

Example of Using the 6.033 Impact Framework

A large part of your Design Project is learning to justify your decisions. Sometimes we justify decisions with standard technical metrics — e.g., “We chose design X over Y because X has lower latency.” Other times, we justify decisions with their impact on groups of people — e.g., “We chose design X over Y because Y has a negative impact on group Z.”

This year, we’re using the Impact Framework to help you think through the impact of your design on various groups. This document gives you a few examples of key steps in the Impact Framework.

Domains and Stakeholders

As part of your DP Prep assignment we asked you to explain what domains are impacted by this system, and what the best/worst outcomes of the system might be. As the DP continues, you’ll start to refine those concepts: thinking about what stakeholders are impacted by your system, how they benefit (or don’t) in various outcomes, and what design decisions you might make to avoid negative outcomes.

To help get you started, here are some domains/stakeholders that might be impacted by your system. **This is not an exhaustive list.** Your specific design may require you to add some additional stakeholders and/or to refine some of the groups listed. There may also be stakeholders listed here that aren’t particularly impacted by your design.

- Users. We can break this group down in many ways: people living in houses vs. apartments; people who work in Centertown but don’t live there; patients in the hospital; users with higher battery thresholds vs. lower thresholds; etc.
- CMLC and its employees
- The MIT researchers interested in the data; MIT as a whole
- Centertown, MA; its economy; small-business owners in the town; large-business owners in the town
- The environment (in Centertown specifically, and perhaps more broadly)
- The energy industry

You may find that your design impacts some of these groups in the same way; for instance, perhaps users with higher battery thresholds have a similar experience in your system to those with lower battery thresholds. That’s okay. The goal is to think through the impact on different groups of people.

Best- and Worst-case Scenarios

In the DP Prep assignment, many students stated that the best-case scenario for this project was that it met all of its goals, and the worst case scenario was that it didn’t. We can get much more extreme; here are two examples

- **Example best case:** The project meets all of its goals; microgrids share energy optimally; no one is ever without power; the town saves a great deal of money on electricity; the town becomes a model for this type of energy-sharing set-up, inspires other towns to do the same; the electric grid becomes as efficient as possible world-wide
- **Example worst case:** The project fails so spectacularly that not only does the town run out of energy, but it discourages all other towns from ever trying this microgrid-sharing strategy; people all over are disincentivized from sharing public utilities; climate change worsens.

Note that these are just examples of best/worst case scenarios. You could argue for others; for instance, a worst-case scenario where the city runs out of power and patients in the hospital can't get treatment.

These examples might seem so extreme as to be useless. They're not! There are a wide range of outcomes for any system, both good and bad. Starting with some extreme cases can help you think through the more middle-ground outcomes (e.g., the system meets some of its goals but not all; the system works well for some people but not everyone) and how they affect different people differently.

Change Matrix

The Change Matrix is a big part of the Impact Framework. We hope that it will provide a useful tool as you design your system; it's something you should revisit and refine often. **Even though we are asking you to turn it in as part of your Preliminary Report, it is not being graded.** We only want to see how you're using it.

The Change Matrix first appears in Step 1.4 of the Impact Framework, and asks you to consider the outcomes for the relevant domains. Here is a possible example the "users" domain. You might have different answers!

	Domain: Users
Best	users never run out of energy; all users receive credit towards their bill
Pretty-good	most users have energy; sometimes batteries run low, and occasionally a user's battery hits zero
Neutral	users sometimes run out of energy, sometimes not
Pretty-bad	Energy is unreliable
Worst	Users constantly run out of energy

As you move through the Impact Framework, you'll refine the Change Matrix by thinking about how specific stakeholders are impacted. Just as an example, take the case of users; we might see something like this as part of the "pretty-good" case:

	Domain: Users
Pretty-good	most users have energy; sometimes batteries run low, and occasionally a user's battery hits zero. Bad for users whose batteries runs low/hits zero; may be especially bad if this is more likely to happen to users in the subsidized apartments, who likely have a different socioeconomic status than those in single-family homes

Your Own Design

Given these examples, it might not be clear how the Impact Framework relates to your specific design; after all, we gave all of these examples without a particular design in mind.

You'll likely find that specific decisions you make impact domains and/or stakeholders that aren't listed here, and/or that the outcomes for those people are specific to your design. But you should also be using the Impact Framework to guide some of your decisions, and come out with positive outcomes for many groups of people. For instance, in the example above: could you design your system so that users in the subsidized apartments *weren't* more likely to be impacted than those living in homes? Would that cause negative outcomes for a different group of people?