



THE IMPOSSIBLE HOUSE

FACTSHEET

MY MISSION

Hello! I'm Laura Ryan. I'm renovating a tiny, dark worker's cottage in Newtown, Sydney, starting early 2021. My goal is to transform it into a light-filled, off-grid home.

WHY SO 'IMPOSSIBLE?'

It's been far from easy getting to this point. In fact, according to the many architects, solar, water, legal and sustainability experts I've engaged with in the last 4 years, the project is near impossible! For a few key reasons:

1. The house is small and overshadowed, with difficult access.

2. It's situated in an inner-city, high-density area.

3. Space!

It's easy to be off the grid when you have the square meterage, but we **only have 104m²** to work with. The limited roof space severely limits harvesting water and sunlight. The small block also makes it difficult to incorporate solar passive principles.

4. Cost.

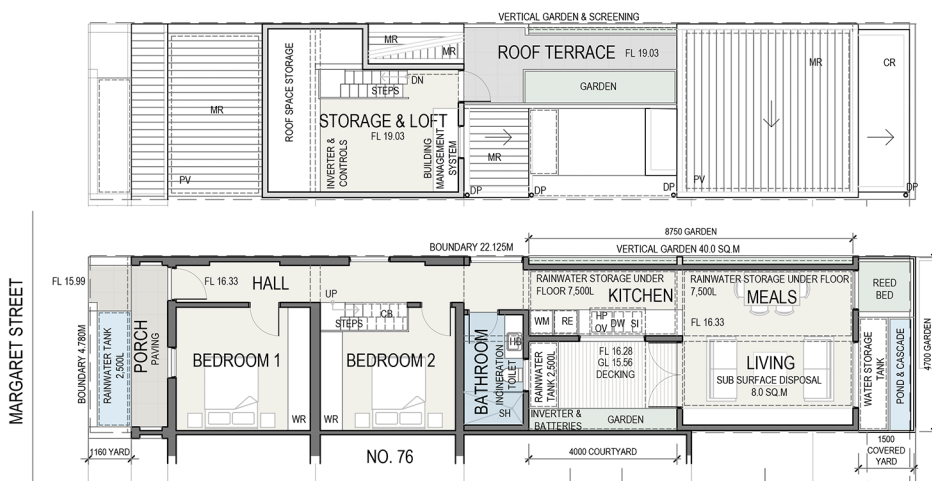
I want to prove that it can be done for the same cost as a 'normal' renovation.

5. Heritage restrictions

MY BRIEF

- No heating or cooling systems to be installed in the home, but the house has to be warm in winter and cool in summer.
- The electricity, waste and water systems need to be self-sufficient.
- We need to salvage as much of the existing property as possible for re-use in the new build.
- The house must look, feel and function like a "normal house". The inhabitants should not have to make livability sacrifices.
- Only sustainably sourced materials are to be used, e.g., no concrete.

FUTURE FLOOR PLANS



PLANNING

It is important that if you are trying to implement non standard solutions then you need to involve both the council and your private planner at the start of the project to understand your design envelope. I am extremely lucky to live in the Inner West Council area, who have a goal of zero net emissions and who are helping me to achieve my goals.

Councillor Pauline Lockie from the Council has been a big supporter of the project and has helped me to understand what is and isn't possible. Thank you Pauline and the Inner West Council!

EFFICIENT MODULAR BUILDING

The unique modular design system allows construction time to be accelerated and cost carefully controlled while maintaining quality and durability. The build should take around two weeks. Much shorter than the usual build time.

The structural timber materials are sourced from Australian & New Zealand plantation timbers as natural solid framing timbers, LVL engineered timbers and plywood bracing materials.

With this supply chain they are able to seek chain of custody verification of the source of these timbers through Forest Stewardship Council or other certification system. For internal wall and ceiling linings plasterboard is to be reduced or excluded from the build. This gives the opportunity to look at lining with other products that are either reclaimed or timber based.

INTERIOR DESIGN

I want to contribute to an attitude shift about living sustainably so the house must not only look great but all the materials used in the build are as sustainable as possible. Think inner city cool! Not hippy log cabin! As much of the existing property will be salvaged for re-use as possible. For example bookshelves, existing furniture and fittings will be repurposed. Where paints, tiles, wallpaper, fabric etc. all need to be sustainably sourced and non toxic.

INCINERATING TOILET

- <https://www.cinderellaeco.com/au-en/products>
- Energy consumption per incineration: 0,8 - 1,5 kWh
- Power requirement: 220 - 240 V, 10A
- Four people using the toilet for a week will only produce about one teacup of ash

ENERGY

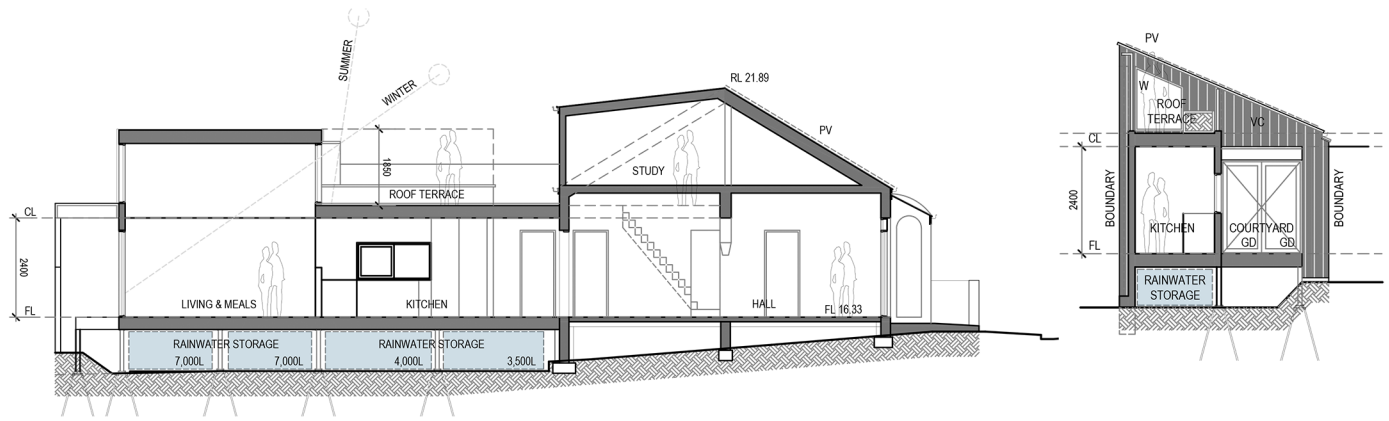
7.11kW solar system	12.0kWh battery	5.7kWh per day daytime load	6.3kWh per day to battery	13.6kWh per day exported to grid
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WATER

We are still working on this solution!

SPECIFIC REQUIREMENTS FOR THE WATER RECYCLING SYSTEM:

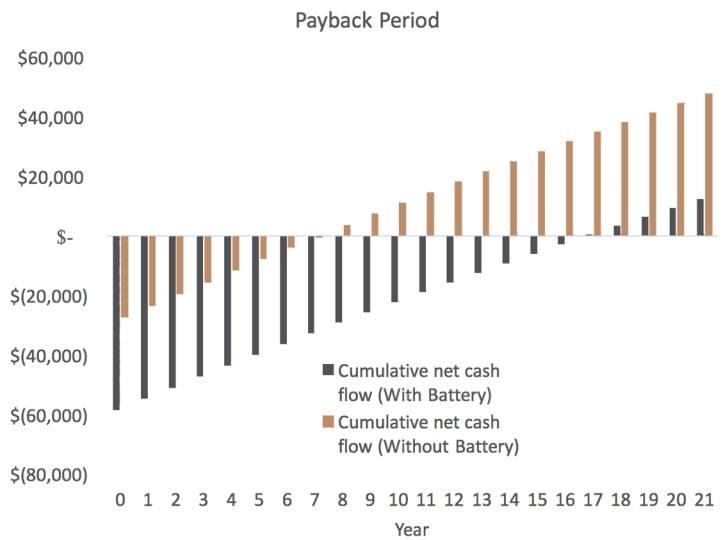
1. Recycle all water so that it may be re-used for drinking, the garden or the washing machine
2. No water to leave the property (i.e. disconnected from the mains and storm water)
3. Support a 3 person household
4. Cost of the solution to be less than \$30,000
5. The system must satisfy NSW health regulations



DOES IT ADD UP TO BE SUSTAINABLE?

For this type of off-grid renovation to be attractive to others, it needs to be cost effective. Going off the grid for me means I will disconnect from government services which supply me with water, electricity, gas and sewage disposal. I will therefore need to invest in solar panels, water tanks, an incinerating toilet and grey water recycling systems.

This chart shows the payback period for an off-grid solution with and without a battery (year 7 without and year 17 with). Including a battery is NOT cost effective. The payback period for solar only is year 4! A fantastic result! Calculations include assumptions for discounting future cash flows and inflation, excludes connections to water, sewerage and electricity. See theimpossiblehouse.com for a full breakdown of cost assumptions.



These calculations are for a 1-person household where consumption is well below the average for a 1-person household. The numbers are even more compelling for families and 2+ households because the cost of electricity is higher than the feed in tariff.

THE TEAM



Paul Adams
Architect



Dr. Laura Ryan
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Susan Burchill
Writer/ Producer



THE
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My blueprint for sustainable city living

For more info, visit website:
www.theimpossiblehouse.com