The Wind Project Development Process

Developed for the
National Renewable Energy Laboratory

by
Dale Osborn
Distributed Generation Systems, Inc.

September 1998

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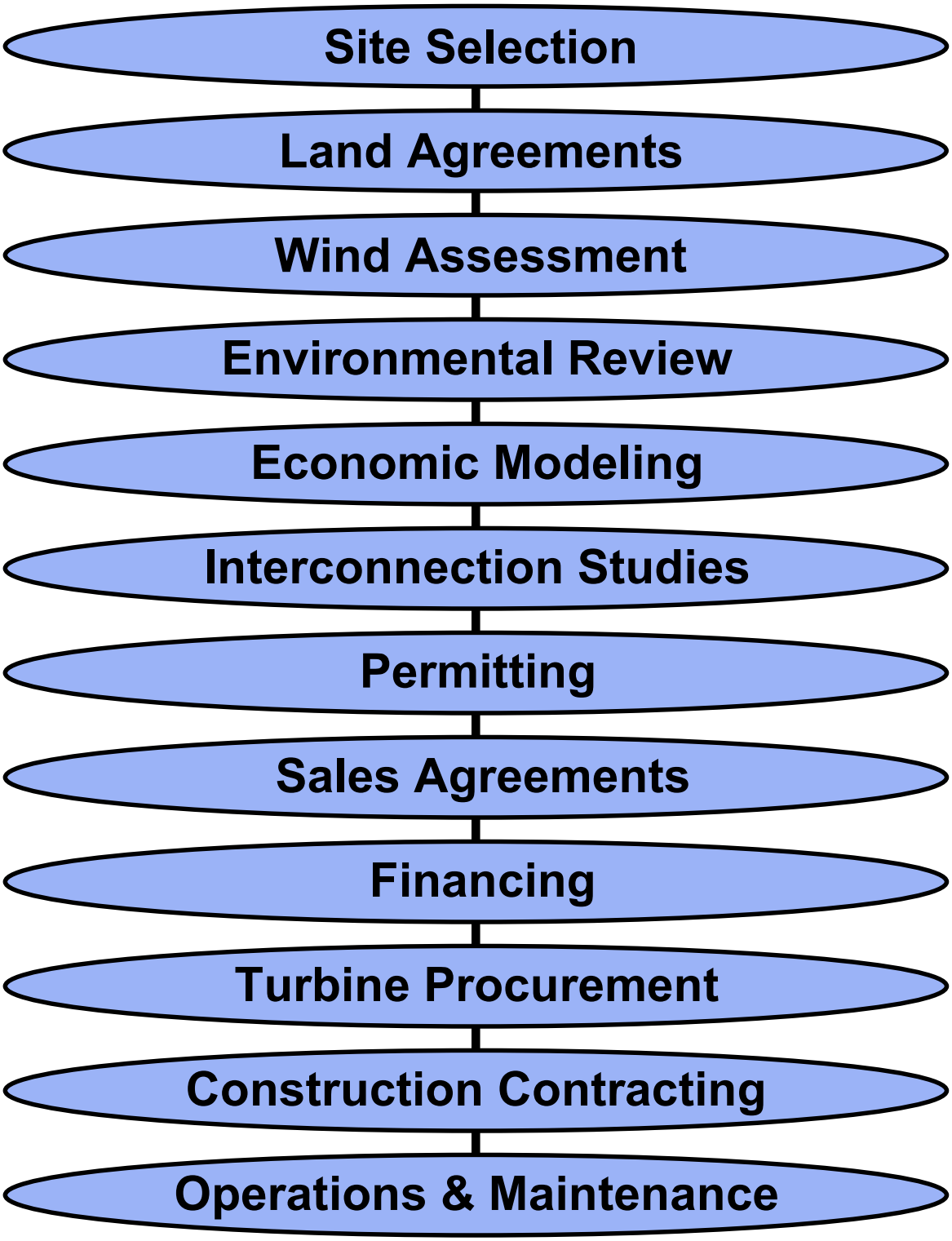
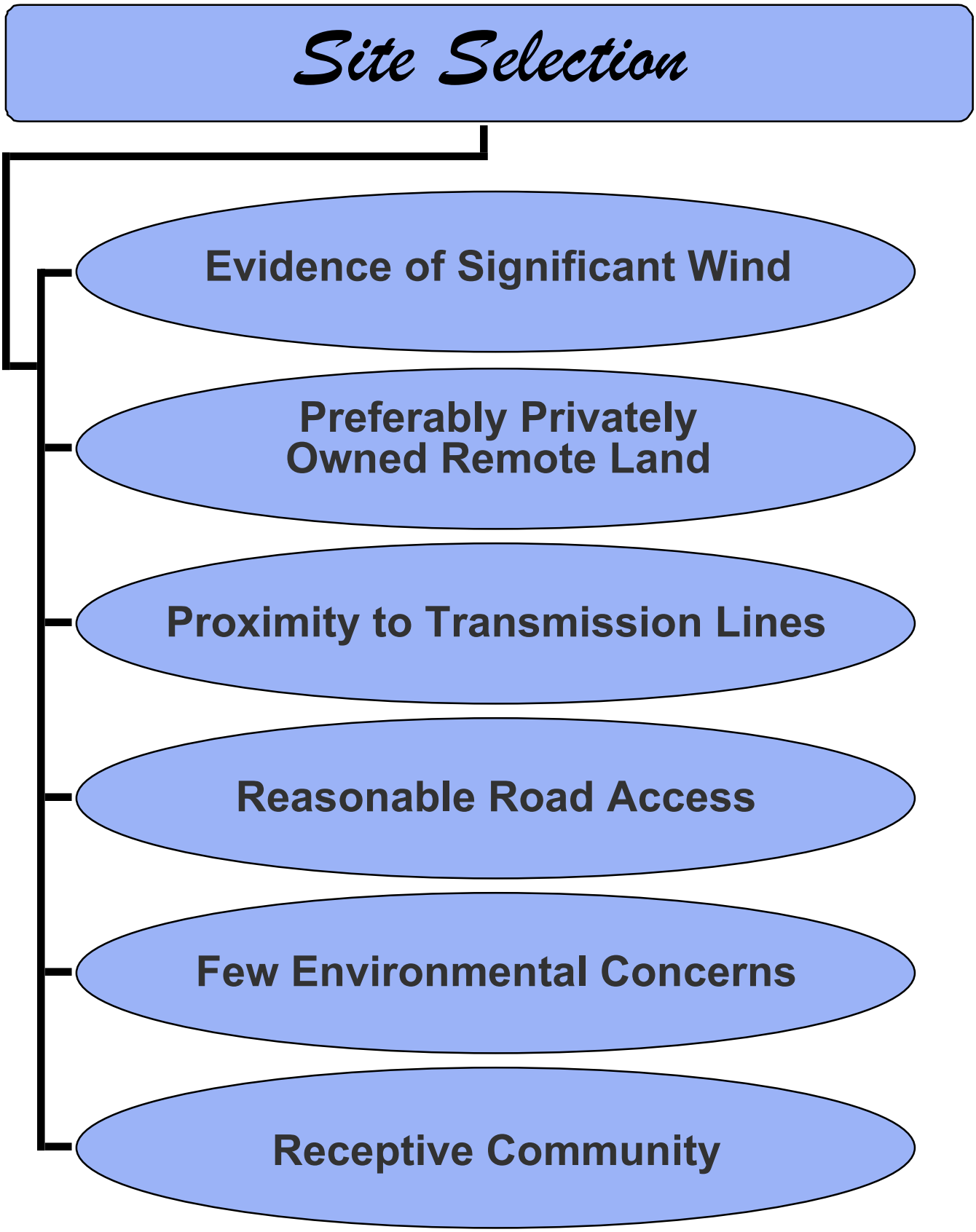
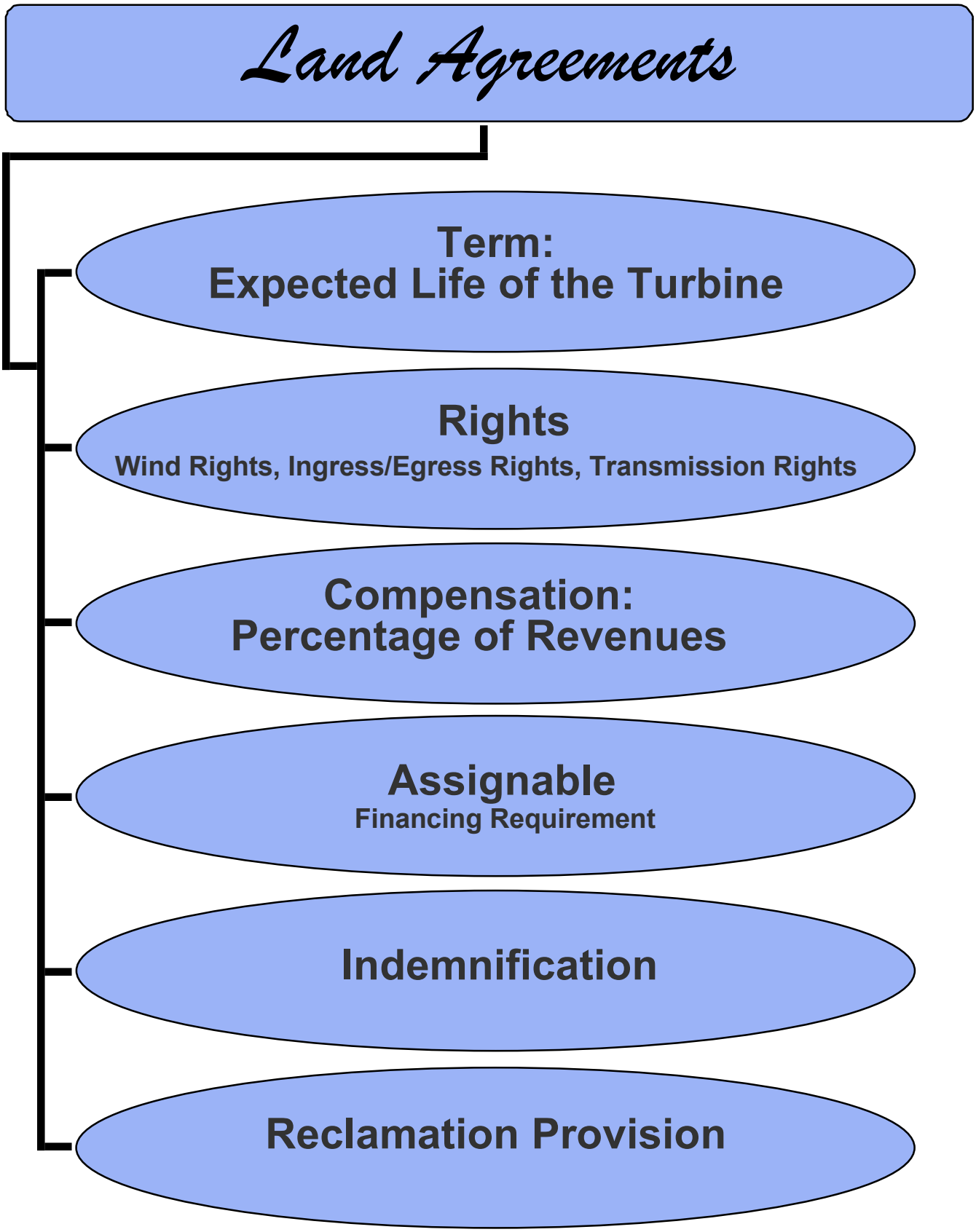
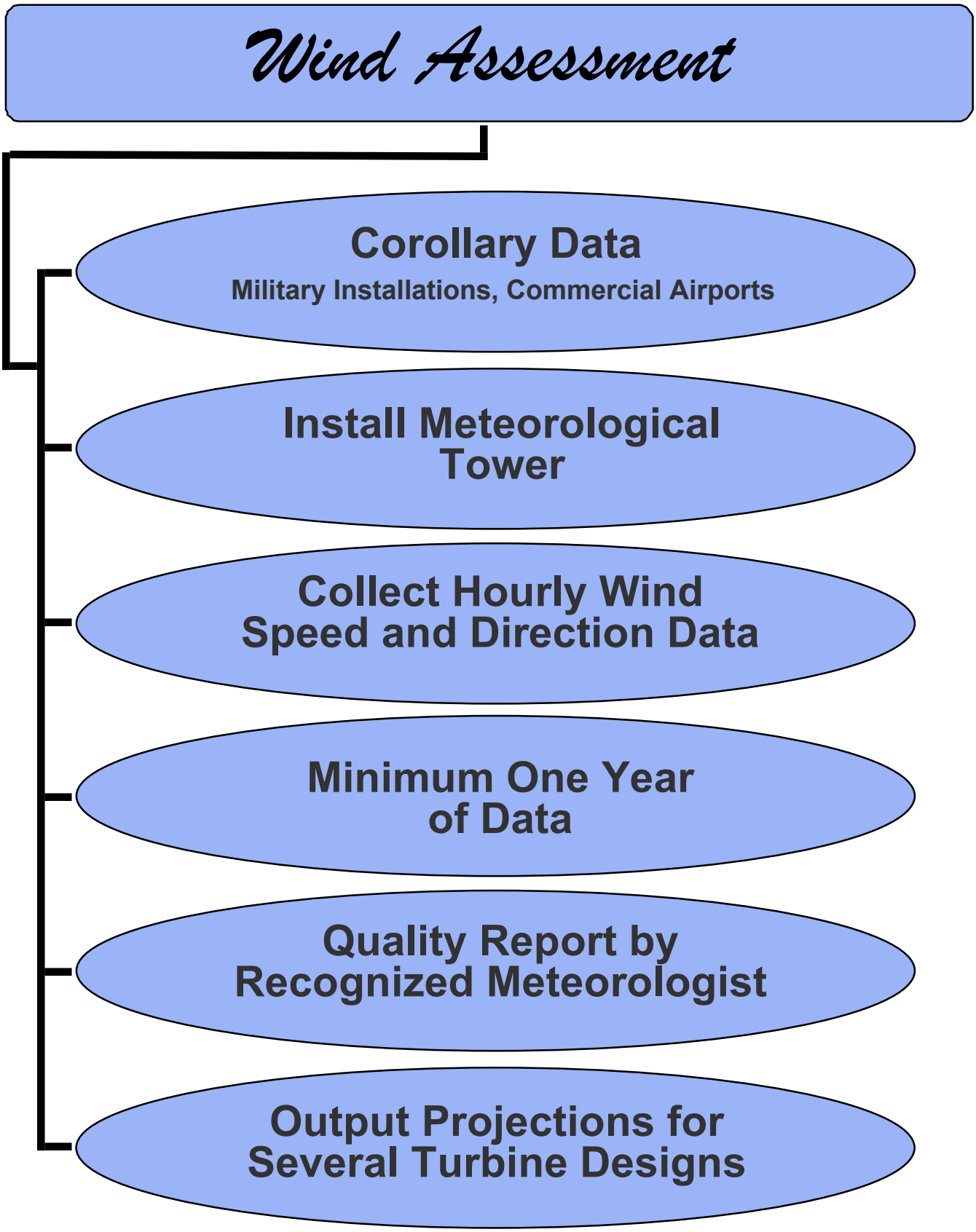
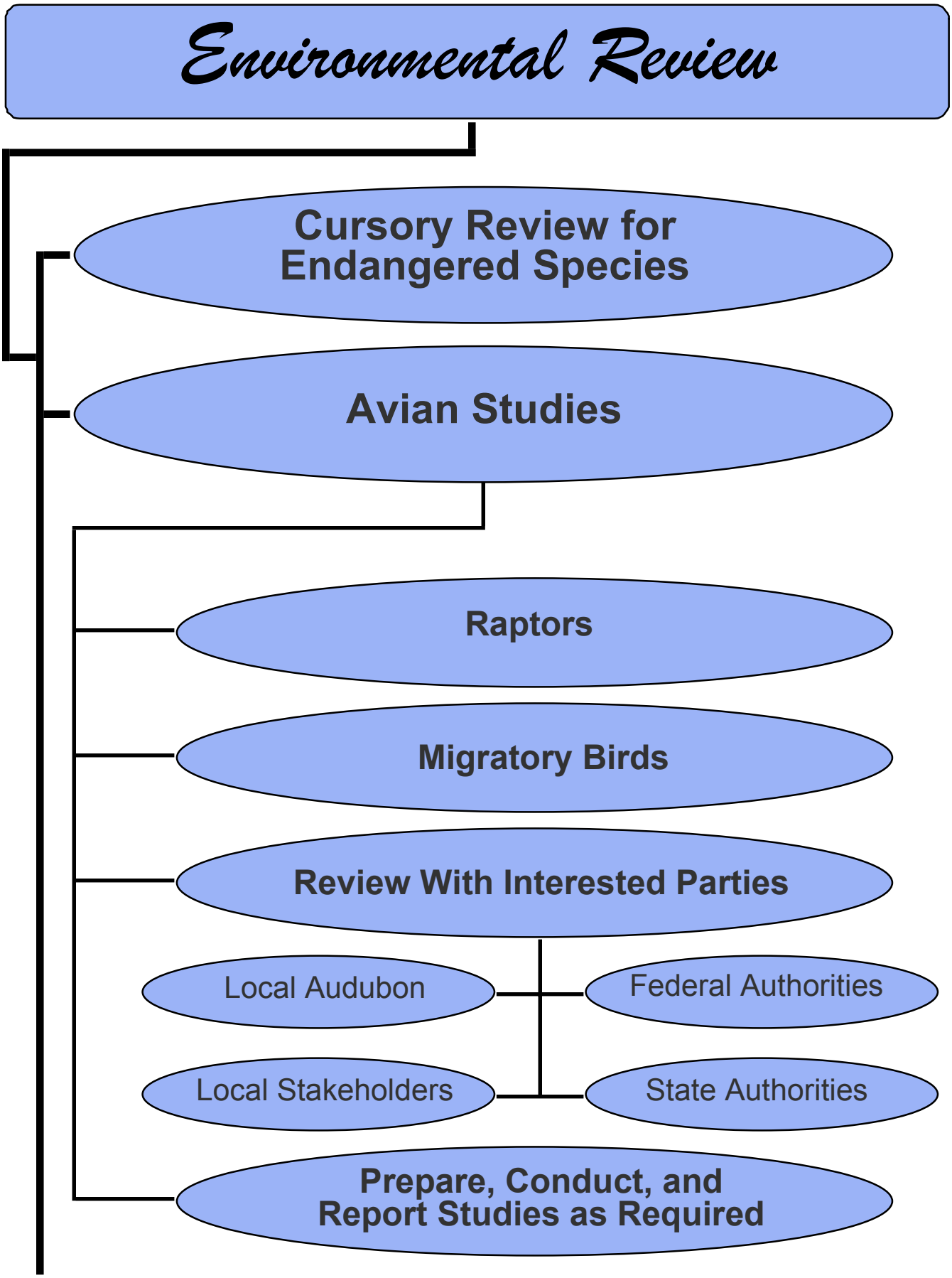



Site Selection
Evidence of Significant Wind
Preferably Privately Owned Remote Land
Proximity to Transmission Lines
Reasonable Road Access
Few Environmental Concerns
Receptive Community

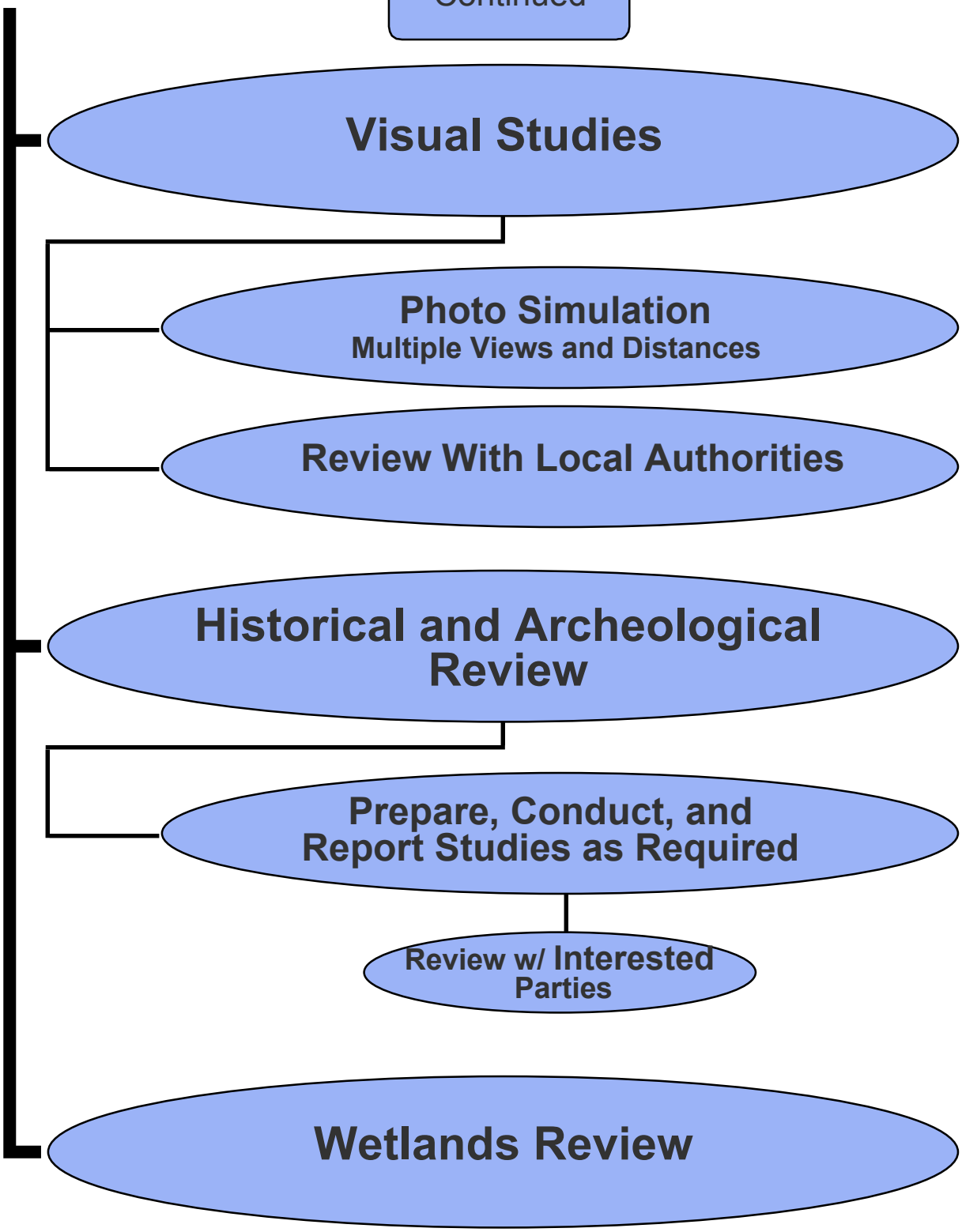

Land Agreements
Term:
Expected Life of the Turbine
Rights
Wind Rights, Ingress/Egress Rights, Transmission Rights
Compensation:
Percentage of Revenues
Assignable
Financing Requirement
Indemnification
Reclamation Provision

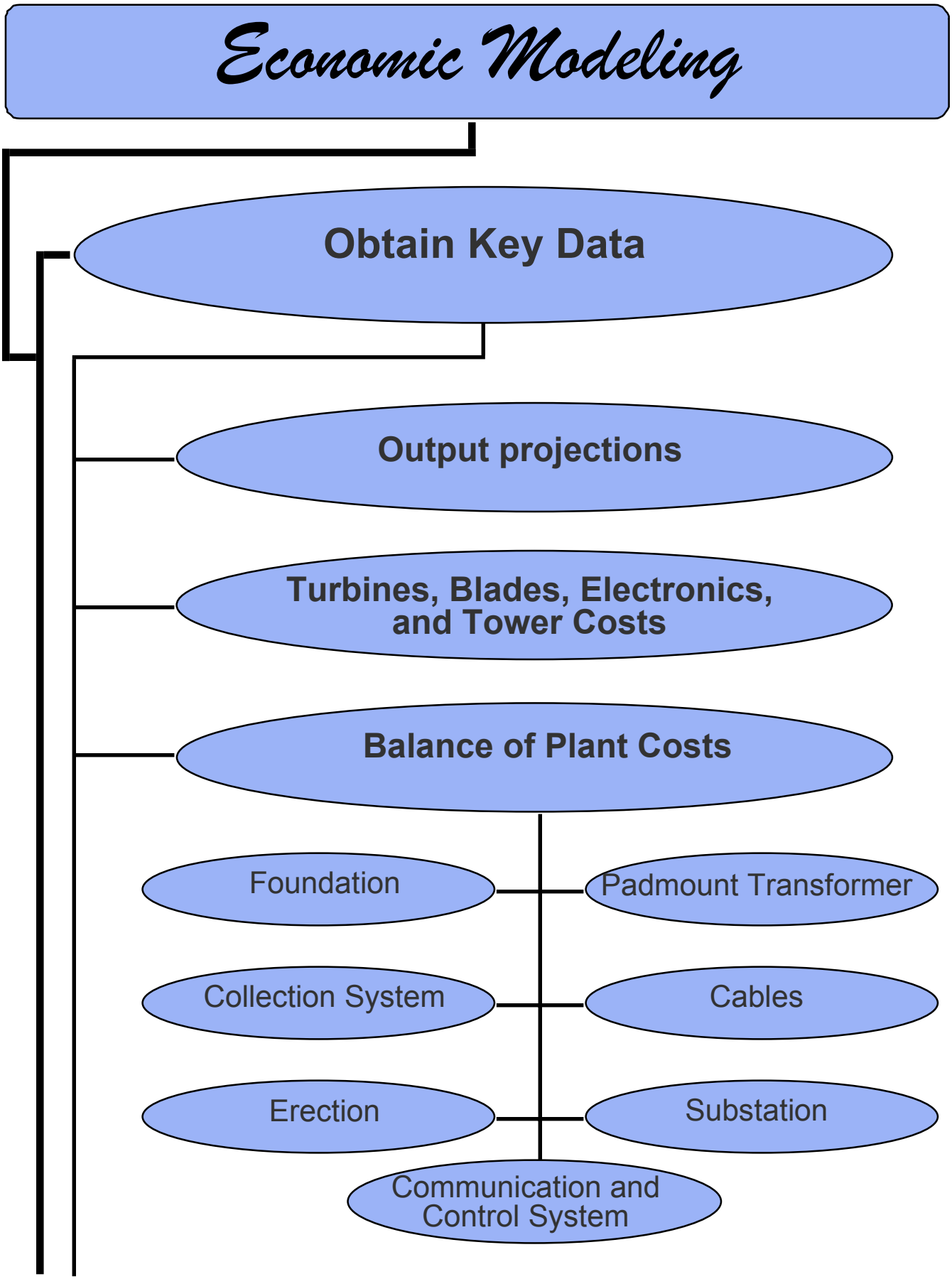

Wind Assessment
Corollary Data
Military Installations, Commercial Airports
Install Meteorological Tower
Collect Hourly Wind Speed and Direction Data
Minimum One Year of Data
Quality Report by Recognized Meteorologist
Output Projections for Several Turbine Designs

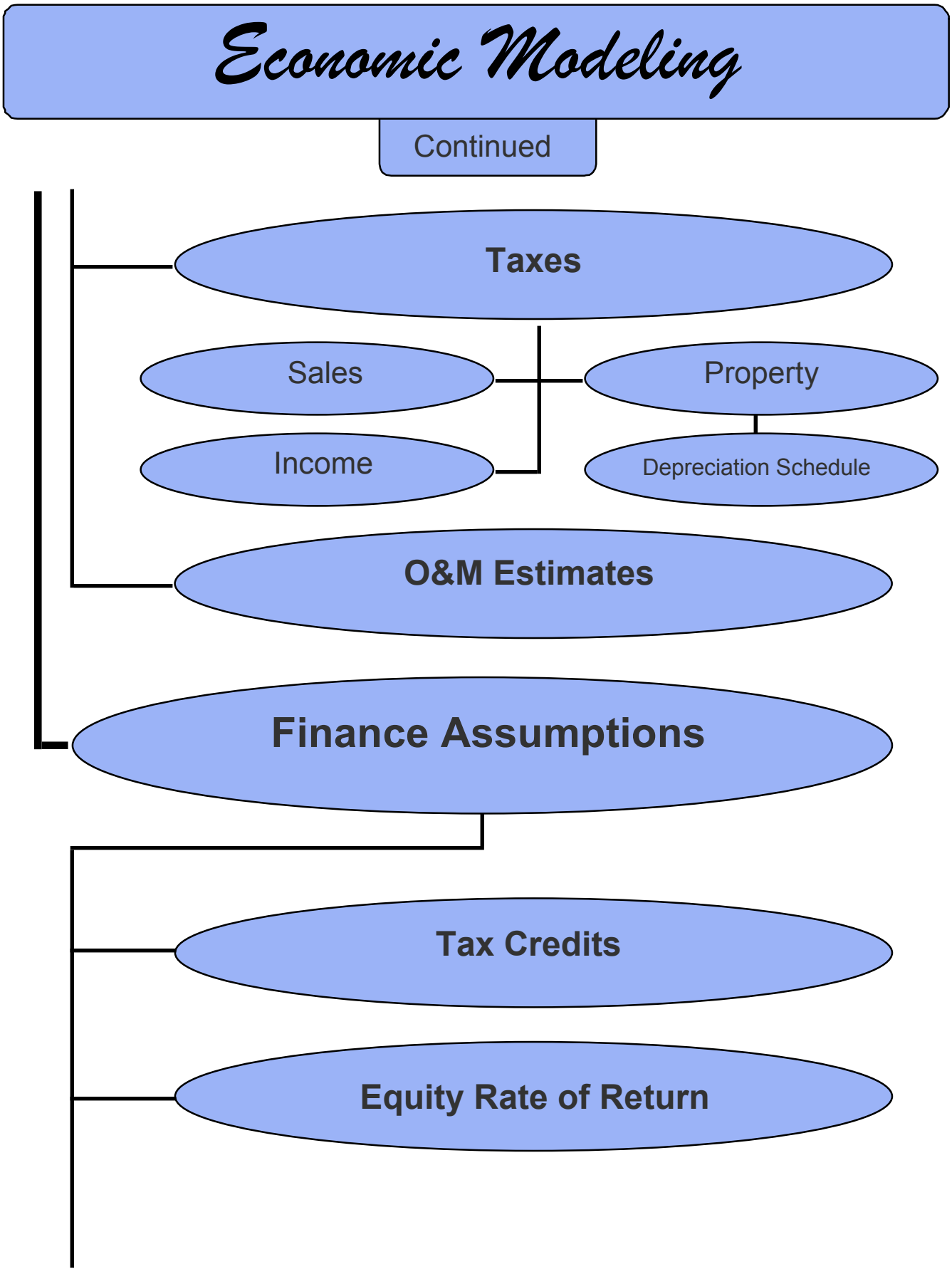

Environmental Review
Cursory Review for Endangered Species
Avian Studies
Raptors
Migratory Birds
Review With Interested Parties
Local Audubon
Federal Authorities
Local Stakeholders
State Authorities
Prepare, Conduct, and Report Studies as Required

Environmental Review

Continued

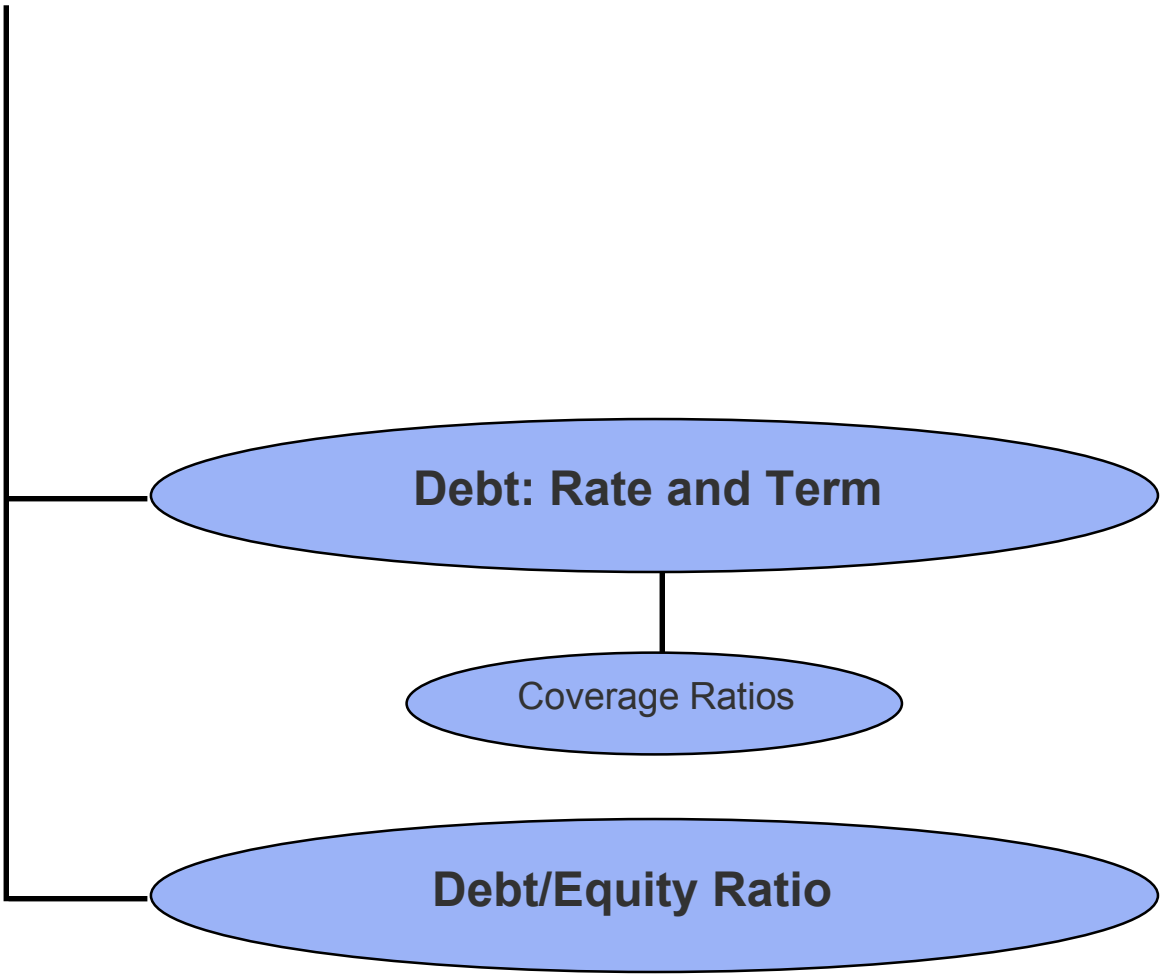


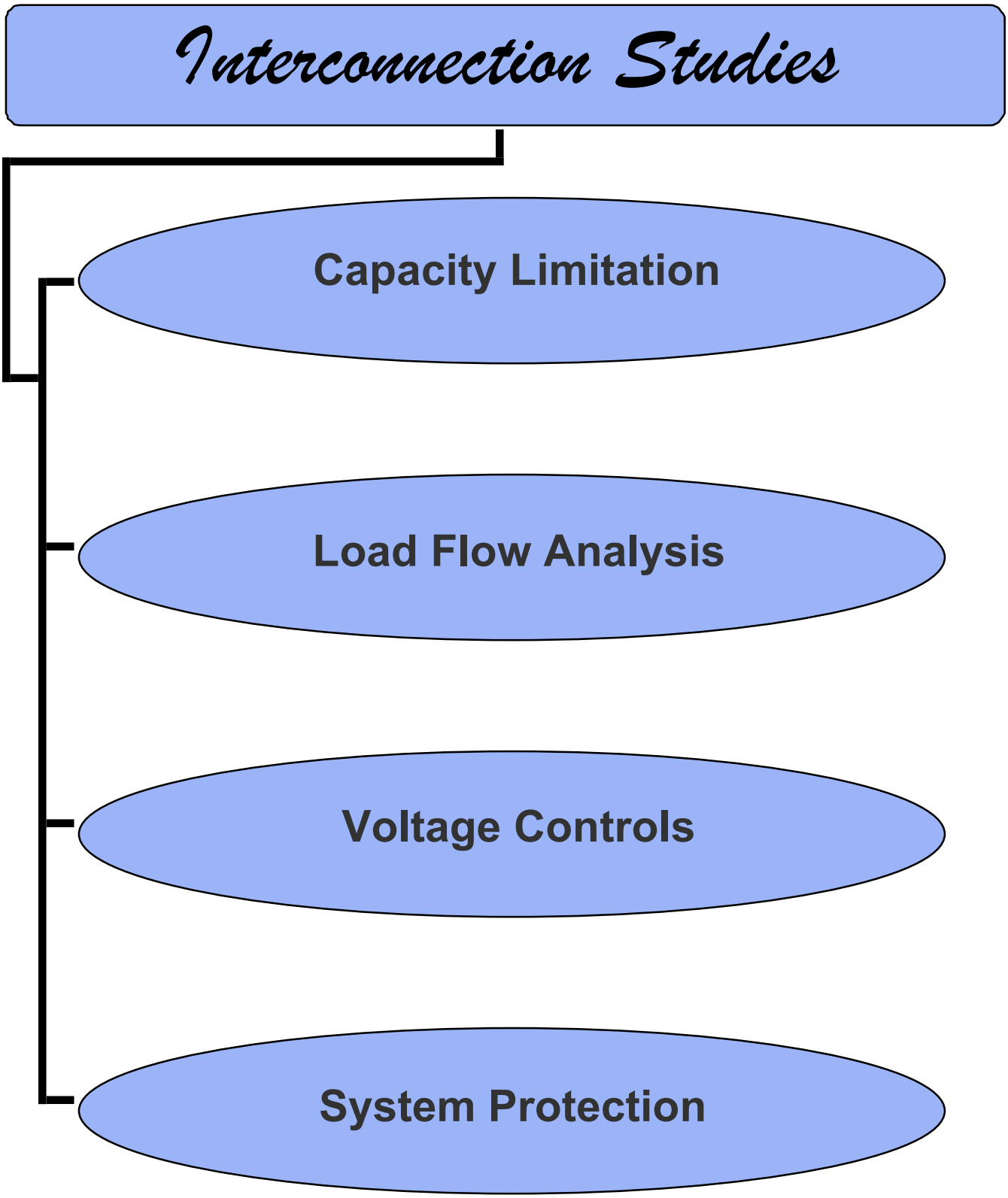

Economic Modeling
Obtain Key Data
Output projections
Turbines, Blades, Electronics, and Tower Costs
Balance of Plant Costs
Foundation
Padmount Transformer
Collection System
Cables
Erection
Substation
Communication and Control System

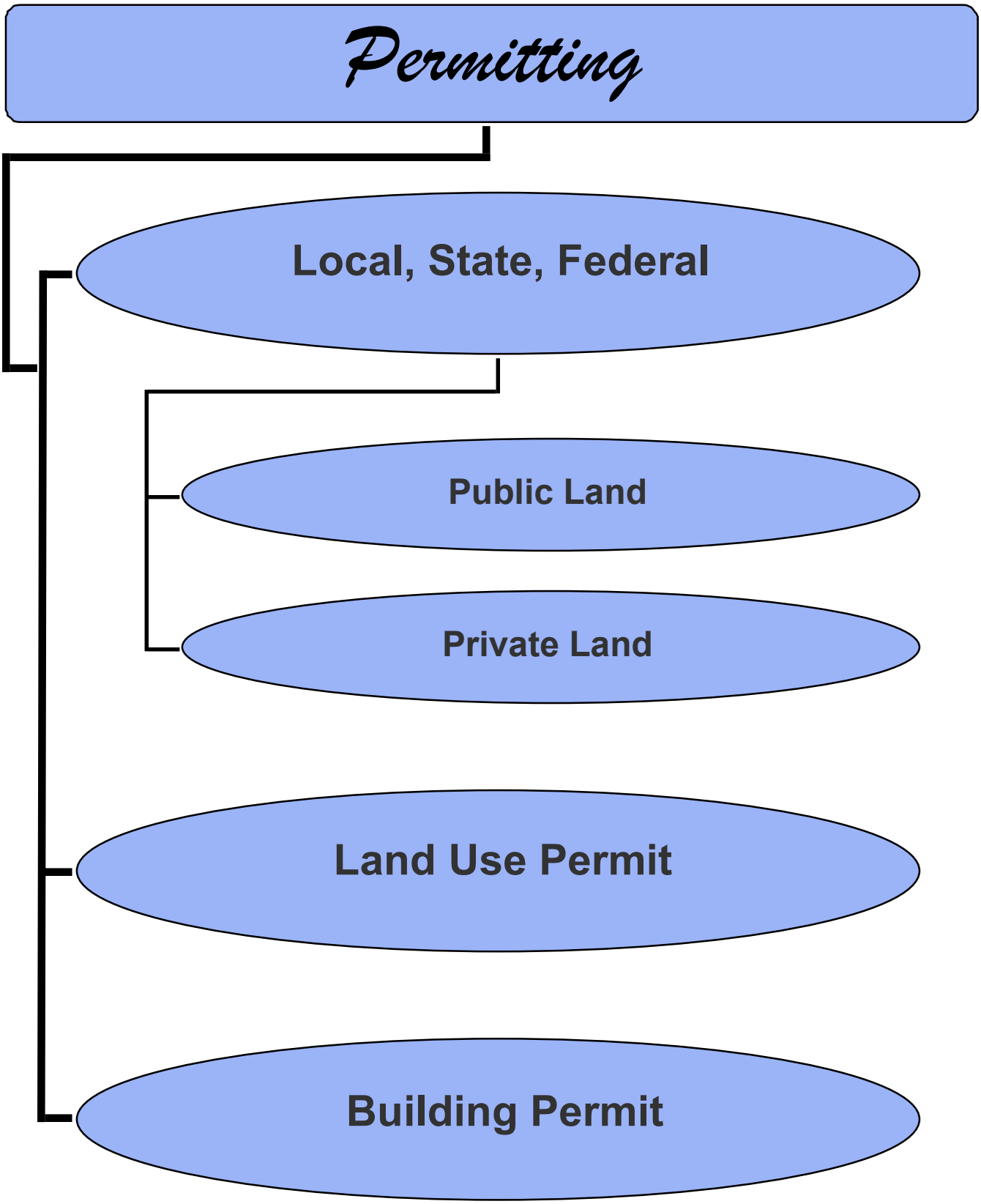

Economic Modeling
Continued
Taxes
Sales
Property
Income
Depreciation Schedule
O&M Estimates
Finance Assumptions
Tax Credits
Equity Rate of Return

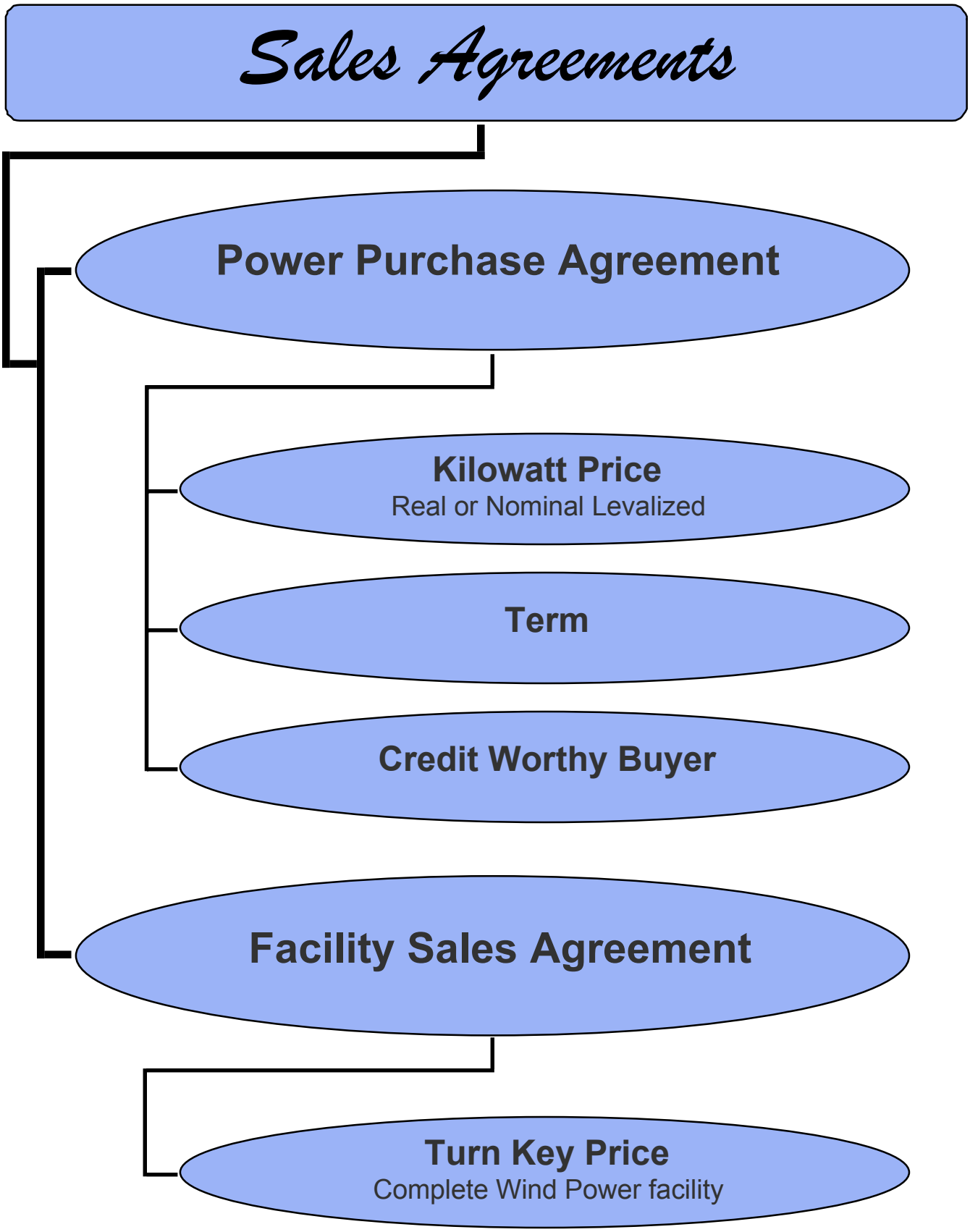
Economic Modeling

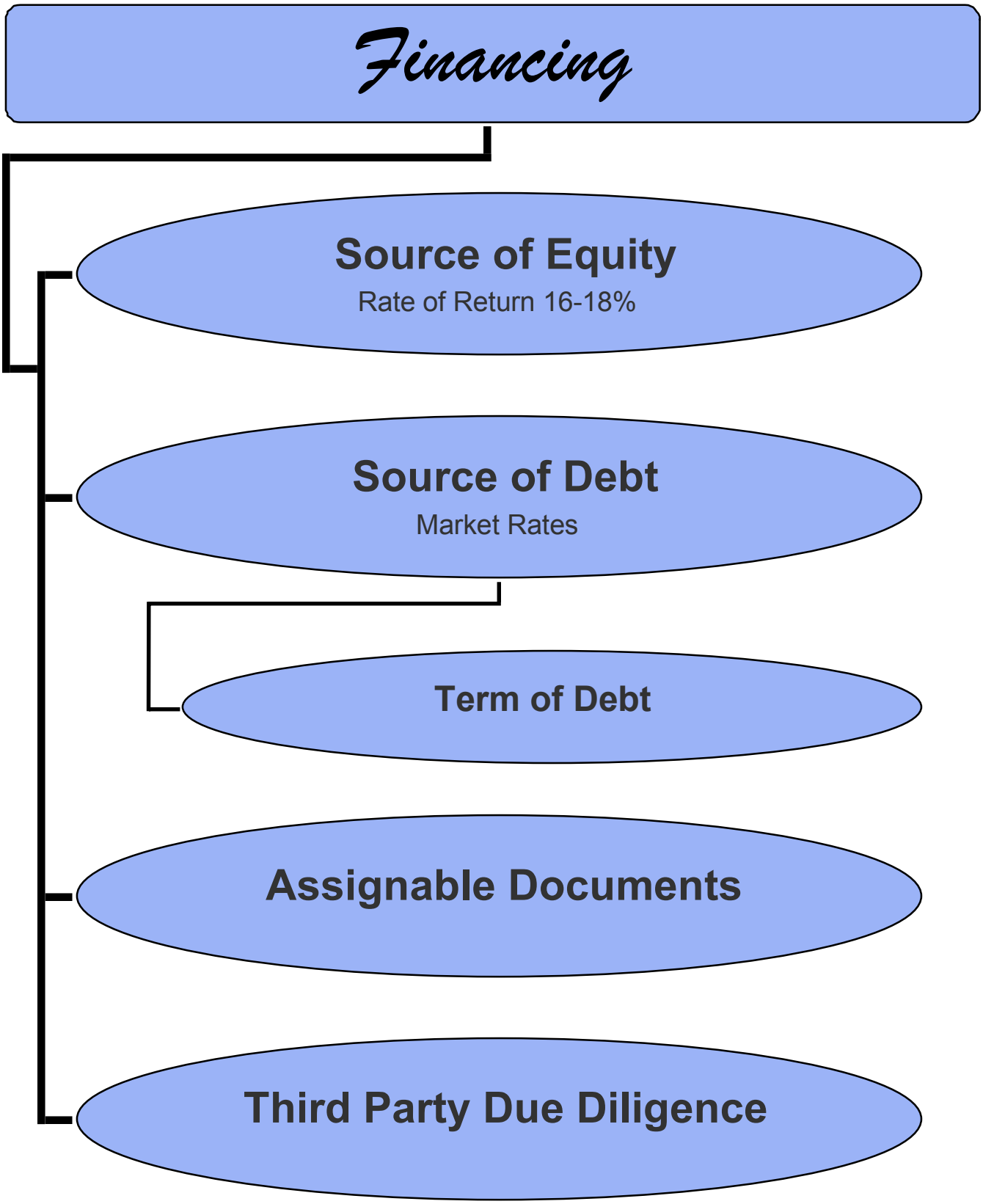
Continued

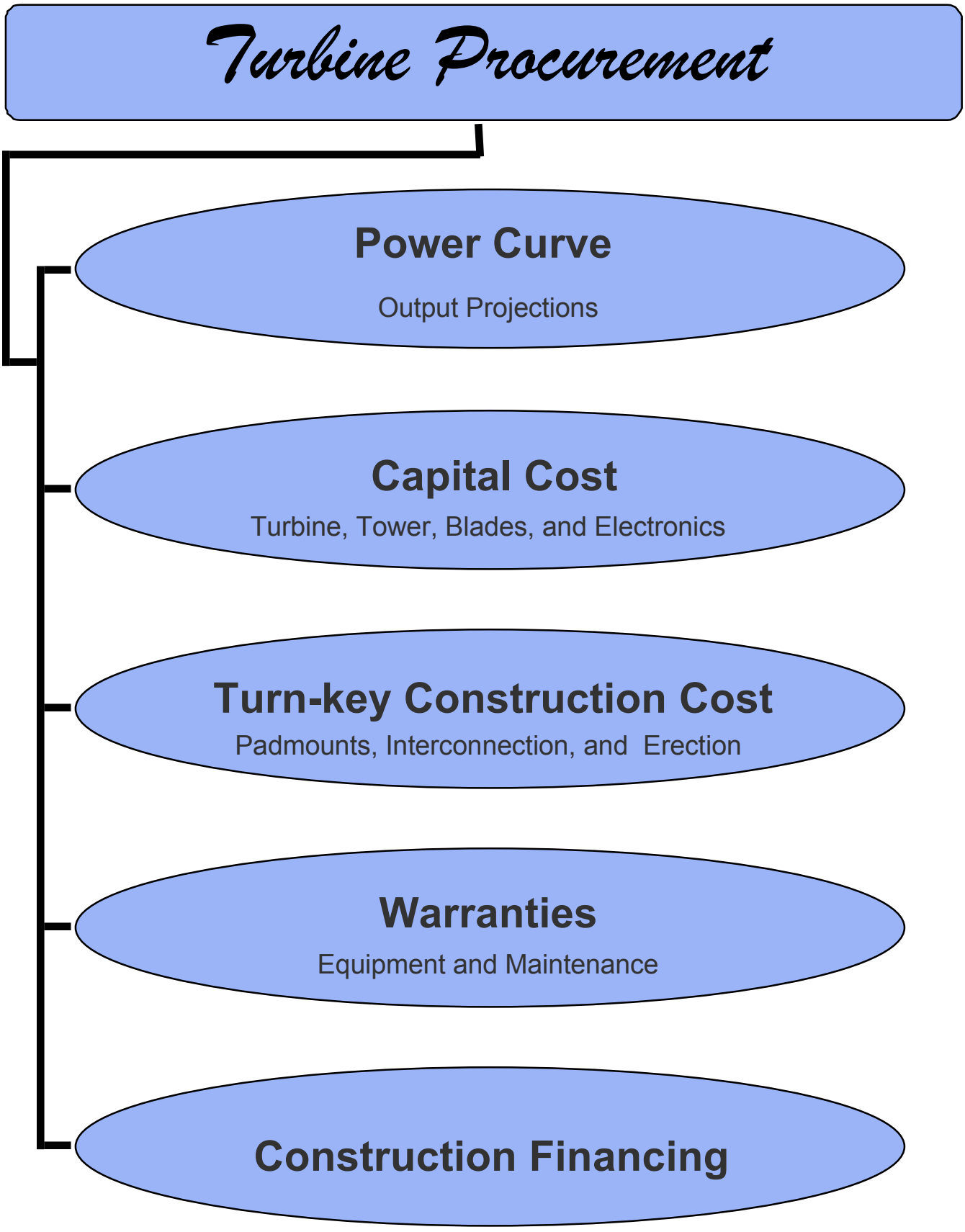


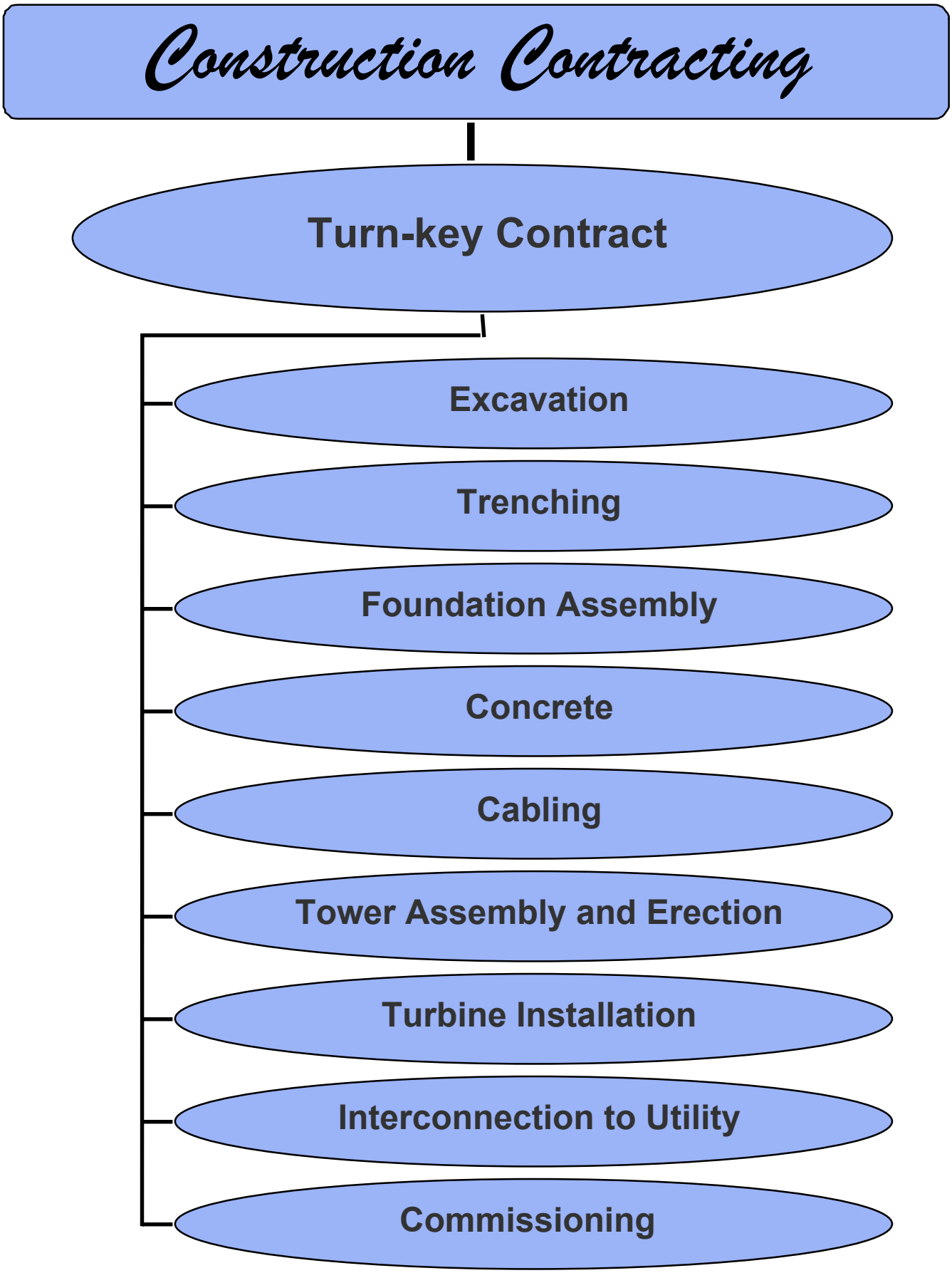

Interconnection Studies
Capacity Limitation
Load Flow Analysis
Voltage Controls
System Protection

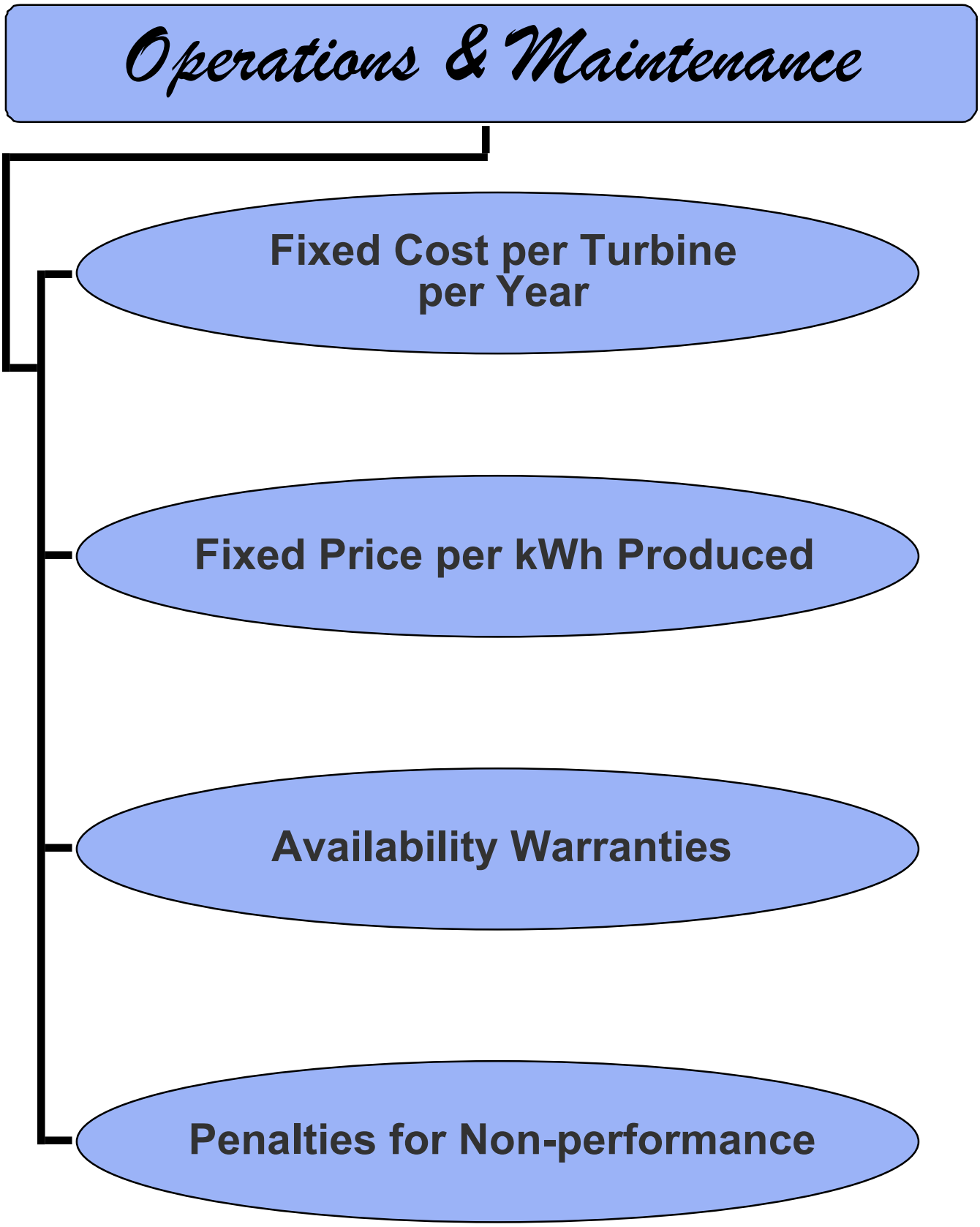

Permitting
Local, State, Federal
Public Land
Private Land
Land Use Permit
Building Permit


Sales Agreements
Power Purchase Agreement
Kilowatt Price
Real or Nominal Levalized
Term
Credit Worthy Buyer
Facility Sales Agreement
Turn Key Price
Complete Wind Power facility


Financing
Source of Equity
Rate of Return 16-18%
Source of Debt
Market Rates
Term of Debt
Assignable Documents
Third Party Due Diligence


Turbine Procurement
Power Curve
Output Projections
Capital Cost
Turbine, Tower, Blades, and Electronics
Turn-key Construction Cost
Padmounts, Interconnection, and Erection
Warranties
Equipment and Maintenance
Construction Financing


Construction Contracting
Turn-key Contract
Excavation
Trenching
Foundation Assembly
Concrete
Cabling
Tower Assembly and Erection
Turbine Installation
Interconnection to Utility
Commissioning


Operations & Maintenance
Fixed Cost per Turbine per Year
Fixed Price per kWh Produced
Availability Warranties
Penalties for Non-performance