

# NUCLEAR POWER

## *Resurgence, Status Quo or Collapse?*

### *2007 - 2030*

#### **BACKGROUND**

Heightened concern over climate change, sustained high fossil fuel prices and growing international acceptance have each contributed to calls for a resurgence of nuclear power in the United States. The Bush Administration is giving nuclear energy a prominent place in its domestic and international energy policies. These include a continuation of the relicensing of nuclear plants for 20 years beyond their originally-designated 40-year life, encouragement for the construction of new nuclear units, and the exportation of US nuclear power technology abroad (e.g., to India). Yet opponents cite concerns of waste disposal, safety, terrorism, and point to nuclear power as simply uneconomic without vast federal government subsidies. Moreover, in a period of slowing baseload generating demand, the enormous capital costs associated with nuclear power could carry significant investment risk.

The specific course of action the US will take is highly uncertain, and the realistically potential outcomes range from “significant expansion” to “accelerated closure.” The passage of time will soon force the US to select a definitive policy regarding nuclear power’s role in our energy future. This will be a hotly contested issue, with implications reaching far beyond the obvious “nuclear power v. environmentalist” confrontation, to a debate significantly impacting fossil fuel and renewable energy users and suppliers.

The purpose of this report is to forecast the implications of different nuclear futures on electricity generation, fuel production, and environmental air emissions. With regard to electricity generation, different nuclear outcomes produce vastly diverse consequences for coal, natural gas, and renewable power generation. This alteration of the power generation mix has strong repercussions for suppliers of coal, natural gas, and renewables. Finally, adding or subtracting nuclear power in the generation equation can either force a change in the environmental standards that are set, or strongly affect the ease or difficulty in meeting the increasingly stringent standards that appear almost certain to be coming.

The objective of this report is accomplished by identifying three very different scenarios reflecting the broad range of possible nuclear outcomes. These scenarios and the conditions that create them are described below.

◆ ***Significant Expansion*** – This case envisions considerable growth in nuclear power generation over the next several decades. Much of the impetus behind this growth is provided by a serious US policy aimed at reducing greenhouse gases and the conclusion that nuclear power provides the most feasible alternative for doing so while not impairing economic progress. Even though coal prices decline under competitive pressure, the nuclear option is the more viable economic choice in most regions. Public opinion shifts to moderately supporting nuclear power based on both these environmental and economic considerations. Moreover, the growing realization that vast nuclear expansions in China, India, and Russia have already “let the genie out of the bottle” serves to reinforce the perspective that there is little the US can do to contain nuclear power by its own policies. With this as a backdrop, the nuclear option receives strong political and economic

support from the federal government as it pursues investment incentives for the nuclear industry, and preempts state objections to the transportation and disposal of nuclear waste. A major issue addressed in this scenario is the examination of what limits, if any, there will be on nuclear power expansion.

◆ **Status Quo** – This is effectively the “middle ground” case with regard to nuclear power development, whereby the decision is made to maintain nuclear power’s roughly 20% contribution to total US electricity generation. While this represents a “status quo” in terms of market share for nuclear power, it does in fact allow nuclear generation to rise in conjunction with increasing electricity demand over time. The driving force behind this policy is “energy diversity”---the argument that each source of power generation carries with it positives and negatives, but we can neither afford to eliminate any option nor over-rely on any single energy source to meet our needs. This case reflects a broad based effort to balance all of our energy alternatives---coal, natural gas, renewables, and nuclear---as well as to reduce electricity demand growth. The consequences for nuclear power in this instance are that new nuclear plants will be constructed throughout the next several decades in order to maintain nuclear’s designated contribution to the generation mix, but that its growth will be capped by the energy diversity policy.

◆ **Collapse** – This scenario emphasizes skepticism among both policy-makers and the public at large regarding nuclear power that ultimately manifests into policies of prohibiting new nuclear unit construction and denying relicensing to units that have not already been approved. These policies could come about by any number of developments, ranging from a lively national debate that results in the conclusion that nuclear waste disposal cannot be achieved (politically or technologically), to a nuclear accident or successful terrorist attack on a nuclear facility either in the US or abroad that so radically turns US public opinion against nuclear power that there is no political alternative available to decision-makers other than to permanently close out this option.

***It’s a Carbon Constrained World.*** All three scenarios are analyzed in the realistic context of mandatory, increasingly stringent nationwide CO2 requirements beginning in 2015. This is a key assumption, because in each of the three cases, a vastly diverse array of CO2 control strategies must be developed based on the different generation mix that prevails in each scenario.

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