Dan Stowell (*mcld*) mcld.co.uk Jerry Clough (*SK53*) (with Open Climate Fix)

### Dan ("mcld" on osm)





see openclimatefix.github.io



see openclimatefix.github.io



### Number of PV installs, per postcode district

### Official data

UK government open data:

- Electricity grid "feed in" data ("FiT")
- Planning database ("REPD")

Geolocations often approximate

Good coverage of large-scale, less complete for small-scale



1000

1500

2000

500

### Goal: map them all

• Solar farms



• Small-scale PV



### UK: ~1,000 ~8 GW

### UK: ~1,000,000 ~4 GW

## Machine vision?

- Various projects exist
  - Can detect large farms well
- Small-scale very difficult
- Imagery crucial: quality & age
- (also needs training data)





### "False friends"

- Greenhouses
- Polytunnels
- Conservatories
- Roof windows



• Solar panels on canal-boats...

## **OSM UK: Quarterly project**



Page Discussion

Read Edit Edit source View history

### UK 2019 Q3 Project: Solar Power

The aim of this UK Quarterly Project is to map all things solar power related.

This project runs for July, August, and September 2019.

### How to tag [edit | edit source]

See generator: source=solar. Note that the larger solar farms are not all consistently mapped: some are mapped as just a single "generator", not as a "plant" as described in the wiki page.

For more on tagging rooftop solar, see Renewable energy in the United Kingdom/Rooftop Solar PV.

To watch how to survey(using OsmAnd) and how to map(using iD) these solar panels, Mapper Diaries & has an extendedlength video. that also talks about why we map them.

### Suggested processes [edit | edit source]

Solar farms and smaller rooftop installations are guite different (e.g. in guantity, or in how easy they are to see in imagery). Do we want a single approach, or to approach the two separately?

### Data sources [edit | edit source]

The Department for Business Energy and Industrial Strategy





Adding solar PV to OpenStreetMap using the ID editor.

### M > Solar mapping

### Solar mapping summary



Local authority	Plant count	Generator count	FiT register count	Completeness	Has module count	Has orientation	Has location	Plants without source	Generators without source/type	Last updated
Aberdeen City	0	91	1249	7.29%	2.20%	0.00%	100.00%	1	1	2019-09-01
Aberdeenshire	3	121	5423	2.29%	0.00%	0.00%	95.87%	1	36	2019-09-18
Abertawe	3	131	2612	5.13%	0.76%		00 74%	0	2	2010-00-17

## Tagging solar PV

- Tagging basics are easy: good presets in JOSM/iD, for power=plant & power=generator
- Nodes vs areas(ways): speed vs shape detail
- Other extremely helpful metadata:
  - Orientation (generator: orientation="SE")
  - Power output (plant:output:electricity="17 MW")
    - Proxies... generator:solar:modules=\* area (of polygon, or manual estimate)
  - Start date (start\_date="2015-02")

### **OSM UK progress**



### **OSM UK progress**











### Thanks to...

- Approx 130 UK mappers
- OSM UK people involved in shaping:
  - Jerry Clough
  - Gregory Williams
  - Jez Nicholson
  - Russ Garrett
- Jack Kelly / Open Climate Fix

## Observations on solar PV mapping

1) Large solar farms – fine: many ways to find them (aerial, machine vision, official data)

- Small-scale is where mapping makes biggest difference
- 2) Highly clustered data (in reality, and in survey)
- 3) Imagery quality: massive variation in usefulness
- 4) Some PV can't be seen in aerials; some PV invisible from ground!
- 5) Fast mapping vs craft mapping

### Current work: solar data wrangling



### Conclusion: map solar PV!

- OSM UK project: great progress
- Let's go global do it in your country too!
  - Small-scale PV is particularly valuable "missing piece"
- We WILL use these data to reduce CO2
  - Pilot studies underway on solar nowcasting
- Open data  $\rightarrow$  Other businesses/projects/machine learning
- Thank you to all mappers!

Dan Stowell - mcld.co.uk