Energy Supply and Demand Technical Work Group
Draft Option Proposals

	Summary List of Option Proposals	Lead(s)
ES&D 1	Transmission System Optimization and Expansion	Tom Lovas
ES&D 2	Energy Efficiency for Residential and Commercial Customers	Meera Kohler Jim Posey Wayne Hall
ES&D 3	Implementation of Renewable Energy (electricity – focus)	Kate Lamal Chris Rose
ES&D 4	Building Standards/Incentives	Kohler Posey Hall
ES&D 5	Efficiency Improvements for Generators	Lamal Posey
ES&D 6	Energy Efficiency for Industrial Installations	Kohler Posey Hall
ES&D 7	Implementation of Small-Scale Nuclear Power	Lovas Dan White
ES&D 8	Research and Development for Cold-Climate Renewable Technologies	Lovas White
ES&D 9	Implementation of Advanced Supply-Side Technologies	Lovas White Steve Denton

ES&D 1: TRANSMISSION OPTIMIZATION AND EXPANSION

Policy Description

A policy of Transmission Optimization and Expansion will promote the effective utilization of both traditional and non-traditional electric power resources to offset sources of greenhouse gases. This policy is directed toward establishing programmatic improvements in the electrical network of Alaska that will provide: 1) greater efficiency in power supply for utility and industrial purposes; 2) additional opportunities for renewable resource utilization; 3) enhanced coordination between and among electricity end-users and energy providers; and, 4) promote the reduction of electric energy losses associated with inadequate and aging infrastructure. A statewide emphasis on optimizing and expanding the transmission, and for some factors, the distribution system, will provide economic and environmental benefits throughout the varied and uniquely situated regions of Alaska.

Policy Design

The policy of transmission optimization and expansion includes four sub-categories, each of which must be addressed to obtain the full benefit of improved system configuration and operation. A portion of the policy objectives have been accomplished through statewide initiatives and governmental action in prior years. A continuation, with acceleration, of such action will expedite the implementation processes of the policy of transmission improvement. An aggressive construction program with systematic and incremental expansion, upgrade and enhancement will assure maximum gain and economic system operation.

Establishing specific subsets in the transmission policies will provide an effective format and pathway to accomplishing the objectives. There are four specific components that would be recognized in state energy policy:

1. Existing Transmission Optimization

The policy directive on transmission optimization should be to maximize the uses and applications of the existing transmission grid (generally considered to be 69 kV and above). This can be accomplished with a statewide regulatory framework that provides assurance that interconnection requirements and practices, and transmission access arrangements, provide equitable treatment among energy provides. Such polices will be conducive to effective economic dispatch and use of all available supply resources prior to incremental generation additions. This policy directive will provide for both resource sharing among energy producers and the reduced operation of less efficient generation facilities. The policy supporting transmission optimization should also consider a framework for use of an environmental dispatch order. An environmental dispatch order would consider regulated emissions as an economic component of economic dispatch.

2. Transmission System Expansion

A statewide policy advocating transmission system expansion will promote renewable resource development and provide enhanced opportunities for existing and new resource sharing arrangements for the common benefit. Transmission expansion will support development of larger, more efficient generation alternatives that are more cost-effective and environmentally efficient, and provide for greater opportunities to displace inefficient facilities currently operated to meet local needs. The policy for expansion should recognize four distinct regions of Alaska – Southeast Alaska, Western and Southwest Alaska, the Railbelt and Interior and Arctic Northwest -- and provide equivalent access to funds, technical support and construction priorities for each region. In doing so, the policy will recognize the unique topology, economics and environment of each region and provide for contemporaneous expansion in accordance with the needs of each.

3. "Smart Grid" Features

The recommended policy for transmission should additionally support, in addition to towers, conductors and substations, the advancement of technology that increases the "intelligence" of the transmission network. The "Smart Grid" features include enhanced automation features associated with the most sophisticated communications techniques available. The "smart grid" will incorporate multiple communications channels supporting two-way discourse between producers and users of electric energy, and provide enhanced communications for telephony, data transmission, and other services as may become available. The transmission grid is a valuable resource that provides for numerous benefits, and no constraints should be placed that would impede the inclusion of the most advanced technology available.

4. Reduced Transmission and Distribution System Line Losses

While a policy of transmission optimization and expansion in and of itself would generally imply system loss reductions, the policy should additionally address losses on any and all electric systems, including distribution systems. Reducing system losses will provide for less fuel consumption in fossil generating units and a more effective energy contribution of renewable resources. The system loss reduction policy could include voluntary targets beyond the estimated beneficial levels addressed in Power Cost Equalization (PCE), and apply to non-PCE eligible utilities in equal measure. A variety of techniques and equipment can be implemented to reduce line (and transformation) losses.

Goals:

The goals of the policy of Transmission Optimization and Expansion include:

- Interconnection of major generation facilities within the applicable regions of Alaska
- Access to identified hydroelectric, wind, tidal and other non-fossil fired generation resources.

- Displacement of less-efficient industrial and commercial electrical generation facilities (including Alyeska Pipeline pump stations, North Slope production facilities, Cook Inlet production facilities, fish processing generation, and others).
- Improved access for combined heat and power production facilities at industrial locations.
- Reduced diesel-fired generation in remote locations.
- Electricity access for resource development such as mining, tourism, fisheries, and others in remote locations.
- Regional grids supplied by specialized resources (e.g,, geothermal facilities).

Timing:

The policy to optimize transmission service may be implemented immediately. The transmission system is in operation as currently configured, is scrutinized continually for improvement, and maintained for assurance of service. Any policy supporting enhancement of transmission services in any fashion will be recognized and considered in both daily activities and planning for the future by all system beneficiaries.

Parties Involved:

Electric transmission facilities, while primarily owned and/or operated by utility organizations, are subject to regulatory oversight by a host of state and federal agencies. As transmission facilities are notably visible and by their very nature have a wide range of ecological impacts, numerous non-governmental organizations also participate in various ways on transmission system issues. Consequently, the number of parties involved is extensive. The primary participants, however, in implementation of a statewide policy of transmission optimization and expansion are:

- The electric utilities of Alaska – private, municipal, cooperative, joint action agencies and various operating organizations among utilities.
- The Alaska Energy Authority and Alaska Industrial Development and Export Authority.
- The Denali Commission.
- The Regulatory Commission of Alaska
- The Alaska Department of Natural Resources
- The USDA Rural Utilities Service
- The US Fish and Wildlife Agency
- The Army Corp of Engineers
- Statewide commercial and industrial enterprise owners, and
- All users of electricity state-wide.

Others:

Implementation Mechanisms

A statewide policy promoting enhancement of the state's transmission system will be implemented through regulatory polices of the state to reduce barriers to development and to establish, for example, a transmission bank providing low-cost funds for financing system expansion and technological improvements. The Denali Commission and AIDEA/AEA would be the agencies of significance in providing financial and technology support.

Related Policies/Programs in Place

The State of Alaska and the Denali Commission have had programs in place to enhance the transmission system. Alaska's AIDEA/AEA has developed transmission facilities, retaining ownership while delegating maintenance and operation to utility participants, and includes transmission system development as a component of expanded access to renewable resources by utilities. The federal government has supported improved transmission, as by the authorization of the various components of the Southeast Alaska Intertie system that has benefitted from periodic contributions of appropriated funds for design and construction by various electric utility organizations.

Type(s) of GHG Reductions

Types: CO_2, N_2O, others?
Industrial: facilities, subject to participation
Utility: Extent of transmission coverage
Residential water and space heating: Potential for electrification
Negative: Increased baseload power plant utilization
Transportation for servicing lines (land and air)

Estimated GHG Reductions and Net Costs or Cost Savings

Option No.	Policy Option	GHG Reductions ($MMtCO_2eq$)			Net Present Value 2010-2025 (Million $)	Cost Effective-ness ($/t$CO_2$eq)	Level of Support
		2015	2025	Total 2010-2025			
ES&D-5							

- Data Sources
- Quantification Methods
- Key Assumptions

Key Uncertainties

TBD -

Additional Benefits and Costs

TBD – Subject to additional consideration by ES&D TWG

Feasibility Issues

TBD – Subject to review by ES&D TWG

Status of Group Approval

Pending – until review by ES&D TWG

Level of Group Approval

TBD – Subject to vote of ES&D TWG

Barriers to Consensus

TBD – Subject to vote

ES&D 3: IMPLEMENTATION OF RENEWABLE ENERGY

Policy Description

Installing renewable energy generation will directly off set use of fossil fuel. This policy will promote a reduction in the use of fossil fuels by establishing an economic and regulatory environment that will allow utilities and individuals to install predictable and reliable capital-intensive renewable energy generation.

Policy Design

The State must develop a system that will (a) provide grants or long term low interest loans to utilities and individuals to install renewable energy projects and (b) develop regulation that allows utilities to recoup renewable energy capital costs through rates even if capacity is not needed.

ES&D 5: EFFICIENCY IMPROVEMENTS FOR UTILITY-SIZE GENERATORS

Policy Description

Making existing generation more efficient will reduce use of fossil fuels. This policy will promote projects such as waste heat recovery, unit optimization to increase output, or unit optimization to reduce fuel consumption by rewarding businesses that undertake these projects.

Policy Design

Reduced costs associated with avoided fuel usage should be incentive enough to encourage companies to undertake such projects. Many of the efficiency or heat recovery projects are capital intensive, and typically capital expenditures are recovered in rates, while the fuel avoidance is captured in reduction of the fuel surcharge consumers see on their bills. Capital is paid for over time, fuel savings are recovered monthly. So, while a consumer's over all bill may go down, the rates may need to increase to recover the capital expenditures. Therefore this policy will be designed to allow businesses to access capital that the State will provide for the efficiency improvements that will be paid back as a percentage of the fuel savings over time.

Focus on later (Steve Colt) already been looked at.

ES&D 7, 8 & 9: ENERGY SUPPLY TECHNOLOGY RESEARCH AND DEVELOPMENT

Policy Description

A policy of Energy Supply Technology Research and Development will advance the implementation of effective supply--side energy resources to offset or reduce the production of greenhouse gases. This policy is directed to establishing programmatic incentives for participation and support of public and private investment in fundamental research, demonstration and deployment of carbon-emission reduction and energy production technologies that hold promise for implementation throughout Alaska. Advanced technologies in electric power generation, both small-scale and large-scale, in fossil generation, nuclear generation, and renewables will provide greater efficiency in power supply for utility and industrial purposes. A statewide emphasis on enhanced utilization of new and emerging technologies that provide the end-use benefits of electric energy with greater efficiency will provide economic and environmental benefits through Alaska.

The policy will provide incentives and reduce barriers to implementation of advanced generation technologies using the variety of energy sources available to Alaska. While emphasis may be provided on cold-climate applicability (e.g., combined heat and power) or other regional characteristics (e.g., geothermal availability) the emphasis will be on cost-effective supply and net environmental impacts. Such incentives will allow for utilization of ubiquitous indigenous resources (e.g. oil, coal, gas and geothermal energy) or imported forms, as may prove beneficial through demonstration. Therefore, the policy will support improvements to existing combustion and production systems (boilers, engines, and turbines) for higher efficiency operating characteristics and alternative fuels; emerging technologies such as coal and biomass liquefaction and gasification (at both low and high volumes); small-scale nuclear facilities with advantageous domestic heat utilization options; energy storage using advanced batteries or off-peak hydrogen production from intermittent or high capacity factor generation sources; fossil combustion effluent carbon capture with value-added sequestration; and others as may become feasible.

In addition to R&D on reducing CO_2 production, policy should encourage R&D on carbon capture and management. Such examples could include food production in greenhouses or other novel value-added carbon capture as well sequestration.

Policy Design

General:

……..Issues: Allow/accommodate utility risk-taking in technology (regulatory)
Statewide budget and funding of R&D (legislature)
Agency support for systems testing (DNR, DEC, etc)

Permitting (agency, municipality, village, and landowner policies)
Exploiting vendor demonstration opportunities.
Using and developing capacity at the University of Alaska for R&D

Goals:

The goals of the policy of Technology Research and Development include:

Timing:

Parties Involved:

- The electric utilities of Alaska – private, municipal, cooperative, joint action agencies and various operating organizations among utilities.
- The Alaska Energy Authority and Alaska Industrial Development and Export Authority.
- The University of Alaska
- The Denali Commission.
- The National Laboratories: NETL, INL, Oak Ridge, NREL, others
- The Regulatory Commission of Alaska
- The Alaska Department of Natural Resources
- The USDA Rural Utilities Service
- The US Fish and Wildlife Service
- Technology vendors and
- Non-governmental organizations (NGOs)

Other:

Implementation Mechanisms

Related Policies/Programs in Place

Type(s) of GHG Reductions

Types: CO_2, N_2O, others?
Industrial: facilities, subject to participation
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Estimated GHG Reductions and Net Costs or Cost Savings

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ES&D-7							
ES&D-8							
ES&D-9							

- Data Sources
- Quantification Methods
- Key Assumptions

Key Uncertainties

TBD -

Additional Benefits and Costs

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Feasibility Issues

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Status of Group Approval

Pending – until review by ES&D TWG

Level of Group Approval

TBD – Subject to vote of ES&D TWG

Barriers to Consensus

TBD – Subject to vote

ES&D Policy Option	Energy Supply and Demand TWG	Potential GHG Emissions Reduction	Cost per Ton
ES&D-1	**Transmission System Optimization and Expansion**		
	Transmission System Optimization	H	M-H
	Reduce Transmission and Distribution Line Loss	H	L
	Smart Grid		
	Transmission System Expansion		
ES&D-2	**Energy Efficiency for Residential and Commercial Customers**		
	Consumer Education Programs	U	U
	Low-cost Loans for Energy Efficiency Improvements	H	L-M
	Energy Efficiency Funds (e.g., public benefits funds) administered by state agency, utility, or 3rd party (e.g., Energy Efficiency Trust)	H	N-L
	Revolving loan fund for EE programs / improvements (to be repaid by savings) - [add to AEA / AHFC]	U	U
	Demand-Side Management (DSM)/Energy Efficiency Programs, Funds, or Goals for Electricity (including expansion of same)	H	N-L
	Demand-Side Management (DSM)/Energy Efficiency Programs, Funds, or Goals for Natural Gas, Propane, and Fuel Oil	M-H	N-L
	Demand-Side Management (DSM)/Energy Efficiency Programs, Funds, or Goals for Natural Gas, Propane, and Fuel Oil	M-H	N-L
	Appliance Recycling/Pick-Up Programs and Appliance Standards	L-M	L-M
	Support for Federal-level Appliance Efficiency Standards	U	U
ES&D-3	**Implementation of Renewable Energy**		
	Incentives to Promote Implementation of Renewable Energy Systems (i.e. Renewable Energy Fund, HB152)	L-M	L-M
	Grid-based Renewable Energy Incentives	H	M-H
	Distributed Renewable Energy Incentives	M-H	M
	Production-based incentives		
ES&D-4	**Building Standards / Incentives**		
	Improved Building Codes for Energy Efficiency	H	L-M
	Green Building Tax Credit *(permit fee reimbursement?)* [add to AEA / AHFC]	L-M	L-M
	Promotion and Incentives for Improved Design and Construction (e.g. LEED, green buildings) in the Private Sector	H	L
	Improved Design and Construction, “Government Lead-by-example”	M	N-L
ES&D-5	**Efficiency Improvements for Generators**		
	Efficiency Improvements and Repowering Existing Plants	M-H	L
ES&D-6	**Energy Efficiency for Industrial Installations**		
	Industrial DSM: Demand-side energy efficiency and incentives, with an industrial focus	H	L
	Industrial and Commercial Audits	U	U
	Training and Education for Builders and Contractors	U	U
	Energy Management Training/Training of Building Operators	U	U
	Incentives for Industrial CHP		
ES&D-7	**Implementation of Small-Scale Nuclear Power**		
	Nuclear Power Support and Incentives	H	H
	Small nuclear power units (<100 MW), distributed generation		
ES&D-8	**Research and Development for Cold-Climate Renewable Technologies**		
	Research & Development of Cold Climate Technology for Alaska (cold climate, small scale supply-side renewable resources)		
	Technology-focused initiatives (biomass, energy storage, etc.)	M-H	L-M
	Technology R&D	U	U
ES&D-9	**Implementation of Advanced Supply-Side Technologies**		
	Advanced fossil fuel technology incentives, support, or requirements (IGCC, CCS, etc. including: space heating)	L	H
	[Transportation advanced fuels shifted to transportation group]		
	Coal-to-liquids Production: GHG Emission Reduction Incentives, Support, or	L	H