PRESENTATION TECHNIQUES

EG2050 System Planning

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KTH Electrical Engineering

BACKGROUND

According to the Swedish Higher Education Ordinance, a requirement to receive a Master of Science in Engineering, is that the student can

> "demonstrate the ability to present his or her conclusions and the knowledge and arguments on which they are based in speech and writing to different audiences in both national and international contexts."

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EXERCISE 3.3 - Presentation I

a) The electricity price is set by the intersection of the supply and demand curves. In the figure we can see that the intersection is in the range between 25 and 40.

In this range, the supply is given by

$$G = 30 + (\lambda - 25).$$

The demand is given by

$$D = 40 - (\lambda - 20)/2.$$

Setting G = D yields

$$30 + (\lambda - 25) = 40 - (\lambda - 20)/2$$

$$3\lambda/2 = 45$$

$$\lambda = 30$$

b) The income of the company is $30 \cdot 20 = 600$.

The variable costs of the company are $20 \cdot 5 = 100$.

The fixed costs of the company are 100.

$\Rightarrow$ The profit is 400.

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EXERCISE 3.3 - Presentation II

The figures below show supply and demand for a certain electricity market.

a) Compute the electricity price assuming perfect competition, perfect information and that there are neither transmission-, reservoir nor capacity limitations?

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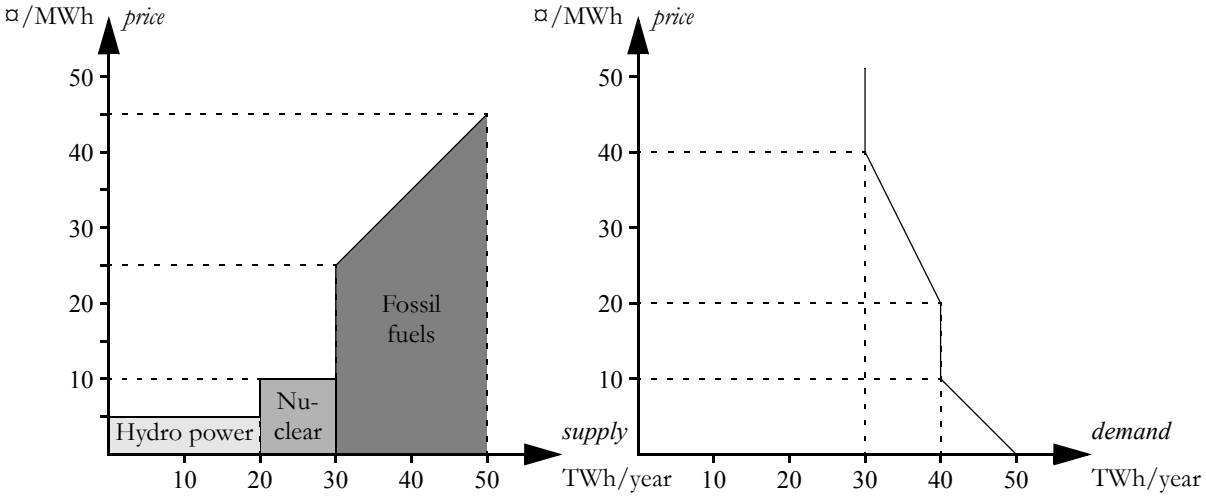

EXERCISE 3.3 - Presentation II

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Solution

Assume a price, λ, in the range 25–40 ¤/MWh.

The supply in the price range 25–45 ¤/MWh is given by

$$30 + (\lambda - 25).$$

The demand in the price range 20–40 ¤/MWh is given by

$$40 - (\lambda - 20)/2.$$

Setting these expressions to be equal and solving for λ yields the price $\lambda = 30$ ¤/MWh.

EXERCISE 3.3 - Presentation II

b) Assume that a certain company owns all hydro power plants in this electricity market and have fixed costs of 100 M¤/year. How large is the profit of the company?

Solution

Income: 30 ¤/MWh $\cdot$ 20 TWh/yr. $= 600$ M¤/yr.

Variable costs:
5 ¤/MWh $\cdot$ 20 TWh/yr. $= 100$ M¤/yr.

Fixed costs: 100 M¤/yr.

The profit is then $600 - 100 - 100 = 400$ M¤/yr.

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EXERCISE 3.3 - Presentation III

Inputs

- Supply and demand curves.
- One company owns all hydro, fixed costs 100 M¤/yr.

Problems

a) Electricity price?

b) Profit of hydro?

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EXERCISE 3.3 - Presentation III

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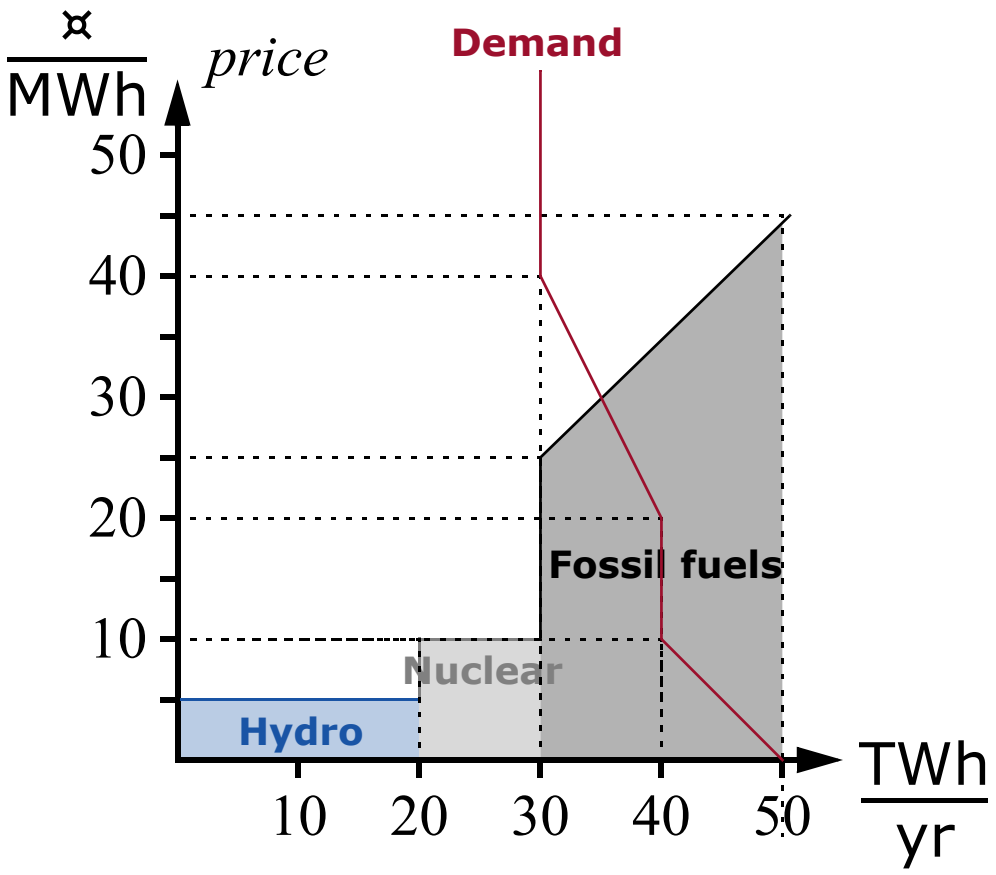
Solution a)

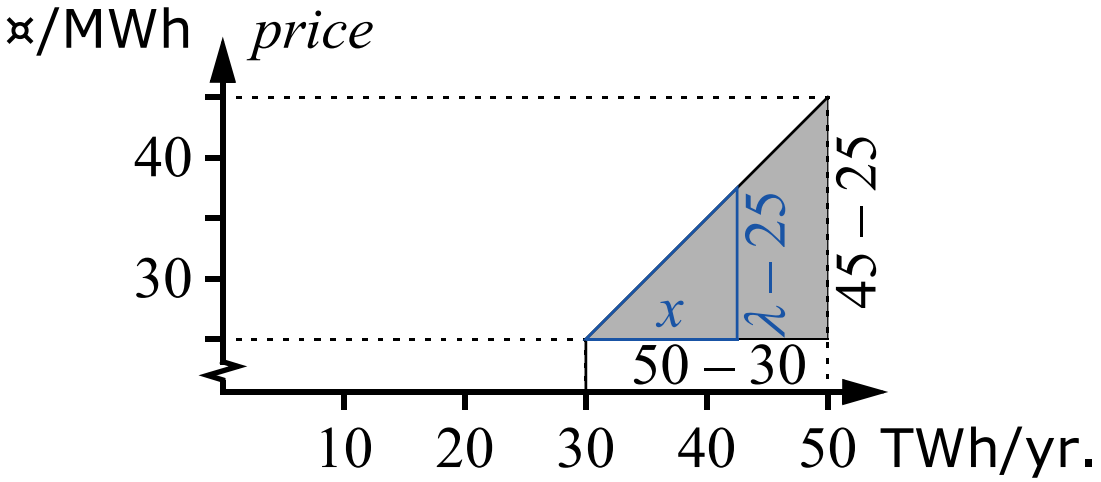
- The price is given by the intersection of the supply and demand curves.
- Graphical solution may not be exact enough.



EXERCISE 3.3 - Presentation III

Supply curve in the price range between 25 and 45 ¤/MWh:

$$G = \underbrace{20}_{\text{hydro}} + \underbrace{10}_{\text{nuclear}} + \underbrace{(50-30)\frac{\lambda-25}{45-25}}_{\text{fossil fuels}}.$$



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EXERCISE 3.3 - Presentation III

Demand curve in the price range between 20 and 40 ¤/MWh:

$$D = 40 - (40 - 30)\frac{\lambda - 20}{40 - 20}.$$

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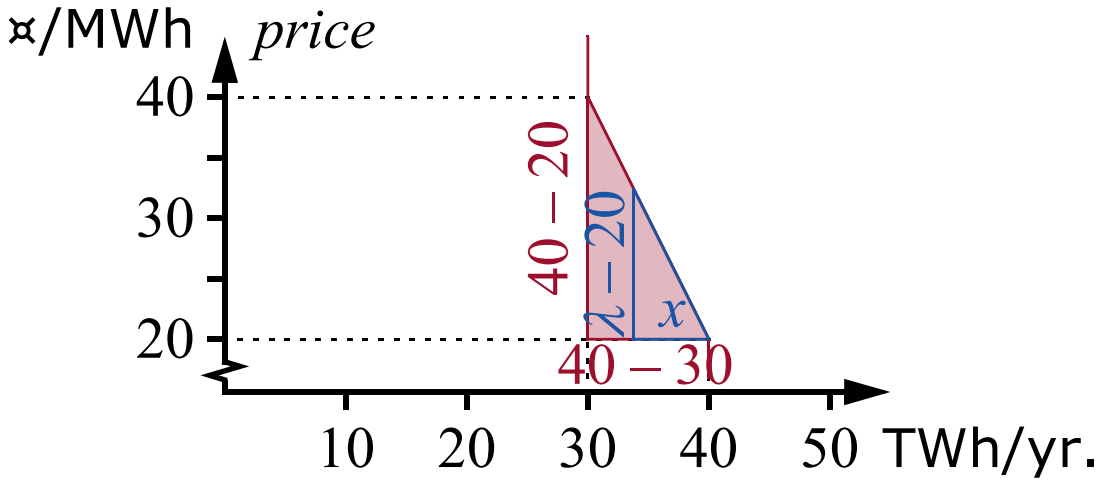

EXERCISE 3.3 - Presentation III

Supply and demand will be equal if

$$30 + 20\frac{\lambda - 25}{45 - 25} = 40 - 10\frac{\lambda - 20}{40 - 20}.$$

The solution to this equation is $\lambda = 30$ ¤/MWh.

Answer a)

The electricity price will be 30 ¤/MWh.

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EXERCISE 3.3 - Presentation III

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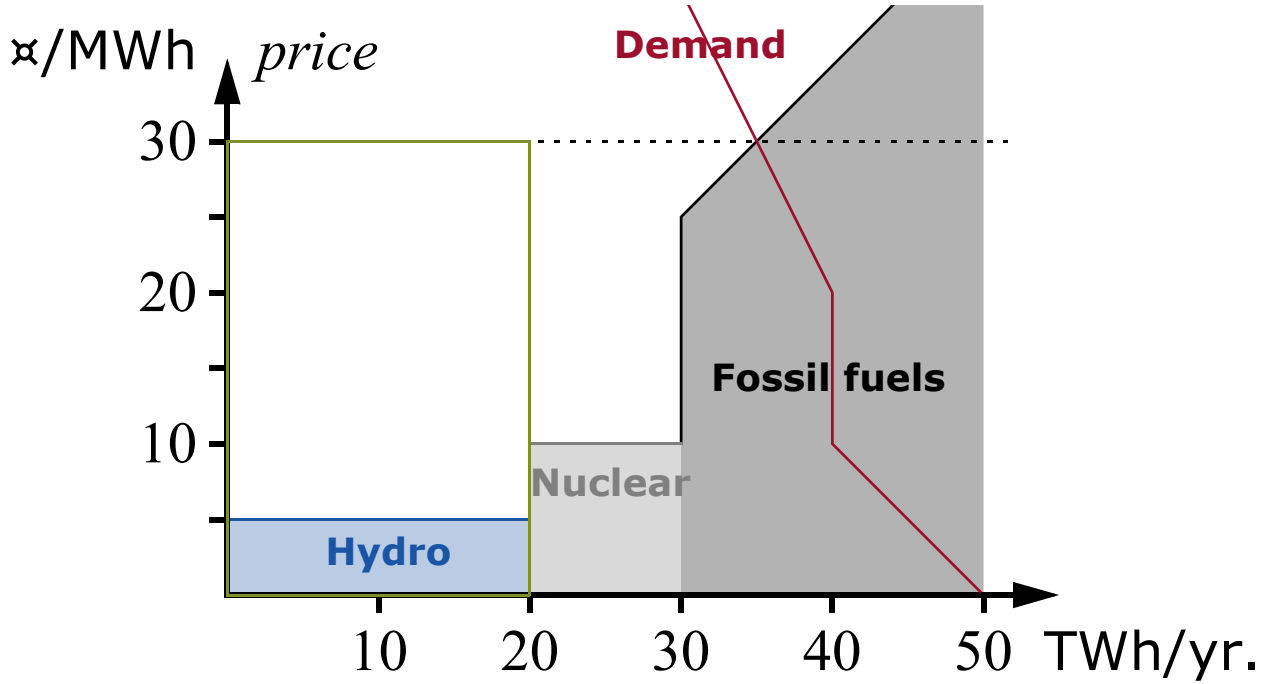
Solution b)



income of sold electricity $= 30 \cdot 20 = 600$ M¤/yr.

variable costs $= 5 \cdot 20 = 100$ M¤/yr.

EXERCISE 3.3 - Presentation III

$$profit = income - variable\ costs - fixed\ costs =$$
$$= 600 - 100 - 100 = 400\ \text{M¤/yr.}$$

Answer b)

The profit of the hydro power company will be 400 M¤/yr.

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ADVICE - Audience

- Turn towards the audience as much as possible!
- If you are using a computer presentation:
  - Put the computer so that you can read the screen when facing the audience.
  - Only turn towards the projector screen when you need to point at something in the presentation.
- If you are using the blackboard:
  - Write first (if you like you can read loud at the same time).
  - Turn towards the audience and comment on what you have written.

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ADVICE - Contents

- The text should be a support (for the lecturer as well as for the audience) and not a complete manuscript!
- Focus on such that would be hard to explain in words or drawing on a blackboard:
  - Figures
  - Formulae
  - Tables
- It can be practical to have extra slides ready if some questions can be anticipated.

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ADVICE - Time

- Rule of thumb for computer presentations: 2 min./slide (excluding title page, table of contents, etc.)
- Equations, tables and figures may take longer time to explain.
- Practice and check your timing with a stop watch!

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ADVICE - Layout

- Use at least 24 points size for the main text and at least 18 points in figures and tables.
- Generally, you should use a sans serif font.

  Example of a **sans serif** font.

  Example of a **serif** font.
- Serif fonts can be appropriate for mathematical symbols and equations.
- Avoid animations and other special effects!

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