

Building Flexible Sustainability Dashboards

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When we set out to build a better dashboard to communicate energy, waste, and water usage streams throughout campus, we were targeting a student audience. We first anticipated that availability of the data would be our biggest hurdle, but quickly found that Harvard Business School's Operations team has access to an ever-improving and immense amount of data at a fairly granular level across campus.

The hurdle instead proved to be (a) the collection, manipulation and analysis of that data today is incredibly manual, and (b) how to display the data in a way that could affect student behavior.

For this project we focused on (a) an area where we could make a concrete proposal in the allotted span of time, and a necessary prerequisite to solving (b).

In order to track progress toward the [Harvard sustainability goals](#), and more generally to track operations energy, waste, and water usage on a monthly basis, the HBS Operations team currently pulls granular usage data from multiple sources into a common view. The process today is manual: downloading reports from multiple services and public data sources, pulling relevant data into a different structure in excel, manipulating data to assign it to buildings or normalize by heating and cooling degree days, and then comment on abnormalities within the spreadsheet. This process is repeated each month, and select charts are pulled out.

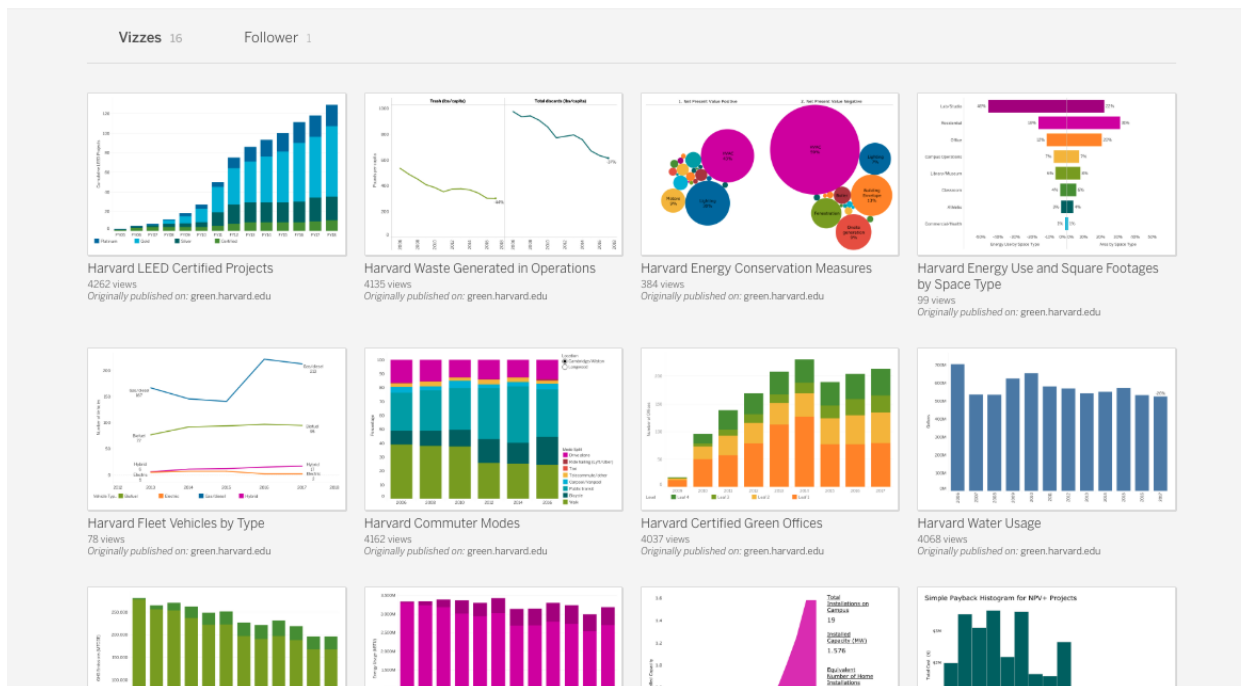
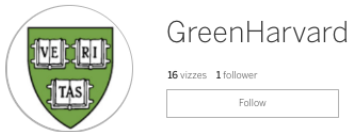
This process has been perfected so that it doesn't consume many resources and produces data to inform operations meetings, but could yet be improved - and would need to be made more seamless if we are to reach the eventual goal of displaying data to students to inform and inspire behavior changes.

We looked at other data-driven organizations and worked with the Operations team to determine the core criteria for a data system. Ideally, the HBS operations team would have an approach to this data that enables them to:

- Seamlessly pull data from multiple disparate sources, into a central view (not manually)
- Provide the entire team access to the database

- Incorporate comments in a useful way
- Enable iteration and be flexible for operations to alter views, generate new charts, add and remove data streams

For these reasons, we proposed a move to Tableau and outlined a data architecture that could meet these core criteria.



The Harvard Office for Sustainability uses Tableau to visualize the University's sustainability data.

To use Tableau effectively, we focused on Harvard's sustainability goals that require well defined metrics. These goals are to become fossil fuel neutral by 2026 and fossil fuel free by 2050, reduce waste by 50% by 2020, and reduce water usage by 50% by 2020.

Based on best practices used in other organizations and the Office for Sustainability, we concluded that there were several metrics that could be emphasized to engage users in an informative and engaged experience. In energy and emissions, what works well is to connect where the pollution is coming from to how much is being emitted using a map with point source values. We can also dynamically rank the emissions by facility size and understand how much is being emitted per square foot of a building. Another way to visualize the data is to look at year-over-year change from building to building and compare year-over-year changes across different type of facilities grouped by type of facility.

In waste reduction, what we've seen works well is to tie the economic impact with the waste reduced. For example, [ReFED](#), a non-profit that takes a data driven approach to reducing food waste, created a value per ton chart that shows the financial benefit of reducing waste minus investment and costs per ton of the food waste diverted. The output is a ranking of different ways to reduce food waste based on the value per ton they generate.

Finally, in reducing water usage, several drought prone communities and municipalities have created visually savvy charts that depict how water usage has decreased compared to goals and what are the areas that have not met their goals using box plot charts. These charts show the disparities in different communities and facilities on achieving objectives.