

# ANALYTICAL thinking

A PERCEIVED DICHOTOMY BETWEEN CREATIVE AND CRITICAL THINKING LEADS SOME INDIVIDUALS TO PICK ONE FORM OF STRATEGY OVER THE OTHER. YET, DIFFERENT TYPES OF PROBLEMS CALL FOR DIFFERENT PROBLEM-SOLVING MECHANISMS.

## INTRODUCTION

Analytical thinking follows a technical and systematic process based on the close examination of events, situations, and results to find the implications behind these factors and to derive optimum solutions. The diagram below illustrates this step-by-step approach, which focuses on convergent thinking to evaluate and eliminate ideas moving towards a single solution. Similar to other ways of thinking, analytical thinking begins with a problem or a situation that is judged as something that needs to be corrected or solved. A client, for example, will initially identify a problems, directly or indirectly, and may seek consultation from a special-



ized external organization responsible for breaking down the problem into key risks and drivers to formulate a claim. Gathering relevant data and information (facts) is the next step and is vital in supporting the analysis required for proving or disproving the hypothesis.

The analysis step in this process is what differentiates convergent and divergent thinking as people deliberately use techniques and technical knowledge that have previously been defined. In other words, the tools used in analytical thinking have a track record of success and are consequently used repetitively in similar situations to reach similar outcomes.

Lastly, the solution is the final recommendation presented to clients based on outcomes of testing the claim (what a client may pay for). Essential to this process is the fit between the solution and the client's need, as a solution is rendered useless if it cannot be implemented.

## BC HYDRO'S SMART METERING PROGRAM

The summer of 2011 marks the beginning of BC Hydro's province-wide implementation of smart meters across homes and business. Attempting to completely upgrade the electrical grid by 2014, BC Hydro claims smart technology will allow for over twenty years of benefits, in the amount of \$1.6 billion, for the company and clients alike.

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Such long-term projects are not taken lightly. Costs are weighed against benefits, both in a qualitative and quantitative manner, and decision-makers run through scenario after scenario to assure the project's success. In determining the financial viability of projects, analytical thinking often triumphs given the systematic breakdown of a project's costs and benefits and conversion into workable numbers. BC Hydro's initiative is no exception and Net Present Value (NPV) is one of the tools incorporated into the energy giant's step-by-step appraisal.

## PROBLEMS

In a highly fixed cost industry and given changing consumer expectations, BC Hydro has acknowledged the necessity of upgrading the electrical grid. In the next 20 years, forecasts illustrate a 40% growth in the demand for electricity and the current metering system has not been upgraded since the 1950s.

This has posed the following problems:

- Increasing client rates
- Lack of customer choice and control over energy usage
- Subpar customer service and response to power outages
- Free rider problem in terms of energy theft
- Current metering system hinders clean energy future

## CLAIM

Enter BC Hydro's Smart Metering Program. It involves substituting existing meters with smart meters to upgrade the

technology and telecommunications infrastructure, allowing BC Hydro to run the electricity system in a reliable, safe and cost-effective manner.

A smart meter is a digital, two-way communication device between the client and BC Hydro capturing the amount of energy consumed and when. The key difference between the old and new meter is the ability to send and receive information in real time. Under the out-dated system, for example, BC Hydro does not know of power outages unless the client calls to report the issue.

Commercial and residential customers will actively be able to manage their electricity usage through an in-home feedback tool, which displays up-to-date consumption and price information. The system also allows BC Hydro to trace abnormalities in consumption levels that may be related to energy theft. Finally, modernizing British Columbia's electricity system will ensure the fostering of green technologies and innovations, such as solar panels and electric vehicles. Adding to this, greater customer control and company optimization will reduce energy waste.

## FACTS & NPV ANALYSIS

In order to identify potential benefits and resulting monetary values from implementing the smart meter, BC Hydro formed a panel of experts, which included Enspira Solutions and PricewaterhouseCoopers. The following tables illustrate their findings:

Smart Meter Claims & Capabilities	Benefits	Present Value (Millions) *
Meter Reading Automation	Operational Efficiencies, Energy Savings	\$222
Meter Sampling	Operational Efficiencies, Energy Savings	\$61
Remote Re-connect Automation	Operational Efficiencies, Energy Savings	\$47
Distribution Asset Optimization	Energy Savings, Capacity Savings	\$15
Outage Management Efficiencies	Operational Efficiencies	\$10
Continuous Optimization and Load Research	Operational Efficiencies, Energy Savings	\$6
Call Centre and Billing	Operational Efficiencies, Revenue Protection	(\$2)
Voltage Optimization	Energy Savings, Capacity Savings	\$208
Theft Detection	Energy Savings, Capacity Savings, Revenue Protection	\$732
Voluntary Time-of-Use Rates	Energy Savings, Capacity Savings	\$110
Conservation Tools (in-home feedback)	Energy Savings	\$220

\* All costs and benefits have been calculated over the period 2006 - 2033 in the 2010 present value using a nominal discount rate of 8% per year and include the cost of achieving individual claims or capabilities.

	Nominal Value (Millions)	Present Value (Millions)
Gross Benefits	\$4,658	\$1,629
Less: Operating & Maintenance Expenses	(\$745)	(\$330)
Less: Smart Metering Program Costs	(\$930)	(\$779)
<b>Total Net Value for Period 2006 - 2033</b>	<b>\$2,983</b>	<b>\$520</b>

*\* All costs and benefits have been calculated over the period 2006 - 2033 in the 2010 present value using a nominal discount rate of 8% per year and include the cost of achieving individual claims or capabilities.*

## SOLUTION

The Smart Metering Program has a NPV in the amount of \$520 million up to the year 2033. Reduced theft of electricity, energy savings, and operational savings pays for the project itself and the ensuing benefits from capacity savings yield a return on the investment. According to BC Hydro standards, this value is more than enough to continue with the province-wide implementation of smart meters. Net benefits will flow to customers, reducing rates below what they would otherwise be in the absence of BC Hydro's investment.