BatKedge. (See instructions at the end of the document)

BatKedge is a battery production company based in Bordeaux, France. To produce batteries, BatKedge needs to buy around 2.45 million tons of a chemical component from 6 suppliers in Europe: 3 factories are part of the BatKedge group and 3 are partner companies. BatKedge has received bids from these factories for next year.

The table below summarizes these offers and the relevant information concerning the 6 suppliers. For example, supplier A is a plant belonging to the Kedge group offering the chemical component at €49.5 per ton, delivered by train. Supplier A has an annual production capacity of 300,000 tons. Finally, as part of its concern for the environment, BatKedge has introduced an environmental assessment criterion for its suppliers. The higher the score, the more environmentally friendly the chemical component treatment process. The score obtained by supplier A is 15.

	A	B	C	D	E	F
Price (€/tonne)	49.5	50	61	63.5	66.5	72.5
Kedge/Partner	Kedge	Kedge	Partner	Kedge	Partner	Partner
Truck/Train	Train	Truck	Train	Truck	Truck	Train
Environmental Criterion	15	16	18	20	21	23
Capacity (mt/an)	300	600	510	655	575	450

As part of its commitment to eco-responsibility, BatKedge wants all the chemical components used in the production of its batteries to achieve an average score of 19. In addition, to improve relations with the trade unions, BatKedge has also committed to sourcing 50% of its supplies from the Group's factories. Finally, receipt of components by rail is currently limited to 1,200 thousand tons and 1,440 thousand tons by truck.

The questions BatKedge is asking itself are as follows:

1. How much of the chemical component should BatKedge purchase from each supplier to minimize the cost of supply?
2. What will BatKedge's total cost of supply be?
3. What will be BatKedge's average supply cost?

It is clear that BatKedge's main objective is to formulate a procurement plan that minimizes the cost of supplying the chemical component. The cheapest chemical component is the component from suppliers A, B and C. However, the cheapest components also have a lower environmental score, which contradicts BatKedge's environmental objectives, which are to have an average score of 19. One strategy would be to contract only with Suppliers whose environmental score is at least 19. This strategy would effectively eliminate suppliers A, B and C, which is unfortunate as these are the three cheapest suppliers. In fact, a more intelligent strategy would be to diversify supplies. For example, sourcing equal quantities from suppliers C (score 18) and D (score 20) would give an average score of 19.

BatKedge would now like to answer the following additional questions:

1. What is the cost of the component at the margin? In other words, how much does an additional ton of components cost BatKedge?

2. Should BatKedge consider increasing its trucking capacity? If so, how much should it be prepared to spend?
3. Should BatKedge consider increasing its rail capacity? If so, how much should it be prepared to spend?
4. Should BatKedge be willing to negotiate more components from suppliers B and F, even at a higher price? If so, how far should it be prepared to go?
5. How should BatKedge evaluate a Kedge/Partner supplier on a cost basis? Should it be prepared to pay a premium for a Kedge supplier to reduce its commitment to the unions?

Instructions:

- The case must be carried out by groups of no more than 4 students.
- Due date is Friday 16th February.
- Documents to be submitted are:
    - A report with the mathematical formulation and the answers to the questions,
    - an Excel file with the solved problem including the sensitivity report generated and,
    - the corresponding python code.
- Send by email frderic.babonneau@kedgebs.com