

TOP 3: Methodendarstellung zur Herleitung des SimBench-Datensatzes (Bsp. HS-Ebene)

IAEW, RWTH Aachen University

Daten

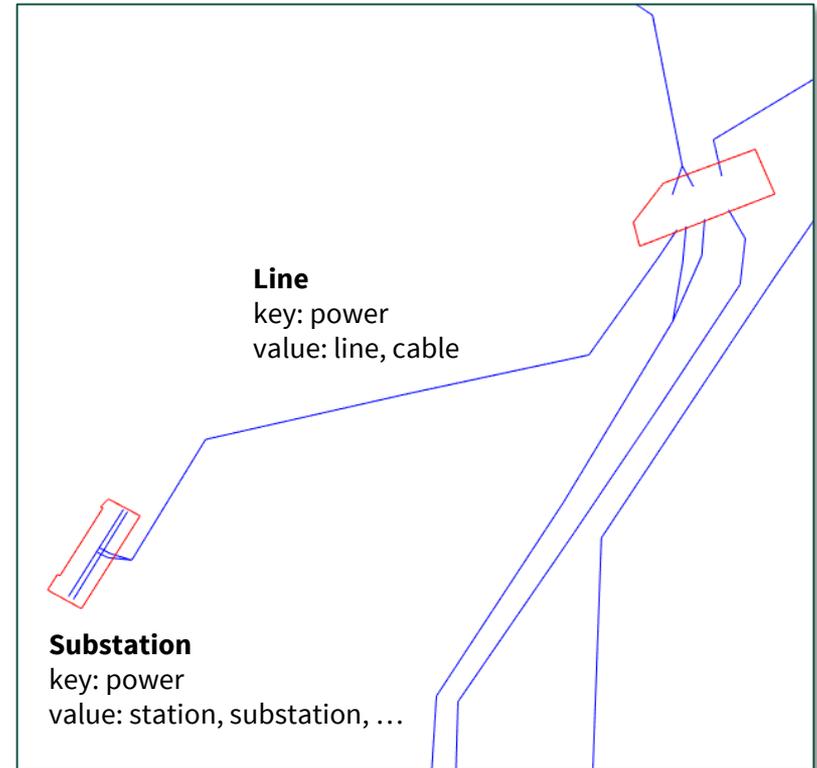
Open Street Map

Datenformat

- Lizenz: Open Database License (ODbL)
- Komponenten in OSM sind „getaggt“ in Kategorien wie beispielsweise *power*, *voltage*, *line*, *substation*, etc.
- Grundstruktur über *nodes*, *ways*, *relations*

Beispiel Datenverarbeitung

- *Relations* enthalten Informationen über den Zusammenhang zwischen unterschiedlichen *ways* und *nodes*
- *Substations* werden über ihren Mittelpunkt als ein Datenpunkt substituiert und den Netzknoten hinzugefügt
- Elemente der *line* innerhalb der *relation* werden zu einer Leitung zwischen den zuvor definierten Knoten gespeichert



Daten

PostgreSQL über pgAdmin4

The screenshot shows the pgAdmin 4 web interface. The left sidebar displays a tree view of the database schema, including public, Collations, Domains, FTS Configurations, FTS Dictionaries, FTS Parsers, FTS Templates, Foreign Tables, Functions, Materialized Views, Sequences, and Tables (27). The main window shows a SQL query editor with the following query:

```
1 SELECT * FROM public.power_ways
2 WHERE voltage='110000'
3 ORDER BY id
```

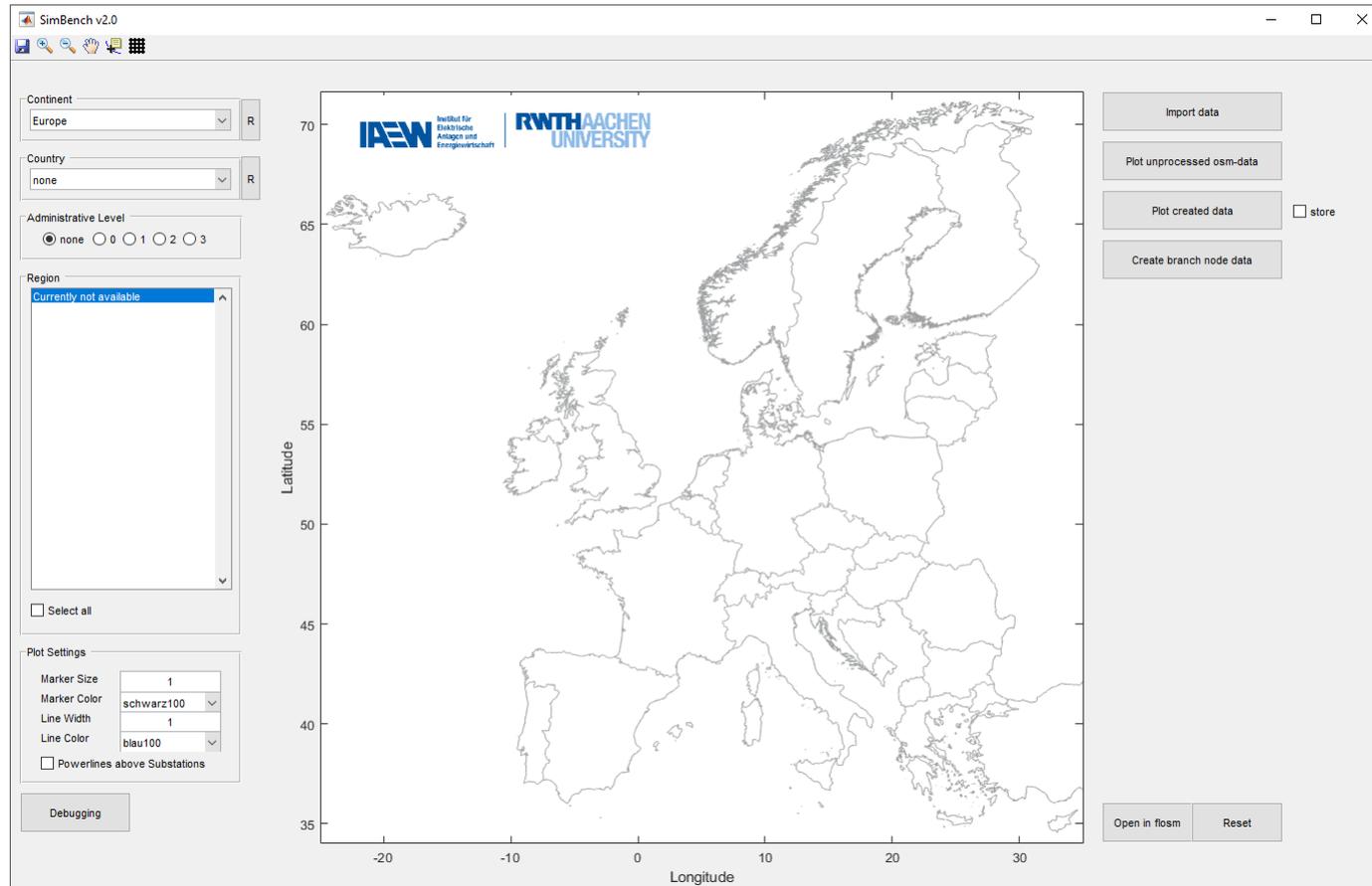
Below the query editor, the 'Data Output' tab displays a table with 25 rows and 14 columns. The columns are: id, version, user_id, tstamp, changeset_id, way geometry, power text, voltage text, cables text, wires text, circuits text, frequency text, and name text. The table contains data for various power lines and substations, such as 'Heizkraftwerk Charlottenburg', 'Umspannwerk Frankfurt Nord', 'Steigerwald', 'Freileitung Grambke - Mittelbüren - Niedervieland', '110 kV Sonsbeck Ost+West', '110 kV Sonsbeck West', '110 kV Sonsbeck Ost+West', '110 kV Sonsbeck Ost', 'Föhring', 'Umspannwerk Sindelfingen', 'Anlage 9333', 'Anlage 135', 'MOW-BIN', 'GBN-MOW 1;GBN-MOW 2', 'Malchow', '835;836;(837;838)', and '706 WUL-FRH;707 WUL-FRH'.

id	version	user_id	tstamp	changeset_id	way geometry	power text	voltage text	cables text	wires text	circuits text	frequency text	name text
1	4763495	27	1443767	2016-11-28 03:36:02	43995821	0102000020E61000...	plant	110000	[null]	[null]	[null]	Heizkraftwerk Charlottenburg
2	4825893	16	1951513	2014-09-28 12:26:34	25722300	0102000020E61000...	substation	220000;110000	[null]	[null]	[null]	Umspannwerk Frankfurt Nord
3	4852708	31	13203	2015-08-12 11:28:49	33286772	0102000020E61000...	line	110000	3	double	[null]	Steigerwald
4	4852716	11	13203	2015-08-12 11:28:49	33286772	0102000020E61000...	line	110000	12	double	[null]	Freileitung Grambke - Mittelbüren - Niedervieland
5	4852795	6	13203	2015-08-12 11:28:50	33286772	0102000020E61000...	line	110000	3	single	[null]	Freileitung Grambke - Mittelbüren - Niedervieland
6	5028567	10	13203	2017-07-02 00:14:33	49973503	0102000020E61000...	line	110000	6	single	[null]	110 kV Sonsbeck Ost+West
7	5028568	5	92274	2010-12-29 20:37:48	6802374	0102000020E61000...	line	110000	6	single	[null]	110 kV Sonsbeck West
8	5028732	6	92274	2010-12-29 20:37:57	6802374	0102000020E61000...	line	110000	6	single	[null]	110 kV Sonsbeck West
9	5104477	8	153031	2012-02-28 13:01:47	10818028	0102000020E61000...	line	110000	6	single	[null]	110 kV Sonsbeck Ost+West
10	5104478	8	153031	2012-02-28 13:01:47	10818028	0102000020E61000...	line	110000	6	single	[null]	110 kV Sonsbeck Ost+West
11	5104479	5	329877	2014-11-07 23:38:57	26630789	0102000020E61000...	line	110000	3	single	[null]	110 kV Sonsbeck West
12	5104480	5	329877	2014-11-07 23:38:56	26630789	0102000020E61000...	line	110000	3	single	[null]	110 kV Sonsbeck Ost
13	5404079	13	2045115	2017-10-10 23:47:39	52807365	0102000020E61000...	substation	380000;110000	[null]	[null]	[null]	Föhring
14	5544326	21	1778799	2017-05-11 04:57:45	48576715	0102000020E61000...	substation	110000	[null]	[null]	[null]	Umspannwerk Sindelfingen
15	7954291	12	3375374	2015-11-17 10:35:43	35371391	0102000020E61000...	line	220000;110000	6	[null]	[null]	Anlage 9333
16	7954292	14	13203	2016-08-04 02:51:31	41227514	0102000020E61000...	line	110000	3	[null]	[null]	Anlage 135
17	7962792	21	13203	2015-06-18 13:31:41	32048790	0102000020E61000...	line	110000	3	single	[null]	MOW-BIN
18	7979022	20	13203	2015-06-18 13:31:40	32048790	0102000020E61000...	line	110000	6	single	[null]	GBN-MOW 1;GBN-MOW 2
19	7979027	16	13203	2015-06-18 13:31:40	32048790	0102000020E61000...	line	110000	[null]	single	[null]	Malchow
20	7979029	33	13203	2015-06-18 13:37:54	32048790	0102000020E61000...	line	110000	3	single	[null]	[null]
21	8005541	13	616774	2012-12-04 00:46:00	14146917	0102000020E61000...	historicline	110000	6	[null]	[null]	[null]
22	8014776	10	66391	2016-12-18 08:54:10	44484476	0102000020E61000...	cable	110000	[null]	[null]	[null]	(837;838)
23	8014790	18	13203	2015-06-18 15:13:39	32050681	0102000020E61000...	abandoned	110000	12	single	[null]	835;836;(837;838)
24	8014805	19	13203	2015-06-18 15:13:40	32050681	0102000020E61000...	abandoned	110000	12	single	[null]	[null]
25	8014833	36	3619264	2017-11-26 04:49:37	54086176	0102000020E61000...	abandoned...	110000	6	single	[null]	706 WUL-FRH;707 WUL-FRH



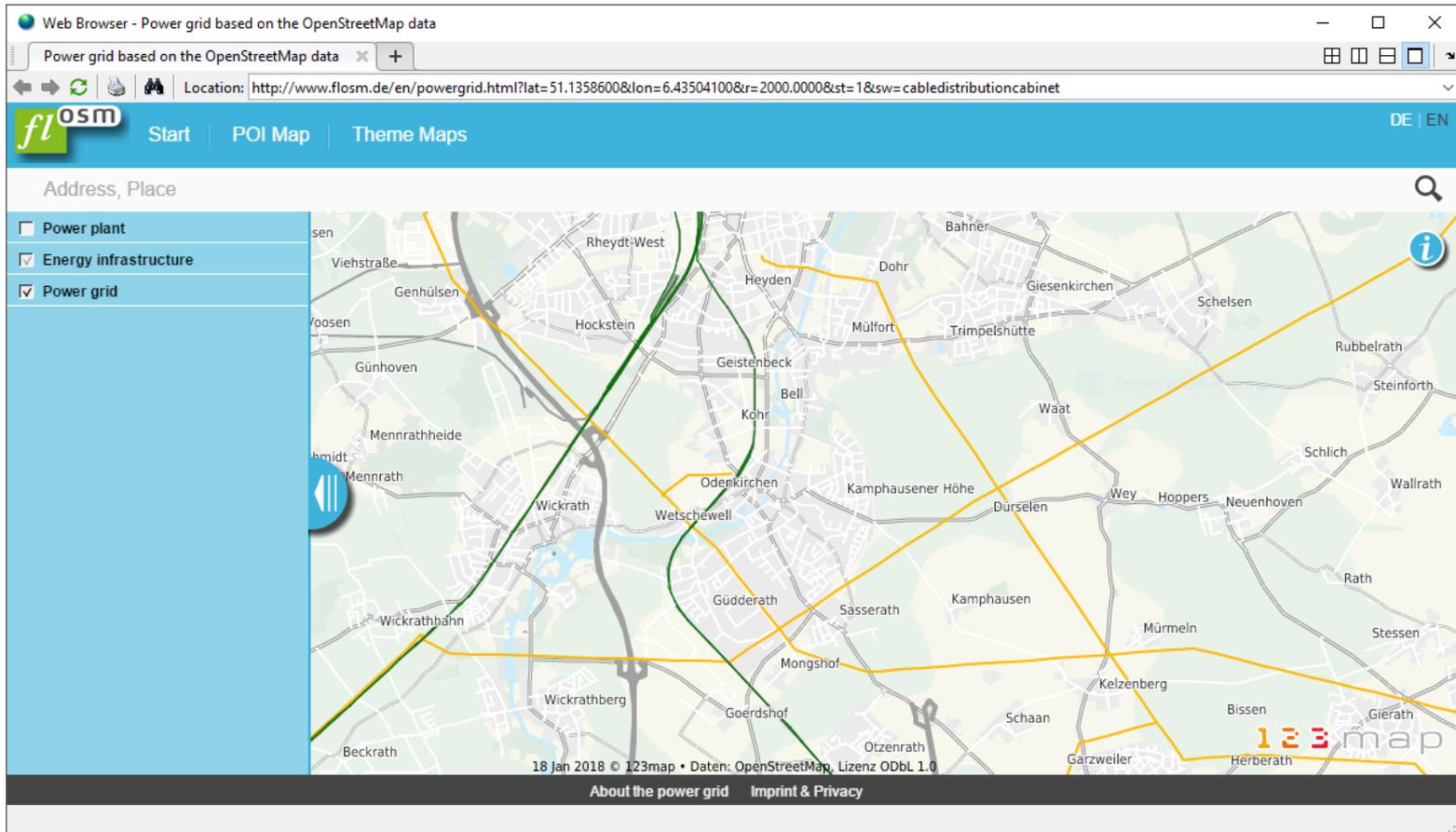
Methode

Vorstellung der GUI



Methode

Darstellung in flosm



Vielen Dank für Ihre Aufmerksamkeit!



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Konsortialführung

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Zoom auf Deutschland - Wahl administrative Level

The screenshot displays the SimBench v2.0 application window. The central map shows Germany with its administrative boundaries. The map axes are labeled 'Latitude' (ranging from 48 to 55) and 'Longitude' (ranging from 4 to 16). The interface is divided into several control panels:

- Continent:** A dropdown menu set to 'Europe'.
- Country:** A dropdown menu set to 'Germany (DE)'.
- Administrative Level:** Radio buttons for 'none', '0', '1', '2', and 'max', with 'max' selected.
- Region:** A list of German states including Baden-Württemberg, Bavaria, Berlin, Brandenburg, Bremen, Hamburg, Hesse, Lower Saxony, Mecklenburg-Vorpommern, North Rhine-Westphalia, Rhineland-Palatinate, Saarland, Saxony, Saxony-Anhalt, Schleswig-Holstein, and Thuringia. 'none' is currently selected.
- Plot Settings:** A table for configuring markers and lines:

Marker Size	1
Marker Color	schwarz100
Line Width	1
Line Color	blau100

There is also a checkbox for 'Powerlines above Substations' which is currently unchecked.
- Buttons:** 'Import data', 'Plot unprocessed osm-data', 'Plot created data' (with a 'store' checkbox), 'Create branch node data', 'Open in flosm', and 'Reset'.
- Debugging:** A button located at the bottom left of the control panels.



Import aus Datenbank (auch aus lokaler Datei möglich)

The screenshot shows the 'Import_gui' window with the following settings:

- Database Connection:** Database: de_20180122, User: postgres, Server: gbrr32.iaew.rwth-aachen.de
- Import Misc:** HS, Import cables, HoS, Optimistic, Public, Results, Import new borders
- Data Powerlines:** Table: public.power_ways, Field Geometry: way, Field Data: id, circuits
- Data Substations:** Table: public.power_ways, Field Geometry: way, Field Data: id
- Filter Conditions (Powerlines):**

Condition	Variable	Value
Condition 1	power	line
Condition 2	voltage	'110000'
Condition 3		
- Filter Conditions (Substations):**

Condition	Variable	Value
Condition 1	power	station
Condition 2	voltage	'110000'
Condition 3		

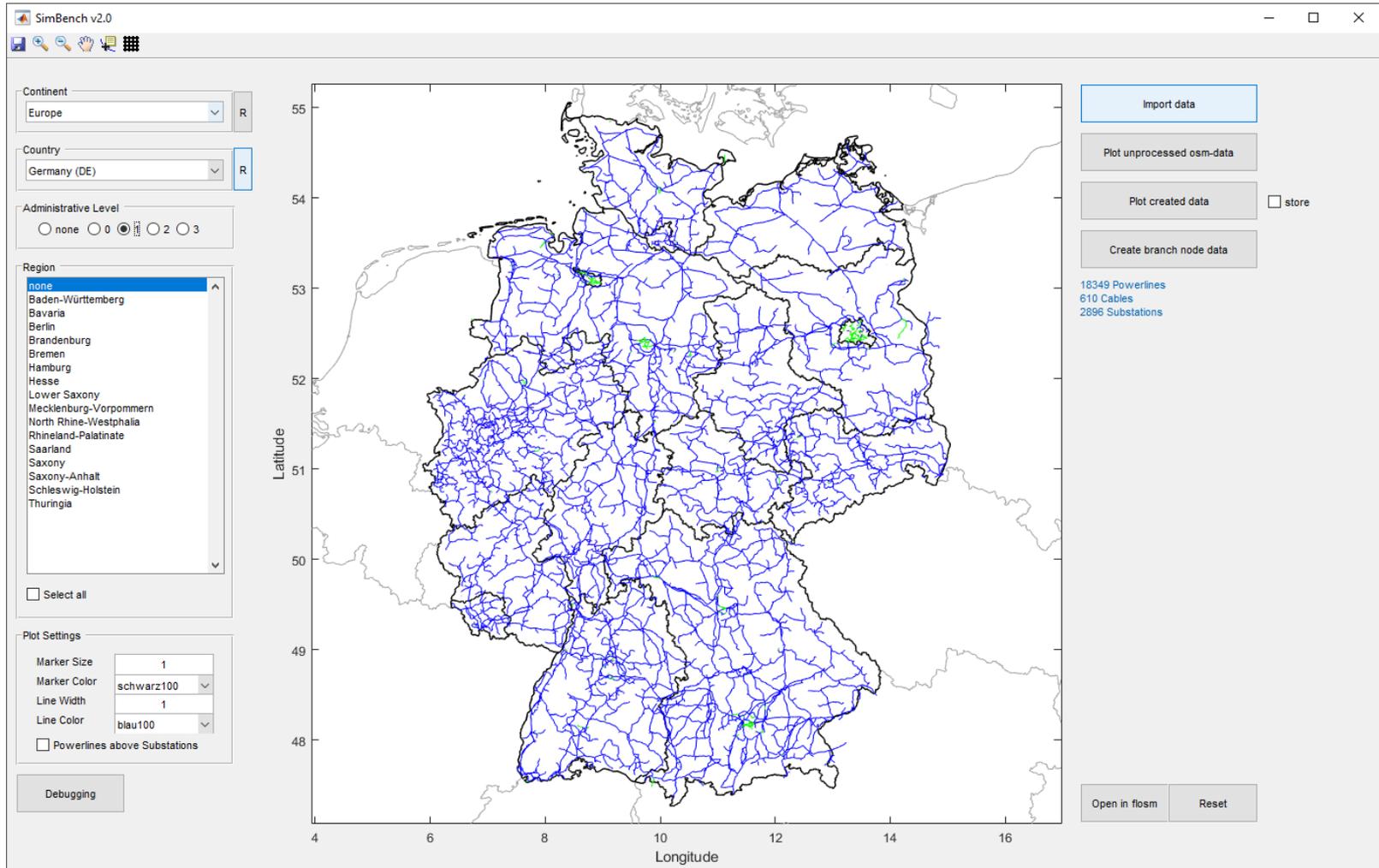
Buttons: [Create postgresql String](#),

```
SELECT ST_AsText(way), id, circuits FROM public.power_ways WHERE power='line' and voltage~'110000';
```

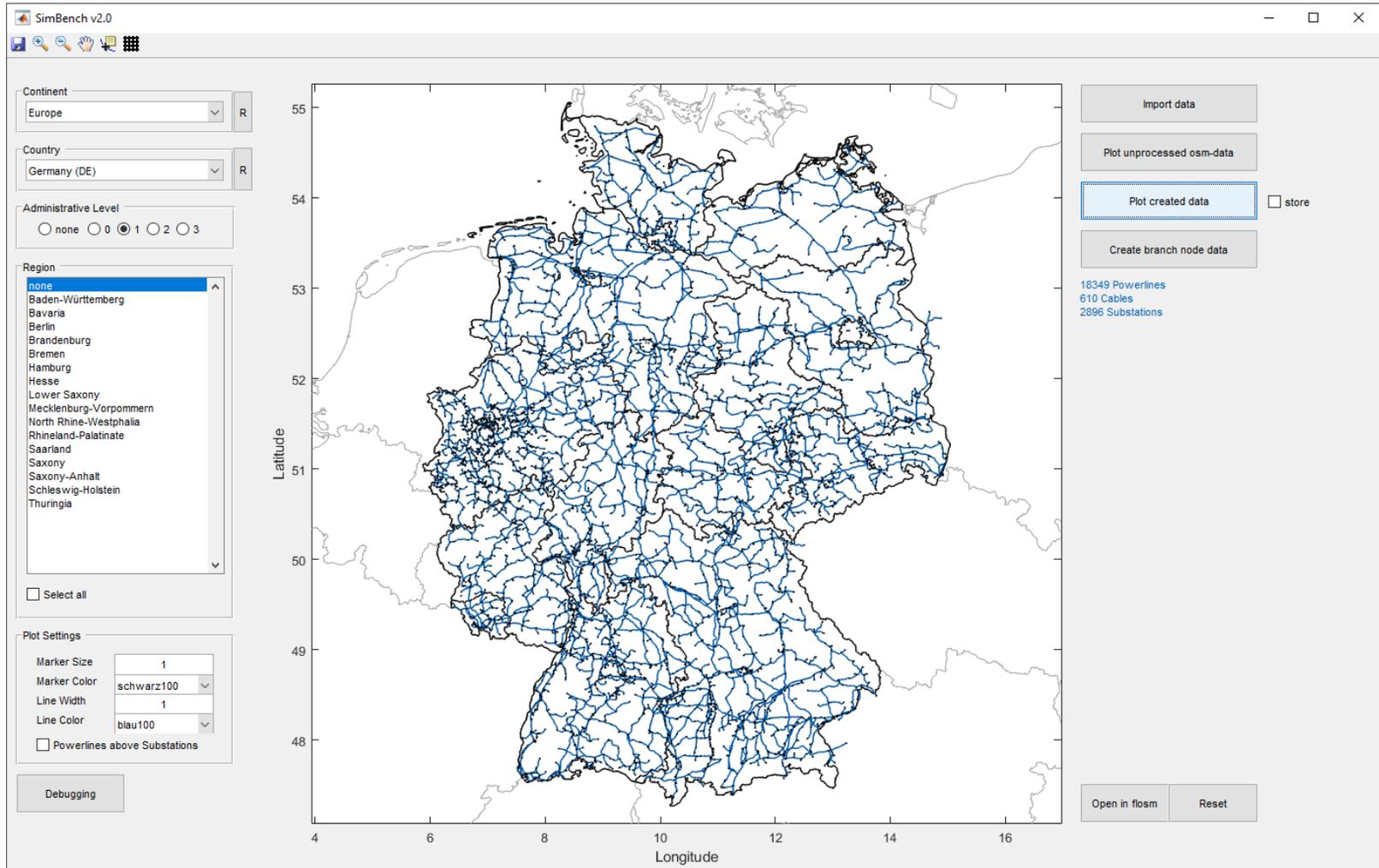
```
SELECT ST_AsText(way), id FROM public.power_ways WHERE power~'station' and voltage~'110000';
```



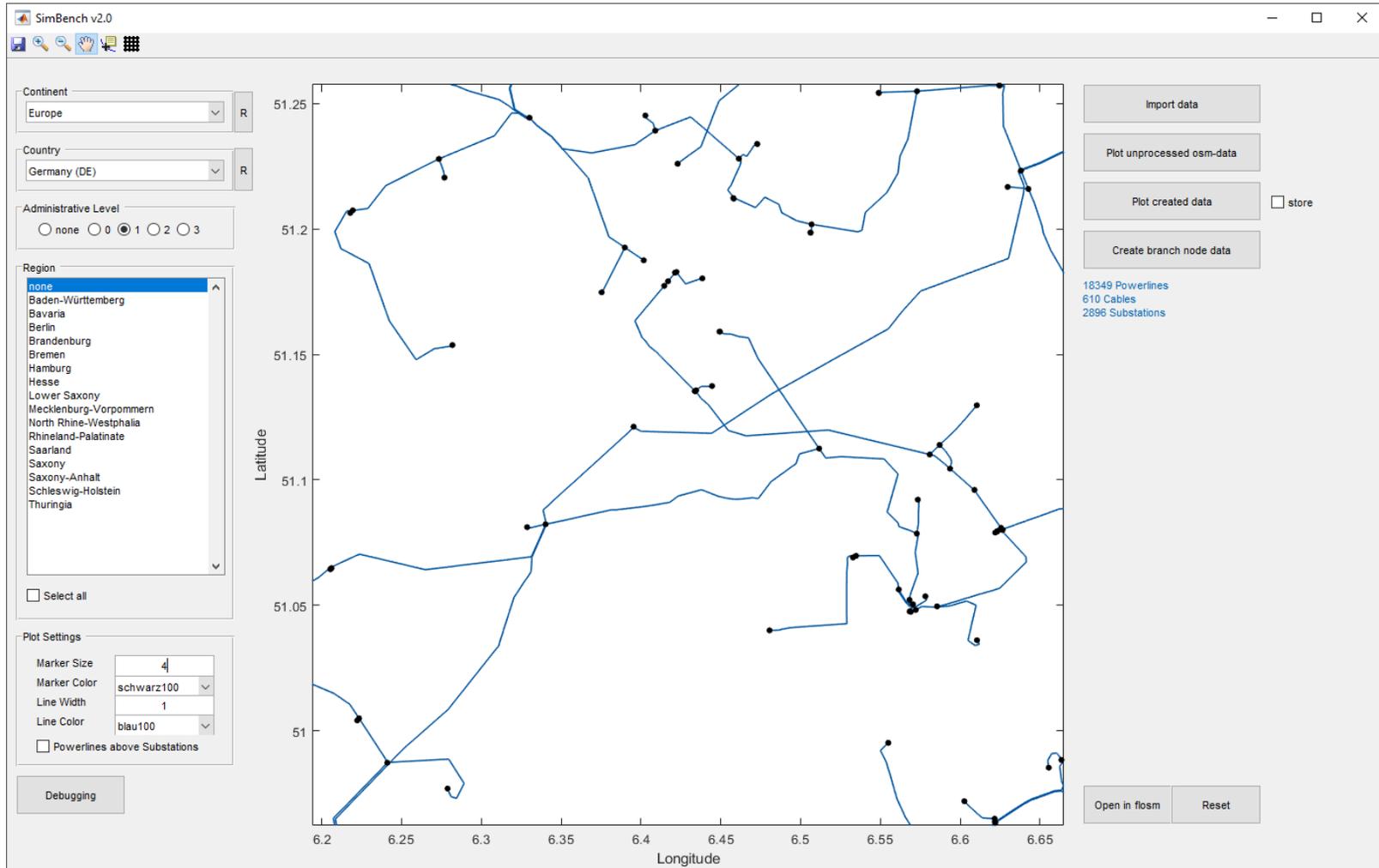
Plot unprocessed data



Plot created data



Möglichkeit zum Zoom



Öffnen in flosm

The screenshot shows a web browser window titled "Web Browser - Power grid based on the OpenStreetMap data". The address bar contains the URL: <http://www.flosm.de/en/powergrid.html?lat=51.1358600&lon=6.43504100&r=2000.0000&st=1&sw=cabledistributioncabinet>. The page features a blue header with the "flosm" logo and navigation links for "Start", "POI Map", and "Theme Maps". A search bar is located above the map. On the left side, there is a filter menu with the following options: "Power plant" (unchecked), "Energy infrastructure" (checked), and "Power grid" (checked). The main map area displays a detailed power grid overlaid on a street map of a region in Germany. The grid consists of various colored lines: green for high-voltage lines, yellow for medium-voltage lines, and orange for low-voltage lines. Numerous place names are visible on the map, including Rheydt-West, Heyden, Dohr, Giesenkirchen, Schelsen, Rubbelrath, Steinforth, Schlich, Wallrath, Rath, Stessen, Gierath, Herberath, Bissen, Kelzenberg, Mürmeln, Schaan, Garzweiler, Wickrath, Wetschewell, Odenkirchen, Kamphausener Höhe, Dürselen, Wey, Hoppers, Neuenhoven, Kamphausen, Sasserath, Mongshof, Goerdshof, Otzenrath, Wickrath, Wickrathbahn, Wickrathberg, Beckrath, Günhoven, Menrath, Menrathheide, Hockstein, Geistenbeck, Bell, Kohr, and Waat. At the bottom of the map, there is a copyright notice: "18 Jan 2018 © 123map • Daten: OpenStreetMap, Lizenz ODbL 1.0" and two links: "About the power grid" and "Imprint & Privacy".

