Script

* Intro 15s - Dheeraj
  + Relatable scenario
* Need for AI in energy industry 30s - Dheeraj
  + Problem statement
* What SMART Power does 1 min - Dheeraj

SMART power seeks to provide accurate short term electrical load forecasting to save money for customers as well as the people of Canada.

* Demo/Prototype – explain its implementation 3 mins /180s
  + Login – Nathen 10s

Now it may be obvious that all applications require some form of login/validation, whether it be authentication or authorization. Well the smart power web application is no different.

* + Dashboard – outline UI – Nathen 35s

Once logged in, the users are greeted with a sleek, balanced home dashboard. This dashboard is meant to provide general information and data that may be of use to the user. The synergy between visuals and data provides brings about a reduction in clutter which is essential as we aim for easy user navigation and comprehension. The graph displays Ontario’s Electricity demand during the past three days, but this of course can be customized to be more specific. Along the left-hand side of the screen you can see there is a menu with a few tabs that will take us away from the home dashboard and deeper into the real power this web application holds. This is where Adam will walk you through our machine learning model and its predictions

* + Model – Toggle model settings and submit (1 iterations) - Adam 30

Our approach to the model interface is that we wanted to extend customization to the customer so we have implemented four layers of settings. A forecast will be for a single region that the customer has purchased a subscription for previously. For the purpose of this demo we have integrated Toronto, Ottawa and Bruce Penninsula.

In terms of statistical analysis, we have reviewed some of the classical metrics used to measure forecasting accuracy and allowed the customer to optimize the model based on their selection.

Forecast horizon is how far into the future the user wishes to predict. This being a short term forecast, we offer increments of 6 hours, 12 hours and 24 hours. The cost of using a larger forecast horizon is that there is added inaccuracy that increases the wider the range becomes, forcing the user to always keep that in mind as a cost-benefit.

The last setting is the start time, where the user would input the current and end timestamps to outline the range they wished to predict.

* + Forecast – graphs demand forecasts and overlays real data - Adam 80s

After submitting your model request, JSON requests access our running webservice to obtain data and pass it to the webapp. The main chart shows SMART power’s specialized forecast, including max, min and average to allow the customer to know all the uncertainty before any kind of decision making on their end. If they are only interested a single dataset, the user can toggle any of them off at their leisure.

Now, a forecast is only as good as the model itself, so we’ve incorporated common metrics to provide insight on the model. They’re strength can be identified through a colour combination of green representing ideal, yellow being average, and red poor to make it easy for the user to know the validity of their model. We believe in passing on as much information to the customer as possible so that they can make the most informed decision.

If the model strength is not to the user’s liking, they can submit a re-run request. This is not an implemented feature in the prototype yet, but we believe it would be essential in any kind of final product.

Lastly, all the forecasting data can be exported to common file formats such as CSV, DAT and RDATA for analysis outside of the webapp.

* + Show Samples for Toronto, Ottawa and Bruce over 1 week – Adam

Now, you might be thinking, that’s great that you can provide all this but how accurate are the models that SMART power makes? We tested forecasts over 7 days from April 4th -10th on a regional basis to demonstrate its robustness despite predicting during the high-point of the COVID lockdown. Shown is our test for Toronto, achieving a 2.3% error from the actual electrical demand which would’ve been classified as a strong performance on our webapp.

* Flow chart for architecture 30s – Nathen

Stepping one level out from the depths of computer science there is a simple way to show the steps we have gone through when creating and maintaining our web application. We start off with pulling the data required for our model to work with. The data does not come ready right out of the gate so there will need to be some preprocessing work done. Once the data is ready, it will be stored using Azure Blob Storage. Through Azure Machine Learning the model is built, trained and tested, and then Registering and deploying said model is next. The data our model produces will be stored within a database …. And as Adam has said before our web application backend will be pulling the data and communicating it to the front end for users to see.

* Business Model 2 mins
  + Value proposition 20 s - Nathen
  + Customers, Relationships, Partners 20s - Nathen
  + Revenue Streams 30s - Nathen
  + Cost Model 10s - Nathen
  + Financial Statements & Assumptions 40s - Dheeraj
* Next Steps 30s - Adam
  + Timeline

Moving forward, we believe a feasible amount of time needed to launch Smart power is 10-12 months

and in that time we would address company incorporation, acquiring our primary customer; the IESO, launching our official webapp on our domain, and automated model training.