Aaron Montague
4/11/2015
Final Project IS 520

Client company description: Vivint Solar

Vivint Solar is solar electricity provider that designs, installs, and maintains residential photovoltaic systems. Vivint Solar in 2013 is operating in 6 states: New York, New Jersey, Massachusetts, Maryland, Hawaii, and California. The company offers solar panels via a power purchase agreement (PPA). Vivint Solar owns, installs, and maintains solar panels on customers' homes in exchange for customers agreeing to purchase the solar energy their panels produce. Customers do not pay for installation, but pay for energy that the panel's produce, for the life of the contracts. Its innovation in the field is the use of micro inverters for each separate solar panel, allowing maximum production when some of the panels are in the shade.

Executive Summary/ Project overview:

In an effort to maximize the installation-operations side of Vivint Solar, key performance indicators have been implemented to improve results. The team I'm working with has laboriously been tracking and rewarding employees manually for their performance on these key performance indicators and the time spent each week spent on these activities has become too tedious for the over-strapped analysts.

My boss tasked me with the following:

1. Create an auto generating rep dashboard
    a. My job was to automate the list creation of offices and people who have reached thresholds for certain levels of performance, so my employer can send the PDF list out and stimulate more competition amongst other offices and technicians.
2. Calculate coin reward amounts
    a. Every data update, employees' performance record changes and their new coin is calculated according to the metrics. I was tasked with programming a solution to reward all employees according to how much coin they should receive during the period.
3. Create a CSV with coin amounts to be awarded
    a. After the coin is calculated, my boss wanted a button that can create a CSV file with a list of all the reps who received coin, their id numbers, and the new coin amounts. This CSV file is to be loaded to the company store where employee id numbers and coin will be credited to them.
4. Delete Coin
    a. Create a button that will delete coin values that were awarded during previous reward period.
5. Create an auto generating mgmt. dashboard
    a. Management wants to see if the metrics they are using are too easy and also which offices are doing poorly or well. They wanted me to produce a dashboard that would have the capability to be sent to managers to help make decisions on metric improvements and how the installation operations are doing as a whole
6. Have the capacity to email rep and mgmt. dashboards to a small list of management.
    a. This functionality will expedite the process of getting the dashboard PDFs to management who will then be able to distribute them across the offices.

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Discussion of learning and conceptual difficulties encountered.

1. I learned a lot throughout this project with VS and my VBA project. Listed below are the most pertinent concepts that I learned about:
    a. Creating a custom ribbon that is saved to the workbook
        i. I walked through this exercise with one of the TAs Nate and was able to make the workbook look much more professional.
    b. How to use worksheet filters and VBA
        i. The worksheet filters created problems at the beginning, but once I learned how to show all data, I was able to clear and filter the data according to the needs of the dashboards.
    c. Making source data dynamic while generating a dashboard
        i. This workbook will continually be updated and the data sheet, 'data input workbook' will be holding new data throughout the quarter, so I learned a lot about refreshing the pivot table source data and making the pivot table refer to a relative storage space rather than having a hardcoded location in memory in my VBA code.
    d. Exporting Spreadsheet data to PDF
        i. Exporting a PDF wasn't too hard because I used the macro recorder to aid me, but saving and opening the file with the correct file name required a little more work.
    e. Moving spreadsheet to a new workbook and saving using VBA
        i. In order to move the CSV file for coin upload to the online company store I had to learn how to create a CSV file from existing data.
    f. Creating and utilizing object variables
        i. Object variables make the whole process of referencing objects easier. I tried to make use of them as much as I could to simplify my code
    g. How to use the internet to solve VBA problems
        i. I've found that if I'm dealing with a problem, many other people have run into the same problem and have come up with a solution, so I referred to the internet often.
    h. How to update pivot tables with VBA
        i. I learned how to maintain formatting throughout workbook when update pivot tables using VBA
    i. How to effectively use macro and spreadsheet functions to produce an aesthetically pleasing and functional dashboard
    j. How use a form effectively for email purposes
    k. How to work with VSolar management on the project.
        i. I started working with VSolar specifically on this project, and I'm only considered a contractor at this point. Every time I went into the office, it seemed like the scope of the project had changed and that I had to make adjustments to the progress I made on the project the week prior. Scope creep became more and more apparent and in order to finish the project, I had to seal off some of the functionality requirements and polish the rest of the project.
        ii. I learned a lot about how to set expectations and how to communicate effectively with my manager. This project will not have been a success had I not communicated with my manager and held constant meetings with him to understand his expectations.

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Assistance:

1. I visited with Dr. Allen and got help on the email portion of my project because Gmail wasn't wanting to send an email through VBA without me accepting that it is a less secure source. He helped me solve the problem. He also advised to me build a userform to enter the email data all on one dialogue box because it's more professional to do it that way. I also received help from him by using relative references for saving and accessing the pdf and other files rather than having a hardcoded reference to my computer.

2. I also got help from Nathan, one of the TA's on the customized ribbon used in the workbook. He walked me through how to program the XML necessary to gather the button images and how use the customer UL editor.

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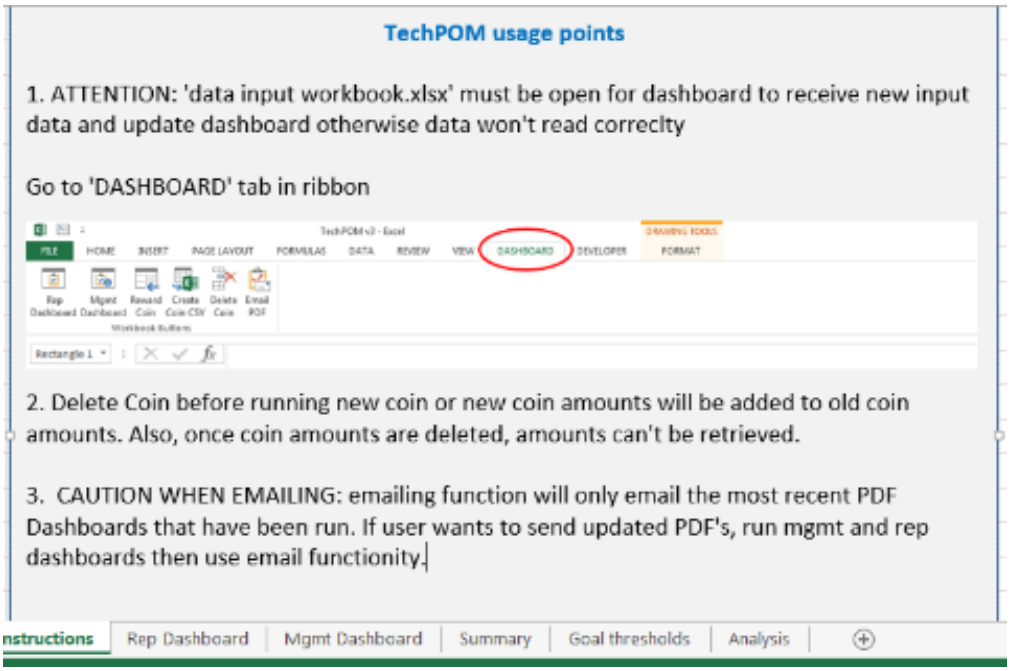
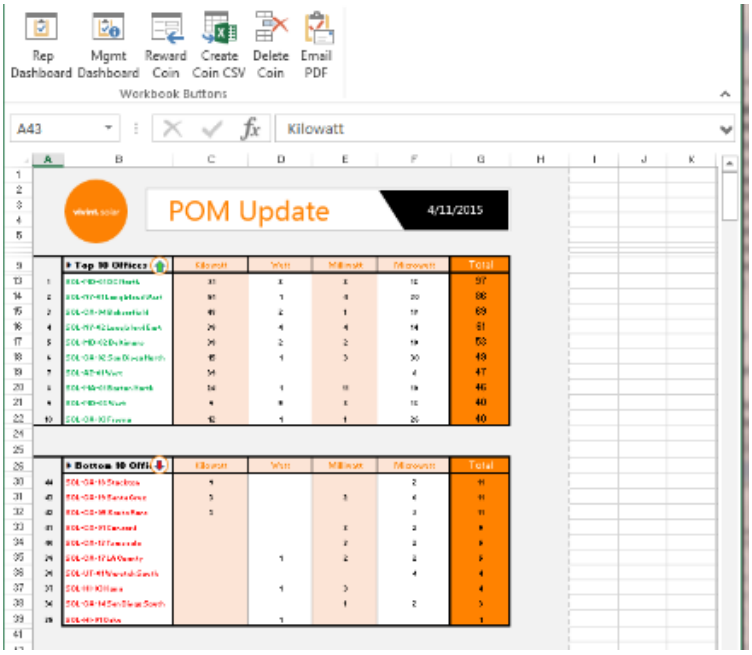
Instructions on workbook use:



The following information will be a tutorial of how to use the dashboard:

1. Go to the dashboard tab of the upper ribbon on the TechPOM v3 Excel file and click on the rep dashboard button.



2. The macro will automatically look for any new data and update the office rankings within the pivot tables on the rep dashboard. The office rankings are a function of how many employees within the office have reached a threshold. Each level has a weighted point value associated with it. The total is the sum of the weighted values of all reps in the office. These totals are then sorted to produce the top 10 and bottom 10 offices.
    a. This data sourcing is dynamic and so you don't have to redefine the pivot table each time you run it.

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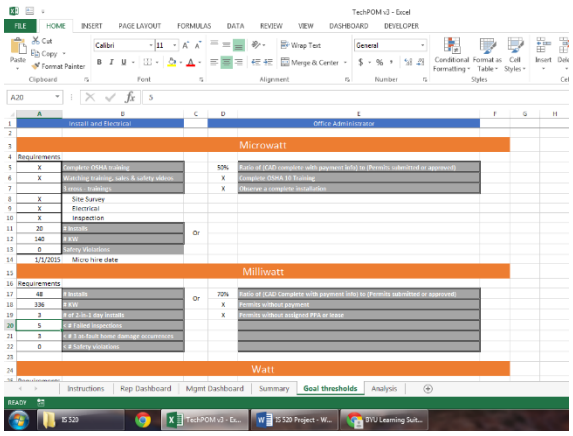
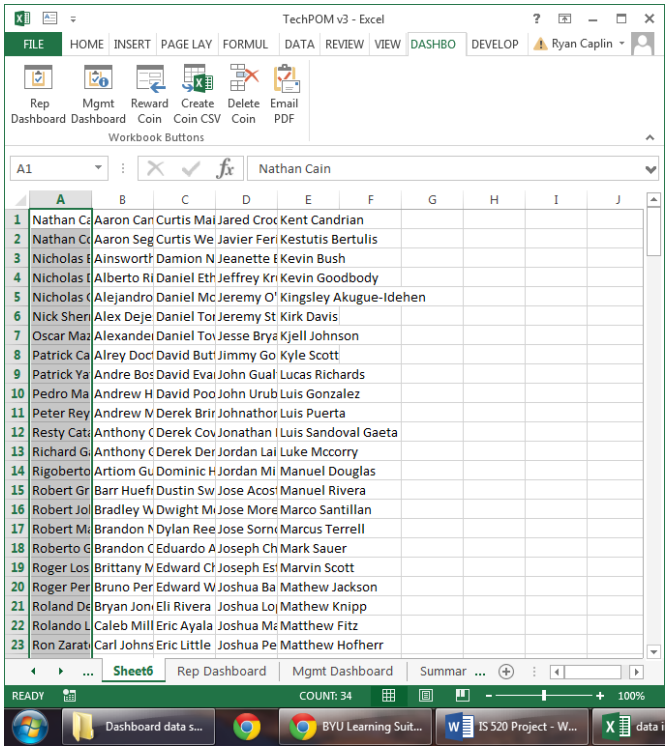
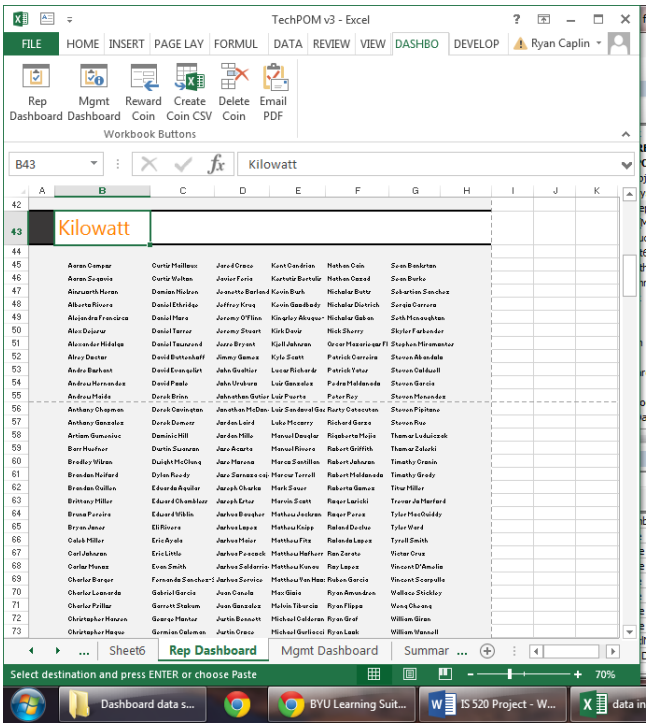
3. After updating the pivot tables, the macro will filter for Kilowatt and create a new sheet where it will alphabetize the names that meet the threshold criteria and sort them into columns on the new sheet.
    a. The criteria for each level is found on the goal threshold tab pictured below.





4. Once the list is pasted, alphabetized and formatted the POM level is found on the rep dashboard sheet and then the list data is pasted below
    a. This process iterates through all POM Levels and populates the data on the rep dashboard
    b. If previous lists are present in the space, the macro will delete all the previous data and replace it with the updated data



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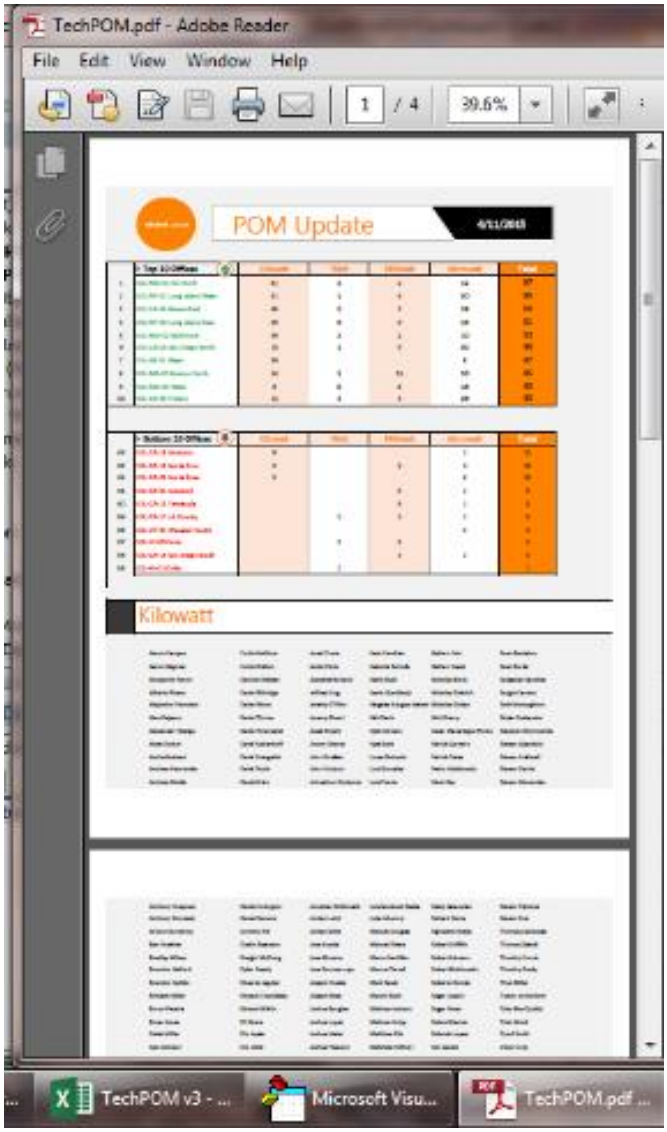
5. After the pivot tables are updated and the list is generated with the new data, the macro will print and save a PDF to a location relative to where the workbook is opened.
    a. The file will be called 'TechPOM.pdf' and will open after the macro is finished running



6. Mgmt dashboard
    a. Go back to the custom ribbon and click on mgmt. dashboard

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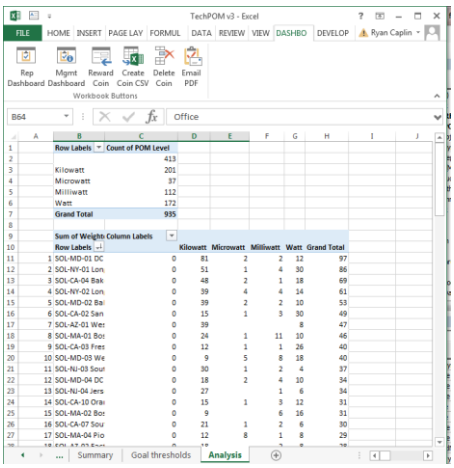
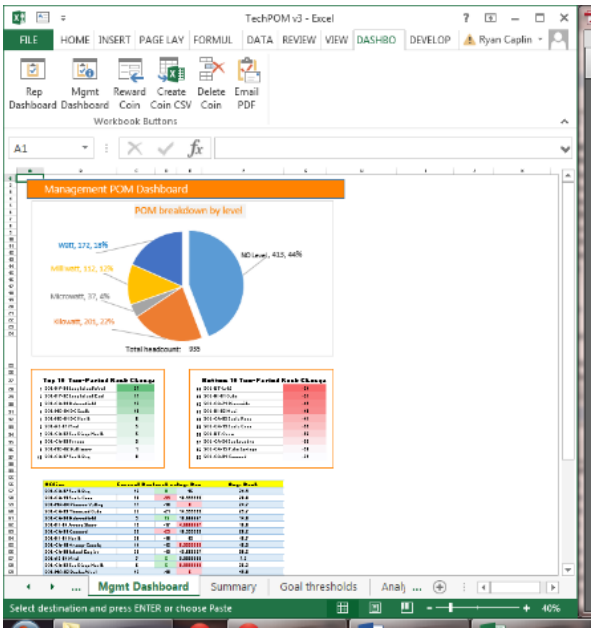
7. The first thing the mgmt. button will do is update the pivot tables with the source data and look for all available data to manipulate. This is helpful because data will be continually added throughout the life of the project.



8. Once the pivot tables are updated, the workbook functions will update the graph and other data using match functions and index functions.
    a. The analysis of the pivot tables which holds all the updated office data is copied and pasted into the mgmt. dashboard and conditional formatting is used to identify poorly performing offices



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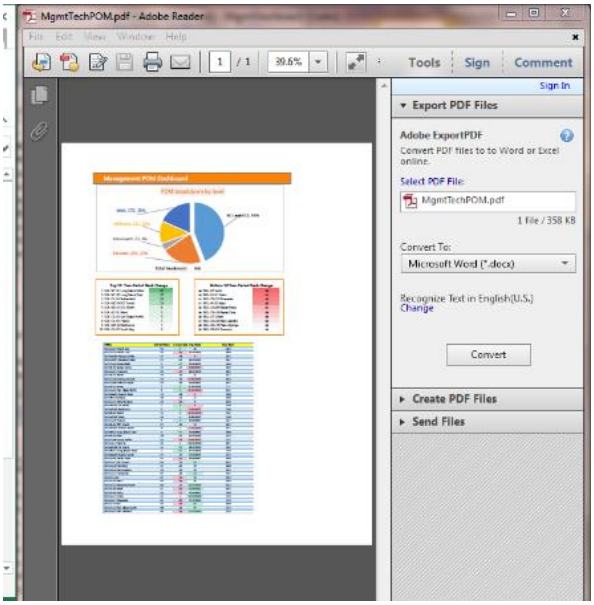
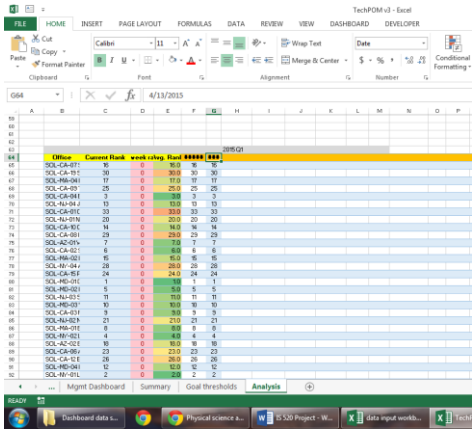
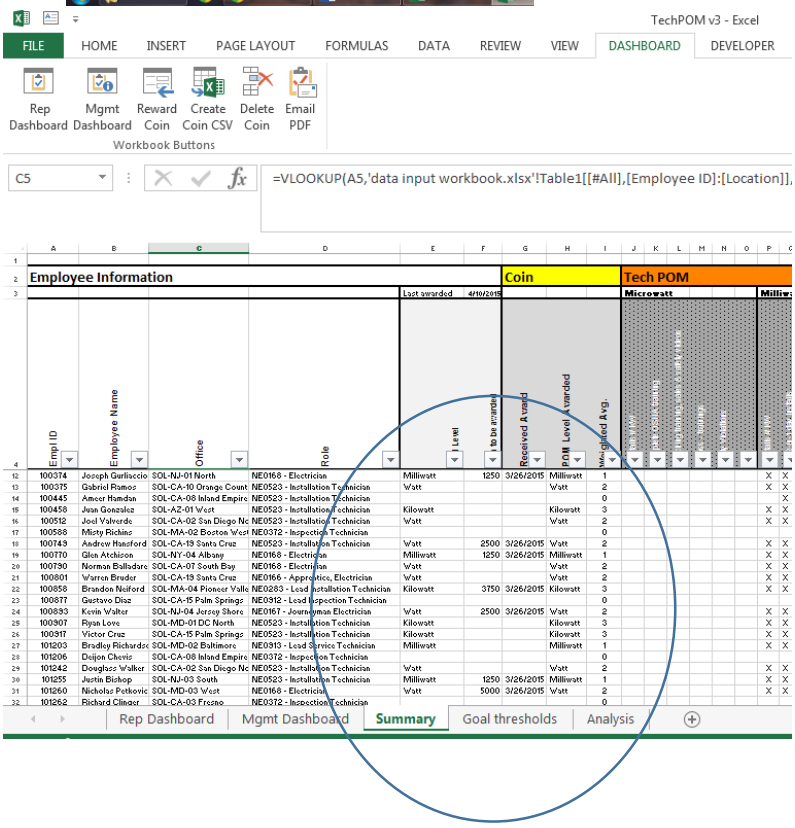
9. After the formulas update the figures and the key metrics for each office are copy and pasted, a pdf is printed out with the mgmt dashboard and saved as 'mgmtTechPOM.pdf'



10. One of the functions that contribute to the dashboard is a function that looks for the rightmost data in the group of data and subtracts the cell to the left of it. This is helpful because the macro copy and pastes data from the current rankings into a history and it will provide a dynamic reading of the rank changes of each office. Only a VBA function can accomplish this task.



11. Calculate Coin button functionality
    a. Go to the 'calculate coin' button on the Dashboard button of the ribbon
    b. The calculate coin button will award the coin according to the levels in the summary sheet
    c. When the data is updated and the new POM levels are calculated in the workbook, the discrepancy between the past POM Level and the current POM level of each rep needs to be calculated and coin needs to be awarded
    d. This macro is more complicated than it seems, but it will continue adding coin, which varies in amounts, until the discrepancy between the past and current POM levels reach equilibrium



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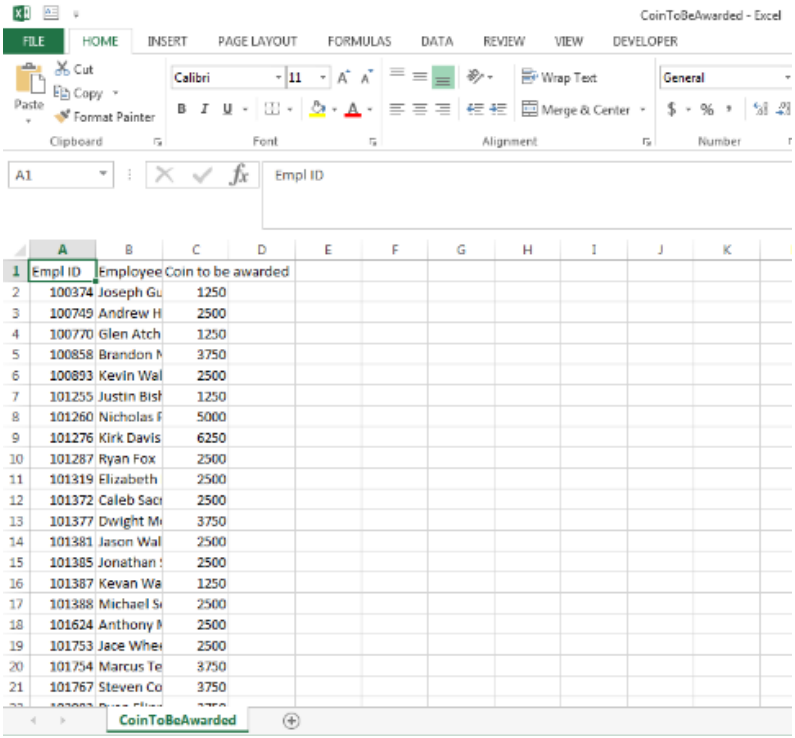
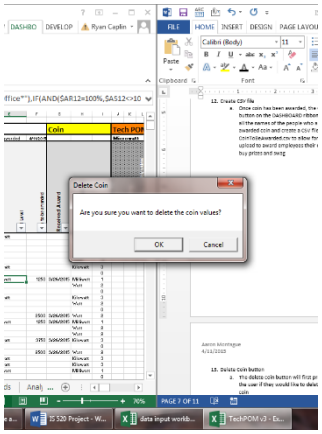
e. Unless new data is input into the data workbook, no changes will occur and activating the button won't do anything

12. Create CSV file
    a. Click on the create CSV File button
    b. Once coin has been awarded, the CSV file button on the DASHBOARD ribbon will take all the names of the people who are awarded coin and create a CSV file and move them to the file. This new file is called CoinToBeAwarded.csv and allows the user to go to the store and upload the file to award employees their coin to buy prizes and company apparel



13. Delete Coin button
    a. Go to the 'Dashboard' button of the custom ribbon
    b. The delete coin button will first prompt the user if they would like to delete the coin because once the coin is deleted, it is gone



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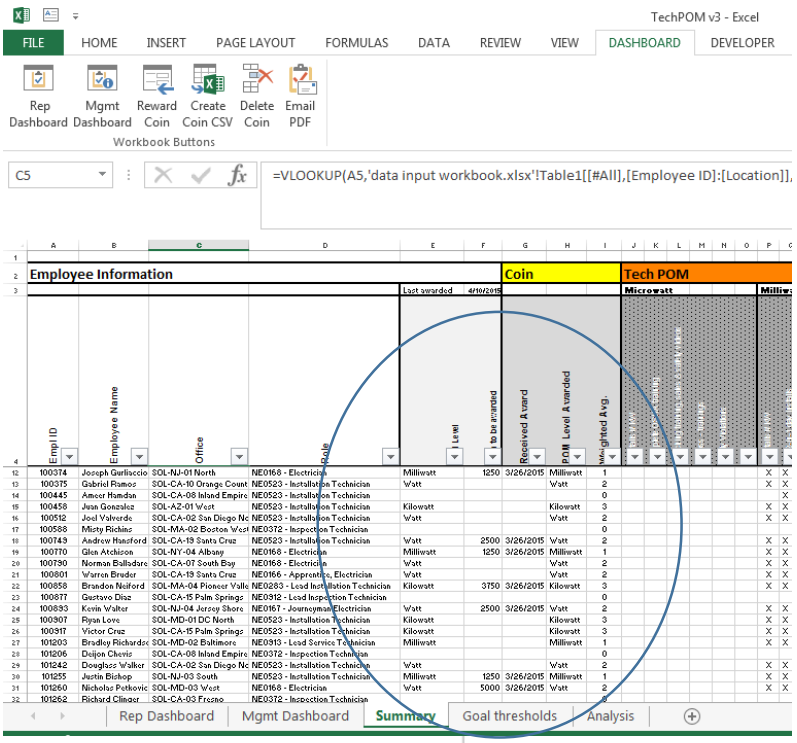
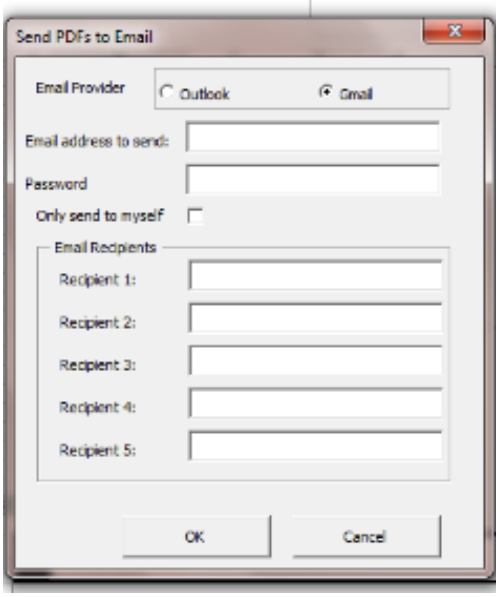
c. Once the user says okay, all the coin amounts will be permanently erased. The coin amounts can be recovered if the user doesn't save the workbook and exits and reopens the same workbook.



14. Click on the 'Email PDF' button in the dashboard custom ribbon
    a. The button will present a User form with the email address to send from and the password to that address to send the mgmt. and rep dashboards.
    b. There is functionality to send from outlook and gmail. These email providers are the most common for VS, so that's why they are built into the user form.
    c. The user form also give 5 spaces for recipients for the pdf's to get sent from



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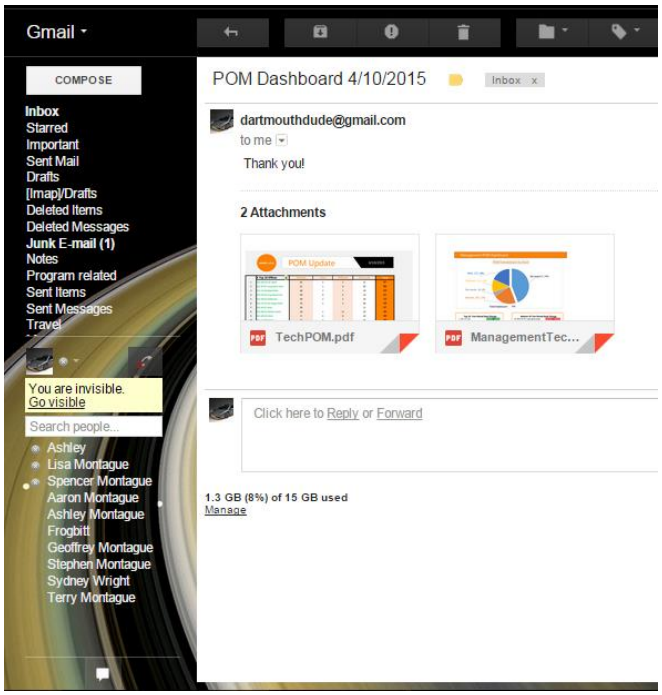
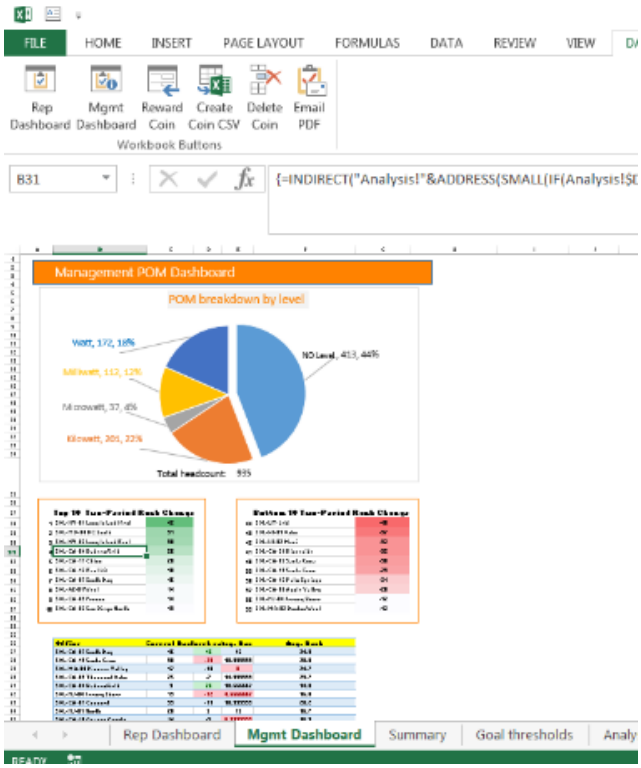
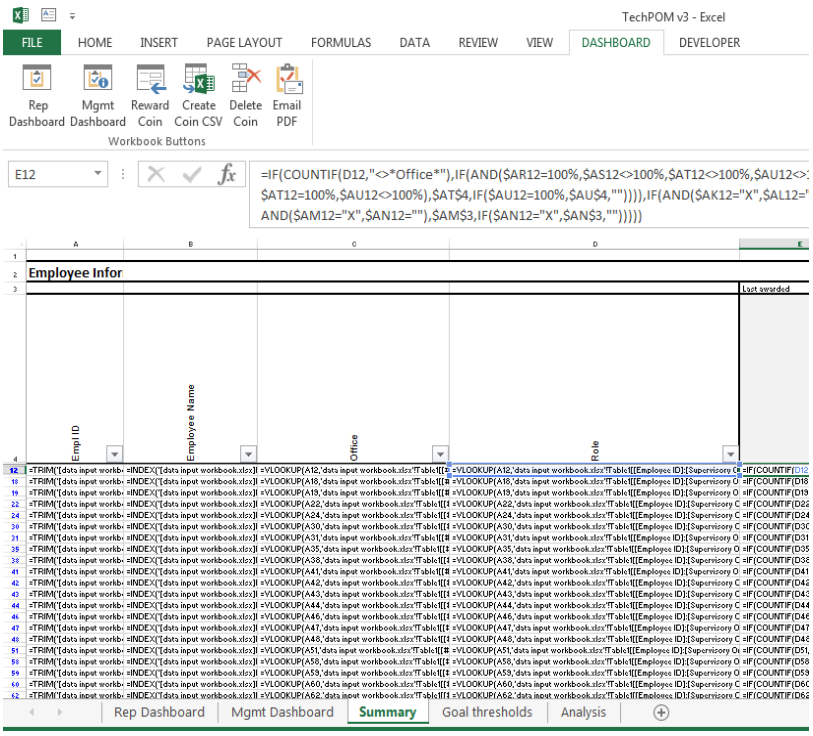
d. Once the user clicks okay, the mgmt. and rep pdfs will be sent to the specified recipients or just to the sender's email address.
    i. NOTE: Only the most recently calculated rep and mgmt. dashboards will be sent. If user wants to send pdf with updated data, the user will need to calculate and run the rep and mgmt. dashboard buttons before sending.



15. Miscellaneous details about forms
    a. Created mega formulas and altered mega formulas to work with macros and create dashboards. This contributes to spreadsheet and dashboard functionality.
    b. The mega formulas are large and unruly but their static nature helps avoid having to hard code the VBA code to create the dashboards





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Conclusion:

All of these elements listed in this write up are useful in expediting the process of calculating, publishing, and recording how the offices are doing, which, in turn, will help improve office performances. What used to take several hours each week now takes minutes, and what used to be an editing nightmare is a consistently beautiful representation of Vivint Solar's installation offices.