

PRE-COURSE GLOSSARY

This brief glossary will help you become familiar with key words that will be used in the course. It will be especially helpful for persons whose first language is not English and also for others less familiar with economic evaluation and probability concepts.

You will not be expected to memorize a lot of definitions. However, it is important to be able to recognize important terms. When you to understand a concept well, you will be able give someone a satisfactory definition or explanation.

The post-course reference handbook, *Decision Analysis for Petroleum Exploration*, contains an extensive glossary.

bias: a repeated or systematic distortion of a value or statistic, imbalanced about its mean.

bonus: an up-front payment to obtain lease acreage a concession; also called lease bonus and signature bonus.

capital: the amount of money or equivalents invested in a business. Capital projects, compared to expenses, are those investments that are capitalized (i.e., expensed across time through depreciation, depletion or amortization).

cashflow (or cash flow): money entering or leaving the company treasury. Net cashflow is receipts net of cash expenses (including taxes paid) and capital expenditures.

chance event: an experiment, process or measurement whose outcome is not known beforehand. Represented in decision models as (synonymous) random variable, stochastic variable, or chance node.

complementary outcomes (events): two distinct and different outcomes which together represent all the possible outcomes of a chance event.

compounding: determining a future value by multiplying periodic interest factors; interest is earned on the interest. The inverse of PV discounting.

conditional probability:

the probability that an event will occur given that another event has already occurred.

continuous event: a chance event having an infinite number of possible outcomes along a continuum.

correlation: relationship between variables such that changes in one (or more) variables is generally associated with changes in another. Synonymous with association. Correlation is caused by one or more dependency relationships.

cost of capital (CoC): a price, expressed as an effective interest rate, that a company must pay for its funds.

cumulative distribution function (CDF): the integration of a PDF, left-to-right, showing the probability (0-1, y-axis) of being \leq the x-axis value. Has an S shape.

decision tree: a graphical representation of a decision problem and the expected value calculations, consisting of decision, chance and terminal nodes connected by branches.

dependence or dependency: when the outcome of one chance event influences, or is influenced by, the outcome of another chance event. Dependent relationships are often represented by formula relationships or with correlation coefficients. Opposite of independence. Partial or shared dependency is the cause of correlation.

deterministic: said of a model where all parameters are fixed or "determinate." Single-point solution. The antonym is *stochastic* (see).

discounted cashflow analysis (e.g., as in DCF analysis): projecting a future cashflow stream and determining its present value.

discrete event or distribution: a chance event that has a finite number of outcomes, e.g., the number of "heads" from flipping 10 coins. Compare continuous event.

escalation: a price or cost increase with time, as a result of the combined effects of real price growth and inflation. Any of these can be positive or negative.

evaluation: general term for any type of analysis used for asset appraisal, feasibility study, engineering evaluation, project assessment, and all other types of analyses related to decisions.

expected monetary value (EMV): expected value of the NPV outcome. $EMV = E(NPV) = EV \text{ NPV}$.

expected value (EV): the probability-weighted average outcome. This is the same as the mean statistic. The "expected" word comes from "mathematical expectation" and EV not the outcome to expect.

farmout (FO): an agreement to release a portion of ownership in a lease or license to another party in return for assumption of certain obligations.

forecast: a judged or predicted view of the event sequence or future state of the world. Usually calculation or estimation is involved.

frequency distribution (FD): a graph or other characterization of the observed values in a sample data set. Commonly graphed as a frequency histogram (bar chart).

frequency histogram: a graph showing frequency of observations counted in segments of the value range, usually presented as a bar chart with vertical bars.

independence: the characteristic where one event does not affect the occurrence of another, and vice versa.

inflation: a rising general level of prices and wages in an economy, expressed as an annual percentage rate.

interest:

1. amount paid for the use of funds, e.g., interest earned by savings in a bank account.
2. ownership in a project, asset or entity.

intuition: the believed capacity for guessing accurately. Judgments based upon feelings and not logical thinking.

joint event: a composite chance event comprised of two or more event outcomes occurring together.

lease: a contract that temporarily transfers certain rights to an asset, e.g., mineral rights underlying land surface. Concession licenses are similar.

marginal: incremental difference, said of cashflows, cost of capital, profit, etc. A marginal project is one that is borderline economic, where the incremental value is negligible.

mean: the arithmetic average of equally-likely outcomes or a set of observations. The probability-weighted average. Synonymous with expected value (EV) when referring to a probability distribution.

median: the most central value of a population or sample set. Point where it is equally likely to be above as below or that crossover point.

mode: the particular outcome that is most likely. This is the highest point on a probability density function.

Monte Carlo simulation (simulation): a process for modeling the behavior of a stochastic (probabilistic) system. A sampling technique is used to obtain trial values for key uncertain model input variables. By repeating the process for many trials, a frequency distribution is built up which approximates the true probability distribution for the system's output.

mutually exclusive outcomes: the situation where each outcome is distinct from all others.

mutually exclusive: meaning that only one alternative or project can be done, to the exclusion of others.

net cash flow (NCF): cash flow from operations, net of capital expenditures, overhead, and taxes.

normal distribution: the frequently-encountered, bell-shaped distribution. Also called Gaussian distribution.

objective:

1. (noun) the purpose of an organization. Often, less correctly, used to mean a goal.
- 2a. (adjective) unbiased.
- 2b. (adjective) from comprehensive understanding or abundant data.

objective analysis: one that is free from bias, requiring bias-free assessment inputs, objective value measure, and calculation integrity that doesn't introduce bias.

optimal: adjective meaning the best, in the context of the decision situation. The optimum (a noun) on a value curve or surface determines the optimal values of decision variables.

outcome: a particular result or sample of a chance event

play: a family of prospects that share a common geologic history of source deposition, hydrocarbon generation, migration, reservoir development, etc.

portfolio: a company's or individual's holdings of assets, projects, investments, or opportunities.

present value (PV or NPV): the value of a future cashflow stream or amount as of today or earlier date. The sum of discounted cash flow (DCF) values. The discount rate represents policy or attitude toward time preference of money.

probability $P(x)$: the likelihood of an event occurring, expressed as a number from 0 to 1 (or equivalent percentages). Synonyms: chance, likelihood. The sum of the probabilities of all possible outcomes equals 1.

probability density function (PDF): a mathematical or graphical representation that represents the likelihood of different outcomes from a chance event. The integral of a PDF over its entire range equals 1.

projection: a view of the sequence of events or future state of the world under an assumed set of assumptions. Compare forecast.

prospect: a defined local area in which a company hopes to discover valuable minerals.

random number: a number usually obtained from sampling a 0-1 uniform distribution and used for event sampling in Monte Carlo simulation.

reserves: estimated volumes of remaining economically-recoverable mineral resources with current technology. Usually, this means proved reserves. Less certain categories are classified as probable and possible.

revenue: income recorded on the company's books. Realized in cashflow as cash receipts.

risk: the quality of a system that relates to the possibility of different outcomes. There are unknowns about conditions of nature and about how systems operate. Risk is approximately synonymous with uncertainty for most people.

risk aversion: dislike of risk; conservative risk attitude.

sampling: obtaining examples from a parent population (PDF) or from measurement or experiment.

scenario: a possible sequence of events and a future state of the world.

statistic: a number that describes some attribute (location or shape) of a population or sample observations. The most common statistics are mean, median, mode, standard deviation, and variance.

stochastic (pronounced stow-KAStic): an adjective meaning probabilistic, statistical, chaotic or random. The term is complementary to deterministic (see).

subjective probability: probability assessment or judgment that is, at least in part, based on opinion, hunches, feelings, and/or intuition. uncertainty often used synonymously with risk.

variable: a value or symbol in a model that has a value or can be evaluated. Synonyms: parameter, input value.

working interest (W.I.): the fraction of the cost burden borne by a working interest party (part-owner); participation or ownership fraction. Working interest times the wellhead production equals company gross production.

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