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Brief 4

Sustainable Nuclear Power Development

Nuclear power use is increasing globally because of nuclear power's potential to aid development by providing a cleaner energy. As countries develop, energy consumption increases, which increases greenhouse gases (GHG) emissions. Nuclear power, unlike fossil fuels, emits nearly zero GHG on a complete lifecycle analysis, and it uses less land than renewables. Nuclear power use is increasing worldwide; which, joined with energy conservation and renewable energy development, provides for a sustainable energy future.

Sustainable development of nuclear energy depends on its inherent safety, competitiveness, and efficient use of natural resources. New generations of nuclear power plants strive to be "passively safe" by using the laws of physics to power safety systems. Integral primary system reactors increase safety by simplifying technology. If a reactor has fewer components, then fewer things can break, which not only better protects against foreseeable events, but also unforeseeable events. Simplifying technology increases efficiency and decreases cost. For example, small modular reactors lower the cost of reactors from several billion dollars to less than \$1 billion. Technological advancements lead to more efficient uses of natural resources. For example, liquid salt-cooled reactors use liquefied salt instead of water to cool reactors, decreasing amounts of waste water.

Problems with nuclear power include large upfront costs, nuclear waste management, and public hesitation; but in the end, nuclear power is still a viable energy option. Nuclear power has high capital costs, but it also has high capacity. Nuclear power fuel costs less than fossil fuels, which increases its competitiveness. Nuclear waste management has many technical problems

and lacks public policy solutions. However, while both types of waste are radioactive, nuclear waste needs less storage space than fossil fuel waste. Increased inherent safety of nuclear power and waste management solutions can overcome public hesitation.