Resource Assessment: estimation of future supply (of minerals, fuels, geothermal energy)

Assessment requires:
- estimation of amount of a given material (e.g. of mineral deposit, fuel, geothermal fluid)
- estimation of the fraction of that material that can be recovered

Further requirements during assessment:
- not only the quantities that can be produced under present economic conditions,
- but also the quantities not yet discovered or that might be produced with improved technology or under different economic conditions.

Resource Assessment:
- estimation of thermal energy in the ground
- estimation of the amount of this energy that can be extracted economically and legally at some future time
- estimation of the amount of byproducts that might be produced and used economically along with thermal energy
GEOTHERMAL RESOURCES

- **Byproducts**
  - metals or salts dissolved in saline goeth. fluid
  - gases (e.g. methane) dissolved in geopressed fluids

RESOURCE TERMINOLOGY

- **Resource Base**: sum of mineral raw material present in the earth’s crust in a given geographic area (whether its existence is known or not; regardless of cost consideration and technological feasibility of extraction)
- **Resource**: that part of resource base which seems likely to become available given certain technologic and economic conditions.
- **Reserve**: quantities of minerals producible with existing technologies under present economic conditions.

The primary goal of resource estimation is the comparison of different energy sources, and to do this, the terminology used in various disciplines (e.g. coal, fuel, geothermal energy) must be comparable.
GEOTHERMAL RESOURCE ASSESSMENT

- Developed on the basis of McKelvey diagrams proposed for mineral resources (Fig. 4.1)

- The depiction of the geothermal resource terminology on a McKelvey diagram is given in Fig. 4.2.

GEOTHERMAL RESOURCE ASSESSMENT

- **Geothermal Resource Base**: all the heat in the Earth’s crust beneath a specific area referenced to mean annual temperature
- **Accessible Resource Base**: thermal energy at depths shallow enough to be tapped by drilling in foreseeable future
- **Geothermal Resource**: that fraction of accessible resource base that might be extracted economically and legally at some reasonable future time
- Both the accessible resource base and the geothermal resource include identified and undiscovered components.
- **Geothermal reserve**: identified geothermal energy that can be extracted legally today at a cost competitive with other energy sources.

GEOTHERMAL RESOURCE ASSESSMENT

- Reserve estimates are considered to be:
  - Certain, if reservoir data are available from drill holes
  - Probable, if reservoir data are available only from geological and geophysical surface explorations
  - Possible, if the geological speculation is the only available data on the subsurface situation