >XXKT >XXKT X days X weeks
Reduction Services	Respiratory Protection Spill Response Training Gas Skirts Changed Burners Conveyers and Recovery Utility Services Pot Turnaround	X %Compliance X% Min < X back-ups X interruptions X interruptions Lines XX, X days Lines XX, X days

Pot-lines	Housekeeping HF Roof Emissions Exception Pots Pot Sealing High Metal Level Low Metal Level Stud Pulling Overtime Metal Production Pots Operating Current Efficiency Amperage	>X <X <X % >XX % <XX % <XX % >XX % X % XXX XXX XXX % XXX
Casting & Wharf Customer	House Keeping Absence OT Recovery % OEE % Scrap total Reliability % Complaints Concerns On time Delivery	XX <XX % <XX % >XX % >XX % <XX % >XX % <X <XX XX%
Maintenance & Engineering	Critical Equipment Reliability Availability Planned Work Breakdown Backlog Scheduled Work PM Scheduled Compliance PM on Critical Equipment Planned Quality Audits Overtime Absenteeism	>XX% >XX% >XX % <XX % XX weeks >XX% >XX% >XX% >XX% <XX% <XX%
Risk Management System	ISO9001, 14001 & OHSAS 18001 Perform risk assessments Audit	Maintain Registration Status In all operations Per Schedule
Finance Expenditures ***IT***	Budget Work with departments to identify cost reduction Develop expenditure check list Provide expenditure training Improve communications between Plant and corporate office Improve help desk follow up	XXX % Compliance

	Implement procurement project Garage improvement project	
Organization	Revise accountant tasks Revise procurement organization	
Governance	Self audit, complete plan Ensure procurement controls are in place US GAAP Finalize process Perform Accounts reconciliation	
Human Resources		
Human rights	Improve awareness of harassment Develop a succession plan	Brochure
Staffing	Monitor workforce levels and implement strategies Implement staff management on-line Revisit the recruitment process	Local benchmarks Hire best employees
Labour relations	Develop the negotiation strategy for 2005 Manage contracting out grievances Assist & coach Supervisors	Within agreement time limits Decrease absenteeism
Training	Revisit cell operator program Training/coaching to support supervisors	
Corporate Affairs	Positive community discussions operations about business plans Establish good communication networks in the local region	

* selected objectives are modified for confidentiality reasons, department names appear in bold italics

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