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MEMORANDUM TO THE ENERGY AND ENVIRONMENT TRANSITION TEAM OF PRESIDENT-ELECT BARACK OBAMA

ENERGY & ENVIRONMENT: SCIENCE AND POLICY

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III. About the National Council for Science and the Environment

I. Core Principles

1. Healthy and economically productive societies require health environments
2. Environmental issues are intimately linked with important economic, national security, health, social and ethical issues.
3. Research and education are essential for a strong economy.
4. Environmental research and education are essential for Green Jobs that provide scientifically and environmentally skilled workers in all parts of American society.
5. Scientific knowledge, understood by decision-makers (e.g., no "techno-babble') is key to effective and durable decisions.
6. Enabling science to support energy and environmental decision-making requires:
    a. investing in science, particularly cross-cutting and interdisciplinary, and its synthesis;
    b. support for effective communication of science to decision-makers;
    c. ensuring the integrity of science; and,
    d. supporting a national culture of education and thoughtful problem-solving.
7. People, come and go; enduring solutions require institutionalizing changes.
8. A number of significant actions can be made by President Obama and his Administration with powers that already reside with the Office of the Presidency and with the agencies.
9. Many necessary actions to slow and ultimately reverse the rate of environmental degradation require the assistance of other nations, Congress, the scientific community, conservation organizations, landowners and the general public.

II. Primary Recommendations

A. Energy for a Sustainable and Secure Future

1. There must be an immediate massive effort to transform U.S. and global energy production and consumption towards greater sustainability and security. We recommend that this be embodied in a National Energy Strategy publicly endorsed by the new President.

2. This effort must involve coordination among governments at all levels as well as incentives for the private sector to capitalize on and enhance market forces. This requires leadership from the Secretary of Energy that extends cooperatively beyond the Department, to other federal agencies, and beyond the federal government.

3. An objective understanding of science and full impact of energy options should guide decision-making rather than a belief that right choices or specific technologies can be made by policymakers. To enable this, there should be more effective use of science. Tools such as life cycle analysis, to assess and compare the strengths and weaknesses of different energy systems, are needed to guide decisions in all economic sectors, particularly transportation, housing, agriculture and energy production. OSTP, DOE and other agencies should be directed to develop an operational policy on this.

4. The new National Energy Strategy should include a multi-year, multi-sectoral research, development, demonstration and deployment (RD3) plan for improving the diversity and reliability of the energy supply while reducing environmental impacts and improving energy predictability. This plan should include a specific and substantial role for university energy research.

5. Substantial investment from government and the private sector will be needed to develop and implement this plan as current levels of R&D energy investment are inadequate to meet our energy challenges. Energy R&D should be tripled in the short term, to $15 billion/year, and ramped up to 5 to 10 times its current level.

6. The scientific component of a new National Energy Strategy should recognize and support a broader range of fields than has been the case historically, including such areas as architecture, biotechnology, community planning, education, history, information sciences and technology, microbiology, nanotechnology, and various social sciences. These should be integrated into funding strategies for a new multi-disciplinary field of energy science and technology and a companion field of energy studies.

7. The new National Energy Strategy should also include careful study of investment, tax, and other financial and regulatory policy instruments.

8. Sustained and broad federal investment in basic energy research will power an energy revolution by "priming the pump" through generating the revolutionary, not evolutionary,

ideas to solve large-scale problems. Universities are especially well-equipped to carry out revolutionary research.

9. Inquiry-based and experiential education on all levels, including consumer education, is a key component of engaging the citizenry in energy sustainability. This can be coupled with efforts to build energy smart and healthy schools and other initiatives to improve infrastructure.

10. Engage the American public in substantive discussion about their energy consumption habits. Emphasize that energy is not just about the supply side.

11. Increase the budget of Energy Information Administration. More and better data are needed on the full range of energy and related environmental issues.

B. Climate Change Science and Solutions

1. Rapid reduction of greenhouse gas emissions to near-zero levels over the next four decades is needed to prevent a "dangerous" situation from becoming "catastrophic".

2. Many of the solutions to climate change are known; many provide win-win-win-win opportunities for health, the economy, national security, and the environment. These include increased efficiency in the home energy, transportation, agriculture and consumer sectors. Cost curves for energy efficiency that show that half of the actions that could be taken would actually lead to cost reduction. These "low hanging fruits" can provide between 25 and 50% of the required greenhouse gas (GHG) mitigation.

3. There must be significant transformation in most economic sectors, especially the power generation and mobile source sectors. In many areas there will be significant opportunities for job creation and enhancement of our nation's competitiveness. However, certain industries and regions are likely to experience negative economic impacts.

4. Emission reduction scenarios that include methane and other greenhouse gases are able to meet climate targets at substantially lower costs compared to CO2-only strategies (for the same targets). Inclusion of non-CO2 gases provides a more diversified approach that offers greater flexibility in the timing of the reduction program.

5. Tropical deforestation is currently responsible for 20% of global CO2 emissions. Avoiding such deforestation provides many additional benefits, including biodiversity, conservation and provision of ecological goods and services such as climate moderation.

6. In many sectors, such as agriculture and transportation, there are considerable unstudied opportunities on how to reduce GHG emissions.

7. Issues often not considered in GHG reduction strategies such as population, consumption, land use and planning, and forestry should be reexamined in the context of climate change.

8. The climate problem is serious enough to warrant an objective analysis of geoengineering options, i.e., those that could deliberatively modify earth's heat balance to temporarily add a cooling component, which could potentially buy time as humanity makes dramatic reductions in our greenhouse gas emissions for more permanent climate moderation. In evaluating geoengineering, particular focus should be on efficacy, economic, environmental and ethical issues.

9. Given the inevitability of a certain amount of disruptive climate change (most likely at least 2 degrees C), much more attention should be given to adaptation – particularly of vulnerable populations and ecosystems, including polar and coastal areas and urban

areas. It is likely that all species and all areas will be affected, so analysis of vulnerability and resilience should guide adaptation strategies.

10. Although available technology and energy conservation offer important near term opportunities, the wide scale utilization of new technology will be needed to avoid potentially catastrophic impacts in the longer term.

11. The current research and development (R&D) effort is woefully inadequate and not always directed at the most critical needs. Significantly greater investment in science of all types (especially social and behavioral sciences) and technology is necessary to develop the technologies and approaches needed for transformation to a sustainable, low-carbon society. At least a doubling of current investment is necessary in the very near term. The US Global Change Research Program and the federal Climate Change Technology Program should be expanded and new institutional arrangements such as a National Climate Service or an Earth Systems Science Agency should be considered.

12. Major investments in public education, formal and informal education at all levels, expanded communication pathways between scientists and decisionmakers are all necessary to provide both the information and motivation for the needed social changes. The investments should be based on high-quality educational and social science research.

13. Current information management systems are also insufficient and mechanisms such as a National Climate Effects Network are needed to better manage, analyze and distribute information.

14. Federal efforts must support and build upon the leadership on climate change that is currently coming from local and state governments, universities and some businesses.

15. There are substantial limits on what the business and financial communities can do without strong policy and price signals from the federal government. Lacking a price on carbon, capital markets cannot help, and investors remain in the dark on the potential for returns.

16. The US has a moral and a security obligation to assist developing nations and to work in partnership internationally.

17. As the premier economic and technological world power with the highest GHG emissions, leadership by the US at the federal level is critical because of the scale and urgency of the problem and the urgent need to encourage action by other nations such as China.

18. In order to combat climate disruption at a global scale the US must vigorously re-engage in international climate change negotiations.

C. Integrating Environmental and Human Health

Recognizing the connection between environmental quality and human health is important to improving public health and to building public support for action on environmental issues.

1. Climate change science has been recognized by the National Academy of Sciences and other as being weak in the area of human dimensions, especially the health impacts of various mitigation strategies, major health threats, and adaptation strategies. Therefore, health impacts should be emphasized in legislation, funding and guidance given to the agencies responsible for such work (CDC, NIH, EPA).

2. Minimizing the health impacts of the "built environment" requires research on health impacts on the scale of metropolitan areas (e.g., transportation systems), neighborhoods (e.g. walkability, parks and green space), and buildings (e.g. green buildings). Some of this will be synergistic solutions that will protect the environment, save money, reduce energy consumption, and protect health. This is a ripe area for scientific research.

3. Despite several decades of research, there is much about the effects of chemical exposures that is unknown, particularly about subtle effects such as neurotoxicity, developmental toxicity, endocrine disruption, reproductive toxicity; effects of mixtures of toxicants; major routes of exposure; who is most heavily exposed (biomonitoring data invaluable here); who is most susceptible; etc. Much more research is needed here, including full and sustained funding for the National Children's Health Study, endocrine disrupters under the Food Quality Protection Act, and a variety of other toxicological, epidemiological, ecological and health topics.

4. The government should support additional and integrated databases to assist researchers and decisionmakers to store and retrieve information about health effects.

5. The government should support additional and integrated clearinghouses to serve as information sources on the interrelationships between environment and health, for researchers, educators and public communicators.

6. The government should support integrated assessments, such as Health Impact Assessments that include environmental information and Environmental Impact Assessments that include health information.

7. The government should support risk-related models, tools, and protocols to help decision-makers incorporate environmental and health information.

8. Communication must be improved between environmental and health communities, between scientists and decisionmakers, between scientists and the public. Integrate environmental health into the broader effort at environmental education by providing guidance to agencies. Relatively limited funds would help. Success equals the next

generation of environmental scientists and leaders that understands health risk and benefits far better than today's, and can integrate them into decision-making.

9. All stakeholders need to be involved early on and throughout the process of setting science priorities and moving science to policy and management. Particular attention must be provided to engage often-neglected stakeholders, including women, children, people from diverse cultures and other especially vulnerable populations.

D. Biodiversity

The biodiversity crisis continues unabated at unprecedented and catastrophic rates and levels of losses of agricultural and other genetic material, distinct biological populations and species, unique ecosystem types, and ecological phenomena. These losses have tremendous consequences on human well being, through loss of resilience to climate change and other environmental changes, and declines in ecosystem goods and services.

Overall each agency should review its authorities, regulations, initiatives, waivers, spending, and related international agreements and report to the President, CEQ, and domestic advisory bodies on things that need to be changed to better conserve biodiversity.

The President should issue an Executive Order directing agencies to conserve biological diversity, with particular emphasis on public lands and water and incentives for private land conservation.

Specifically,

1. The Administration must recognize the interconnections between global climatic disruption and biodiversity loss.

    a. The entity that coordinates federal actions on climate change should include a point person on biodiversity.

    b. Because of the inevitable climate change that will only worsen, there must be a concerted effort to develop and implement a Biodiversity Adaptation Strategy.

    c. The USGS National Climate Change and Wildlife Science Center should be a key part of that strategy.

    d. The Global Warming Wildlife Survival Act contains much of what is needed and should be enacted and vigorously implemented.

    e. Any federal climate mitigation scheme such as a cap-and-trade system should include dedicated funds for biodiversity adaptation.

2. Biodiversity research and conservation can be an important part of the Obama Administration's effort to re-engage US leadership in the rest of the world.

    a. The U.S. should re-engage in existing international environmental endeavors including requesting that the Senate ratify the Convention on Biological Diversity, Convention on Biological Diversity, the Convention on Migratory Species and the Law of the Sea, participating in international efforts to combat global climate change, and developing a multi-agency plans for their implementation.

    b. US government policies should promote the linkages between biodiversity, economic development and sustainable livelihoods throughout the world. For example, projects

to provide water for impoverished people should also ensure water for biodiversity, and vice versa.

3. Biodiversity is a fundamental basis for the wealth of America. The United States should engage in short-term and long-term actions to preserve that fundamental wealth.

    a. Just as federal land purchases in the depression were essential in building the network of conservation lands that provide ecosystem services and other benefits as well as contribute to economic recovery, the federal government should use land trust organizations and other mechanisms to purchase lands to help to complete a national conservation landscape that provides resistance and resilience to climate change and protects ecosystem services, as well as assisting the recovery of the real estate market.

    b. The USDA should develop a major focus on creating and sustaining life, encompassing and integrating food quality and quantity, rural communities, water and ecosystem sustainability and related issues.

    c. The Administration and Congress should establish a US system of fully protected marine reserves, in conjunction with other international efforts, which include evidence-based approaches from all major marine ecosystems.

4. Biodiversity is essential to national security and international stability.

    a. Referencing UN population projections, the United States must recognize that many social, environment, and security problems are rooted in rapid population growth. Areas of high biodiversity have some of the fastest population growth rates and are among the areas where local conflicts threaten global stability and security.

    b. The EPA should develop an integrated assessment protocol, including the assessment of biodiversity, ecosystem services, and socio-economic factors based on a transparent and standardized approach, which will enable assessing environmental change from the development of various types of energy systems.

5. Proper information is essential to realize the benefits of biodiversity and ecosystem services.

    a. The US should support a second Millennium Ecosystem Assessment, and the development of an IPCC-like mechanism for ongoing global assessments, but should also conduct integrated assessments of biodiversity, ecosystem services and environmental condition within the US on a variety of regional scales as well as on a national scale.

    b. The US should fund and support the Global Biodiversity Information Facility - the primary international conduit for biodiversity collections information.

c. The Office of Science and Technology Policy and the President's Science Advisor should enact the recommendations in the 2008 report from the Interagency Working Group on Scientific Collections and the upcoming NSF survey of federally funded collections.

d. Because environmental problems are caused by a dysfunctional relationship between people and the environment, the government should support research on coupled human-natural systems, including links between population dynamics and biodiversity.

E. Water

Water quality and quantity will be major issues for the foreseeable future. The increased demands due to rising human population, coupled with drastic shifts in hydrological patterns due to global climate disruption will lead to additional conflicts at a variety of scales. An increased investment in science, including monitoring, is essential to developing solutions that serve a variety of human and ecosystem users.

1. Establish a National Commission on Water Sustainability. The Commission should be charged with addressing domestic water sustainability issues as well as the U.S. role in international water sustainability issues. Following the example of the U.S. Commission on Ocean Policy, the Water Commission should be a multi-stakeholder body of experts. Among other things, the Commission should be asked to identify a sustainable source of funding for the nation's water infrastructure.

2. Develop a robust set of indicators for sustainable water management. Ideally, this will be part of a national system of environmental indicators led by an interagency Committee on Environmental Monitoring and Forecasting as recommended in Section F on Environmental Monitoring and Forecasting.

3. To achieve indicators for sustainable water management will require a vigorous program of monitoring, surveillance, research, and assessment. An independent organization, such as the National Academies, should identify research needed to create a robust monitoring program.

4. Secure water sources are critical components of a secure homeland. The Department of Homeland Security should be directed to coordinate with appropriate agencies to support the creation of the necessary detect and report in real time on the security of the nation's water supplies. This will require science, technology, integrated information systems, reporting and public education efforts.

5. Irrigation accounts for 70 percent of water use in the United States. For this reason, irrigation must be a focus of any program for water sustainability. As such, USDA research, extension and other programs and policies affecting agricultural water use require support and guidance to achieve efficient use of water that does not compromise the nation's environment or its food supply.

6. Promote international capacity building on sustainable water management through AID and the international programs of other agencies.

F. Forestry

As we move toward the end of the first decade of the 21st Century, our nation's forests face an array of challenges to their ability to sustain all the values, services and products that they provide to our society.

1. The United States urgently needs to develop an integrated public-policy framework to sustain our nation's forests in the 21st century. Therefore, we recommends the creation of:

    a. A Presidential Commission on Sustainable Forests

    b. A Congressional Forest Caucus and forest committees in the National and Regional Governor's Associations

    c. A National Council on Forests as a broadly based coordinating organization to guide a multi-year policy reform process

2. These multi-stakeholder bodies should carry out the following:

    a. Develop a framework for action based on a set of principles that can guide the creation of coherent federal and state forest policies, and capture the diverse perspectives of various stakeholders

    b. Conduct a top-to-bottom review of international, federal, state, and local tax policies affecting forests

    c. Formulate federal agency policies that facilitate greater local planning and actions across public and private forest ownerships at landscape scale

    d. Invest in research and technology to enhance both global competitiveness of domestic forest products and ecological resilience of forests to climate change and disturbances

    e. Create stronger integration of forested watersheds into water resource planning including development of appropriate incentives to maintain and enhance watersheds that provide water for consumption and economic development

    f. Create a comprehensive approach to the coherent use and effects of fire in forests that integrates prevention and control of wildfires, use of prescribed fires and impacts of resulting smoke as an element of air quality

    g. Develop new, more holistic approaches to communicating forest values to the public and the media

G. Environmental Monitoring and Forecasting

The nation's and the world's ability to understand and respond to dangerous environmental change depends upon a well-integrated adequately funded systems of analytical tools, observation facilities and communication mechanisms to understand, monitor, and forecast environmental trends.

1. Recognizing that environmental monitoring and forecasts can help policymakers and the public understand the implications of current trends and the potential implications of alternative policy choices, the White House Office of Science and Technology Policy should establish and support an interagency Committee on Environmental Monitoring and Forecasting. This committee should draw into it existing efforts under the Committee on Environment and Natural Resources (CENR) Subcommittee on Ecological Forecasting and other interagency initiatives such as National Environmental Status and Trends (NEST – currently led by CEQ) , and the Group of Earth Observations (GEO).

2. The interagency Committee on Environmental Monitoring and Forecasting, there should have a goal of establishing a national system of environmental indicators. This mechanism should:

    a. Start with an urgent focus on indicators relevant to changing climate; baseline information is crucial as change accelerates.

    b. Build upon existing activities (NEST, Heinz Center, EPA, etc.)

    c. Indicators must function at national, regional, and state scales, and must be developed through a fully collaborative effort with states and other stakeholders at the table.

    d. Accelerate the use of indicators as concrete management tools by requiring that key indicators be identified and tracked for any major environmentally-related legislation or program initiative.

3. Raise the focus on ensuring adequate environmental monitoring information, in light of both existing needs and the imperative to document baselines as climate change accelerates:

    a. Prepare an OMB budget crosscut for monitoring and reporting.

    b. Develop a high level review process that will not simply bless the status quo to develop for the 2011 budget a strategic plan with real priorities for enhancing the quality and availability for information available to decision makers.

    c. Commit to improving <u>delivery</u> of information (i.e., moving beyond simply collecting data and "making it available") in efforts such as the National Climate Service (NOAA), National Center for Climate Change and Wildlife Science (DOI/USGS), Energy Information Administration, EPA, and elsewhere in the federal government.

4. Develop and fund an international environmental research and monitoring capacity through platforms such as the Global Earth Observation System of Systems (GEOSS) and the National Ecological Observatory Network (NEON).

H. Environmental Education and Training

1. To make the transition to a new green economy, America needs a broad base of educated citizens who possess a wide range of skills and understanding of the connections between economics, energy, the environment, and social well being. This represents the framework for leading environmental education and training programs.

2. Fully fund and expand, under the stimulus package, environmental internship and fellowship programs that exist at science, energy, environment and natural resource agencies. These programs will provide immediate jobs and provide essential training and experience for green jobs.

3. To prepare Americans for the transition to a green economy, new investments are needed to Science, Technology, Engineering and Mathematics (STEM) and Environmental education in federal agencies and through them to K-12, at nation's universities and colleges (including community colleges), and major public education programs. Existing programs should be fully funded at NSF, DOE, DOI, EPA, NOAA, USDA and elsewhere. This can be achieved through OMB directives in developing agency budgets.

4. Build multi-disciplinary environmental sciences capacity and ecological literacy within government and society through investments in research, professional continuing education and retraining, preparation of future natural resource professionals focused on climate mitigation and adaptation, as well as public education and communication

5. Education standards should incorporate sustainability principles into learning.

I. International

Numerous international recommendations have been made in other sections, most significant that that United States should re-engage and provide leadership in numerous intentional agreements and fora on environmental issues, ranging from climate change, to fisheries, to biodiversity. The following are additional international recommendations that did not fit in other thematic sections:

1. Through AID, State Department or an appropriate agency support the creation of International Information Centers to allow for widespread access of material resources and databases on sustainability for all sectors of society.

2. International environmental policy needs to recognize the requirements of a rapidly enlarging global human population will lead to accelerated environmental degradation, loss of biodiversity, competition for water resources, and agricultural failure. Increasing the opportunities of women for education, economic advancement, family planning, and other forms of empowerment has demonstrated itself to be the most effective and sustainable policy on human population. Recommending such an approach to the Obama Administration, might be unnecessary, but is worth reinforcing.

J. Institutional Changes

As was stated in the Core Principles section above, solutions that outlast an Administration, even if it serves two terms, require institutionalizing the solutions. A legacy of success requires more than good people in key positions (good people, like bad people, come and go). It is never too early to think about how to make improvements durable. Therefore, we recommend that the Administration consistently consider durability of its policies and consider establishing institutions that provide longevity beyond the current political leadership, economic downturn, and other transitory factors. With this in mind:

1. Establish a Cabinet-level Department of the Environment. We recognize that this may not be an "immediate" issue for the Obama Administration, but the time may be right to revisit this issue. There a several ways to approach such a Department and we make no specific recommendation here. Rather, we suggest the President issue a statement indicating the desirability of a Department of Environment and establish a Task Force to consult with affected agencies, Congress, and others to develop a plan. This represents a "low political capital" way of testing the waters.

2. Revisit the proposal for a non-regulatory National Institute for the Environment to support interdisciplinary, solutions-oriented environmental research, assessment, education and information dissemination. The scope of such an institute should reflect changes in agencies such as the National Science Foundation that have occurred in the past decade.

3. Laboratories, classrooms and other facilities are literally the foundation for our research and teaching. "Quadruple Green" facilities (green buildings for green research, green education and green economic returns) should be included in the economic stimulus package. Green facilities construction and renovation, within less than a year, would translate into employment for a wide range of professions and produce large numbers of domestic jobs. Many universities have a backlog of projects ready to begin as they have prepared proposals to NSF, NIST, private foundations and individuals, and other sources of these critical funds. By having an expedited review process, universities should be able to get shovels in the dirt within 6-12 months, particularly for renovation projects. At the same time, instituting a green mandate into the request will allow universities to move their facilities towards a more sustainable future and model sustainability to students. This has great benefits to university missions as well as to the planet.

III. About the National Council for Science and the Environment

The National Council for Science and the Environment is an NGO dedicated to improving the scientific basis for environmental decision-making.

The Council specializes in programs that bring together individuals, institutions and communities to collaborate on broad-based projects that cannot be carried out by individual entities.

The Council has 160 affiliated universities and colleges.

The Council's annual National Conference on Science, Policy and the Environment brings together representatives from all levels of government, leaders in research and education, NGOs and business to develop strategies for improved decision-making on critical environmental challenges. Most of the recommendations included in this memo were jointly developed at these conferences by groups representing the communities mentioned.

The Council supports multi-stakeholder bodies drawn from the same breadth of communities mentioned above, to guide the development and deployment of decision-making tools to address specific environmental challenges. One of these, the National Commission on Science for Sustainable Forestry, developed the recommendations on Forestry (II-F)

The Council is also the Secretariat for the Environmental Information Coalition, an open membership group of institutions and individuals creating an online resource, the Earth Portal, to connect the public with high quality environmental information. At the center of the Earth Portal is the Encyclopedia of Earth – often referred to as "Wikipedia with Quality Control."

Contacts:

- Peter Saundry, Executive Director, 202-207-0002, psaundry@NCSEonline.org
- David Blockstein, Senior Scientist, 202-207-0004, david@NCSEonline.org