

HANDOUT 4.2.1 FREIBURG: GERMANY'S MOST SUSTAINABLE CITY

With your partner, read the information below about Freiburg, a city located in the Black Forest of Germany, and answer the questions in **Handout 4.2.2**.

GREEN CITY: FREIBURG, GERMANY

Freiburg has a goal of achieving 100 percent renewable energy and carbon neutrality for the entire city by 2035.

Solar Energy

Freiburg is known as Europe's "solar city." Freiburg is a shining example of the success of Germany's *Energiewende*.

The German *Energiewende* is the national transition to a low-carbon economy. The primary obstacle to increased solar has historically been cost, especially with regard to solar rooftop photovoltaics (PV). Vauban is a city district in Freiburg in which the majority of homes run on solar energy generated on-site. Vauban is known as one of the most sustainable city districts in the world. Thanks to solar PV, some homes in Vauban actually generate more energy than they use (plus-energy homes) and can sell excess solar-generated electricity back to the municipal grid.

Bioenergy

In addition to using solar power as a major energy source, Freiburg uses biomass for a significant share of the city's energy needs. The majority of Freiburg consists of woodland and green spaces, and over 5,000 hectares (12,355 acres) of forest surrounds the city. Biomass energy is generated from wood and forestry by-products in Freiburg, but the city also turns trash into biomass energy to power residences and businesses. Here's a brief piece from the World Wildlife Foundation summarizing green spaces in Freiburg:

Two-thirds of Freiburg's land area is devoted to green uses. Just 32% is used for urban development, including all transportation. Forests take up 42%, while 27% of land is used for agriculture, recreation, water protection, etc. Freiburg's success is credited largely to its democratic strength. (https://wwf.panda.org/wwf_news/?204419/Freiburg-green-city)

Wood is burned, in addition to waste, in the biomass plant in the city district of Vauban. Landfill gas and organic waste are both used in the other biomass plants in Freiburg. These biomass plants, along with another biomass plant in Freiburg that uses mostly rapeseed oil to produce biodiesel, are designed to create combined heat and power to supply district heating and electricity in the city.

Biomass plants and solar energy are not the only sources of renewable energy in Freiburg. Other than solar and biomass, small wind farms and small hydropower projects also provide energy to the city (wind and hydroelectricity represent a relatively minor share of Freiburg's energy. Conventional energy sources make up the rest of Freiburg's energy needs).

Green Building and Alternative Transit

Freiburg remains at the forefront of green building technologies, mandating that all new construction use only the latest, cutting-edge energy-efficient designs. Energy conservation is central to all new building in the city, and energy-efficient retrofits are applied to existing structures. Residential recycling programs go beyond standard measures; for example, compost is also collected in the form of kitchen and garden waste.

Freiburg promotes biking and walking, which have become increasingly popular means of transit in the city. Freiburg features a pedestrian-only zone in the city center, where no cars are allowed. Biking accounts for over one quarter of all transportation in the city. More than 300 miles of bike paths in the city help to reduce automobile use.

To help make alternative modes of transit even more attractive, all roads in Freiburg, other than major roads, have a maximum speed limit of 50 km/h (31 mph). The city offers the Regio Card (Regiokarte), which gives residents full access to all of Freiburg's trams, streetcars, trains, and buses. As a result of increasing city residents' access to Freiburg's mass transit options, 70 percent of the population live within 0.5 km (0.31 miles) from a tram stop.

Urban Planning

Green urban planning is paramount in Freiburg, and the city has designated green areas as a priority in land-use decisions. Almost half of the city remains protected as parks, forest, or green landscaped spaces—a big reason why biking and walking remain so popular in the city. In the city district of Vauban, entire neighborhoods run on energy provided by rooftop solar panels, as well as a municipal biomass plant.

Careful urban planning helped to create a city layout in Vauban that lends itself to cycling as the primary mode of transit. The terms “filtered permeability” and “fused grid” refer to a plan that ultimately means connected streets throughout the town, as well as plenty of pedestrian and bike paths. Residents primarily live in co-op buildings, such as the “solar ship,” a large area of co-op buildings that run strictly on renewable energy.

Source: Excerpts from: Green City: Freiburg, Germany. Green City Times. (2021, June 11). <https://www.greencitytimes.com/freiburg/>.

HANDOUT 4.2.2 FREIBURG: GERMANY’S MOST SUSTAINABLE CITY QUESTIONS

Names: _____

With your partner, answer the following questions after reading the information on Freiburg, Germany in **Handout 4.2.1**.

1. What goal does Freiburg want to achieve by 2035?

2. Why is the Vauban district in Freiburg one of the most sustainable city districts in the world?

3. What happens to excess generated solar energy?

4. What is the *Energiewende*?

5. How is biomass energy generated?

6. In addition to wood, what else is burned in biomass plants?
 7. What other forms of renewable energy are available in Freiburg?
 8. How does Freiburg encourage energy conservation?
 9. What has Freiburg done to encourage the use of alternative means of transportation?
 10. What is green urban planning?

HANDOUT 4.2.3 FREIBURG: GERMANY’S MOST SUSTAINABLE CITY QUESTIONS ANSWER KEY

Names: _____

With your partner, answer the following questions after reading the information on Freiburg, Germany in **Handout 4.2.1**.

1. What goal does Freiburg want to achieve by 2035?

For the entire city to achieve 100 percent renewable energy and carbon neutrality.

2. Why is the Vauban district in Freiburg one of the most sustainable city districts in the world?

The majority of homes run on solar energy generated on-site.

3. What happens to excess generated solar energy?

Excess solar-generated energy is sold back to the municipal grid.

4. What is the *Energiewende*?

The Energiewende is Germany’s national transition to a low-carbon economy.

5. How is biomass energy generated?

It is generated from the burning of wood and forestry by-products.

6. In addition to wood, what else is burned in biomass plants?

Trash is also burned.

7. What other forms of renewable energy are available in Freiburg?

Other forms are small wind farms and small hydroelectric projects.

8. How does Freiburg encourage energy conservation?

Green-building technologies are mandated in all new construction, and energy retrofits are applied to existing structures.

9. What has Freiburg done to encourage the use of alternative means of transportation?

All roads have a maximum speed limit, and residents are given full access to all Freiburg’s mass transport.

10. What is green urban planning?

The designation of green areas as a priority in land-use decisions.