

Swedish Electric Power Production 2 November 2020

Förnyelsebar elproduktion och eltransporter (DAT460)

Swedish Electric Power Production Assignment:

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1. Introduction

The aim of this task is to get a knowledge of the electric power production in Sweden today and how a possible future looks like. Nowadays, the main part of the power comes from hydro-, nuclear- and wind-power. A minor part comes from biomass and some from solar power. The Swedish Energy Agency has the task to plan for future power production in Sweden. In the Fig.1 below, it is shown about different scenarios of Swedish electric power production. It is shown that wind power will be 3-4 times more productive compare with today's and solar power can also play an important role.

Några olika alternativ utifrån Energimyndighetens scenarier till 2040

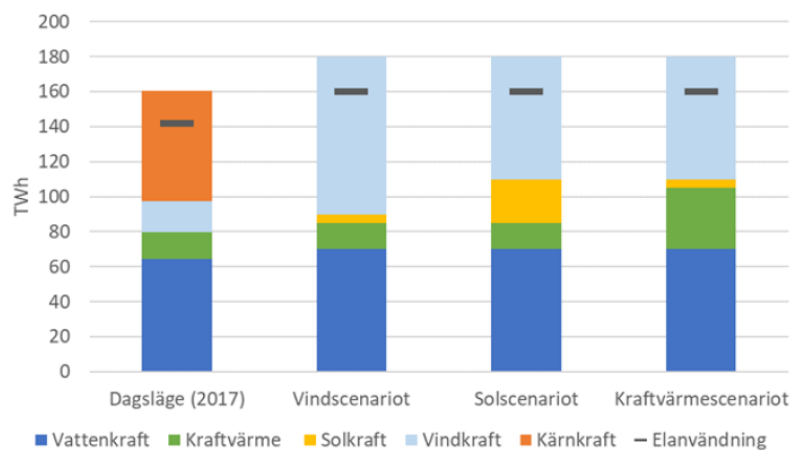


Fig.1 Different scenarios of Swedish electric power production

The Swedish transmission system operator is Svenska Kraftnät, Svk. Svk has the main responsibility for the operation of the power system in Sweden. All, not the small ones, electric power producers have to report the production to Svk. Svk makes this information available to everyone by datafiles on their webpage.

2. Working with Excel file

An Excel file can be downloaded from the web page of Svk, with the electric power production and consumption. The link is as follows.

<https://www.svk.se/aktorsportalen/elmarknad/kraftsystemdata/elstatistik/?page=0&category=126&sort=date&limit=20#block-15861>.

There are different ways of making figures in the Excel, the most easy one is to just mark what you like to plot and then go to insert and Charts and make a choice you like so satisfy the aim of the task.

3. Power production of today

We want you write a short report about the power production of the year 2019 (how it varies in days, weeks and seasons). The consumption of electric power should also be investigated.

Q1: Make some plots showing different power source production, and total power production in Sweden of the year 2019 (how it varies in days, weeks, and seasons), an example of solar power production during one day is given in Fig.2.

Q2: Calculate the energy for each power source, and total consumption of year 2019.

Q3: Make some plots showing the power consumption in Sweden of the year 2019 (how it varies in days, weeks, and seasons), an example of power consumption during one day is given in Fig.3.

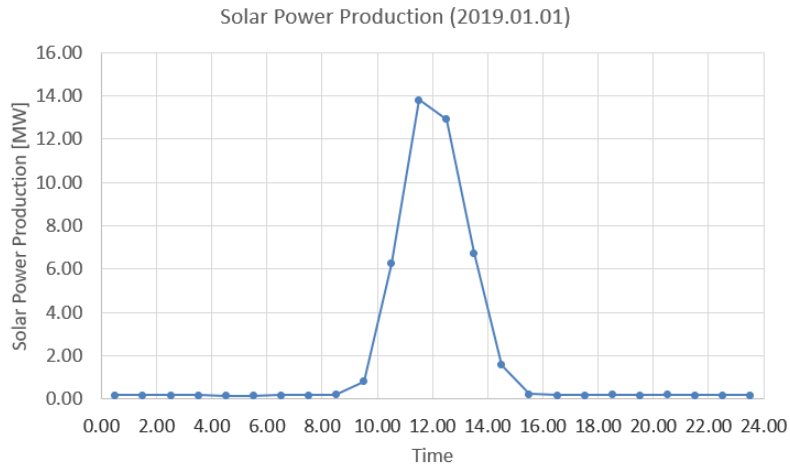


Fig.2 Solar power production during one day

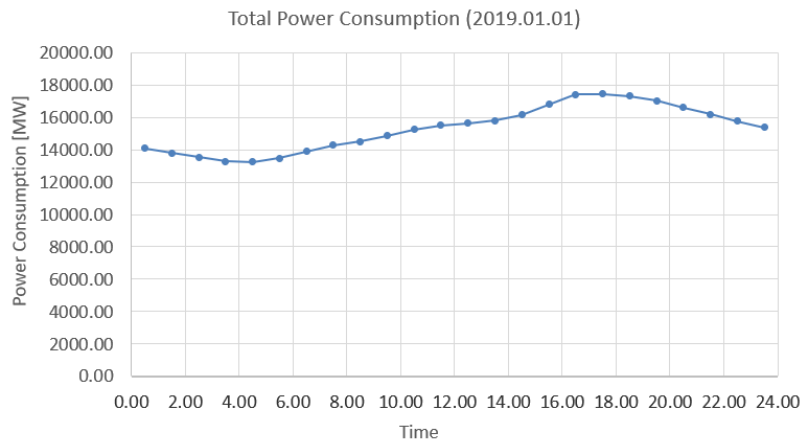


Fig.1 Total power consumption during one day

4. Power production of tomorrow

In the figure above you have seen the future as pointed out by the Swedish Energy Agency, SEA, in numbers of TWh for one year. With the numbers from Svk you have plotted the production and consumption per hour. In the following tasks, we ask you to describe the power production needed to fulfill the scenario in 2040 by Swedish Energy Agency. We assume that all production unit are placed as today but have much higher or lower power production. We suggest that you multiply the production/consumption of 2019 with a factor to reach the energy for one year as Swedish Energy Agency suggest.

Q4: What is the energy/year of the year 2040, suggested by SEA, for each power source and consumption?

Q5: Make some plots showing the power production in Sweden of 2040. Similar plots as in Q1.

Q6: Make some plots showing the power consumption in Sweden of 2040. Similar plots as in Q3.

Q7: Is there any need for energy storage or demand side management? Explain your conclusion