



Camberwell Girls Grammar School

TILTSHIFT CHALLENGE 2023

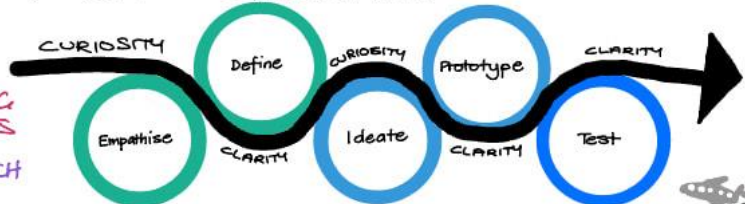


Extinguishing the flames: shifting from gas to electric in Australia

Types of energy used in Australia include

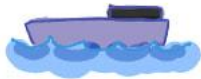


DESIGN THINKING PROCESS GUIDING RESEARCH



71% ELECTRICITY GENERATED FROM FOSSIL FUELS

Renewable energy sources include wind, hydro, biomass, solar



exporting → COAL, NATURAL GAS, GREEN HYDROGEN

importing → REFINED PETROLEUM

Design tools + frameworks
MIRO



USED FOR WEIGHING ARGUMENTS

multi-faceted plan needed

↑ community awareness
↓ electricity bills
real time feedback
↓ \$ discount electrical appliances



Global implications with energy transition

IDEAS
STRATEGIES FOR INDIVIDUALS

retraining
↓ taxes on electric appliances
Australia-wide approach
recycle/re-use gas appliances

↓↓↓ ENERGY USE
Recommended Reading



Sketchnote: Dr. Charlotte Forward @talkinged19



Global Alliance of Leading Edge Schools for Sustainability GALESS

ENERGY TRANSITION
DAY 3
Fintona

Ivanhoe Grammar School

TILTSHIFT CHALLENGE 2023

ONE STEP IS ALL IT TAKES

Energy consumption
7% residential consumption
33% industrial

Energy sources
coal → 60% Australian electricity
104 million tonnes of CO₂

2022: 1/3 homes AUSTRALIA
natural gas 160,000 tonnes of CO₂
hydropower 5-7%

FUTURE ENERGY SOURCES

solar, geothermal, hydroelectricity, offshore wind
SOLAR → small scale, large scale

58 million PJ of unused energy
10,000 x more than currently generated

Western Downs Green Power Hub

15km² → 235,000 homes

Sketch note: Dr Charlotte Forwood @talkingd19

GLOBAL IMPLICATIONS → Global leader | Export technology
→ Share knowledge | infrastructure





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**ENERGY TRANSITION
CONFERENCE MELBOURNE
OCT 17TH-20TH 2023**

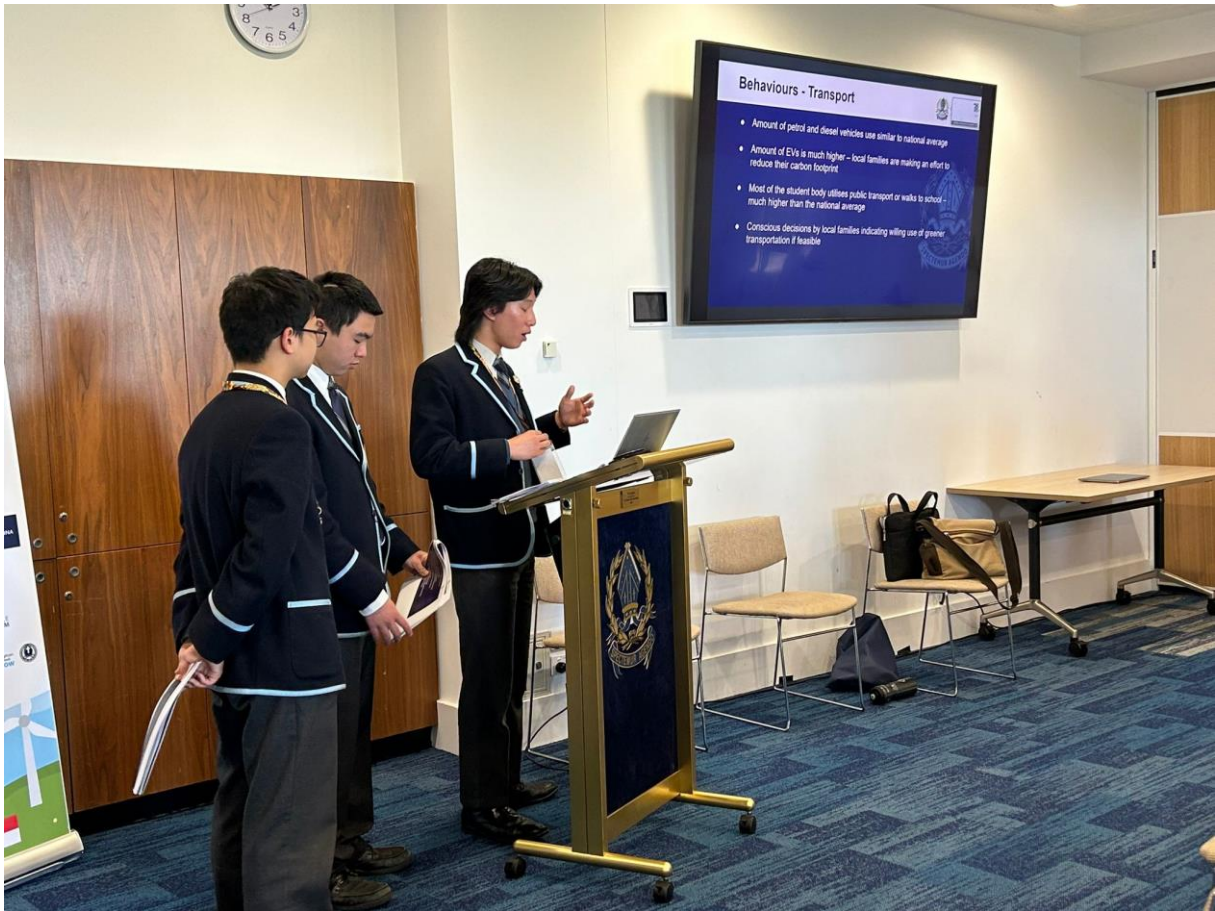
Organised by the
Boroondara Gifted Network - BGN

Host Schools



Participating Teams



















Mentone Girls Grammar School



Transition to Biofuels

1% AUSTRALIA'S ENERGY

untapped resource

Proposed transition plan



- nationwide fuel blending mandates
- renewable fuel incentives for companies
- fossil fuel tax rebates
- ↳ DISINCENTIVE



DEVELOPMENT AND INFRASTRUCTURE

- investments in biodiversity plants



TRADE

- global feedstock transportation
- partner with Aviation industry
- investment in technological and educational sectors



RAISING PUBLIC AWARENESS

- media support
- education campaigns

QANTAS+ AIRBUS

sustainable aviation fuel **SAF** PROJECT

How are biofuels produced?



anaerobic fermentation + digestion



TWO TYPES OF BIOFUEL

CONVENTIONAL

- food sources
- cheaper
- limited opportunities for blends
- ↓\$

ADVANCED

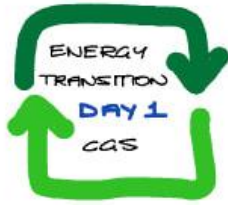
- waste + residues
- more sustainable
- ↑\$\$\$

↓ CO₂ emissions

↑ economy
waste reduction
+ fuel stability

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Raffles Institution

HYDROGEN ENERGY
secondary source

DIFFERENT TYPES OF HYDROGEN ENERGY INCLUDING:

- unclean
- carbon capture
- most environmentally friendly ↑ \$\$\$

TILTSHIFT CHALLENGE 2023

ISSUES || transportation | toxic

HYDROGEN FUEL CELLS ↑ efficiency \$\$\$
COMBINED CYCLE GAS TURBINES

NUCLEAR ENERGY



↓ lifetime carbon emissions
nuclear waste can be recycled

still being assessed

4TH GENERATION micro reactors

ISSUES
land constraints
public perceptions

SOLAR ENERGY

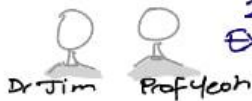
↑ growth



ZERO EMISSIONS
2050

INTERVIEWS

little potential at almost full capacity



2 EXPERTS

most dominant:

SOLAR

3% of Singapore's needs

adds unnecessary step

NEED

↑ primary data from Singaporeans

→ NUCLEAR still a possible option

→ HYDROGEN limited to imports (can it be produced locally)

→ Singapore can help others world class research capabilities

CONCLUSIONS

→ IMPORT GREEN HYDROGEN

+ NUCLEAR AND HYDROGEN MICROREACTORS TO SUPPLEMENT

REGIONAL ASEAN POWER GRID FOR DIVERSIFICATION



CONTINUE TO MAXIMISE SOLAR ENERGY TRANSITION

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sketchnote - Dr Charlotte Forwood @talkinged19



SIR KARL HOPPER SCHULE, VIENNA

TILTSHIFT CHALLENGE 2023

Hydropower 26.5%] POWER USE
Biogenic 47.5%

sustainable building LISI Building → Project of Vienna University of Technology

Vertical tiles (photovoltaic) 96% wood → good insulator
air heat pump floor heating
25,000 kWh/year typical Austrian house
6,000 kWh/year

“Am Getreidemarkt” 1st Plus-Energy Office skyscraper in the world
ventilate stairwells LED lights triple glazing
photovoltaic glass in windows = vertical solar power plants

HISTORY IN HARMONY WITH SUSTAINABILITY

- sustainability
- energy efficiency
- preservation of history

challenges and Monument Protection

PRESERVATION EFFICIENCY

NAVIGATE THE REGULATIONS

PLAN

AUSTRIAN SCHOOLS

Set up (solar panels/tiles) €18K - €36K

↓ energy use €5K - €7K + generate up to €5K energy

Sketchnote: Dr. Charlotte Forwood @talkingself