Ashland Municipal Electric Utility [1]

Problem description

Oregonians' electricity needs are served by 40 utilities and a small number of power marketers[2]. *Ashland Municipal Electric Utility* (AMEP) is the second oldest Municipal Utility in Oregon. Power for the City of Ashland is purchased from the Bonneville Power Administration and produced at the City-owned Hydro Plant, metered at distribution substations and dispersed through city-owned feeder and distribution lines, transformers and meters, to each customer.[3]

AMEP is considering replacing some of its equipment at a generating substation and is attempting to decide whether it should replace an older, existing PCB transformer. (PCB is a toxic chemical known formally as polychlorinated biphenyl.) Even though the PCB generator meets all current regulations, if an incident occurred, such as a fire, and PCB contamination caused harm either to neighboring businesses or farms or to the environment, the company would be liable for damages. Recent court cases have shown that simply meeting utility regulations does not relieve a utility of liability if an incident causes harm to others. Also, courts have been awarding large damages to individuals and businesses harmed by hazardous incidents.

If the utility replaces the PCB transformer, no PCB incidents will occur and the only cost will be the cost of the transformer, $85,000. Alternatively, if the company decides to keep the existing PCB transformer then management estimates there is a 50-50 chance of there being a high likelihood of an incident or a low likelihood of an incident.

- For the case in which there is a high likelihood that an incident will occur, there is a .004 probability that a fire will occur sometime during the remaining life of the transformer and a .996 probability that no fire will occur. If a fire occurs, there is a .20 probability that it will be bad and the utility will incur a very high cost of approximately $90 million for the cleanup, whereas there is an .80 probability that the fire will be minor and cleanup can be accomplished at a low cost of approximately $8 million. If no fire occurs, then no cleanup costs will occur.
- For the case in which there is a low likelihood of an incident occurring, there is a .001 probability that a fire will occur during the life of the existing transformer and a .999 probability that a fire will not occur. If a fire does occur, then the same probabilities exist for the incidence of high and low cleanup costs, as well as the same cleanup costs, as indicated lor the previous case. Similarly, if no fire occurs, there is no cleanup cost.

Managerial report

1. Construct a table showing the financial elements of the problem and another table for the key probability elements.
2. Perform a decision tree analysis of this problem for AMEP, using Treeplan. Indicate the recommended solution. Is this the decision you believe the company should make? Explain your reasons.
3. Read about incorporating risk attitude with utility functions in Ragsdale's *Managerial Decision Modeling*, chapter 14, paragraph 14.15. Read also Treeplan's documentation. Find the meaning of *Risk Tolerance*.
4. Copy your tree in a new sheet of your workbook (i.e. duplicate the sheet). Set the tree to use the exponential utility fonction and try several values of RT. How sensible is the decision to the value of RT ? Does this new analysis change your conclusion ?
5. Present in a managerial report your analysis and your recommendation to AMEP's Board.

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[1] B.F.C. This case is directly adapted from another case. The reference of the original case will be given after the final exam.

[2] http://www.oregon.gov/energy/pages/oregons_electric_power_mix.aspx

[3] http://www.ashland.or.us/SectionIndex.asp?SectionID=423