Minerals and Hydropower

Both the U.S. and China have large territories and abundant natural resources.

China

- By the end of 2017, a total of 173 kinds of minerals were discovered in China
- The identified reserves & resources of major minerals, such as coal, oil, natural gas, manganese, gold and graphite demonstrated an evident growth.
- China's most important mineral resources are hydrocarbons, of which coal is the most abundant. most of the total is located in the northern part of the country.
- China's onshore petroleum resources are located mainly in the Northeast—notably at the Daqing oil field— and in the northwestern provinces of Xinjiang (particularly in the Tarim Basin), Gansu, and Qinghai; there are also reserves in Sichuan, Shandong, and Henan provinces.
- Shale oil is found in a number of places, especially at Fushun in Liaoning, where the deposits overlie the coal reserves, as well as in Guangdong. Light oil of high quality has been found in the Pearl River estuary of the South China Sea, the Qaidam Basin in Qinghai, and the Tarim Basin in Xinjiang.

https://www.britannica.com/place/China/Minerals

- Natural gas: Sichuan province accounts for almost half of the known reserves and production. Other gas deposits have been found in Inner Mongolia, the Qaidam Basin, Shaanxi, Hebei, Jiangsu, Shanghai, and Zhejiang and offshore to the southwest of Hainan Island.
- Iron ore: extensive and are found in most provinces, with Hainan, Gansu, Guizhou, southern Sichuan, and Guangdong having the richest deposits. The largest mined reserves are located north of the Yangtze River and supply neighbouring iron and steel enterprises.


China
International Boundary
Administrative Boundary
National Capital
Administrative Capital
0
500 KM
0
500 Miles
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RUSSIA
KAZAKHSTAN
MONGOLIA
CHINA
INDIA
KYRGYZSTAN
TAJ.
AFG.
PAKISTAN
Indian claim
Lines of control
NEPAL
BHUTAN
BANGLADESH
MYANMAR
LAOS
THAILAND
VIETNAM
XINJIANG
Urumqi
XIZANG (TIBET)
Lhasa
QINGHAI
Xining
GANSU
Yinchuan
NINGXIA
NEI MONGOL (INNER MONGOLIA)
Hohhot
Lanzhou
Xi'an
SHAANXI
SICHUAN
Chengdu
Chongqing
CHONGQING
YUNNAN
Kunming
GUIZHOU
Guiyang
HUBEI
Wuhan
HUNAN
Changsha
SHANXI
HEBEI
Shijiazhuang
Taiyuan
BEIJING
Beijing
TIANJIN
Tianjin
Bo Hai
HENAN
Zhengzhou
SHANDONG
Jinan
JIANGSU
Nanjing
Hefei
ANHUI
Shanghai
SHANGHAI
Hangzhou
ZHEJIANG
Nanchang
JIANGXI
Fuzhou
FUJIAN
Taipei
TAIWAN
Taiwan
Taiwan Strait
East China Sea
Yellow Sea
GUANGXI
Nanning
GUANGDONG
Guangzhou
Macau S.A.R.
Hong Kong S.A.R.
Haikou
HAINAN
Hainan Dao
Gulf of Tonkin
South China Sea
Philippine Sea
PHILIPPINES
PARACEL ISLANDS
Andaman Sea
HEILONGJIANG
Harbin
Changchun
JILIN
Shenyang
LIAONING
NORTH KOREA
SOUTH KOREA
75
90
105
120
135
45
30
15

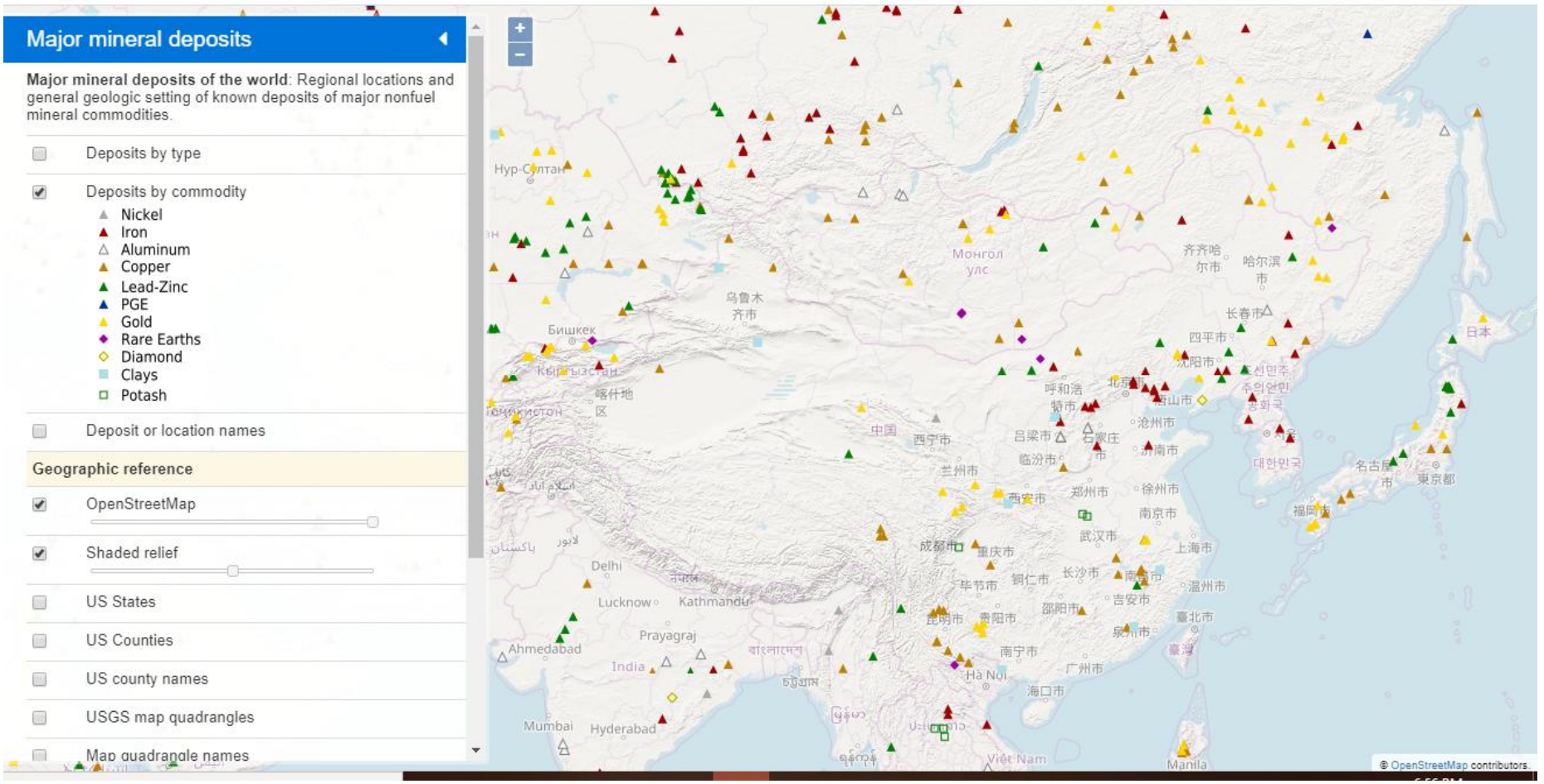
No.	Mineral	Unit	2016	2017	Growth rate/%
1	Coal	Billion tons	1598.00	1666.67	4.3
2	Oil	Billion tons	3.50	3.54	1.2
3	Natural gas	Billion cubic meters	5436.55	5522.10	1.6
4	Coalbed methane	Billion cubic meters	334.40	302.54	−9.5
5	Shale gas	Billion cubic meters	122.41	198.29	62.0
6	Iron ore	Billion tons of ores	84.06	84.89	1.0
7	Manganese ore	Billion tons of ores	1.55	1.85	19.1
8	Chromite	Thousand tons of ores	12331.9	12202.4	−1.1
9	Vanadium	Thousand tons of V_2O_5	64017.7	64281.6	0.4
10	Titanium	Million tons of TiO_2	786	819	4.2
11	Copper	Million tons of metal	101.11	106.08	4.9
12	Lead	Million tons of metal	85.47	89.67	4.9
13	Zinc	Million tons of metal	177.53	184.94	4.2

14	Bauxite	Million tons of ores	4852	5089	4.9
15	Nickel	Thousand tons of metal	11183.7	11180.7	0.0
16	Cobalt	Thousand tons of metal	672.5	687.8	2.3
17	Tungsten	Thousand tons of WO_3	10159.5	10304.2	1.4
18	Tin	Thousand tons of metal	4453.2	4500.4	1.1
19	Molybdenum	Thousand tons of metal	28824.1	30067.8	4.3
20	Antimony	Thousand tons of metal	3072.4	3197.6	4.1
21	Gold	Tons of metal	12167.0	13195.6	8.5
22	Silver	Thousand tons of metal	275.2	316.0	14.8
23	Platinum group metal	Tons of metal	365.5	365.3	−0.1
24	Strontium ore	Thousand tons of celestite	55156.4	56440.5	2.3
25	Lithium	Thousand tons of oxides	9614.6	9673.8	0.6
26	Magnesite	Million tons of ores	3086	3115	0.9

No.	Mineral	Unit	2016	2017	Growth rate/%
27	Fluorite	Million tons of minerals	222	242	8.9
28	Refractory clay	Million tons of ores	2581	2592	0.4
29	Pyrite	Million tons of ores	6037	6060	0.4
30	Phosphate rock	Million tons of ores	24408	25284	3.6
31	Potash	Million tons of KCl	1057	1027	−2.8
32	Boron	Thousand tons of B_2O_3	76476.1	78172.6	2.2
33	Sodium salt	Billion tons of NaCl	1412.86	1422.49	0.7
34	Mirabilite	Billion tons of Na_2SO_4	117.11	117.12	0.0
35	Barite	Million tons of ores	351	362	3.1
36	Cement limestone	Billion tons of ores	134.33	137.01	2.0
37	Glass-making siliceous rock	Million tons of ores	8321	8875	6.6
38	Gypsum	Million tons of ores	97262	98472	1.2

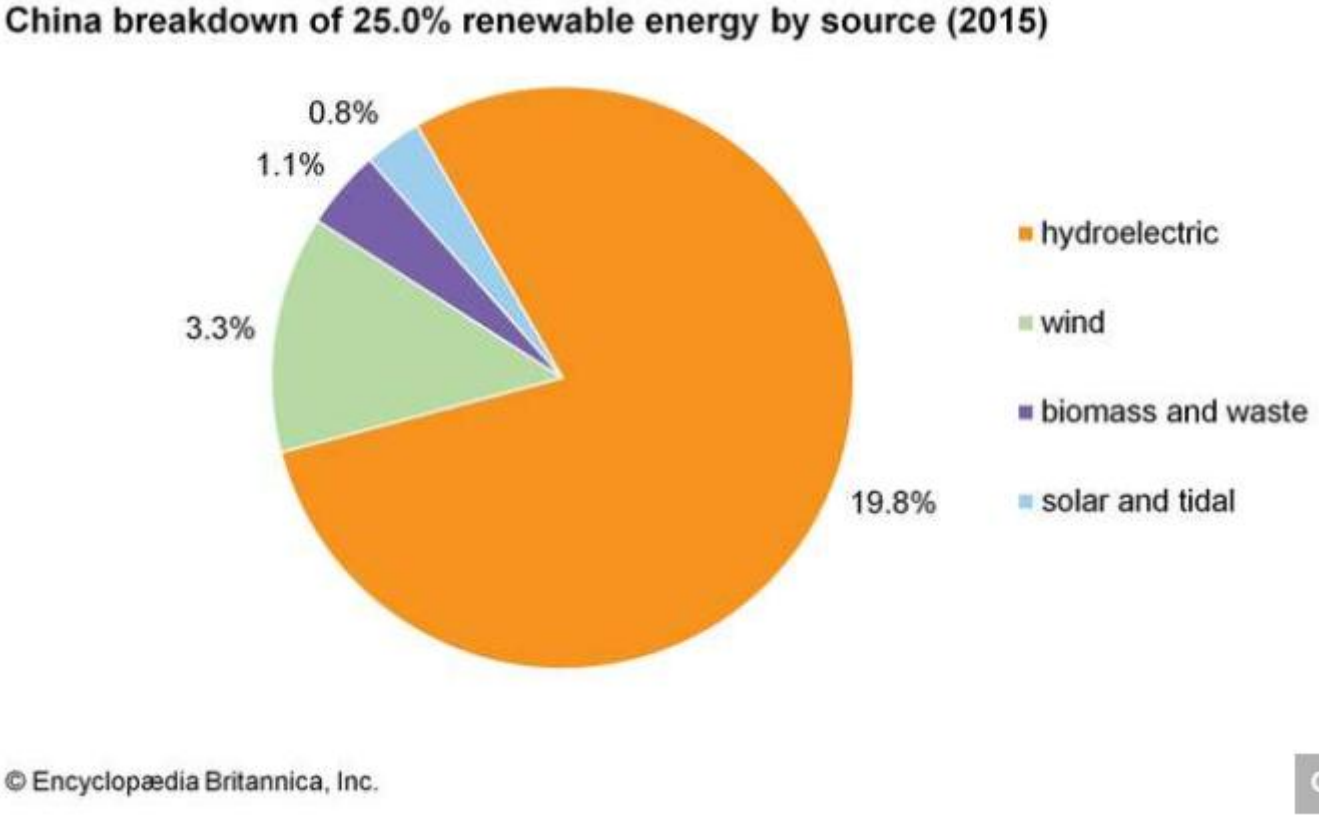
39	Kaolin	Million tons of ores	3395	3474	2.3
40	Bentonite	Million tons of ores	2966	3062	3.2
41	Diatomite	Million tons of ores	494	513	3.9
42	Veneer granite	Million cubic meters	4637	5057	9.1
43	Veneer marble	Million cubic meters	1631	1675	2.7
44	Diamond	kg of minerals	3124.64	3124.62	0.0
45	Crystalline graphite	Million tons of minerals	300	367	22.6
46	Asbestos	Million tons of minerals	95.66	95.46	−0.2
47	Talc	Million tons of ores	286	289	1.1
48	Wollastonite	Million tons of ores	166	170	2.1

https://mrdata.usgs.gov/major-deposits/map-us.html#home

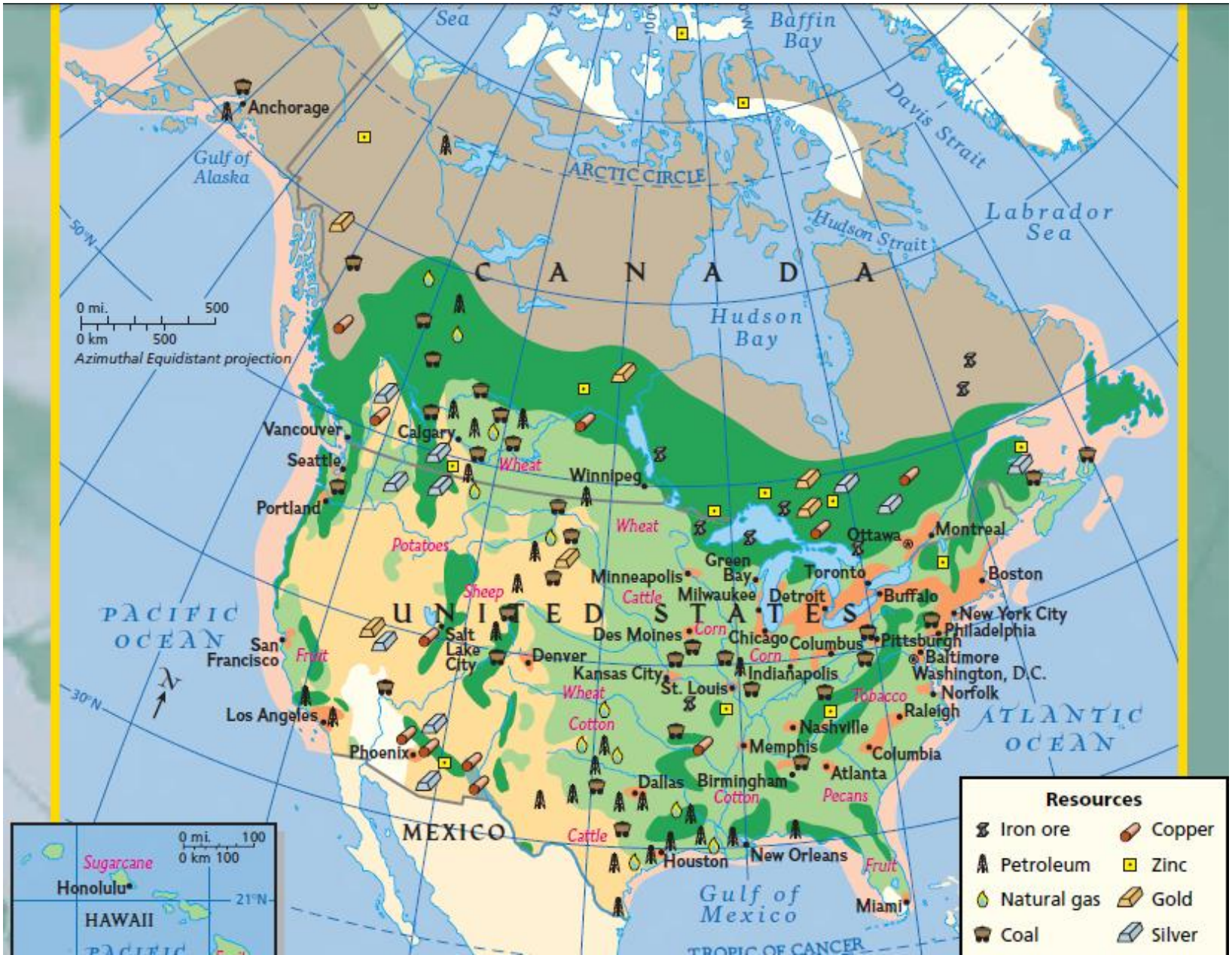


Hydroelectric potential

- River network and mountainous terrain provide ample potential
- Hydroelectric capacity is in the southwest—notably in Sichuan, Yunnan, Tibet, and Hubei

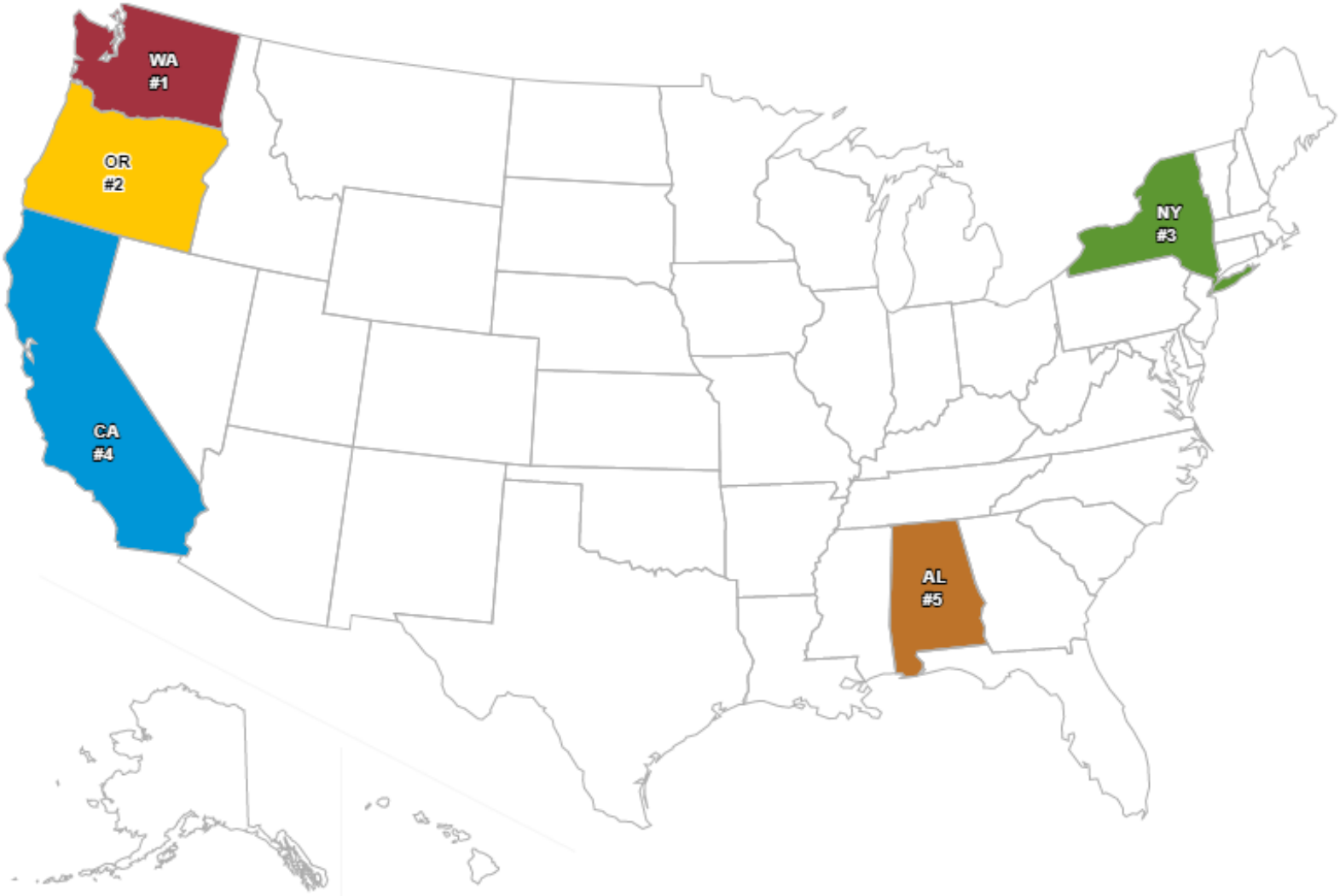


Minerals-USA



- Coal remains a primary industry for the U.S., and is often linked with states near the Appalachians.
- Oil reserves: Texas and Alaska
- Natural gas: Texas
- Gold, Silver, and Copper: Rockies
- Iron, Nickel: Canadian Shield

Top hydropower producing states, 2018



Source: U.S. Energy Information Administration, *Electric Power Monthly*, Table 1.10.B, February 2019, preliminary data

- **Hydroelectricity generation varies with precipitation levels.** Because electricity generation from hydropower depends on precipitation, and precipitation levels vary seasonally and annually, the ranking of each state in annual hydroelectricity generation may be different from its ranking in generation capacity.
- **Most dams were not built for electricity generation**
- Only a small percentage of the dams in the United States produce electricity. Most dams were constructed for irrigation and flood control and do not have hydroelectricity generators.
- The biggest hydropower plant in the United States is at the **Grand Coulee Dam on the Columbia River in Washington**, a state that gets about two-thirds of its electricity from hydropower.

- 45 hydroelectric facilities in 1886 to more than 2,000 facilities in 50 states and Puerto Rico that contribute approximately 80,000 megawatts (MW) to our nation’s electrical capacity.

Hydropower pros and cons

- **Advantages:**
- Once a dam has been built and the equipment installed, the **energy source—flowing water—is free**.
- It's a **clean fuel source** renewed by snow and rainfall.
- Hydropower plants can supply **large amounts of electricity,** and they are relatively easy to adjust for demand by controlling the flow of water through the turbines.
- **Disadvantages**: Big dam projects can **disrupt river ecosystems** and surrounding communities, harming wildlife and forcing out residents.
- The Three Gorges Dam, for example, displaced an estimated 1.2 million people and flooded hundreds of villages.
- Dams also prevent fish (**salmon) migration**
- Hydropower plants can also cause low dissolved oxygen levels in the water
- https://www.nationalgeographic.com/environment/global-warming/hydropower/

- The **promise of carbon-free electricity** from hydropower has been **undermined by revelations** that decaying organic material in **reservoirs releases methane, a potent greenhouse gas**.
- **Small hydro projects:** can take advantage of existing water flows or infrastructure.
- Special water intakes and turbines can help make sure water released from a **dam is better aerated** to address the problem of low dissolved oxygen.
- Dams planned **more strategically** to **allow fish passages**, for example, while water flows at existing dams can be calibrated to give ecosystems more recovery time from flooding cycles.
- More research on ways to make hydropower projects more friendly to the ecosystems around them.
- **A growing movement: tear down dams** that **are no longer functioning or needed around the world**, with the aim at restoring more natural rivers and the many benefits they provide to wildlife and people, including recreation.