A REGULAR MEETING

Of The

TRAVERSE CITY LIGHT AND POWER BOARD

Will Be Held On

TUESDAY, March 9, 2010

At

5:15 p.m.

In The

COMMISSION CHAMBERS
(2nd floor, Governmental Center)
400 Boardman Avenue

Traverse City Light and Power will provide necessary reasonable auxiliary aids and services, such as signers for the hearing impaired and audio tapes of printed materials being considered at the meeting, to individuals with disabilities at the meeting/hearing upon notice to Traverse City Light and Power. Individuals with disabilities requiring auxiliary aids or services should contact the Light and Power Department by writing or calling the following.

Jessica Dezelski,
Administrative Assistant
1131 Hastings Street
Traverse City, MI 49686
(231) 932-4543

Traverse City Light and Power
1131 Hastings Street
Traverse City, MI 49686
(231) 922-4940

Posting Date: 03-5-10
3:00 p.m.

Light and Power Board
March 9, 2010

PLEDGE OF ALLEGIANCE

1. ROLL CALL

2. CONSENT CALENDAR

The purpose of the consent calendar is to expedite business by grouping non-controversial items together to be dealt with by one Board motion without discussion. Any member of the Board, staff or the public may ask that any item on the consent calendar be removed therefrom and placed elsewhere on the agenda for full discussion. Such requests will be automatically respected. If an item is not removed from the consent calendar, the action noted in parentheses on the agenda is approved by a single Board action adopting the consent calendar.

A. Consideration of approving minutes of the Joint Study Session of February 22, 2010.

B. Consideration of approving minutes of the Regular Meeting of February 23, 2010.

3. OLD BUSINESS

None as of March 5, 2010

4. NEW BUSINESS

A. Integrated Resource Plan presentation. (Rice/Feahr)

5. REPORTS AND COMMUNICATIONS

A. From Legal Counsel:

None as of March 5, 2010

B. From Staff:

(1) Update re: public forums. (Rice)

(2) Quarterly All Employee Staff Meeting March 12 at the Light & Power Service Center. (Rice)

C. From Board:

None as of March 5, 2010

6. PUBLIC COMMENT

/jd

TRAVERSE CITY
LIGHT AND POWER BOARD

Minutes of Joint Study Session of City Commission with
Traverse City Light and Power Board
Held at 7:00 p.m., Governmental Center, Commission Chambers
Monday, February 22, 2010

LIGHT AND POWER BOARD MEMBERS -

Present: Linda Johnson, Mike Coco, John Welch, James Hoogesteger, Ralph Soffredine, Jim Carruthers

Absent: John Snodgrass

EX OFFICIO MEMBER -

Present: Ben Bifoss, City Manager

OTHERS: Ed Rice, Tim Arends, Glen Dine, Jessica Dezelski, Karen Feahr, Mark Rollenhagen

The meeting was called to order at 7:00 p.m. by Mayor Bzdok.

1. **Presentation by Traverse City Light and Power regarding electric generation requirements.** The following individuals addressed the City Commission and Traverse City Light and Power Board:

   Ed Rice, Traverse City Light & Power Executive Director
   Rick Buckhalter, 932 Kelley Street

2. **Discussion regarding Traverse City Light and Power's WiFi Initiative.** The following individuals addressed the City Commission and Traverse City Light and Power Board.

   Ed Rice, Traverse City Light and Power Executive Director
   Michael Moore, Traverse City Film Festival President and Production Company owners, 232-233 East Front Street, Bellaire resident
   Rick Buckhalter, 932 Kelley Street
   Tino Breithaupt, Economic Development Senior Vice President, Traverse City Area Chamber of Commerce and Traverse Bay Economic Development Corporation.
   Bryan Crough, Community Development Director
   R. Ben Bifoss, City Manager

3. **Discussion regarding other topics of mutual interest.** The following individuals addressed the City Commission and Traverse City Light and Power Board:

   None.

4. **Public Comment.** The following individuals addressed the City Commission and Traverse City Light and Power Board:

Ross Richardson, 873 Washington Street

The meeting was adjourned at 9:09 p.m.

Edward E. Rice, Secretary
LIGHT AND POWER BOARD

/jd

TRAVERSE CITY
LIGHT AND POWER BOARD

Minutes of Regular Meeting
Held at 5:15 p.m., Commission Chambers, Governmental Center
Tuesday, February 23, 2010

BOARD MEMBERS -

Present: Linda Johnson, Mike Coco, John Welch, James Hoogesteger, Ralph Soffredine, Jim Carruthers

Absent: John Snodgrass

EX OFFICIO MEMBER -

Present: R. Ben Bifoss

OTHERS: Ed Rice, Tim Arends, Jessica Dezelski, Karen Feahr, Jim Cooper, Blake Wilson, Glen Dine

The meeting was called to order at 5:15 p.m. by Chairperson Johnson.

2. CONSENT CALENDAR

Moved by Welch, seconded by Soffredine, that the following items, as recommended on the Consent Calendar portion of the agenda, be approved:

A. Consideration of approving minutes of the Study Session of February 2, 2010.
B. Consideration of approving minutes of the Regular Meeting of February 9, 2010.
C. Consideration of approving minutes of the Closed Session of February 9, 2010.
D. Consideration of approving minutes of the Study Session of February 11, 2010.

CARRIED unanimously. (Snodgrass absent)

3. OLD BUSINESS

A. Keith Schneider made a presentation to the Board regarding the content and format of the upcoming public forums.

4. NEW BUSINESS

A. Moved by Welch, seconded by Hoogesteger, that the Light and Power Board approves the Organizational Chart as presented.

Roll Call:
Yes: Johnson, Coco, Welch, Hoogesteger, Soffredine
No: Carruthers

CARRIED. (Snodgrass absent)

Moved by Coco, seconded by Welch, that the Light and Power Board approves adding the staff position of Marketing and Community Relations Coordinator, grade 2, with a pay range of $47,588 to $61,865 plus benefits.

Roll Call:
Yes: Johnson, Coco, Welch, Hoogesteger, Soffredine
No: Carruthers

CARRIED. (Snodgrass absent)

Moved by Welch, seconded by Coco, that the Light and Power Board approves adding the staff position of Network Administrator, grade 3, with a pay range of $50,919 to $66,195 plus benefits.

Roll Call:
Yes: Johnson, Coco, Welch, Hoogesteger, Soffredine
No: Carruthers

CARRIED. (Snodgrass absent)

B. Moved by Welch, seconded by Hoogesteger, that the Board authorize the Chairman and Secretary to enter into a Tree Trimming Services Agreement with Trees Inc, in the amount of $102,783.77 for trimming of the HL-21, HL-22, BW-22, BW-31 circuits; also for any additional work at an hourly/weekly rate of $71.57 and $2862.80 respectfully; and to authorize the Executive Director to administer amendments and change orders that are in the best interest of the department; subject to approval as to form by counsel.

Roll Call:
Yes: Johnson, Coco, Welch, Hoogesteger, Soffredine
No: Carruthers

CARRIED. (Snodgrass absent)

5. REPORTS AND COMMUNICATIONS

B.
(1) Jim Cooper spoke re: the Block-LED grant.
(2) Jim Cooper spoke re: energy optimization program.
(3) Karen Feahr spoke re: the Wood Energy Summit.
(4) Ed Rice spoke re: upcoming public forums on February 25 at 7:00 p.m. at the Opera House, February 27 at 2:00 p.m. at the Hagerty Center and April 7 at 7:00 p.m. at the Hagerty Center.

6. PUBLIC COMMENT

No one from the public commented.

The meeting adjourned at 6:43 p.m.

Edward E. Rice, Secretary
LIGHT AND POWER BOARD

/jd

TRAVERSE CITY
LIGHT & POWER

To: **Light and Power Board**

From: Karen Feahr, Energy Supply Manager KEF

Date: March 5, 2010

Subject: Integrated Resource Plan – Final Report

The Final Report of the Integrated Resource Plan was completed on February 25 and has been distributed to the Board. The Executive Summary is attached. A presentation on the IRP will be made at the March 9 Board Meeting.

Introduction

Traverse City Light and Power ("TCLP") is a municipally-owned entity of the City of Traverse City (the "City") established in 1912, which is governed by an Electric Utility Board. TCLP provides electric service to a mix of residential, commercial, and diversified industrial customers totaling approximately 11,000 customers within the City's geographic limits and surrounding areas. TCLP's mission is to provide affordable rates, ensure high levels of customer satisfaction, and provide reliable utility service to its customers. In 2008, TCLP had a total annual load of approximately 343,000 megawatt-hours (MWh) and summer peak demand of 64.9 megawatts (MW). The 2009 summer peak demand was approximately 67 MW, which was lower than the projected value of 74.6 MW as a result of the economic recession and mild weather.

Based on TCLP's commitment to provide reliable electric service and the long-term investments and strategies needed to address growing electric demand in its service territory, TCLP has commissioned R.W. Beck to conduct an integrated resource planning study ("IRP Study") over a study period 2009-2028 ("Study Period"). The integrated resource plan ("IRP") is a long-term (20-year) comprehensive energy resource plan to meet TCLP's projected electric power requirements. The IRP is based on detailed computer modeling techniques and risk analysis, and includes energy efficiency programs, an expanded renewables program, the utilization of existing generation resources, and the development of new, local electric power generation. The IRP provides a strategy that is designed to meet the objectives of balancing cost, risk and reliability for customers in light of the significant uncertainties that exist in the energy industry. The IRP reflects TCLP's best efforts on how to meet customer energy needs over the next two decades in a balanced manner.

This IRP Study was performed under that certain agreement dated April 20, 2009 between TCLP and R. W. Beck (the "Agreement"). This report has been prepared for the use of TCLP for the specific purposes identified in this report. This report is solely for the information of and assistance to TCLP and should not be relied upon for any other purpose or by any other party unless authorized in writing by R. W. Beck in accordance with the Agreement.

Electric Demand and Capacity Resources

In July 2009, R. W. Beck prepared an econometric load forecast for TCLP for the period 2009 through 2028, which reflects a "business-as-usual" growth trend and an adjusted load forecast to account for the implementation of an Energy Optimization

Plan ("EOP") as required under Michigan Public Act 295. The adjusted load forecast projects the peak demand to grow to approximately 83.5 MW by 2028. Table ES-1 below shows a summary of TCLP's forecast after accounting for the impact of the EOP.

Table ES-1
TCLP Load Forecast After EOP Impacts

	Fiscal Year Energy		Calendar Year Peak Demand		
	(MWH)	% Change	(MW)	% Change	Load Factor
2009	347,786		74.6 [1]		53.2%
2010	349,887	0.6%	74.9	0.4%	53.3%
2011	351,813	0.6%	75.1	0.3%	53.5%
2012	353,373	0.4%	75.1	-0.1%	53.7%
2013	355,363	0.6%	75.5	0.6%	53.7%
2014	364,649	2.6%[2]	77.2	2.2%	53.9%
2015	367,082	0.7%	77.6	0.4%	54.0%
2016	369,711	0.7%	77.7	0.2%	54.3%
2017	372,354	0.7%	78.3	0.7%	54.3%
2018	375,211	0.8%	78.7	0.5%	54.5%
2019	378,189	0.8%	79.1	0.5%	54.6%
2020	381,371	0.8%	79.3	0.3%	54.9%
2021	384,585	0.8%	80.0	0.8%	54.9%
2022	387,993	0.9%	80.5	0.6%	55.1%
2023	391,499	0.9%	81.0	0.6%	55.2%
2024	395,186	0.9%	81.3	0.4%	55.5%
2025	398,971	1.0%	82.0	0.9%	55.5%
2026	402,929	1.0%	82.6	0.7%	55.7%
2027	406,889	1.0%	83.1	0.7%	55.9%
2028	411,023	1.0%	83.5	0.4%	56.2%

[1] The actual peak demand for 2009 was 67 MW.

[2] It has been assumed that TCLP will gain a significant number of customers from Consumers Energy beginning 2014.

TCLP has ownership shares in two coal-fired power plants, Belle River, operated by Detroit Edison, and Campbell 3, operated by Consumers Energy, and a combustion turbine unit, operated by Michigan Public Power Agency ("MPPA"), and owns and operates a wind turbine located in its service area. The combined dependable operating capacity of the TCLP generating facilities is approximately 58.4 MW. TCLP's current generating resources are described in more detail in Table ES-2 below.

Table ES-2
Summary of TCLP Generation Resources

Unit	Technology	Fuel	Net Capacity MW	In-Service Year
Belle River	ST	Coal	10.5	1983
Campbell Unit 3	ST	Coal	10.4	1980
Kalkaska CT	CT	Natural Gas	36.9	2003
Traverse Wind	Wind	N/A	0.6	1996
Total			58.4	

TCLP is also a member of MPPA and a member of MPPA's power pool, which provides access to excess energy and supplemental energy needs of several other MPPA municipal members from which to buy supplemental power and sell excess power. Transactions among the power pool members are based on a purchase power contract with MPPA, which will expire December 31, 2010.

In order to meet TCLP's projected additional need for capacity and renewable energy resources, it has recently entered into a 20-year Power Purchase Agreement ("PPA") for 10 MW of wind energy from Heritage Stoney Corners Wind Farm I, LLC ("Heritage Wind"), which will increase TCLP's renewable energy portfolio. It is also planning to enter into a PPA for approximately 2 MW of landfill gas from Granger Electric of Michigan, LLC ("Granger Landfill Gas") as a member of MPPA.

Figure ES-1 below illustrates TCLP's projected demand and capacity requirements based on the load forecast, existing resources, new PPAs and a 15% reserve margin over the Study Period. As shown below, even with the new PPAs acquired during 2009, TCLP will experience a capacity shortfall beginning 2011 without additional generating resources. TCLP current plans are to fill the shortfall over the period 2011 through 2014 through short-term purchases until additional generation can be installed or acquired. Note that the wind capacity, including the Heritage Wind PPA, is counted at only 8.0% of its installed capacity. This adjustment is based on a MISO standard and is intended to reflect the fact that wind units are not dispatchable and typically operate at less than their rated capacity during summer peak periods. As a result, the Heritage Wind PPA and TCLP's existing 0.6 MW wind unit are discounted to 0.8 MW and 0.05 MW, respectively.

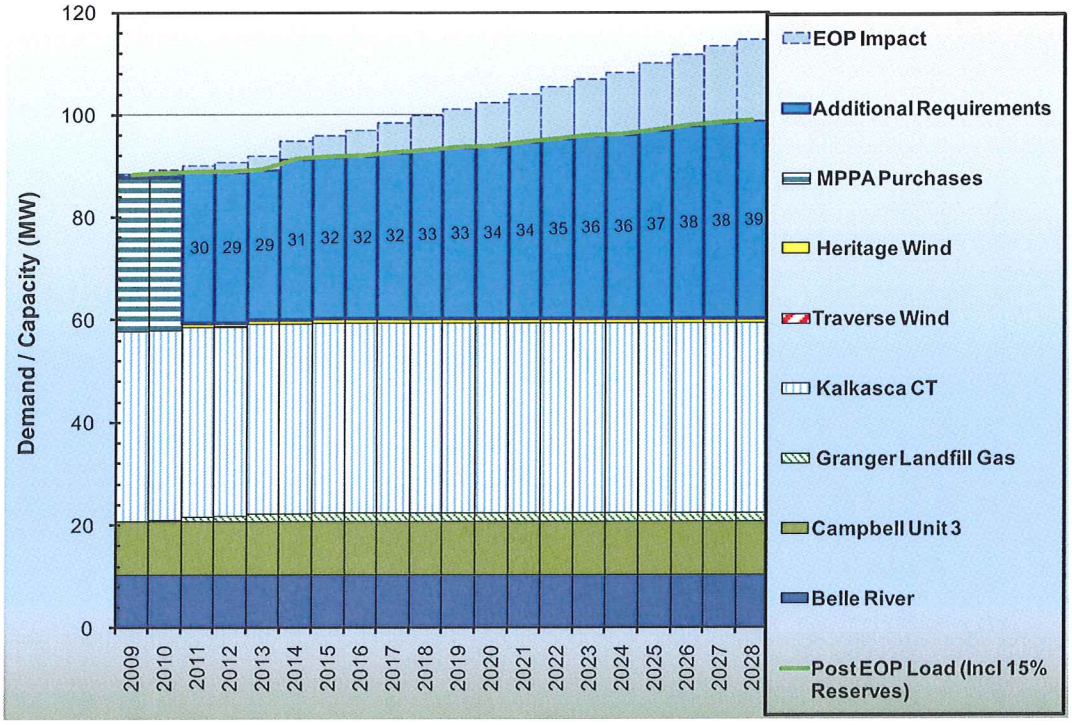

Figure ES-1: Traverse City Light and Power Capacity and Demand Summary

In order to meet the capacity and energy requirements in 2015, it is imperative to have a resource plan and strategy to implement the development, construction and commissioning of the next increment of generation. The additional generation resource(s) should be consistent with TCLP goals and comply with the Michigan renewable energy standards.

Fuel Mix

Preserving fuel diversity in power generation and balancing the risks associated with future fuel prices and price volatility are key principles of TCLP's strategic plan. To reduce risk and provide for continued flexibility, it is a goal of TCLP that its generation be powered by a variety of fuels, including natural gas, coal and a range of renewable sources. Figure ES-2 illustrates TCLP's current capacity fuel mix based on owned and contracted capacity in 2010 (with wind resources shown at nameplate capacity).

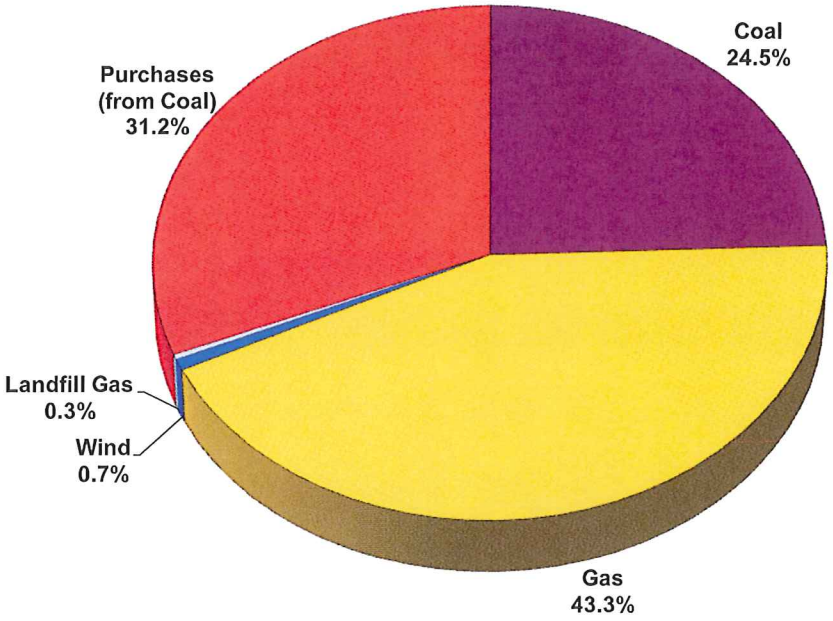

Figure ES-2: Traverse City Light and Power Capacity Fuel Mix in 2010

As the chart shows, coal currently represents more than one-half of the current fuel mix based on capacity and, given its typically high capacity factor, is a key contributor to lower overall fuel costs and reduced price volatility for customers. However, gas is also an important contributor to the diversity of the portfolio.

Figure ES-3 shows the projected capacity fuel mix as of 2015 under a resource portfolio option that is identified later, in the results discussion, as a potential optimal resource mix, including the existing coal, gas, and renewables capacity, along with additional gas-fired combustion turbine and biomass capacity. Additional potential optimal resource portfolios discussed later include larger amounts of biomass capacity.

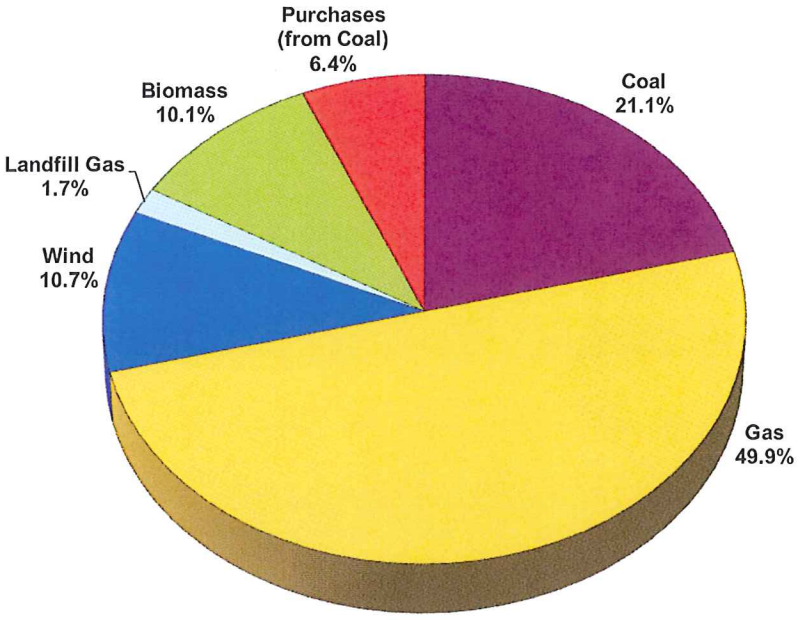

Figure ES-3: Traverse City Light and Power Capacity Fuel Mix in 2015

As illustrated in Figure ES-3, the 2015 fuel mix is fairly different from 2010, with the capacity contribution of renewables increasing to approximately 23% from 1%, of gas increasing to approximately 50% from 43%, and coal decreasing to approximately 28% from 56%. Importantly, the coal and biomass resources can be expected to operate at much higher capacity factors than the gas resources, such that the fuel mix on an energy basis would be much more weighted to those resources. The 2015 fuel mix increases the diversity of the overall portfolio principally from additional renewable sources, while retaining the benefits of fossil fuel diversity by continuing to include significant natural gas and coal contributions. The portfolio also retains some flexibility associated with short-term purchases.

IRP Process

R. W. Beck's process in developing a successful integrated resource plan includes the following:

- Development of a load forecast that reflects TCLP's Energy Optimization Plan ("EOP")
- Identification of viable generating resource options and development of the costs and operating characteristics of each option that meet the goals and standards set by TCLP
- Projections of fuel costs and power prices in the Michigan region

- Busbar[1] screening analyses of the generation options
- Development of the optimal resource plan(s) that take into account costs and risks of all alternatives and combinations of alternatives

Prior to performing the resource expansion optimization analysis, all generating resource alternatives evaluated for the IRP Study were assessed for their levelized cost (or average present value costs) over a consistent study period and operation relative to all other alternatives, a process frequently referred to as a busbar screening analysis.

Following the busbar screening analyses, the generating resource alternatives that were identified as reasonable candidates for further evaluation were combined in a resource expansion optimization model to identify an optimum resource expansion plan. The model used by R. W. Beck incorporates an algorithm that couples a rigorous dynamic programming optimization process with a stochastic[2] representation of uncertain future conditions for load, fuel prices, carbon dioxide ("CO_2") prices, and power prices. The model thus produces a least-cost resource plan (at a given risk tolerance) by simulating the real option cost and value of resource expansion decision-making that occurs in actual utility practice.

Economic and financing assumptions, load forecast, fuel prices, emission allowance prices, generating resource characteristics and costs, and other general assumptions used to perform the generation expansion analysis are set forth in Section 2 of the Report and are summarized under the section entitled 'Principal Considerations and Assumptions' near the end of the Executive Summary.

Busbar Screening Analysis Results

Generating resources are compared on a total average present value dollars per MWh basis over a range of capacity factors considered reasonable for the type of resource being evaluated. When a generating resource alternative is found to be lower cost than all, or many, other alternatives in a particular class of resources, the alternative would be retained for further investigation. Experience demonstrates that alternatives that possess the lowest average total production cost within a given operating range (capacity factor) using a busbar screening approach will likely also be identified as the principal alternatives selected through a more rigorous dynamic optimization analysis. The detailed results of the busbar screening analysis are set forth in Section 3 of this Report.

Figure ES-4 below provides a summary of the present value average costs, in 2008 dollars, over the period 2011 through 2028 of the resources included in the busbar screening analysis over a range of capacity factors.

[1] The busbar screening analyses only include capital and operating costs of each resource alternative, but do not include the cost of transmission. The cost of transmission was assumed to be generally comparable for the evaluated resource alternatives.

[2] Stochastic projections reflect the uncertainty and volatility in forecasting variables such as fuel costs and electric loads. A stochastic projection is usually captured by forecasting future values based on past economic behavior and numerous future outcomes. The resulting stochastic projection provides a range of potential values instead of one forecasted value.

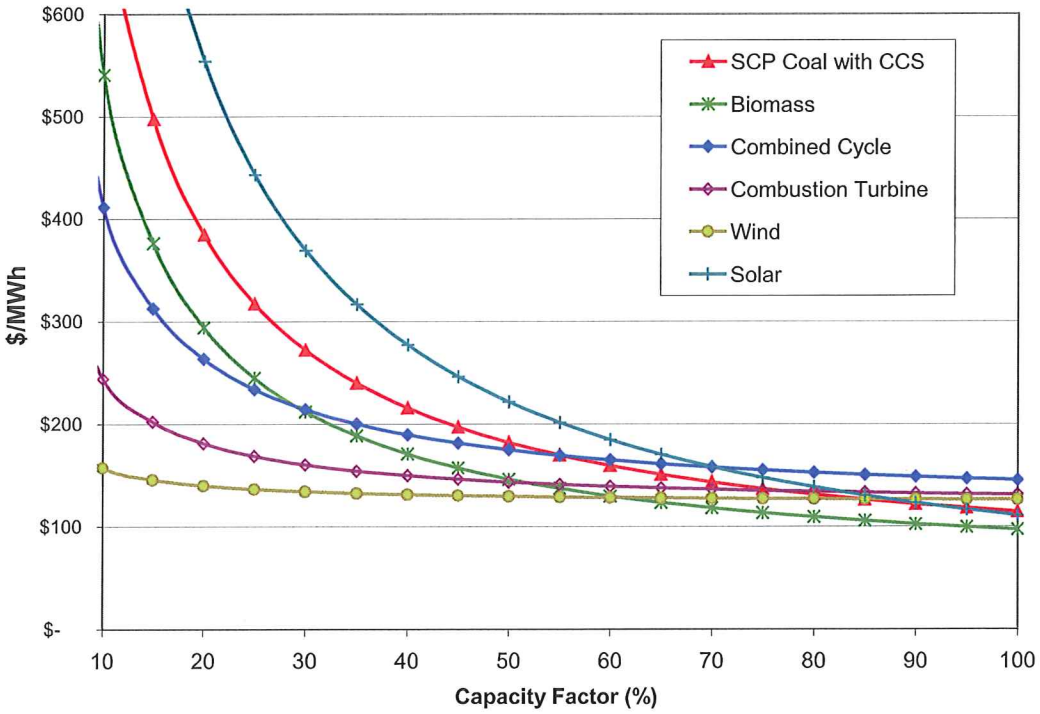

Figure ES-4: Average Levelized Cost v. Capacity Factor

The results of the screening analysis suggest that the Heritage Wind PPA is the lowest cost resource at low capacity factors and that the Biomass unit is the lowest cost resource at high capacity factors. Given the high capital cost of the solar photovoltaic resource, this resource has a higher energy cost throughout most of the capacity factor range. The points of intersection between any two-cost curves suggest a break-even between the two resources in question, beyond which the lower cost resource would be preferred. For example, the combined cycle and supercritical pulverized ("SCP") coal with carbon capture and sequestration ("CCS") resource intersect near 55% capacity factor. Beyond this point, the coal resource is able to spread the greater capital cost over more hours and achieve lower cost than the combined cycle resource.

However, it is important to consider the capacity factors over which the resource in question would typically operate. It also must be recognized that this simplified analysis does not take into account the benefit of dispatchability, meaning the ability to dispatch the unit when it is most advantageous. For example, the wind and solar resources are unlikely to achieve capacity factors beyond 30% and 50%, respectively. Therefore, the solar resource is clearly not economic in the majority of situations, at the estimated capital cost. In addition, considering that the wind resource will only generate electricity when the wind is blowing, it is unable to be reliably dispatched at the times of the highest load and highest market prices. Therefore, despite the appearance of lower average cost, the wind resource is more than likely inferior to the combustion turbine resource, from a pure economic perspective.

Generation Resource Expansion Results

R. W. Beck utilized a proprietary dispatch simulation and dynamic resource optimization model to simulate the addition and dispatch of TCLP's existing resources and all possible combinations of varying amounts of each resource type, in some cases, up to certain limits. The resource optimization algorithm determines when and in what order resources should be added to minimize total power costs, given the uncertainty in future conditions over the Study Period. The "Optimal Resource Expansion Plan" is the generating resource plan that produces the lowest present value of total expected power supply costs and within a given risk tolerance.

Given uncertainty with respect to the opportunities, TCLP has or will have to install Biomass capacity locally, the upper limit in the number of Biomass resources that were allowed to be added were varied to create the following potential Optimal Plans.

- Case 1: 10 MW (a single unit) of the Biomass resource option
- Case 2: 20 MW (two units) of Biomass
- Case 3: 30 MW (three units) of Biomass

Optimal Resource Plan

Case 1 Results - Figure ES-5 depicts the optimal resource expansion plan for TCLP based on the assumptions described in Section 2 and the consideration of only one Biomass unit. The analysis suggests an expansion plan with TCLP's existing resources, including the 10 MW of the Heritage Wind PPA, the full 10 MW of available Biomass capacity, brought online in 2015 (the first year available), and approximately 13 MW of Combustion Turbine capacity, also brought online in 2015.

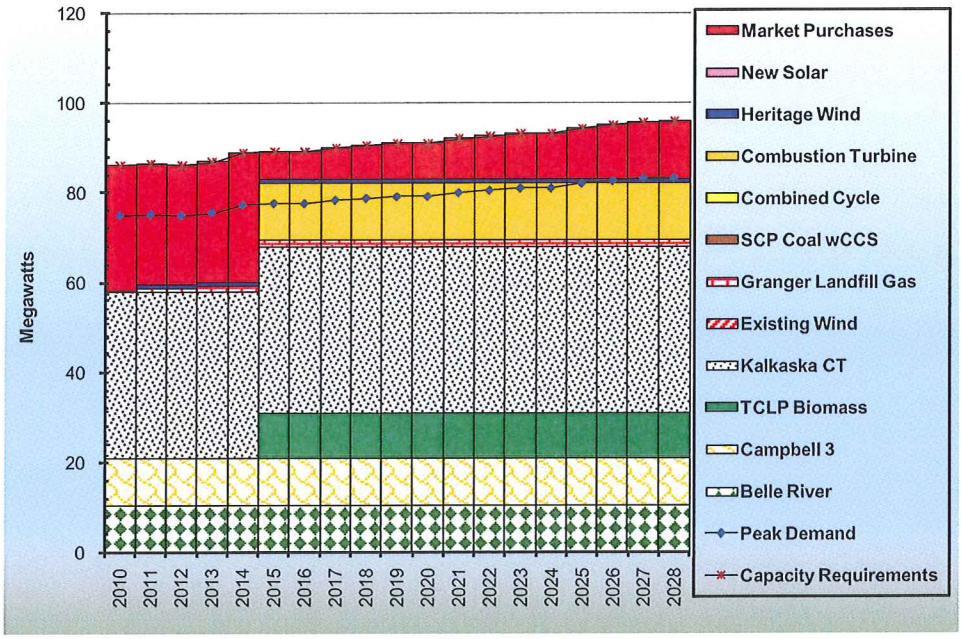

Figure ES-5: Optimal Plan – Case 1

Figure ES-6 below depicts the range of projected annual average power costs under the Case 1 Optimal Plan. The lines shown include the expected value, or mean, across the draws and the 5th and 95th percentiles, encompassing 90 percent of the potential power costs. In the upper left corner of the graph is shown the levelized power costs over the Study Period and the standard deviation, across the draws.

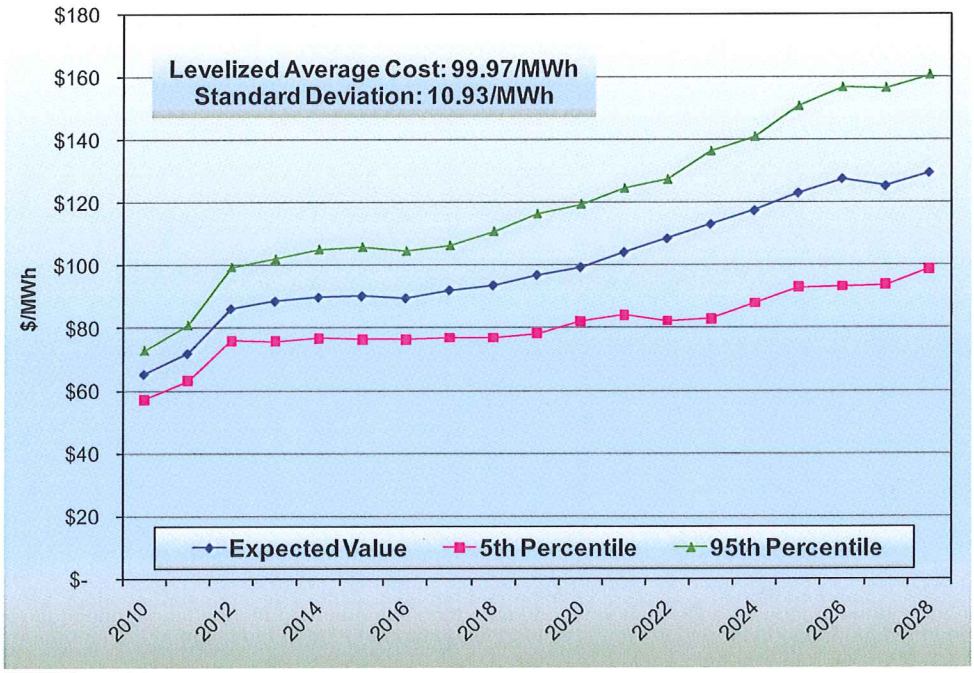

Figure ES-6: Range of Power Supply Costs – Case 1

Case 2 Results - Similarly, Figures ES-7 and ES-8 below depict the optimal resource expansion plan for TCLP, based on the consideration of up to two Biomass units, and the resulting range of projected annual average power costs, along with the levelized cost and standard deviation across the draws. Similar to the Case 1 results, the full amount of available Biomass capacity (20 MW) is brought online in the first available year. Most of the remaining capacity needs are fulfilled through the addition of approximately 6.3 MW of combustion turbine capacity.

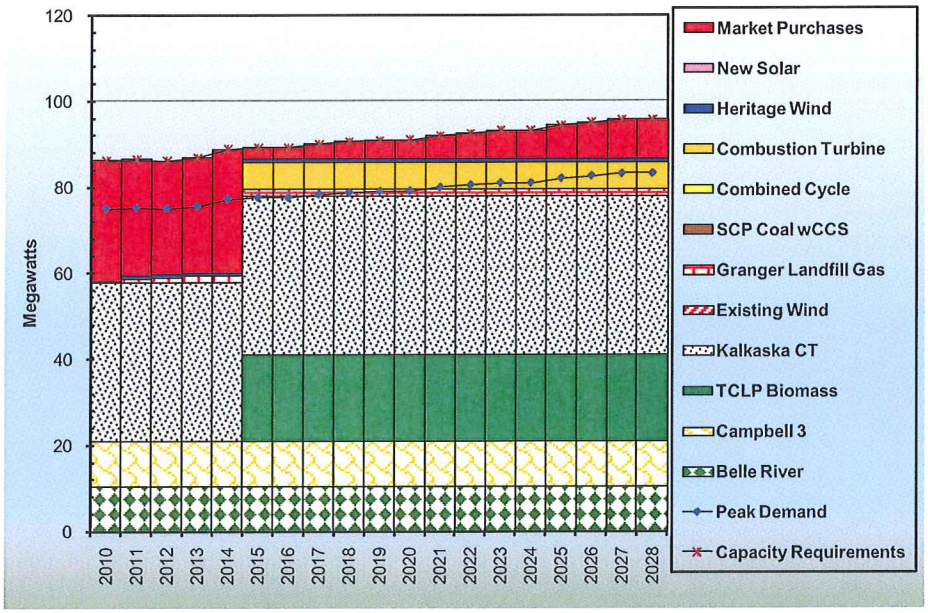

Figure ES-7: Optimal Plan – Case 2

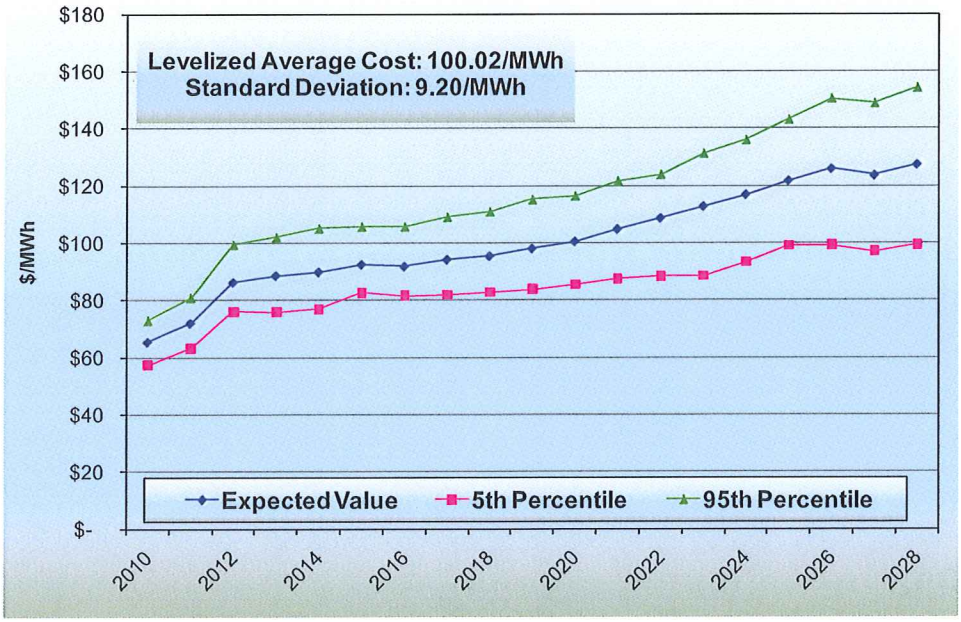

Figure ES-8: Range of Power Supply Costs – Case 2

Case 3 Results - Finally, Figures ES-9 and ES-10 below depict the optimal resource expansion plan and the resulting range of projected annual average power costs for Case 3. Similar to the results for Cases 1 and 2, the upper limit of 30 MW of Biomass capacity is selected for installation, the first two units of 10 MW each in 2015 and the third unit in 2016 or thereafter. This amount of capacity, combined with TCLP's existing resources meets nearly all of TCLP's capacity needs over the Study Period, with the rest being fulfilled with short-term capacity purchases.

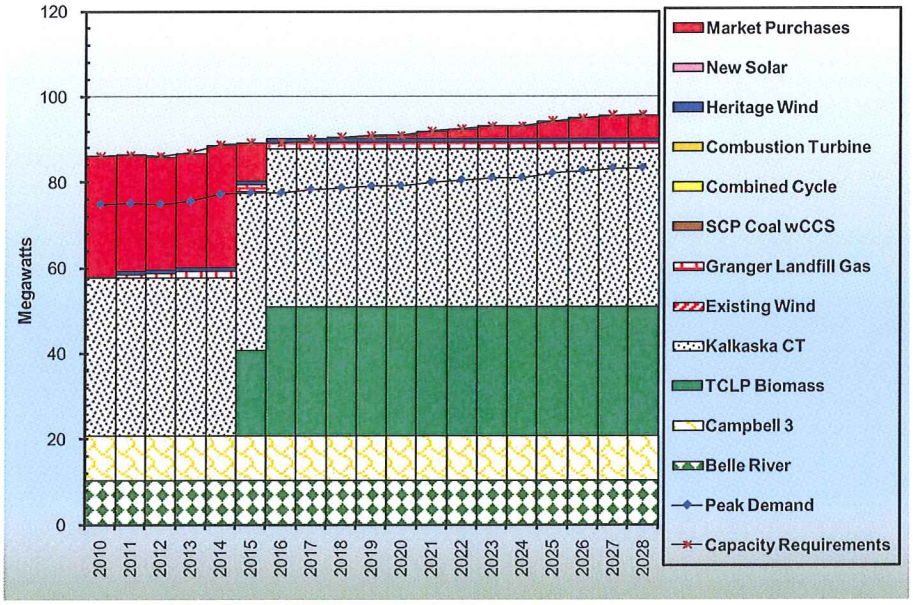

Figure ES-9: Optimal Plan – Case 3

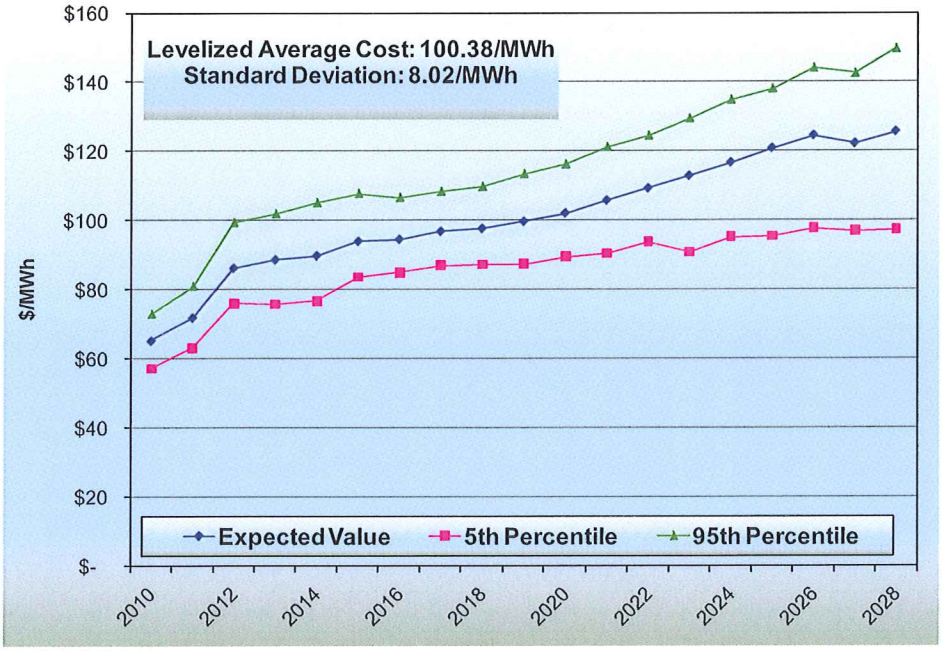

Figure ES-10: Range of Power Supply Costs – Case 3

Sensitivity of Results to Natural Gas Prices

In order to assess the sensitivity of the Optimal Plans to higher and lower natural gas prices, Cases 1 through 3 (again corresponding to varying levels of maximum allowed Biomass capacity) were re-simulated with higher and lower natural gas prices, set to the 70th and 30th percentiles, respectively. The resulting gas prices correspond to levels at which gas prices are only 30% likely to be higher or lower, respectively. Under the High Gas Prices sensitivity case, gas prices are on average approximately 27% higher than the expected gas prices. Under the Low Gas Prices sensitivity case, gas prices are on average approximately 21% lower than the expected prices.

The results of this scenario showed that the Optimal Plans in each case were essentially unaffected by the High Gas Prices sensitivity. This is primarily because the Optimal Plans already resulted in essentially the maximum amount of Biomass capacity possible being selected. The Combustion Turbine capacity selected in Cases 1 and 2 were also unaffected, as the market is similarly influenced by natural gas prices as the operating costs of this technology. However, the resulting market prices are still not high enough to warrant the higher capital costs of building the SCP Coal with CCS resource or additional renewable resources.

The Low Gas Prices sensitivity, on the other hand, resulted in Optimal Plans reflecting significant delays in the build-out of Biomass capacity. However, the ultimate amount of Biomass capacity that was reflected in the Optimal Plan was the same. Figure ES-11 provides an example, using the results of Case 2, which corresponds to a maximum allowed Biomass capacity of 20 MW. As compared to the results under expected gas prices, shown in Figure ES-7, the Optimal Plan under this sensitivity reflects only 10 MW of Biomass capacity added in 2015, with the remaining allowed 10 MW not built until 2026. The 6.3 MW of Combustion Turbine capacity is also added in 2015, as in the expected case. The Low Gas Prices sensitivity also reflects the market being relied upon for a greater share of capacity and energy needs.

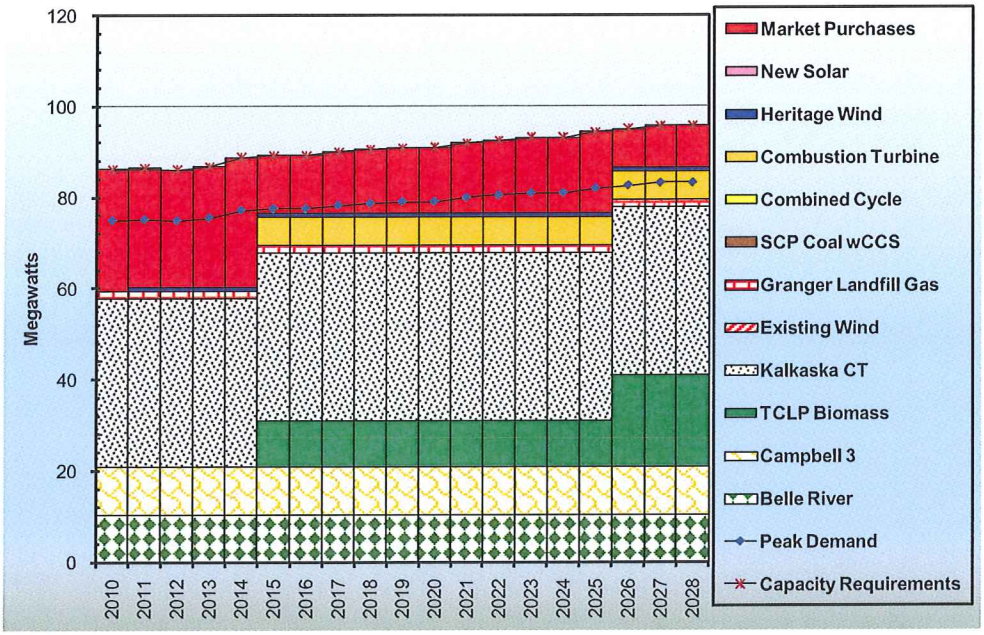

Figure ES-11: Optimal Plan – Case 2 (Low Gas Prices Sensitivity)

Costs versus Risks

Figure ES-12 below provides a comparison of the three alternative Optimal Expansion Plans versus the Base Plan in the form of an X-Y chart, which combines both the levelized power cost over 2011-2028 for each plan and its standard deviation. The relative position of each plan along the X- and Y-axes corresponds to a trade-off between a preference for lower expected costs and a preference for projected costs of greater certainty (i.e., lower standard deviation), with points closer to the origin being overall more preferred. It is up to the utility planner to determine the acceptable trade-off between resource plans of lower cost versus those of lower uncertainty.

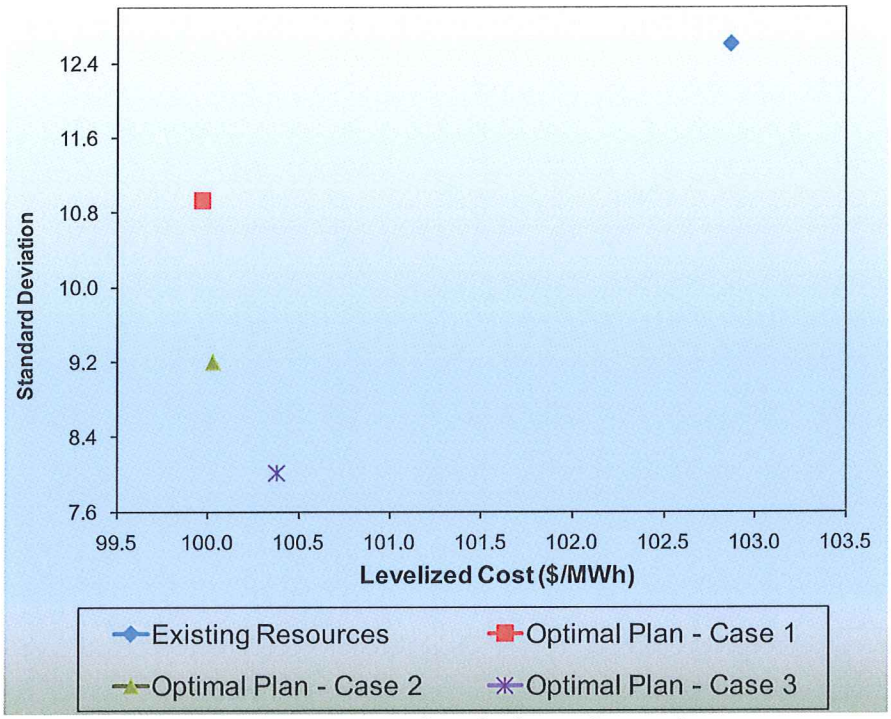

Figure ES-12: Power Supply Costs Comparison

The results reflect that the Optimal Plans result in lower average levelized cost than the Existing Resources, and that they also successively lower the standard deviation of levelized power costs across the draws. The Optimal Plans add a significant amount of Biomass capacity, which both lowers the average levelized cost and significantly lowers the variability in levelized cost, which is evident in the lower standard deviation. This is most likely driven from the fact that the Biomass resource utilizes fuel that is subject to less volatility than gas-fired resources, based on the assumptions relied on herein, which also influence market prices more so than other fuel types.

The overall results discussed above suggest that, given the resource options that have been considered and the assumptions discussed in Section 2, TCLP is projected to achieve lower cost and greater certainty of cost with as much as 20-30 MW of Biomass capacity to be brought online over 2015-2026. These units are intended to operate at high capacity factors, and indeed must be to support steam or hot water sales to which they would be tied. Given that amount of capacity and TCLP's other resources, it is estimated that as much as 40% of the energy generated by this amount of Biomass capacity would be surplus to be sold into the wholesale market for the first several years of the Study Period. While the risks associated with this surplus energy are accounted for in the simulations that support the additions of Biomass capacity, TCLP should consider its tolerance for risk and perhaps limit its exposure somewhat. Accordingly, the Case 2 results, which consist of the additions of 20 MW of Biomass capacity and approximately 6.3 MW of Combustion Turbine capacity appear most reasonable and representative of balancing TCLP's goal of lowest cost and minimizing risk. Given the results of the Low Gas Prices sensitivity, TCLP might consider

building a smaller amount of Biomass capacity in the 2015 timeframe and building additional capacity somewhat later. This would afford TCLP some flexibility in the event that the relatively low natural gas prices that are evident today appear likely to be sustained in the long-term.

REP Results

Figure ES-13 below provides a graphical representation of the projected amount of renewable generation in TCLP's portfolio as compared to the REP goal outlined in Michigan Public Act 295. The chart shows that the Existing resources, with the Heritage PPA are projected to be well above the state requirements through 2014 and exactly meet the current State REP Goal for 2015 and beyond. The additions of significant amounts of Biomass capacity reflected in the Optimal Plans result in renewable generation that far exceed the State REP requirements, as well as TCLP's RPS Goal, over the Study Period.

The State REP Goal shown below is intended to represent how that legislation will be interpreted for purposes of tracking TCLP's renewable requirements. The growth in the renewable percentage through 2015 is based directly on the percentages outlined in the legislation, while the percentages beyond 2015 are based on the amount of renewables required in 2015 applied to the forecasted energy requirements, net of the EOP, over the forecast horizon. This results in a slightly declining required share of renewable generation, as TCLP's energy requirements are forecasted to grow by 0.9% per year over 2010-2028.

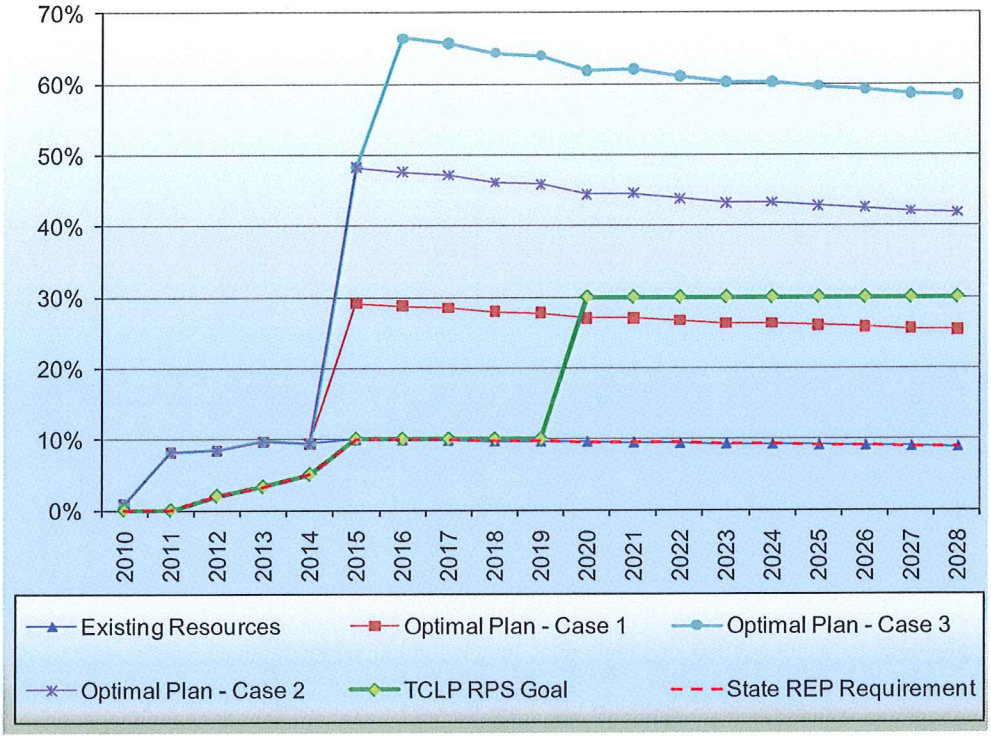

Figure ES-13: Renewable Generation v. Michigan REP Goal

Principal Considerations and Assumptions

In the preparation of this report and the opinions, which follow, we have made certain assumptions with respect to conditions that may occur in the future. TCLP has also made certain assumptions with respect to its projections of future operations. We have used and relied upon certain information and assumptions provided by TCLP, as well as certain information and assumptions provided to TCLP by others. To the extent that actual future conditions differ from those assumed herein, the actual results will vary from those forecast. The principal considerations and assumptions made in preparing this report that were made by us or provided to us by TCLP or others are set forth in Section 2 of the Report and the key assumptions are summarized below.

The generation resource options considered in the IRP include the following:

- Supercritical pulverized coal-fired steam plant with CCS (SCP Coal with CCS) – 8.5 MW
- Combined cycle gas turbine (SOLAR[3] Model T70-CC1 with combined heat and power 'CHP' operation) – 8.0 MW
- Simple cycle combustion turbine (SOLAR Model T70-SC1) – 6.3 MW
- Solar Photovoltaic (Solar PV) – 0.1 MW per year (total of 0.5 MW available)
- Wind Heritage PPA (based on Heritage PPA prices) – 10 MW
- Biomass (Gasification configuration with CHP operation) – 10 MW (as defined by TCLP)

For the SCP Coal with CCS resource, it is assumed that TCLP would jointly participate with other municipal or investor-owned utilities in a larger-scale plant totaling 544 MW.

[3] SOLAR – Solar Turbines Incorporated, a subsidiary of Caterpillar Inc., is one of the world's leading manufacturers of industrial gas turbines, with more than 13,400 units and over 1.4 billion operating hours in 96 countries.

Table ES-3 presents the estimated costs and operating characteristics for each of the resource options considered in the IRP Study.

Table ES-3
TCLP New Resource Characteristics

	SCP Coal with CCS [1]	CHP Biomass [2]	Combined Cycle	Combustion Turbine	Heritage Wind [2]	Solar PV [2]
Type			SOLAR Model T70-CG1	SOLAR Model T70-SG1	PPA	
Capacity (MW)	544	10	8	6.2	10	0.1
Fuel	Coal	Biomass	Natural Gas	Natural Gas	Wind	Solar
Earliest In Service Date	2018	2015	2015	2015	2011	2012
Construction Period (months)	72	48	48	36	-	24
Capital Cost (2009$/kW; Incl'd IDC)	$6,774	$4,000	$1,428	$1,291	-	$10,000
Financing Period (years)	40	30	30	30	-	20
Bond Rate for DS %	6.0%	6.0%	6.0%	6.0%	-	6.0%
Fixed O&M (2009$/kW-year)	89.50	95.00	115.00	7.50	-	14.40
Variable O&M (2009$/MWh)	4.80	16.00	4.00	-	105 [3]	0.00
Heat Rate (Btu/kWh)	12,200	8,500	9,623	11,655	-	-
CO_2 Emission Rate (lb/MMBtu)	21	-	120	120	-	-
NO_X Emission Rate (lb/MMBtu)	0.02	0.01	0.01	0.01	-	-
SO_2 Emission Rate (lb/MMBtu)	0.0006	-	0.0006	0.0006	-	-

[1] The capacity rating, O&M costs, and heat rate reflect the impact of parasitic load requirements and additional costs for pumping CO_2 effluent to a permanent storage location and related processing facility loads and costs. It is assumed that TCLP would jointly own this unit with an ownership entitlement of approximately 8.5 MW or multiples thereof.
[2] Data provided by TCLP.
[3] Reflects purchased power agreement price in 2011. Price is escalated at 2%/year thereafter.

Figure ES-10 below depicts the fuel price forecasts for the generating resource options considered.

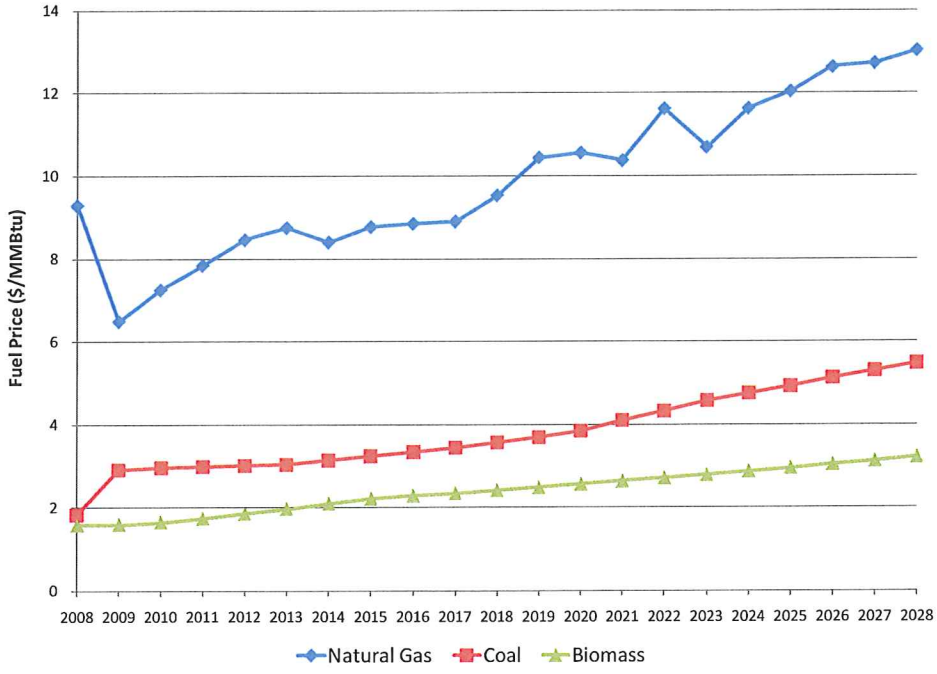

Figure ES-10: Generating Unit Fuel Price Forecasts

Changes or developments in technology, legislation and regulation could affect the considerations and assumptions, and the projections of the electric power and energy requirements of TCLP and the projections of the costs set forth herein. The potential effect of changes or developments in these areas, or potentially other areas that could affect projections, cannot be predicted or determined at this time.

Conclusions

Based on the principal considerations and assumptions set forth in Section 2 of the Report and upon the results of our analyses and studies as summarized in the Report, which Report should be read in its entirety in conjunction with the following, we are of the opinion that:

1. The load forecast (adjusted for TCLP's EOP) prepared in July 2009 results in compound average annual growth rates in peak demand and annual energy requirements of approximately 0.6% and 0.9%, respectively, for the period 2009 through 2028.
2. Taking into consideration the projected peak demand and energy requirements including a 15% reserve margin and the existing capacity resources currently in-service, there is a projected need for additional capacity resources in the amount of 30 MW in 2011 increasing to 32 MW by 2015.

3. The results of the busbar screening analysis indicate that the Biomass option is the lowest cost of the base-load resources (assuming an 85% capacity factor) over the period 2011 through 2028.
4. The results of the busbar screening analysis indicate that the Wind Resource is the lowest cost of the peaking resources (assuming a 25% capacity factor) over the period 2011 through 2028. However, the lack of dispatchability, combined with the typically lower generation during peak summer periods from wind resources, make the unit less economic than the Combustion Turbine resource option.
5. The Optimal Generating Resource Plan, which produces the lowest projected present value of total power supply costs and lowest risk over the Study Period, is an expansion plan with TCLP's existing resources, including the 10 MW of the Heritage Wind PPA, and a build-out of Biomass generation totaling 20-30 MW over the Study Period and 0-13 MW of Combustion Turbine capacity, with larger amounts of Biomass capacity displacing the need for the CT capacity. The amounts of capacity from these two resource types that are most reasonable to be added depend on several factors, including (i) TCLP's tolerance for the risk inherent in the potential for surplus energy generated from the larger amounts of Biomass capacity and (ii) the opportunities and the characteristics of the opportunities that TCLP is able to develop to install this CHP technology on its system.
6. Under the Higher Gas Price sensitivity case, the optimal expansion plans would be unchanged from the Optimal Plans under the Expected Case.
7. The Optimal Generating Resource Plan in Case 2 is projected to exceed the state REP requirements as well as TCLP's REP goals over the Study Period. TCLP's energy from renewable resources under the Optimal Generating Resource Plan Case 2 is projected to be 8.1% in 2011, 48% in 2015, 44% in 2020 and 43% in 2025.

TRAVERSE CITY
LIGHT & POWER

To: **Light & Power Board**

From: Ed Rice, Executive Director

Date: March 5, 2010

Subject: Public Forums

On February 25 and 27, 2010 Traverse City Light & Power held two public forums on renewable energy. Approximately 300 individuals attended. The intent of the forums was to provide Traverse City citizens and customers the opportunity to share their views on the Light & Power goal of acquiring 30% of its power from local renewable sources by 2020. L&P's has been proactive, through the use of media announcements and direct mailings to all customers, to provide opportunity for input into the solution of the selection of electric generation for L&P customers.

In each of the public forums attendees participated in facilitated group discussions to answer the following questions:

1. What specifically about the 30BY20 goal do you like?
2. What specifically concerns you about the 30BY20 goal?
3. What specifically do you believe L&P should do?

Following are the aggregated results of each of the questions. (PowerPoint)

The L&P staff is currently analyzing each of the suggestions from question three in preparation for the April 7th follow-up session.

Because L&P has not determined a final solution to the energy supply issue and have only performed high level feasibility or conceptual analysis, significant time and effort will be expanded to provide proper responses to the questions.

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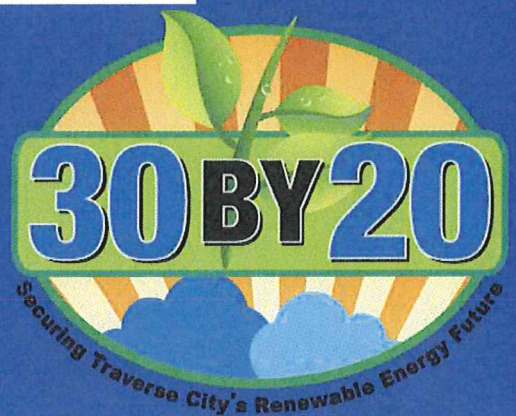

Securing Traverse City's Renewable Energy Future

TRAVERSE CITY LIGHT & POWER

30BY20

What specifically about the 30BY20 goal do you like?

- 30BY20 goal is focused on local generation – 63 dots
- 30BY20 goal is visionary and long-term – 42 dots
- 30BY20 goal lowers emissions and gets us off coal – 34 dots
- 30BY20 goal is green and renewable – 23 dots

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30BY20

What specifically about the 30BY20 goal do you like? (cont.)

- 30BY20 goal can be accomplished with a renewable and sustainable forest plan – 16 dots
- 30BY20 goal is focused on diversifying fuel sources – 13 dots
- 30BY20 goal will have positive economic impact on Traverse City and region – 12 dots

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30BY20

What specifically about the 30BY20 goal do you like? (cont.)

- 30BY20 goal includes efficiency and conservation - 8 dots
- 30BY20 goal is being pursued in an open process that invites community input – 7 dots

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30BY20

What specifically concerns you about the 30BY20 goal?

- Forest impacts – fuel supply, soils, habitat, management– of biomass generation – 84 dots
- The thoroughness, completeness, accuracy, and availability of information – 61 dots
- Is biomass generation really sustainable, renewable, and carbon neutral – 54 dots

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30BY20

What specifically concerns you about the 30BY20 goal? (cont.)

- Environmental consequences of 30BY20 goal, especially biomass – air and water pollution, ash disposal, water use, tourism – 52 dots
- 30BY20 goal is overly ambitious and will cost too much, raise rates – 27 dots
- Not enough emphasis on conservation and efficiency – 18 dots

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30BY20

What specifically concerns you about the 30BY20 goal? (cont.)

- Concern about biomass plant location, truck traffic – 7 dots
- Technologies are immature – 6 dots
- Biomass decision is done deal, no Plan B– 3 dots
- Students not include – 2 dots

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30BY20

What specifically concerns you about the 30BY20 goal? (cont.)

- Nimbyism – 1 dot
- Too much focus on low rates – 1 dot
- Is landfill gas sustainable – 1 dot
- Concern about effect of biomass on wood prices – 1 dot

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30BY20

What specifically do you believe L&P should do?

- Pursue diverse energy options – 357 dots
  Breakdown
  - Wind – 63 dots
  - Conservation and efficiency – 58 dots
  - Hydro – 48 dots
  - Subsidies, incentives to encourage conservation, discourage use, support renewables – 48 dots

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30BY20

What specifically do you believe L&P should do? (cont.)

- Pursue diverse energy options – 357 dots
  Breakdown (cont.)
  - Natural gas – 32 dots
  - Nuclear – 25 dots
  - Biomass – 19 dots
  - Feed-in tariff – 16 dots
  - Solar – 13 dots
  - Biofuels including garbage – 13 dots

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30BY20

What specifically do you believe L&P should do? (cont.)

- Pursue diverse energy options – 357 dots
  Breakdown (cont.)
  - Coal – 7 dots
  - Diversify – 7 dots
  - Landfill gas – 5 dots
  - Energy storage – 2 dots
  - Wave energy – 1 dot

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30BY20

What specifically do you believe L&P should do? (cont.)

- More public dialogue, information, education, survey, marketing – 57 dots
- End biomass idea – 17 dots
- Conduct feasibility study, EIS for all technologies and impacts – 15 dots
- Better understand and apply sustainable options – 13 dots

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30BY20

What specifically do you believe L&P should do? (cont.)

- Delay decision – 11 dots
- Change plant location – 6 dots
- Develop ash disposal plan – 4 dots
- Involve land managers – 3 dots
- Raise rates – 2 dots

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30BY20

What specifically do you believe L&P should do? (cont.)

- Develop plan for capitalization and operation assets – 2 dots
- Develop Plan B – 1 dot
- Sell TCL&P – 1 dot