



Biomass energy register
for sustainable site development for
European regions

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BEn

**Biomass energy register for sustainable site development
for European regions**

Intelligent Energy – Europe (IEE)

Horizontal Action: Bio Business Initiative

Deliverable 3.1: Content related concept

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1. Introduction

The following description focuses on different aspects regarding the content of the biomass energy register to be developed. The regional biomass energy register should indicate regional energy sinks as well as biomass potentials for sustainable energy production. It will be based on open source geoinformation technologies and will be available for the public and local players via the internet. The register will assist the optimisation process regarding biomass production, biomass conversion and energy consumption through identifying suitable locations for bioenergy projects. Within the project the web based biomass energy register portal will be developed and applied for each model region and will be made available to further European regions.

According to this targets the content of the register has to be clearly specified, this deliverable serves as the content related concept describing the data to be integrated.

Data in geoinformation systems are usually organised in different layers. Each layer has its own data source and can come from different origins. Furthermore the layers are thematically grouped. In order to be displayed together (in layered structure) they have to describe the same spatial extent. An example is provided in the figure below.

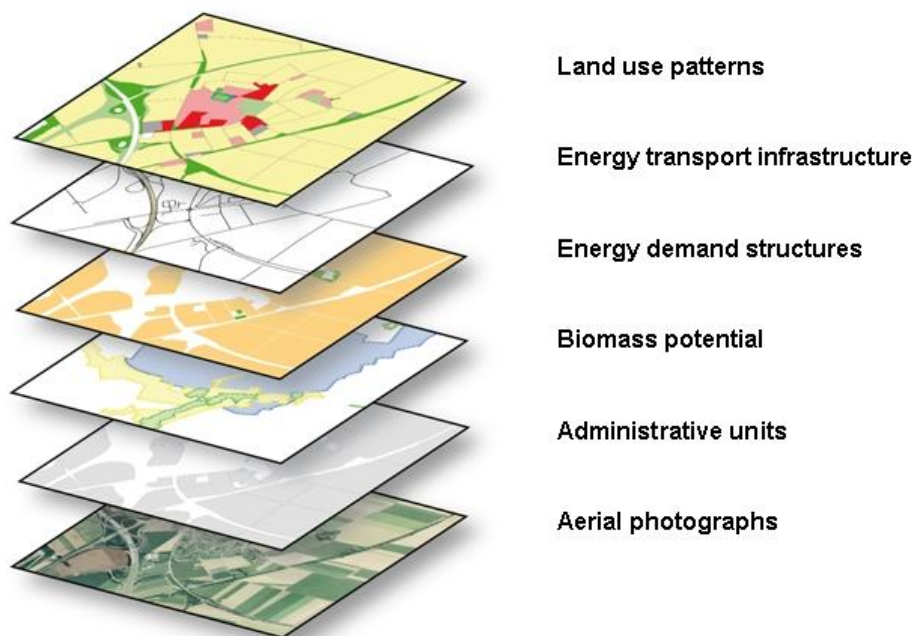


Figure 1: GIS Layer model

Concerning BEn the different kinds of layers (data) can be roughly divided into two data types – named basic data (backdrop maps) and application related data (project specific data). The collected data will be integrated as different layers. The detailed procedure how to manage it technically will be explained in Deliverable 3.2.

2. Practical relevance of the content of the biomass energy register

To guarantee a use of the register the practical relevance has to be considered.

BEn provides structured biomass to energy related data in combination with practical functionalities which are needed for the location planning. The BEn portal provides a starting point from which the first analysis for the realisation of bioenergy related projects could be conducted.

The planned energy register will combine data on the energy demand structures for selected objects (like hospitals, schools, swimming pools, cold stores) with data on biomass resources, maps of the regions, existing biomass installations/projects and contact persons. This will help to develop sustainable biomass energy plans and to directly realise measures (construction of new plants, networking between different actors, subvention of the substitution of boilers etc.). It will also help to broaden knowledge – it is, for example, also possible to use creative solutions converting heat into cold or to plan innovative bio industrial trade zones.

One aim is to involve the regional stakeholders in the biomass energy register development. The content concept of the register should be also stakeholder oriented. The project addresses a variety of stakeholders and market actors.

2.1. Target Group(s)

- Local Authorities (Communities)
- Regional planners
- Citizens
- Financing actors, banks
- Farmers (agriculture), single farmers, agricultural associations
- Forest management
- Food industry
- Feed stock suppliers in general
- Regional SME, larger enterprises, Industry, Chambers of Commerce
- Biomass consumer

2.2. Definition of terms

Within the energy register development a common understanding of definitions is a precondition for a good and smooth development. One of the first steps in the content concept will be the agreement on common terms and procedures (see among others e.g. the Deliverable 3.3.: definition of technical potential)

3. General data types

Concerning BEn the different kinds of layers (data) can be roughly divided into two data types – namely basic data (backdrop maps) and application related data (project specific data). Basic data might be the same or at least similar in different GIS. What makes the application different or special for different purposes, is the application related data - data necessary to answer certain questions.

3.1. Basic data

Basic data, such as survey maps, topographical maps, orthophotos, provide an overview of the region and are used for better orientation – they provide background information. Basic data usually cover the complete area. This way they allow a better relation to real world features, for example: a biogas plant visualised as a point geometry can be easier related to the real world feature (the actual plant), when it is presented on an aerial photo. Basic data are usually multidisciplinary and are used in different applications.

One of the first steps within the BEn-project is to clarify which basic data are available in the model regions and the technical way how to get and how to implement these data (file based – web mapping service), i.e. which way of map service integration has to be applied (external vs. new map service).

Backdrop maps will be integrated with different resolutions - starting from a generalized overview going to a more detailed view. On different zoom stages, i.e. different scales, a certain map will be shown. Annex I shows backdrop maps on different zoom stages.

In this annex zoom stages and maps for the Emscher-Lippe Region are shown. Depending on the zoom stage a different kind of map will be visible for the user.

3.2. Application related data

Application related data (project specific data): Additionally to the basic data, specific geodata to fulfil the BEn approach have to be collected: these data are so called “application related data” and will be integrated into the register as well. Application related data might cover the whole area, but are often used for distinctive features (single points, lines or polygons). These specific data comprises data e.g. about energy sinks and biomass potentials. The data collection will mainly base on a questionnaire. For methods on collecting data with the help of questionnaires see deliverable D.3.3.

Application related data will be used as overlays; they will be presented on top of basic data (cf. figure 1 - GIS Layer model).

As described above two different kinds of data can be distinguished – basic data and application related data. The data types can be further grouped thematically. Each theme consists of distinctive geo objects, which represent real world features.

A short overview of possible themes is given by the following table:

basic data	application related data
topographical data; data describing land use	energy sinks (e.g. cooling houses, hospitals)
aerial photograph	biomass potentials
survey maps	local actors
	biomass installations, biomass projects

Table 1: Overview for basic and application related data

The following figure serves as an example for possible data within the register and tries to visualise the statements made above.

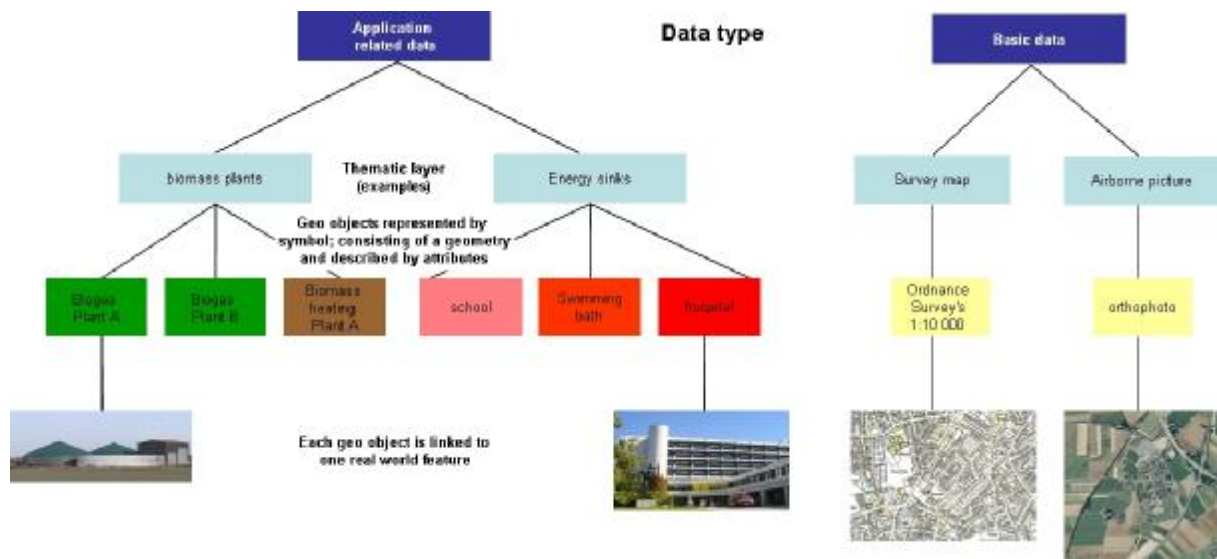


Figure 2: basic data types and examples

4. Data content for the energy register

4.1. Basic data - backdrop maps

4.1.1. Emscher-Lippe Region, Germany

Due to realised cooperation with the Kreis Recklinghausen, a local authority within the Emscher-Lippe Region, different kinds of backdrop maps are already accessible for the register. Each backdrop map, within a certain resolution, will present a layer in the register: the following layers will be included.

- Corine landcover data covering whole Europe
- Topographical map, scale 1:125.000
- Topographical map, scale 1:75.000
- Topographical map, scale 1:40.000
- Topographical map, scale 1:10.000
- Aerial pictures

For details cf. Annex_D3.2_backdrop_maps.ppt

4.1.2. North East, England

The availability of background data in the North East of England is limited for the project BEn basically to the open source data and GIS data owned by the local authorities. This last category, however, does not encompass the topographical maps and aerial pictures, as they are solely produced by the Ordnance Survey UK. Getting this data would demand licensing, what becomes very costly for the large area of the North East of England Government Region. Another constraint in the case of licensing would be the limited time and need for renewal of the licenses on a yearly or 3-year basis what is not desirable as the BEn register

should not generate any extra costs after the project end. The government is however exploring ways of making “mid-range” Ordnance Survey maps freely available online from 2010 on, so there could be a possibility to incorporate them in the BEn register¹. RDI team will follow this topic. In this current context the Google data or an open source data will serve as backdrop information (cf. 4.1.5).

4.1.3. Umbria, Italy

A first survey on the Italian spatial data infrastructure especially on the website of the Italian Ministry of Environment and Territory delivered the following results.

- Municipalities;
- Corine Land Cover;
- Urban areas and infrastructures;
- DTM (Digital Terrain Model);
- Railways;
- Geologic map;
- Maps of the Military Geographic Institute;
- Orthophotos 2008.

The technical conditions for integration of this data sources will be checked.

4.1.4. Gostynin Lake District, Poland

In Poland the existing geospatial data systems can be used as the backdrop maps. The main system is the Geoportal national service www.geoportal.gov.pl/. The access to the maps is for free

- http://sdi.geoportal.gov.pl/wms_prg/wmservice.aspx - State Register on Boundaries
- http://sdi.geoportal.gov.pl/wms_prng/wmservice.aspx - State Register on Geographical Names
- http://sdi.geoportal.gov.pl/wms_hydro/wmservice.aspx - Polish Hydrographical Map
- http://sdi.geoportal.gov.pl/wms_sozo/wmservice.aspx - Polish Ecological Map
- http://sdi.geoportal.gov.pl/wms_topo/wmservice.aspx - Topographical maps
- http://sdi.geoportal.gov.pl/wms_orto/wmservice.aspx - Aerial photo map (orthophoto)

Further investigations especially regarding usability and scale depending visibility (switching layers on or off) have to be carried out.

4.1.5. Fallback option

If it will not be possible to get background data from all model regions due to technical or legal restriction, data from Google maps or open source data from the OpenStreetMap

¹ <http://www.guardian.co.uk/technology/2009/nov/19/ordnance-survey-maps-free-online>

project² will be integrated into the register. This will guarantee the same look-and-feel for the energy register in all model regions. Two different layers from Google presented in the following picture will be integrated, the upper one called 'map' and the lower one called 'satellite'.

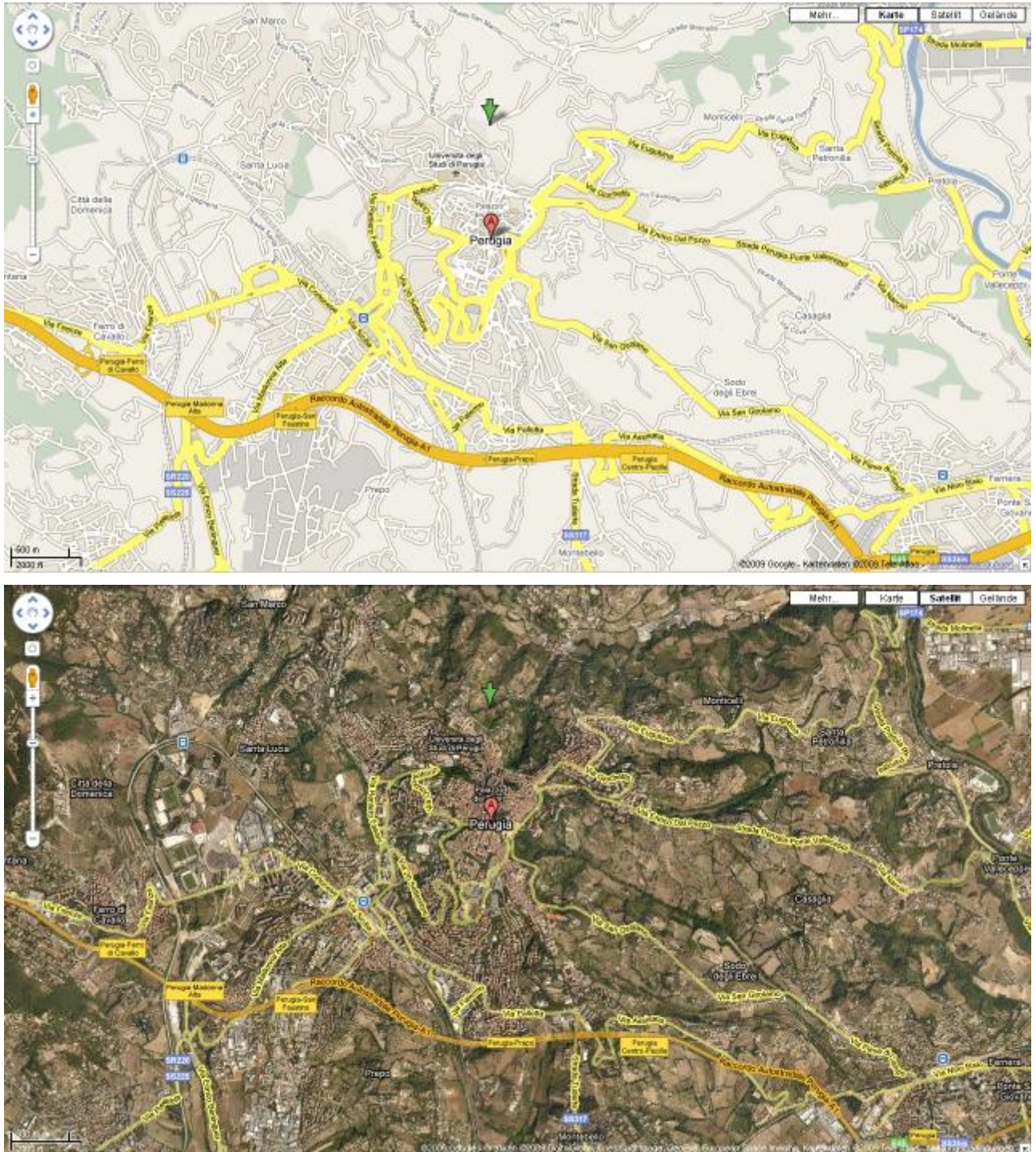


Figure 3: Fallback option Google maps: Layer 'map' and layer 'satellite'

² <http://www.openstreetmap.org/>

4.2. Application related data (project specific data)

Four distinct data layers will be integrated as application related data. These layers represent

- data about biomass potentials,
- data about energy sinks,
- data on actors and stakeholders in the region as well as
- installed biomass plants or projects.

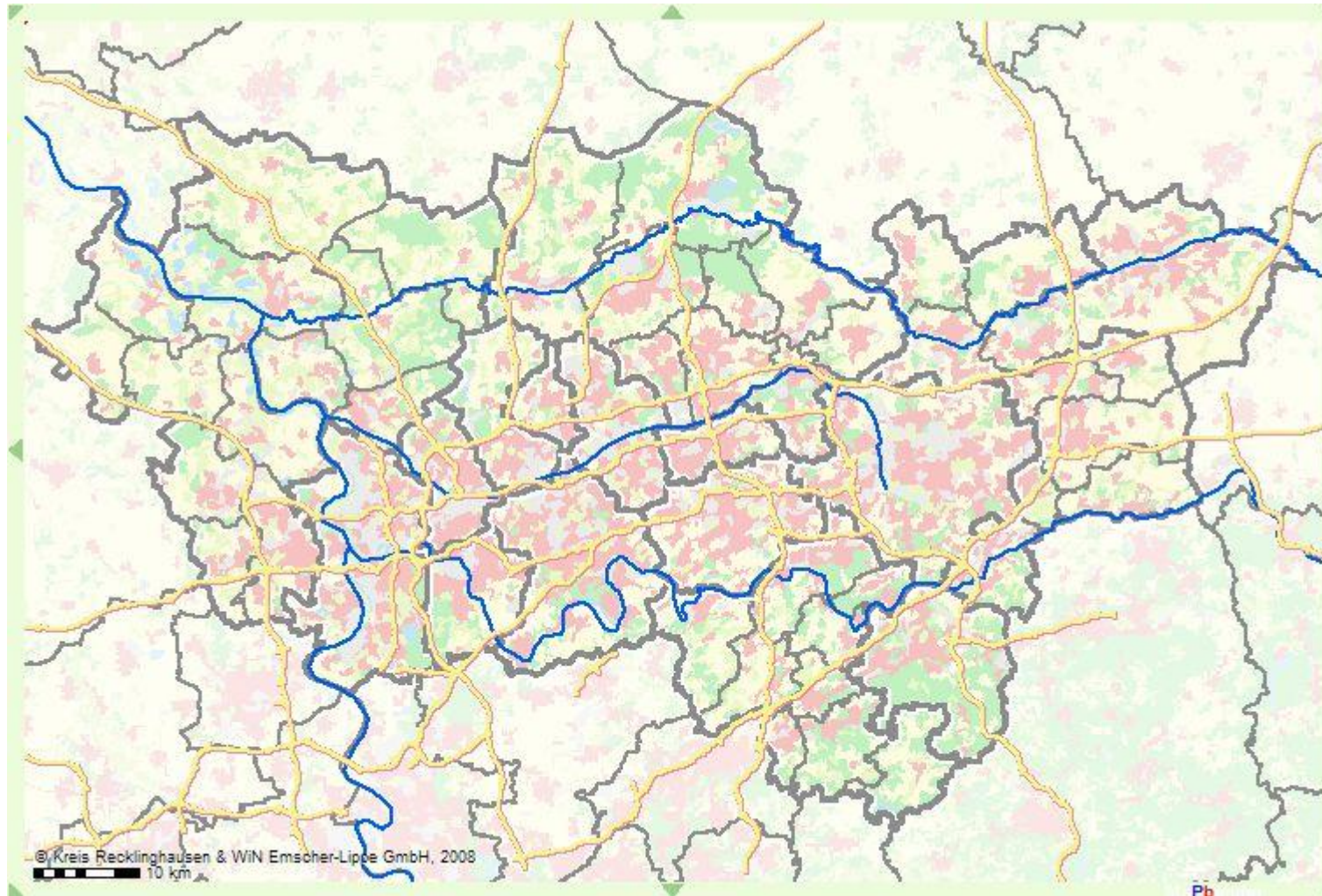
For all layers a specific data model has to be developed. All layers consist of distinctive single objects. All objects share the same attribute structure, which describes and distinguishes the single objects. The formal description of the different attributes is the data model. A simple data model can be described with help of tables. In such a table each row represents a single object. Each object has different attributes which can be described by values within the different columns (=fields) of the table. The field names represent the attribute names.

For all datasets (biomass potential and energy sinks) data models, i.e. table structures are developed. An example is given for energy sinks.

ID	Name	address	zip_code	city	short_description
1	swimming_pool	yourstreet 1	12345	yourcity	public bath
installed_power	type	year_installation	used_fuels	annual_consumption	add_information
780	public	1998	gas	900000	

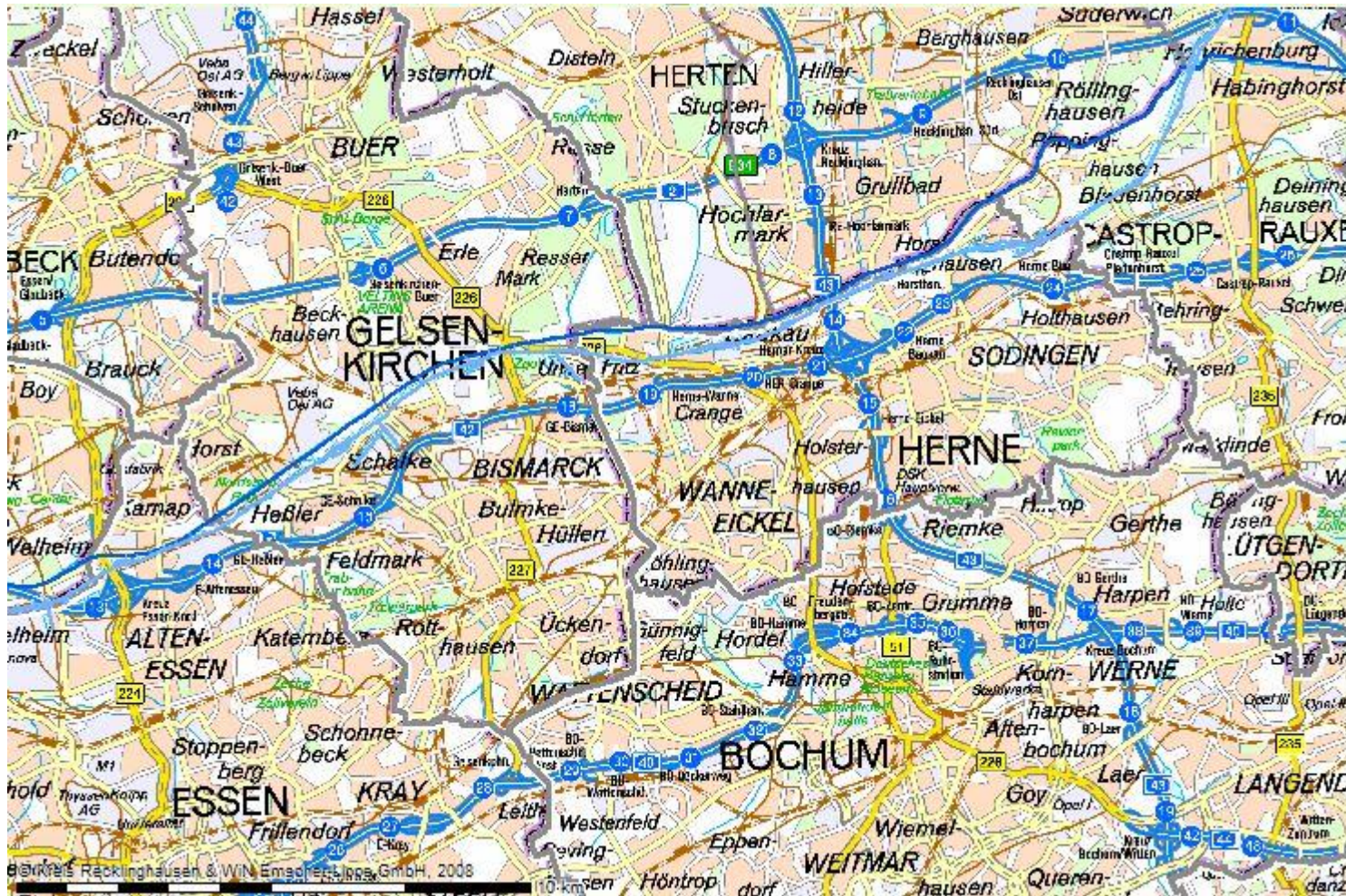
Attribute table can be used for queries within the register. Or the different features can be symbolised by field values.

Startscreen – Overview of the whole region - Landuse data (CORINE) (in this context CORINE serves as a backdrop map as well)



Overview Map A

Screenshot 1:100.000



Overview Map A

Same backdrop map, different
Scale as previous slide

Screenshot 1:50.001



Overview Map B

backdrop map change
due to zoom in (scale change)

Screenshot 1:50.000



Overview Map B

Same backdrop map, different
Scale as previous slide

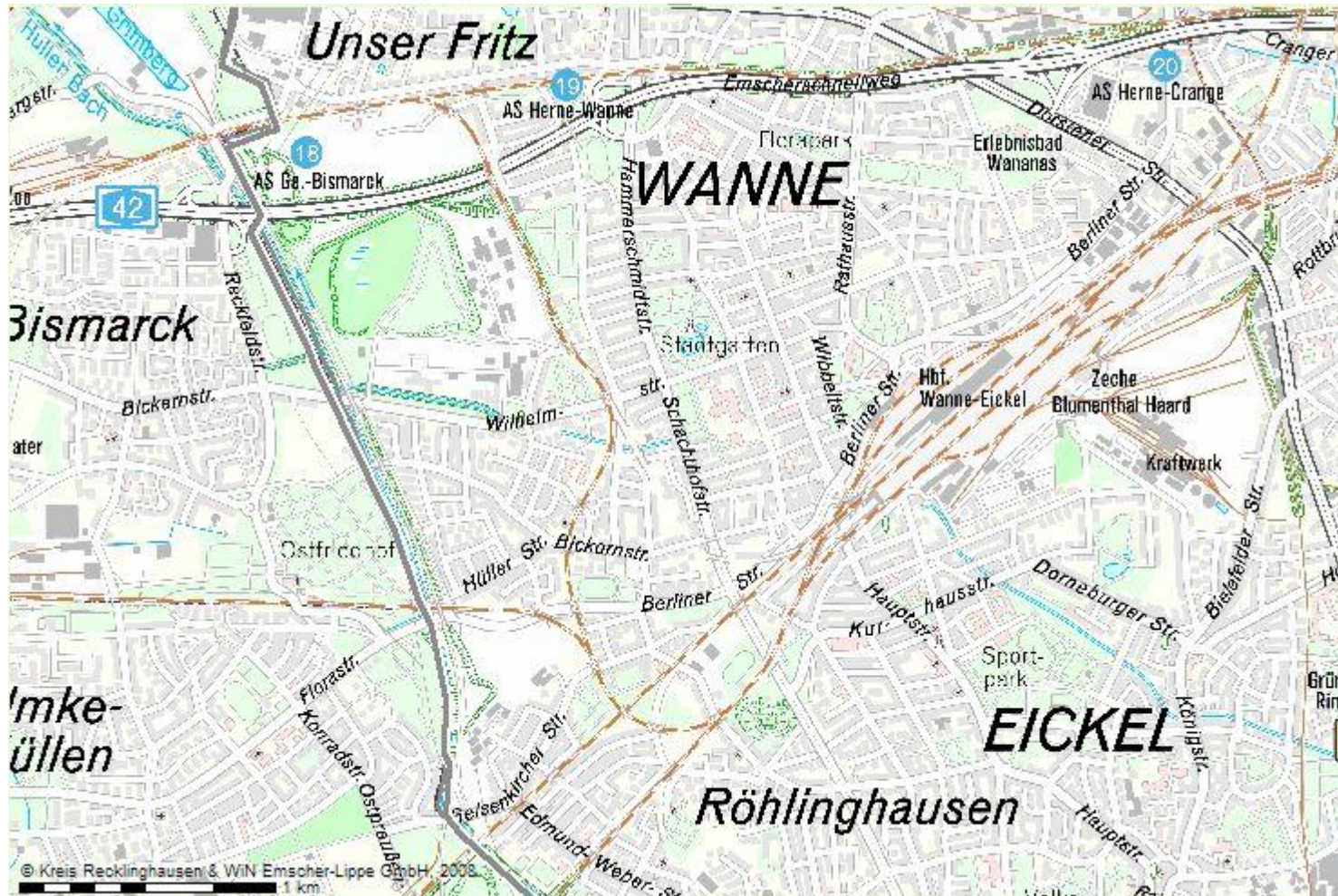
Screenshot 1:20.001



Overview Map C

backdrop map change
due to zoom in (scale change)

Screenshot 1:20.000



Overview Map C

Same backdrop map, different
Scale as previous slide

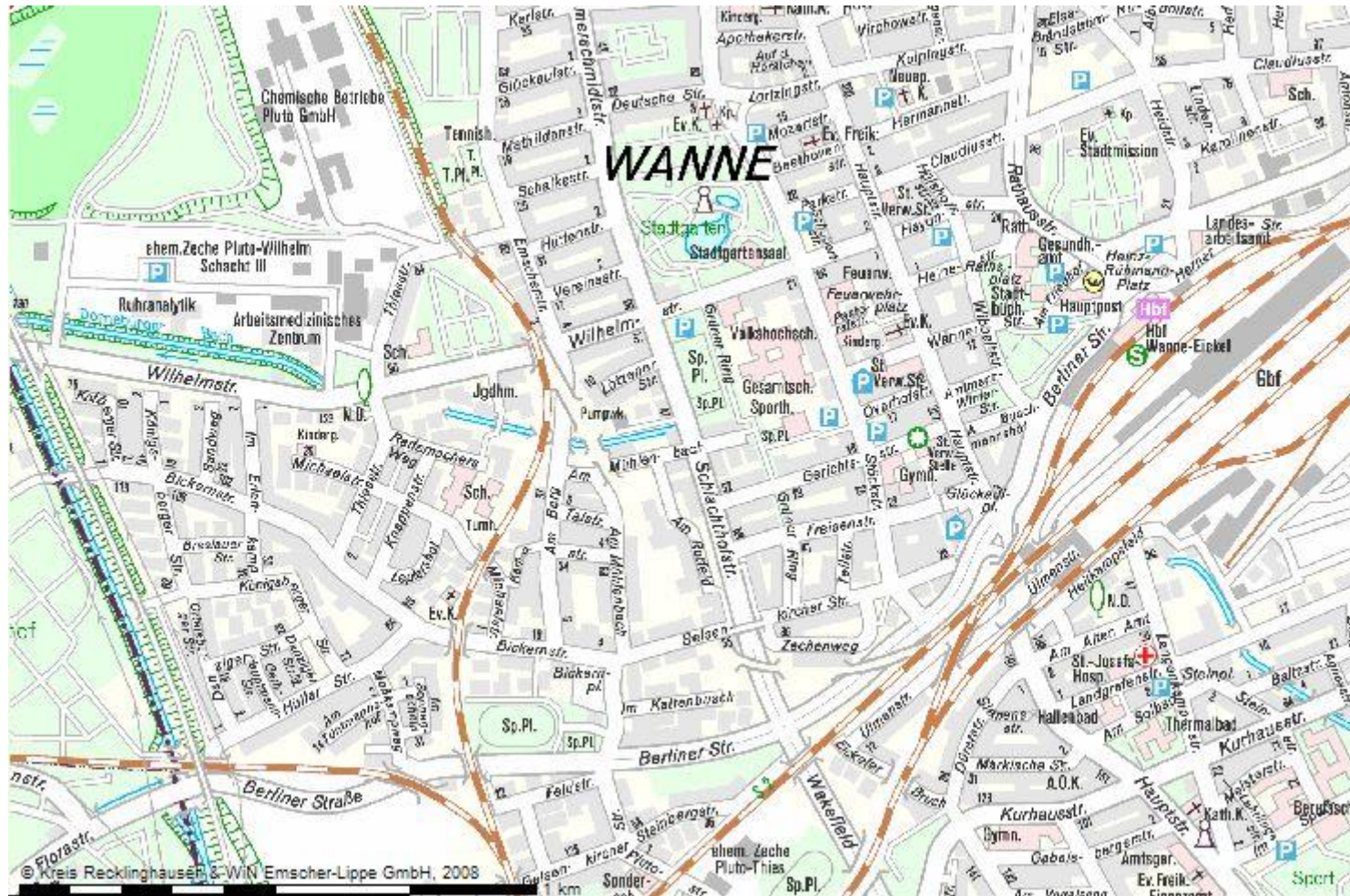
Screenshot 1:10.001



Overview Map D

backdrop map change
due to zoom in (scale change)

Screenshot 1:10.000



Overview Map D

Same backdrop map, different
Scale as previous slide

Screenshot 1:4.501



Aerial photos

backdrop map change
due to zoom in (scale change)

Screenshot 1:4.500

