

Productive Capacity Criterion Indicators

(italics indicates priority indicator)

The goal of this criterion is to assess the Nation's energy and mineral resources and the capability to meet the needs of current and later generations. This includes finding, extracting, processing, and transporting resources to the marketplace including net imports.

These indicators represent links in the chain of sustainable development that deal with the capacity of mineral/material, and energy systems. None of the indicators selected here can be used alone. Each provides a piece of the picture of the capacity of the United States to meet current and future mineral/material and energy requirements.

Starting with the universe of the mineral estate of the United States, the links affecting the capacity for use include: access to lands for exploration, estimated resources and reserves, and production, processing, and transportation capacities.

Stock-in-use is linked to domestic production and net imports and, in turn, represents a link to re-use and recycling, and thus the capacity of the system to continue to meet societal needs while bypassing the extraction, processing, and transport associated with virgin materials. Similarly, the efficiency of use of materials and energy, as measured by energy and material intensities, provides a link to the process of sustainability measuring the extent to which the same amount of materials and energy can provide greater economic benefits to society.

Substitution provides another link to sustainability, especially in regard to energy. Renewable energy resources, for example could gradually substitute for non-renewable fossil fuels. The energy supply mix is a useful indicator of this link. Many materials can substitute for the functions of other materials, for example, composites for structural metals, or aluminum for the conductive properties of copper.

These indicators should supply the essential information necessary to judge progress in the process of sustainable development in mineral/material and energy systems; the capacity of these systems to meet social, economic, and environmental needs. They do not define sustainability, but their status and trends are important to any assessment of that goal.

PC 1 Resources

PC 1.1 Lands Available for Access for Exploration, Development, and Protection. (Map highlighting Federal lands, built infrastructure, state and local parks, known mineralized areas, wilderness areas, areas of critical environmental concern, etc. Perhaps include table of the quantity of identified resources.) Assigned to BLM – Sie Ling Chiang and _____.

PC 1.2 *Average Grade of Ores Produced.* Assigned to USGS-Lorie Wagner

PC 1.3 *Identified Resources (combined with 1.1)* Assigned to USGS-Lorie Wagner

PC 1.4. Reserves (Known) USGS [relegated to appendix]

PC 1.5 Resources Left Behind /Bypassed [relegated to appendix]

PC 2. Exploration Capacity

PC 2.1 *Annual Drilling Length.* Assigned to USGS – Dave Wilburn

PC 2.2 *Annual Amount Budgeted for Exploration.* (Also appears under the socio-economic indicator list). Assigned to USGS – Dave Wilburn

PC 2.3 *Discovery Rate Per Dollar of Exploration Expenditure.* Assigned to USGS – Dave Wilburn

PC 2.4 *Annual Exploration Rig Utilization.* Assigned to USGS – Dave Wilburn

PC 2.5 *Annual Domestic Coal Leases and Licenses.* Assigned to USGS – Dave Wilburn

PC 3. Production (Extractive) Capacity

PC 3.1 *National Supply Mix of Mineral Commodities and Energy* (includes domestic production, imports, exports, net import reliance). Assigned to USGS – John Sznopak

PC 3.2 Co-Product and By-Product Inter-dependence (Percentage of non-fuel mineral production produced as a co-product or by-product in value terms.) [Needs more thought]

PC 3.3 Idle Production Capacity as it Relates to Total [Requires more work and thought]

PC 3.4 Percent of natural gas (flared) and coal bed methane (emitted) compared to total production of gas fuels. [Needs more thought]

PC 3.5 Produced water [Move to the environmental domain.]

PC 4. Processing Capacity (Smelting, Refining, Pipelines, Transportation, etc.)

PC 4.1 Virgin/Recycled Materials. Assigned to USGS – Lorie Wagner

PC 4.2 Capacity of Oil and Gas Pipelines and Electricity Transmission Lines.
Assigned to _____

PC 4.3 Rail Transportation Capacity [relegated to appendix]

PC 4.4 Barge Transportation Capacity [relegated to appendix]

PC 4.5 Fresh Water Shipping Capacity [relegated to appendix]

PC 4.6 Ocean-Going Vessels Capacity [relegated to appendix]

PC 4.7 Truck Transportation Capacity [relegated to appendix]

PC 5. Use of Energy and Mineral/Materials

PC 5.1 Consumption Mineral Commodities and Energy Over Time. Assigned to USGS – Lorie Wagner

PC 5.2 Stocks in Use. Assigned to USGS – Dan Sullivan

PC 5.3 Substitution and Life Span Indicators [Needs more thought, invite input for indicators, relegated to appendix]

PC 5.4 Trends in consumption of mineral materials versus forest materials.
[relegated to appendix]

PC 5.5 Diversity of Resource development. Products usage-percent of resource development products in use per sector [Requires clarification – relegated to appendix]

PC 5.6 Diversity of Resource development. Products usage: Percent of resource development-derived energy used per sector. [Requires clarification – relegated to appendix]