



Project Work Order & Financial Analysis

This document to be preserved in the form reviewed and approved on the date identified below.

Project (Oracle) #:	159740	Project Category:	New Initiatives	
Project Name:	2018/2019 Tesla	Sponsoring business unit:	Innovation	
Recommended Level of Spending (Budget)*:	\$15,228,859	Primary purpose of the Project:	Innovation	
Date of Project Approval**:	2-Apr-18	Secondary Purpose (optional):	Reliability	
Forecasted Project Dates:	Start Month:	Sept	Start Year:	2017
	End Month:	June	End Year:	2019
Who approved the Project? (Identify participants from Capital Management Team meeting).	Capital Management Team Leaders – McClure, Otley, Castonguay, Bombardier, Costello, Burke, Bugbee, Carlson.			

* Note: Itemization of costs and supporting cost documentation to be maintained in UI tool.

** This date represents the most recent CMT project approval date for inclusion in this rate filing; some projects were previously approved.

Q1. Description of the project (*Describe in layman's terms and then outline technical scope of work*).

The Grid Transformation/Tesla Powerwall 2.0 Pilot offers customers the option to have a Powerwall 2 installed in their home for \$15/month for ten years, or for a one time, upfront \$1,500 charge. The battery is available to the customer for backup power, providing increased reliability in times of grid outage. GMP utilizes the Powerwalls to reduce peak costs during our monthly transmission peak, and our annual capacity peak. This is done by using Tesla's GridLogic aggregation software platform, and allows GMP the ability to control the charging and discharging of each unit individually, and in aggregated groups. This pilot is an important part of our overall strategy to do everything we can to reduce our peak charges while improving customer resiliency.

Q2. Why is the project necessary at this time? (*Describe reason/s for doing the project this year*)

This Pilot is necessary to increase reliability for participating customers, and to reduce overall system costs for all GMP customers. The Powerwalls represent a valuable asset on GMP's grid that allows for dynamic control of resources to help reduce our peak load while also creating a new tool that can be utilized to manage a distributed energy system – like the one we are shifting towards. GMP began the pilot deployment in the fall of 2017 with the intention of waiting to introduce these into the 2019 rate request. We must continually find new tools and resources to drive down power supply expenses and create new, 'non-traditional' revenues, that flow back to non-participating customers. This pilot provides both while giving the host customer an alternative to a fossil-fuel-fired generator for backup power. Note that the PowerWall program is closed to plant on a quarterly basis, however, this Financial Analysis summarizes the entire program costs.

Q3. Describe labor assumptions associated with the project. (*Narrative description of assumptions. Show calculations here and numbers should tie to numbers in UI tool*).

Due to our strategic partnership with Tesla, we are able to shift all the requirements of sales, installation and maintenance to the Tesla team. This was all included in the negotiation of our project with them and wrapped into the price per unit. There is an initial interaction between customers and our Energy Services Team, but the customer is then immediately transferred to Tesla to start the process of site survey and installation. The fully wrapped price, including installation, is \$7,200 per unit plus related overheads. See Exhibit 2-Direct Materials Tab.

Q4. Describe contractor assumptions associated with the project. (*Narrative description of assumptions. Show calculations here and numbers should tie to numbers in UI tool*).

Total cost for each Installed Powerwall is \$7,200, as per the executed DER Program Agreement between GMP and Tesla. This cost paid to Tesla includes customer acquisition, hardware, installation, and continued technical support for the duration of the Pilot.

Q5. Describe additional O&M costs associated with project. (Provide narrative description of costs and assumptions here and show calculation of total additional O&M costs in the “cost tab” on attached “Quantifiable Savings and Costs not in UI” spreadsheet).

These units are provided with a full warranty by Tesla. Any operational or maintenance items that are needed for a Powerwall system will be performed by Tesla as part of their warranty and are therefore not an additional cost for GMP customers. Our financial model includes the full cost of the software platform as well as a small reimbursement to each customer for the efficiency losses that occur during cycling of the batteries. This software platform will also be used for Tesla PowerPack installations.

Q6. How will the project provide benefits to GMP customers? (Provide narrative description of operational benefits. Identify both qualitative and quantitative benefits. Show calculations for quantifiable project benefits, both budgetable and non-budgetable, in the “benefits tab” on attached “Quantifiable Savings and Costs not in UI” spreadsheet).

This Pilot will benefit participating customers by increasing their reliability, and providing backup power available to them during grid outages. Participating customers with a PV system can significantly extend the life of their backup power by charging the battery directly from the solar should the grid be down for extended periods of times. Non-participating customers will benefit by receiving a share of the cost savings and revenue that the battery systems provide. A full cost benefit analysis of the entire program is included with the project documentation.

Value per Battery

Each battery provides a value to all non-participating customers of \$1,447 on an NPV basis.

Total Value

The total current NPV of this pilot to non-participating customers is \$2.89 million.

Q7. Is the Project part of a broader capital program?

- Yes
- No

a. If yes, identify specific documented program (e.g., 4.900 program such as adding animal mitigation at substations, or facilities capital program to add security cameras to facilities).

Q8. Is the project an extension of an existing capital asset?

- Yes
- No

a. If yes, identify existing capital asset (e.g., Oracle is existing capital platform, and updating it would be an extension (not a replacement) of that platform).

b. If yes, was the existing asset, which this project extends, approved in prior capital review? (If Yes, identify project #)

[Empty yellow response box]

c. Was the existing asset subject to a prior cost benefit analysis? (If Yes, identify when)

[Empty yellow response box]

Q9. What alternatives were considered? Explain all of the viable alternatives GMP considered to this Project, including an estimate of costs, where possible (i.e., alternate vendor quotes, or cost of replacing entire asset, alternative brands/types/models, or cost of delaying or not doing project at all).

GMP has a continued relationship with Tesla that has enabled us to move forward with this Pilot in a unique way. GMP is continuously evaluating other solutions, however, none are competitive on price of equipment and overall program structure. We explored other battery technology solutions specifically looking at 3 other vendors ranging in price from \$12K up to \$22K for somewhat similar size batteries. We have also physically tested other battery solutions and did not find the performance and stability to quite match the Powerwall model, however, we do anticipate the other battery systems will continue to improve. When running these alternatives through our NPV modeling we see a range of -\$9 million to -\$33 million NPV.

GMP has also considered alternative methods to reduce 10MW of peak power, but it is difficult to achieve such a large reduction in one program. We currently have a suite of demand response programs, and we are continually looking for new programs. As the need for more and more peak shaving develops, it will be important to have a variety of programs to use in concert with each other. We currently have curtailable programs for our C&I customers (e.g., Critical Peak, Curtailable Rider and the Pilot Load Response Rider). We also have a variety of other programs including an Off-Peak Controlled Water Heater program, residential demand response and our control programs. At times, it can be difficult to achieve a certain level of curtailment during particular hours or across a span of hours for a variety of reasons including but not limited to limitations on the number of times and hours that can be curtailed under certain programs, seasonal differences (during certain times of the year, we have more load available for curtailment than at other times) and customer decisions not to curtail, which is allowed under certain programs. For these reasons, having a suite of programs with diverse customers, load profiles and requirements is necessary. The Tesla batteries also have the unique feature of having energy available to inject onto the grid when needed rather than relying customers to curtail. Additionally, the Tesla program provides an exceptional option to diversify our programs with a relatively large potential, while also having the unique feature of providing backup power benefits to the participating customers beyond the monetary incentives used to encourage participation, which makes this program very attractive. We continue to explore other device types to help reduce both large and small quantities of load during peak periods. And lastly, in our view, a portfolio approach to demand resources will yield the greatest value to customers over time. Not relying on any single resource, but diversifying across multiple resources, customer types, control methods and other parties will assure greatest benefit.

-
- a. **Explain why GMP selected the preferred alternative for the Project (*describe reason(s) for selecting this Project over other alternatives, such as lower cost, better quality, only option that met standards, only option that was available w/o replacing existing platform or asset, past experience with this brand etc.*).**

Through testing of various storage systems as well as building on our previous positive experience working with Tesla, we chose to move forward with Tesla. In addition to providing the best battery storage solution at the most competitive cost, they provided the software solution that is utilized to manage the fleet of batteries. This is a very important benefit in the Tesla offering compared to other solutions. Furthermore, they have provided a performance guarantee for the peak benefits as well as a full 10-year warranty for the storage systems.

Additionally, Tesla Powerwalls represent a unique resource to help GMP expand its suite of programs with a relatively large number of available megawatts. Not only are the batteries capable of providing consistent and continuous power, they provide the participating customers with backup power that is a desired benefit to participate in a GMP program.

Q10. What is the expected depreciable life of the project and/or any individual assets as part of the project? (*Note: Finance Team will answer this question for all projects*).

The expected depreciable life is 10 year or 10%.

Q11. Is Project cost over \$2,000,000?

- Yes**
- No (if No, no cost benefit analysis required).**

a. If Yes, did Capital Management Team require Cost/Benefit Analysis?

(Note: Capital Management Team pre-meeting first week of February will determine whether Cost Benefit Analysis required.)

- Yes (if Yes, complete separate CBA).**
- No**

b. If over \$2,000,000 and Capital Management Team determined no Cost Benefit Analysis (CBA) required, identify applicable exception(s) below and describe:

- Project addresses immediate safety hazard;**
- In-kind replacement of equipment that is damaged or no longer functionally useful for its intended purpose;**
- Project intended to address a regulatory requirement or is a reliability project and viable alternatives are not reasonably available for Project.**

Ex-2 - Capital Summary	Actuals To-Date: Thru Dec 2017	Forecast: Jan 2018 - Dec 2018	Rate Period: Jan 2019 - Sep 2019	Total
159740: 2019 Tesla				
Expenses				
<u>Direct Costs</u>				
Contractor Expense	2,994,187	0	0	2,994,187
Labor - Direct Internal	855	0	0	855
Materials - Direct		9,468,000	1,656,000	11,124,000
Materials - Stock		0	0	0
Sub-Total Direct Costs	2,995,042	9,468,000	1,656,000	14,119,042
<u>Overheads</u>				
A&G Capitalized	225,600	751,759	131,486	1,108,845
FH&S of Materials		0	0	0
Overheads - PETI, Nprod, etc.	730	0	0	730
Vehicles	242	0	0	242
Sub-Total Overheads	226,572	751,759	131,486	1,109,817
<u>Other</u>				
Inv, Ext, Eng		0	0	0
Revenue		0	0	0
Sub-Total Other		0	0	0
<u>AFUDC</u>				
AFUDC		0	0	0
Sub-Total AFUDC		0	0	0
Total Expenses	3,221,614	10,219,759	1,787,486	15,228,859

Quantitative Benefits

Avoided Costs	\$ 17,824,864.00	NPV
Are the additional savings budgetable? <input style="width: 100px;" type="text"/>		

Labor Hours Saving	\$ -	Amount of savings
Department	15: Engineering	Job Class
Department	15: Engineering	Job Class
		05: Engineer
		05: Engineer
		# of Hours
		# of OT Hours
		Rate
		OT Rate
		\$ 54.96
		\$ 54.96
		\$ -
		\$ -
Are the additional savings budgetable? <input style="width: 100px;" type="text"/>		

Additional Revenues	\$ 2,782,638.00	Amount of additional revenues NPV
Additional Generations		
Additional kWh	Enter quantity here	Price per kWh
Revenue by unit	Enter # of units here	Revenue by unit
		Enter value here
		Enter value here
Are the additional savings budgetable? <input style="width: 100px;" type="text"/>		

Additional Costs

Additional Costs	Enter amount here
Are the additional costs budgetable?	[Yellow Box]

Additional O&M Labor Required	\$	-							
Department	15: Engineering	Job Class	05: Engineer	# of Hours	0	Rate	\$ 54.96	\$	-
Department	15: Engineering	Job Class	05: Engineer	# of OT Hours	0	OT Rate	\$ 54.96	\$	-
Are the additional cost budgetable?	[Yellow Box]								

Project Expenditure Inquiry

Project Number	Project Name	Project Service Type Name	WM Circuit	Expenditure Item	Expenditure Item Date	Cost	Expenditure Class	Transaction Source	Expenditure Category	Expenditure Type
152047	FY17 Tesla Powerwall	Addition		12864812	12/1/2016	715.00	VI	AP INVOICE	Accounts Payable	260 - Outside Sources -Regular
152047	FY17 Tesla Powerwall	Addition		12907094	1/1/2017	2,125.00	VI	AP INVOICE	Accounts Payable	260 - Outside Sources -Regular
152047	FY17 Tesla Powerwall	Addition		12907095	1/1/2017	2,125.00	VI	AP INVOICE	Accounts Payable	260 - Outside Sources -Regular
152047	FY17 Tesla Powerwall	Addition		13481703	6/29/2017	1,221.99	VI	AP INVOICE	Accounts Payable	260 - Outside Sources -Regular
152047	FY17 Tesla Powerwall	Addition		13806538	9/1/2017	2,988,000.00	Invoice 1	AP INVOICE	Accounts Payable	264 - New Initiative - Outside
152047 Total						2,994,186.99			Accounts Payable	
152047	FY17 Tesla Powerwall	Addition		12991927	2/4/2017	116.55	ST	GMP Payroll	Labor	010 - Payroll: Regular
152047	FY17 Tesla Powerwall	Addition		12992518	2/4/2017	124.77	ST	GMP Payroll	Labor	010 - Payroll: Regular
152047	FY17 Tesla Powerwall	Addition		12992519	2/4/2017	207.95	ST	GMP Payroll	Labor	010 - Payroll: Regular
152047 Total						449.27			Labor	
153364	Tesla 2017	Addition		12990818	2/4/2017	68.42	ST	GMP Payroll	Labor	010 - Payroll: Regular
153364	Tesla 2017	Addition		12990819	2/4/2017	102.63	ST	GMP Payroll	Labor	020 - Payroll: Overtime
153364	Tesla 2017	Addition		12990820	2/4/2017	91.22	ST	GMP Payroll	Labor	010 - Payroll: Regular
153364	Tesla 2017	Addition		12992120	2/4/2017	86.04	ST	GMP Payroll	Labor	020 - Payroll: Overtime
153364	Tesla 2017	Addition		12992121	2/4/2017	57.36	ST	GMP Payroll	Labor	010 - Payroll: Regular
153364 Total						405.67			Labor	
152047	FY17 Tesla Powerwall	Addition		12877480	12/1/2016	53.84	BTC		Overheads	230 - A/G Expense
152047	FY17 Tesla Powerwall	Addition		12916811	1/1/2017	320.02	BTC		Overheads	230 - A/G Expense
152047	FY17 Tesla Powerwall	Addition		12997461	2/4/2017	24.09	BTC		Overheads	250 - 401K Match
152047	FY17 Tesla Powerwall	Addition		12997462	2/4/2017	81.95	BTC		Overheads	230 - A/G Expense
152047	FY17 Tesla Powerwall	Addition		12997463	2/4/2017	4.17	BTC		Overheads	250 - Bonuses
152047	FY17 Tesla Powerwall	Addition		12997464	2/4/2017	142.25	BTC		Overheads	250 - Employee Medical
152047	FY17 Tesla Powerwall	Addition		12997465	2/4/2017	17.78	BTC		Overheads	250 - Liability + General Ins
152047	FY17 Tesla Powerwall	Addition		12997466	2/4/2017	53.66	BTC		Overheads	050 - Overhead: FICA
152047	FY17 Tesla Powerwall	Addition		12997467	2/4/2017	3.35	BTC		Overheads	250 - Group Life
152047	FY17 Tesla Powerwall	Addition		12997468	2/4/2017	1.94	BTC		Overheads	250 - LTD
152047	FY17 Tesla Powerwall	Addition		12997469	2/4/2017	127.82	BTC		Overheads	030 - Non-Productive Overhead
152047	FY17 Tesla Powerwall	Addition		12997470	2/4/2017	-7.20	BTC		Overheads	060 - Post Retirement Health
152047	FY17 Tesla Powerwall	Addition		12997471	2/4/2017	102.92	BTC		Overheads	060 - Overhead: Pensions
152047	FY17 Tesla Powerwall	Addition		12997472	2/4/2017	5.26	BTC		Overheads	060 - Overhead: SERP
152047	FY17 Tesla Powerwall	Addition		12997473	2/4/2017	163.03	BTC		Overheads	160 - Vehicle Overhead
152047	FY17 Tesla Powerwall	Addition		13050765	2/4/2017	11.95	BTC		Overheads	250 - 401K Match
152047	FY17 Tesla Powerwall	Addition		13050766	2/4/2017	1.23	BTC		Overheads	230 - A/G Expense
152047	FY17 Tesla Powerwall	Addition		13050767	2/4/2017	-2.78	BTC		Overheads	250 - Bonuses
152047	FY17 Tesla Powerwall	Addition		13050768	2/4/2017	3.18	BTC		Overheads	250 - Employee Medical
152047	FY17 Tesla Powerwall	Addition		13050769	2/4/2017	0.38	BTC		Overheads	250 - Liability + General Ins
152047	FY17 Tesla Powerwall	Addition		13050770	2/4/2017	1.15	BTC		Overheads	050 - Overhead: FICA
152047	FY17 Tesla Powerwall	Addition		13050771	2/4/2017	0.07	BTC		Overheads	250 - Group Life
152047	FY17 Tesla Powerwall	Addition		13050772	2/4/2017	0.05	BTC		Overheads	250 - LTD
152047	FY17 Tesla Powerwall	Addition		13050773	2/4/2017	-0.15	BTC		Overheads	060 - Post Retirement Health
152047	FY17 Tesla Powerwall	Addition		13050774	2/4/2017	2.19	BTC		Overheads	060 - Overhead: Pensions
152047	FY17 Tesla Powerwall	Addition		13050775	2/4/2017	0.12	BTC		Overheads	060 - Overhead: SERP
152047	FY17 Tesla Powerwall	Addition		13483314	6/29/2017	92.02	BTC		Overheads	230 - A/G Expense
152047	FY17 Tesla Powerwall	Addition		13806669	9/1/2017	224,996.40	BTC		Overheads	230 - A/G Expense
152047 Total						226,200.69			Overheads	
153364	Tesla 2017	Addition		12996317	2/4/2017	11.64	BTC		Overheads	250 - 401K Match
153364	Tesla 2017	Addition		12996318	2/4/2017	53.79	BTC		Overheads	230 - A/G Expense
153364	Tesla 2017	Addition		12996319	2/4/2017	2.01	BTC		Overheads	250 - Bonuses
153364	Tesla 2017	Addition		12996320	2/4/2017	68.70	BTC		Overheads	250 - Employee Medical
153364	Tesla 2017	Addition		12996321	2/4/2017	8.59	BTC		Overheads	250 - Liability + General Ins
153364	Tesla 2017	Addition		12996322	2/4/2017	25.92	BTC		Overheads	050 - Overhead: FICA
153364	Tesla 2017	Addition		12996323	2/4/2017	1.62	BTC		Overheads	250 - Group Life
153364	Tesla 2017	Addition		12996324	2/4/2017	0.94	BTC		Overheads	250 - LTD
153364	Tesla 2017	Addition		12996325	2/4/2017	61.74	BTC		Overheads	030 - Non-Productive Overhead
153364	Tesla 2017	Addition		12996326	2/4/2017	-3.48	BTC		Overheads	060 - Post Retirement Health
153364	Tesla 2017	Addition		12996327	2/4/2017	49.71	BTC		Overheads	060 - Overhead: Pensions
153364	Tesla 2017	Addition		12996328	2/4/2017	2.54	BTC		Overheads	060 - Overhead: SERP
153364	Tesla 2017	Addition		12996329	2/4/2017	78.74	BTC		Overheads	160 - Vehicle Overhead
153364	Tesla 2017	Addition		13048588	2/4/2017	5.77	BTC		Overheads	250 - 401K Match
153364	Tesla 2017	Addition		13048589	2/4/2017	0.60	BTC		Overheads	230 - A/G Expense
153364	Tesla 2017	Addition		13048590	2/4/2017	-1.34	BTC		Overheads	250 - Bonuses

Cost/benefit analysis for Tesla project (too large to provide in PDF form).

GMP_Tesla-Financial Model - 3.6.18 Updated.xlsm - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER ACROBAT

D52

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

Scenarios Summary

Inputs: Active Scenario Values

	Base Case
Capacity	
FCM Physical Effectiveness	100%
RNS Physical Effectiveness	99%
FCM Forecast Accuracy (% of Physical Effectiveness)	80%
RNS Forecast Accuracy (% of Physical Effectiveness) (Minimum Performance or Expected)	70%
Communication Availability	90%
FCM - Realized Benefit	72%
RNS - Realized Benefit	62%
Market Prices	
% of Day Ahead Energy Revenue Forecast	100%
% of Base Operating Reserves Forecast	100%
% of Base Frequency Reg Forecast	100%
Frequency Reg Linear Decline End Year (Base Forecast = N/A)	No Regulation
Market Access and Deployment	
New Solar Share of Total Deployments	30%
Delay to Capacity Benefit Readiness (Quarters)	1
Delay to Wholesale Market Readiness (Quarters)	2
FCM Quarter Cutoff for Year	2
Initial Energy Arbitrage Year	2019
Initial Reserves Year	2019
Initial Frequency Regulation Year	2050
Frequency Reg Ending Year	2050
Weighted Avg Battery Useful Life (Years)	12.6

	New PV	New No PV
Pricing and Customer Payment		
Install Price (\$/battery)	\$7,200	\$7,200
Customer Payment (\$/battery)	\$1,338	\$1,338
GMP Purchase Price Net Customer Payment (\$/battery)	\$7,200	\$7,200
Levelized Billing Requirement (aka Present Value Rev. Req.) Adjusted for Gross Rev and Weather Etc.	\$8,515	\$8,515
Factor	1.183	1.183
Onbill Financing Rate	7.03%	7.03%
Monthly Payment to GMP	\$15.90	\$15.90

Note - Includes .90 cents per month for sales tax

Active Scenario Result Summary

Per Battery Benefits	\$8,912
Per Battery Costs	\$8,857
= Per Battery Net Benefit	\$56
+ Customer Payment	\$1,391
= Adjusted Net Benefit with Customer Payment	\$1,447

	Per Battery	Portfolio
Details		
RNS	\$4,088	\$8,176,057
FCM	\$3,368	\$6,736,105

Scenarios Summary Annual Cash Flows Annual Simulation Results Deployment and Timing Revenue Req't Calculations Deployment ISO NE Capacity Analysis Capacity Prices Return on Ratebase System Characteristics Cap ...

READY 85%

Cost/benefit analysis for Tesla project – alternative 1 (too large to provide in PDF form).

GMP_Tesla-Financial Model Alternatives - 3.6.18 Updated -ALT1.xlsm - Excel

Customer... : X ✓ fx

1 2 A B C D E F G H I J K L M N O P Q R S T

Scenarios Summary

Inputs: Active Scenario Values

	Base Case
Capacity	
FCM Physical Effectiveness	100%
RNS Physical Effectiveness	99%
FCM Forecast Accuracy (% of Physical Effectiveness)	80%
RNS Forecast Accuracy (% of Physical Effectiveness) (Minimum Performance or Expected)	70%
Communication Availability	90%
FCM - Realized Benefit	72%
RNS - Realized Benefit	62%
Market Prices	
% of Day Ahead Energy Revenue Forecast	100%
% of Base Operating Reserves Forecast	100%
% of Base Frequency Reg Forecast	100%
Frequency Reg Linear Decline End Year (Base Forecast = N/A)	No Regulation
Market Access and Deployment	
New Solar Share of Total Deployments	30%
Delay to Capacity Benefit Readiness (Quarters)	1
Delay to Wholesale Market Readiness (Quarters)	2
FCM Quarter Cutoff for Year	2
Initial Energy Arbitrage Year	2019
Initial Reserves Year	2019
Initial Frequency Regulation Year	2050
Frequency Reg Ending Year	2050
Weighted Avg Battery Useful Life (Years)	12.6

	New PV	New No PV
Install Price (\$/battery)	\$12,207	\$12,207
Customer Payment (\$/battery)	\$1,338	\$1,338
GMP Purchase Price Net Customer Payment (\$/battery)	\$12,207	\$12,207
Levelized Billing Requirement (aka Present Value Rev. Req.) Adjusted for Gross Rev and Weather Etc.	\$14,466	\$14,466
Factor	1.185	1.185
Onbill Financing Rate	7.03%	7.03%
Monthly Payment to GMP	\$15.90	\$15.90

Note - Includes .90 cents per month for sales tax

Active Scenario Result Summary

Per Battery Benefits	\$8,912
Per Battery Costs	\$14,809
= Per Battery Net Benefit	(\$5,896)
+ Customer Payment	\$1,391
= Adjusted Net Benefit with Customer Payment	(\$4,505)

	Per Battery	Portfolio
Details		
RNS	\$4,088	\$8,176,057
FCM	\$3,368	\$6,736,105

Scenarios Summary | Annual Cash Flows | Annual Simulation Results | Deployment and Timing | Revenue Req't Calculations | Deployment | ISO NE Capacity Analysis | Capacity Prices | Return on Ratebase | System Characteristics | Cap ...

READY 85%

Cost/benefit analysis for Tesla project – alternative 2 (too large to provide in PDF form).

GMP_Tesla-Financial Model Alternatives - 3.6.18 Updated - ALT 2.xlsm - Excel

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER ACROBAT

D31

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48

Scenarios Summary

Inputs: Active Scenario Values

	Base Case
Capacity	
FCM Physical Effectiveness	100%
RNS Physical Effectiveness	99%
FCM Forecast Accuracy (% of Physical Effectiveness)	80%
RNS Forecast Accuracy (% of Physical Effectiveness) (Minimum Performance or Expected)	70%
Communication Availability	90%
FCM - Realized Benefit	72%
RNS - Realized Benefit	62%
Market Prices	
% of Day Ahead Energy Revenue Forecast	100%
% of Base Operating Reserves Forecast	100%
% of Base Frequency Reg Forecast	100%
Frequency Reg Linear Decline End Year (Base Forecast = N/A)	No Regulation
Market Access and Deployment	
New Solar Share of Total Deployments	80%
Delay to Capacity Benefit Readiness (Quarters)	1
Delay to Wholesale Market Readiness (Quarters)	2
FCM Quarter Cutoff for Year	2
Initial Energy Arbitrage Year	2019
Initial Reserves Year	2019
Initial Frequency Regulation Year	2050
Frequency Reg Ending Year	2050
Weighted Avg Battery Useful Life (Years)	12.6

	New PV	New No PV
Install Price (\$/battery)	\$14,511	\$14,511
Customer Payment (\$/battery)	\$1,838	\$1,338
GMP Purchase Price Net Customer Payment (\$/battery)	\$14,511	\$14,511
Levelized Billing Requirement (aka Present Value Rev. Req.) Adjusted for Gross Rev and Weather Etc.	\$17,213	\$17,213
Factor	1.186	1.186
Onbill Financing Rate	7.03%	7.03%
Monthly Payment to GMP	\$15.90	\$15.90

Note - Includes .90 cents per month for sales tax

Active Scenario Result Summary

Per Battery Benefits	\$8,912
Per Battery Costs	\$17,555
= Per Battery Net Benefit	(\$8,643)
+ Customer Payment	\$1,391
= Adjusted Net Benefit with Customer Payment	(\$7,251)

	Per Battery	Portfolio
Details		
RNS	\$4,088	\$8,176,057
FCM	\$3,368	\$6,736,105

Scenarios Summary Annual Cash Flows Annual Simulation Results Deployment and Timing Revenue Req't Calculations Deployment ISO NE Capacity Analysis Capacity Prices Return on Ratebase System Characteristics Cap ...

READY 85%

Cost/benefit analysis for Tesla project – alternative 3 (too large to provide in PDF form).

Green Mountain Power Corporation Analysis of Battery Value											
		Reference Values									
Degradation (% per year)	3.00%	Reg Scenario		No Regulation							
Wholesale value escalation factor	0.00%	Day Ahead Energy		2019							
Marginal cost of distribution escalation factor	0.00%	Operating Reserves		2019							
		Regulation Start Year		2050							
Project Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
		1	2	3	4	5	6	7	8	9	10
Available Resources for Monetization (MW, Net of Failures)											
RNS Degradation		99%	99%	98%	98%	98%	98%	97%	97%	96%	96%
FCM Degradation		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Wholesale Market Access Scenario (1=Energy Only; 2=Energy+Reserves; 3=All)		0	2	2	2	2	2	2	2	2	2
Benefit of Portfolio - Net of Degradation											
Avoided RNS Capacity Payment		\$1,218,063	\$1,269,583	\$1,339,635	\$1,389,297	\$1,435,648	\$1,479,082	\$1,522,101	\$1,566,323	\$1,609,074	\$1,652,433
Avoided FCM Capacity Payment		\$398,095	\$1,096,318	\$860,746	\$827,109	\$924,516	\$967,786	\$1,068,299	\$1,186,039	\$1,309,556	\$1,437,762
ISO NE Day Ahead Energy		\$0	\$243,159	\$229,866	\$224,079	\$218,247	\$212,310	\$207,098	\$201,839	\$196,153	\$190,385
ISO NE Operating Reserve		\$0	\$160,959	\$160,429	\$160,272	\$160,066	\$159,975	\$159,882	\$159,845	\$159,755	\$159,705
ISO NE Frequency Regulation		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Benefit @ 100% Performance		\$1,616,157	\$2,770,018	\$2,590,676	\$2,600,756	\$2,738,477	\$2,819,152	\$2,957,380	\$3,114,046	\$3,274,539	\$3,440,285
Customer Makewhole Payments		(\$54,000)	(\$112,039)	(\$102,237)	(\$99,431)	(\$96,598)	(\$93,762)	(\$91,278)	(\$88,795)	(\$86,284)	(\$83,766)
Net Benefit		\$1,562,157	\$2,657,979	\$2,488,439	\$2,501,325	\$2,641,879	\$2,725,390	\$2,866,102	\$3,025,251	\$3,188,255	\$3,356,519
% of Portfolio FCM Ready and Operational		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
% of Portfolio RNS Ready and Operational		100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
% of Portfolio Wholesale Ready and Operational		75%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Benefit of Portfolio - Expected Available											
Avoided RNS Capacity Payment		\$1,218,063	\$1,269,583	\$1,339,635	\$1,389,297	\$1,435,648	\$1,479,082	\$1,522,101	\$1,566,323	\$1,609,074	\$1,652,433
Avoided FCM Capacity Payment		\$398,095	\$1,096,318	\$860,746	\$827,109	\$924,516	\$967,786	\$1,068,299	\$1,186,039	\$1,309,556	\$1,437,762
ISO NE Day Ahead Energy		\$0	\$243,159	\$229,866	\$224,079	\$218,247	\$212,310	\$207,098	\$201,839	\$196,153	\$190,385
ISO NE Operating Reserve		\$0	\$160,959	\$160,429	\$160,272	\$160,066	\$159,975	\$159,882	\$159,845	\$159,755	\$159,705
ISO NE Frequency Regulation		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Benefit @ Expected Availability		\$1,616,157	\$2,770,018	\$2,590,676	\$2,600,756	\$2,738,477	\$2,819,152	\$2,957,380	\$3,114,046	\$3,274,539	\$3,440,285
Customer Makewhole Payments		(\$40,500)	(\$112,039)	(\$102,237)	(\$99,431)	(\$96,598)	(\$93,762)	(\$91,278)	(\$88,795)	(\$86,284)	(\$83,766)
Net Benefit		\$1,575,657	\$2,657,979	\$2,488,439	\$2,501,325	\$2,641,879	\$2,725,390	\$2,866,102	\$3,025,251	\$3,188,255	\$3,356,519
% Adjustment for Forecasting/Availability (Performance Guarantee)											
RNS Benefit		62%	62%	62%	62%	62%	62%	62%	62%	62%	62%



TESLA, INC
45500 Fremont Blvd.
Fremont, CA 94538
Tel: 650-681-5000
Fax: 650-638-1029
Contractors License # 949283

FROM: Tesla, Inc 45500 Fremont Blvd Fremont, CA 94538		JOB NAME: <u>Green Mountain Power Corp</u>	
ATTN: Adam Christian PHONE #: 1-385-237-1209		JOB ADDRESS: <u>163 Acorn Lane</u> <u>Colchester, VT 05446</u>	
TO: Green Mountain Power Corp 163 Acorn Lane Colchester, VT 05446		ATTN: Matthew Haley	
Powerwall 2 Deployment Fee (per unit)		\$	<u>7,200.00</u>
Installations of Powerwall 2 for Grid Transformation Innovative Pilot			<u>415</u>
Sub-total		\$	<u>2,988,000.00</u>
Grand Total		\$	<u>2,988,000.00</u>
Please remit payment to:			
Bank Name: Wells Fargo Bank, N.A. Bank Address: 420 Montgomery St. San Francisco, CA 94104 Account Name: Tesla Motors Inc. Account #: 4000118323 ABA/Routing #: 121000248			
Dated: <u>September 19, 2017</u>		Company Name: <u>Tesla, Inc</u>	
By: <u>Adam Christian</u>		Title: <u>Billing Manager</u>	