Concerning the Southeast IRP — for the House Energy Committee hearing, Feb. 9, 2012

Larry Edwards, Greenpeace (Sitka Field Office), 747-7557, ledwards@greenpeace.org

Time ran out before I could be called to give these comments verbally, so I am submitting in writing.

Thank you Mr. Chairman. I am Larry Edwards, a long-time Sitka resident speaking for Greenpeace.

The draft plan proposes converting 80% of the region's space heating to biomass in 10 years, at a cost of over half-a-billion-dollars. (IRP at 17-15).

While calling for this massive biomass program, heat pumps and related technologies were not investigated in detail, having been summarily dismissed by the plan as options because of factual errors made in writing it.

For example, the claim that "air source heat pumps generally require expensive ducts" is outdated information and no longer true.

A significant error was an economic one, with the draft plan claiming that the breakeven point in wood pellet costs vs. the cost of power to run heat pumps is at 6.5 cents per KW-hour — or around half the current cost of hydro power in the larger communities. That claim is grossly in error. At the current price for pellets ($375/ton, according to the plan), pellets don't breakeven with heat pumps until the cost of power increases to about 32 cents per KW-hour. Even at an optimistic future price for pellets that the plan claims — $250/ton — the breakeven does not occur until the cost of electric power increases to 21 cents per KW-hour. (In the hydropower communities power is currently 9 to 12 cents/KWh.)

At either price for pellets, pellet stoves will cost far more to operate than heat pumps for the foreseeable future, and likely beyond. The SE-IRP missed this point entirely, and in error assumed and acted on the opposite conclusion.

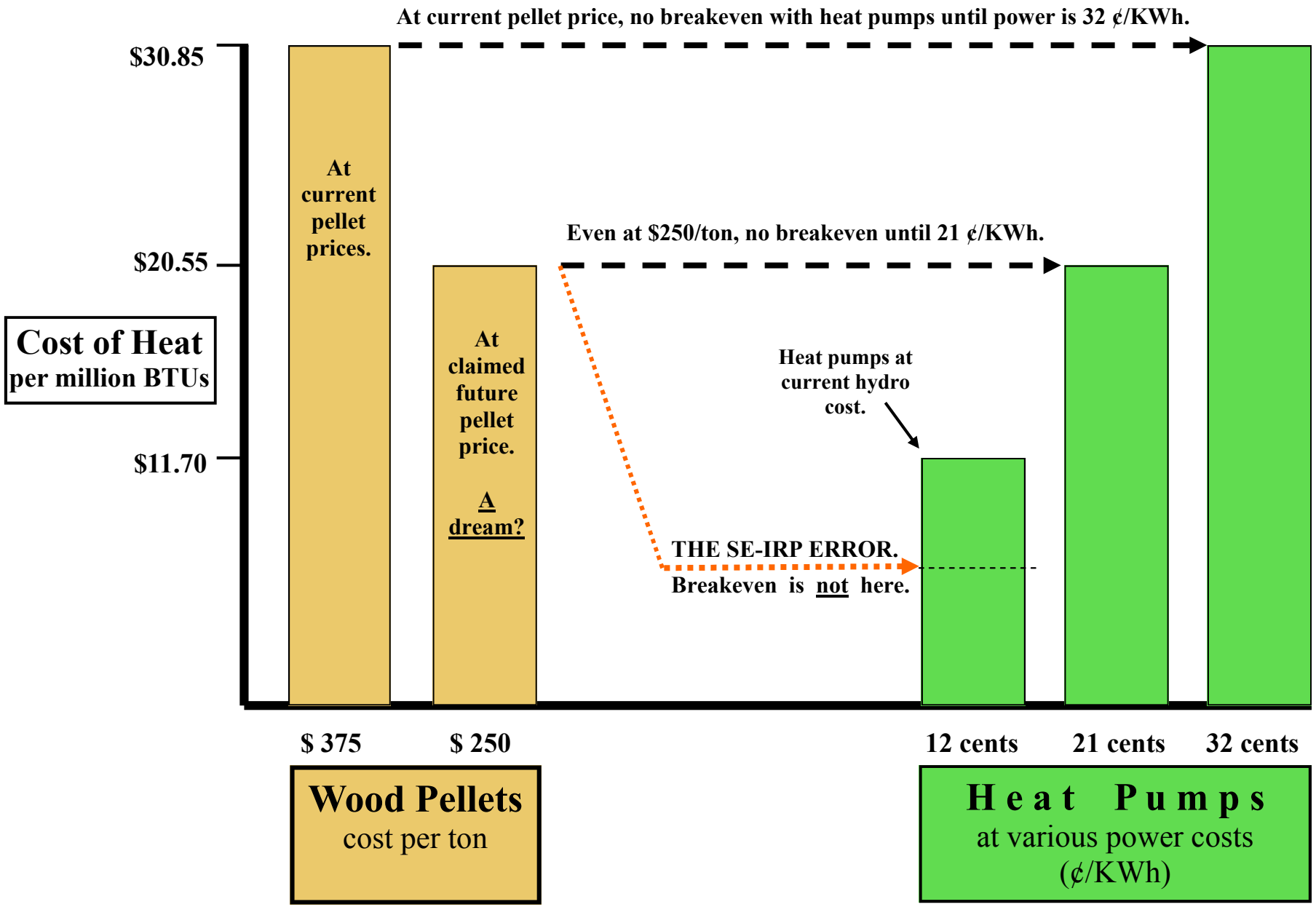
Today I provided your Committee staff with a file [also attached to this written submission] containing a chart which illustrates this, and a spreadsheet showng how these corrective calculations were made. The file also contains two tables from the SE-IRP; one for the power cost breakeven point for biomass vs. electric resistance heat, and the other for biomass vs. heat pumps. (See: Southeast IRP Tables 16-7 and 16-9).

Please note that in both tables, the breakeven is said to be 6.5 cents per KW-hour. This simply can't be! Clearly one of those tables is wrong, and as I have shown it is the biomass vs. heat pumps one.

I flagged this error at the IRP's January 5 committee meeting. Others have raised this error since then, but AEA has publicly said there is no error. I have corresponded with the consultant, Black & Veatch, which also denies an error — but which tacitly refuses to address the evidence of the error that is evident when comparing the two tables. And after weeks, Black & Veatch has failed to provide me with its breakeven point calculations. If there is no error, this unresponsiveness is odd indeed.

It seems clear that this gross, highly significant error — which results in the least-cost heat pump option being summarily dismissed from consideration — necessitates preparation of a revised draft Southeast IRP. **This plan is not ready to go to a final version — the public needs to be able to comment on a reasonable draft**.

A final point is that with heat pumps, the hydropower communities can be converted from both the existing electric resistance and fuel oil heating to heat pumps without additional burden on existing hydro capacity. **We need a 10-year program for this, not biomass.** In Sitka, for example, in 2008 38% of residential heat was by electric resistance (more now). Conversion of that to heat pumps with a COP of 3 would cut power consumption enough to also move all fuel oil users to heat pumps — and still reduce the city's power consumption. Also, incorporating more efficient seawater-source heat pumps with downtown district heating systems (as in Scandinavia) would save even more power capacity.



Correction to the Draft SE-IRP's Breakeven Points — Pellets vs. Heat Pumps.

(SE-IRP Table 16-9 has a very significant error that misled the nature of the plan.)

Prepared by Larry Edwards, 747-7557
Greenpeace — Sitka, Ak.. 9-Feb-2012

Correcting the SE-IRP Error Concerning the Economics of Heat Pumps vs. Biomass

In Table 16-9, the SE-IRP concluded that for wood pellets at $250/ton, heat from biomass is cheaper than from heat pumps if power costs over 6.5 cents/KWh (about half the current rate). That calculation is wrong by a huge amount, and has fundamentally misled the Integrated Resource Plan.

Here is the correct calculation, using the same assumptions of 80% pellet combustion efficiency and a COP of 3.0 for heat pumps:

For $250/ton pellets:	Cost per ton	Million BTU per ton	Boiler Efficiency	Cost per Million BTU	Convert to Cost per thermal-KWh	Heat Pump Efficiency: KWh(thermal) per KWh(electric)	Power Cost Breakeven for Biomass: $/KWh(elect)	Rounded Power Cost Breakeven (cents)
	$250	**15.2**	**80%**	**$20.56**	**$0.070**	**300%**	**$0.210**	**21**

The breakeven is not 6.5 cents per KWh, but 21 cents per KWh -- far more than the power cost in larger hydro-powered communties. Moreover, $250 per ton for pellets is a projected future price that may well prove to be optimistic. The current price is $375 per ton.

For $375/ton pellets:	Cost per ton	Million BTU per ton	Boiler Efficiency	Cost per Million BTU	Convert to Cost per thermal-KWh	Heat Pump Efficiency: KWh(thermal) per KWh(electric)	Power Cost Breakeven for Biomass: $/KWh(elect)	Rounded Power Cost Breakeven (cents)
	$375	**15.2**	**80%**	**$30.84**	**$0.105**	**300%**	**$0.316**	**32**

At either pellet price (and $375/ton seems more realistic), and with power far less costly than the breakeven points, operate than pellet stoves. heat pumps will be far more economical to operate than biomass heat in at least Juneau, Ketchikan, Wrangell, Petersburg and Sitka.

The SE-IRP draft therefore made a huge blunder in dismissing heat pumps for economic reasons and in not considering them in depth. This error severely affected the nature of the SE-IPR and the options it considered in detail.
BOTTOM LINE: A new SE-IRP draft is needed.

Prepared by Larry Edwards, 747-7557
Greenpeace --- Sitka, Ak. 9-Feb-2012
ledwards@greenpeace.org

Table compares electric resistance heat to wood pellets.

Table 16-7 Wood Pellet Heating Option Cost Comparison on a $/MBtu Equivalent Basis

FUEL	UNIT COST	$/MBTU	BREAKEVEN UNIT COST WITH WOOD PELLETS AT $250/TON
Wood Pellets (average lower 48 price, proxy for SE Alaska price with local pellet production)	$250/ton	$19.53	NA
Wood Pellets (current price per ton based on cost of 40 pound bags in Juneau)	$375/ton	$29.30	$250/ton
Heating Oil	$3.50/gallon	$31.55	$2.09/gallon
Propane	$3.70/gallon	$50.644	$1.43/gallon
Electric (Juneau 2010 average)	12 cents/kWh	$35.89	6.5 cents/kWh
Electric (Metlakatla, 2010 average, lowest Southeast Alaska community)	9.2 cents/kWh	$27.51	6.5 cents/kWh
Electric (Tenakee Springs, 2010 average, highest Southeast Alaska community after PCE)	31.51 cents/kWh	$94.24	6.5 cents/kWh
Note: Assumes 80 percent appliance efficiency for wood pellets, fuel oil, and propane calculations, 98 percent efficiency for electricity.			

Table 16-7 also compares the cost of electricity at three price levels with wood pellets. The table indicates that at a cost of 12 cents/kWh, which was the average residential price in Juneau in 2010, the cost of electricity would be $35.89/MBtu (assuming 98 percent efficiency for a furnace or boiler). The break even price of electricity versus wood pellets at $250/ton is approximately $6.5 cents/kWh. Based on the high (30.5 cents/kWh) and low (9.2 cents/kWh) residential electricity costs of Southeast communities in 2010, the cost of electricity ranges from a high of $91.21/MBtu to a low of $27.51/MBtu. These break even costs are for fuel only and do not include the cost of new or retrofit stoves and furnaces needed to burn wood pellets.

A recent study by Haa Aaní, LLC evaluated the total program costs and benefits of converting seven schools in the Ketchikan School District from electric power to wood pellets. The study estimated that it would cost $2.5 million to convert the seven schools, but this would create a 20 percent savings on fuel costs each year (assuming a pellet cost of $300/ton) and the program would have a payback of less than 12 years if no State grant funds were put into the program. The volume of wood pellet fuel required for the program would account for one-fourth of the volume needed to support a local wood pellet production mill and could be a catalyst for creating a local production industry. The study concluded that there were ample opportunities for the conversion of additional commercial buildings to fully utilize the capacity of a wood pellet production mill. The study noted that conversion of the seven schools alone would reduce electric power requirements by 5 MW, thereby allowing other end-users the ability to utilize existing power supplies.[23]

[23] See *Ketchikan School District Pellet Boiler Systems: The Business Case*, a Power Point presentation by Nathan Soboleff, Renewable Energy Program Manager, Haa Aani, LLC and Peter Brand: PBrand BioEnergy Consulting.

When evaluating these conclusions, it should also be kept in mind that the heat pump study did not evaluate heat pumps against all possible heating alternatives. Wood pellets and perhaps propane options from the North Slope would appear to be preferred options for the smaller communities in Southeast Alaska. Table 16-9 presents a comparison of the pellet costs and the electricity costs from Table 6-6 for heat pumps with a COP of 3.0. These alternatives are dependent, however, on the development of a local wood pellet industry and, in the case of propane, the development of an Alaskan market and transport system capable of delivering propane from the North Slope to Southeast Alaska.

Table 16-9 Wood Pellet Heating Option Cost Comparison on a $/MBtu Equivalent Basis

FUEL	UNIT COST	$/MBTU	BREAKEVEN UNIT COST WITH WOOD PELLETS AT $250/TON
Wood Pellets (average lower 48 price, proxy for Southeast Alaska price with local pellet production)	$250/ton	$19.53	NA
Wood Pellets (current price per ton based on cost of 40 pound bags in Juneau)	$375/ton	$29.30	$250/ton
Electric (Juneau 2010 average)(1)	4 cents/kWh	$11.72	6.5 cents/kWh
Electric (Metlakatla, 2010 average, lowest Southeast Alaska community)(1)	3.07 cents/kWh	$8.99	6.5 cents/kWh
Electric (Tenakee Springs, 2010 average, highest Southeast Alaska community after PCE)(1)	10.50 cents/kWh	$30.79	6.5 cents/kWh

Note: Assumes 80 percent appliance efficiency for wood pellets with a COP of 3.0 for heat pumps.

(1)Adjusted for a COP of 3.0.

This table purports to show the breakeven point between wood pellet heat and heat pumps.