Origins of Coal

Coal begins forming 360 million to 290 million years ago

Tectonic movements buried plant material from swamps and peat bogs, which were covered under silt and sediments, often to great depths. With burial, the plant material was subject to high temperatures and pressures. This caused physical and chemical changes in the vegetation, transforming into peat and then into coal.

Initially, the peat was converted into lignite or ‘brown coal’ and over many more millions of years, the continuing effects of temperature and pressure produced further changes in the lignite, transforming it into the range known as ‘sub-bituminous’ coals. Further chemical and physical changes occur until these coals become harder and blacker, forming the ‘bituminous’ or ‘hard’ coals. Under the right conditions, the process can continue until anthracite is formed.

Types of Coal

Metallurgical Coal

Metallurgical coal is the oldest, hardest and cleanest burning type of coal and is essential to steel production. 1 billion tonnes are produced worldwide each year with Canada contributing 30 million tonnes to that total. Western Canada is home to some of the largest and highest-quality steel-making coal deposits in the world. Close proximity to the west coast allows for convenient transport to seaborne markets around the world.

Thermal Coal

Thermal coal burns less efficiently than its metallurgical counterparts, but will still remain the largest source of electricity generation worldwide through to 2040. 41% of the world’s electricity comes from thermal coal and 6.7 billion tonnes are produced each year. Thermal coal is expected to increase its share in ASEAN nations power generation from 32% today to 43% in 2040 but will use high-efficiency supercritical or ultra-supercritical technology to reduce emissions.

Coal promises to have a place in the global energy mix for years to come. The industry is an economic driver for Canada and gainfully employs tens of thousands of Canadians both directly and indirectly.

With its rich history of innovation in natural resource development, Canada should continue to invest in clean coal technology that can be used locally and around the world.

Coal is not the problem - emissions are - so all of our future focus should be concentrated on supporting and promoting a better way to use coal.

We can find the right balance between protecting our environment and our economy. There is no need to sacrifice one for the other.
Uses of Coal

- Global steel production is dependent on coal:
  - 74% of steel produced today uses coal.
  - Metallurgical coal - or coking coal - is a vital ingredient in the steel-making process.
- World crude steel production was 1.6 billion tonnes in 2017.
- Steel is an alloy based primarily on iron. As iron occurs only as iron oxides in the earth's crust, the ores must be converted reduced, using carbon. The primary source of this carbon is coking coal.
- Around 98% of iron ore is used in steel-making. During the iron-making process, a blast furnace is fed with iron ore, coke and small quantities of fluxes (minerals such as limestone which are used to collect impurities).

The Future of Coal

- Carbon Capture
  - HELE technologies are important as a key first step towards the deployment of carbon capture, use and storage technology (CCUS). HELE plants reduce the volume of CO₂ to be captured and hence the capacity of the capture plant required and the quantity of CO₂ to be transported and sorted.
    - Identified as critical to meeting targets of Paris Agreement by IPCC and IEA.
    - Applies to many industries - steel, chemicals, cement, fertilizers, pulp & paper, coal and gas-fired power generation.
    - The Global CCS Institute says 2000 CCS facilities need by 2040 - currently about 20 in operation.
    - Canada home to the world's first coal-fired generation CCS plant - Boundary Dam 3.