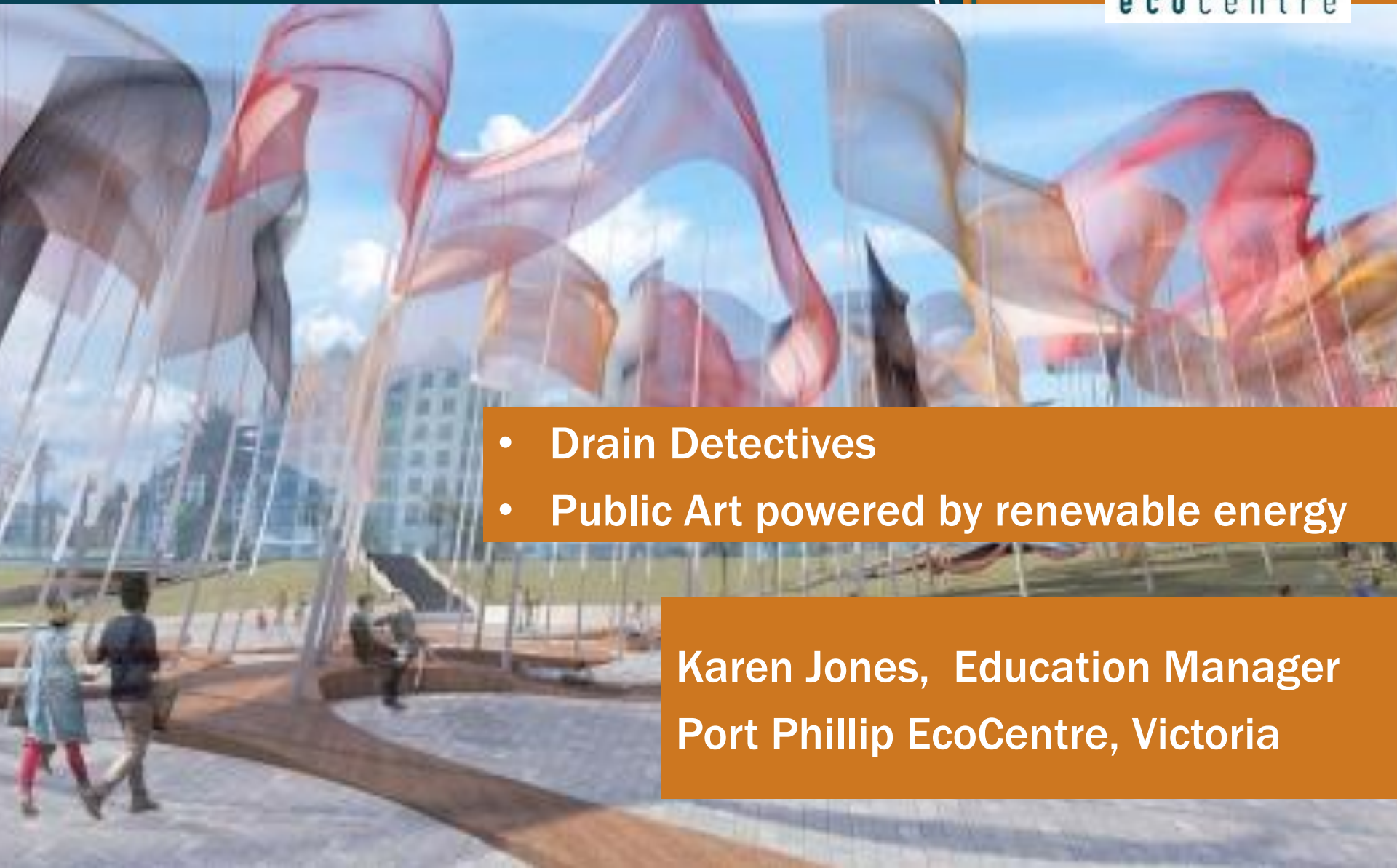
# STEAM through the Sustainability lens



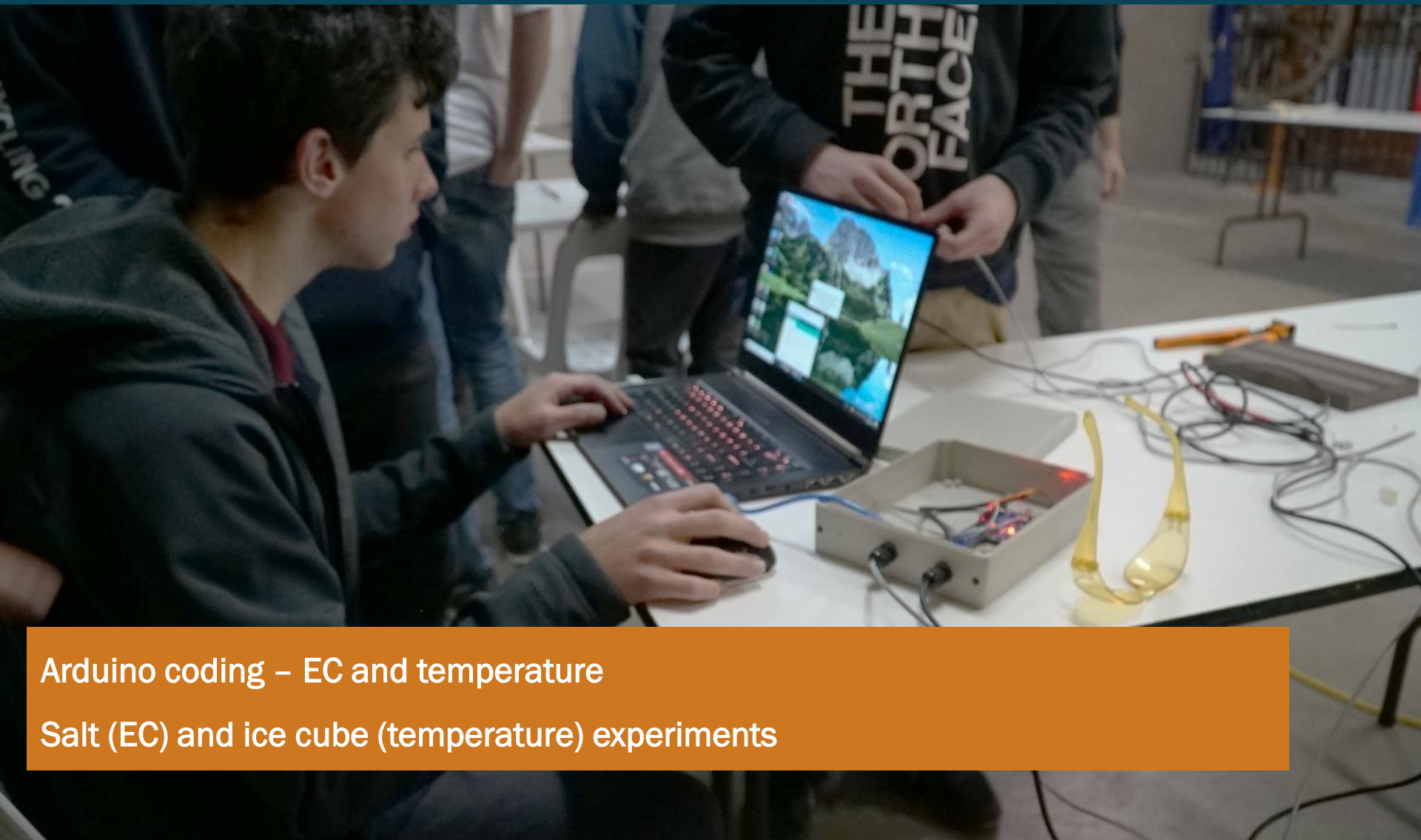
- Drain Detectives
- Public Art powered by renewable energy

Karen Jones, Education Manager
Port Phillip EcoCentre, Victoria

# Drain Detectives Program

1. Building a sensor & experiments
2. Planning location of sensors in drainage network
3. Analysing sensor data and making recommendations
4. Conduct Beach EPA water quality experiments

# Drain Detectives Program



Arduino coding – EC and temperature

Salt (EC) and ice cube (temperature) experiments

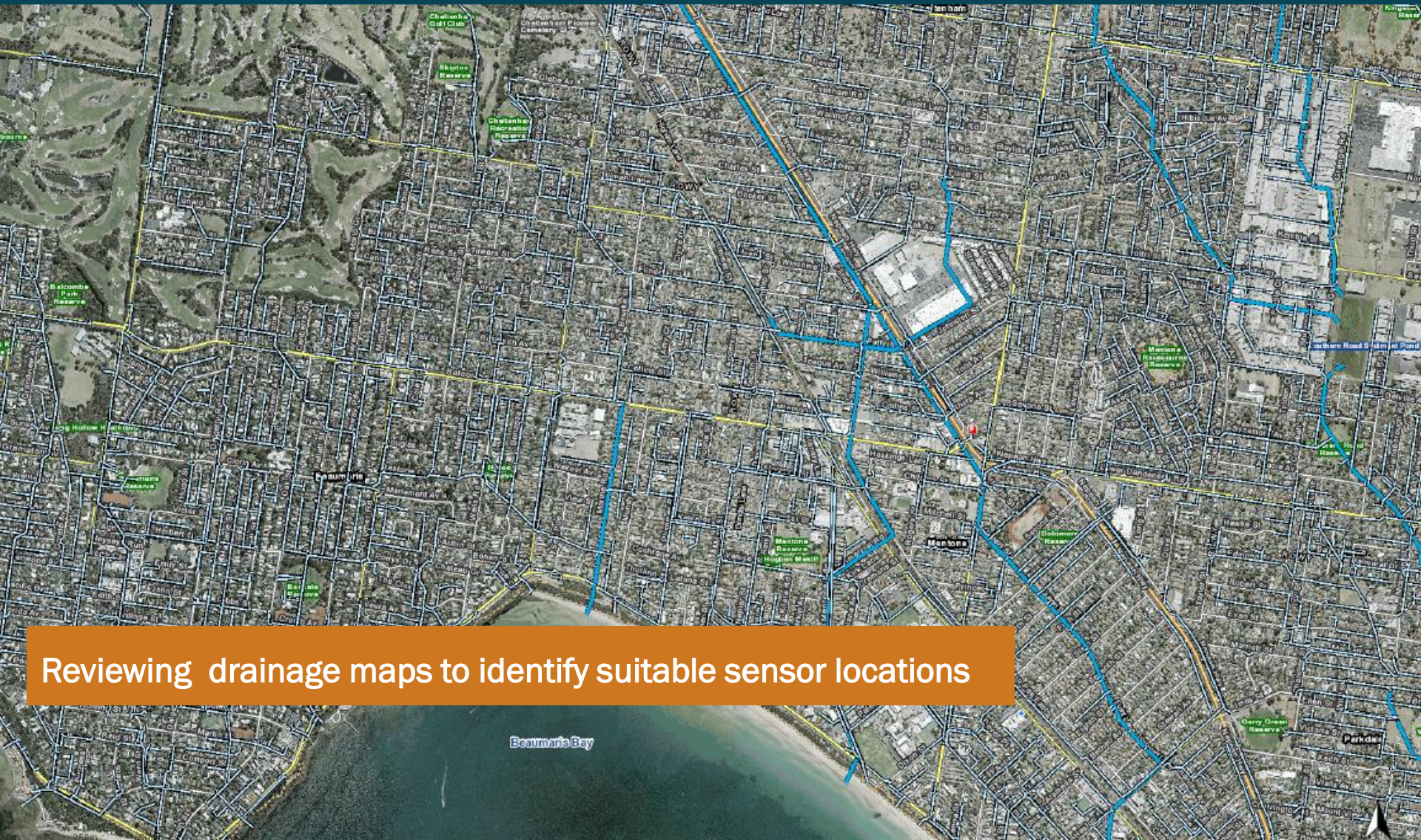
# Drain Detectives Program

EPA water quality testing

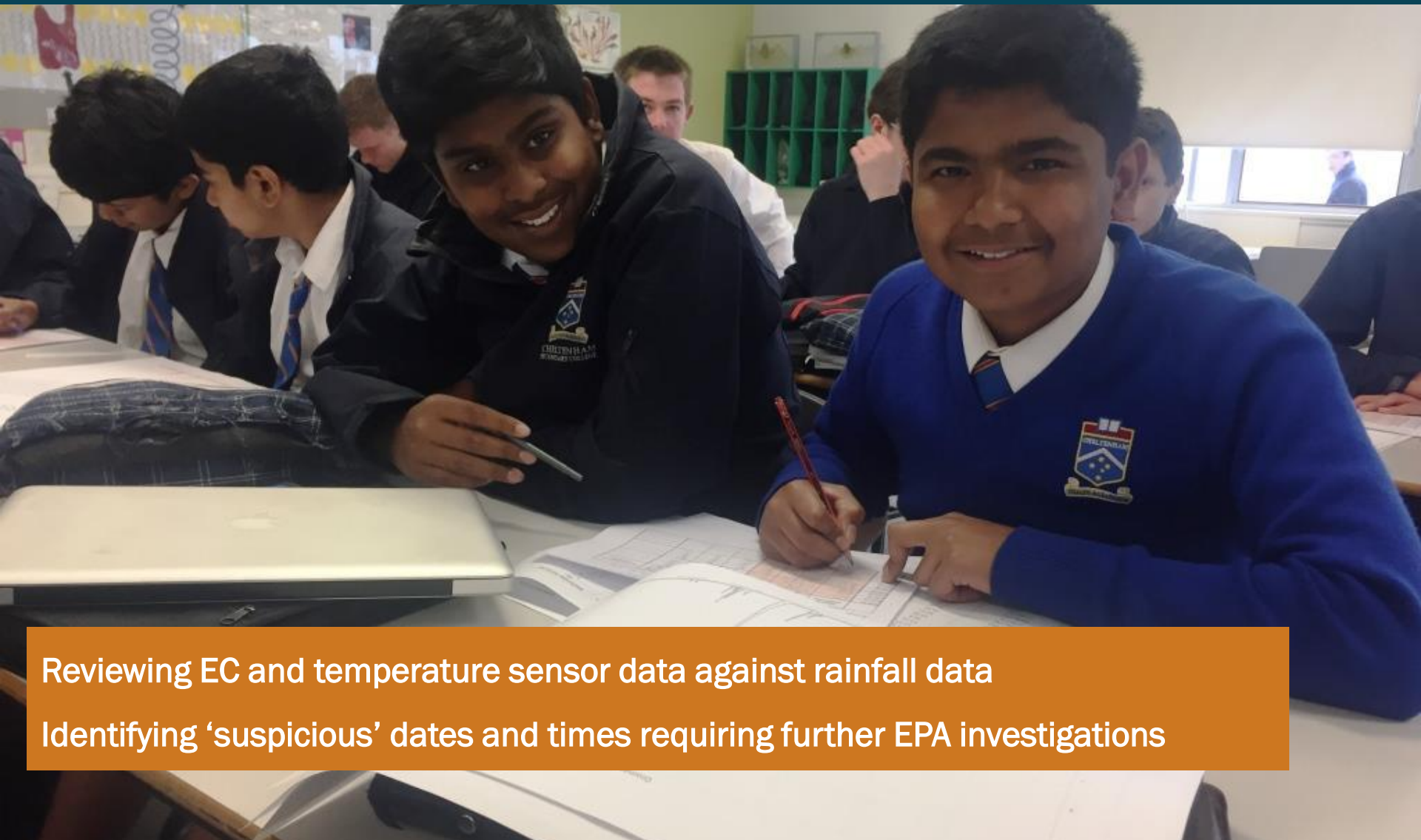
# Drain Detectives Program

Reviewing  land use maps to identify where sensors to be installed

# Drain Detectives Program



# Drain Detectives Program



Reviewing EC and temperature sensor data against rainfall data

Identifying ‘suspicious’ dates and times requiring further EPA investigations

# Drain Detectives Program

Presenting recommendations

# Public Art powered by renewable energy

St Kilda Marina senario

# St Kilda Marina scenario

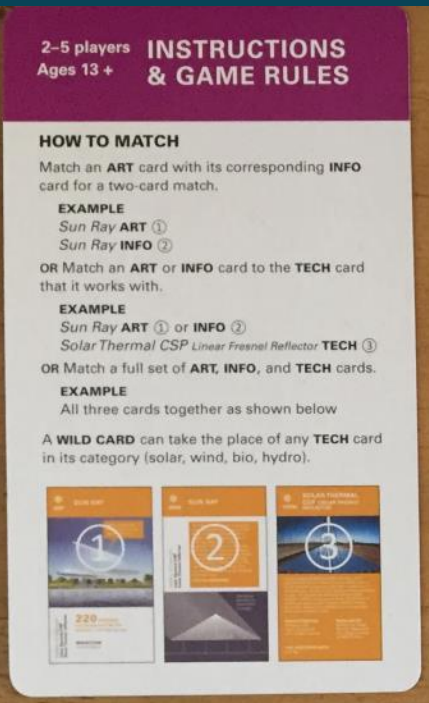
Researching:

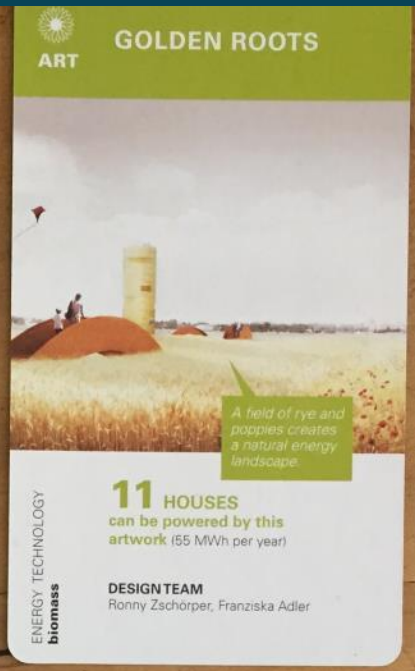
- Land use
- Council requirements
- Requirements for public art
- Renewable energy technology

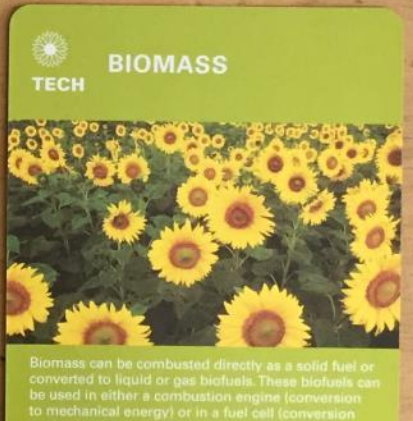
# St Kilda Marina scenario

# Renewable Energy Technology

# Renewable Energy

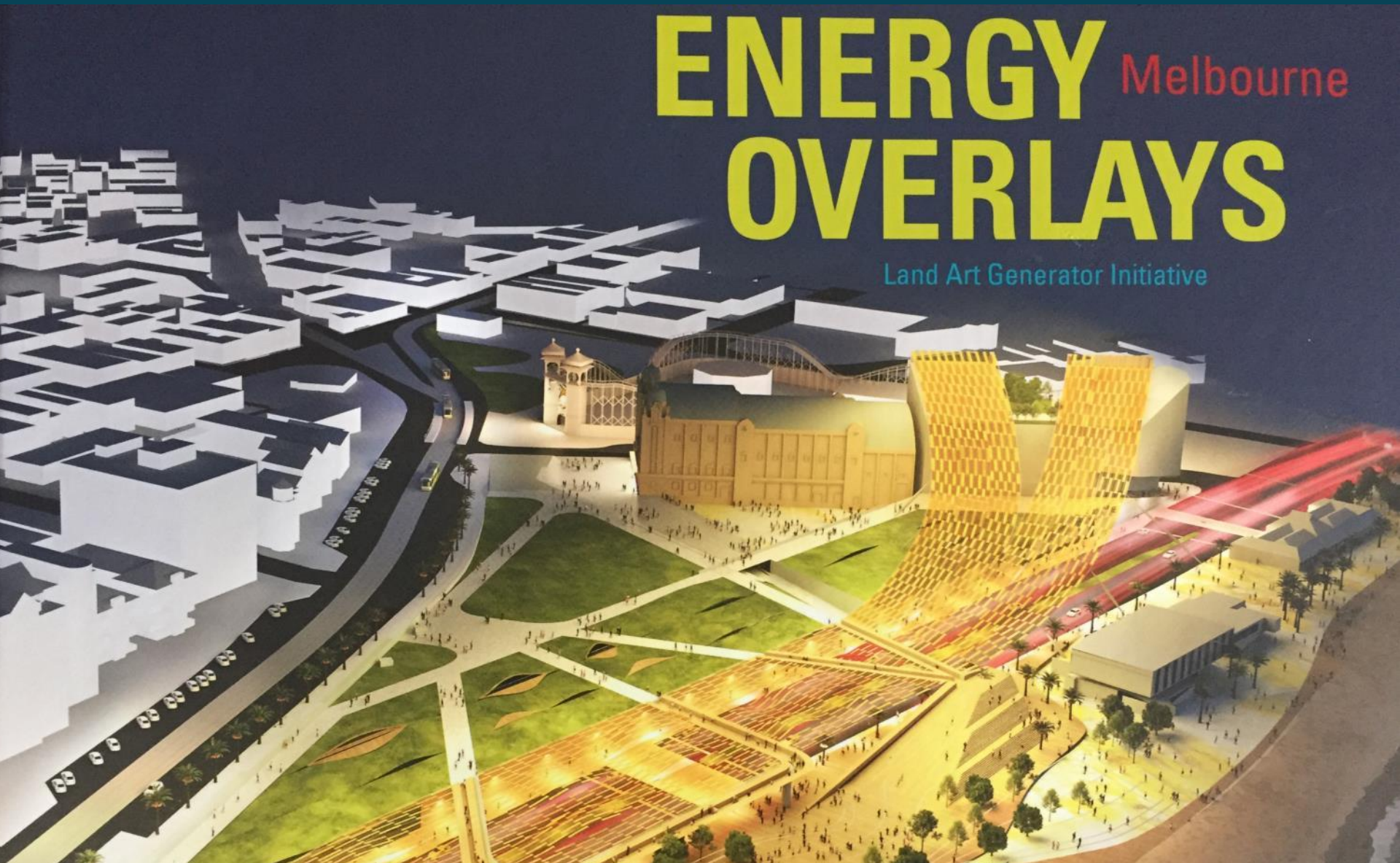






# Renewable Energy Technology

# Art + Energy Designs



# Art + Energy Designs

## HEAD IN THE CLOUDS

After an afternoon picnic at St Kilda Triangle, clouds pass by over a translucent airy canopy. As the sky clears, the sun finally peeks out. At the same time, the poles holding up the canopy grow taller, stretching it up into a billowing space, the form of which is designed to capture as much heat and light as possible. While the Melbourne sun transforms the city into a blazing afternoon heat, *Head in the Clouds* creates a naturally cool pocket. The interwoven design is informed by the ubiquitous—and recognizable—rooftop solar panels, as well as the site's various contextual narratives, from the entertainment district to foreshore sunbathing.

The artwork, as a series of clouds scattered throughout St Kilda Triangle's new masterplan, provides a unifying identity to the new lawn adjacent to the Palais Theatre, St Kilda Festival Park, and the beach.

A translucent tensile fabric embedded with Sphelar® solar cells is used to transform a typical flat roof canopy into a billowing cloud-like structure, creating rolling peaks that orient towards the north to collect maximum sunlight. The innovative Sphelar® solar cells woven into the structural fabric are spherical in shape and capture solar energy from all angles.

Responsive to the amount of sunlight it receives, *Head in the Clouds* educates visitors about renewable energy while allowing them to directly engage with the moving structure.

In addition to collecting solar power, the installation collects wind energy with Windbelt™ wind harvesting devices embedded within telescoping columns in the skeletal steel structure, producing enough energy to operate the cloud fabric's vertical billowing effect.

The immersive cloud structure embraces those who interact with it, welcoming an optimistic view of sustainability as they stand—quite literally—with their heads in the clouds.

**TEAM**
Yuxun Emmeily Zhang, Alexandra Siu, Liyang Zhang

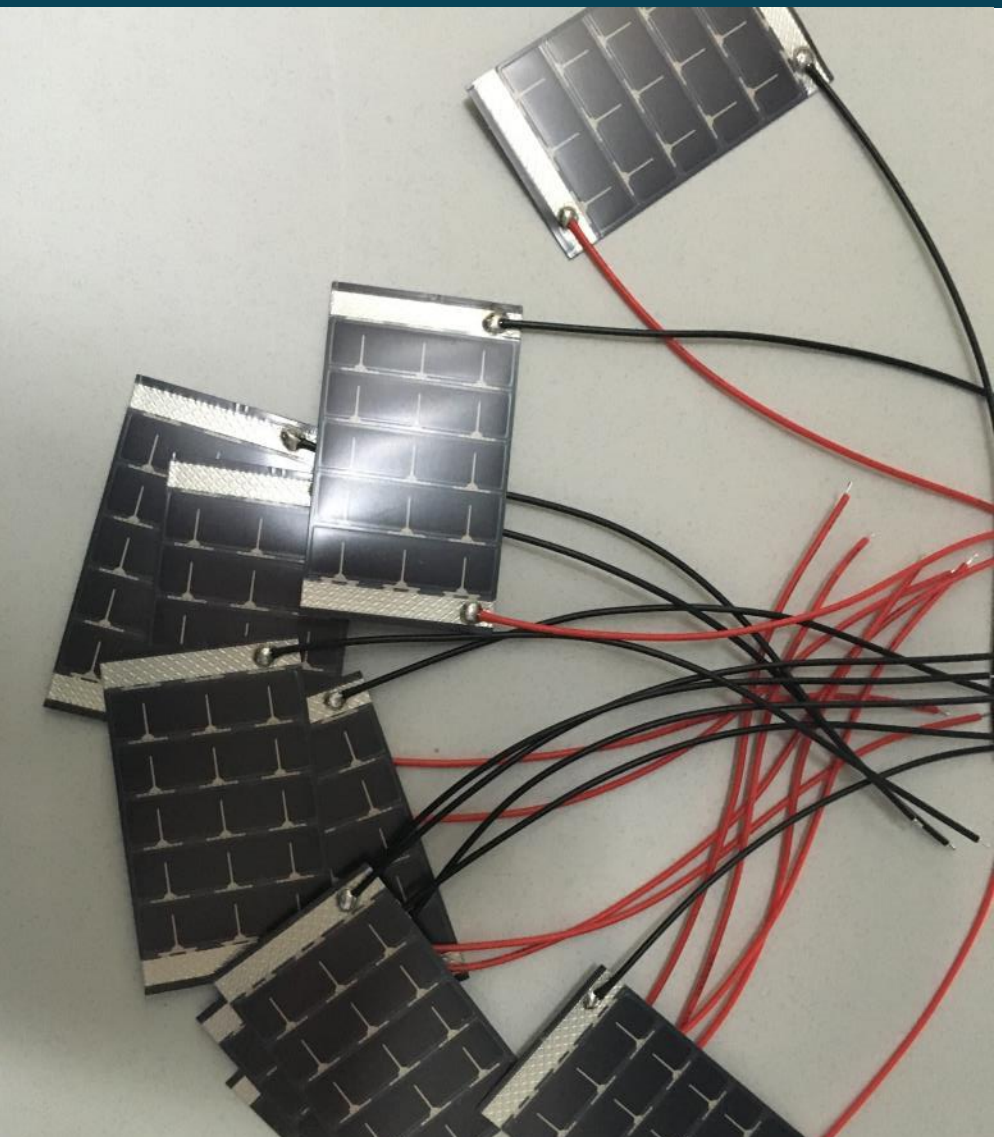
**TEAM LOCATION**
Cambridge (ON), Canada

**ENERGY TECHNOLOGIES**
transparent silicon solar mesh (Sphelar®), aerostatic flutter wind harvesting (Windbelt™)

**ANNUAL CAPACITY**
260 MWh

Sitting in a "Park Cloud"

# 3D models



# 3D models

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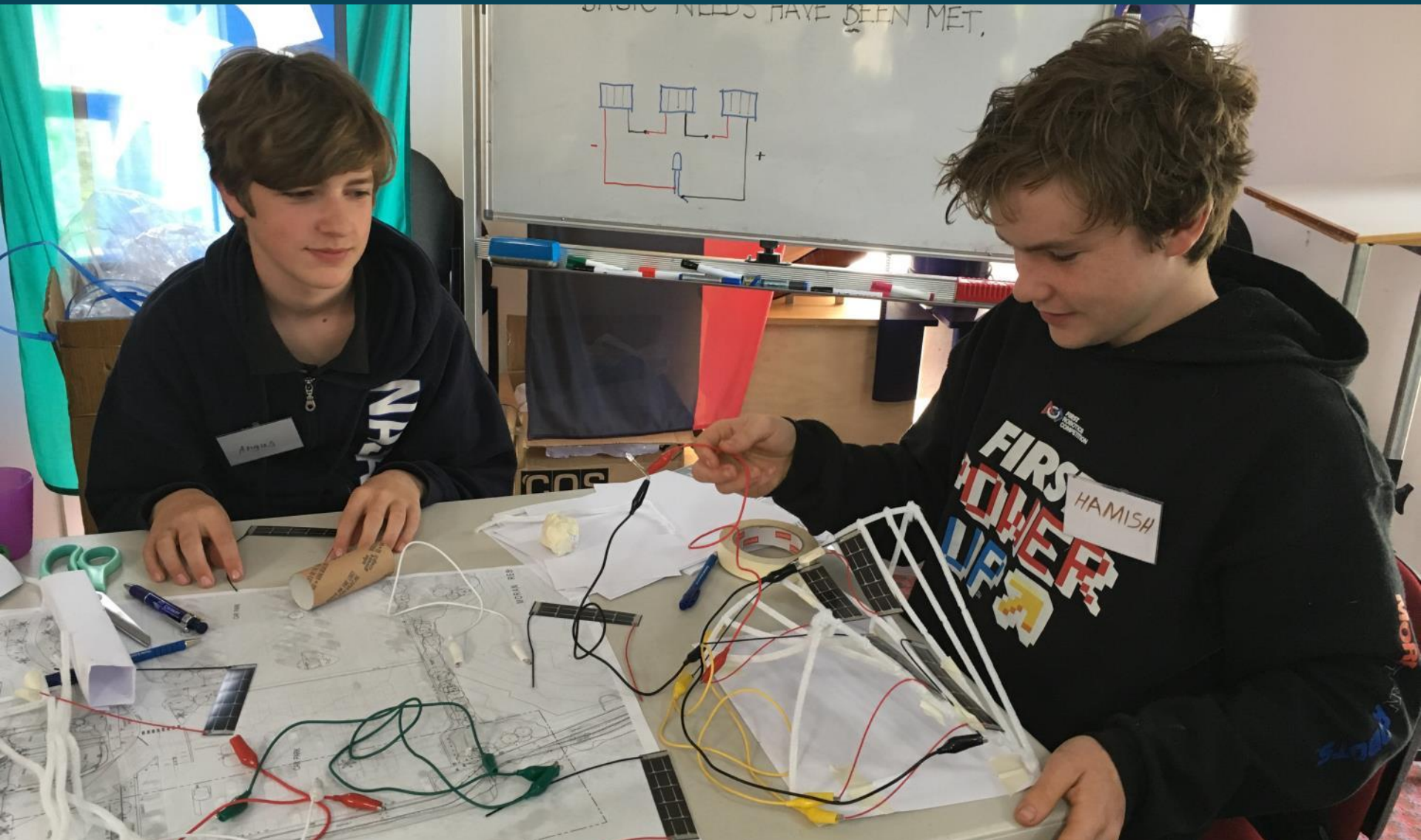
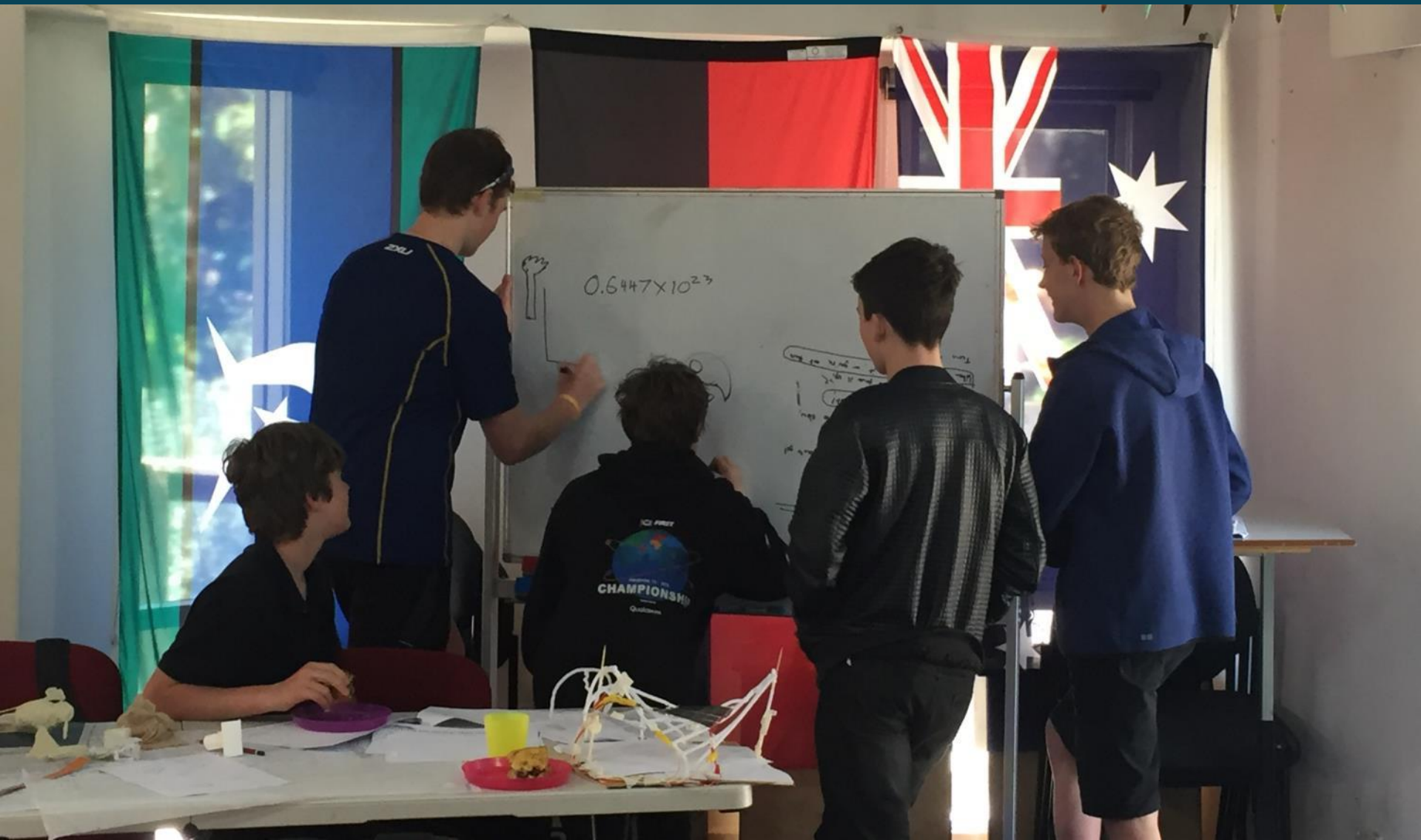
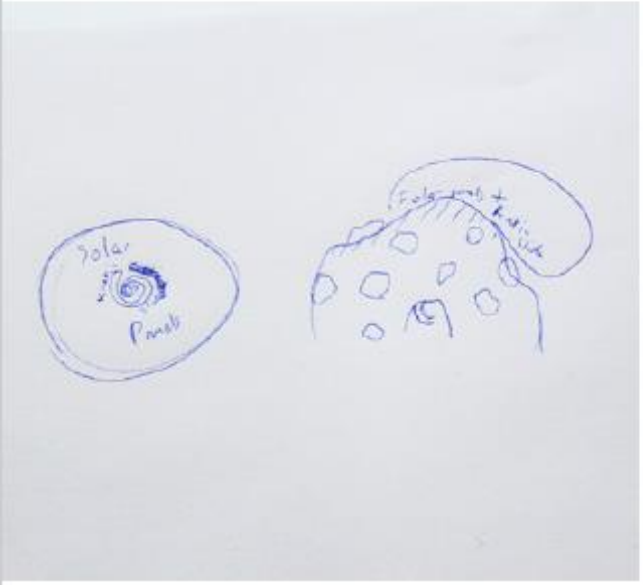


# How many homes powered?



# KINETIC ROCK

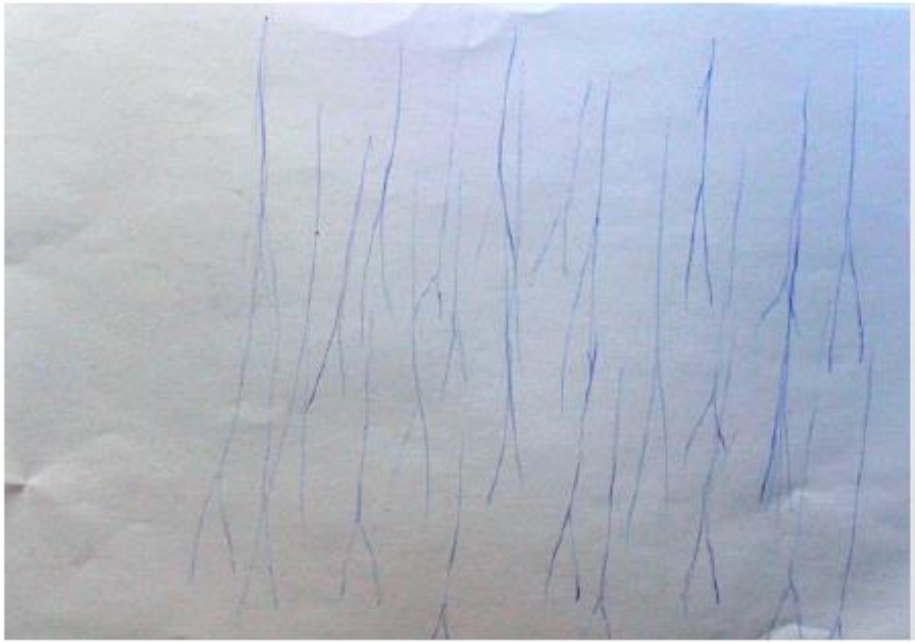
**Participant** Mikayla



**Keywords:** Climbing, colourful, play, weird
**Technology:** Kinetic (piezo), solar panels
**Inspiration:** There were lots of rocks on the site, which provided the original source of inspiration.

# MUTANT SEAGRASS

**Participant** Liora



**Technology:** Piezoelectric

**Inspiration:** Sea grass

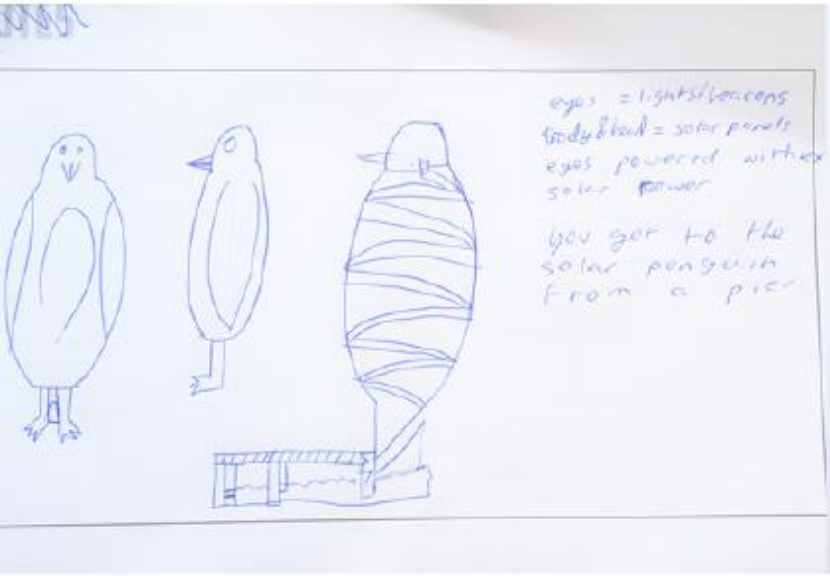
**Keywords:** big, green, filter, marine, grass

**Experience:** A moment of surprise when they see it for the first time.
Greater interest in renewable energy and nature.

# SOLAR PENGUIN

**Participant** Evan

**Technology:** My *Solar Penguin* is completely covered with solar panels and will tower over St Kilda.
The two eyes are lightbulbs and can be used when the city is in complete darkness.
The *Solar Penguin* powers 123 houses.
**Inspiration:** My inspiration is from the solar duck and the penguins that visit the lighthouse
**Keywords:** massive, bright



**Experience:** Visitors will be able to walk inside the penguin which they access from a pier once you get all the way to the top of the penguins head you could look out of the penguins beak.

# Celebration

# Questions

**Port Phillip EcoCentre**
www.ecocentre.com

**55A Blessington Street, St Kilda VIC 3182**
**ph:03 9525 3102 e:schools@ecocentre.com**

Karen Jones
Education Manager

PORT PHILLIP ecocentre