

BATTLEFIELD SUNRISE: RENEWABLE ENERGY SOURCES LEGAL STATUS EXAMINED UNDER THE LAWS OF ARMED CONFLICT

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A key feature which helps to make these energy sources resilient is that they are renewable: they harness the energy of sun, wind, water, or farm and forestry wastes, rather than that of depletable fuels. ¹

I. INTRODUCTION—Energy Security and National Defense

America has turned its attention on to the importance of energy security and military commanders and defense planners should take note. Amidst rolling brownouts, bankruptcies and record breaking gasoline prices lies a radically different battlefield of the future. New energy technologies are emerging that will supplement and possibly someday replace centralized power generation. “Green Energy” and “Off-Grid” are the buzz-words. They are used to describe the rapid developments occurring in the renewable energy sector. This Article addresses the energy security issues that are evolving alongside new energy technology developments and argues that Regenerative Energy Sources (RES or renewable energy sources) are prohibited from military attack under the Laws of Armed Conflict.

II. SUNRISE—Emergence of Renewable Energy Resources on the Battlefield

The Scenario. The sun rises with a crisp orange glow over the desert sands as HAMMER 01 and 02 cut a path through the sky.² Radios crackle with the code words CLEARED HOT.³ Immediately the aircraft bank in formation to roll in on their targets. JDAM missiles,⁴ loosed from the rails, rocket downward toward their prey. As the FAST MOVERS⁵ egress the target

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¹ See AMORY B. LOVINS AND L. HUNTER LOVINS, BRITTLE POWER—ENERGY STRATEGY FOR NATIONAL SECURITY, 366 (1982) (providing a comprehensive study of renewable resources in relation to national security).

² HAMMER 01 and 02 are standard U.S.A.F. Call Signs for Strike Aircraft (e.g. F-15E Strike Eagle).

³ CLEARED HOT is a standard U.S.A.F. Radio Brevity Code Word authorizing tactical weapons release.

⁴ JDAM—JOINT DEFENSE AERIAL MUNITION is a standard U.S. Department of Defense Stand Off Weapon System. Weapon is highly effective against point targets and is likely to have similar lethality against a Photovoltaic System.

⁵ FAST MOVERS is a standard U.S.A.F. Radio Brevity Code Word for Small Fast Moving Fighter Aircraft.

area, the pilots watch from a safe distance as the small white puffs home in on a dazzling rainbow of light reflected off one of the world's largest photovoltaic systems.⁶ SHACK.⁷ A combat strike on the enemy's power generation infrastructure.

The Targets—PV systems. Power generation equipment that converts sunlight into electricity. These systems have a multifunctional purpose. They provide “clean energy” (power generation that does not emit harmful atmospheric emissions), while also offering an independent and decentralized (also referred to as stand-alone or “off-grid”) means of supplying energy resources to remote targets.

Photovoltaic (PV) systems and their sister technologies—hydropower plants, wind farms, and biomass facilities—are more commonly known by their names Regenerative Energy Sources (RES), Renewable Resources, Renewable Energy, or just Renewables.⁸ They are systems designed to capitalize on resources that provide a virtually unlimited supply of energy (e.g. the sun) and they are at the top of the list of new technologies designed to promote “sustainable” development—development that allows for growth of future generations.

The heated political discussions over international climate control and America's energy crisis have placed these technologies back in the press headlines.⁹ Deregulation has carved them a market niche. Blackouts have increased consumer demand. Competition has generated price declines.¹⁰ And successful renewables project developments have proved their economic viability in modern energy markets. Today the increasing number of wind farms seen on the Texas horizon and solar panels seen on German rooftops is a trend seen worldwide.¹¹

Although RES systems—particularly PV systems—carry high capital costs to build and install, their popularity and acceptance by the public is on the rise. Market competition is fierce in some energy supply sectors, but the production lines of even smaller companies such as SOLON AG of Berlin, Germany, a producer of solar modules, are tapped out by demand. More and more renewables systems are being incorporated into building structures and community power supplies.¹² Defense planners must therefore consider the impact these new energy technologies may have on future military operations.

⁶ For general information regarding Photovoltaic Systems and Building Integrated Photovoltaic design see SOLON AG for Solar Technology Web Site at <http://www.solonag.com> (last visited Apr. 1, 2001).

⁷ SHACK is a standard U.S.A.F. Radio Brevity Code Word used by pilots to describe high probability of munitions impact on a Target's Designated Mean Point of Impact (DMPI).

⁸ Renewable Energy Resources (RES) are sometimes referred to as „Alternative Energy,“ though that term is more appropriately descriptive of such energy resources as synthetic fuels and fuel cells. For a general market assessment of renewables see Fritz Vahrenholt, *Global Market Potential for Renewable Energies*, SHELL SOLAR (1998), available at <http://www.deutsche/shell.de/> (last visited Mar. 9, 2000).

⁹ See, e.g., William P. Hirshman, *California Screaming—Deregulation's Short Circuit may be PV's Gold Mine*, 2 PHOTON INTERNATIONAL 22, Feb. 2001 available at <http://www.photon-magazine.com/> (last visited Apr. 1, 2001) (discussing increased demand for energy from the renewables sector).

¹⁰ See *Water Agencies Pitch in to Combat Energy Crisis; Assistance in Purchasing Alternative Power Sources Announced*, Business Wire, Business Editors and Utilities Writers, Association of California Water Agencies-Utility Service Agency (ACWA-USA), Dan Smith or Jennifer Persike-Becker, 916/441-4545, available at <http://www.businesswire.com/> (last visited Apr. 1, 2001) (discussing increase in demand for renewables in California market specifically stating that “Harza Energy, [sic] will supply 30 and 60 kW microturbines to member water agencies at a discounted price. Costs will range from \$22,000 to \$26,000 per 30 kW unit.”)

¹¹ See Kevin Fullerton, *Winds of Change*, Vol. 19/34 AUSTIN CHRONICAL 22, Apr 21., 2000 (discussing increased growth of renewables in Texas particularly in the wind sector as a result of the Texas Legislature's Senate Bill 7 mandating increase of 2000 MW renewable energy by 2009). See also Robert Kahn, *Windboom bei den Ölbaronen [translated Wind Boom by the Oil Barons]*, 11 NEUE ENERGIE 64-67, (describing Texas as a leader in wind energy development).

¹² See Michael Zipf, *Surplus Energy from the Sun*, 5 DEUTSCHLAND—THE ENERGY REVOLUTION—THE DAWNING OF THE SOLAR AGE 62, 65, Oct./Nov. 2000 (noting that despite typically cloudy weather there is an increase in market demand for solar powered homes in Germany).

Most renewables systems are complicated to build, expensive to replace, and fragile. The PV systems described in the opening paragraph of this scenario are particularly SOFT TARGETS.¹³ They are primarily glass, with aluminum frames, soldered circuits, junction boxes, and hundreds of costly silicon based solar cells. Renewables systems like these provide an example of what could easily be destroyed by cruise missiles, general-purpose bombs, or even more effectively with cluster munitions. As targets of war they carry a high political cost. They are designed to protect the environment. Any strikes directed toward them are likely prohibited by international laws of armed conflict.¹⁴

III. ENVIRONMENTAL SECURITY—The Basis for Examining Legal Constraints

Renewable resources are closely linked to a variety of environmental, economic and energy security policies.¹⁵ The overlapping nature of these policies creates an unclear status for renewables during times of conflict. Analysis of the United Nations Charter, International Conventions, and the Laws of Armed Conflict shows that renewables should receive prohibited target status. The foundation for this protective status is based on the accepted fact that renewable resource development is purposed for the protection of the environment. In recent years the environment has become an important factor in military planning.

Although defense related strategies have historically rested on defending, attacking, or securing energy resources, they have only recently been viewed as critical to the environment.¹⁶ A number of peacetime and wartime events have helped increase the public concern for the military's impact on the environment.¹⁷ The fall of the Berlin wall sparked numerous U.S. base closures and revealed environmental damage caused by lax U.S. military standards. Across the globe, the withdrawal of troops from Eastern Europe uncovered environmental damage on an

¹³ SOFT TARGETS is a standard U.S.A.F. Radio Brevity Code Word for targets that are not heavily defended or easily destroyed.

¹⁴ Striking photovoltaic systems would likely run contrary to international legal regimes *see, e.g.* U.N. CHARTER available at <http://www.un.org/Overview/Charter.htm> (last visited 1 Apr 2001):

PREAMBLE: We the peoples of the United Nations determined *to save succeeding generations from the scourge of war, which twice in our lifetime has brought untold sorrow to mankind, and to reaffirm faith in fundamental human rights, in the dignity and worth of the human person, in the equal rights of men and women and of nations large and small, and to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained, and to promote social progress and better standards of life in larger freedom, and for these ends to practice tolerance and live together in peace with one another as good neighbours, and to unite our strength to maintain international peace and security, and to ensure by the acceptance of principles and the institution of methods, that armed force shall not be used, save in the common interest, and to employ international machinery for the promotion of the economic and social advancement of all peoples.*

¹⁵ *See, e.g.,* ACT ON GRANTING PRIORITY TO RENEWABLE ENERGY SOURCES (GERMANY)—available at <http://www.uni-muenster.de/Energie/re/iwr/info0005e.htm> (last visited Oct. 1, 200)

SECTION 1, PURPOSE The purpose of this Act is to *facilitate a sustainable development of energy supply in the interest of managing global warming and protecting the environment* and to achieve a substantial increase in the percentage contribution made by renewable energy sources to power supply in order at least to double the share of renewable energy sources in total energy consumption by the year 2010, in keeping with the objectives defined by the European Union and by the Federal Republic of Germany. (English Translation is substantially the same as the original German text).

¹⁶ *See generally, DANIEL YERGIN, THE PRIZE 329-350 (1992) (discussing *The Epic Quest for Oil, Money & Power*).*

¹⁷ *See generally, e.g., Bertrand Charrier, Foreward: An Environmental Assessment of Kuwait—Seven Years After the Gulf War—Final Report, Aug. 1998, available at* <http://www.gci.ch/GreenCrossPrograms/legacy/Kuwait/kuwait7years.htm> (last visited Dec. 1, 2000).

even grander scale. Public concern for the environment rose to new levels on both sides of the Atlantic and tighter environmental restrictions were placed on peacetime military operations.

Since the end of the Cold War, the general increase in public concern for the environment has made environmental security a top priority for the U.S. military's peacetime operations and training. Today's commanders routinely factor into their planing the political fallout that may occur from environmental disregard. Even troops without Hazardous Materials Training know that any disregard of environmental regulations will overshadow training successes. However, it is the effects of modern day conflict, that have raised this concern to new heights. In order to be declared victory, military operations can no longer be disassociated from environmental security.

The Green Cross is an organization advocating protection of the environment during wartime. It has highlighted the inextricable link between environmental security and defense strategy.¹⁸ This organization arose from the devastating environmental effects resulting from Operation DESERT STORM.¹⁹ Its primary mission is to document the environmental effects of modern conflict. The publications it has produced have proved that the environment can be an objective of war, target of war, or a potential cause for international crises. They also show the need to address environmental concerns at the tactical level of military planning.

Green Cross' most disturbing account of environment destruction occurring from military operations is detailed in Iraq's 1990 invasion of Kuwait. During the Gulf War, Saddam's forces lit 613 oil well fires in Kuwait that took nine months to extinguish with soot contaminating 953 km² of the desert. Iraqi troops released a further 60 million barrels of oil into the desert creating 246 oil lakes covering a surface area of 49 km², and spoiling over 1,500 km of the Persian Gulf Coastline. Another 10 million barrels were released directly into the Gulf waters.

Most people remember distinctly the horrifying pictures of environmental damage caused by Saddam Hussein's forces. The environmental catastrophe that occurred was one that U.S. forces had to contend with in the heat of battle. Civilian firefighting experts were also called in to work closely with the military after Kuwait was liberated.²⁰ Though energy security objectives provided the bond that held together a worldwide allied coalition against a regional tyrant in defense of democratic principles, it was the wartime effects on the environment that left people most shocked and disturbed.

The burning oil wells of Kuwait signaled the world that environmental issues can no longer be tossed aside in as an afterthought. Military victory can only be achieved when damage to the environment is kept to an absolute minimum.²¹ Consequently, environmental concerns are creating hidden planning factors that national security strategists must examine and address. Though destruction of a renewable energy target would not cause the environmental damage of a burning oil well, the environmental security issues associated with it provides the basis for reviewing renewable resources in light of the Laws of Armed Conflict.

IV. RENEWABLES BOOM—Overwhelming Public Acceptance of Renewable Energy

Renewable resources have gained a secure foothold in the energy community as a result of rising concerns for the environment.²² They find favor in both the public and private sectors.

¹⁸ See generally, GREEN CROSS WEB SITE, available at <http://www.gci.ch/> (last visited Dec. 1, 2000).

¹⁹ See generally, e.g., Bertrand Charrier, *Foreward: An Environmental Assessment of Kuwait—Seven Years After the Gulf War—Final Report*, Aug. 1998, available at <http://www.gci.ch/GreenCrossPrograms/legacy/Kuwait/kuwait7years.htm> (last visited Dec. 1, 2000).

²⁰ Display visited at the Bush Museum, Bryan, Texas (last visited May 1, 2001).

²¹ See generally, e.g., Natalie Pawelski, Host, *Earth Matters—Wars; Past and Present, Leave Scars on the Earth—Transcript*, May 30, 1999, available at <http://www.gci.ch/GreenCrossPrograms/legacy/yugoslavia/CNNtranscript.htm> (last visited Dec. 1, 2000) (discussing environmental concerns arising during NATO action in Kosovo).

²² See generally JEREMY LEGGETT, *THE CARBON WAR* (1999) (discussing the increased financial backing for renewable resources).

The majority of government programs supporting renewables development have been designed to help promote energy independence and a reduction of carbon emissions in response to concerns over global warming.²³ In the private sector, these justifications provide a strong customer base for start-up energy companies.

Over the last 10 years renewable resources have exploded on the worldwide scene. In Germany alone it is estimated that over 20,000 jobs have been created in the wind industry since 1990. Growth in the wind industry is estimated to have exceeded 100% since 1990 and in the area of photovoltaics there's been an annual average growth of 20% with a 500% increase in growth for the year 2000, the direct result of the German Renewable Energy Law. Throughout Europe towns are springing up that are designed to supply their citizens entire energy supply needs with energy produced by renewable resources. And in America the term „sustainable community“ is beginning to gain popularity.

The interest in renewables and environmental concern is emphasized by private investments and business initiatives. Over 3 Billion German Marks were tossed into „Green Funds“ in year 2000. Top U.S. mutual funds focusing on the environment have current earning averages exceeding 20%. Major petroleum corporations such as Shell and BP-Amoco have also made major investments in renewables technologies—something unheard of even five years ago. The renewables market is growing rapidly and although renewable resources provide only a small percentage of world's primary energy supply—less than 5%—renewables interest now appears be firmly rooted in business economics. Renewables serve almost 20% of the world electricity market with forecasts for a dramatic increase. Some experts now say that the solar revolution is upon us.²⁴

Previous interest in the renewables industry peaked in the 1970's with the world oil crisis. Driven by energy supply security concerns, the United States was a world leader in promoting renewables research and integration. Most development occurred through large government supported subsidies and development programs designed to promote growth in the renewables sectors. With the loss of OPEC influence in the late 1980's and reduction in costs for offshore drilling, renewables could not, however, maintain a competitive market position against competing fossile fuels. In the United States, support for renewables waned. Though many other nations maintained token development programs, it was not until Europe, faced with conflicting national policies and critical environmental concerns that renewables began to gain rapid increases in public favor.

Europe, a continent with little natural resources other than coal, has had to face difficult energy policy issues well before the United States.²⁵ European concerns over pollution and public disfavor of nuclear energy stemming from the Chernobyl catastrophe in 1986 have forced European nations to forge consensus on the most visceral of issues. In the 1990's European energy security issues began to run parallel with environmental goals, and various renewables programs took root. The worldwide agreement at the 1991 Rio Earth Summit to reduce carbon emmissions secured support for „clean energy“—energy produced with „zero emissions.“

²³ See, e.g., ACT ON GRANTING PRIORITY TO RENEWABLE ENERGY SOURCES (GERMANY) available at <http://www.uni-muenster.de/Energie/re/iwr/info0005e.htm> (last visited Oct. 1, 200)

SECTION 1, PURPOSE: The purpose of this Act is to facilitate a sustainable development of energy supply in the interest of managing global warming and protecting the environment and to achieve a substantial increase in the percentage contribution made by renewable energy sources to power supply in order at least to double the share of renewable energy sources in total energy consumption by the year 2010, in keeping with the objectives defined by the European Union and by the Federal Republic of Germany. (English Translation is Substantially the Same as the Original Version in German).

²⁴ See JEREMY LEGGET, THE CARBON WAR (1999).

²⁵ Interview with Professor John Fleming, Negotiation Instructor, Center for Public Dispute Resolution, The University of Texas School of Law, Austin, Texas, 25 Jul 2000.

Though capital intensive manufacturing costs have hindered their development, European governments have boosted their growth with generous government subsidies, deregulation, and social-democratic legislation.

The European Union views renewable resources as a crucial element in emission control and energy security. The currently accepted view among most European governments is that carbon emissions are a primary cause for environmental damage and must be reduced. The European Union has pledged to reduce emissions by 12.5% prior to 2010 while leading European nations such as Germany have pledged to go beyond EU goals to reduce emissions further with a goal of 25% reduction. Both the EU and its Member States view renewable resources as a viable means for meeting these carbon emission reduction goals.

European policies supporting renewables development are inextricably linked with protection of the environment. Wind farms, biomass plants, photovoltaic systems, and hydro facilities are all considered means of precluding or reducing carbon emissions. More progressive countries such as Denmark and Holland have been working towards goals of providing over 50% of their national energy demands through renewable energy sources. Since renewables by their nature are „*designed to promote advancement of all peoples*,“ and there is overwhelming acceptance for their development, strong arguments can be made that they are illegitimate targets of war.

V. TARGET ENVIRONMENT—Overlapping and Competing International Legal Regimes

In order to determine whether or not renewables are legitimate targets in times of conflict, analysts must first determine the international legal filters through which they must be viewed. Renewable Energy Sources characteristically are associated with two public policy regimes: (1) energy, and (2) the environment. Analysts can not fully understand the legal theories behind renewables development through the lens of just one policy filter. They must use both. As a target of war, renewable energy sources would be vital to the enemy's energy and industrial infrastructure. On the other hand, looked at as elements providing protection for the environment, renewables promote sustainable development and the advancement of all peoples.

The first place to gain an understanding of the analytical filters through which renewables must be viewed is the United Nations Charter. The U.N. Charter provides the basic legal guidance for considering military action. This Charter calls for nations to resolve disputes peacefully.²⁶ It prohibits military action that is not in the „*common interest*“ of its Member States and permits military action only through the exception of Self Defense. Unless military action is justified by the U.N. Charter's Self Defense criteria it would be difficult to label any strikes against renewable resources as legitimate.²⁷

²⁶ U.N. CHARTER available at <http://www.un.org/Overview/Charter/> (last visited: Dec. 1, 2000), CHAPTER 1 PURPOSES AND PRINCIPLES:

ARTICLE 2—The Organization and its Members, in pursuit of the Purposes stated in Article 1, shall act in accordance with the following Principles. 1. The Organization is based on the principle of the sovereign equality of all its Members. 2. *All Members shall settle their international disputes by peaceful means in such a manner that international peace and security, and justice are not endangered.*

²⁷ U.N. CHARTER available at <http://www.un.org/Overview/Charter/> (last visited: Dec. 1, 2000), CHAPTER 1, PRINCIPLES AND PURPOSES:

ARTICLE 1—The purposes of the United Nations are: 1. To maintain international peace and security, and to that end: *to take effective collective measures for the prevention and removal of threats to the peace*, and for the suppression of acts of aggression or other breaches of peace... 2. *To achieve international co-operation in solving international problems of an economic, social, cultural, or humanitarian character*, and in promoting and encouraging respect for human rights...

The Self Defense exception must, however, be viewed in light of legal regimes that have come into effect since the U.N. Charter's ratification. Over the last ten years there have been numerous international legal frameworks designed with the „*common interest*“ of protecting the environment. The Rio Protocol, The Kyoto Protocol, and the various governmental legislation and policy statements surrounding the international movement to promote protection of the environment all come later in time.²⁸ Therefore, a general policy agreement exists worldwide that emphasizes the importance of protecting the environment.

In the event that military strikes were conducted against renewables in either preemptive or reactionary self-defense operations, the strikes would have to be viewed in light of these conflicting policies. A further determination would have to be made as to whether or not the strikes were intentional or unintentional, and whether or not they were necessary to completing military objectives.²⁹ The great weight placed on protection of the environment by a large percentage of U.N. Member States puts a huge hurdle in front of any military commander's determination to make renewable energy sources „fair game“ on the battlefield.

Reprisal, like Self Defense, is another general legal exception that could be used to support military strikes. But, reprisal also appears to be a difficult legal basis upon which to view renewables as legitimate wartime targets. Reprisal must be proportional in response to preliminary act of violence. Unless there are substantial grounds to believe that the energy produced by a renewable resources plant is promoting enemy activity (e.g. supplying a chemical weapons plant with power) it would hard to justify their destruction as a means of promoting collective self defense. Purely from an international policy standpoint, renewables appear to be a wiley target to hit.

VI. TARGET CHARACTERISTICS—Inherent Design to Protect the Environment

The legal foundation for providing renewable energy sources with international protection against wartime targeting is built on the inherent characteristics of renewable energy. Renewable resources by their very character promote multiple U.N. Charter policies. This causes conflicting analytical problems in determining whether or not they can be considered a legitimate target of war.³⁰ The majority of countries promoting renewables view them as an indispensable means of protecting the environment through a reduction of carbon emissions.³¹ They would not expect them to be legitimate targets of war.

²⁸ See *Five Years After RIO—Written Statement at the United Nations General Assembly, Nineteenth Special Session, Jun. 23-27, 1997*, available at <http://www.icrc.org/> (last visited: Dec. 1, 2000) (noting in End Note 1 that Principle 24 of the RIO Protocol states that „*warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of conflict and cooperate in its further developmen, as necessary.*“)

²⁹ For a short reference on basic principles of international law governing the use of force see BLOND'S INTERNATIONAL LAW 150-163 (1995) (touching on principles of reprisal and self defense).

³⁰ U.N. CHARTER available at <http://www.un.org/Overview/Charter/> (last visited: Dec. 1, 2000) CHAPTER IX—INTERNATIONAL ECONOMIC AND SOCIAL CO-OPERATION:

ARTICLE 55—*With a view to the creation of conditions of stability and well-being which are necessary for peaceful and friendly relations among nations based on respect for the principle of equal rights and self-determination of peoples, the United Nations shall promote: a) higher standards of living, full employment, and conditions of economic and social progress and development; b) solutions of international economic, social, health, and related problems; and international cultural and educational cooperation; and universal respect for, and observance of, human rights and fundamental freedoms for all without distinction as to race, sex, language, or religion.*

³¹ See, e.g., *A Climate of Change*, 47 NEW REVIEW 6-7, (UK DEPARTMENT OF TRADE AND INDUSTRY) Feb., 2001 (stating that England's „new Renewables Obligation will help to achieve the Government's renewable energy targets, which in turn form part of the targets for its over-all climate change programme.“).

Though a bit behind schedule in implementing advanced renewable policies, the United States Department of Energy has acknowledged the „*clean energy*“ characteristics of renewables. „*Clean Energy*“ prevents the suspected catalysts of global warming—carbon emissions—which are viewed as probable causes for future instability and humanitarian crisis. Since renewable energy resources are designed to prevent the catalysts of global warming, they must be viewed as facilities that are designed to prevent or reduce the threat of future global calamity.³²

An argument can be put forth that a single facility, or small number of renewable systems can not be enough to provide effective protection for the environment. *De minimus* arguments such as these, have not however typically provided a sound bases for defending a legal position. Therefore, no matter how small the renewables facility, whether it be a 3kWp solar home system, a 100MW generating facility for a power grid, or an architecturally designed Building Integrated Photovoltaic (BIPV) system, it can be viewed as added protection for the environment. Renewables exist as an insurance policy for maintaining future stability.

Though the environmental protection that renewables offer may be small—these sources currently only make up 5% of the world’s energy capacity—their „*clean energy*“ design characteristics are in line with U.N. Charter policies to „*promote international peace and stability*.“³³ Renewables also exhibit characteristics that meet a number of other U.N. objectives (e.g. „*saving succeeding generations from the scourge of war, and promoting social progress and better standards of life*“) all outlined in the U.N. Charter Preamble.³⁴ Therefore, in order for renewables to be viewed as a legitimate target of war, they would have to be utilized in such a manner that is contrary to their inherent characteristics.

Without utilization contrary to renewables target characteristics, the policy filters weighing in favor of protecting renewables from attack are probably too strong to be overcome. Striking renewable resource targets would likely be considered legally „*inconsistent*“ with U.N. policies.³⁵ If the renewable energy sources were themselves positioned in such a manner on the

³² See generally RUGGERO J. ALDISERT, LOGIC FOR LAWYERS—A GUIDE TO CLEAR LEGAL THINKING (1997).

³³ See U.N. CHARTER available at <http://www.un.org/Overview/Charter/> (last visited: Dec. 1, 2000):

PREAMBLE: We the peoples of the United Nations determined *to save succeeding generations from the scourge of war*, which twice in our lifetime has brought untold sorrow to mankind, and *to reaffirm faith in fundamental human rights*, in the dignity and worth of the human person, in the *equal rights of men and women and of nations large and small*, and to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained, and *to promote social progress and better standards of life* in larger freedom, and for these ends to practice tolerance and live together in peace with one another as good neighbours, and to unite our strength *to maintain international peace and security*, and to ensure by the acceptance of principles and the institution of methods, that armed force shall not be used, save in the common interest, and to *employ international machinery for the promotion of the economic and social advancement of all peoples*.

³⁴ See U.N. CHARTER available at <http://www.un.org/Overview/Charter/> (last visited: Dec. 1, 2000):

PREAMBLE: We the peoples of the United Nations determined *to save succeeding generations from the scourge of war*, which twice in our lifetime has brought untold sorrow to mankind, and *to reaffirm faith in fundamental human rights*, in the dignity and worth of the human person, in the *equal rights of men and women and of nations large and small*, and to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained, and *to promote social progress and better standards of life* in larger freedom, and for these ends to practice tolerance and live together in peace with one another as good neighbours, and to unite our strength *to maintain international peace and security*, and to ensure by the acceptance of principles and the institution of methods, that armed force shall not be used, save in the common interest, and to *employ international machinery for the promotion of the economic and social advancement of all peoples*.

³⁵ See U.N. CHARTER available at <http://www.un.org/Overview/Charter/> (last visited: Dec. 1, 2000) CHAPTER 1, PURPOSES AND PRINCIPLES:

battlefield that did not „*promote the economic and social advancement of all peoples*“ a justification could be provided for planning a strike.³⁶ But, strong legal arguments never rests on policy alone. And, in the case of renewable resources, there are further conventions and protocols that provide additional support for viewing them as prohibitive targets.

VII. TARGET RESTRAINTS—Specific Theories Prohibiting Hostile Attack

After reviewing the policy filters through which renewables must be viewed on the global battlefield, future situations could still be imagined where military planners might seek to target specific renewable energy sources. The “off-grid” nature of renewable energy systems could demand that targeting of renewables in order to cut direct power to a remote weapons plant, or military facility. In a more likely situation, military planners might want to “blind” a particular sector of an enemy’s country requiring the targeting of substations, or generation sources that include grid-integrated renewable technologies. Renewables might also be integrated into specific government structures such as a planning facilities or command structures.³⁷

Large numbers of countries in Africa, the Middle East, and Asia have all shown interest in renewables technologies. These have all been areas of the world where regional tensions have previously erupted into military conflict. Any number of organizations including the U.N. Security Council,³⁸ NATO, or the U.S. government could one day determine that a country or a

Article 3—All Members *shall refrain in their international relations from the threat or use of force* against the territorial integrity or political independence of any state, or in *any other manner inconsistent with the Purposes of the United Nations*.

³⁶ See U.N. CHARTER available at <http://www.un.org/Overview/Charter/> (last visited: Dec. 1, 2000):

PREAMBLE: We the peoples of the United Nations determined *to save succeeding generations from the scourge of war*, which twice in our lifetime has brought untold sorrow to mankind, and *to reaffirm faith in fundamental human rights*, in the dignity and worth of the human person, in the *equal rights of men and women and of nations large and small*, and to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained, and *to promote social progress and better standards of life* in larger freedom, and for these ends to practice tolerance and live together in peace with one another as good neighbours, and to unite our strength *to maintain international peace and security*, and to ensure by the acceptance of principles and the institution of methods, that armed force shall not be used, save in the common interest, and to *employ international machinery for the promotion of the economic and social advancement of all peoples*.

³⁷ Author’s business discussions with Mr. Steven Strong, President, SOLAR DESIGN ASSOCIATES at SOLON AG, Berlin, Germany, Mar. 6-7, 2001 (noting that the U.S. Department of State has expressed interest in using Photovoltaics in Embassies for enegy security reasons).

³⁸ See U.N. CHARTER available at <http://www.un.org/Overview/Charter/> (last visited: Dec. 1, 2000), CHAPTER V—THE SECURITY COUNCIL / FUNCTIONS AND POWERS:

ARTICLE 24—In order to ensure prompt and effective action by the United Nations, its Members *confer on the Security Council primary responsibility for the maintenance of international peace and security*, and agree that in carrying out its duties under this responsibility the Security Council acts on their behalf.

ARTICLE 25—In order to promote the establishment and maintenance of international peace and security with the least diversion for armaments of the world’s human and economic resources, *the Security Council shall be responsible* for formulating, with the assistance of the Military Staff Committee referred to in Article 47, plans to be submitted to the Members of the United Nations *for the establishment of a system for the regulation of armaments*.

CHAPTER VII—ACTION WITH RESPECT TO THREATS TO THE PEACE, BREACHES OF THE PEACE, AND ACTS OF AGGRESSION

facility relying on energy generated by renewables is a threat. For this reason, it is necessary to review specific provisions of International law governing the Laws of Armed Conflict to determine what criteria must be met before engaging a hostile target.³⁹

Although the United States has not ratified Protocols I or II of the Geneva Conventions, a large percentage of countries have. International consensus shows that there is strong legal weight against targeting renewables. This consensus is supported by the following analysis of the potential legal justifications precluding attack on renewables targets. A short reference of these justifications can also be viewed in Appendix 1:

A. Restricted Warfare Theory

Since the late 19th century, countries worldwide have sought to restrict the disastrous effects of warfare by legal means. The Saint Petersburg Declaration of 11 December 1868 though limiting only „*specific projectiles in time of war*“ is viewed as primary mandate for acknowledging restraints on warfare.⁴⁰ The Saint Petersburg Declaration provides support for protecting renewables. It states that „*the necessities of war ought to yield to the requirements of humanity*“ and provides support for the position that renewable resources should be given prohibitive status given their characteristic design to provide „clean energy.“ Further provisions of the St. Petersburg declaration support this interpretation stating that „*the only legitimate object which States should endeavour to accomplish during war is to weaken the military forces of the enemy.*“ Therefore, any attack on a renewables resources target „*that does not directly strengthen the military forces of the enemy*“ is likely prohibited by the most basic of constraints on warfare.

Support for the „*restricted warfare*“ theory for protecting renewable resources is also found in further international protocols. Protocol I of the Geneva Convention specifically states that

ARTICLE 39—The Security Council *shall determine the existence of any threat to the peace, breach of the peace, or act of aggression* and shall make recommendations, or decide what measures shall be taken in accordance with Articles 41 and 42, to maintain or restore international peace and security.

ARTICLE 41—The Security Council may decide what measures not involving the use of armed force are to be employed to give effect to its decisions, and it may call upon the Members of the United Nations to apply such measures. *These may include complete or partial interruption of economic relations and of rail, sea, air, postal, telegraphic, radio, and other means of communication, and the severance of diplomatic relations.*

ARTICLE 42—Should the Security Council consider that measures provided for in Article 41 would be inadequate or have proved to be inadequate, it may take *such action by air, sea, or land forces as may be necessary* to maintain or restore international peace and security. Such action may include demonstrations, blockade, and other operations by air, sea, or land forces of Members of the United Nations.

³⁹ For a comprehensive overview of International Humanitarian Law *see* INTERNATIONAL RED CROSS WEB SITE available at <http://www.icrc.org/> (last visited Dec. 1, 2000) (archiving all international conflict related legal provisions).

⁴⁰ *See* SAINT PETERSBURG DECLARATION, 11 DECEMBER 1868 available at <http://www.icrc.org/> (last visited Dec. 1, 2000):

On the proposition of the Imperial Cabinet of Russia, an International Military Commission having assembled at St. Petersburg in order to examine the expediency of forbidding the use of certain projectiles in time of war between civilized nations, and that Commission having by common agreement fixed the technical limits at which the necessities of war ought to yield to the requirements of humanity, the Undersigned are authorized by the orders of their Governments to declare as follows:

Considering:

That the progress of civilization should have the effect of alleviating as much as possible the calamities of war;

That the only legitimate object which States should endeavour to accomplish during war is to weaken the military forces of the enemy...

warfare is „*not unlimited*“ and that specific „*methods or means*“ are restricted.⁴¹ This Protocol reaffirms the Saint Petersburg Declaration’s theory of restrictive warfare and provides a basis for further legal supporting prohibiting the targeting of renewables. The „restricted warfare“ theory provides the foundation of legal support in favor of renewables and is strengthened with a number of additional articles.

B. Civilian Target Theory

In times of conflict many renewable resources are likely to fall under the protection of civilian target status. Many grid connected or island renewable systems may be owned, either directly or indirectly through cooperatives, or financial institutions. The variety of legal provisions designed to protect the civilian population in wartime provide broad support for protecting renewables against attack. A strong legal defense for providing renewables with protective status can be structured on the basis of Geneva Convention, Protocol I, Articles 48-58.

Basic guidance for military operations is outlined under Geneva Convention Protocol I, Article 48.⁴² This provision calls for conflicting parties to „*at all times distinguish between civilian objects and military objectives.*“ Protocol I, Article 51 provides the general rule for civilians stating that they are to receive „*general protection against the dangers arising from military operations.*“⁴³ Protocol I, Article 51 also prohibits „*indiscriminate attacks*“ against

⁴¹ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 35—BASIC RULES:

1. In any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited.
2. It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.
3. It is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment.

⁴² See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 48—BASIC RULE AND FIELD APPLICATION

In order to ensure respect for and protection of the civilian population and civilian objects, *the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives* and accordingly shall direct their operations only against military objectives.

⁴³ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 51—PROTECTION OF THE CIVILIAN POPULATION

1. The civilian population and individual civilians shall enjoy general protection against dangers arising from military operations. To give effect to this protection, the following rules, which are additional to other applicable rules of international law, shall be observed in all circumstances.
2. The civilian population as such, as well as individual civilians, shall not be the object of attack. Acts or threats of violence the primary purpose of which is to spread terror among the civilian population are prohibited.
3. Civilians shall enjoy the protection afforded by this Section, unless and for such time as they take a direct part in hostilities.
4. Indiscriminate attacks are prohibited. Indiscriminate attacks are:
 - (a) those which are not directed at a specific military objective
 - (b) those which employ a method or means of combat which cannot be directed at a specific military objective;or

civilians stating that attacks must be made against „*specific*“ military targets. Furthermore, Protocol I Articles 51 demands that all „*attacks be limited strictly to military objectives*.“⁴⁴ It is strengthened by Protocol I, Article 57 which calls decision makers to „*do everything feasible to verify that the objectives to be attacked are neither civilians nor civilian objects* “ in order to „*take all reasonable precautions to avoid losses of civilian lives and damage to civilian objects*.“⁴⁵

(c) those which employ a method or means of combat the effects of which cannot be limited as required by this Protocol; and consequently, in each such case, are of a *nature to strike military objectives* and civilians or civilian objects without distinction.

5. Among others, the following types of attacks are to be considered as indiscriminate:

(a) an attack by bombardment by any methods or means which treats as a single military objective a number of clearly separated and distinct military objectives located in a city, town, village or other area containing a similar concentration of civilians or civilian objects.

(b) an attack which may be expected to cause incidental loss of civilian life, injury to civilians, *damage to civilian objects*, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated.

6. Attacks against the civilian populations or civilians by way of reprisals are prohibited.

7. The presence or movements of the civilian population or individual civilians shall not be used to render certain points or areas immune from military operations, in particular in attempts to shield military objectives from attacks or to shield, favour or impede military operations. The Parties to the conflict shall not direct the movement of the civilian population or individual civilians in order to attempt to shield military objectives from attacks or to shield military operations.

8. Any violation of these prohibitions shall not release the Parties to the conflict from their legal obligations with respect to the civilian population and civilians, including the obligation to take the precautionary measures provided for in Article 57.

⁴⁴ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 52—GENERAL PROTECTION OF CIVILIAN OBJECTS:

Civilian objects shall not be the object of attack or of reprisals. Civilian objects are all objects which are not military objectives defined in paragraph 2.

Attacks shall be limited strictly to military objectives. In so far as objects are concerned, military objectives are limited to those objects which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage.

In case of doubt whether an object which is normally dedicated to civilian purposes, such as a place of worship, a house or other dwelling or a school, is being used to make an effective contribution to military action, *it shall be presumed not to be so used.*

⁴⁵ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 57—PRECAUTIONS IN ATTACK

In the conduct of military operations, constant care shall be taken to spare the civilian population, civilians and civilian objects.

With respect to attacks, the following precautions shall be taken:

those who plan or decide upon an attack shall:

do everything feasible to verify that the objectives to be attacked are neither civilians nor civilian objects and are not subject to special protection but are military objectives within the meaning of paragraph 2 of Article 52 and that it is not prohibited by the provisions of this Protocol to attack them;

take all feasible precautions in the choice of means and methods of attack with a view to avoiding, and in any event to minimizing, incidental loss of civilian life, injury to civilians and damage to civilian objects;

refrain from deciding to launch any attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated;

These international restraints on warfare require targeteers and military tacticians to account seriously for the placement of renewable resources on the battlefield. Decentralized renewable resources such as Cooperative Windfarms, offgrid or net-metered PV systems may make it difficult to „*distinguish between civilian objects and military objectives*“ as demanded by Protocol I, Article 48.⁴⁶ Since the electricity generated from these system may supply both the civilian population and military facilities, they may not fall the definition of civilians in Protocol I, Articles 43 and 50.⁴⁷ Military planners or targeteers may have difficulty providing a legal justification for knocking out a grid system that provides a large percentage of electricity to civilian communities through renewable resources. Only in clear cases where renewable energy sources are used to shield or support military objectives can they be clearly viewed as legitimate targets.⁴⁸ Even if renewable resources are not decentralized but grid connected, civilian property may be affected. Civilian investments in renewables may even be considered enough to provide legal protection under provide property exclusion of Protocol I, Article 53.⁴⁹

an attack shall be cancelled or suspended if it becomes apparent that the objective is not a military one or is subject to special protection or that the attack may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects, or a combination thereof, which would be excessive in relation to the concrete and direct military advantage anticipated;

effective advance warning shall be given of attacks which may affect the civilian population, unless circumstances do not permit.

When a choice is possible between several military objectives for obtaining a similar military advantage, the *objective to be selected shall be that the attack on which may be expected to cause the least danger to civilian lives and to civilian objects.*

In the conduct of military operations at sea or in the air, each Party to the conflict shall, in conformity with its rights and duties under the rules of international law applicable in armed conflict, *take all reasonable precautions to avoid losses of civilian lives and damage to civilian objects.*

No provision of this Article may be construed as authorizing any attacks against the civilian population, civilians or civilian objects.

⁴⁶ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 48—BASIC RULE AND FIELD APPLICATION

In order to ensure respect for and protection of the civilian population and civilian objects, *the Parties to the conflict shall at all times distinguish between the civilian population and combatants and between civilian objects and military objectives* and accordingly shall direct their operations only against military objectives.

⁴⁷ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 43—DEFINITION OF CIVILIANS:

F/A

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F/A

⁴⁸ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

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⁴⁹ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

Renewables receive an even stronger legal defense for protective status under Protocol I, Article 54—*Protection of Objects Indispensable to the Survival of the Civilian Population*.⁵⁰ Since there is an international consensus that renewable electricity generating systems are considered vital to health and welfare of nations worldwide, any targeting of grid connected or decentralized renewable resource systems that leads to civilian blackouts or energy shortages could be considered as a violation of this article. Additionally, renewables themselves are designed with the protection of the environment in mind, and therefore can be viewed as indispensable to the survival of the civilian population.⁵¹ Given their unique characteristics,

PROTOCOL I, ARTICLE 53—PROTECTION OF PRIVATE PROPERTY:
F/A

⁵⁰ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 54—PROTECTION OF OBJECTS INDISPENSABLE TO THE SURVIVAL OF THE CIVILIAN POPULATION:

Starvation of civilians as a method of warfare is prohibited.

It is prohibited to attack destroy, remove or render useless objects indispensable to the survival of the civilian population, such as foodstuffs, agricultural areas for the production of foodstuffs, crops, livestock, drinking water installations and supplies and irrigation works, for the specific purpose of denying them for their sustenance value to the civilian population or to the adverse Party, whatever the motive, whether in order to starve out civilians, to cause them to move away, or for any other motive.

The prohibitions in paragraph 2 shall not apply to such of the objects covered by it as are used by an adverse Party:

as sustenance solely for the members of its armed forces; or

if not as sustenance, then in direct support of military action, provided, however, that in no event shall actions against these objects be taken which may be expect to leave the civilian population with such inadequate food or water as to cause its starvation or force its movement.

These objects shall not be made the object of reprisals.

In recognition of the vital requirements of any Party to the conflict in the defense of its national territory against invasion, derogation from the prohibitions contained in paragraph 2 may be made by a Party to the conflict within such territory under its own control where required by imperative military necessity.

⁵¹ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

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These objects shall not be made the object of reprisals.

In recognition of the vital requirements of any Party to the conflict in the defense of its national territory against invasion, derogation from the prohibitions contained in paragraph 2 may be made by a Party to the conflict within such territory under its own control where required by imperative military necessity.

military planners and targeteers are well advised to heed Protocol I, Article 58's call to ensure that „*necessary precautions be taken*“ to protect „*civilian objects*.“⁵²

This particular review of Articles under Geneva Convention Protocol I shows that renewable resources on the battlefield are quite likely protected by the civilian target status. Additional Protocol I Articles can be interpreted as a basis for broader protection under this theory⁵³ with even further support under Protocol II, Articles 13 and 14.⁵⁴ Under this theory, even strikes with

⁵² See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 58—PRECAUTIONS AGAINST THE EFFECTS OF ATTACKS:

The Parties to the conflict shall, to the maximum extent feasible:

- without prejudice to Article 49 of the Fourth Convention, endeavour to remove the civilian population, individual civilians and civilian objects under their control from the vicinity of military objectives;
- avoid locating military objectives within or near densely populated areas;
- take the other necessary precautions to protect the civilian population, individual civilians and civilian objects under their control against the dangers resulting from military operations.

⁵³ PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000) (declaring decentralized renewable resource systems could provide them additional legal protection as necessary to civil defense):

PROTOCOL I, ARTICLE 62—GENERAL PROTECTION:

Civilian civil defense organizations and their personnel shall be respected and protected, subject to the provisions of this Protocol, particularly the provisions of this Section. They shall be entitled to perform their civil defense tasks except in case of imperative military necessity.

The provisions of paragraph 1 shall also apply to civilians who, although not members of civilian civil defense organizations, respond to an appeal from the competent authorities and perform civil defense tasks under their control.

Buildings and material used for civil defense purposes and shelters provided for the civilian population are covered by Article 52. Objects used for civil defense purposes may not be destroyed or diverted from their proper use except by the Party to which they belong.

PROTOCOL I, ARTICLE 65—CESSATION OF PROTECTION:

The protection to which civilian civil defense organizations, their personnel, buildings, shelters and material are entitled shall not cease unless they commit or are used to commit, outside their proper tasks, acts harmful to the enemy. Protection may, however, cease only after a warning has been given settling, whenever appropriate, a reasonable time-limit, and after such a warning has remained unheeded.

The following shall not be considered as acts harmful to the enemy:

- that civil defense tasks are carried out under the direction or control of military authorities;
- that civilian civil defense personnel co-operate with the military personnel in the performance of civil defense tasks, or that some military personnel are attached to civilian civil defense organizations.
- that the performance of civil defense tasks may incidentally benefit military victims, particularly those who are hors de combat.

It shall also not be considered as an act harmful to the enemy that civilian civil defense personnel bear light individual weapons for the purpose of maintaining order or for self-defense. However, in areas where land fighting is taking place or is likely to take place, the Parties to the conflict shall undertake the appropriate measures to limit these weapons to handguns, such as pistols or revolvers, in order to assist in distinguishing between civil defense personnel and combatants. Although civil defense personnel bear other light individual weapons in such areas, they shall nevertheless be respected and protected as soon as they have been recognized as such.

The formation of civilian civil defense organizations along military lines, and compulsory service in them, shall also not deprive them of the protection conferred by this Chapter.

⁵⁴ PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL II), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

a low probability of „collateral damage“ to renewable resources could lead to politically costly violations of international law.⁵⁵ For this reason, this legal theory should force defense planners to take care in determining the validity of targeting future energy resource systems. Military planners must be prepared face negative political fallout if renewables are placed at risk and later determined to be closely associated with the civilian populace.

C. Environmental Target Theory

Additional justification for providing protection to renewable resources from hostilities can be found in Geneva Convention provisions designed to protect the environment. Protocol I, Articles 35 and 55 and *The Convention on Modification of Environment* provide support for the legal theory that renewables are illegitimate targets.⁵⁶ Strong basis for this exists because

PROTOCOL II, ARTICLE 13—PROTECTION OF THE CIVILIAN POPULATION

The civilian population and individual civilians shall enjoy general protection against the dangers arising from military operations. To give effect to this protection, the following rules shall be observed in all circumstances.

The civilian population as such, as well as individual civilians, shall not be the object of attack. Acts or threats of violence the primary purpose of which is to spread terror among the civilian population are prohibited.

Civilians shall enjoy the protection afforded by this Part, unless and for such time as they take a direct part in hostilities.

PROTOCOL II, ARTICLE 14—PROTECTION OF OBJECTS INDISPENSIBLE TO THE SURVIVAL OF THE CIVILIAN POPULATION

Starvation of civilians as a method of combat is prohibited. It is therefore prohibited to attack, destroy, remove or render useless, for that purpose, objects indispensable to the survival of the civilian population, such as foodstuffs, agricultural areas for the production of foodstuffs, crops, livestock, drinking water installations and supplies and irrigation works.

⁵⁵ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 58—PRECAUTIONS AGAINST THE EFFECTS OF ATTACKS:

The Parties to the conflict shall, to the maximum extent feasible:

- without prejudice to Article 49 of the Fourth Convention, endeavour to remove the civilian population, individual civilians and civilian objects under their control from the vicinity of military objectives;
- avoid locating military objectives within or near densely populated areas;
- take the other necessary precautions to protect the civilian population, individual civilians and civilian objects under their control against the dangers resulting from military operations.

⁵⁶ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL II), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 35—BASIC RULES:

1. In any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited.
2. It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.
3. It is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment.

PROTOCOL I, ARTICLE 55—PROTECTION OF THE NATURAL ENVIRONMENT:

Care shall be taken in warfare to protect the natural environment against widespread, long-term, and severe damage. This protection includes a prohibition of the use of methods or means of warfare which are intended or may be expected to cause such damage to the natural environment and thereby to prejudice the health or survival of the population.

renewables are internationally accepted as elements designed to protect the environment.⁵⁷ European countries including Germany, and Denmark have given their stamp of official recognition to this theory through legislation that states that renewables protect the environment.⁵⁸ The European Union has as well.⁵⁹

Protocol I, Article 35 establishes the basic rules for armed conflict concerning the environment. It specifically states that combatants are „*prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment.*“⁶⁰ A similar provision specifically calling for „*Protection of the Natural Environment*“ can be found in Protocol I, Article 55.⁶¹

Given the scientific consensus that carbon emissions are causing „*widespread, long-term, and severe damage to the natural environment*“ any strikes on renewables can be viewed as contributing to this widespread damage.⁶² Since the loss of renewable resources can be expected to result in use of substitute fuel sources that emit green house gasses (e.g. portable generators, back-up power plants), strikes, no matter how limited in nature, can be viewed as contributing to the long term damage of the environment. Though „limited strikes“ and „negligible damage“ can be offered as counter-arguments to providing renewables with environmental protection status, repairs of damaged resource sites is both costly and time consuming. Therefore, immeasurable damage to the environment can not be viewed as as negligible.

The environmental target theory can be supported by provisions of CONVENTION ON THE PROHIBITION OF MILITARY OR ANY HOSTILE USE OF ENVIRONMENTAL MODIFICATION TECHNIQUES, 10 DECEMBER 1976.⁶³ More widely ratified than Protocol I, this Convention is

Attacks against the natural environment by way of reprisals are prohibited.

⁵⁷ F/A (European Union Legislation Associated to Renewables)

⁵⁸ F/A (Danish Renewables Legislation Associated to Environment)

⁵⁹ F/A (European Union Legislation Associated to Renewables)

⁶⁰ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 35—BASIC RULES:

1. In any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited.
2. It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.
3. It is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment.

⁶¹ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL II), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 55—PROTECTION OF THE NATURAL ENVIRONMENT:

Care shall be taken in warfare to protect the natural environment against widespread, long-term, and severe damage. This protection includes a prohibition of the use of methods or means of warfare which are intended or may be expected to cause such damage to the natural environment and thereby to prejudice the health or survival of the population.

Attacks against the natural environment by way of reprisals are prohibited.

⁶² F/A (IPCC Report discussing climatic change)

⁶³ See CONVENTION ON THE PROHIBITION OF MILITARY OR ANY HOSTILE USE OF ENVIRONMENTAL MODIFICATION TECHNIQUES, 10 DECEMBER 1976 *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

signed and ratified with no reservations, understandings or declarations by the United States. Though it would be a stretch to state that striking renewables targets would result in the „deliberate manipulation of natural processes“ strong arguments can be put forth that post-strike substitution of fuel sources would be enough for a strike on renewables to violate this convention. A deliberate strike or one with known risk of collateral damage to renewables can be viewed as a „deliberate manipulation of natural processes“ through known indirect effects. From this perspective renewables gain further support for receiving prohibited target status under environmental provisions.

E. Dangerous Forces Theory

The post-strike substitution of fuel sources for renewables can be taken a step further to provide renewables with support under international legal provisions precluding strikes on dangerous objects. A number of authors have written on Dangerous Forces and applied this theory to nuclear facilities, and hydro dams.⁶⁴ Applied to renewable resources, this theory would be based on the precept that the targeting of renewable energy sources would lead to an expected subsequent increase of CO₂ gasses into the atmosphere.⁶⁵ Considered to be both a poisonous pollutant, and recognized as a probable cause of global warming, CO₂ gasses, could be considered dangerous forces.

A number of provisions can be utilized to support this legal defense. Geneva Conventions Article 23 specifically prohibits the employment of poison⁶⁶ and Protocol I, Article 56 provides „Protection of Works and Installations Containing Dangerous Forces.“⁶⁷ Though the targeting

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1. Each State Party to this Convention undertakes not to engage in military or any other hostile use of environmental modification techniques having widespread, longlasting or severe effects as the means of destruction, damage or injury to any other State Party.
 2. Each State Party to this Convention undertakes not to assist, encourage or induce any State, group of States or international organization to engage in activities contrary to the provisions of paragraph 1 of this article.

ARTICLE II

As used in article I, the term „environmental modification techniques“ refers to any technique for changing - through the deliberate manipulation of natural processes - the dynamics, composition or structure of the Earth, including its biota, lithosphere, hydrosphere and atmosphere, or outer space.

US Ratification—No reservations, understandings, or declarations.

Signature 18.05.1977.

Ratification 17.01.1980

⁶⁴ F/A (Mike Schmitt—Dangerous Forces and Hydro Dams Article)

⁶⁵ F/A (IPCC Report)

⁶⁶ See CONVENTION (II) WITH RESPECT TO THE LAWS AND CUSTOMS OF WAR ON LAND AND ITS ANNEX: REGULATIONS CONCERNING THE LAWS AND CUSTOMS OF WAR ON LAND. THE HAGUE, NETHERLANDS, 29 JULY 1899 available at <http://www.icrc.org/> (last visited Dec. 1, 2000):

CONVENTION (II)— ARTICLE 23:

Besides the Prohibitions provided by special Conventions, it is especially prohibited
To employ poison or poisoned arms;

⁶⁷ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, available at <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 56—PROTECTION OF WORKS AND INSTALLATIONS CONTAINING DANGEROUS FORCES:

Works or installations containing dangerous forces, namely dams, dykes, and nuclear electrical generating stations, shall not be made the object of attack, even where these objects are military objectives, if such attack may cause the release of dangerous forces and consequent severe losses among the civilian population. Other military objectives located at or in the vicinity of these works or installations shall not be made the object of

of renewable resources is not likely to result in the immediate „severe losses among the civilian population“ it is plausible to expect a release of „dangerous forces“ through substitute energy supply uses. Protocol II, Article 15 reiterates the international consensus to limit consequences of „dangerous forces“ during conflict.⁶⁸

Though the indirect emission of carbon gasses is not specifically named in Dangerous Forces provisions, allegorical arguments can provide additional justification for providing protective status to renewable resources.⁶⁹ Immeasurable harm from indirect emission of CO₂, can not be interpreted as no harm. Furthermore these provisions must be viewed in their most restrictive sense given the policies behind limiting warfare.⁷⁰ In light of changed circumstances restrictions

attack if such attack may cause the release of dangerous forces from the works or installations and consequent severe losses among the civilian population.

The special protection against attack provided by paragraph 1 shall cease:

for a dam or a dyke only if it is used for other than its normal function in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support

for a nuclear electrical generating station only if it provides electric power in regular, significant, and direct support of military operations and if such attack is the only feasible way to terminate such support;

for other military objectives located at or in the vicinity of these works or installations only if they are used in regular, significant and direct support of military operations and if such attack is the only feasible way to terminate such support.

In all cases, the civilian population and individual civilians shall remain entitled to all the protection accorded them by international law, including the protection of the precautionary measures provided for in Article 57. If the protection ceases and any of the works, installations or military objectives mentioned in paragraph 1 is attacked, all practical precautions shall be taken to avoid the release of dangerous forces.

It is prohibited to make any of the works, installations, or military objectives mentioned in paragraph 1 the object of reprisals.

The Parties to the conflict shall endeavour to avoid locating any military objectives in the vicinity of the works or installations mentioned in paragraph 1. Nevertheless, installations erected for the sole purpose of defending the protected works or installations from attack are permissible and shall not themselves be made the object of attack, provided that they are not used in hostilities except for defensive actions necessary to respond to attacks against the protected works or installations and that their armament is limited to weapons capable only of repelling hostile action against the protected works or installations.

The High Contracting Parties and the Parties to the conflict are urged to conclude further agreements among themselves to provide additional protection for objects containing dangerous forces.

In order to facilitate the identification of the objects protected by this article, the Parties to the conflict may mark them with a special sign consisting of a group of three bright orange circles placed on the same axis, as specified in Article 16 of Annex I to this Protocol [Article 17 of Amended Annex]. The absence of such marking in no way relieves any Party to the conflict of its obligations under this Article.

⁶⁸ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL II), 8 JUNE 1997, available at <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL II, ARTICLE 15—PROTECTION OF WORKS AND INSTALLATIONS CONTAINING DANGEROUS WORKS:

Works or installations containing dangerous forces, namely dams, dykes and nuclear electrical generating stations, shall not be made the object of attack, even where these objects are military objectives, if such attack may cause the release of dangerous forces and consequent severe losses among the civilian population.

⁶⁹ See generally RUGGERO J. ALDISERT, LOGIC FOR LAWYERS—A GUIDE TO CLEAR LEGAL THINKING (1997).

⁷⁰ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, available at <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 52—GENERAL PROTECTION OF CIVILIAN OBJECTS:

Civilian objects shall not be the object of attack or of reprisals. Civilian objects are all objects which are not military objectives defined in paragraph 2.

Attacks shall be limited strictly to military objectives. In so far as objects are concerned, military objectives are limited to those objects which by their nature, location, purpose or use make an effective contribution to military

on warfare call for military planners to give renewable resources the „*benefit of the doubt*“ when there is fog on the modern battlefield.⁷¹

F. Superfluous Injury and Unnecessary Suffering Theory

A more tenuous legal defense supporting protective status for renewable resources in conflict can be found in Geneva Convention (II) Article 23⁷² and the Basic Rules outlined by Protocol I, Article 35.⁷³ These articles prohibit the employment of „*arms, projectiles, or material of a nature to cause superfluous injury*“ and „*unnecessary suffering*.“ Though these articles have been most often interpreted with regard to individual injuries (e.g. from landmines),⁷⁴ there is no reason why they can not be applied on a community level. Since CO₂ is known to be a harmful pollutant and potential contributor to global warming, any strikes on renewables that result in the

action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage.

In case of doubt whether an object which is normally dedicated to civilian purposes, such as a place of worship, a house or other dwelling or a school, is being used to make an effective contribution to military action, *it shall be presumed not to be so used*.

⁷¹ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

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In case of doubt whether an object which is normally dedicated to civilian purposes, such as a place of worship, a house or other dwelling or a school, is being used to make an effective contribution to military action, *it shall be presumed not to be so used*.

⁷² See CONVENTION (II) WITH RESPECT TO THE LAWS AND CUSTOMS OF WAR ON LAND AND ITS ANNEX: REGULATIONS CONCERNING THE LAWS AND CUSTOMS OF WAR ON LAND. THE HAGUE, NETHERLANDS, 29 JULY 1899 *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

CONVENTION (II)—ARTICLE 23:

Besides the Prohibitions provided by special Conventions, it is especially prohibited

- (e) To employ arms, projectiles, or material of a nature to cause superfluous injury;
- (g) To destroy or seize the enemy's property unless such destruction or seizure be imperatively demanded by the necessities of war.

⁷³ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 35—BASIC RULES:

1. In any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited.
2. It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.
3. It is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment.

⁷⁴ See Robin M. Coupland and Peter Herby, *Review of the Legality of Weapons: A New Approach The Sirius Project*, 835 INTERNATIONAL REVIEW OF THE RED CROSS 583-592, Sep. 30, 1999 *available at* <http://www.icrc.org/> (last visited Dec. 1, 2000).

indirect emission of CO₂ can be interpreted as cause for „*superfluous injury*“ and „*unnecessary suffering*.“

D. Cultural Object Theory

Renewable Resources already receive strong protection under the previously cited provisions of international law, and though granting protective status on the theory that they are cultural objects may be a weak justification, it bears mentioning. In light of recent community movements towards sustainable development this theory can be supported by Protocol I, Article 53.⁷⁵ Sustainable development seeks to protect cultural heritage of future generations through environmental protection.⁷⁶ Since some European countries such as Germany, Holland, and Denmark place weight on environmental policy and some towns such as Ostritz, Germany seek to preserve this heritage by meeting all energy needs through renewable resources, cultural object arguments may not be so tenuous.⁷⁷

Though it may be difficult to put forth a legal defense supporting protective status for renewable resources on the theory that they are cultural objects it can not be viewed as completely unacceptable. Holland is known for its historic wind mills, and Denmark for its modern offshore windshore parks.⁷⁸ Germany is a world leader in architectural design and is renowned for its modern art. The Building Integration of Photovoltaics could easily be included therein.⁷⁹ Cultural protective status is likely to gain further legitimacy by Federal or State constitutional provisions protecting the environment.

⁷⁵ See PROTOCOL ADDITIONAL TO THE GENEVA CONVENTIONS OF 12 AUGUST 1949, AND RELATING TO THE PROTECTION OF VICTIMS OF INTERNATIONAL ARMED CONFLICTS (PROTOCOL I), 8 JUNE 1997, available at <http://www.icrc.org/> (last visited Dec. 1, 2000):

PROTOCOL I, ARTICLE 53—PROTECTION OF CULTURAL OBJECTS AND PLACES OF WORSHIP:

Without prejudice to the provisions of the Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict of 14 May 1954, and of other relevant international instruments, it is prohibited: (a) to commit any acts of hostility directed against the historic monuments, works of art or places of worship which constitute the cultural or spiritual heritage of peoples; (b) to use such objects in support of the military effort; (c) to make such objects the object of reprisals.

⁷⁶ See BETH E. LACHMAN, LINKING SUSTAINABLE COMMUNITY ACTIVITIES TO POLLUTION PREVENTION—A SOURCE BOOK—RAND 5 (1997) (quoting from OUR COMMON FUTURE, WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT (THE BRUNTLAND COMMISSION), OXFORD UNIVERSITY PRESS, OXFORD, 1987, P.43 to define „Sustainability“ as it relates to community development):

WHAT IS SUSTAINABILITY?

The most common starting definition is the one for sustainable development from the United Nations' World Commission on Environment and Development (The Bruntland Commission) 1987 Report, Our Common Future:

Development that meets the need of the present without compromising the ability of future generations to meet their own needs.

The term „sustainable development“ may have a negative connotation because it is overused and is often associated with development in other countries, rather than in the United States.

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⁷⁸ See OSTRITZ-MARIENTHAL WEB SITE available at <http://www.ostritz-st-marienthal.de/> (last visited Apr. 1, 2001) (describing Ostritz as an Energy Ecological City obtaining all its energy needs from renewable energy sources).

⁷⁹ See SOLON AG WEB SITE available at <http://www.solonag.com/> (last visited Apr. 1, 2001) (portraying a variety of architecturally unique photovoltaic projects including 7.3 kWp PV System integrated in the design of the Clinical Molecular Biological Research Centre, Elangen).

Germany's constitution calls for the protection of the environment.⁸⁰ A number of other German State constitutions have similar provisions.⁸¹ German citizens are proud of the cultural heritage they have developed for promoting „*umweltbewußtsein*“—environmental awareness. This cultural heritage for protecting the environment is reflected in the legislation adopted by many other European States. Similarly, cultural heritage may be attached to renewable resource projects underway among developing nations. As tenuous as it seems, renewables might even be viewed as a cultural object that promotes a nation's esprit d'corps or history.⁸²

VIII. SUNSET—Summary of Renewables' Protective Status

The review of international legal provisions placing limits on warfare shows that there are three basic legal restraints making it politically costly to attack renewable resources:

- 1) Means of warfare is not unlimited;
- 2) Renewables development is promoted by legislation designed to protect the environment;
- 3) Attacking renewable resources would be contrary to international consensus;

If combat strikes were planned against renewables or if a nation's renewables sector were to sustain significant collateral damage from either terrorism or hostile attack these policy themes would likely result in international criticism.

Although U.S. renewable resource policies have not received much attention in Europe, American economic growth in the renewables sector shows a tendency towards European and Asian trends. Targeting of renewables therefore would not be considered in „*common interest*“ as required by international legal regimes.⁸³ Strikes or terrorist attacks on renewables would run contrary to restrictions on warfare.

The only exception for targeting renewables can be maintained when renewables are employed in a manner contrary to protective policies. If renewables are feeding electricity in

⁸⁰ Differing from the UNITED STATES, GERMANY provides constitutional protection of the environment . See BASIC LAW FOR THE FEDERAL REPUBLIC OF GERMANY, MAY 23, 1949 *reprinted by* Press and Information Office of the Federal Government Federal Republic of Germany (1998).

ARTICLE 20A [PROTECTION OF THE NATURAL BASES OF LIFE]

Mindful also of its responsibility toward future generations, the state shall protect the natural bases of life by legislation and, in accordance with law and justice, by executive and judicial action, all within the framework of the constitutional order.

⁸¹ F/A (Bavarian and Thuringia Constitutional Provisions Protection the Environment)

⁸² Creation of the German Basic Law (Constitution) came from the desire to reestablish a State with high concern for the welfare of humanity in the wake of the destruction of World War II. See Prof. Dr. iur. Ilse Staff, *Introduction to Basic Law* in BASIC LAW FOR THE FEDERAL REPUBLIC OF GERMANY, MAY 23, 1949 *reprinted by* Press and Information Office of the Federal Government Federal Republic of Germany (1998).

⁸³ Striking photovoltaic systems would likely run contrary to international legal regimes *see, e.g.* U.N. CHARTER *available at* <http://www.un.org/Overview/Charter.htm> (last visited 1 Apr 2001):

PREAMBLE: We the peoples of the United Nations determined *to save succeeding generations from the scourge of war*, which twice in our lifetime has brought untold sorrow to mankind, and *to reaffirm faith in fundamental human rights*, in the dignity and worth of the human person, in the *equal rights of men and women and of nations large and small*, and to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained, and *to promote social progress and better standards of life* in larger freedom, and for these ends to practice tolerance and live together in peace with one another as good neighbours, and to unite our strength *to maintain international peace and security*, and to ensure by the acceptance of principles and the institution of methods, that armed force shall not be used, save in the common interest, and *to employ international machinery for the promotion of the economic and social advancement of all peoples.*

direct support of military efforts, for example to a chemical weapons plant, then they could not be viewed as promoting the „*international machinery for economic and social advancement of all peoples*.“⁸⁴ In such a case, an argument by analogy would easily lift the protective status for those renewables facilities.

Targeting renewable resources would also undermine the sovereignty of other competing legal regimes designed to protect the environment. There are various legal regimes include the following:

- RIO Declaration, Principle 24[1] „Sustainable Development“⁸⁵
- Kyoto Protocol⁸⁶
- International Red Cross Guidelines⁸⁷
- EU Treaty⁸⁸
- EU Directive on Renewable Energy⁸⁹
- German Constitution and the German Renewable Energy Law⁹⁰

Legal regimes such as these emphasize that renewables are indispensable to protecting environment. They provide legislative legitimacy for granting renewables protective status.

Though environmentalists and lobbyists may clash over scientific issues regarding threat of carbon emissions, general consensus outside of America, particularly among European allies centers around the „*precautionary principle*“—a principle demanding that countries act in precautionary manner when protecting the environment against unknown threats.⁹¹ Similarly, precautions must be taken to prevent destruction of renewable resources in time of conflict. Unless targeteers determine that eliminating specific renewables sites is necessary to meet very

⁸⁴ Striking photovoltaic systems would likely run contrary to international legal regimes *see, e.g.* U.N. CHARTER available at <http://www.un.org/Overview/Charter.htm> (last visited 1 Apr 2001):

PREAMBLE: We the peoples of the United Nations determined *to save succeeding generations from the scourge of war*, which twice in our lifetime has brought untold sorrow to mankind, and *to reaffirm faith in fundamental human rights*, in the dignity and worth of the human person, in the *equal rights of men and women and of nations large and small*, and to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained, and *to promote social progress and better standards of life* in larger freedom, and for these ends to practice tolerance and live together in peace with one another as good neighbours, and to unite our strength *to maintain international peace and security*, and to ensure by the acceptance of principles and the institution of methods, that armed force shall not be used, save in the common interest, and to *employ international machinery for the promotion of the economic and social advancement of all peoples*.

⁸⁵ *See* RIO RIO DECLARATION ON ENVIRONMENT AND DEVELOPMENT available at F/A

RIO DECLARATION PRINCIPLE 24 [1]

Warfare is inherently destructive of sustainable development. States shall therefore respect international law providing protection for the environment in times of armed conflict and cooperate in its further development, as necessary.

⁸⁶ F/A (Kyoto Protocol)

⁸⁷ *See generally*, INTERNATIONAL RED CROSS WEB SITE available at <http://www.icrc.org/> (last visited Dec. 1, 2000) (archiving all international conflict related legal provisions). *See also* Glen Plant, Environmental Protection and the Law of War: A Fifth Geneva Convention on the Protection of the Environment in Time of Armed Conflict (1992). [The Guidelines have been published as an annex to UN Doc. A/49/323 (1994). They are reprinted in 36 International Review of the Red Cross 231 (1996) which is also available on the ICRC homepage (<http://www.icrc.org>).].

⁸⁸ F/A (Environmental Provisions of the EU Treaty)

⁸⁹ F/A (EU Directive on Renewable Energy)

⁹⁰ F/A (German Basic Law and German Renewable Energy Law)

⁹¹ *See* JEREMY LEGGETT, THE CARBON WAR 23 (1999) (discussing political debate over controlling carbon emissions and specifically addressing the legal theory behind the „Precautionary Principle.“).

specific military objectives, intentional strikes, or probable damage to renewable energy sources runs contrary to legislatively supported international consensus restricting warfare.

IX. CONCLUSION—Practical Battlefield Realities

At the end of the day when the sun has set, renewables will have arrived on the future battlefield without full clarification of the RULES OF ENGAGEMENT. Since uniformed service members are increasingly placed in situations where tactical decisions may result in longstanding foreign policy ramifications, they must be aware of those policy issues that can prevent additional crisis and confusion on the front lines. SUSTAINABLE DEVELOPMENT may not become a term integrated into Defense jargon any time soon, but changes in energy technology demand that military planners take into account renewable energy when considering targeting an enemy's energy infrastructure. Although modern warfare often overrides legal theory, there is a strong basis for prohibiting attack on renewable energy sources in times of conflict.

APPENDIX I—LEGAL CONSTRAINTS PROHIBITING ATTACK ON RENEWABLES TARGETS	
Policy Filters	Source
1. No Use of Force	U.N. Charter
2. Self Defense Only	U.N. Charter
3. Environmental Protection	U.N. Charter, Rio Protocol, Kyoto Protocol
Target Characteristics	Source
1. Promotes Clean Energy	Various Government Documents
Legal Theory	Source
1. Restricted Warfare	Saint Petersburg Declaration—Renouncing Certain Explosives Protocol I, Article 35—Basic Rules
2. Civilian Target	Protocol I, Article 48—Basic Rule Protocol I, Article 50—Definition of Civilians Protocol I, Article 51—Protection of Civilian Population Protocol I, Article 52—General Protection of Civilian Objects Protocol I, Article 53—Protection of Private Property Protocol I, Article 54—Indispensible to Survival of Population Protocol I, Article 57—Precautions in Attack Protocol I, Article 58—Precautions in Effects of Attacks Protocol I, Article 62—General Protection Protocol I, Article 65—Cessation of Protection Protocol II, Article 13—Protection of civilian Population
3. Environmental Target	Protocol I, Article 35—Basic Rules Protocol I, Article 55—Protection of Natural Environment Convention on Environmental Modification
4. Cultural Object	Protocol I, Article 53—Protection of Cultural Objects
5. Dangerous Works	Geneva Convention II, Article 23(a)—Poison Prohibited Protocol I, Article 56—Protection against Dangerous Forces Protocol II, Article 15—Protection against Dangerous Forces
6. Superflous Injury	Geneva Convention II, Article 23(e)—No Superflous Injury Protocol I, Article 35—Basic Rules
7. Unnecessary Suffering	Geneva Convention II, Article 23(g)—No Unnecessary Targets Protocol I, Article 35—Basic Rules
Policy Theory	Source
1. Restricted Warfare	Protocol I, Article 35—Basic Rules
2. Environmental Protection	U.N. Charter RIO Declaration, Principle 24[1] „Sustainable Development“ International Red Cross Guidelines
3. Contrary to Consensus	EU Treaty EU Directive on Renewable Energy German Constitution Bavarian Constitution State of California California