**FINDING OF NO SIGNIFICANT IMPACT
FOR THE JOINT DOE/EPA PROGRAM ON
NATIONAL INDUSTRIAL COMPETITIVENESS THROUGH
ENERGY EFFICIENCY, ENVIRONMENT AND ECONOMICS (NICE³)**

DOE/EA--1069

AGENCY: Department of Energy

ACTION: Finding of No Significant Impact

SUMMARY:

The Department of Energy (DOE) has prepared a Programmatic Environmental Assessment (PEA), DOE/EA 1069, to assess the environment impacts associated with a joint DOE/EPA cost-sharing grant program named National Industrial Competitiveness through Energy Efficiency, Environment and Economics (NICE³). DOE funds NICE³ Projects under the Pollution Prevention Act of 1990 (PPA), and the Energy Policy Act of 1992 (EPACT). The purpose of the NICE³ Program is to encourage waste minimization technology in industry by funding projects that develop activities and process improvements to conserve energy and reduce pollution. The proposed action would provide Federal financial assistance in the form of grants to industry in order to promote pollution prevention, energy efficiency, and cost competitiveness.

The PEA presents a general analysis of the potential environmental effects associated with broad types of projects that can be funded under the NICE³ Program. It does not examine specific environmental effects or alternatives associated with individual projects. The potential environmental impacts associated with proposals to fund individual projects will be assessed in project-specific National Environmental Policy Act (NEPA) documents

Based on the analysis presented in the PEA, DOE has determined that the proposed action (providing NICE³ grants for projects which are consistent with the goals of the PPA and EPACT) does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, the preparation of an Environmental Impact Statement is not needed and the Department is issuing this Finding of No Significant Impact.

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BACKGROUND:

The NICE³ Program was developed by the EPA and DOE in 1991 in response to the PPA. It has been expanded to encompass goals contained in EPACT. While funds may be appropriated through both DOE and EPA budgets, the program is administered by DOE. NICE³ funding has been available to participants throughout the U.S. Projects have been and would continue to be evaluated on their ability to demonstrate pollution reduction technologies, energy and waste savings, and competitiveness and cost efficiency. Funding priority has been and would continue to be given to proposals that fall within one or more of the following standard industrial classifications (SIC): Pulp and Paper (SIC Code 26); Chemicals (SIC Code 28); Petroleum and Coal Products (SIC Code 29); and Primary Metals (SIC Code 33).

PROPOSED ACTION:

The proposed action is for DOE and EPA to provide NICE³ grants to industry in partnership with a state for projects which are consistent with the goals of PPA and EPACT. Eligibility for participation in the NICE³ Program is extended to all 50 states, the District of Columbia, the U.S. Virgin Islands, the Commonwealth of Puerto Rico, any territory or possession of the United States, and all Federally recognized Native Americans. (For convenience the term "state" is used

to refer to all eligible applicants.) Applications must be submitted by a state agency on behalf of or in conjunction with an industry partner(s), and may include local governments, private universities, private nonprofit organizations, private businesses, or individuals. Grants may be provided for up to 45 percent of the total project cost (prior to FY 96, funding was authorized for up to 50 percent of total cost) for projects that demonstrate energy-efficient and waste-minimizing industrial applications, implement efficiency improvements in processes and reduce by-product waste streams, and encourage pollution prevention and energy conservation.

ENVIRONMENTAL IMPACTS:

Potential environmental impacts associated with the implementation of the NICE³ program include impacts to air and water resources, waste management, land use, endangered and threatened species, cultural resources, socioeconomics, and energy consumption. The PEA assess the potential environmental impacts associated with the NICE³ program by assessing previously funded projects.

Short-term negative impacts of the NICE³ Program would result from construction activities of individual projects. However, in the long term, the NICE³ Program would contribute to improved environmental conditions by increasing energy efficiency and reducing waste generation. It is reasonably foreseeable that new, but permissible discharges could result as new, less polluting technologies replace older technologies.

Air Resources: Reduced emissions of Clean Air Act (CAA) pollutants from decreased energy demand and subsequent reductions in power generation would improve air quality in the long term. Other positive impacts would be reduced emissions of carbon dioxide from the use of natural gas as a fuel, reduced consumption of motor vehicle fuels and reduced emissions of volatile organic carbons and hydrocarbons. Short-term impacts associated with construction activity fugitive dust emissions would be held to insignificant levels through the application of standard construction techniques, in compliance with state and local standards and permitting requirements.

Impact Examples:

Reduced carbon dioxide emissions (by approximately 2,514 tons/year/facility) are expected from a project to recycle water used for cleaning which reduces the quantity of contaminated wastewater shipped off-site for incineration. Reductions result from the reduced consumption of natural gas in the incinerator and the reduced consumption of fuel in the vehicles transporting the wastewater to the incinerator (see Example 2, Appendix 1 of the NICE³ PEA).

A new technology for the recycling of aluminum chips contaminated with cutting oil and coolants could decrease fume and dust emissions and reduce hazardous gas and volatile organic compound emissions from 206 tons/year/facility to zero (see Example 5, Appendix 1 of the NICE³ PEA). Other NICE³-supported technologies identified in Appendix 1 of the NICE³ PEA also would contribute to reduced tanker truck, toxic lead and nickel, nitrous and sulfur oxides, and volatile organic compound emissions.

Only one project would not result in decreased gaseous effluent discharges (see Example 14, Appendix 1 of the NICE³ PEA). A new electrophotographic screening process for phosphorous coating of television cathode ray tubes would produce an estimated 40 tons/year/facility of toxic gaseous hydrocarbon (GHT) as organic solvents (toluene/xylene). The process would exhaust the solvents to an incinerator with greater than 95 percent destruction capability, higher than the 90 percent required for other dry-coating technologies. The remaining two tons of GHTs have been permitted by the state under its authority to implement provisions of the CAA and after its determining that the potential release of the 40 tons a year (assuming non-use of the incinerator) would not pose a significant threat to the environment or anyone living in proximity to the facility.

Water Resources: Most NICE³ projects involve reductions in the quantities of liquid wastes requiring treatment or disposal, or a reduction in the quantity of liquid wastes discharged into streams or rivers. In either case the result is improved water quality.

Impact examples:

The new electrophotographic screening process for color picture tube manufacturing would reduce, possibly eliminate, the amount of waste water generated in picture tube manufacturing (see Example 14, Appendix 1 of the NICE³ PEA).

A Dense Fluid Extraction process, a high pressure process using carbon dioxide in a liquid form referred to as a super-critical fluid state, for metal cleaning would replace the current perchloroethylene (PERC) process. The elimination of the PERC waste stream would reduce the possibility of groundwater and soil contamination due to spills (see Example 24, Appendix 1 of the NICE³ PEA).

In a third project, the use of post-consumer waste paper to produce pallets would result in a 50 percent reduction in water use and a 35 percent reduction in wastewater generation (see Example 4, Appendix 1 of the NICE³ PEA).

Waste Management: By emphasizing source reduction and waste minimization methods, NICE³ projects would encourage safe and efficient waste management practices, reducing wastes by approximately 100 million tons by the year 2010.

Impact Examples:

A methanol recovery system saves FMC from sending over 500,000 gallons of methanol to an off-site incinerator facility (see Example 1, Appendix 1 of the NICE³ PEA). Also, PPG industries decreased their volume of waste requiring disposal and reduced the amount of fuel required for transporting waste and incineration (see Example 2, Appendix 1 of the NICE³ PEA). AMPCO Metal Manufacturing Company anticipates reducing total waste by nearly 14,000 tons per year per unit (see Example 6, Appendix 1 of the NICE³ PEA).

Land Use: Due to increased energy efficiency and reduction in energy demand, land resources would remain undisturbed due to a potential decrease in exploration and production of energy resources. A second potential impact is the reduced demand for existing or new disposal capacity due to the reduced volumes of waste products being generated. Construction activities

associated with NICE³ projects are expected to occur within existing structures or in close proximity to existing buildings in industrial areas.

Impact Examples:

By eliminating nearly 18,000 tons of wastepaper from the regional waste stream, Erving Paper Mills, Inc. anticipates reducing landfill requirements correspondingly (see, Example 17, Appendix 1 of the NICE³ PEA). Similarly, Damage Protection Products' expects, through its 40-percent recycled paper project, to save 2.9 million cubic yards of landfill space as a result of 1.9 billion pounds per year of wastepaper eliminated from the waste stream (see Example 4, Appendix 4 of the NICE³ PEA).

Endangered and Threatened Species: Short-term construction activities associated with NICE³ demonstration projects could affect listed species if a project were located within their habitat range. However, in such a case, DOE would direct the grant applicant to execute appropriate mitigative actions as a condition for the grant or, reject the applicant's request for funding.

Cultural Resources: Since most projects would be located within existing facilities, it is very unlikely that cultural or archeological resources or areas of historical significance would be affected. When sufficient uncertainty exists, the state historic preservation office would be contacted to determine whether cultural or archeological resources or areas of historical significance exist at the site. If necessary, DOE would direct the grantee to execute appropriate mitigative actions.

Socioeconomics: The main beneficiaries of the NICE³ Program would be industry partners that develop the funded project at a reduced cost to their company. Increases in energy efficiency and waste minimization may lead to lower utility and energy costs for energy consumers, but this appears unlikely. Individual projects would affect different groups depending on various factors -- for example, while a project reducing wastes may impact companies providing waste treatment or disposal services, another project implementing new technologies within an industry may require new skills resulting in increased wages for workers. With regard to environmental justice issues, DOE would endeavor to ensure, through the project review and selection process, that

NICE³-funded projects would not have disproportionately high or adverse impacts on minority and low-income populations.

In most cases, grants issued for implementation of projects under the NICE³ Program are for site-specific applications in buildings and areas previously disturbed. Therefore, the potential environmental impacts resulting from the proposed action are not expected to be significant because of the small scale of individual grants. Each grant would be monitored closely by DOE and EPA and the respective industrial partner(s).

ALTERNATIVES TO THE PROPOSED ACTION:

No Action Alternative: Under the No Action alternative, DOE and EPA would not provide funding for NICE³ projects. However, DOE and EPA are authorized to provide grants to fund the NICE³ Program when funds are appropriated by Congress. As a result, the No Action alternative would not accomplish EPACT's direction to DOE "to continue to carry out a 5-year program to improve the energy efficiency and cost effectiveness of pollution prevention technologies and processes, including source reduction and waste minimization technologies and processes."

Other Alternative Actions: Single Agency Administration: This alternative would allow only one agency, either the EPA or DOE, to fund the NICE³ Program. However, since EPA, in response to the PPA, must "promote source reduction practices in other Federal agencies," participation by both EPA and DOE would assure that the application of the grants are consistent with the PPA. Furthermore, joint funding would allow each agency to maintain appropriate control to ensure the goals of NICE³ are met.

Projects Not Eligible for Funding: Various other types of waste minimization, waste reduction, energy efficiency and energy recovery projects are not eligible for funding under the NICE³ Program. These include nuclear waste management, end-of-pipe treatment, waste disposal, municipal solid waste collection or separation, incineration for energy recovery, noise abatement, and research and development projects and have not been included in the NICE³ Program for the following reasons:

- Nuclear Waste Management: This program is the responsibility of DOE's Office of Environmental Management and does not meet the goals of the PPA or EPACT.
- End-of-Pipe Treatment and Waste Disposal: The focus of the PPA is on pollution reduction at the source. End-of-pipe solutions and disposal efforts are underway in other DOE and EPA programs and are not consistent with the pollution reduction goals of the PPA.
- Municipal Solid Waste Collection or Separation, Incineration for Energy Recovery: There is already an existing DOE program, the Municipal Solid Waste Management program, that is responsible for solid waste collection and separation. Incineration for energy recovery projects are excluded from NICE³ Program funding because they are covered under the Municipal Solid Waste Management program.
- Noise Abatement: Since noise abatement does not contribute to reductions in energy or waste generation, it does not contribute to the goals of the PPA or the NICE³ Program.
- Research and Development: In order to achieve the intent of NICE³, projects must be beyond the R&D stage and be ready to demonstrate full-scale operation.

DETERMINATION:

Based on the analysis in the PEA, DOE has determined that the proposed action, to provide NICE³ grants to industry in partnership with a state for projects which are consistent with the goals of PPA and EPACT, is not a major federal action significantly affecting the quality of the human environment. Therefore, the preparation of an environmental impact statement is not required and DOE is issuing this finding of no significant impact.

Issued at Washington, DC, this 19th day of March, 1997.

Christine A. Ervin
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Energy Efficiency and Renewable Energy

**Programmatic Environmental Assessment for the
National Industrial Competitiveness through
Energy Efficiency, Environment and Economics
(NICE³)
Program**

DOE/EA 1069

U.S. Department of Energy

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ABBREVIATIONS AND ACRONYMS

CAA	Clean Air Act
CWA	Clean Water Act
DOE	U.S. Department of Energy
EA	Environmental Assessment
EPA	Environmental Protection Agency
EPACT	Energy Policy Act of 1992
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969, as amended
NPDES	National Pollutant Discharge Elimination System
PEA	Programmatic Environmental Assessment
PPA	Pollution Prevention Act of 1990
SIC	Standard Industrial Classification
VOC	Volatile Organic Compounds

PREFACE

This document assesses the environmental impacts associated with the National Industrial Competitiveness through Energy Efficiency, Environment, and Economics (NICE³) Program, a grant program jointly funded by the U.S. Department of Energy (DOE) and U.S. Environmental Protection Agency (EPA). Within this programmatic environmental assessment (PEA) DOE considers the environmental consequences of and alternatives to the NICE³ grant Program. The Program was established jointly by DOE and EPA in response to concerns expressed by Congress in the Pollution Prevention Act of 1990 (PPA), 42 USC §13101. In the PPA, the EPA was charged with the responsibility to address pollution problems through prevention rather than treatment and disposal. As originally designed by DOE, the NICE³ Program also required that, in order to qualify for a grant, a project must be cost-effective and energy-efficient. The Program has been expanded to encompass new goals contained in the Energy Policy Act of 1992 (EPACT), Public Law 102-486, and the Climate Action Plan, Number 16.

As a PEA, this document cannot analyze the impacts associated with every project that will ever be funded under the NICE³ Program. This PEA focuses on the individual and cumulative impacts of representative projects. It also identifies criteria by which future projects can be evaluated to determine whether they fall within the parameters established by the NICE³ PEA. No additional NEPA documentation is necessary for those projects. For specific NICE³ projects which do not fall within those parameters, additional NEPA documentation would be prepared. When appropriate, such documents may tier from this PEA.

1.0 INTRODUCTION

This programmatic environmental assessment (PEA) has been prepared by DOE in compliance with the National Environmental Policy Act of 1969 (NEPA), as amended, to assess the general impacts associated with a joint DOE/EPA program to encourage industry demonstration of new and innovative technologies to minimize waste generation, promote energy efficiency, and promote cost-competitiveness. DOE and EPA have named this program the National Industrial Competitiveness through Energy Efficiency, Environment and Economics (NICE³) Program (the Program).

The NICE³ Program was initiated in 1991 by EPA and DOE to (1) encourage cleaner production and manufacturing processes in the United States, (2) reduce wastes in industry, (3) conserve energy and energy-intensive materials, and (4) improve industrial cost-competitiveness through Federal financial assistance. The Program was developed by EPA and DOE in response to findings by Congress which resulted in the enactment of the Pollution Prevention Act of 1990 (PPA). As stated in the PPA, it is the policy of the United States that pollution prevention be preferential to recycling, that recycling be preferential to treatment, that treatment be preferential to disposal, and that disposal be employed only as a last resort. The Energy Policy Act of 1992 (EPACT), Public Law 102-486, Section 2108, authorized the Secretary of Energy, in consultation with the Administrator of EPA, "to continue to carry out a 5-year program to improve the energy efficiency and cost-effectiveness of pollution prevention technologies and processes, including source reduction and waste minimization technologies and processes."

Eligibility for participation in the NICE³ Program is extended to all 50 states, the District of Columbia, the U.S. Virgin Islands, the Commonwealth of Puerto Rico, any territory or possession of the United States, and all Federally recognized Native American Tribes. Only state agencies on behalf of or in conjunction with an industry partner(s) can apply for this grant program. Local governments, state governments, private universities, private non-profit organizations, private businesses, individuals, and all others must apply through a state agency. For convenience, the term "state" in this PEA refers to all eligible applicants. In short, in order for a project to be eligible it must meet the following criteria:

- The application must be submitted by a state and have at least one U.S. industry partner.
- The project must involve the demonstration of a proven technology. It may not involve research and development.
- The project must save money and energy and reduce environmental waste.
- The project must be technically feasible and able to be deployed in the marketplace.
- The applicant must show that they are capable of designing, construction, testing, and evaluating the proposed concept.

2.0 PURPOSE AND NEED

The Pollution Prevention Act of 1990 directed the EPA to develop and implement a strategy to promote the reduction of pollutants at their source. As part of this strategy, EPA was further directed to coordinate with other Federal agencies and to promote generic research and development on techniques that have broad applicability; to facilitate the adoption of source reduction techniques by businesses, including the use of state matching grants to foster the exchange of information regarding source reduction techniques; and provide for technical

assistance to businesses. In response to the provisions of this Act, and subsequently Section 2108 of the Energy Policy Act of 1992 (EPACT), and Climate Action Plan, Number 16 (to reduce the emission of carbon dioxide), EPA and DOE have sponsored the NICE³ Program. The goal of the NICE³ Program is to encourage, through grants to private industry, the demonstration of waste minimization technologies that are energy-efficient and cost-effective. While funds may be appropriated through both the DOE and EPA budgets, the Program is administered by DOE. Through this PEA, DOE is assessing the programmatic environmental impacts associated with NICE³ projects.

The purpose of this document is not to assess the merits of developing a technical and financial assistance program nor is it to determine whether that program should be in the form of grants or other types of financial aid. The decisions on the funding mechanism and the goals of the program were made by Congress when it directed EPA to develop a grant program in coordination with other Federal agencies. The only discretion the DOE has in the administration of the NICE³ Program is in deciding which projects to fund.

Representative projects are identified in Appendix 1. Projects funded in 1994 and 1995 were evaluated individually under NEPA with a determination that each could be categorically excluded from further NEPA review. Projects selected for 1996 funding will be evaluated under this PEA and the NEPA Rule to determine if additional NEPA assessment is needed.

The purpose of this PEA, as required by NEPA, is to provide a programmatic environmental analysis of potential impacts of activities that could be funded under the NICE³ program and to provide a basis for DOE decisions to fund projects under the NICE³ program. This PEA is the first phase of NEPA compliance; the second phase will include appropriate project-specific NEPA analysis.

2.1 The NICE³ Program

Under the NICE³ Program, DOE may fund up to 45 percent of a project's total cost (prior to FY 96, funding was authorized for up to 50 percent of total cost). In order for a project to be considered for a grant, it must demonstrate the ability to improve industrial efficiency, reduce industry's costs, and lower pollutant emissions to the environment. In general, projects which can achieve these goals are those that:

- Demonstrate successful industrial applications of less polluting, more energy efficient technologies in conjunction with innovative waste minimization techniques.
- Encourage accelerated adoption of energy-conserving and pollution-prevention technologies.
- Coordinate the activities of institutions responsible for energy consumption, protection of the environment, and economic competitiveness at Federal, regional, state, and local levels.
- Identify and implement improvements in the use of materials and supplies, more efficient processes, and reduction of by-product waste streams.
- Develop strategies to overcome barriers that inhibit energy efficiency and waste minimization techniques in business and industry.
- Enhance industrial competitiveness through the introduction and dissemination of cost-effective waste minimization and energy-efficient processes, equipment, and practices.

Projects which result in a "net" reduction in waste generation are eligible for funding. Projects are not disqualified on the basis of the fact that a new source may be created as long as the new source is more than offset by a reduction in the generation of another pre-existing waste stream. New sources which are below State thresholds for permitting do not require an independent impacts analysis since by virtue of their exempt status the State has already determined that these releases will not have a significant impact. However, projects which involve nuclear waste management, end-of-pipe treatment, waste disposal, municipal solid waste collection or separation, incineration for energy recovery, noise abatement, and research and development are not eligible for funding, as discussed below.

Projects falling under all Standard Industrial Classification (SIC) codes (1-39) would be considered for funding; however, priority would be given to proposals that fall into one or more of the following broad SIC codes:

- Pulp and paper, SIC Code 26;
- Chemicals, SIC Code 28;
- Petroleum and coal products, SIC Code 29; and
- Primary metals, SIC Code 33.

NICE³ projects are selected through a national screening process. Applications are forwarded by the state to the appropriate DOE Regional Support Office and from there to DOE's Golden, Colorado Field Office. They are screened for Program eligibility at each stage, with a close technical review performed at the Field Office by a team comprised of technically qualified personnel from DOE and other Federal agencies. The components of this review include: concept description, innovation, cost-efficiency, applicant information and capabilities, energy savings, waste savings, economic competitiveness, commercialization, job impacts/labor savings, and outside resources. Following the basic eligibility and technical reviews, a National Selection Panel, comprised of technical staff representatives from DOE Headquarters and Regional Offices, the Environmental Protection Agency, the National Institute of Standards and Technology, the Department of Defense, and non-federal personnel, performs a final selection review of the remaining eligible applicants. While the Panel is usually not comprised of the same individuals from one year to the next, there usually is some overlap to maintain institutional knowledge. Eligible projects are ranked by the Panel, and top-ranking applications are funded, following negotiations (between DOE and the state), until Program funds are depleted. Non-selected applicants often re-apply in subsequent grant cycles and have their projects approved at that time.

Projects which involve nuclear waste management, end-of-pipe treatment, waste disposal, municipal solid waste collection or separation, incineration for energy recovery, noise abatement, and research and development are not eligible for funding because they do not meet the intent of Congress in the PPA and for individual reasons as follows:

Nuclear Waste Management: Projects relating to the clean-up of radioactive wastes and the development of new technologies for the remediation of contaminated sites are the responsibility of DOE's Office of Environmental Management.

End-of-Pipe Treatment and Waste Disposal: The focus of the PPA is on waste minimization, that is, pollution avoidance rather than treatment. This requires addressing upstream steps in industrial processes, materials use, and innovative products that will help industry reduce the

generation of wastes. End-of-pipe solutions, disposal, and recycling efforts are already underway in other DOE and EPA programs.

Municipal Solid Waste Collection or Separation, Incineration for Energy Recovery: There is an existing DOE program, the Municipal Solid Waste Management Program, that has responsibility for solid waste collection and separation. That program includes technology development and data collection efforts for solid waste collection and separation activities. As with the NICE³ Program, these are cost-shared projects with industry. The Municipal Solid Waste Management Program also is evaluating and collecting data on the use of incineration for energy recovery. Alternatives to incineration, such as gasification and biological digestion of organic matter, also are being explored.

Noise Abatement: Noise abatement does not contribute to energy reduction or to a reduction in waste generation; therefore, it does not contribute to the goals of the PPA.

Research and Development: Grants for basic research and development (R&D) are not a part of the NICE³ Program because of the Program's focus on energy efficiency and waste reduction. In order to achieve these goals, projects must be beyond the R&D stage and ready for demonstration in full-scale operation. The Program, therefore, supports those technologies whose performance can be verified on an industrial line and that can reach commercial scale application quickly after the initial tests in the industrial process line.

3.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

3.1 The No Action Alternative

Under the No Action alternative, DOE and EPA would not provide funding for NICE³ projects. However, DOE and EPA are authorized to provide grants to fund the NICE³ Program when such funds are appropriated by Congress. As a result, the No Action alternative, in the absence of another viable program, would not be consistent with EPACT's direction that DOE "continue to carry out a 5-year program to improve the energy efficiency and cost effectiveness of pollution prevention technologies and processes, including source reduction and waste minimization technologies and processes."

3.2 The Proposed Action: DOE and EPA Joint Administration of the NICE³ Program

Under the proposed action, DOE would provide NICE³ grants for projects which are consistent with the goals of the PPA, and EPACT. The types of NICE³ projects which may qualify for grants include those that:

- Demonstrate successful industrial applications of less polluting, energy-efficient technologies in conjunction with innovative waste minimization techniques.
- Encourage accelerated adoption of energy-conserving and pollution-prevention technologies.
- Coordinate the activities of institutions responsible for energy consumption, protection of the environment, and economic competitiveness at Federal, regional, state, and local levels.
- Identify and implement improvements in the use of material and supplies, develop more efficient processes, and reduce by-product waste streams.

- Develop strategies to overcome barriers that inhibit the use of energy-efficient and waste minimization techniques in business and industry.
- Enhance industrial competitiveness through the introduction and dissemination of cost-effective waste minimization and energy-efficient processes, equipment, and practices.

Following are brief discussions of four projects previously funded under this Program which demonstrate the degree to which energy conservation, waste reduction, and cost-competitiveness can be achieved through the NICE³ Program.

3.2.1 New Energy Saving Process for Recovering and Reusing Methanol

Prior to June 1991, approximately 436 million pounds a year of waste methanol was disposed of by burning it in cement kilns as a waste fuel. Changes in environmental regulations now require that it be burned in incinerators, an expensive and energy-intensive process.

In the process of purifying hydrogen peroxide, waste methanol is produced as a result of cleaning the catalyst with a methanol wash to remove trace quantities of hydrogen peroxide, organic solvents, and metal cations. During this process, the methanol then becomes a waste product.

In 1991, FMC Corporation, with the assistance of a NICE³ grant (Appendix 1, Project 1), investigated the use of a new method of steam distillation to recover the contaminated methanol by spraying steam directly into the distillation column. Distillation is a separation process in which vapors are created from the liquid stream by heating the liquid. If several liquids are present, each liquid can be vaporized and collected separately by heating different sections of a vertical column to the vaporization temperature (boiling point) of that particular liquid as it falls through the column. The new process allows 90 percent of the volume of the contaminated methanol to be recovered and reused. In addition to recovering a high percentage of methanol, the steam distillation technique allows for safer operation of the distillation column because separation can be accomplished at a lower temperatures than in a conventional distillation column. In traditional distillation, steam or another heat source is applied indirectly through an external reboiler. By contrast, in direct steam distillation, the steam acts as a dilutant, preventing the buildup of undesirable quantities of hydrogen peroxide and metal cations in the bottom of the distillation column. As a result, two potential hazards are avoided: 1) generation of oxygen from the decomposition of hydrogen peroxide by metal ions, which can lead to a methanol fire or explosion; and 2) violent decomposition or detonation reactions catalyzed by the metal ions and activated by a high concentration of hydrogen peroxide in the bottom of the column.

Based on the first year and a half of operation the system has operated at a recovery efficiency of 98.6 percent compared to a predicted efficiency of 90 percent, with an annual energy savings of 25.2 billion Btu. The system also will save approximately 1.93 million pounds of methanol from having to be disposed of each year. In 1992, FMC Corporation saved more than \$500,000 in operating expenses using this method of methanol recovery. Any industry with a waste methanol stream may apply this technology to their processes.

3.2.2 Ultrasonic Dishwashing Reduces Wastewater and Nitrous Oxides Emissions

Over 4 million commercial dishwashers used in retirement homes, restaurants, universities, hospitals, and other institutional kitchens utilize a technology developed in the late 1880's. These dishwashers use large volumes of high-temperature, highly pressurized water, plus strong detergents to clean dishes adequately.

Ultrasonic Products, Inc., (UPI) produced an ultrasonic dishwashing technology that uses lower temperature water and less detergent, resulting in energy savings, wastewater reduction, and a reduction in nitrous oxides emissions from power generating facilities. This technology, first demonstrated in 1990 and later reported by Southern California Edison to be the leading technology with the greatest potential for savings, operates at a lower water temperature (100°F) than conventional dishwashers (140°-160°F with sanitizing rinse at 180°F), uses no strong detergents, requires much less water, generates less wastewater, and reduces the amount of dish breakage from thermal stress.

The technology, which UPI has patented and registered globally, utilizes an ultrasonic transducer that can be molded into the shape that best fits the geometry of the dishwashing unit. The transducer generates sound waves that result in micro-bubbles collapsing on the dish surface at a rate of 40,000 times per second. The mechanical scrubbing and cleaning action derived from this action allows cooler water to be used. This new system is also omnidirectional, allowing waves to permeate into the interior of objects with no "dead spots."

Potential benefits include an estimated reduction in wastewater by 1.42 billion gallons per year nationwide, an 8.2 million pound reduction in nitrous oxides emissions annually due to the reduced electrical demand, and a reduction in the use of harsh, caustic detergents. The reduced electrical demand would save operators of dishwashers \$14.2 million annually in energy costs. These estimates are based on the assumption that this technology could be applied to 15 percent of all commercial dishwashers in the United States.

3.2.3 UV-Curable Coatings for Aluminum Can Production

This project deals with the transfer of an existing technology rather than with the demonstration of a new technology. Coors Brewing Company, with the assistance of a NICE³ grant (Appendix 1, Project 12), is attempting to encourage other aluminum can manufacturers to adopt UV-curing technology.

Conventional practice uses solvent-based printing and over-varnish coatings. These are applied to the aluminum and cured by convective heat transfer in natural gas-fired ovens. The UV-curing technology, used by Coors since 1974, also is used on furniture and paper, plastic, and glass products. The UV-curing process reduces energy consumption and solvent emissions.

In the UV-curing process, mercury vapor lamps produce the UV light that cures coatings at room temperature. Because oven air is not heated and large air fans are not needed, less energy is consumed and fewer volatile organic compounds (VOCs) are released. Although the process is already more cost effective than thermal curing, it has not achieved widespread acceptance due to a lack of familiarity within industries where it could be used. This project's goals are to develop better and even more cost-effective coatings and to educate others by quantifying and advertising the energy savings and pollution prevention benefits.

The Coors plant produces approximately four percent of the aluminum beverage cans in the United States. The estimated energy savings at the Coors facility alone are 62 billion Btu/year. Coors estimates that the potential for future savings will be 2.2 trillion Btu in 2010.

UV-curing technology reduces pollution at the source by applying less coating material to each can. UV-cured coatings contain fewer solvents, so fewer VOCs and other pollutants are released. The technology meets the stringent emission standards of the Clean Air Act Amendments of 1990 and the Pollution Prevention Act without end-of-pipe VOC emission control. Currently, waste reduction provided by the Coors facility alone has been more than

4,500 tons to date. On a national basis, UV-curing could reduce waste by more than 160,000 tons in 2010.

Even without additional cost reductions, UV-curing is cheaper than thermal curing. In existing facilities, replacing thermal curing with UV-curing instead of end-of-pipe treatment could result in annual savings of \$12,000 per billion cans. (Currently it is estimated that about 100 billion aluminum beverage cans are produced in the United States per year. By 2010 that number is expected to be 165 billion cans per year.) Using UV-curing instead of thermal curing in new plants could result in annual savings of \$100,000 per billion cans.

3.2.4 New Manufacturing Process for Color TV Picture Tubes

This project (Appendix 1, Project 14) involves the application of a new technology for the manufacture of color television picture tubes that is intended to provide higher image resolution while improving energy efficiency and promoting waste reduction. Proprietary to Thompson Consumer Electronics, Inc. (TCE) of Lancaster, PA, the new technology, while already demonstrated successfully in the laboratory, must be transferred to a full manufacturing environment for trial.

Under the NICE³ pilot project, the new tube process will take TCE's proprietary technology, an electrophotographic screening process for phosphorus coating of cathode ray tubes which uses a dry phosphor adhesion process, and apply it to a pilot-scale manufacturing line at a Marion, Indiana, facility. The three-year project is expected to produce thousands of picture tube units each day. Compared with current technology, this new process is expected to offer millions of dollars in annual savings for each system in operation. Energy savings are projected to be about 278 billion Btu per year for each operating system. Environmentally, the new process is expected to reduce greatly the amount of wastewater currently generated in the production of color TV picture tubes.

The current screening process utilizes a water-based coating process resulting in phosphorous sludge and water waste. The new process uses a dry phosphor adhesion process, which eliminates the generation of all waste water and all screening machine waste. It makes use of organic solvents, which are exhausted to an incinerator that will destroy over 95 percent of the solvents.

Once successfully demonstrated in a production environment via the NICE³ project, the new technology's benefits and advantages are expected to have global applications, and, given the competitive intensity of the consumer electronics industry, a shift to the new technology is anticipated to be rapid. Further, adoption of the technology also should enable third-world countries to compete more effectively.

Because, pending the NICE³ pilot project, it has not yet been demonstrated in a production environment, the technology presently is considered risky. This is discussed more fully in Section 5 of this PEA.

3.2.5 Other NICE³ Projects

Appendix 1 provides a synopsis of several NICE³ projects, including the four described above. As can be seen from Appendix 1, NICE³ projects range in cost from several hundred thousand dollars to several million dollars. DOE funding is limited to 50 percent of the total project cost. Depending on the level of appropriation there also may be a limit on the maximum funding for any one project. Energy savings range from a million Btu per year to over a trillion Btu per year.

Environmental benefits include the recovery of methanol; reduced emissions of carbon dioxide, sulfur oxides, and nitrous oxides; reduced emissions from incinerators; reduced generation of waste waters and other waste materials; the elimination of emissions of lead, mercury, and nickel; and the reduction or elimination of other hazardous or toxic pollutants. In addition to energy savings and reductions in the generation of wastes, all projects exhibit an economic savings for the industrial partner. For the projects listed in Appendix 1, these savings range from a few thousand dollars to several million dollars. As demonstration projects, it is hoped that other industries will adopt these technologies, thus multiplying the benefits many times over.

3.3 Single Agency Administration

Under this alternative only one agency, either DOE or EPA, would administer the NICE³ Program without assistance from the other. Whether overall funding would change or not is difficult to determine; however it is doubtful that Congress would appropriate more money for the program if it were fully administered by EPA or DOE alone. Because the PPA calls for EPA to "promote source reduction practices in other Federal agencies," continued participation by both agencies assures that the grants (administered by DOE) are consistent with overall objectives of the PPA (an EPA responsibility). Furthermore, EPA has other responsibilities under the PPA, such as the establishment of training programs on source reduction technologies, and data gathering and dissemination, which are easier to meet if they are involved in the grant process. Therefore, while administration by only one agency would not violate the provisions of PPA, joint administration allows each agency to maintain an appropriate level of control pursuant to that agency's functions to ensure that its goals are met.

4.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This section identifies areas of the environment likely to be affected by implementation of the NICE³ Program.

4.1 Geography

Geographic areas that could be affected by this Program include the fifty states, the District of Columbia, the U.S. Virgin Islands, the Commonwealth of Puerto Rico, and territories or possessions of the United States.

4.2 Air Resources

All air quality regions could be affected by actions taken under the NICE³ Program. In particular, air quality in industrial areas is likely to be affected, since most projects would be located within existing industrial facilities. Consideration must be given to potential new releases of pollutants and the regulation of those pollutants under the Clean Air Act and other pertinent Federal and state statutes. There could be potential air impacts from construction activities associated with the implementation of these projects.

4.3 Water Resources

Measures covered under the NICE³ Program most likely would affect water quality in areas where industrial facilities already are located. There could be potential new releases of pollutants. The regulation of those pollutants under the Clean Water Act and other pertinent Federal and state statutes would be considered in appropriate project-specific environmental analyses. Impacts on surface waters and ground waters would be considered from the

perspectives of both the operation of the new processes and from activities that may impact these resources during any related construction activities. There could also be potential impacts on wetlands and floodplains which would be considered in these assessments.

4.4 Land Use

Lands potentially affected by the NICE³ Program would include previously developed industrial facilities, where projects most likely would be located, and lands where energy resources are located. For projects which would involve the construction of new facilities or the construction of access roads, consideration would be given to the impacts associated with these activities in previously undisturbed areas. These considerations would include the potential for impacts on historically or culturally sensitive areas, areas of archeological significance, wetlands or floodplains, and habitat for endangered or threatened species.

4.5 Endangered and Threatened Species

A wide variety of endangered and threatened species exist in areas eligible for funding under this Program. Most projects under the NICE³ Program, however, would take place in areas that already have been disturbed. However, as identified above, consideration would be given to the potential for impacts on endangered and threatened species and their habitats from project-related activities if there are construction activities associated with the project, especially if those activities take place in previously undisturbed areas.

4.6 Cultural Resources

Land resources or existing buildings associated with activities funded under the NICE³ Program are unlikely to possess historic or archeological significance since most activities would take place in areas where the land has already undergone significant industrial development. Consideration would be given to the potential for impacts on historically or culturally sensitive areas and areas of archeological significance that could be impacted by NICE³ projects, especially if those activities take place in previously undisturbed areas.

4.7 Socioeconomics

Consideration would be given to the potential for local and regional socioeconomics that could be impacted by NICE³ projects.

On February 11, 1994, Executive Order No. 12898, Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations, was issued. This Order requires that all Federal agencies consider and address disproportionately high and adverse effects of their programs on minority and low-income populations. Individuals living in proximity to the industrial facilities eligible for NICE³ grants could be affected, as well as the workers at and owners of those facilities.

In the event of potential adverse impacts due to NICE³ project funding, DOE would conduct the appropriate analysis to determine if the area contained low-income or minority communities which could be subject to disproportionately high and adverse impacts. If it appears that disproportionately high and adverse impacts to low-income or minority communities would occur, the Department would address those impacts prior to issuing any NICE³ grant.

Generally, the public would be beneficially affected by the reduced potential of exposure to hazardous materials stored or shipped off-site from facilities where these projects are implemented and by reduced releases of potential pollutants into the environment.

4.8 Energy Consumption

Because the NICE³ Program has been designed to encourage energy efficient processes, it is reasonable to expect that there would be some effect on the generation of electrical power or the burning of fossil fuels resulting from the funding of projects. This would have a corresponding impact on the environment relating to the decreased generation of electrical power or the decreased burning of fossil fuels.

5.0 ENVIRONMENTAL IMPACTS OF THE PROPOSED ACTION

Projects funded under the NICE³ Program are undertaken in pursuit of a common goal -- to improve U.S. industry competitiveness through demonstration of energy efficient, cost-effective, and waste minimizing technologies. The NICE³ Program would result in improved overall environmental conditions in the long term through an increase in energy efficiency and a reduction in the need for waste treatment and disposal. Additional benefits to the environment also could be realized in the delayed need for exploration and production of energy resources and in the reduced need for waste disposal capacity.

Negative impacts associated with the NICE³ Program would probably be the result of construction activities for individual projects and would be limited to the short term. It is also possible that new but permissible discharges could result as new, less polluting technologies replace older technologies.

The potential environmental impacts associated with each project selected for funding under this Program would be evaluated in compliance with the National Environmental Policy Act.

5.1 Air Resources

In the long term, overall air quality would improve through implementation of the NICE³ Program. Improved air quality would result primarily from decreases in energy demand and, therefore, reductions in emissions of Clean Air Act (CAA) criteria pollutants at power generating facilities.

The NICE³ Program has excluded incineration for energy recovery projects from funding; however, incineration is an accepted treatment technology for reducing the emissions of certain waste materials, such as volatile organics. For projects where incineration is used, the emissions from those facilities must be assessed and separate NEPA documentation prepared if there would be any potential for an environmental impact.

In the short term, construction activities associated with NICE³ projects may impact air quality in the immediate vicinity of the construction areas, most of which are expected to be in existing industrial areas. These impacts most likely would be limited to fugitive dust emissions. All construction activities would conform to appropriate Federal, state, and local standards and permitting requirements.

Impact Examples

The PPG project for Reducing Contaminated Wastewater from Water-Based Paint equipment cleaning operations (Appendix 1, Project 2) is estimated to reduce carbon dioxide emissions by approximately 2,514 tons/year/facility. Previously, 400,000 gallons of wastewater were shipped off-site for incineration. This resulted in the release of approximately 2,466 tons per year of carbon dioxide from the combustion of natural gas for the incinerator and an additional 183 tons per year from the combustion of fuel during the transportation of the wastewater to the incinerator. The new process, a combination of ultrafiltration followed by a reverse osmosis system, reduces the volume of wastewater to only 20,000 gallons. The cleaned water is placed in storage and reused. Carbon dioxide releases are reduced to 123 tons per year from the incinerator and 11 tons per year from tanker fuel consumption.

The On-Site Aluminum Recycling project (Appendix 1, Project 5) for aluminum chips contaminated with cutting oil and coolant would eliminate the need for aluminum to be heated twice, reducing energy use dramatically. Therefore, this technology would cut fumes, dust, and emissions to a negligible level. For non-hazardous gas and VOCs, this technology would reduce air emissions from a total of 206 tons/year/facility to zero.

An electrophotographic screening process for phosphorus coating of cathode ray tubes (Appendix 1, Project 14), uses a dry phosphor adhesion process to eliminate the generation of waste water. This process also is estimated to produce 40 tons/year/facility of toxic gaseous hydrocarbon as organic solvents. The project being funded by the NICE³ Program will exhaust the solvents to an incinerator with a destruction capability greater than 95 percent. Because this is a new application of dry coating technology, specific regulations under RCRA do not presently exist. However, the destructive capability of the incinerator is higher than that required for other dry coating technologies, which is 90 percent. The remaining two tons per year have been permitted by the State of Indiana under their authority to implement the provisions of the Clean Air Act. In granting a permit for this new source, the State of Indiana determined that the potential release of the 40 tons per year (assuming the incinerator is not used) would not pose a significant threat to anyone living in proximity to the facility or to the environment.

Other examples of air quality impacts from past NICE³ projects include the following:

- Reduced tanker truck emissions (4 trips per year compared to 65 trips previously) and reduced emissions from the incineration of waste from the PPG Industries, Inc.'s automotive coatings plant in Cleveland, Ohio (Appendix 1, Project 2);
- Elimination of toxic lead and nickel emissions in waste gas from the AMPCO Metal Manufacturing Company, Inc. (Appendix 1, Project 6);
- Reduced emission of VOCs from the UV curing process at the Coors Beverage Company (Appendix 1, Project 12);
- Reduced emissions of VOCs, carbon dioxide, sulfur dioxide, and nitrous oxides at Erving Paper Mills (Appendix 1, Project 17);
- Reduced nitrous oxide emissions (20 to 60 percent where no current nitrous oxide control plan exists; an additional 5 to 25 percent reduction for plants already fitted with low-nitrous oxide burners) and reduced carbon dioxide and sulfur dioxide emissions in direct proportion to the reduced amount of burned fuel (i.e., each one percent of reduced fuel will reduce sulfur

dioxide emissions by one percent) at Ohio Edison as a result of Pegasus Technologies Corporation's project (Appendix 1, Project 20);

- Virtual elimination of VOCs, carbon dioxide, and nitrous oxides emissions at Chrysler Corporation's Newark, Delaware, assembly plant as a result of a new powder paint system for automobile coatings (Appendix 1, Project 22); and
- Reduction of carbon dioxide and nitrous oxide emissions by 237 pounds per ton and 0.82 pounds per ton, respectively, as a result of Osmotek, Inc.'s eliminating double-effect evaporators and the burning of gas or diesel fuel for dewatering of tomatoes for tomato puree and paste in the food processing industry (Appendix 1, Project 23).

All of the projects, with the exception of the Thompson Consumer Electronics company's increased emission of gaseous hydrocarbons (see Section 3.2.4), would result in decreased discharges of gaseous effluents. Generally, these projects would lessen air quality impacts on the environment.

5.2 Water Resources

Water quality may be improved slightly through implementation of the NICE³ Program. Water quality improvements would result from a decrease in industrial wastes reaching the waste stream as a result of substituting demonstrated pollution prevention technologies for end-of-pipe treatment. Reductions in waste waters requiring treatment or disposal may range from a few thousand gallons per year to several million gallons per year.

NICE³ projects assessed under this PEA would not involve construction activities in, or have an impact on, wetlands or floodplains.

Impact Examples

The electrophotographic screening process for picture tube manufacturing (Appendix 1, Project 14) utilizes a dry phosphor adhesion process which may eliminate the generation of all waste water. The current process produces millions of gallons of waste water which must be treated. For the pilot project at the Marion, Indiana, facility, this technology is expected to reduce non-hazardous waste water from 967,680 tons/year to zero. The trade-off, however, is that emissions of gaseous hydrocarbons (toluene/xylene) are projected increase from zero to 2 tons/year. See Section 5.1, above.

The elimination of use of perchloroethylene (PERC) as a solvent in steam by conversion to a Dense Fluid Extraction process, a high pressure process using carbon dioxide in its super-critical fluid state, at the Brush Wellman Elmore facility (Appendix 1, Project 24) would eliminate the potential for contamination of surface water and drinking water aquifers. For this project, the following reductions are estimated:

- Carbon dioxide emissions of 3,815 tons/year/facility from a natural gas-fired boiler for steam production would be reduced to 20 tons/year/facility for the dense fluid extraction process;
- Hazardous PERC gas would be eliminated, from a current level of 100 tons/year/facility;
- Hazardous (non-TRI chemical, toxic chemical subject to reporting under Section 313 of EPCRA) still bottoms would be reduced from 49.5 tons/year/facility to zero.

This technology would result in the release of 1.25 tons/year/facility of non-hazardous liquid hydrocarbon from soil removal and 3.7 tons/year/facility of process carbon dioxide.

Other examples of water quality impact from NICE³ projects include:

- The 50 percent reduction in water use and a 35 percent reduction in wastewater generation at the Damage Protection Products plant (Appendix 1, Project 4);
- The 42 percent of water directly re-used in manufacturing and removed from the normal waste stream within the textile industry at Shaw Industries (Appendix 1, Project 11);
- Reduced groundwater contamination as a result of up to 50 percent reduction in use of nitrogen fertilizers (Appendix 1, Project 13); and
- Ionsep Corporation, Inc.'s 500-gallon nickel plating regeneration system elimination of the need to treat and dispose of bath solution, resulting in elimination of about 3,000 pounds of water to treat per year (Appendix 1, Project 15).

Most NICE³ projects would involve the reduction in the quantities of liquid wastes requiring treatment or disposal rather than the reduction of liquid wastes discharged into streams or rivers. Those projects that would result in decreased discharges of liquid effluents would also lessen water quality impacts on the environment.

5.3 Waste Management

Because of its emphasis on source reduction and waste minimization technologies, projects funded by DOE through the NICE³ Program would result in reduced waste treatment, storage, and disposal needs. DOE anticipates that NICE³ projects cumulatively would result in annual waste savings of approximately 100 million tons by the year 2010.

Impact Examples

Examples of impacts in the area of solid waste management due to NICE³ funded projects include:

- Savings of over a half million gallons of methanol from having to be sent off-site for incineration at the FMC methanol recovery project (Appendix 1, Project 1).
- Reduction from 400,000 gallons of hazardous waste requiring disposal to only 20,000 gallons from the PPG Industries, Inc.'s automotive coatings plant in Cleveland, Ohio (Appendix 1, Project 2);
- AAP St. Mary's aluminum wheel casting plant's estimate of an annual waste reduction of over 900 tons per year (Appendix 1, Project 5);
- The AMPCO Metal Manufacturing Company, Inc., project's estimated total waste reduction of over 13,700 tons per year (Appendix 1, Project 6);
- Annual waste reduction of 200 tons of spent hydrochloric acid and neutralized sludge for Beta Control Systems and potential steel industry-wide hydrochloric acid reduction of 42,000 tons by 2010 (Appendix 1, Project 9);

- Elimination of the need to treat 2000 pounds of solid waste as a result of Ionsep Corporation, Inc.'s 500-gallon nickel regeneration system nickel plating system (Appendix 1, Project 15);
- Paint recycled as paper, aluminum, and plastic and reduced waste stream of water-wash paint sludge for treatment and disposal as a result of Caterpillar's recovery and recycling of water-washed overspray paint (Appendix 1, Project 16);
- Removal of about 17,750 tons per year of wastepaper from the regional wastestream and reduced landfill requirements as a result of Erving Paper Mills, Inc.'s technology (Appendix 1, Project 17);
- Elimination of mercury as a waste disposal problem as a result of development and use of a mercury-free light bulb (Appendix 1, Project 19); and
- Elimination of 95 percent of the paint sludge waste now sent to landfill from Chrysler Corporation's Newark Assembly Plant (Appendix 1, Project 22).

Use of Advanced Optical Sortation of Glass Cullet Feedstock Appendix 1, Project 10) is expected to reduce waste to about 16 percent of that produced by current technology. Waste reduction from the use of advanced optical sortation technology comes from three sources: reduced glass kiln firing temperatures, reduced transportation of waste, and reduced amounts of solid waste. For a single facility, advanced optical sortation is estimated to reduce carbon dioxide, nitrogen dioxide, sulfur dioxide, methane, and solid landfilled wastes by a total of approximately 34,000 tons/year from a baseline of 40,694 tons, a reduction of over 80 percent.

For the 40-Percent Recycled Paper project (Appendix 1, Project 4), in which post-consumer mixed waste paper is substituted for virgin paper, total pollution prevention by the year 2010 is estimated to be 1.9 billion pounds per year of waste paper, with 2.9 million cubic yards of landfill space saved.

Projects involving cross-media contamination shifts, waste remediation, treatment, storage, and/or disposal are ineligible for grants under NICE³. Therefore, the Program would not result in any new waste management needs.

5.4 Land Use

Impacts of the NICE³ Program on land resources would be a potential decrease in the exploration and production of energy resources due to increases in energy efficiency resulting in a reduction in projected energy demand. This means that lands expected to be developed for energy resources (i.e., for coal and petroleum) may remain undisturbed. A second potential impact is the reduced demand for existing or new disposal capacity due to the reduced volumes of waste products being generated. Some projects might involve new construction; however, most of this activity is expected to occur within existing structures or in close proximity to existing buildings in industrial areas. Because of the small size of the individual projects and the fact that they are dispersed throughout the country and its territories, there is no expectation that land use impacts would be significant.

5.5 Endangered and Threatened Species

Implementation of the NICE³ Program most likely would not cause adverse effects to endangered and threatened species in the long-term due to the small scale of NICE³ projects.

The Program could be beneficial to species habitat should lands containing energy resources remain undisturbed.

In the short term, construction activities associated with NICE³ demonstration projects could affect one or more listed species if the project were located within the species' habitat. Where listed endangered and threatened species exist on a proposed project's site, DOE would participate in the interagency consultation process required under Section 7 of the Endangered Species Act and, if necessary, direct the grantee to implement appropriate mitigative actions.

Positive impacts also could occur as a result of reduced releases of pollutants to the air and water.

5.6 Cultural Resources

Under the NICE³ Program, cultural resources could be affected only if a project is sited where such resources are located. This is unlikely since most projects would be located within existing facilities. Nevertheless, the state historic preservation office would be contacted to determine whether cultural resources exist at the site and, if necessary, DOE would direct the grantee to implement appropriate mitigative actions. As stated in Section 5.4, Land Use, most of the projects would take place within existing structures, or adjacent to them, in previously disturbed industrial areas. Under these circumstances, it is unlikely that NICE³ projects would have significant impacts on areas of cultural, archeological, or historical significance.

5.7 Socioeconomics

Overall, the individual NICE³ projects would have limited socioeconomic impacts. The main beneficiaries of the Program would be the industry partners that are involved, as they would benefit from the application of the funded activity at a reduced cost to their businesses. It should be noted, however, that impacts on jobs is one of the evaluation criteria used in the decision making process, and those proposals that show a potential for a net gain in employment, would increase the chance for the proposed project to be funded.

Individual projects would affect different socioeconomic groups depending on a variety of factors. For instance, a project involving a significant reduction in the generation of wastes may impact companies providing transportation services or waste treatment services. On the other hand, the implementation of new technologies within an industry may require added skills resulting in increased wages for workers.

Regional and local impacts would depend primarily on the location of projects that are funded. Because no adverse impacts are anticipated from NICE³-funded projects, there would be no disproportionately high or adverse impacts on minority and low-income populations.

One of the eligibility criteria for a NICE³ grant is that the applied technology must result in reduced waste generation, less energy consumption, and more efficient use of materials and supplies. Furthermore, the NICE³ Program funds only those projects which already have demonstrated positive results in these areas. Therefore, it is expected that the majority of projects funded would have no significant adverse environmental impacts and that they would fall within the boundaries established by this PEA. Each project proposed to be funded by the Program would undergo an analysis pursuant to the National Environmental Policy Act. DOE encourages stakeholder input concerning any DOE-funded project, regardless of impacts.

5.8 Energy Consumption

One of the goals of the NICE³ Program is to increase the energy efficiency of the industrial processes receiving funding through either reduced electrical consumption or a reduction in the consumption of fossil fuels. Environmental impacts associated with this goal would be decreased emissions of combustion gases either directly, as in the reduced combustion of natural gas, fuel oil, or vehicle fuels, or indirectly, as in reduced combustion of gas, oil, and coal at power plants. In neither case are the impacts expected to be significant.

Impact Examples

A new process to use ultra-violet light for the curing of paint coating on aluminum cans in place of a heat curing process could save as much as 62 billion Btu of energy at the Coors Brewing Company in Colorado, (Appendix 1, Project 12). A project by the Michigan Biotechnology Institute (Appendix 1, Project 13) which uses the by-products from the production of sugarcane molasses to increase the uptake of nitrogen in plants from nitrogen fertilizers could result in the savings of up to 547 billion Btu of energy from the reduced production of nitrogen-based fertilizers. The advanced optical system for sorting waste glass (Appendix 1, Project 10) could save one million Btu per ton of glass processed. Over three and a half trillion Btu per year could be saved if the process for reusing dyebaths (Appendix 1, Project 11) were adopted industry-wide. Appendix 1 contains additional information on potential energy savings from these and other projects.

5.9 Cumulative Impacts

Because of the limited number of projects which would be funded annually and their limited size and scope, and the fact that they occur over such a wide, expansive area, it is not expected that there would be any cumulative, or overlapping, impacts from one project to another. Cumulative impacts on energy utilization and cost savings may be important from the standpoint of effectiveness of the NICE³ Program, but they are not expected to have statistical importance in terms of a measurable decrease in total energy consumption in the United States or an increase in the gross national domestic product.

APPENDIX 1. EXAMPLES OF REPRESENTATIVE NICE[®] PROJECTS

Project	Industry and Industry Partners	Cost	Energy Savings	Environmental Benefits	Economic Savings
1. New Energy-Saving Process for Recovering and Reusing Methanol	FMC Corp.; Texas State Energy Conservation Office; Texas Natural Resource Conservation Commission	Industry: \$ 263,714 DOE/EPA: \$ 96,000 State: \$ 96,000 Total: \$ 455,714	25.2 billion Btu per year	276,104 gallons per year of methanol recovered	\$516,100 in 1992
2. Reducing Contaminated Wastewater from Water-Based Paint	PPG Industries, Inc.; Ohio Department of Development	Industry: \$ 227,000 DOE/EPA: \$ 227,000 Total: \$ 454,000	3.6 billion Btu per year	Reduced emission from incineration and transportation; 95 percent reduction in wastewater.	\$205,000 per year
3. Solvent Recovery System Minimizes Volatile Organic Compounds	Niagara Mohawk Power; Carrier Corp.; Mechanical Technology, Inc.; Chemsystems Software; New York State Energy Office; New York State Energy Research and Development Agency	Industry: \$ 498,028 DOE/EPA: \$ 277,000 State: \$ 155,128 Total: \$ 930,156	30 trillion Btu at demonstration facility	60,000 pounds of solvent recovered	\$157,679 saved at demonstration facility
4. Using Post-Consumer Waste Paper to Produce Pallets Reduces Waste	Damage Protection Products; California Integrated Waste Management Board	Industry: \$ 238,521 DOE/EPA: \$ 100,000 State: \$ 142,906 Other: \$ 150,000 Total: \$ 631,427	60 percent less energy than previous technology	50 percent water use savings; 35 percent wastewater reduction, 74 percent air pollution reduction	To be determined
5. On-Site Aluminum Recycling for Wheel Manufactures	AAP St. Marys; Ohio Department of Development	Industry: \$1,000,000 DOE/EPA: \$ 200,000 State: \$ 200,000 Total: \$1,400,000	15.6 billion Btu per year	963.8 tons per year per unit of total waste reduction	\$1.92 million per year per unit

<u>Project</u>	<u>Industry and Industry Partners</u>	<u>Cost</u>	<u>Energy Savings</u>	<u>Environmental Benefits</u>	<u>Economic Savings</u>
6. Electric Heating of Tundish Eliminates Lead Emissions	AMPCO Metal Manufacturing Company, Inc.; Ohio Department of Development	Industry: \$ 464,000 DOE/EPA: \$ 241,000 State: \$ 36,000 Other: \$ 100,000 Total: \$ 841,000	28.9 billion Btu per year per unit	Elimination of toxic lead and nickel emissions in waste gas; refractory waste disposal reduced by 80 percent; total waste reduction of 13,759 tons per year per unit.	\$1.2 million per year (O&M)
7. Ultrasonic Dishwashing Reduces Wastewater and Nitrous Oxides Emissions	Ultrasonic Products, Inc.; Southern California Edison; California Division of Water Resources	Industry: \$ 220,000 DOE/EPA: \$ 220,000 Total: \$ 440,000	1.42 trillion Btu per year, assuming 15 percent market penetration	Annual nationwide reduction of 8.2 million pounds of nitrous oxides and 1.42 billion gallons of waste water, assuming 15 percent market penetration	\$14.2 million, assuming 15 percent market penetration
8. Recycling Spent Potliner from Aluminum Smelters	Columbia Aluminum Corporation; Washington State Department of Ecology; Washington State Energy Office; CH2M HILL Center for Space and Advanced Technology	Industry: \$ 390,741 DOE/EPA: \$ 400,000 State: \$ 9,259 Total: \$ 800,000	488,000 Btu per ton of aluminum produced	Waste reduction of 14,501 tons per year	\$8.20 saved per ton of aluminum produced
9. Hydrochloric Acid Recovery System for Galvanizers and Steel Manufacturers	Beta Control Systems, Inc.; Oregon Department of Energy	Industry: \$ 100,000 DOE/EPA: \$ 97,000 State: \$ 40,304 Other: \$ 8,304 Total: \$ 245,608	5 billion Btu per year	Waste reduction of 200 tons per year per unit	\$260,000 per year
10. Advanced Optical System Sorts Waste Glass Feedstock for Container Manufacturing	Alpine Technology; Oregon Department of Energy; Oregon State University	Industry: \$ 386,730 DOE/EPA: \$ 348,000 State: \$ 222,450 Other: \$ 52,000 Total: \$1,009,180	1 million Btu per ton of glass cullet feedstock per year	Solid waste reduced by 67 percent per year	\$57,000 saved per year

<u>Project</u>	<u>Industry and Industry Partners</u>	<u>Cost</u>	<u>Energy Savings</u>	<u>Environmental Benefits</u>	<u>Economic Savings</u>
11. Automated Reuse of Dyebaths in Carpet Manufacturing	Shaw Industries; Georgia Pollution Prevention Assistance Division; Georgia Office of Energy Resources; Georgia Research Alliance; Georgia Institute of Technology and Georgia State University	Industry: \$ 396,641 DOE/EPA: \$ 348,000 State: \$ 36,100 Other: \$ 52,000 Total: \$ 832,741	3.6 trillion Btu per year (industry wide)	Waste reduced by 36 million pounds of chemicals per year (nationwide)	\$1.6 million saved per year at Shaw Industries
12. UV-Curable Coatings for Aluminum Can Production	Coors Brewing Company; Colorado Office of Energy Conservation	Industry: \$ 237,092 DOE/EPA: \$ 218,000 State: \$ 12,908 Other: \$ 32,000 Total: \$ 500,000	62 billion Btu per year at Coors	Waste reduction by more than 4,500 tons per year at Coors	\$10 million with industry-wide implementation
13. Sugarcane Molasses By-Product Used to Increase Fertilizer Efficiency	Michigan Biotechnology Institute; Uniroyal Chemical; Galbraith Laboratories; Hawaiian Commercial and Sugar Company; Cherry Marketing Institute; Michigan State University Department of Agricultural Engineering	Industry: \$ 434,174 DOE/EPA: \$ 345,000 Other: \$ 52,000 Total: \$ 831,174	547 billion Btu per year	Nitrogen fertilizers reduced by 50 percent, decreased carbon dioxide emissions; molasses waste reduction	\$21 million per year
14. New Manufacturing Process for Color TV Picture Tubes	Thompson Consumer Electronics, Inc.; Indiana Department of Commerce, Office of Energy Policy	Industry: \$ 400,000 DOE/EPA: \$ 348,000 State: \$ 200,000 Other: \$ 52,000 Total: \$1,000,000	278 billion Btu per year per operating system	Significant reduction in wastewater predicted	Millions of dollars saved annually for each operating system
15. Regenerating Nickel Bath Saves Energy, Recovers Metals	Ionaop Corporation, Inc.; Delaware Department of Natural Resources & Environmental Control	Industry: \$ 250,000 DOE/EPA: \$ 250,000 Total: \$ 500,000	460 million Btu per year.	Reduced chemical usage; reduced treatment of solid hazardous waste (2,000 pounds per year) and water (3,000 pounds per year)	Total annualized cost savings projected at \$363,974

<u>Project</u>	<u>Industry and Industry Partners</u>	<u>Cost</u>	<u>Energy Savings</u>	<u>Environmental Benefits</u>	<u>Economic Savings</u>
16. Recovery and Recycling of Water-Washed Overwrap Paint	Caterpillar, Illinois Department of Energy and Natural Resources	Industry: \$ 504,000 DOE/EPA: \$ 285,000 Total: \$ 789,000	Process energy savings of 700,000 Btu per 55-pound bag of pigment; elimination of overwrap waste transportation costs; total savings 900,000 Btu per 55-pound bag of pigment.	Recycling of paint as paper, aluminum, and plastic; 2.5 million pound reduction of water-wash paint sludge per typical automotive plant per year	\$0.15 per pound of water-wash spray sludge; estimated annual savings at East Peoria plant of \$75,000
17. Particle Analyzer, Nontoxic Chemicals Boost Paper Recycling	Erving Paper Mills, Inc.; Flow Vision, Inc.; WoodFree, Ltd.; Solzer PaperTec; Massachusetts Division of Energy Resources; Massachusetts Office of Technical Assistance	Industry: \$2,300,000 DOE/EPA: \$ 425,000 State: \$ 10,371 Total: \$2,735,371	Reduction of No. 6 fuel oil by 1.4 million gallons at EPM; 236 billion Btu per year per plant.	Reduction of 17,750 tons of wastewater per year from regional waste stream; elimination of all chlorine compound bleaches and reduction of VOC emissions; reduction of EPM sulfuric acid usage by 75 tons per year by 1998; decrease in emissions of carbon dioxide, nitrous oxide, and sulfur dioxide	\$742,300 per year per plant
18. Recovering Lignin from Pulp and Paper Operations	Alex Technologies Corporation; Weyerhaeuser Corporation; J.C. Steele, Inc.; Industrial Gas Technology Commercialization Center; Georgia Department of Natural Resources' Pollution Prevention Assistance Division	Industry: \$ 456,700 DOE/EPA: \$ 408,063 Total: \$ 864,763	0.2 billion Btu per year	Reduction per year of 12,700 tons of nitrous oxide emissions, 3.4 million tons of carbon dioxide emissions, and 7.6 million tons of spent-time waste	\$677,000 per year per unit
19. Radio Frequency Power Leads to Brighter, Mercury-Free, Energy Efficient Bulb	Westinghouse Electric Corporation; Fusion Lighting, Inc.; Maryland Energy Administration	Industry: \$ 510,000 DOE/EPA: \$ 399,398 Total: \$ 909,398	1.8 billion Btu per year per facility using 14 million lumens	Energy emissions reduction of 577 tons per year per facility using 14 million lumens -- elimination of toxic mercury waste disposal	\$174,000 per year per facility using 14 million lumens

<u>Project</u>	<u>Industry and Industry Partners</u>	<u>Cost</u>	<u>Energy Savings</u>	<u>Environmental Benefits</u>	<u>Economic Savings</u>
20. More Electricity, Fewer Emissions from Coal-Fired Boilers	Pegasus Technologies Corp.; Ohio Edison; Ohio Department of Development's Office of Energy Efficiency	Industry: \$ 105,000 DOE/EPA: \$ 100,000 State: \$ 35,000 Total: \$ 240,000	25.0 million Btu per year	Reductions per year of 120,000 tons of nitrous oxides emissions and 50,000 tons of sulfur oxides emissions	More than \$30 million per year
21. Making High-Quality Circuit Boards with Fewer Toxic Chemicals	Continental Circuits Corp.; Ardrex Corp.; Shipley Corp.; Lea Ronald Corp.; McDermion, Inc.; Arizona Department of Environmental Quality	Industry: \$ 200,000 DOE/EPA: \$ 200,000 State: \$ 20,000 Total: \$ 440,000	1.0 billion Btu per year per unit	Reduction per year per unit of 20 tons of formaldehyde waste, 13.0 tons of nitric acid, and 101 tons of carbon dioxide	\$1.5 million per year per unit
22. Powder Paint System Improves Automobile Coatings, Boosts Environment	Chrysler Corp.; Delaware Department of Natural Resources and Environmental Control; Delaware Division of Pollution Prevention and Division of Air and Waste Management	Industry: \$10,237,460 DOE/EPA: \$ 400,000 Total: \$10,637,460	\$3.3 billion Btu per year per unit	Emissions reductions per year per unit of 24,500 pounds of nitrous oxides, 2,792 pounds of sulfur oxides, and 3,246 tons of carbon dioxide	\$3.96 million per year per plant
23. Better Tasting Pizza Sauce Using an Energy-Saving Osmotic Filtration System	Osmotek, Inc.; The Sabroso Company; Tri-Valley Growers; Oregon Department of Energy's Conservation Resources Division	Industry: \$ 670,545 DOE/EPA: \$ 395,194 State: \$ 19,000 Total: \$1,084,739	1.5 million Btu per ton of water removed	Carbon dioxide emission reduction of 2,371 pounds per day per ton of water removed.	\$30,800 per year per 10,000 pounds per hour water removal
24. Dense Field Extraction	Brush Wellman, Inc.; Ohio Department of Development, Office of Energy Efficiency.	Industry: \$ 805,000 DOE/EPA: \$ 400,000 Total: \$1,205,000	3.4 billion Btu per year.	Elimination of: 3,795 tons of carbon dioxide per year per facility; PERC gas (from a baseline of 100 tons per year per facility); hazardous still bottoms (from present 49.5 tons per year per facility).	To be determined.

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