

The EWB Challenge team has found that many student groups tend to come up against similar, complex questions when trying to develop design ideas that are innovative, community-centred, and clearly address the Design Brief. In the discussion below we outline how you might think through some of these common topics as you progress your design proposal from initial idea to final submission. You'll almost always find there is no one right answer, and we acknowledge this can be challenging! However, it is also a huge opportunity to understand and practice the skills and mindsets you will be asked to bring to your engineering career.

With all of these questions, you'll find the work you put in doing initial background research and learning (step one of the design process, and often called 'discovery'/'inspiration'/'empathising') becomes very valuable. A good place to start with this background research is spending time diving deep into all of the information and resources available across the EWB Challenge website.

Question 1: What is a reasonable budget for my design idea? How do I know what 'affordable' means for this community or partner organisation?

The EWB Challenge design brief does not outline a specific budget or maximum cost that your project must fit within. However, there are always numerous resources available for you and your team to think through what an *appropriate* cost would be for the Challenge project you are addressing and the product/system/mechanism you are proposing. Cost and affordability are always key design considerations.

To understand what an appropriate budget looks like, you'll want to consider what you know about the context of your project, what you've learned about the community and partner organisation, and examples of other projects completed by this organisation or in a similar location.

Once you've worked your way through some background research, here are a few questions you might ask yourself:

- **Who are the key stakeholders in my project? Who is my key audience for this proposal?**

Clearly thinking through who the stakeholders are that you are proposing be involved in your project can help you determine what kind of costs might be appropriate. Who are you 'pitching' your project to,

and how can you speak to their needs and priorities? For example, if your key audience is an organisation, you might look at examples of previous projects they are proud of and learn from how these projects were designed, delivered, and operated over time.

- **What are the different scales at which this idea might be implemented and managed?**

Project ideas might be household level solutions, might involve multiple households, or might actually require participation from an entire community - an appropriate budget can look different in each situation. If you are proposing individuals might be able to be involved on their own, considering how much income that individual has, and how much they might spend on other things day to day can be helpful. How much of an investment are you asking for?

- **Perception of value**

How much benefit will your design idea bring to the individual or community? If the benefit is significant, it can be easier to justify a larger initial investment. Is the cost appropriate for the amount of benefit this design idea will bring to an individual or community?

- **What existing costs will be offset by my design proposal?**

This about the function of your design idea, and if there is anything people are doing to meet this need already. How much are people paying to meet this need currently? Think about the case of energy supply - when thinking about an investment in solar panels on your house, you will likely consider how much you are paying for energy currently and how solar panels can offset that. In some communities, investing in solar panels might offset a weekly expense of paying for kerosene. A higher initial cost may be able to offset a recurring cost that continues over time.

Another way to think about offsetting costs is to think about how much people 'are paying' through not having access to your solution. This can be a bit trickier, but a very powerful thought process. For example, investment in a sanitation solution such as a well-designed toilet (which would have large scale positive health impacts) might be evaluated alongside considerations such as current healthcare costs and worker sick days. How much might a community or family benefit if investment in a toilet means they do not have to spend as much on medical services or lost wages from sick days?

TIP: a really effective way of framing your design proposal so that it is most useful for EWB and our partner organisation is to look at low cost and simple ways to test your idea. We challenge you to create a report which will enable those who are interested to get started and test the real-world feasibility of your idea without spending a lot of money. This will enable validation 'in the field', creating proof that your idea works and worth investing more time and money in!

Question 2: I can't find a clear answer to a specific question I have, and I can't move forward with my project until I have this information. What do I do?

As you go through the design process, you will inevitably come up with questions that require you to make estimates or assumptions to continue moving your design idea forward. This is expected and absolutely okay! There are ways you can make

reasonable assumptions and document them in your EWB Challenge report, so that a lack of specific information on certain topics does not become a barrier to completing your project.

- **Making and explaining your assumptions**

There are many resources available for all EWB Challenge project contexts that will provide general background information which can inform your design. For example, while you might not be able to find specific data for a small community location, you might be able to find that information at a district or country level. Try looking at levels of governance above the local area (i.e. what province is it in, what region, what district?) and think about the potential differences in the data you see for urban and rural settings. This research should provide you enough background then draw an assumption about your specific project context.

The photo/video/interactive resources on the EWB Challenge website are an invaluable opportunity to dive into a project context, and the information you'll be able to gather through these tools will also help you make informed assumptions in your project design. For example, if you see evidence of a certain type of construction or material in many photos, it is reasonable to assume those skills and resources are accessible to your project stakeholders. You can always ask for validation of your assumption by asking a question on the EWB Challenge discussion forum.

- **Clearly documenting your decision-making**

It is absolutely fine to make assumptions in your project where the data isn't available. However, when you do so it is important to record the fact in your final report. By clearly documenting where and how you made estimates or key assumptions, we'll understand the logic of your proposal. If there is interest in taking your idea forward, we can validate these assumptions with our own knowledge, research, and experience where required.

This way of working is generally best practice - throughout your university career you will be asked to document what you perceive to be the limitations of your ideas and research. In doing so you're not only equipping others with the information they need to iterate your ideas, you can highlight whole new areas of research which could add value in the future.

- **Allowing for variables, thinking about a modular approach**

In many cases the reason a specific answer isn't possible or meaningful is because the range of applications is so broad. For example, we may not be able to give you a specific answer to the average plot size for agriculture in a region because there is often a huge range of plot sizes. As another example, we may not be able to provide one number for the number of users of a water source as this number may fluctuate considerably depending on the season.

One way to handle these variables is to think about a solution that can be applied to the full range of applications - consider what a 'modular approach' could look like in your design proposal. Are there solutions that can be scaled up or down to meet the particular situation? Coming up with solutions that can be scaled easily to fit the context, especially in combination with a decision-making tool to help determine the size of the system required, can only increase the relevance and feasibility of your idea for EWB and our partners.

Question 3: I'm not sure if my preferred material is available in this location, what do I do?

When developing a design proposal that is most suited to a particular context and sustainable over time, you'll likely start investigating what kinds of materials are or are not available locally.

- **Explore the photo galleries, videos, and interactive resources to see what's already common across a community**

The photos and videos on the EWB Challenge website are a great resource for observing materials that are already regularly used in the context. Take time to look through and make notes of the different materials you see in use as well as construction styles and equipment that might be visible. You won't just be looking at structures and technology, looking at surrounding flora can be key as well. For example if you can see large stands of bamboo in the background of some photos, it can be reasonable to assume bamboo may be available at a low cost.

- **What is the function of this material, and is there anything else that can serve that purpose?**

If through your research it appears the material or resource you are looking for is not easily available in this location, try thinking through what the function of the material is and what properties allow it to do this. What is this material/resource doing, and are there any other materials/resources you KNOW are locally available that can do this same thing? This thought process is actually always good practice - identifying where local and/or abundant materials can be utilised can make your design proposal more affordable and, by extension, more accessible to everyone.

TIP: the discussion forum on the EWB Challenge website is a great resource to draw on here. Before asking whether a material is available, do a quick search of the existing forum posts to see if others have already asked and received an answer.