DOWNLOAD PDF INSURMOUNTABLE RISKS

Chapter 1 : Risks for a company to creating and maintainnig a website

Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Change, produced by the non-profit Institute for Energy and Environmental Research (IEER), documents accident, proliferation and contamination threats associated with reviving the nuclear industry as part of efforts to reduce greenhouse gas emissions.

Hiring of additional employees As mentioned above, a feasibility study is often at the core of launching a business. It can be the key to launching a successful start-up, as it helps to underline the future pain points and to determine whether the plan is viable in the first place. Overall, a feasibility study is the perfect tool for situations where the impact is likely to be big in terms of operational or economic significance. Gumpert nailed the essential importance of a feasibility study in his book How to Really Create a Successful Business Plan. When discussing the possible failure of a feasibility study i. While these are often all required for conducting a study, you might sometimes focus mostly on a single element or a combination of a few of them. This part of the feasibility study should answer the following questions: What is the proposed product or service? Is the product or service already on sale? If not, how far is it from an existing marketplace and what will the introduction cost? How can you protect the product or service from the competition? What are the strengths of the product or service? What are the main benefits to customers or users? What resources are required for producing or providing it? How capable is the organization to acquire these resources? What are the regulatory standards surrounding the product or service and its use? Remember the above questions can be used when you are introducing a new product or launching a business, but also if you are implementing a new product or service within your organization. For instance, if you are introducing new software, you must understand the strengths of it, as well as the resources required for implementing it. Market feasibility should answer the following questions: What market segments are you targeting? Why would people buy the product or service? Who are the potential customers and how many of them are there? What are the buying patterns of these potential customers? How will you sell the product or service? Who are your competitors? Including past, current and future competitors. What are the strengths and weaknesses of your competitors? The above essentially points out to the importance of conducting market research as part of your feasibility study. Market feasibility is an important part of a feasibility study when the plan of action deals with issues such as business expansion, new product or service launch, product development and starting up a business. The questions that require answering as part of the commercial feasibility study include: What are the strengths and weaknesses of your business? What are the potential sales volumes of the product or service? What are the sensitivity points for your business in terms of sales? What is the ROI? Furthermore, if you are conducting a feasibility study as part of launching a business, you also need to answer the following questions: How long can your business survive without a sale? How long before you break even with the product or service? How much money is required to start operating? Will your organization require external finance? While the above points are mainly important for new businesses, any organization can benefit from thinking about them when launching a new operation. For example, if you are adding a new product line to your business, you should use the above questions as a guide to understanding the implications to your other operations and the financial viability of the new product. The overall risk assessment part of a feasibility study examines the different ways your organization can reduce the risk of embarking on the new action. The overall risk assessment should answer the following questions: What are the major risks associated with the operation? What is the survival outlook for each of the above risks? How sensitive are the profits? What are the best ways to minimize these risks? The aim is to try to cover all the possibilities and create a risk assessment map, which deals with the probability of the risk and the impact it would have on the business. For instance, consider your business is conducting a feasibility study in order to hire a new employee. One risk might deal with the possibility the hire is an inadequate fit and leaves after six month trial period. For example, the cost of a bad hire could be low due to your recruitment strategy or the position not being essential for operations. This is how you can create your own risk assessment map. In addition, if you are launching a new business, the overall risk assessment should also consider one final question. Self-sufficiency is crucial for business success, as having to borrow

can hinder the long-term survivability of your business. Nonetheless, it is an important aspect to keep in mind, as it deals with the impact of acquiring a new business. This is not only relevant to new businesses, as your organization might acquire a new business as part of its growth strategy. The purpose of this final element is to study whether purchasing an existing business is a sound investment to make. It requires your organization to answer questions such as: Why is the current owner selling the business? What is the competition like? What is the valuation of the assets included in the sale? What are the advantages and disadvantages of the current business location? Is your organization continuing operations in the same premises or not? This is essentially a pre-screening of the proposed action and it examines whether a proper feasibility assessment is worth the time and money. For example, before you conduct a feasibility study on the viability of acquiring a business, you want to check quickly the overall attainability of the action. Preliminary assessment should consist of the following steps: First, you want to outline the planned idea or action. This means looking at what you are looking to achieve and why. Second, you should examine the market space and the commercial viability of the action. You want to get an overall feel of what type of customers are you potentially attracting. Third, you should examine the unique characteristics of the idea and whether they are strength or a weakness. The idea or action might have certain unique characteristics i. Fourth, you need to determine if there are insurmountable risks to the action. Keep in mind the above is just to get an overall feel of the idea. Outlining the project scope and conducting current analysis Next, you should move on to outlining the project scope by defining the area of study for the feasibility study. Do you need to look at all five elements of the study, for example? The scope must be detailed and outline the objectives of the feasibility study clearly. Actions, such as hiring new personnel to a single department, can sometimes have an impact on sectors that might not immediately seem obvious. The key to outlining the scope is about understanding the different participants and end-users of the proposed idea or action. Finally, you also need to analyze the current situation prior to the implementation of the idea or action. You can do so by describing the weaknesses and strengths of the business. Whether you are implementing a new software or equipment or launching your own new product, you need to compare the proposed product or service with other similar items on the market. This might mean you need to compare the feasibility of your chosen software for example, accounting platform with other products on the market. What are the benefits of your proposed choice and what are the weaknesses? Are the risks associated with your chosen software smaller or bigger than those of competitive products? The same analysis applies when launching a new product. Part of your feasibility study must then focus on understanding what the customers are looking for and whether your proposed idea answers these needs. You should also compare the proposed product with the existing products or services and focus on the advantages, as well as disadvantages, you might have. Examining the market conditions You also need to examine the market conditions. There are four specific points when it comes to the analyzing market in terms of feasibility. Defining the target market. Studying the buying habits of the target market. Understanding the sale and market share outlook of the proposal. Outlining the product awareness required for the use of your product or service. The main goal of this part of the feasibility study is to understand the revenue projection for implementing the proposed idea or action. You want to have a realistic understanding of the kind of sale numbers you can expect and the scope of the promotional activities you are required to undertake. For example, in terms of product or service awareness, you must be able to determine the type of marketing required for potential customers to understand and be able to use the item. Understanding the financial costs One of the most important steps for concluding a feasibility study involves calculating the financial costs related to the proposal. No matter what type of idea or action your organization is considering, the financial cost of it can be the major point in determining its viability.

Chapter 2 : Book Review â€“ Insurmountable Risks Â« No2NuclearPower

This booklet summarizes the main findings and conclusions from Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Change by Brice Smith, Ph.D. published by IEER Press.

Regulation of business continues to grow, punctuated by landmark laws that have re-shaped the financial services the Dodd-Frank Act and health care the Affordable Care Act industries in the United States. Further, federal regulators have substantially ramped up their enforcement of numerous existing laws such as the Foreign Corrupt Practices Act and those governing insider trading. Corporations are dedicating greater resources towards internal compliance, both within legal departments and increasingly in separate and independent compliance functions. While investment in internal compliance structures often benefits the firm â€" most importantly, by reducing potential liability â€" its costs also merit scrutiny. These costs go beyond expenditures on compliance personnel, monitoring and reporting systems, and employee training. If firms perceive compliance-based obligations as unrealistic and insurmountable, they may very well turn way from good faith efforts to comply and work to evade regulation. Risk management is a proactive decision-making process that firms pursue in anticipation of key decisions or problems. Application of risk management to compliance requires an understanding that compliance is a non-binary, dynamic, and bounded choice. Rather, firms exist in various gradations of compliant and non-compliant states. Firms can also be fully compliant without any deviation. Firms thus face a sliding scale of choices when choosing to conform to a rule. Further, compliance is a dynamic system. Compliance requirements â€" even for sweeping regulatory mandates â€" are not consistent across different firms. Each company faces its own regulatory mix from which arise the collective compliance obligations of the enterprise. Small companies may be exempt from obligations that large multinational corporations must follow. Firms in different industries may require specialized compliance capacity to respond to industry-specific regulatory mandates. How firms comply also changes as the compliance function matures in the organization. Firms will generally seek compliance with the regulations that are least costly to follow or have the greatest return on their investment. Gains in compliance become increasingly costly as firms need more complicated and extensive investments to achieve more complete states of compliance. Finally, compliance is bounded by human limitations that arise even before a given rule becomes enforceable. A legislature or a regulator may craft a rule that is particularly ambiguous or complex. Such suboptimal drafting may be the result of an inaccurate assessment of the consequences of such regulation, a lack of sufficient time and resources, or deliberate vagueness created in order to ensure amenability to political interests. From the moment the rule is enacted, it is already embedded with imperfections that make full compliance unknowable. A firm seeking to minimize compliance-related risks must deal with all of these challenges. Technical efficiency is the ability of a firm to produce a level of output with a minimum quantity of input. Such inputs include capital, labor, and equipment used in a fashion that does not waste resources. Investments in human resources, information technology, auditing, legal, and other compliance-related activities reduce exposure to risk from non-compliance. An allocatively efficient state of compliance is one that applies resources at the state-of-the-art level but also does so in a fashion that optimally balances cost and risk. While a technically efficient firm extracts maximum output from a given use of resources, an allocatively efficient firm represents the best possible use of a range of possible uses of resources. As the firm invests more in compliance, it moves up the TE curve from TEb toward TEi, with each unit of investment in compliance generating a proportionally greater return in the form of reduced compliance risk. Over time, as the metaphorical low hanging fruit of compliance is plucked, returns on compliance investments decline. Once the firm passes TEi, the cost of compliance increases at a marginal rate greater than the return it provides in reduced risk of non-compliance. Compliance investments at this state are not worth their return on investment to the firm. Moving from the most inefficient state at AEa, a firm pursues allocative efficiency along the diagonal line until it reaches AEi. At this point, the firm has minimized avoidable costs resulting from inefficient deployment of firm resources. By highlighting the consequences for a firm to comply in any given instance, our model shows how a firm decides to what extent to invest resources to

optimize the relative benefits of compliance to the firm relative to the cost of investing in compliance. Firms will more clearly see the strategic benefits of complying with law through a more risk-aware view of their compliance functions. Implications of the EIR Model The EIR model provides an analytical framework for addressing the effectiveness of different approaches to business regulation. It equips regulators with a dynamic understanding of how compliance functions respond to different kinds of regulatory mandates. We categorize regulatory rules as three basic archetypes of regulation. Direct Regulation consists of traditional command-and-control rules promulgated and enforced by government agencies through sanctions and penalties. Collaborative Regulation consists of hybrid public-private approaches to regulation that use non-coercive measures and often incorporate private standards. Market Contingent Regulation seeks to influence firm behavior by providing incentives or signals to regulated firms, such as market-leveraging taxes, fees, and permits and mandatory disclosure requirements. Through our model, we show how regulators can strategically use different combinations of Direct Regulation, Collaborative Regulation, and Market Contingent Regulation to compel more firm-efficient compliance and calibrate regulatory enforcement measures to public policy goals. Talesh, To Comply or Not to Comply:

Chapter 3 : How to Conduct a Feasibility Study the Right Way

insurmountable risks [Rachel's introduction: We are told we must build more nuclear power plants to halt global warming. It may sound persuasive at first -- until the Institute for Energy and Environmental Research (IEER) examines the numbers and reveals that nuclear power almost certainly cannot expand rapidly enough to make a real difference.

The risk with the greatest potential impact in was found to be a failure of climate change mitigation and adaptation. This is the first time since the report was published in that an environmental risk has topped the ranking. This year, it was considered to have greater potential damage than weapons of mass destruction 2nd , water crises 3rd , large-scale involuntary migration 4th and severe energy price shock 5th. The number one risk in in terms of likelihood, meanwhile, is large-scale involuntary migration, followed by extreme weather events 2nd , failure of climate change mitigation and adaptation 3rd , interstate conflict with regional consequences 4th and major natural catastrophes 5th. Such a broad risk landscape is unprecedented in the 11 years the report has been measuring global risks. For the first time, four out of five categories â€" environmental, geopolitical, societal and economic â€" feature among the top five most impactful risks. The only category not to feature is technological risk, where the highest ranking risk is cyberattack, in 11th position in both likelihood and impact. This diverse landscape comes at a time when the toll from global risks would appear to be rising. The number of people forcibly displaced in stood at Data from the report appears to support the increased likelihood of risks across the board, with all 24 of the risks continuously measured since having increased their likelihood scores in the past three years. In addition to measuring their likelihood and potential impact, the Global Risks Report also examines the interconnections among the risks. Here, data suggests a convergence may be occurring, with a small number of key risks wielding great influence. All five of the most interconnected pairs of risks in accounted for more interconnections than in Knowledge of such interconnections is important in helping leaders prioritize areas for action, as well as to plan for contingencies. Which panic button to press? Environmental risks have come to prominence in the global risks landscape in , despite the presence on the horizon of a large number of other, highly visible risks. Income disparity, which was highlighted by the report in , is this year reflected in the growing interconnections involving profound social instability and both structural unemployment and underemployment and adverse consequences of technological advances. This is widening the backdrop of uncertainty against which international firms will increasingly be forced to make their strategic decisions. Meanwhile, geopolitical instability is exposing businesses to cancelled projects, revoked licenses, interrupted production, damaged assets and restricted movement of funds across borders. These political conflicts are in turn making the challenge of climate change all the more insurmountable â€" reducing the potential for political co-operation, as well as diverting resource, innovation and time away from climate change resilience and prevention," said Cecilia Reyes, Chief Risk Officer of Zurich Insurance Group. One potential black swan event could be in the area of technological risk. While cyberattacks rise slightly in terms of likelihood and impact in , others, including failure of critical information infrastructure, appear to be declining as a risk in the eyes of experts. Technological crises have yet to impact economies or securities in a systemic way, but the risk still remains high, something that potentially may not have been fully priced in by experts. Our separate survey of business leaders assessing risks for doing business finds cyberattacks to be the top risk in no fewer than eight countries, including the USA, Japan, Germany, Switzerland and Singapore. International security in the spotlight In addition to assessing the likelihood and potential impact of 29 global risks, the Global Risks Report takes an in-depth look at how the global security landscape could evolve in the future. The report features the outcomes of a year-long study to examine current trends and possible driving forces for the future of international security. Through its analysis of the interconnections between risks, the report also explores three areas where global risks have the potential to impact society. Risks for doing business For the second year, the Global Risks Report also provides country-level data on how businesses perceive global risks in their countries. Unemployment and under-employment appears as the risk of highest concern for doing business in more than a fourth of the economies covered, and is especially featured as the top risk in two regions, sub-Saharan Africa and the

Middle East and North Africa. The only region where it does not feature in the top five is North America. Energy price shock is the next most widespread risk, featuring in the top five risks for doing business in 93 economies. Cyberattacks, mentioned above, feature among the top five risks in 27 economies, indicating the extent to which businesses in many countries have been impacted already by this rising threat. The Global Risks Report is available here.

Chapter 4 : An Efficient Investment-Risk Model of Compliance | CLS Blue Sky Blog

*Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Change [Brice Smith] on theinnatdunvilla.com *FREE* shipping on qualifying offers. The Institute for Energy and Environmental Research provides the public and policy-makers with thoughful.*

The dangers of using nuclear power to combat global climate change by Brice Smith. MIT suggests a global growth up to 1,GW by Since all existing reactors would be closed by then, it means 1, new reactors. Due to increases in demand nuclear power accounts for only In the US, where the largest share of nuclear construction is assumed to take place, carbon emissions from electricity production actually increase. The failure of nuclear power, so far, according to Smith, has been largely due to its inability to compete economically with coal and natural gas. The University of Chicago found that by the time the eighth plant is built â€" when cost savings due to learning would be complete â€" the cost of electricity would still remain higher that fossil fuels. But, of course, cost comparisons with fossil fuels are not the most useful when looking at the role nuclear power might play in mitigating the impacts of climate change. Combined with energy efficiency, wind power offers the most economically competitive way to provide carbon-free electricity supplies. One Americanism perhaps is where Smith discusses the advantages of CHP, and says the number of industries large enough to efficiently operate their own generators limits its potential. If so, then what about University campuses, shopping malls, hospitals, schools and so on. His section on fuel switching suggests using liquefied natural gas as a transition fuel in combined cycle gas turbines â€" whereas in Europe there is a growing body of opinion that using gas in this way without CHP would be criminally inefficient. A large increase in global nuclear capacity implies a proportional expansion of uranium enrichment. The diffusion of knowledge and the increase in trade in specialised materials and equipment would make it progressively more difficult to identify clandestine weapons programmes. It would take just 0. The number of reprocessing facilities required â€" given the inherent difficulty in attempting to safeguard large plutonium separation plant â€" would pose a huge proliferation risk. In a useful section which explains how advanced reprocessing technology might work, Smith says it might offer some non-proliferation benefits compared to current technology, but would still pose significant risks if deployed on a large scale. Dr ElBaradei has suggested they should be under international control. But similar initiatives have failed in the past, and are likely to be just as unacceptable today. A second unique vulnerability of nuclear power is the potential for catastrophic accident, or terrorist attack. The chapter on nuclear safety draws heavily on the work of David Lochbaum and the Union of Concerned Scientists. In other words, the accident rate is higher during the initial shakedown phase when the plant is new; then things settle down for a while, until ageing problems increase the likelihood of accidents again. Given the amount of cracking in various different components of UK reactors, this story offers a warning about the dangers of operators and regulators giving too much weight to commercial considerations. On new reactors Smith warns against curtailing public participation in the licensing process â€" US history shows that interveners have had a positive impact on safety. There is a useful section too on the various studies of the risk of terrorist attacks on spent fuel ponds. The flawed logic behind Probabilistic Risk Assessment is highlighted by the prediction that a Three Mile Island type accident would occur once every , years â€" made only five years before the partial meltdown. But even if these risk levels are correct, the global growth in reactor numbers proposed by MIT would produce an unacceptable accident frequency â€" with 4 core damage accidents by According to MIT, the worldwide deployment of GW of nuclear capacity would require a new Yucca Mountain sized nuclear dump to be opened somewhere every three or four years. But even without new reactors, the US will need a second dump by , if Yucca is to stick to the statutory limit. Smith emphasises the uncertainties regarding geological disposal and highlights a number of examples of errors in previous models used to support Department of Energy decision-making. In this Smith appears to be seeking to shift support away from reprocessing, MoX and fast reactors, which all have weapons proliferation implications, by showing that uranium resources are plentiful. A laudable aim, but unfortunately Smith does not appear to have addressed the argument made by Jan Willem Storm van Leeuwen about the increasing

amount of carbon emissions from uranium mining as we are forced to turn to poorer quality ores. Nevertheless this book would be a useful addition to any UK campaigners armoury. This briefing will help you respond by 15th March

Chapter 5 : Netflix Has 'Insurmountable' Lead: Credit Suisse | Investopedia

Insurmountable Risks: The Dangers of Using Nuclear Power to Combat Global Climate Change, Brice Smith, Institute for Energy and Environmental Research. The large number of reactors required for nuclear power to play any meaningful role in reducing greenhouse gas emissions greatly complicates the efforts required to deal with its unique vulnerabilities including the potential for.

We are told we must build more nuclear power plants to halt global warming. It may sound persuasive at first -- until the Institute for Energy and Environmental Research IEER examines the numbers and reveals that nuclear power almost certainly cannot expand rapidly enough to make a real difference. And if it did, it would create intractable problems of waste disposal and the spread of A-bombs worldwide. While there are significant uncertainties, the possible outcomes of global warming are so varied and potentially so severe in their ecological and human impacts that immediate precautionary action is called for. Compared to fossil fuels, nuclear power emits far lower levels of greenhouse gases even when mining, enrichment, and fuel fabrication are taken into consideration. The most important practical consideration, rarely addressed in the debate, is this: We have considered in detail two representative scenarios for the future expansion of nuclear power. The assumed worldwide growth rate of electricity is the same for both, 2. Nuclear growth scenarios The first scenario was taken from a study from the Massachusetts Institute of Technology. To give a sense of scale, this proposal would require one new reactor to come online somewhere in the world every 15 days on average between and Despite the increase in nuclear power envisioned under the global growth scenario, the proportion of electricity supplied by nuclear power plants would increase only slightly, from about 16 percent to about 20 percent. As a result, fossil fuel-fired generation would also grow and the emissions of carbon dioxide, the most important greenhouse gas, from the electricity sector would continue to increase. In order to consider a more serious effort to limit carbon emissions through the use of nuclear power, we developed the "steady-state growth scenario. Considering a range of assumptions about the future contribution of renewables and natural gas fired plants, we found that between 1, and 3, GW of nuclear capacity would be required to hold emissions constant. For simplicity we used 2, GW as the alternative case study. This scenario is roughly equivalent to assuming that nuclear plays about the same role in the global electricity sector in the year as coal does today in the United States. In order to significantly reduce carbon dioxide emissions, nuclear power plant construction would have to be more rapid than one a week. We have not considered such scenarios, since the dangers of using nuclear energy to address greenhouse gas emissions are amply clear in the two scenarios discussed here. Evaluating the scanarios Given that both time and resources are limited, a choice must be made as to which sources of electricity should be pursued aggressively and which should not. The best mix of alternatives will vary according to local, regional, and country-wide resources and needs. In making a choice, the following should serve to help guide the selection: The options must be capable of making a significant contribution to a reduction in greenhouse gas emissions, with a preference given to those that achieve more rapid reductions; 2. The options should be economically competitive to facilitate their rapid entry into the market; and, 3. The options should minimize other environmental and security impacts and should be compatible with a longer term vision for creating an equitable and sustainable global energy system. It is within this context that the future of nuclear power must be judged. Security The largest vulnerability associated with a large expansion of nuclear power is likely to be its connection to the potential proliferation of nuclear weapons. Reprocessing the spent fuel would add significantly to these security risks see below. Proposals to reduce the risks of nuclear weapons proliferation are unlikely to be successful in a world where the five acknowledged nuclear weapons states seek to retain their arsenals indefinitely. The institutionalization of a system in which some states are allowed to possess nuclear weapons while dictating intrusive inspections and restricting what activities other states may pursue is not likely to be sustainable. Safety The potential for a catastrophic reactor accident or well coordinated terrorist attack to release a large amount of radiation is another unique danger of nuclear power. Such a release could have extremely severe consequences for human health and the environment. The so- called CRAC-2 study conducted by Sandia National Laboratories

estimated that a worst case accident at an existing nuclear plant in the United States could, for some sites, result in tens of thousands of prompt and long-term deaths and cause hundreds of billions of dollars in damages. As summarized by Peter Bradford, a former commissioner of the U. First, the questions of completeness and how to incorporate design defects are particularly difficult to handle. Second, concerns arise due to the fact that nuclear power demands an extremely high level of competence at all times from the regulators and managers all the way through to the operators and maintenance crews. Finally, the increased use of computers and digital systems create important safety tradeoffs, with improvements possible during normal operation, but with the potential for unexpected problems to arise during accidents. In light of the uncertainties inherent in risk assessments, William Ruckelshaus, the head of the U. From this, the probability of such an accident occurring is estimated to be between 1 in 8, and 1 in per year. The possibility that public opinion could turn sharply against the widespread use of nuclear power following an accident is a significant vulnerability. If nuclear power was in the process of being expanded, public pressure following an accident would leave open few options. On the other hand, if long-term plans to phase out nuclear power were already being carried out, there would be far more options available and those options could be accelerated with less disruption to the overall economy. Spent Fuel There is also the difficulty of managing radioactive waste. The existence of weapons-usable plutonium in the waste complicates the problem. While the management of low-level waste will continue to pose a challenge, by far the largest concern is how to handle spent nuclear fuel. Complicating this task are the long half-lives of some of the radionuclides present in the waste for example: Through , the global growth scenario would lead to nearly a doubling of the average rate at which spent fuel is generated, with proportionally larger increases under the steady-state growth scenario. Assuming a constant rate of growth, a repository with the capacity of Yucca Mountain 70, metric tons would have to come online somewhere in the world every five and a half years in order to handle the waste that would be generated under the global growth scenario. For the steady-state growth scenario, a new repository would be needed every three years on average. The characterization and siting of repositories rapidly enough to handle this waste would be a very serious challenge. Yucca Mountain has been studied for more than two decades, and it has been the sole focus of the U. Department of Energy DOE repository program since In fact, in February , Secretary of Energy Samuel Bodman admitted that the DOE can no longer make an official estimate for when Yucca Mountain might open due to ongoing difficulties faced by the project. Internationally, no country plans to have a repository in operation before , at the earliest, and all repository programs have encountered problems during development. Even if the capacity per repository is increased, deep geologic disposal will remain a major vulnerability of a much-expanded nuclear power system. Alternatives to repository disposal are unlikely to overcome the challenges posed by the amount of waste that would be generated under the global or steady-state growth scenarios. Proposals to reprocess the spent fuel would not only not solve the waste problem, but would greatly increase the dangers. Reprocessing schemes are expensive and create a number of serious environmental risks while still generating large volumes of waste destined for repository disposal. In addition, reprocessing results in the separation of weapons-useable plutonium, adding significantly to the risks of proliferation. Under the global growth scenario, the authors of the MIT study estimate that more than metric tons of separated plutonium would be required annually to supply the required MOX mixed-oxide fuel. Just one percent of this commercial plutonium would be sufficient to produce more than nuclear weapons every year. The authors of the MIT study acknowledge the high cost and negative impacts of reprocessing and, as such, advocate against its use. Instead they propose interim storage and expanded research on deep borehole disposal. It is possible that deep boreholes might prove to be an alternative in countries with smaller amounts of waste. The concept for mined geologic repositories dates back to at least However, turning this idea into a reality has proven quite difficult, and not one spent fuel rod has yet been permanently disposed of anywhere in the world. Costs Nuclear power is likely to be an expensive source of electricity, with projected costs in the range of six to seven cents per kilowatt-hour kWh for new reactors. Table 2 show estimates of cost per kilowatt- hour. While a number of potential cost reductions have been considered by nuclear power proponents in the United States, it is unlikely that plants not heavily subsidized by the federal government would be able to achieve these. This is

particularly true given that the cost improvements would have to be maintained under the very demanding timetables set by the global or steady-state growth scenario. Promising Alternatives A number of energy alternatives that are economically competitive with new nuclear power are available in the near to medium term. Of the available near-term options for reducing greenhouse gas emissions, the two most promising ones in the United States and other areas of the Global North are increasing efficiency and expanding the use of wind power at favorable sites. At approximately four to six cents per kWh, wind power at favorable sites in the United States is already competitive with natural gas or new nuclear power. With the proper priorities on upgrading the transmission and distribution infrastructure and changing the way the electricity sector is regulated, wind power could expand rapidly in the United States. In fact, without any major changes to the existing grid, wind power could expand to 15 to 20 percent of U. Improvements in energy efficiency could continue to be made in the medium term as well. For example, as the current building stock turns over, older buildings could be replaced by more efficient designs. In addition, the utilization of wind power, thin-film solar cells, advanced hydropower at existing dams, and some types of sustainable biomass could allow renewables to make up an increasingly significant proportion of the electricity supply over the medium term. This expansion of renewables could be facilitated through the development of a robust mix of technologies, the development of strengthened regional grids to help stabilize the contribution of wind and solar power through geographic distribution, the use of pumped hydropower systems to store excess electricity during times of low demand, and the tighter integration of large scale wind farms with natural gas fired capacity. In addition, the current fossil fuel based energy system is very expensive to maintain. Transition technologies Energy efficiency and renewable energy programs have few negative environmental or security impacts compared to our present energy system and, in fact, have many advantages. As a result, these options should be pursued to the maximum extent possible. However, in order to stabilize the climate, it appears likely that some energy sources with more significant tradeoffs will also be needed as transition technologies. The two most important transition strategies are increased reliance on the import of liquefied natural gas LNG and the development of integrated coal gasification plants IGCC-integrated gasification combined cycle with sequestration of the carbon dioxide emissions in geologic formations. Compared to pulverized coal plants, combined cycle natural gas plants emit about 55 percent less CO2 for the same amount of generation. If efficiency improvements and an expanded liquidification and regasification infrastructure can stabilize the long-term price of natural gas at the cost of imported LNG, then the use of combined cycle natural gas plants is likely to remain an economically viable choice for replacing highly inefficient coal fired plants. The use of coal gasification technologies would greatly reduce the emissions of mercury, particulates, and sulfur and nitrogen oxides from the burning of coal. However, for coal gasification to be considered as a potentially viable transition technology, it must be accompanied by carbon sequestration, the injection and storage of CO2 into geologic formations. Experience in the United States with carbon dioxide injection as part of enhanced oil recovery has been gained since at least In addition, the feasibility of sequestering carbon dioxide has been demonstrated at both the Sleipner gas fields in the North Sea and the In Salah natural gas fields in Algeria. While the costs of such strategies are more uncertain than those of other mitigation options, estimates for the cost of electricity from power plants with carbon sequestration still fall within the range of six to seven cents per kWh. Some of the most troubling aspects of coal, such as mountain top removal mining, would be mitigated by the reduction in demand due to increased efficiency and the rapid expansion of alternative energy sources. In addition, it appears likely that coal gasification and carbon sequestration would be better suited to the Western United States given the greater access to oil and gas fields which have already been explored and which offer the potential for added economic benefits from enhanced oil and gas recovery. On the other hand, the Eastern United States would appear better suited for an expanded use of LNG during the transition given the existing regasification capacity, the well developed distribution system, and the shorter transportation routes from the Caribbean, Venezuela, and Western Africa. The continued use of fossil fuels during the transition period will have many serious drawbacks. However, these must be weighed against the potentially catastrophic damage that could result from global warming and against the unique dangers that accompany the use of nuclear power. To trade one uncertain but potentially catastrophic health, environmental and security

threat for another is not a sensible basis for an energy policy. No energy system is free of negative impacts. The challenge is to choose the least bad mix of options in the near to medium term while achieving significant global reductions in CO2 emissions, and to move long term toward the development of a sustainable and equitable global energy system. Conclusions Just as the claim by Atomic Energy Commission Chairman Lewis Strauss that nuclear power would one day be "too cheap to meter" was known to be a myth well before ground was broken on the first civilian reactor in the United States, and just as the link between the nuclear fuel cycle and the potential to manufacture nuclear weapons was widely acknowledged before President Eisenhower first voiced his vision for the "Atoms-for-Peace" program, a careful examination today reveals that the expense and vulnerabilities associated with nuclear power would make it a risky and unsustainable option for reducing greenhouse gas emissions.

Chapter 6 : insurmountable risks | Download eBook PDF/EPUB

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Chapter 7 : What are the top global risks for ? | World Economic Forum

Insurmountable Risks: The dangers of using nuclear power to combat global climate change by Brice Smith. A report for the Institute for Energy and Environmental Research Books on nuclear power don't always easily cross the Atlantic, but this one is going to be invaluable.