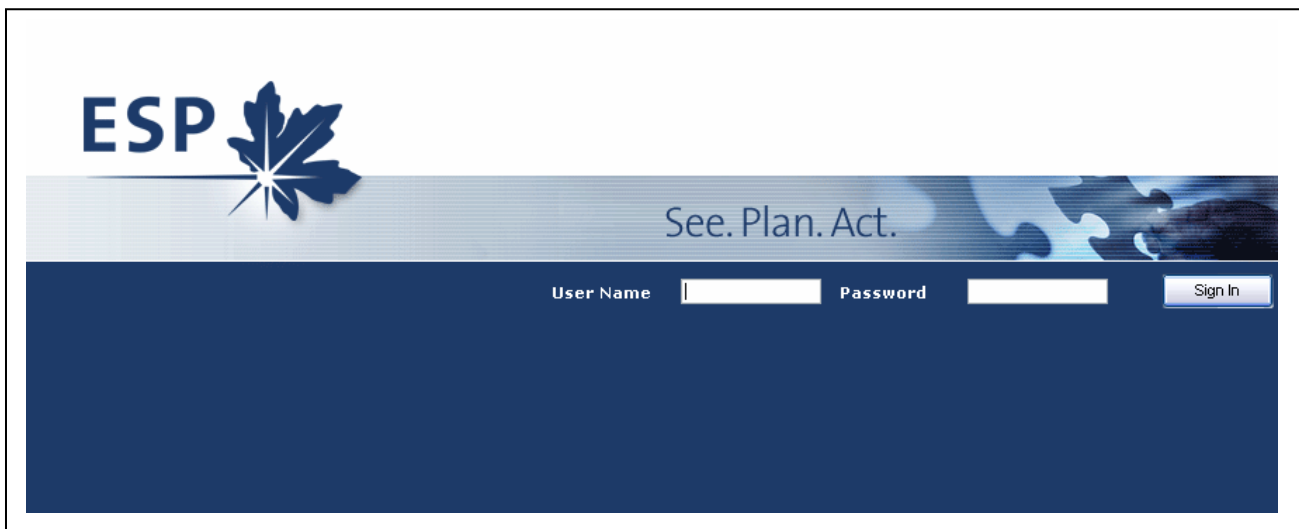


**Introducing:
CopperLeaf Technologies Inc.'s**

ESP – DSM Module:

**Web-based Demand-side Management Modeling,
Planning and Reporting Software**



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ESP – DSM Module: Overview

CopperLeaf Technologies' DSM modeling, planning and reporting software tool - ESP, has been designed specifically to support the business needs of DSM Planners and Managers throughout the entire DSM life cycle. From the identification and screening of savings potential, right through to the definition, approval, delivery and reporting of actual DSM Program and Portfolio performance, ESP's primary mission is to help DSM Planners and Managers efficiently maximize the value of their DSM investments, and effectively communicate their DSM Plans and Program performance with stakeholders.



ESP's logical, robust and flexible modeling approach enables users to categorize, build and assess DSM savings potential, Program alternatives, and overall Portfolio scenarios to a level of detail at which they are most comfortable. ESP gives users the capability to model DSM measures and Programs substantially faster, and with greater accuracy, than can be done in customized spreadsheets. This means better information is available on which key investment decisions can be made and communicated, thus reducing the likelihood of misunderstanding and misallocation of resources, based on erroneous or inadequate information being available.

ESP's comprehensive, efficient and flexible reporting engine enables users to generate a multitude of costs, benefits, energy & capacity savings, greenhouse gas impact, and cost-effectiveness reports (consistent with California Standard Practice Manual guidelines), over multiple years at monthly, quarterly or annual grains, from numerous perspectives. Results can be segmented by different categories, drilled-down multiple levels, and exported to Excel for further custom data manipulation or graphing, thus enabling both internal and external stakeholder reporting requirements to be efficiently satisfied.

Powerful sensitivity analysis functionality enables users to quickly understand the impact of a change in one variable (such as participation, technology costs, avoided costs, customer tariffs, utility Program costs and incentives, etc.) on the cost effectiveness of DSM measures, Programs or Portfolios. Further, the Critical Values capability allows users to set target values for various cost effectiveness benefit/cost ratios, and back-

calculate the change on specific variables (such as utility costs, energy savings, technology/customer costs, lost revenue, etc.) which can be tolerated, while still satisfying the target ratio constraint. This kind of global, repeatable, Portfolio-wide analysis is extremely difficult and cumbersome to do in real-time, using spreadsheets.

ESP's ability to create multiple Plan scenarios with different combinations of Programs and/or Program alternatives, and "freeze", modify or approve data at specific points in time mirrors real-world iterative utility Planning and Budgeting cycles. Program-specific labor forecasting, by job group and department, enables users to efficiently and accurately build Budgets and also ensure human resource requirements are balanced against organizational supply, such that planned work is actually possible to complete in the forecast time-frame, given the finite resources that are available. Then, export "approved" Plans from ESP to Excel with spending dollars organized by account or resource code, and/or by department, for final tuning and upload into enterprise Budgeting or accounting systems.

As DSM Programs are executed, spending, participation and other actuals data can be imported, thus enabling: comparisons to be made against Planned savings and spending targets, calculation of "actual" Program cost effectiveness, and re-forecasting of future/remaining Program activity that is informed by actual performance to-date. Aside from providing valuable information to DSM Planners and Managers on Programs that are still within implementation, it also enables efficient and flexible accountability and performance reporting to be done, satisfying expectations of both internal and external stakeholders, and providing valuable lessons which can inform future Program planning.

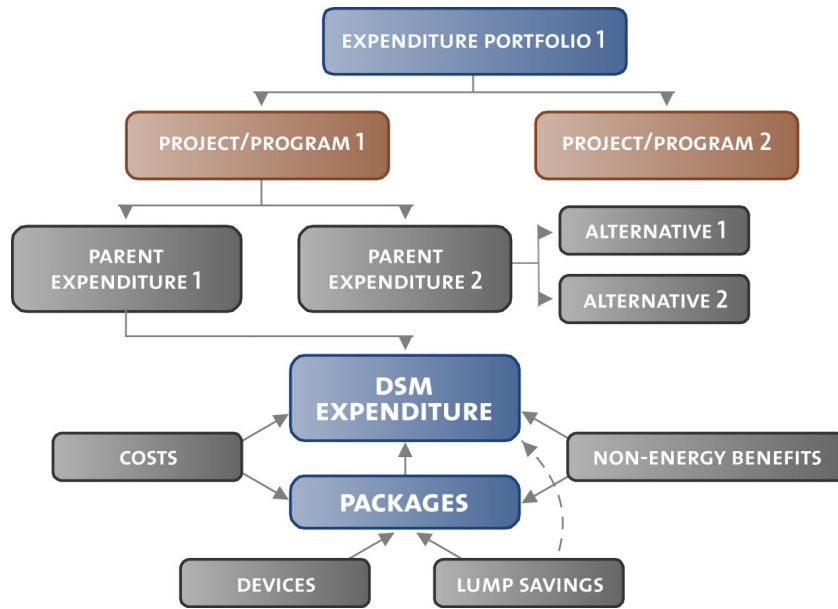
Historical data audit capability on many key variables allows data changes to be traced by date and user. ESP's snap-shot date feature allows key reports to be reproduced in real-time, based on data that was "current" at specific dates in history, but which may have changed since, and internal document attachments allow supporting assumptions to be closely associated with Programs and easily referenced. All of these features help make it easier to explain and reconcile assumption changes over time, and also mitigate against staff turnover, when inevitably important information gets lost.

ESP's web-enabled architecture on a central relational database provides efficient storage and access of data, and consistent real-time calculation of DSM-specific costs, benefits and cost effectiveness, thus ensuring a level playing field when comparing initiatives. It also eliminates the chance of formula error and the need to customize spreadsheet models for every Program or initiative being examined. Multi-user concurrent access, each having individual permissions and preferences, ensures users are given access to only those areas and functions to which they are entitled, and can tailor data display and entry to their preferred mode. A dynamic text change feature enables users to globally configure the application to display terms that are meaningful to their organizations, and ESP's on-line searchable Help feature provides real-time useful information to users on feature functionality and instructions on how to use them.

In short, ESP's web-based architecture and comprehensive DSM modeling, analytical power and reporting functionality, gives DSM Planners and Managers the best chance to maximize the value from their DSM investments.

ESP's DSM Modeling Approach

Taking advantage of an “n-tier” modeling structure, entire DSM investment Portfolios can be assembled and broken down into conservation savings potential, DSM Programs (by sector, customer class, region, or other segmentation parameters), and Program components (called Expenditures) that contain “per-participant” Packages of DSM energy savings measures.



In ESP, Devices are end-use technologies used by customers in their homes, offices, and factories, from which savings potential is derived. In ESP users can define and categorize a multitude of end-use devices and tailor them, via hourly load shapes, by customer rate class.

ESP allows DSM Planners and Managers to model the benefits associated with the retrofit or replacement of legacy Devices with new energy efficient Devices (e.g. the replacement of common household light bulbs with compact fluorescent lights), or the removal of a Device entirely (e.g. a second refrigerator). ESP also models the DSM savings that can be achieved through the use of “control” type Devices such as thermostats and occupancy sensors, which reduce the consumption of other Devices.

The potential savings resulting from the use of Devices depends on how much time the Devices are “on” and the rate at which they consume the “fuel” that powers them. Additionally, the cost-effectiveness of the Device depends on its installed cost, expected life (i.e. time before replacement is required), its usage pattern (i.e. via hourly load shapes associated with individual customer rate classes), and the time over which savings can be counted (known as savings persistence). Below are a series of screen shots from ESP's Device interface, representing a 15 watt Compact Fluorescent Light bulb.

The screenshot displays several overlapping windows from the ESP software interface:

- General Device Configuration Window:** Shows fields for ID (29), Parent Device (None), Code (CFL), Name (CFL 15W), Component Class (Electrical), Component (Lighting), Savings Persistence, Incentive Persistence, Type (Standard), Life in Hours (10000), Commodity (Electricity 1 (TP) (Kilowatt)), and Commodity Peak Demand (0.0150).
- Technical Summary Window:** Shows Name (CFL 15W - CFL), Parent Device (None), Savings Persistence (input field), Incentive Persistence (input field), Life in Hours (10000), and Commodity Peak Demand (0.0150). It includes buttons for Update, Cancel, and Recalculate.
- Customer Class Selection Window:** Shows Customer Class (Residential (integrated)) and Month (Jul).
- Hourly Load Shape Table:** A table with columns for Hours (04:00 AM to 03:00 PM) and days of the week (Sun to Sat). Values represent load in kilowatts.
- Scale Configuration Window:** Shows options for Curving (Summary selected) and Scale (Literal selected). It includes a table for Installed Cost over years 2006-2011.

Customer Class	Device Life (in months)	Annual Consumption	Consumption Unit
Commercial <35kW (integrated)	14	131.40	Kilowatt Hour
Commercial >35kW (integrated)	14	131.40	Kilowatt Hour
Commercial 1821	14	131.40	Kilowatt Hour
	14	131.40	Kilowatt Hour
	14	131.40	Kilowatt Hour
	14	131.40	Kilowatt Hour
	14	131.40	Kilowatt Hour
	137	13.14	Kilowatt Hour
	14	131.40	Kilowatt Hour

Hours	Sun	Mon	Tue	Wed	Thu	Fri	Sat
04:00 AM	11.4	14.3	14.3	14.3	14.3		
05:00 AM	13.9	23.3	23.3	23.3	23.3		
06:00 AM	22.6	43.8	43.8	43.8	43.8		
07:00 AM	37.4	50.3	50.3	50.3	50.3		
08:00 AM	45.2	42.1	42.1	42.1	42.1		
09:00 AM	45.4	36.8	36.8	36.8	36.8		
10:00 AM	46.0	34.3	34.3	34.3	34.3		
11:00 AM	38.8	29.9	29.9	29.9	29.9		
00:00 PM	35.6	27.5	27.5	27.5	27.5		
01:00 PM	33.8	27.9	27.9	27.9	27.9		
02:00 PM	32.4	25.3	25.3	25.3	25.3		
03:00 PM	32.2	25.9	25.9	25.9	25.9		

Item	2006	2007	2008	2009	2010	2011
Installed Cost						
(All)	7.0000	7.1400	7.2828	7.4285	7.5770	7.7286

ESP provides users with configurable modeling adjustment factors to tailor expected savings for specific savings opportunities or DSM Programs. For example, the evaluation of previous DSM Programs may show that only 90% of forecast unit savings for a given type of measure actually materialize one year later. Or perhaps energy savings are dependent on ongoing maintenance or tuning of a new technology to allow it to function at maximum efficiency, and that reduced savings are achieved when this work is not performed. Perhaps the savings of one fuel (i.e. electricity) will actually result in the increase in consumption of another (i.e. natural gas).

ESP also allows users to forecast the rate of natural adoption of new technologies into the future, free-ridership, market spill-over, and the life remaining on incumbent technologies and the rate at which Devices are assumed to be replaced when their lives end. In short, ESP's user-configurable adjustment factors provide great modeling flexibility to tune individual savings opportunities or Programs, thus enabling DSM Planners to correctly handle virtually any situation or series of assumptions that they are faced with.

Devices are not the only means available within ESP to model savings potential, however. Savings can also be modeled directly in “lump” format (i.e. kWh/yr), either as “per-participant” savings in Packages, or directly as total savings in Expenditures. Lump savings can be tuned similar to Devices, via adjustment factors, and are associated with customer rate class hourly load shapes, for defined “attribution” periods during which savings can be counted.

Utility costs associated with different kinds of savings potential opportunities and DSM Programs involve both fixed and variable (i.e. per participant) components. Fixed costs are forecast in “Expenditures”, which can include Program management, administration, and advertising costs, for example. The number of participants are also forecast in Expenditures and associated with “Packages”, which can be built to contain variable costs (e.g. incentives/grants, processing costs, etc.) and “per-participant” energy savings measures (i.e. Device combinations or lump savings and associated adjustment factors). The collage of screenshots below show the contents of a CFL Package and Expenditure. The Package includes the “per-participant” replacement of three 60W incandescent light bulbs with 15W CFLs at a 25% free-ridership rate, at a “per-participant” processing cost of \$50, and an incentive of \$5 per bulb. The Expenditure forecasts 60,000 participants in each of 5 years, and includes some fixed staffing and advertising costs.

The screenshots illustrate the configuration and data for a CFL Package and Expenditure. The Package configuration includes details such as ID, Name, Package Type, and Spending Type. The Package Contents table shows the breakdown of costs and savings over time, including Free-riders, Retrofits/Replacements (CFL 15W/Incandescent bulb 60W), and Spending By Resource Code (2007 Nominal / 320 - Consultants). The Expenditure configuration shows the Expenditure Code, Title, and Alternative. The Expenditure Contents table shows the forecasted costs and savings over a period from 2006 to 2013, including Packages (Res. CFL (incentive)), Spending By Resource Code (Salaries Standard Regular, Advertising & Communications), and DSM Incentive (\$ per unit).

ESP also facilitates the allocation or sharing of costs between the utility offering the Program, co-funding partners (e.g. separate gas and electricity companies jointly sponsoring a Program), and/or customers. Costs can be identified and allocated by organizational account or resource code and by department. Costs can be forecast at a monthly grain over multiple years, in both real and nominal dollars. Organizational overhead costs, which do not in themselves directly produce energy savings, can also be allocated amongst energy savings Programs.

Fundamental to DSM economic analysis are the valuation of avoided utility costs and lost revenue for different commodities such as electricity, gas, water, etc.. ESP enables avoided utility costs and lost revenue to be defined and quantified regionally, monthly, over multiple years, and by customer rate class. As is shown below, commodity consumption can also be defined and valued/priced by time period (e.g. heavy load hours, light load hours).

The screenshot shows the 'General' tab of the ESP software. The main configuration area is for 'Electricity 1 (TP)'. A red-bordered inset window shows the 'Time Periods' configuration for 'Heavy Load Hours' in June. The table below shows the configuration for heavy load hours:

Hours	Sun	Mon	Tue	Wed	Thu	Fri	Sat
00:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
01:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
02:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
03:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
04:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
05:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
06:00 AM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
07:00 AM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
08:00 AM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
09:00 AM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
10:00 AM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
11:00 AM	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Below the table, the 'Primary Time Period' dropdown is highlighted with a red circle and contains 'Heavy Load Hours'. The 'Secondary Time Periods' dropdown contains 'Light Load Hours'.

The screenshot shows the 'Price Forecasts' section. It includes a 'Summary' view and a table of price forecasts. The table below shows the price forecasts for 'Customer Class Price (Time Based)':

Item	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Commercial 1821 / 0 - CEC / Heavy Load Hours	0.0849	0.0866	0.0883	0.0901	0.0919	0.0937	0.0956	0.0975	0.0995	0.1014
Commercial 1821 / 0 - CEC / Light Load Hours	0.0531	0.0541	0.0552	0.0563	0.0574	0.0586	0.0598	0.0609	0.0622	0.0634
Industrial 1821 / 0 - CEC / Heavy Load Hours	0.0637	0.0649	0.0662	0.0676	0.0689	0.0703	0.0717	0.0731	0.0746	0.0760
Industrial 1821 / 0 - CEC / Light Load Hours	0.0478	0.0487	0.0497	0.0507	0.0517	0.0527	0.0538	0.0549	0.0560	0.0571

As is shown below, ESP also handles the monetization of delivery (e.g. capacity) lost revenue and avoided utility costs which are related to avoided distribution/transmission costs associated with demand savings occurring coincident with system or regional peak demand. The effect of distribution system and inter/intra-regional transmission system line losses are also included. In combination with time-based avoided cost valuation, this approach enables ESP to properly model and evaluate load shifting and demand-response Programs, as well as the cost effectiveness of load control and Advanced Metering Infrastructure (AMI).

The screenshot shows the ESP software interface. On the left, a tree view lists regions: BC - British Columbia, CI - Central Interior, KN - Kelly Nicola, NC - North Coast, PR - Peace Region, VI - Vancouver Island, EK - East Kootenay, NIA - Non-Integrated Areas, LM - Lower Mainland, and SE - Selkirk Area. The main window has tabs for 'General', 'Intra-regional line losses', and 'Coincident Peak'. The 'Intra-regional line losses' tab is active, showing a table of commodity line loss percentages. The 'Coincident Peak' tab is also visible, showing a calendar grid for the month of December with checkboxes for each hour of the day.

Commodity	Line Loss %
Electricity - marginal mix	3.0000
Natural Gas	0.0000
Biomass	0.0000
Propane	0.0000
Diesel	0.0000

The screenshot shows the 'Price Forecasts' configuration window. It includes dropdown menus for 'Price Forecast Case', 'Commodity Type', and 'Commodity', all set to '(All)'. The 'Price Type' is set to 'Delivery'. A list of forecast items is shown, including 'Base Case - Electricity 1 (TP) - Delivery - CEC - CEC\$/kW', 'Base Case - Electricity 2 (noTP) - Delivery - CEC - CEC\$/kW', and 'Base Case - Natural Gas - Delivery - CEC - CEC\$/GJ'. Below the configuration is a 'Price Forecasts' summary table with a 'Refresh' button and radio buttons for 'Curving', 'Graph', and 'Summary' (selected). The table shows price forecasts from 2006 to 2014 for various customer classes.

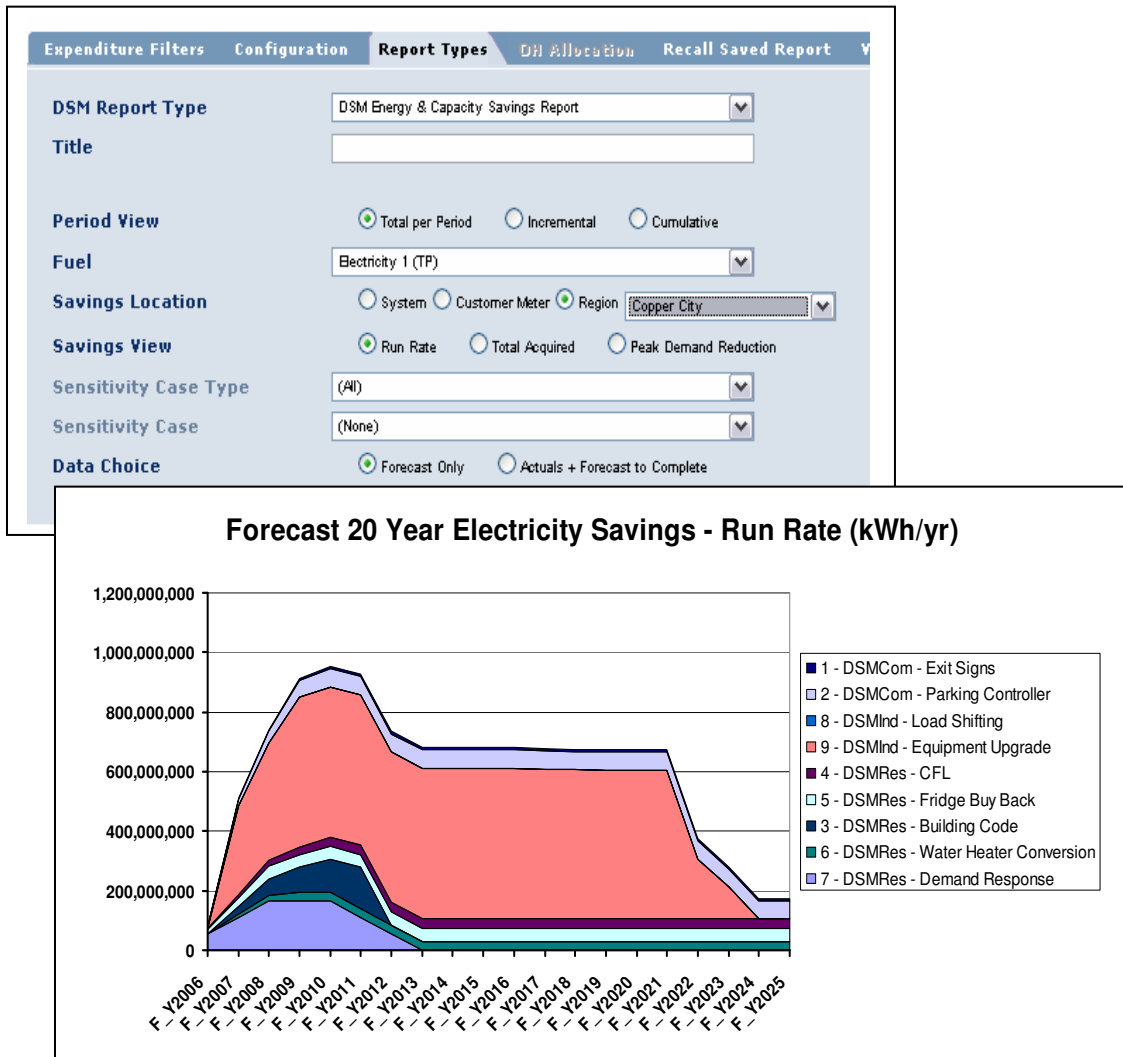
Item	2006	2007	2008	2009	2010	2011	2012	2013	2014
Customer Class Price (non time based)									
Commercial 1821 / 0 - CEC	5.3060	5.4122	5.5204	5.6308	5.7434	5.8583	5.9755	6.0950	6.2169
Industrial 1821 / 0 - CEC	4.2448	4.3297	4.4163	4.5046	4.5947	4.6866	4.7804	4.8760	4.9735
Customer Price (non time based)									
0 - CEC / 1841 - Market Vendor	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000	10.0000

ESP's DSM Analysis & Reporting Engine

Conservation savings potential, DSM Program and Portfolio analysis and reporting is a core and powerful part of ESP. Users can generate the following kinds of reports:

- Energy and Capacity Savings
- Cost Effectiveness
- Costs and Lost Revenues
- Benefits
- Greenhouse Gas Emissions
- Cost Roll-ups (by Resource Code, or Department)
- Critical Values
- Rate Impact

Below is an example of some of the report configuration options for the DSM Energy and Capacity Savings report, and the subsequent graphical result (produced in Excel via an ESP data export) which represents 20 year electricity savings (kWh/yr), by DSM Program. Note the decay in energy savings over time, which is the properly calculated result of ESP's real-world modeling factors such as Device savings persistence, replacement rates, natural adoption, savings attribution, etc..



Users can run standard DSM economic tests (consistent with California Standard Practice Manual guidelines) and calculate metrics such as NPV, benefit/cost ratio, levelized cost, IRR and simple payback. The figure below is a screen shot of some of the reporting options associated with ESP's DSM Cost Effectiveness Report.

Multiple Price Cases can be set-up which allows modeling of DSM Programs under different sets of assumptions of avoided costs and customer rates. This allows users to conduct sensitivity analysis, at run-time, of the impact of different pricing assumptions on DSM Program cost effectiveness from the perspective of the utility, ratepayers, participants, or society on the whole. A sample Cost Effectiveness report (exported to Excel) is shown below.

Start Date:	1/4/2005	Savings Category:	All
Report Time Frame:	20 Fiscal Year(s)	Snapshot Date:	None
Price Forecast Case:	Base Case	Discount Rate - Cost:	6.00%
Sensitivity Case:	None	Scale:	Literal
Export Timestamp	Tuesday, May 09, 2006 9:06:42 PM		

Programs	Utility Test NPV	Utility Test B/C Ratio	TRC Test NPV	TRC Test B/C Ratio	RIM Test NPV	RIM Test B/C Ratio	Participant Test NPV	Participant Test B/C Ratio
Commercial	76,627,314	44.95	68,267,827	7.76	-3,110,626	0.96	57,107,100	7.86
1 - DSMCom - Exit Signs	5,080,341	7.12	2,293,123	1.63	-1,730,104	0.77	2,716,956	1.95
2 - DSMCom - Parking Controller	71,546,973	79.35	65,974,703	11.17	-1,380,522	0.98	54,390,145	10.97
DSM Overhead	-8,819,866	0	-8,819,866	0	-8,819,866	0	0	n/a
10 - DSM - Overheads	-8,819,866	0	-8,819,866	0	-8,819,866	0	0	n/a
Industrial	438,132,027	5.5	360,601,595	3.06	33,061,605	1.07	183,211,718	2.11
8 - DSMInd - Load Shifting	121,879,152	3.25	175,370,676	283.83	49,581,041	1.39	66,303,993	n/a
9 - DSMInd - Equipment Upgrade	316,252,875	8.29	185,230,920	2.06	-16,519,436	0.96	116,907,725	1.71
Residential	142,530,008	5.76	40,970,036	1.31	675,611	1	17,937,534	1.17
3 - DSMRes - Building Code	21,756,563	136.45	-76,171,807	0.22	2,915,438	1.15	-74,364,851	0.19
4 - DSMRes - CFL	18,826,053	2.09	18,671,088	2.07	-4,390,302	0.89	15,351,791	5.13
5 - DSMRes - Fridge Buy Back	34,354,648	13.92	35,180,533	20.19	859,417	1.02	27,877,817	n/a
6 - DSMRes - Water Heater Conversion	24,252,250	18.28	24,905,034	34.18	2,446,090	1.11	17,432,843	37.91
7 - DSMRes - Demand Response	43,340,495	6.14	38,385,189	3.87	-1,155,031	0.98	31,639,934	4.28
Totals:	648,469,482	5.7	461,019,592	2.42	21,806,724	1.03	258,256,352	1.92

Additional sensitivity analysis can be conducted using ESP's Sensitivity Case feature on key variables such as spending or market penetration, etc (screen shot show below).

The screenshot displays the 'Sensitivity Case Types' configuration window. The 'Sensitivity Cases' list includes: DSM: No Utility Capacity Benefits, DSM: Participation @ 75%, DSM: Program Spending +20%, and Std: Spending +25%. The 'General' tab is active, showing details for 'DSM: Participation @ 75%' with ID 101, Type 'Expenditure Sensitivity Cases', and Application Type 'DSM'. Below this, a monthly data table is visible:

Package	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
(All)	-25,000.00	-25,000.00	-25,000.00	-25,000.00	-25,000.00	-25,000.00	-25,000.00	-25,000.00	-25,000.00	-25,000.00	-25,000.00	-25,000.00

ESP's DSM Critical Values report allows users to gain insight as to when changes in key assumptions will lead to a fundamental change in decision on whether or not to fund a DSM Program. As illustrated below, if a target TRC benefit/cost ratio of 1.0 is set for the selected Program (or group of Programs), utility electricity savings can drop to 46.8% of its base value and a TRC benefit/cost ratio of 1.0 can still be achieved. In this particular case, that is a large comfort zone suggesting the DSM Program being analyzed is robust.

The screenshot shows the 'DSM Critical Values Report' configuration window. The 'DSM Report Type' is set to 'DSM Critical Values Report'. The 'Target B/C Ratio' is set to 1.0, and the 'Variable to calculate' is 'Utility Electricity Savings'. The 'Generate' button is visible. Below the configuration, the 'DSM Critical Values Report' results are displayed:

Title:	
Savings Category:	All
Snapshot Date:	None
Discount Rate - Energy:	6.00%
Include Prior Items:	Yes
Target B/C Ratio:	1.00
Price Forecast Case:	Base Case
Sensitivity Case:	None
Base Present Value	18,209,889.70
Critical Present Value	8,521,033.84
Base Annualized Value	1,587,621.17
Critical Annualized Value	742,902.56
Critical / Base	46.8%

ESP’s DSM Planning and Performance Reporting Capabilities

Multiple annual and multi-year Plan scenarios, involving different combinations of DSM Programs and Expenditures, can be created within ESP, to analyze and ultimately feed internal Integrated Resource Planning (IRP), Budgeting and/or external regulatory approval processes.

Recognizing that Planning and Budgeting are iterative processes, ESP enables Plans to be ‘frozen’ at discrete points in time, to capture a snapshot of data and preliminary targets on a specific date. Plans can be modified and re-frozen to reflect new information, with each change being tracked through an audit feature. Monthly, annual and multi-year spending and energy savings targets are fixed when a Plan is approved, and if utility spending has been built-up in accordance with the organizational accounting structure, Budgets can be generated directly from within ESP and relayed to financial systems.

During the year, and over the duration of a multi-year Plan, Program Managers are likely required to report on performance relative to Plan, both in terms of spending and energy savings targets. ESP enables this to be done quickly and efficiently, through its facility to import actual spending and savings data from corporate financial or other systems. The figure below shows a DSM Costs and Lost Revenues report configuration screen in which actuals data is being included and compared to a selected Approved Plan, up to a specified cut-off date (note after the cut-off date, Plan data is compared to current or re-forecasted future projections).

The screenshot shows a web-based configuration interface for a DSM report. At the top, there are navigation tabs: Expenditure Filters, Configuration, Report Types (selected), DR Allocation, Recall Saved Report, View Report, and Plan Snapshot. The main configuration area includes the following fields and options:

- DSM Report Type:** A dropdown menu set to "DSM Costs and Lost Revenues Report".
- Title:** An empty text input field.
- Period View:** Three radio buttons: "Total per Period" (selected), "Incremental", and "Cumulative".
- Labour Price Case:** A dropdown menu set to "Base Case".
- Utility Costs:** Three checkboxes: "Program Costs" (checked), "Incentives" (checked), and "Lost Revenues" (unchecked).
- Partner Costs:** Two checkboxes: "Program Costs" (unchecked) and "Incentives" (unchecked).
- Customer Costs:** One checkbox: "Total Project Cost and Ongoing Costs" (unchecked).
- Allocate Utility Overheads:** One checkbox (unchecked).
- Dollar Type:** Two radio buttons: "Nominal" (selected) and "Present Value".
- Rollup:** Two radio buttons: "By Sector/Project/Program" (selected) and "None".
- Sensitivity Case Type:** A dropdown menu set to "(All)".
- Sensitivity Case:** A dropdown menu set to "(None)".
- Data Choice:** Two radio buttons: "Forecast Only" (unchecked) and "Actuals + Forecast to Complete" (checked). To the right is the "Actuals Cut-Off Date" field, set to "31/07/2006" with a "dd/mm/yyyy" format indicator.
- Include Approved Plan:** A dropdown menu set to "38 - 2007 - DSM 20yr Plan - Sc.1".
- Generate:** A button at the bottom of the configuration area.

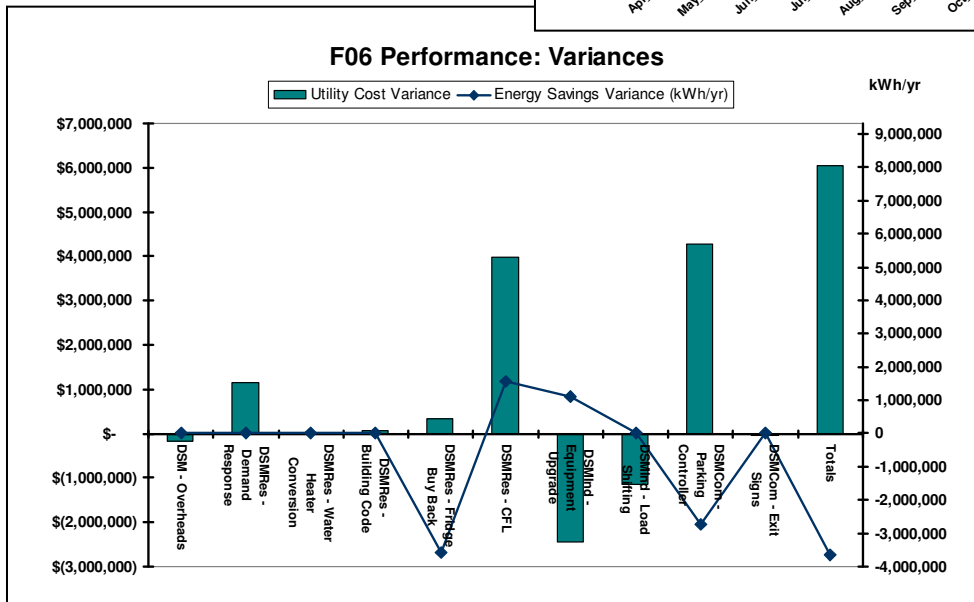
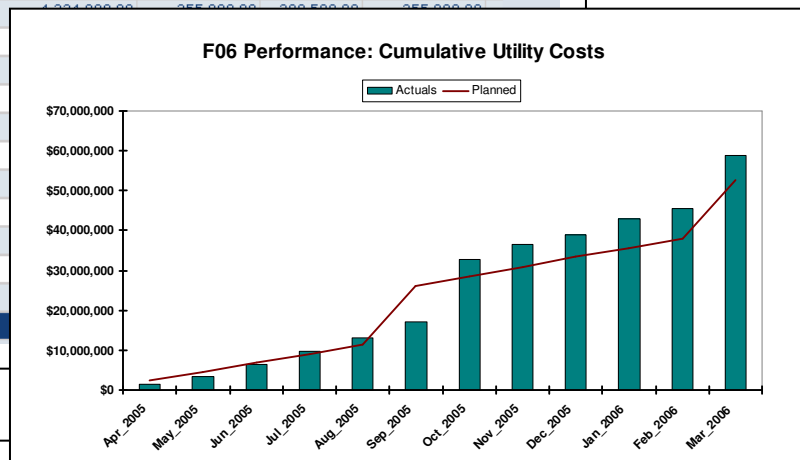
This capability significantly simplifies variance analysis and allows reports like those shown subsequently, to be easily produced. It also enables actual cost effectiveness to be calculated, and re-forecasting of remaining Program activity to be done, with interim “actual” performance being used to inform future forecasts.

DSM Costs and Lost Revenues Report

Title:

Savings Category:	All	Expenditure Portfolio:	All
Snapshot Date:	None	Discount Rate - Cost:	6.00%
Discount Rate - Energy:	6.00%	Scale:	Literal
Include Prior Items:	Yes	Utility Costs:	Program Costs, Incentives
Partner Costs:		Customer Costs:	No
Labour Price Case:	Base Case	Allocate Utility Overheads:	No
Dollar Type:	Nominal	Period View:	Total per Period
Include Approved Plan:	38 - 2007 - DSM 20yr Plan - Sc.1	Sensitivity Case:	None
Data Choice:	Actuals + Forecast to Complete	Actuals Cut-Off Date:	31/07/2006

Sector/Project/Program/Expenditure	P_Report Total	A+F_Report Total	P_Apr_2005	A_Apr_2005	P_May_2005
- 10 - DSM - Overheads	1,960,784.28	1,789,215.64	163,398.69	147,058.82	163,398.69
DSM Overheads - Default	1,960,784.28	1,789,215.64	163,398.69	147,058.82	163,398.69
- Residential	8,163,235.32	13,739,877.38	680,269.61	931,835.79	680,269.61
+ 7 - DSMRes - Demand Response	3,060,000.00	4,000,000.00	255,000.00	200,000.00	255,000.00
+ 6 - DSMRes - Water Heater Conversion	0.00	0.00	0.00	0.00	0.00
+ 3 - DSMRes - Building Code	84,999.96	84,999.96	0.00	0.00	0.00
+ 5 - DSMRes - Fridge Buy Back	965,294.16	965,294.16	0.00	0.00	0.00
+ 4 - DSMRes - CFL	4,052,941.20	4,052,941.20	0.00	0.00	0.00
- Industrial	42,244,000.00	42,244,000.00	0.00	0.00	0.00
+ 9 - DSMInd - Equipment Upgrade	26,824,000.00	26,824,000.00	0.00	0.00	0.00
+ 8 - DSMInd - Load Shifting	15,420,000.00	15,420,000.00	0.00	0.00	0.00
- Commercial	329,294.16	329,294.16	0.00	0.00	0.00
+ 2 - DSMCom - Parking Controller	270,000.00	270,000.00	0.00	0.00	0.00
+ 1 - DSMCom - Exit Signs	59,294.16	59,294.16	0.00	0.00	0.00
Totals:	52,697,313.76				



Aside from providing valuable information to DSM Planners and Managers on Programs that are still in mid-implementation, it also enables efficient and flexible accountability and performance reporting to be done, thus satisfying expectations of both internal and external stakeholders, and valuable lessons to be learned which can inform future DSM Program planning.

Technological Properties

- ASP.NET 1.1
- Microsoft IIS 6.0
- Windows Server 2003
- Relational Database Compatibility:
 - Oracle 9.2
 - SQLServer 2000
- Object-oriented design and programming with UML and C#
- Configurability:
 - User Interface labels for fields, buttons, menu items, and user messages are user-changeable using the Text Master feature within the product.
 - Pick-list contents are user-changeable using various change facilities within the product.
 - Pre-defined set of report types, with user-selectable filter criteria and other report criteria, including which columns to display.
- Scalability:
 - Linear scalability model.
 - Multiple processors and platforms for Application Server.
 - Single Database Server platform.
- Security:
 - Application-level authentication, authorization:
 - User ids, passwords
 - Permissions based on User Groups and Organization
 - Permissions are at a data type level, for create, update, view

Conclusion

In conclusion, ESP's efficient and flexible modeling approach, analytical power and reporting flexibility, combined with its technological platform and other features, facilitates more accurate and informed decision making, and hence greater understanding and stakeholder acceptance of utility DSM Plans. This leads to a more efficiently run and optimized DSM Portfolio, which in-turn yields a higher return on utility DSM investment.

ESP has been installed at BC Hydro in their DSM group, Power Smart, since the fall of 2005, and has been used to extensively model their current 10 year, \$600 million DSM Plan, which has targeted savings of approximately 3,600GWh/yr by 2011/12. ESP has been central to supplying information and answering questions related to BC Hydro's 2006 Rate Case filing with the British Columbia Utilities Commission. ESP is also currently being used to model and examine scenarios which well-surpass the 10 year, 3,600GWh/yr target, over a longer period, drawing on unrealized savings potential to-date in combination with potential changes to applicable regulations, legislation and rate structures.

Feedback to-date from users of ESP at Power Smart has been very positive, as evidenced by the following two testimonials:

"ESP will substantially improve the analytical foundation for our DSM decision-making relative to our previous experience with Excel workbooks."

John Duffy – Manager, Economic Analysis and Legislative Strategy - Power Smart, BC Hydro

"ESP enables users to build and analyze a wide range of DSM programs, both straightforward and complex. The insight it provides around the sensitivity of key variables is most useful, and it saves substantial time compared to traditional spreadsheet analysis. I have seen nothing like it in the industry."

Michael Weiss – ISE Consulting (consultant to BC Hydro's Power Smart group)

This document's Appendix provides a more detailed explanation of how ESP's key features can translate into tangible and quantifiable benefits to your organization.

About CopperLeaf Technologies Inc.

Copperleaf Technologies Inc., of Vancouver British Columbia, provides Demand-side Management and Asset Investment Planning software and services. CopperLeaf's enterprise solutions are built on a base of extensive experience in strategy and business process consulting to energy companies and utilities, bringing together the skills of management consultants and technology professionals that have assisted clients worldwide. Our management team and consulting staff have foundations in areas such as finance, planning, engineering, demand-side management, asset management, and rate design. Given our background, we are very familiar with the core and strategic business issues facing the utility industry today and into the future.

ESP is CopperLeaf's flagship product. ESP's demand-side management (DSM) module is a purpose-built, enterprise-wide DSM modeling, planning and reporting package that supports the business needs of DSM Planners and Managers throughout the entire DSM life cycle. From the identification and screening of savings potential, right through to the definition, approval, delivery and reporting of actual DSM Program and Portfolio performance, ESP's primary mission is to help DSM Planners and Managers efficiently maximize the value of their DSM investments, and effectively communicate their DSM Plans and Program performance with key stakeholders.

For more information on CopperLeaf Technologies, and ESP, please contact us at:

- **Web:** www.copperleafgroup.com
- **Telephone (toll-free in North America):** 1-888-465-5323
- **Email:** info@copperleafgroup.com

APPENDIX:

ESP – DSM Module: Key Features & Customer Benefits/Value Summary

Key Features	Customer Benefits	Value
<p>1. <u>Logical, robust and flexible modeling approach</u> enables users to build and assess conservation savings potential, DSM Program design alternatives, and overall DSM Investment Portfolio scenarios to a level of detail at which they are most comfortable. Some key modeling capabilities include:</p> <ul style="list-style-type: none"> • Retrofits and replacements (with life left on incumbent technologies) • Load shifting and displacement • Demand response • Fuel switching • “Devices” which control the consumption of other technologies • Customer and technology specific load shapes • Monthly, multi-year, regional, time-based tariff pricing and avoided cost valuations for multiple commodities for both consumption and delivery (i.e. energy and capacity) • Technical savings persistence, savings attribution rate, and new technology natural adoption curves • Combine multiple measures into “typical” participant Packages • “Lump” fuel savings associated with large projects, attached to individual customers and customer rate classes • Technology replacement and removal rates • Multiple incentive types that can differ by fuel (e.g. \$/unit, leveled \$/kWh, \$/kWh) • User-configured adjustment factors (e.g. free-riders, spill-over, cross effects, savings degradation, etc.) • Non-energy benefits and environmental externalities • Forecast most key variables over multiple years at a monthly, quarterly or annual grain. 	<p>Capability to model DSM measures and Programs substantially <u>faster</u>, and with <u>greater accuracy</u>, than can be done in spreadsheets. This means <u>better information</u> is available on which key investment decisions can be made and communicated, thus <u>reducing the likelihood of misallocation of resources</u> based on erroneous or inadequate information.</p> <p>Greater modeling accuracy, which leads to better and more transparent decision-making, increases the likelihood that understanding can be built amongst various stakeholder groups, thus <u>increasing the likelihood that proposed Programs and Plans are accepted, more quickly.</u></p>	<ul style="list-style-type: none"> • Reduced staff/consulting costs due to more efficient and flexible modeling platform. • More optimal allocation of limited capital, resulting in higher ROI and NPV to the utility. • Reduced staff/consulting costs related to preparation for regulatory hearings and responding to information requests, and better able to meet more complex requests.

Key Features	Customer Benefits	Value
<p>2. <u>Powerful sensitivity analysis functionality</u> enables users to quickly understand the impact of a change in one variable (such as participation, technology costs, avoided costs, customer tariffs, utility Program costs and incentives, non-energy benefits, and more), on the cost effectiveness of conservation savings potential, DSM Programs or Portfolios. Further, using the <u>Critical Values capability</u>, define various target cost effectiveness benefit/cost ratios and back-calculate the change on specific variables (such as. utility costs, benefits, avoided costs, technology and customer costs, lost revenue, and more) which can be tolerated.</p>	<p>Quickly and efficiently provides users with insight from which they can <u>understand and communicate the decision thresholds/tolerances</u> of key assumptions and variables on individual Programs, or on the entire DSM investment Portfolio.</p>	<ul style="list-style-type: none"> • Reduced staff/consulting costs. • More optimal allocation of limited capital, therefore higher ROI/NPV.
<p>3. <u>Comprehensive, efficient and flexible reporting engine</u> enables users to generate a multitude of costs, benefits, energy & capacity savings, greenhouse gas impact, and cost-effectiveness reports, over multiple years at monthly, quarterly or annual grains, from numerous perspectives and segmentations. Results can be drilled-down from Portfolio, to customer sector, to DSM Program, to DSM Program component, to DSM Program component alternative, and exported to Excel for further custom data manipulation or graphing.</p>	<p>Use reporting engine to inform decision making in real-time, and <u>efficiently satisfy internal and external stakeholder reporting requirements.</u></p>	<ul style="list-style-type: none"> • Better utilization of staff time, thus increasing hours to do other higher value tasks. • More optimal allocation of limited capital, therefore higher ROI/NPV.
<p>4. <u>Ability to create multiple Plan scenarios with different combinations of Programs and/or Program alternatives</u>, and “freeze”, modify or approve data at specific points in time mirrors real-world iterative utility Planning and Budgeting cycles. Then, <u>export “approved” Plans to Excel</u> with spending dollars organized by account or resource code, and/or by department.</p>	<p><u>Efficiently and accurately assemble and update Plans and Budgets</u> in an iterative environment, and export approved results to Excel for import to other systems (e.g. SAP, PeopleSoft).</p>	<ul style="list-style-type: none"> • Better utilization of staff time, thus increasing hours to do other higher value tasks.

Key Features	Customer Benefits	Value
<p>5. <u>Program-specific labor forecasting, by job group and department</u>, enable users to build Budgets and also ensure human resource requirements are balanced against organizational supply.</p>	<p><u>Reduce the time-consuming step of reconciling Program resources implied in spread sheet models, to department head-count</u>, and ensure human resource demand and supply are in balance such that planned work is possible to complete in the planned timeline.</p>	<ul style="list-style-type: none"> • Better utilization of staff time, thus increasing hours to do other higher value tasks. • More optimal allocation of limited capital, resulting in higher ROI and NPV to the utility.
<p>6. <u>Import (via Excel or direct) spending, participation and other actuals data</u> enables comparison to Plan and Forecast targets, and the ability to calculate “actual” cost effectiveness.</p>	<p><u>Easily run interim and post-completion cost-effectiveness reports, with actuals included</u>. This helps yield learnings for future Program initiatives and Planning cycles, and potentially flag in-progress initiatives which should be cancelled or modified.</p> <p><u>More efficiently meet internal and external stakeholder reporting requirements</u>, and demonstrate organizational commitment to accountability.</p>	<ul style="list-style-type: none"> • Reduced staff/consulting costs. • More optimal allocation of limited capital, resulting in higher ROI and NPV to the utility.

Key Features	Customer Benefits	Value
<p>7. <u>Centralized web-enabled architecture and technical platform</u> enable efficient storage and access of data, and consistent calculation of DSM-specific costs, benefits and cost effectiveness, in real-time.</p>	<p>Consistent and common use of key assumptions <u>ensure a level playing field when comparing initiatives</u>, and embedded calculations <u>reduce the chance of mathematical error</u>, and <u>eliminate the need to produce or customize economic spreadsheet models</u> for every Program or initiative being examined.</p>	<ul style="list-style-type: none"> • Better utilization of staff time, thus increasing hours to do other higher value tasks. • More optimal allocation of limited capital, resulting in higher ROI and NPV to the utility.
<p>8. <u>Historical data audit capability</u> on many key variables allows data changes to be traced, by date and user. <u>Snap-shot date feature</u> allows key reports to be reproduced in real-time, based on data that was “current” at specific dates in history, but which may have changed since.</p>	<p><u>More efficiently track down when changes were made and by whom.</u></p> <p>Eliminate the need to categorize, store and then find historical stand-alone spreadsheet models, and be able to <u>quickly compare assumptions and results from different points in time.</u></p>	<ul style="list-style-type: none"> • Better utilization of staff time, thus increasing hours to do other higher value tasks.
<p>9. <u>On-line searchable Help</u> provides real-time useful information to users on feature functionality and instructions on how to use them.</p>	<p><u>Users can quickly reference functional instructions</u>, and do not need to maintain separate documentation.</p>	<ul style="list-style-type: none"> • Enables the software to be efficiently used to its full capability.

Key Features	Customer Benefits	Value
<p>10. <u>Internal document attachments</u> allow supporting assumptions to be closely associated with Programs and easily referenced.</p>	<p><u>Eliminate time searching for background or supporting assumptions.</u> Be able to provide answers to “where did you get that?” type questions.</p> <p><u>Reduce the “cost” of staff turnover</u> and the inevitable loss of “institutional knowledge”.</p>	<ul style="list-style-type: none"> • Better utilization of staff time, thus increasing hours to do other higher value tasks • Value of retaining information to justify current decisions and inform future ones.
<p>11. <u>Multi-user concurrent access, each with their own defined permissions and preferences</u> ensure users are given access to only those areas and functions to which they are entitled, and can tailor the application to display items and enter data in their preferred manner.</p>	<p><u>Managers</u> only interested in viewing results and <u>performing their own “what-if” analysis on their own schedule</u> need not worry about finding and correctly manipulating spreadsheets.</p>	<ul style="list-style-type: none"> • Better utilization of staff time, thus increasing hours to do other higher value tasks.
<p>12. <u>Dynamic text feature</u> enables users to globally configure the application to display terms that are meaningful to their organizations.</p>	<p><u>Periodic changes in terminology can be quickly propagated</u> throughout the entire application, including displays and reports.</p>	<ul style="list-style-type: none"> • Better utilization of staff time, thus increasing hours to do other higher value tasks.