

Visualising Daily Solar Supply

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A Little Bit About the Topic

- 3D Visualisation creates a tangible world in which you can interact with data
- The amount of solar supply is changing rapidly
- Daily changes in weather conditions will affect solar supply

Introduction

Cloud Sustainable Energy Fund

- Out of the \$500M Renewable Energy Fund and the \$150M Energy Innovation Fund, \$100M of is allocated to the establishment of the Australian Solar Institute.

Cloud Climate Target

- By 2020, 20% of Australian power will be from renewable sources, including solar

Cloud Med-Large Power Plants

- The number of medium and large solar PV power plants is increasing (more than triple were accredited in 2018 over 2017)

Cloud Small size systems

- Home use reporting
- Real-time data (in table form)
- Allows us to have a good estimation of daily solar output

Background

- ☁ Small PV system operators
- ☁ Citizen engagement
- ☁ Land reclamation
- ☁ Visualisation as a part of a greater “digital twin” of the city

Web of Ideas – who could use this tool and why?

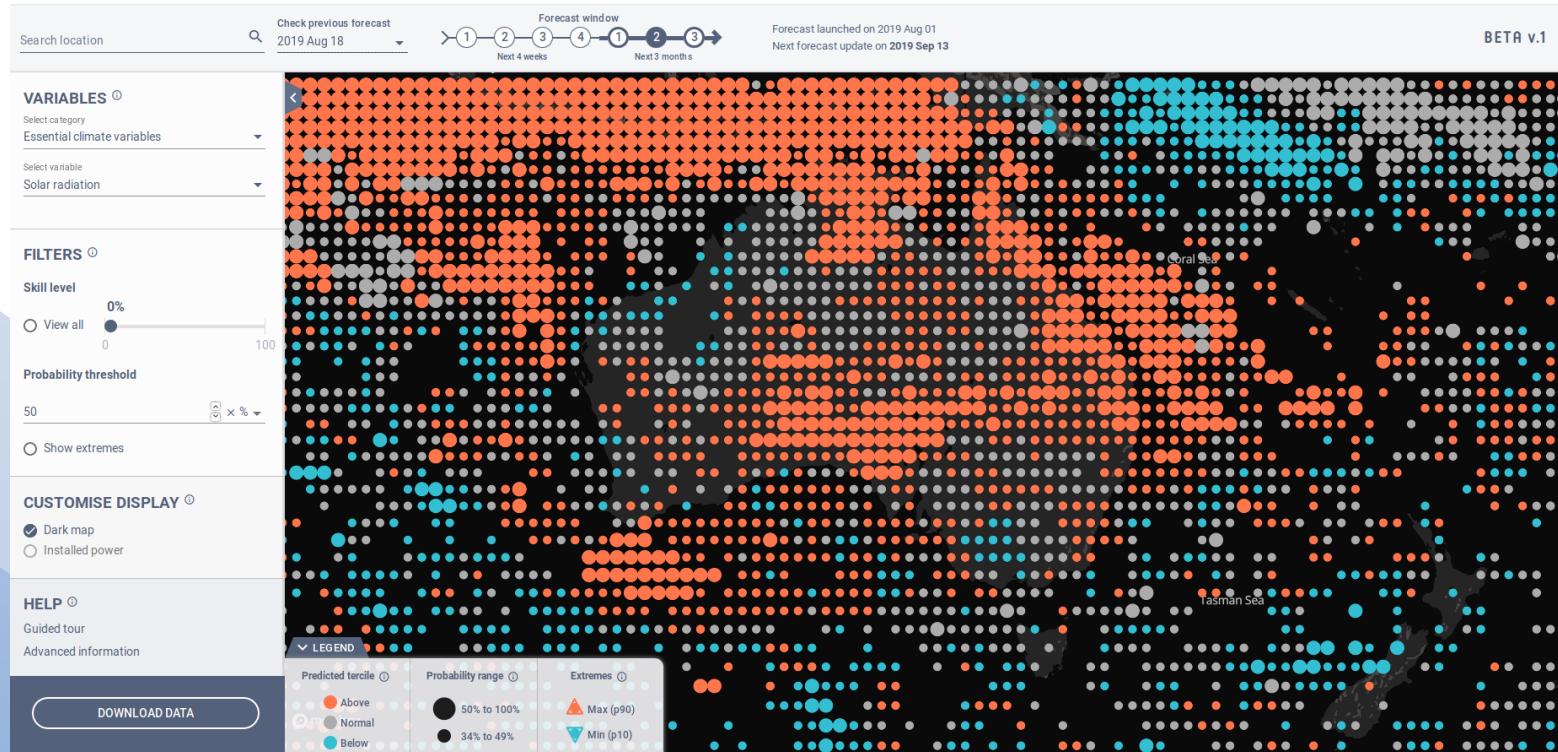
- ☁ Large-scale power production and storage requirements
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- ☁ Compare production with demand

- ☁ Policy decision making
- ☁ Broader community
- ☁ Urban planning

Other Solar Visualisation Tools

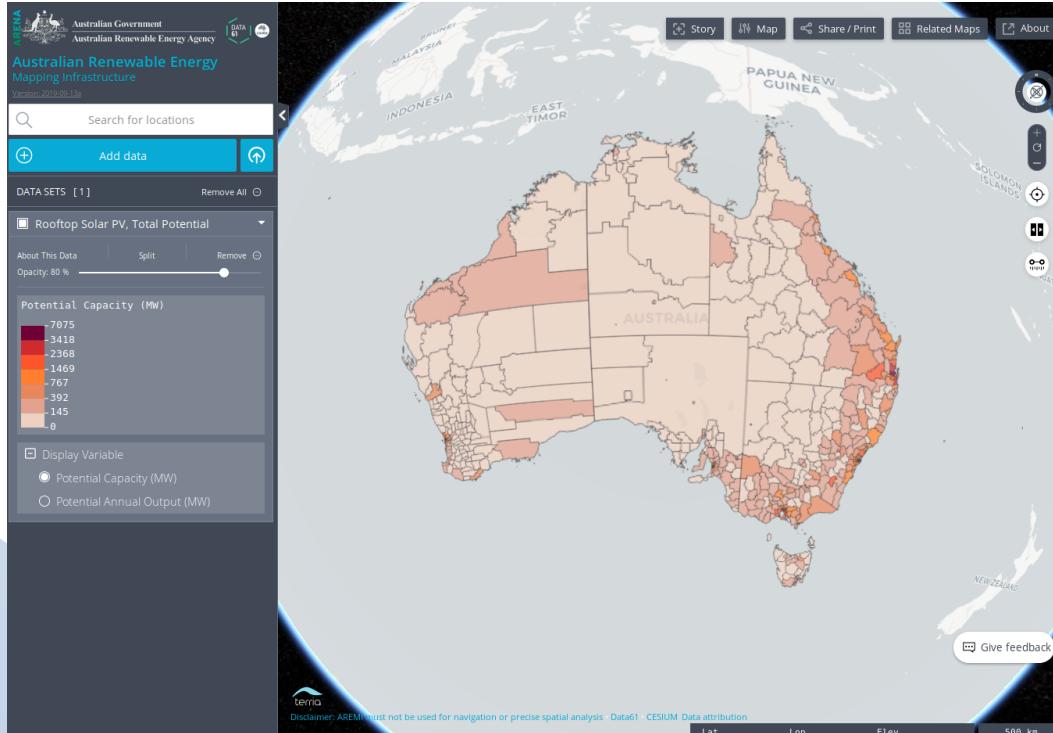
- “S2S4E” Decision Support Tool
 - 2D visualisation
 - Solar energy map
 - Presenting data for decision making and planning
- Terria and National Map
 - Some 3d capability (desktop)
 - Renewable energy map
 - Map of solar capacity
 - Digital twin

“S2S4E” Decision Support Tool



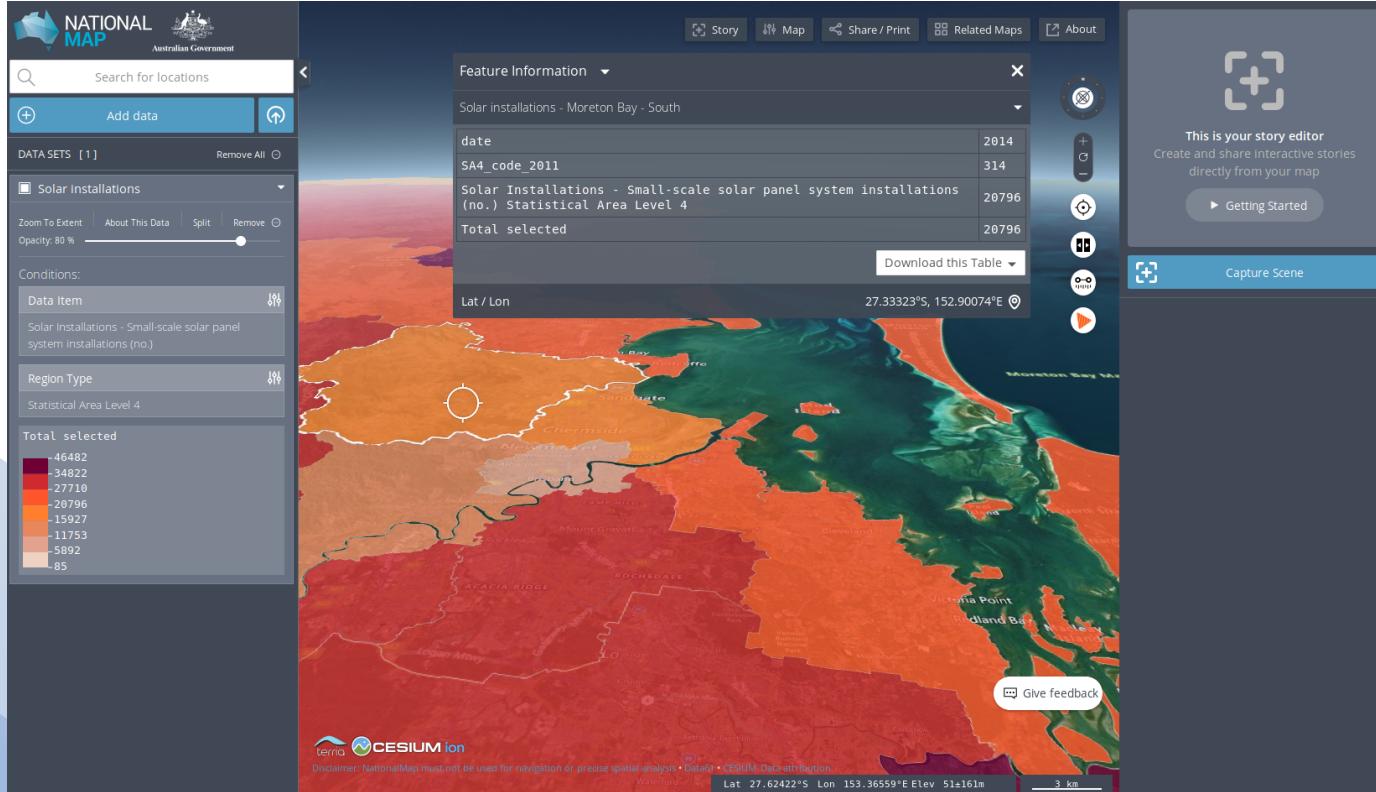
Source: <https://s2s4e-dst.bsc.es/>

Terria and NationalMap



Source: <https://www.nationalmap.gov.au/renewables/>

Terria and NationalMap



Source: <https://www.nationalmap.gov.au/>

Background

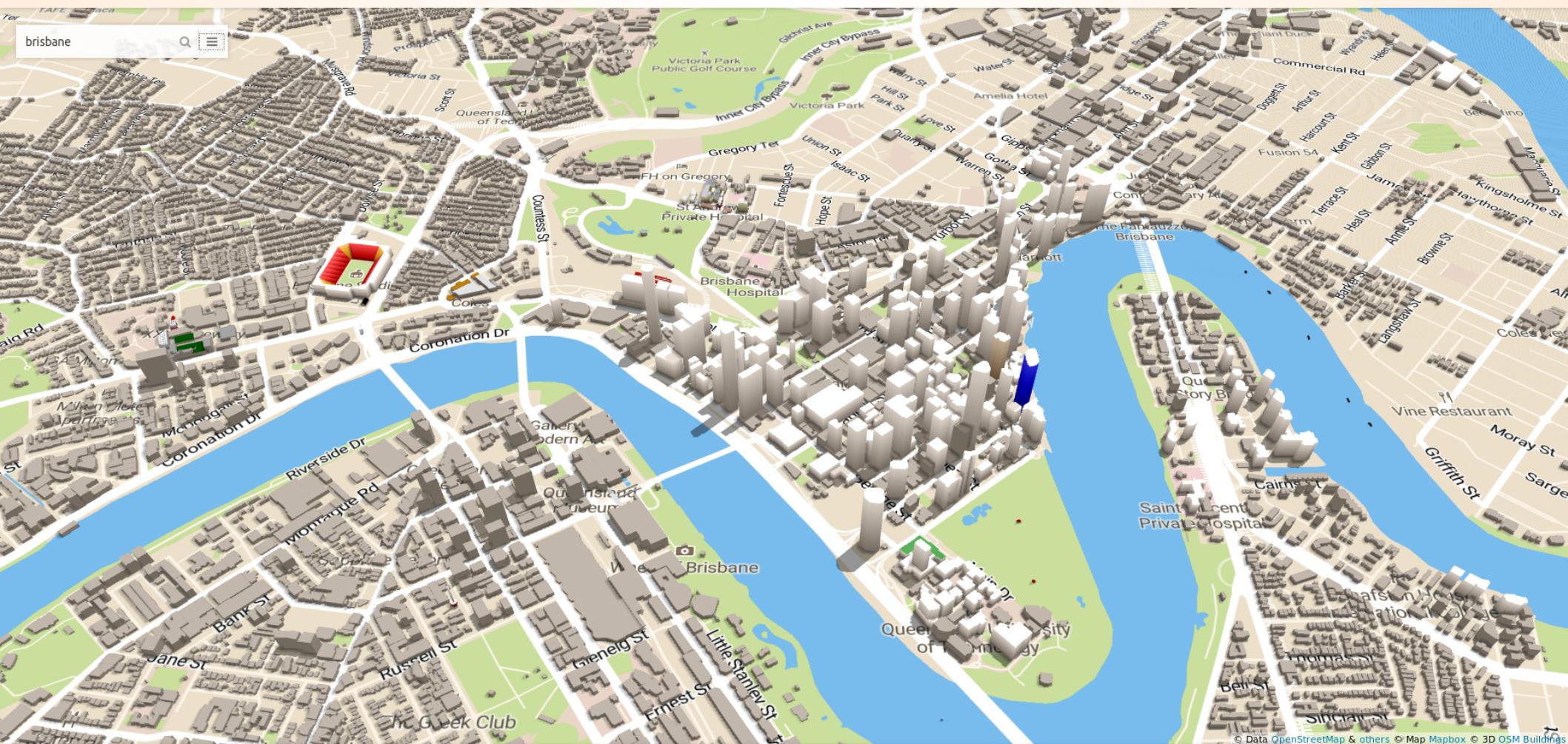
- There are lots of ways and reasons why you might want to visualise this data
- There are many tools available already for solar projects and visualisation
- Conclusion:
 - Keep it simple
 - make it about the data
 - Easy to access and use in conjunction with other data sources

Our Data Sources

- ☁ Maps: OpenStreetMap hosted by omnисcale.net (free, renewed every 30 days)
- ☁ Weather: openweathermap.org API provides daylight hours and cloud cover percentage (free, limited to 60 requests/second)
- ☁ Daily Solar Supply by Region: Live data aggregated into regions, data from the Australian Renewable Energy Agency collected manually from pv-map.apvi.org.au, there is no API for PV postcode data
- ☁ Live PV System Supply: pvoutput.org shows daily and live outputs of PV systems from registered users

Additional Data Source

- 3D buildings for mapping:
osmbuildings.org provides 3D building information
- Terrain elevation data: The data is out there but no open API is available to serve it to us



Goals of the visualisation

- Should be easy for someone to use
- Data should be current and up-to-date
- Should be able to add and show additional data layers as required

Visualisation Design

- HTML Canvas and WebGL
 - Available on all devices with a browser
 - Can be embedded into a part of a page or standalone
 - Offers near-native performance
 - Consistent with accessibility of other tools (Terria and Decision Support Tool)

Visualisation Design

- Layer Types

- Maps – terrain layer, building layer
- Weather – clouds and daylight
- Spatial data points – solar supply per region

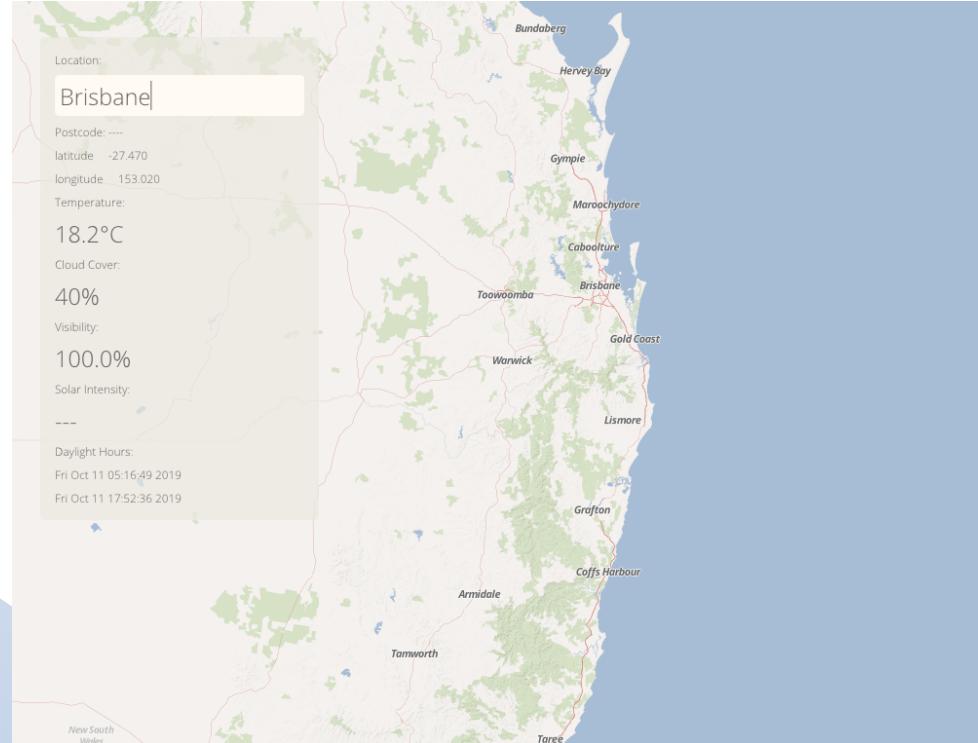
Visualisation Design

- Navigation
 - Should be able to find an area by
 - Finding the location by name
 - Using co-ordinates to find a location
 - Exploration in the virtual world
 - Interactive but also precise

Visualisation Example

- Demo concept with live data visualisation and navigation
 - Find any location by typing the name of a city
 - Map image background
 - Weather data for location, daylight hours etc
- jnmaloney.github.io/OpenSolar/home.html

Visualisation Example



Source: <https://jnmaloney.github.io/OpenSolar/home.html>

Questions?