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Glossary

An italicized term mentioned within a definition is also defined elsewhere in this list. Please see Chapter III for more definitions.

ASCOPE — ASEAN Council on Petroleum.

Btu — British thermal unit. A unit of energy; it is no longer in common usage.

Calorie — *See* ENERGY.

Capacity — The amount of *power* a generator can produce, or a transmission line can carry. If a generator can be operated twenty-four hours a day all year round, the maximum annual *energy* production is equal to its nameplate or rated output Capacity × number of hours in a year. In actual practice, a generator can not be run continuously due to regular maintenance requirements, variability of demand, and unforeseen outages. The ratio of actual to maximum energy production per year is called *load factor*. For a hydroelectric power project, capacity is measured in MW and energy delivered in one year

is measured in GWh (= Capacity × Load Factor × 8,760 h in a year). *See also* ENERGY and POWER.

Celsius — A unit of temperature (formerly Centigrade).

COIME — Committee on Industry, Minerals, and Energy.

COST — Committee on Science and Technology.

Cost-benefit analysis — *See* SOCIAL BENEFIT-COST ANALYSIS.

DES — Directorate of Electricity Services (Brunei).

Direct benefit — That benefit accruing to the owner or investor of a project. *Direct benefits* and *direct costs* are those reflected in the private accounts of the owner; *indirect benefits* and *indirect costs* are those external to a project accounting system. Indirect effects are those felt by private entities other than the owner/investor of a project.

Direct cost — *See* DIRECT BENEFIT.

Distribution line — *See* TRANSMISSION LINE.

Economic reserve — *See* RESERVE.

Economically mineable reserve — *See* RESERVE.

EGAT — Electricity Generating Authority of Thailand.

EHV — Extra high voltage (500 kV and higher).

EIA or Environmental Impact Assessment — A process of anticipating, describing (or quantifying if feasible), and evaluating (assessing social desirability/undesirability) of the complete range of consequences of a specific project. The *Environmental Impact Statement* is a decision document resulting from an EIA. It becomes part of an expanded project feasibility study that allows a broader information base for making decisions on whether or not to go ahead with the project, or what modifications to incorporate in a project.

EIS — Environment Impact Statement. *See* EIA.

Electricity — A loose layman term interchangeably used to mean either electrical energy or electrical power. *Energy* and *power* are two entirely different quantities. Electric energy is a secondary or derived form of energy. It is an intermediate good. *See* ENERGY and POWER.

Energy — The capacity to do work. *Power* is the time rate of doing work. Therefore *energy* is power multiplied by time. Kilowatt (kW) and megawatt (MW) are measures of power. Kilowatt-hour (kWh) which stands for kilowatt × hour is therefore a measure of energy (also, MWh, GWh, and tWh). Electricity

consumers pay for energy, not power. However, large industrial users are also charged an additional "demand charge" proportional to the power they need. Units of energy employed are: calorie, joules, Btu, MMTCE, MMBOE, TOE, MMSCF. *See also* CAPACITY and POWER.

Environmental Impact Assessment — *See* EIA.

Environmental Impact Statement — *See* EIA.

ESCAP — Economic and Social Commission for Asia and the Pacific, a United Nations agency formerly called ECAFE or Economic Commission for Asia and the Far East.

Extended benefit-cost analysis — *See* SOCIAL BENEFIT-COST ANALYSIS.

Greenhouse effect — Accumulation of heat in the atmosphere due to reduction of radiant heat reflected by the planet back to outer space. Carbon dioxide in the atmosphere can cause a greenhouse effect because it allows incoming solar radiation to pass but reduces outgoing radiant heat reflected back to outer space.

HEPP — Hydroelectric power plant.

HVDC — High voltage direct current.

Hz or Hertz — A unit of frequency equal to 1 cycle per second.

Indirect benefit — *See* DIRECT BENEFIT. Examples of indirect benefits due to a project are: income increments from employment, additional profits of businesses created, consumer surplus from reduced costs of consumer goods, etc.

Indirect cost — *See* DIRECT BENEFIT. Examples of indirect costs due to a project are: medical costs from accidents or pollution, decrement in real estate values near a nuclear power plant, additional cost of pumping water from a lowered water table downstream from a dam, etc.

Internal rate of return or IRR — A fictitious discount rate at which present benefits equal present costs. A hypothetical savings account with the same time pattern of deposit and withdrawal as the project's expenditures and incomes, would be left with zero balance if the interest rate is equal to IRR. Hence a project is economically sound if IRR exceeds prevailing interest rates.

Joule — *See* ENERGY.

Kelvin — A unit of temperature in the absolute scale. *See also* CELSIUS.

kW or kilowatt — A measure of POWER. *See* ENERGY.

LLN — Lembaga Letrik Negara or National Electricity Board of Malaysia.

Load factor — *See* CAPACITY.

LOLP — Loss-of-load probability (see Chapter III, Section 1).

Marginal production cost — The incremental cost of producing a unit of output. *Short-term marginal cost (STMC)* is *marginal production cost* of power computed over a short period (one hour or less) during a given time of day. *Medium-term marginal cost (MTMC)* is here defined exactly as Mashayekhi's "average incremental cost", except that averaging is performed for projects in actual existence or construction. The MTMC is computed for a single form of fossil fuel. The cost profiles of all extraction projects — for the whole exploration-to-production cycle in each project — are totaled, discounted, and averaged to get the MTMC. The MTMC can be regarded as "average incremental cost" of projects under implementation.

Marginal reserve — *See* RESERVE.

MMBOE — Million barrels of oil-equivalent, a unit of *energy*. Because of variations in *energy* content and density of crude, a better unit of *energy* is in terms of weight rather than volume, the standard TOE or tons of oil-equivalent. *See* MMSCF and MMTCE.

MMSCF — Million standard cubic feet (of natural gas), a unit of *energy*. "Standard" refers to volume of a gas at standard temperature (293° Kelvin) and pressure (1 atmosphere). Like the *MMBOE* and *MMTCE*, the *MMSCF* is not a recommendable unit of energy because of variations in energy content. Calorie or joules is preferable. *See* MMBOE and MMTCE.

MMTCE — Million tons of coal-equivalent, a unit of *energy*. This unit is not used often because coal has a very wide variation in energy and moisture content from place to place. *See* MMSCF and MMBOE.

MTMC — *See* MARGINAL PRODUCTION COST.

Multiplier effect — The ratio of *social benefit* to *direct benefit*. It measures the degree to which a project exerts beneficial impacts on the rest of society.

MW or megawatt — A measure of *power*. A kW is 1 thousand watts; 1 MW is 1 million watts; 1 GW is 1 billion watts; 1 tW is 1 trillion watts. *See* ENERGY and POWER.

MW(e) — MW electric. *See* MW and POWER.

Natural frequency — There are many natural and man-made systems which tend to return or be restored to their original state after a disturbance. Oscillation can take place in such systems if the restoring force is large enough while the "stiffness" or "drag" of the system is small. The restoring force and the stiffness together determine the *natural frequency* of oscillation of the system. If an external disturbance happens to be "in step" with the natural frequency, destructive "runaway" oscillation can take place.

NPC — National Power Corporation in the Philippines.

NRSE — New and renewable sources of energy.

Pareto transfer — Transfer of resources from project beneficiaries (or indirectly by government compensation) to parties negatively affected by a project.

PLN — Perusahaan Umum Listrik Negara or State Electricity Authority in Indonesia.

Power — The rate of energy flow, measured in units of watt. In this work *power* is used synonymously with "electric power". "Flow" energy resources like hydroelectric, geothermal, and solar power are measured in power or capacity units such as MW, while "stock" energy resources like oil, coal, natural gas, and uranium are measured in energy units like million barrels of oil-equivalent (*MMBOE*), metric tons of coal-equivalent (*MMTCE*), million standard cubic feet (*MMSCF*) of natural gas, joules, or calories. Because a thermal power plant has efficiency of around 30-35 per cent, 1 MW of available or input (primary) power yields only about one-third MW of (secondary) electric power or MW(e), 1 MW(e) is approximately equal to 3 MW. *See* ENERGY and CAPACITY.

Present benefit — The sum of discounted future streams of benefits to all private entities in an economy benefited by a project.

Present cost — The sum of discounted future streams of costs incurred by all private entities in an economy affected by a project.

Potential resource — *See* RESERVE.

Probable reserve — *See* RESERVE.

Proven reserve — *See* RESERVE.

PUB — Public Utilities Board in Singapore.

R&D — Research and development, or the translation of scientific knowledge to technology; the end product of R&D is a working prototype of a useful device or processes which can be produced and sold at a profit.

Reliability — The degree to which a power system can meet demand and changes in demand, or the probability (in days per year) that a power system is unable to provide adequate power *vis-à-vis* demand in part or all of its customers.

Reserve or proven reserve — The amount of non-renewable resource which has been geologically proven and measured. In contrast, *potential resource* or *probable reserve* is the estimated amount of undiscovered but judged very likely to be present based on technical grounds. *Economic reserve* or *economically mineable reserve* is the part of proven reserve which can be extracted profitably given prevailing production costs and price of output. *Marginal reserve* is that part of proven reserve which is not profitable to extract. The difference between proven reserve and probable reserve is one of technical probability; the difference between economic and marginal reserve is one of profitability.

SEB — Sabah Electricity Board.

SESCo — Sarawak Electricity Supply Corporation.

Short-term marginal cost — *See* MARGINAL PRODUCTION COST.

Siltation — The slow accumulation of debris, sand, silt, clay, and other similar materials at the bottom of a water reservoir, slowly reducing its usable storage volume and shortening the lifetime of the dam.

Social benefit — The sum total of present benefits accruing to all private entities (individuals, households, and firms) as a result of a project. *Present benefit* is the sum of discounted stream of present and future benefits expected to be enjoyed by a private entity as a result of a project. *Social benefit* is the sum of *direct* and *indirect benefits*. *Social cost* and *present cost* are defined analogously.

Social benefit-cost analysis, or extended benefit-cost analysis, or simply cost-benefit analysis — The comparison of *social costs* and *social benefits* arising from all phases of a project. Comparison is made by computing the difference between the two

(called net present value), or their ratio (called benefit/cost ratio), or the *internal rate of return (IRR).*

Social cost — *See* SOCIAL BENEFIT.

Socio-technical system — A social grouping organized around the operation of a technical system towards the efficient achievement of some objective. The system embraces people, hardware, organization, and the set of social relations, rules, conventions, and procedures observed to achieve an agreed outcome.

Solar farm or solar plantation — Capture and utilization of solar energy through growing and burning of trees. The term is sometimes used to refer to large areas used to capture solar energy through arrays of solar or photovoltaic panels.

STMC — *See* MARGINAL PRODUCTION COST.

TOE — Tons of oil-equivalent, a unit of energy equal to 10 Gcal or 10 trillion calories. Because energy content and density of crude petroleum varies, this definition sets the standard crude in terms of the standard energy content. *See* MMBOE.

Transmission — Transfer of power from generating source to substation in or near demand centre, usually over long distances and using high voltages (230kV and above). High voltages are necessary to reduce currents and energy losses. Distribution is the transfer of power from substations radially to various points of demand. *Distribution lines* are shorter and lower in voltage (less than 70 kV).

Transmission line — A long conductor used to convey power from one location to another. A *transmission line* is characterized by its capacity (which is a measure of the amount of power that can pass through) and voltage. A *transmission line* with high rated voltage and short distance behaves like a "stiff" connection. *See* TRANSMISSION.

Utility — Used here to mean a power utility company.

Volt — Unit of electric potential, electromotive force, or voltage, a quantity related to electric current in a fashion analogous to the relation between water pressure and flow of water. A kilovolt or kV is 1,000 volts.