The North Country Resource Conservation and Development Area, Inc

Preliminary Feasibility Analysis for Distributed Energy and District Heating in the Village of Groveton, New Hampshire

July 2008

RAMBOLL

horizons Engineering PLLC

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0. Executive summary

In January 2008 the North Country Resource Conservation & Development Area Inc. (NCRC&D) commissioned Horizons Engineering L.L.C. and Ramboll Denmark A/S to carry out a feasibility study of a district heating network in the Village of Groveton, New Hampshire. The study was funded through a Memorandum of Understanding with the North Country Council, Inc to administer part of the US Department of Commerce, Economic Development Administration's Coos County Economic Adjustment Implementation Plan.

NCRC&D organized an Advisory Committee that together with NCRC&D would follow the study. The Advisory Committee was to assist in making information available, to oversee the progress of the study and to finally accept the study report. The Advisory Committee has also an important role to play in the discussions following the issuing of the report, in particular on how to take the next step towards developing a district heating network.

Today the residents of Groveton rely heavily on oil to heat the homes and buildings in the village. With the increasing oil and gas prices an important objective of a district heating network is to reduce the heating costs and to maximize energy efficiencies. A district heating project should also seek to support growth of new business and industry in Groveton. The use of local, renewable energy supplies, such as biomass, would be an additional objective.

Two of the key principles in the study are to avoid advanced technologies during the early stages and to avoid overspending on the district heating network. A phasing of the build-out is part of the suggested approach and for the assessments made in this study Groveton has been divided into three main areas, two of which are proposed supplied from the heat network.

The study does not describe the provision of heat for the district heating network. Assumptions have been made with regard to the location of the heat source at the Wausau Papers property and the use of wood chip as the main fuel in order to assess the economy of the project.

The most difficult and time consuming part of the study has been to obtain precise heating data for the buildings in Groveton. It has been assumed that the district heating supply will cover both the heating of the buildings and the domestic hot water demand, which is the normal procedure when introducing district heating.

The report briefly outlines the heat production technologies available for the supply of a district heating network, including a description of the combined production of heat and power. This section also deals with wood as a fuel, some of the questions surrounding heat storages, alternative heat sources and the requirements for back-up boilers.

Another section of the report is dedicated to planning issues and the possibilities of funding that Horizons Engineering and Ramboll have identified.

The objective of the district heating network is to supply the majority of Groveton with heat and domestic hot water in the most economically feasible way. This means that the network needs to be divided into two networks and implemented over three phases.

Two district heating networks have been outlined in the study to find the right pipe dimensions and to develop project cost estimates. The first network covers the central part of Groveton, west of the Wausau Paper property, and the second network covers the northern part of the village.

It is assumed that a wood chip fired heat production facility is established close to the Wausau Paper property. The facility will have oil-fired back-up boilers.

The connected buildings will have a hydraulic interface unit with a heat exchanger and a cylinder for domestic hot water.

Three scenarios have been examined to assess the feasibility of a district heating network. The scenarios 1A, 1B and 2 represent a development in three stages; scenario 1A covers the area closest to the boiler plant, scenario 1B takes a step further, covering a larger area (including 1A) and scenario 2 is a further development to an even larger area (including both 1A and 1B).

In order to make the financial appraisal we have estimated the costs of the pipe network, the costs of establishing a wood chip fired heat production facility with oil-fired back-up boilers and the costs related to the connection of each building to the district heating network through a hydraulic interface unit. Also assumptions about the oil price and the price of wood chips are included in the study.

The total cost estimates for the three scenarios are listed in the table below. It should be noted that both the development scenarios and the costs are cumulative, i.e. the total cost of construction for the system described in scenario 1B includes the cost of scenario 1A. In the same way the cost of construction for the system described in scenario 2 includes the cost of scenario 1B, which again includes scenario 1A.

Construction costs estimate for each scenario				
Scenario	Plant ($)	Network ($)	HIU *) ($)	Total ($)
1A	1,300,000	1,943,000	681,000	3,924,000
1B	1,500,000	4,332,000	1,308,000	7,140,000
2	1,800,000	9,220,000	2,144,000	13,164,000

HIU = The Hydraulic Interface Unit or consumer's heat exchanger unit

When looking at the results of the calculations, the most interesting figure is probably the heat price that customers will have to pay, if they connect to the district heating system.

The price is in dollars per million Btu ($/MMBtu), and in the following table it has been calculated for the three scenarios used in the study. It should be observed that the price in Scenario 1A is the lower and that the price in Scenario 2 is the higher with Scenario 1B in between. The reason is that it takes a shorter network to supply heat to the buildings closest to the boiler plant and the investment in the network is therefore lower. The consequence is a lower heat price.

Another feature of the table is the payback time and the table shows the results for three different periods: 10, 15 and 20 years. The payback period is interesting because a large part of the heat price is used to pay back the investment in the network and in the heat production facilities. With a shorter payback period, the heat price will become higher.

Heat price to be paid by customers connected to district heating			
Scenario	10 years payback ($/MMBtu)	15 years payback ($/MMBtu)	20 years payback ($/MMBtu)
1A	32	26	23
1B	33	27	24
2	39	31	27

The heat price should be compared with the price paid by residents with individual oil-fired boilers. With a retail oil price of $ 4.00 per gallon and a boiler efficiency of 85%, the comparable price of heat based on oil is $ 39 per MMBtu. For a less efficient oil-fired boiler the price would be higher.

In other terms, with a payback period of 10 years and a development of the district heating network following Scenario 2 (which represents the full build out within the area identified for district heating), the price of heat from the district heating system is the same (39 $/MMBtu) as the price paid when heating with oil. If the payback period is 20 years instead, the heat from district heating is 27 $/MMBtu or 31% lower than heating with oil.

If we look at Scenario 1A, the same numbers are 32 $/MMBtu or 18% lower for 10 years payback and 23 $/MMBtu or 41% lower for 20 years payback.

The results of this study will quite naturally be influenced by changes in fuel prices and the uncertainty in the construction costs estimates. It is therefore important that

any work based on these results takes a critical view on current developments within both the oil price and the price of wood chip. Also a review of the estimated construction costs should be included in any further work

The report concludes with a recommendation that the study is followed by a more detailed investigation in the heat production facility options and the network itself. In particular the cost estimates are based on assumptions, which have to be verified. It is also important that a business plan for the enterprise (or enterprises) is developed and anchored within the community.

1. Introduction

In January 2008 the North Country Resource Conservation & Development Area Inc. (NCRC&D) entered into an agreement with Horizons Engineering L.L.C. in partnership with Ramboll Denmark A/S (Ramboll) to carry out a feasibility study of a district heating network to supply heat to a number of residential, private and public buildings in the Village of Groveton, New Hampshire.

The purpose of the study was to evaluate the technical and commercial aspects of such a project. Also the study was to look at the requirements to develop a scheme and to focus on an overall master plan and strategy for the Village of Groveton with respect to the implementation of a heating network.

Horizons Engineering and Ramboll has teamed up to combine Horizon's local knowledge of Groveton with Ramboll's international expertise and experience with district heating systems.

This report presents the result of the feasibility study.

2. Background to the study

2.1 General background

The majority of the buildings in Groveton are heated with oil. Increasing oil and gas prices, not least over the latest 12-18 months, have led to increasing heating costs and there is currently no real alternative available to the residents of Groveton, who have to rely on individual oil or propane fired boilers.

NCRC&D's role has been to administer the development of a Preliminary Feasibility Analysis which would define "the benefits, costs and other information for the installation of a steam and hot water system within the Village of Groveton, NH". NCRC&D has organized an Advisory Committee that together with NCRC&D has overseen the study.

An important objective of such a heating network is to reduce the heating costs for residents, churches, commercial and municipal buildings and to maximize energy efficiencies. The project should also seek to support growth of new business and industry in Groveton. The use of local, renewable energy supplies, such as biomass, is an additional objective.

2.2 Project considerations

A number of options emerge when these objectives of a heating network project or district heating project are considered. We therefore outline some of the principles that we have followed in this study.

First we think it important to avoid advanced technologies at this stage of the project. Simple or proven technologies are cheaper to install, they carry less risk in terms of operation and maintenance and once the project is running and creating revenue, there will be a more solid base for further investments. For the same reason we have not included co-generation (combined production of heat and electrical power or CHP) in the calculations. It will add an economic risk to the project, which is not acceptable before the heating network is developed and the necessary number of heat customers connected.

The second principle is to avoid overspending on the network and therefore a phasing of the build-out is part of the suggested approach. District heating networks require considerable investments and it is necessary to optimize dimensions both in the initial situation and with a view to future proofing. The crucial part of the establishing of a district heating system is to ensure that enough customers connect at an early stage. If we look at the entire district heating system, the cost of the network is likely to be 60 – 70 % or more of the total cost.

The NCRC&D Request for Qualifications mentions a steam system. In this study we have not taken this option any further because there is no recognized steam demand in the Village of Groveton. A future industrial facility at the Wausau Papers property might turn out to require steam but that would be have to be considered, whenever the demand should arise.

For the assessments made in this study Groveton has been divided into three main areas:

Area 1 is the central part of Groveton. This is the most interesting area in terms of connection to a district heating network due to the relatively high density of buildings.

Area 2 is the part of Groveton that is north of the St. Lawrence and Atlantic Railroad. This area has a lower building density and consequently must have a lower priority with regard to a DH connection.

Area 3 is the row of buildings on the southeast bank of the Upper Ammonoosuc River. We have given this area the lowest priority with regard to a DH connection due to the low density and the limited number of buildings combined with the relatively remote location.

The areas are shown on the aerial photo in Appendix 1.

From our experience with other DH projects and to limit the number of scenarios we have chosen to confine our model for the network to Area 1 and Area 2. Area 1 will be subject to a more detailed analysis while the assessment for Area 2 is carried out using key numbers obtained in the study of Area 1. At this stage a connection of Area 3 is not considered viable for the above reasons.

The outline of the district heating network in this report has an optimum combination of pipe diameters, which have been calculated using the SYSTEM RORNET (SR) software package. The program was developed by Ramboll's district heating department and is one of the standard tools used today for design and analysis of district heating networks, not only with Ramboll but also with a few other consultants and a number of district heating utilities.

In accordance with the Scope of Services provided in the contract between NCRC&D and Horizons Engineering the study does not describe the provision of heat for the district heating network. Assumptions have been made with regard to the location of the heat source and the fuel in order to assess the economy of the project. A broader introduction to various heat production technologies and a discussion of the need for back up production capacity follows in a separate section of this report, which also discusses the potential need for thermal storage.

2.3 Public meeting

Horizons Engineering and Ramboll attended a public meeting in the Village of Groveton on January 22nd 2008, arranged by NCRC&D and hosted by GREAT (Groveton Regional Economic Action Team). The format for the meeting included an introduction to the project by Horizons Engineering and Ramboll and questions and comments were registered.

Additional meetings have not been included in the scope of the study, but Horizons Engineering is prepared to meet with the Advisory Committee to present the results of the study and to discuss our findings and recommendations.

3. Technical study

The most difficult and time consuming part of the study has been to obtain precise heating data for the buildings in Groveton. Tax mapping, aerial photographs and information about location, occupancy type, building square footage, heating type and fuel type have been made available. In order to determine the heat loads this information has had to be supplemented with a digital map connecting the data to the geographical location of each address.

To establish a heat consumption profile for the buildings, the annual fuel consumption of a number of buildings has been investigated to more closely estimate usage.

The technical part of the study has looked at the existing heating of the Village of Groveton and the options for the future. It focuses on the principles of identifying heat loads through heat planning or phasing in order to facilitate the viable introduction of heat supply from a potential new heat source.

3.1 Heat demand and diversity

It has been assumed that the district heating supply will cover both the heating of the buildings and the domestic hot water (DHW) demand. The heat demand of the buildings will depend on the heat loss of the building and to some extent of the type of occupancy.

The provision of DHW, instantaneous or via individual storage cylinders, is important in determining the load. The advantage of DHW via a storage cylinder is that the peak load capacity demand from the buildings is reduced considerably which results in smaller pipe dimensions of the DH system compared to a system based on instantaneous DHW via a heat exchanger. The disadvantage is that the hot water cylinder will take up a little more space. Instantaneous DHW will have a higher demand and subsequently it can generally be assumed that the size (diameters) of the network will increase.

As the peak load consumption will not occur simultaneously for all buildings in an area the flow in the various pipes should be multiplied by a diversity factor. The heat demand and the diversity will depend on individual usage, which means that non residential usage will have a different profile than that of residential. The individual use of DHW will also vary between residential buildings and it is unlikely that everyone within a larger area will need their maximum demand at the same time.

The diversity is assessed for individual schemes based on experience and may vary depending on the combination of residential and non-residential buildings together with their usage, i.e. domestic, retail, offices, industry, etc.

If we should look to Denmark, we would use a factor for simultaneous use of both heating and DHW, but it can also be split with one diversity factor applied for space heating and one for DHW. In the case of Groveton we have chosen the Danish model.

3.2 Calculating the heat load

The heat load or the peak heat demand for each individual house should be calculated based on the annual heat demand of that particular house. The annual heat demands are transformed to heat loads by introducing an annual utilization time.

For the purpose of this study it was decided to select ten random houses in Area 1 and the owners were contacted and asked to provide data on their annual fuel consumption, which was then used to calculate their annual heat demand. The results were used to obtain a benchmark heat load that was applied to all houses in Area 1 and 2. A table containing data for the ten houses is found in Appendix 2.

In rounded figures the data yield an annual average area specific heat consumption of 70 MBtu/sf corresponding to an average area specific heat load of 39 Btu/sf per hour when applying an oil burner efficiency of 85%.

The format of the data means that it is not practical to enclose the energy demand in a separate report but the baseline information that the calculations have been based on is included in the Appendices 2 and 7.

For this assessment an annual utilization time of 1,800 hours has been used. The number is based on experience from projects in Denmark with a view to the recorded outdoor temperature variation in New Hampshire.

3.3 Calculating the diversity factor

For this particular scheme an automatic calculation of diversity factors has been found suitable. An algorithm within the SYSTEM RORNET program package assigns a diversity factor to each pipe section in the DH system for the purpose of minimizing pipe diameters and thus the cost of the system.

3.4 Heat production

For this study the assumed point of delivery of heat is located at the Wausau Papers property or in the immediate neighborhood of this complex. The exact location is not important at this stage of an evaluation but both from the mapping of the heat loads and from the site visit to Groveton in January it seems obvious that a heat plant should be located close to this area to minimize the costs of the district heating network. It will also mean that a development of the network in two or more phases will pick up the largest loads in the first phase.

No alternative heat sources have been identified which could supply heat to the project. The Scope of Services provided in the contract mentions the Tamarack Biomass Facility (or Groveton Renewable Energy Park) but because of the uncertainties surrounding this project we have not found it possible to give it more consideration at this stage.

3.5 Technical network design

3.5.1 Characteristics of modern district heating systems

District heating is a method of delivering heat from a variety of heat producing sources to a variety of heat customers. Heat produced from fossil fuel sources such as natural gas, oil burned directly in boilers or through combined heat and power (CHP) and also renewable energy can be delivered to residential buildings, commercial & public offices, schools, warehouse and factory, hospitals plus light industrial process heating.

There is a long tradition of district heating in US cities going back to the 19th century but most of these systems were steam systems and most of them no longer exist. The steam system of Manhattan in New York City is one of the relatively few larger systems remaining. Closer to Groveton, the Concord Steam Co. provides heat to buildings in the downtown Concord area.

The majority of modern district heating systems are hot water systems, as steam systems in comparison are typically not as efficient and both the initial investment in

the network and the operation and maintenance costs are considerably higher. Hot water district heating systems are normally constructed using pre-insulated pipes and supply temperatures are most often in the range of 170 - 230 ^{O}F with a maximum operation pressure of up to 230 psi in a distribution system.

3.5.2 District heating network conditions

The design of the heat network that would supply heat to connected buildings within an area is critical, as it represents both a significant capital investment and ongoing operational costs. Buildings to interface with the primary heat network, and in some cases specifications for individual residential consumer units and heat metering, also require attention in order to ensure future proofing and to build the confidence of property developers and residents.

The cost of installing the heating network depends largely on four factors:

- The design operating temperature and pressure
- The complexity of services
- The length of the network
- The peak heat demand

A district heating system can theoretically be split into three levels:

- Branches and connections to supply buildings
- Distribution heat network
- Transmission heat network

Transmission and distribution are primary and secondary networks respectively, normally separated by heat exchangers. The temperatures and pressure required to transport the heat energy are higher in a transmission system than in a distribution system. A DH system of the scale necessary in Groveton does not require a transmission network.

It is important to the cost of the scheme as a whole, in relation to both installation and operational costs that the network is fully optimized. This includes not only the pipe dimensions but also the temperature and pressure levels, the routing of the pipes and the operation strategy for the whole system.

Another issue of importance to the operation and maintenance of the system, although not directly connected to optimization, is the quality of the water in the system. One of the main reasons for system failures in the past has been poor water quality.

3.5.3 Interface of consumers to the district heating network

The heating system is assumed to be a central heating system for all houses and buildings with good individual controls and heat metering.

The individual houses and buildings heating systems can be either directly or indirectly connected to the district heating network.

In the direct connection there is no physical barrier between the DH water and the water of the building's central heating system. This could be an issue concerning safety and quality of the district heating water.

Generally we would therefore recommend indirect connection for reasons of security and quality of the district heating water.

In the case of Groveton it is assumed that there is to be a heat exchanger (or hydraulic interface unit) for the connection to the heat network. It is also assumed that the advantages of having domestic hot water (DHW) supplied via a storage cylinder are greater than the disadvantages.

3.6 Groveton District Heating Network

3.6.1 Groveton site visit

In connection with the public meeting in January 2008, Ramboll spent time in Groveton looking at potential pipe routes and the possible location of the heat production plant. The visit also gave the opportunity for Ramboll to get a better impression of the density of the buildings and the condition of the roads.

The general impression is that there will only be few problems with other services and that the relocation of other pipes and cables can largely be avoided.

Horizons Engineering has experience from excavations in Groveton and Area 1 should not hold many obstacles in terms of other pipes or soil conditions. Area 2 may be more difficult because of some evidence of bedrock in the area. This is not expected to be a significant problem because much of the rock within the roads has been removed previously for the installation of water and sewer and the proposed heating network would generally be installed at shallower depth (approximately 30 inches cover).

3.6.2 General preconditions

The general preconditions assumed for each of the identified areas of Groveton have been used in the modeling of the district heating network. The cost estimates have been established as described in section 5.2 and they are included in the tables below for reference.

Area 1

Two DH networks have been modeled. The first model (Model 1A) is geographically limited to consumers in close vicinity to the suggested site of the energy center (the point of heat delivery) but the pipe dimensions have been chosen to supply all of Area 1 in terms of capacity. The second model (Model 1B) covers geographically

practically all of Area 1, including the consumers supplied in model 1A. Model 1A may therefore be considered the first stage in converting all of Area 1 to district heating.

Model 1A

An outline of the network can be found in Appendix 3. The energy center is located next to the Wausau Papers property as initially suggested. The network covers Mechanic Street, State Street, Preble Street, Church Street and most houses on Main Street. Service pipes for each individual house are included.

Table 1 summarizes the results of the dimensioning, incl. trench lengths and costs.

Table 1 – Dimensions and construction costs of the network of Model 1A

Dimension	Trench length ft	Specific costs $/ft	Total costs '000$
DN20	0	0	0
DN25	2,913	150	438
DN50	2,538	182	461
DN80	952	223	212
DN100	246	258	64
DN125	525	305	160
DN150	778	315	245
Total	7,952	199	1.580
Contingency		15%	237
Management, engineering			126
Total network project costs			1,943

Model 1B

An outline of the network is found in Appendix 4. From the energy center branches on both sides of the main pipeline going down Mechanic Street form a network supplying heat to virtually all of Area 1 while keeping pipe dimensions in the part of the network obtained in Model 1A unchanged.

Except from the area covered by the more detailed Model 1A, nodes distributed along the network indicate groups of customers. The result is that all customers are accounted for in terms of heat supply when dimensioning the distribution network but individual service pipes have been ignored in the hydraulic model. The estimated cost of the network is based on the pipe lengths of the model, adjusted to accommodate the service pipes in the part of Area 1, which is outside the area covered by Model 1A.

Appendix 5 shows a plot of the network containing information about pipe diameters.

Table 2 summarizes the result of the dimensioning:

Table 2 – Dimensions and construction costs of the network of Model 1B

Dimension	Trench length ft	Specific costs $/ft	Total costs '000$
Service lines *)	5,004	139	695
DN25	3,842	150	577
DN50	7,433	182	1.350
DN80	1,932	223	430
DN100	246	258	64
DN125	525	305	160
DN150	778	315	245
Total	19,760	178	3.522
Contingency		15%	528
Management, engineering			282
Total network project costs			4,332

**) Service lines in Area 1, outside area covered by Model 1A*

Area 2

For this preliminary study the SYSTEM RORNET model itself has not been expanded to include Area 2. Instead, key figures obtained in Models 1A and 1B are used to evaluate the extra necessary heat production and the additional cost of extending the Groveton DH network to this area.

Appendix 6 shows an outline of the network.

The cost of the network to supply Area 2 is roughly estimated as the cost to cover the same heat load in Area 1 excluding the dense area of Model 1A. In addition 25% has been added to cover rock excavation. Although the network and the associated costs are not based on a separate hydraulic calculation, the fully developed network covering both Area 1 and Area 2 is referred to as Model 2.

Table 3 – Comparison of the network costs of Model 1A, Model 1B and Model 2

	Unit	Model 1A	Model 1B	Model 2
Total costs	'000$	1.943	4.332	9.220
Trench length	ft	7.952	19.760	38.814
Specific costs	$/ft	244	219	238

Internal network – Building heating systems

The internal networks for distribution of heat to radiators or floor heating systems within each individual house are not considered at this early stage of the project.

Hydraulic Interface Units/Customers' Heat Exchanger Units

It is assumed that each house will be connected to the network through a hydraulic interface unit in the building. It consists of a heat exchanger for the in-house space heating installation and a heat exchanger with a water tank for domestic hot water production. This interface connection is named the consumer's heat exchanger unit or Hydraulic Interface Unit, abbreviated HIU. The same assumption applies to the larger non-residential connections. The cost estimates related to the customer connections are summarized under the financial appraisal.

4. Review of available heat production technologies

4.1 Introduction

A district heating system is characterized by a central production of heat and the distribution of this heat via a hot water piping network as mentioned earlier in this report.

Ramboll's experience from Denmark is that district heating offers many environmental, social and in a longer perspective also economic benefits to a community. Around 60% of all households in Denmark are connected to a heat network with three-quarters of that heat supplied as waste heat from CHP plants, some of which are biomass fuelled but with most of the production currently based on coal or gas. Further 12% comes from waste incineration, 6% is biomass burned in boilers and 3% is industrial waste heat. Only the remaining 4% is natural gas or oil used in heat-only back up boilers during peak demand or to provide spare capacity in case of emergency or maintenance.

The district heating infrastructure optimizes the use of energy sources whether based on fossil fuels or renewables. It creates an opportunity to utilize a range of fuels and "free" energy inputs.

Although this study is not meant to address the provision of heat for the district heating network, one of the RFQ objectives is the use of local, renewable energy supplies, such as biomass. In the following we briefly outline the available technologies for heat production in general for a district heating scheme, some of which are more likely than others to be of relevance to a scheme in Groveton but nevertheless useful to get a better understanding of the options available.

4.2 Combined heat and power production (CHP) versus heat only

As mentioned in Section 2 a CHP option has not been included in the calculations. The main reason is that CHP will add to the economic risk of the project and the initial investment will be considerably higher.

Generally speaking the specific heat demand and consequently the size of a CHP plant together with the electricity sales price will be decisive when choosing between a CHP and a heat producing unit. CHP plants are considerable more expensive than boilers producing the same amount of heat. For small-scale biomass plants especially, the market price for electricity is not thought to be sufficient to cover the extra initial costs. Within the scope of this study it is not possible to say where the split might be in New Hampshire as it will depend on a range of parameters, not only related to the local technical and economic conditions but also future legislation including taxes, incentive mechanisms, grants, emission trading schemes, etc.

In terms of the benefits to the residents of the Village of Groveton it is not thought that a CHP-based heat production will carry any advantages over a heat-only production. A heat plant is simpler to establish both technically and financially and the operation will be easier to organize locally.

Although a CHP plant is not recommended for the first phases of a district heating network in Groveton, it may be considered at a later stage. Therefore this review refers to some issues surrounding heat from CHP.

4.3 Wood as the future fuel

The availability of wood locally in New Hampshire makes wood chips or waste wood from forestry or local industrial activities an obvious choice in the Village of Groveton. It is a renewable, sustainable fuel base which can be supported by appropriate forestry practices.

When considering wood as a fuel there are a number of issues that should be considered. When comparing with oil or propane, the use of wood in a central boiler plant would call for a closer look at the following issues:

- The moisture content of the fuel
- Flue gasses
- Fly ash, bottom ash
- Condensate water
- Size constraints
- Noise
- Fuel treatment and feed-in system
- Fuel storage.

District heating boiler plants designed for wood chips vary from similar units based on wood pellets, as the fuels need to be handled differently. Basically both pellets and chips are made of wood but they vary in size, density, water contents etc.

Wood chips are typically made of fresh wood and have a relatively high moisture content compared to wood pellets. Accordingly wood chips can cause increased corrosion and deterioration of the boiler.

Wood pellets are typically made of wood-waste, e.g. from industrial processes. The quality of the pellets may vary and can cause some problems during incineration. For instance the content of problematic substances such as glue from a manufacturing process could cause some serious technical and environmental impacts.

Accordingly the quality of the fuels is crucial for the maintenance level and durability of the heat producing unit. A guarantee for the quality should be applied of the supplier in all cases.

Grate combustion is the traditional technology used for burning both wood pellets and wood chips. Grates are still widely used in small scale plants. Grates are less tolerant of variants in fuel quality than for instance boilers based on fluidized bed technology but they have been able to compete with modern combustion technologies due to a comprehensive technological development. Hence, improved grate firing technologies have made it possible to burn fuels with relatively high water content such as certain wood chips. Both technologies would be suitable for CHP production as well.

Again it should be noted that heat producing boilers based on wood chips typically create higher demands for maintenance and reduce durability of the equipment due to the higher water content of the chips. On the other hand wood chips are considerably cheaper than wood pellets and currently more readily available in New Hampshire.

Considering the lifetime economics of the plant and the existing technological level, a wood chip fired boiler with a grate is the most favorable option. There may be a higher rate of corrosion of the boiler, depending on the water content of the fuel but the quality of the fuel is generally more stable and the combustion is easier to control.

In a fuel market with an increasing interest in biofuels it may also be advantageous to rely on a fuel that requires less processing and therefore should be available in larger quantities and at a more stable price.

For the purpose of this study wood chip has been assumed as the fuel. However, the final conclusion concerning the choice between wood pellets and chips should be based on an updated analysis, once it has been decided that the project should go ahead.

Also it has to be mentioned that although the potential for supplying biomass exists within New Hampshire and other northeastern states, a future global demand for biomass could lead to an increase in prices.

4.4 Alternative heat production technologies

Wood or other biomass fuels could be used in other processes such as gasification, which theoretically could be of interest if CHP was considered. Again we would like to recommend the use of more conventional technologies until the project has proven itself viable.

The advantage of a district heating system is the flexibility and the ability to utilize a variety of heat sources, including what can be called low-grade heat.

One example is the use of solar thermal energy. There are a number of examples in Europe where large-scale solar thermal arrays have been integrated with district heating networks as district heating schemes offer maximum energy utilization from solar thermal as a heat sink for the low temperature water. The largest system in Denmark is connected to the district heating network in a small town, covering 30% of the annual heat demand of 1,200 single-family houses, a few public buildings, a school and a hotel.

Another more distant example of a future energy supply could be the use of fuel cells, which technically would be quite easy to adopt in a district heating system but which are at a stage in their development where cost barriers are too significant for the technology to be a realistic option in a project like the one in Groveton.

4.5 Thermal storage

A thermal store is not a heat production facility in itself but it is a means which can help to ensure a more efficient and cost effective scheme overall, especially in combination with CHP and in some cases with biomass heat only technology.

A thermal store makes it possible to create a time delay between heat consumption and heat production.

The purpose of such time delay is mainly of economic nature and is related to the fact that the cost of heat production may vary with time. By introducing a thermal store in the district heating system it is possible to produce heat at a time when the heat production price is low and then utilize this low cost heat at a time when the production cost for the heat would be high.

The implementation of a thermal store is normally associated with systems supplied from a CHP plant, because the heat production cost here is not only related to the fuel cost but also to the selling price of electricity. When electricity prices are low there could be an advantage in reducing the electricity production and at the same time produce and store heat. When electricity prices are high, production can then be changed in direction of a higher proportion of electricity, taking the required heat for the district heating network from the heat store.

When looking at district heating networks supplied from a plant fired with wood chip, a thermal store can add stability to the operation of the network by leveling or absorbing variations in the output from the plant due to the fuel. If a solar thermal array is established at a later date, a thermal store is mandatory to secure the collection of the heat.

Some schemes in Denmark have their thermal store size based on the weekend demand and switch the production plant off during weekends. This may be done to avoid fuel delivery during weekends if the plant is fueled by for instance wood chip.

4.6 Back up boiler capacity

As stated in section 3.4 the study has not identified alternative heat sources and the district heating project is assumed to be supplied from a central wood chips fuelled heat plant close to or at the Wausau Papers property.

With the proposed district heating network layout there is no reason to introduce back up boilers at any other location than at the central point of heat delivery. There will have to be some back up capacity, preferably an oil-fired boiler but in order to optimize the operation of the system it should be placed at the same location as the biomass boiler.

It should be noted that the oil consumption of a back up boiler will be very small as the boiler will only be operating during peak heat demand.

In an optimized system the use of backup boilers could typically be limited to 100-200 hours or less, depending on weather conditions and the requirements for maintenance. As the boiler is only intended to cover the peak, which is not covered by the base load wood chip boiler, the amount of energy supplied from the oil fired boiler could be less than 2 % of the total heat production.

5. Financial appraisal

In Appendix 8 a financial spreadsheet model for the three scenarios 1A, 1B and 2 is provided. To calculate economic and financial key parameters the Net Present Value (NPV) method has been used with 3% discount rate, initial investments made in 2008 and an operation period of 20 years from year 2009 to year 2028.

5.1 Scenarios

The three scenarios of the financial appraisal are based on the three network models to supply Area 1 and Area 2. Thus, at full development of each scenario district heating system will cover a part of the town's heat demand as shown in Table 4. When both areas are connected (Scenario 2), about half of the heat demand in Groveton is covered by district heating.

Table 4 – Connected consumers to district heating when the system is fully developed

Model/ scenario	Customers at fully developed DH			
	Number of buildings	Floor area sf	Avg. size sf/bldg	Net demand MMBtu/yr
1A	81	344,168	4,249	24,002
1B	220	568,888	2,586	39,674
2	427	839,393	1,966	58,539

The calculations are based on the costs listed in Section 3.6 and summarized below.

The pay-back period for all investments is 10 years. Variants of 15 and 20 years' payback have also been made to evaluate the financial consequences.

Only one model for the district heating heat production has been considered as described in the previous sections, i.e. a biomass boiler that can be fueled with assorted medium wet wood waste with the shape of wood chips or the like, and a gas oil boiler with 100% backup capacity for supporting at peak load and as a reserve. The overall assumed design parameters for the parameters of the district heating system for the three scenarios are shown in Table 5.

Table 5 – Overall design parameters of the district heating systems for the three scenarios

Scenario	At fully developed DH system			Boiler plant capacity *) MMBtu/h	Network length ft
	Net MMBtu/yr	Heat losses %	Gross MMBtu/yr		
1A	24,002	8%	26,001	5 x5	7,952
1B	39,674	10%	44,094	8.5x8.5	19,760
2	58,539	15%	68,850	13.6x13.6	38,814

**) Design capacity of the biomass boiler plus 100% oil boiler backup*

5.2 Summary of estimated costs

A rough estimate of the construction costs of each scenario are shown in Table 6.

Table 6 – Rough estimate of the total project costs of each scenario

Scenario	Plant '000$	Network '000$	HIU *) '000$	Total '000$	Specific $/sf
1A	1,300	1,943	681	3,924	11
1B	1,500	4,332	1,308	7,140	13
2	1,800	9,220	2,144	13,164	16

HIU = The Hydraulic Interface Unit or consumer's heat exchanger unit

The cost of the network has been estimated based on the information available, including the experience of Horizons Engineering from the installation of water pipes and sewers in Groveton. The various estimates cover the assumed capital cost of the main heat network, a wood chips fueled heat plant and interface connections in the building connecting to the network (i.e. the consumer's heat unit or Hydraulic Interface Unit abbreviated HIU).

The assumed technical lifetime is as follows: Boiler plant: 20 years, distribution network: 40 years and HIU: 20 years.

All estimates are conceptual, partly based on Ramboll's experience from European district heating schemes. They have been checked with our US network contacts and adjusted to the conditions in the US. Generally the estimates are thought to be conservative.

There are a number of uncertainties related to the fact that modern US district heating systems based on hot water and constructed with preinsulated pipes are very few. Also the actual costs will depend on the chosen design parameters, as stated in Section 9 on study sensitivity.

The basic scenario is an unchanged heating system with mainly oil use in individual boilers. Miscellaneous required reinvestments in the existing boilers during the period until year 2028 have not been taken into account in the financial appraisal.

5.3 Further assumptions

The financial calculations are based on the following assumptions:

- All costs are expressed in 2008 dollars, and all future costs are assumed constant in fixed prices (i.e. exclusive the inflation rate), except for fuels, that are assumed having an annual real price increase of 2% during the 20 years' operation time period.

- The interest rate for debt is generally assumed to be 4% in fixed prices. With an inflation rate of around 2-3% the nominal interest rate will be 6-7%.

- As biomass fuel source is assumed assorted medium wet wood waste with a heat value around 8 MMBtu per ton. The wood boiler efficiency is assumed to be 94%. As the water content of the wood is expected to be rather high, installation of flue gas condenser to increase the boiler efficiency might be beneficial but has not been included in the present study.

- Stockpiling of the prepared wood waste under roof and protected from rain or snow is assumed. Acquisition of a wood chipper might be required to ho-

mogenize the wood waste in order to make it more suitable for the heat production plant but this has not been included in the costs.

- Collection, preparation and storage of the wood waste is assumed to cost $40/ton (2008 dollars) with an real price increase of 2% p.a. The light fuel oil is assumed to cost $4 per gallon (2008 dollars) with real price increase of 2% p.a. The current development in prices suggests that this is likely to be quite conservative.

- 90% of the potential customers with a hot water heat system are assumed connected to the DH the first year. Within the next 6 years the rest of the customers with a hot water heat system will be connected as well as the customers with other types of in-house heating systems.

- The estimated operation and maintenance costs are shown in Table 7:

Table 7 – Specific average operation and maintenance costs (2008 dollars)

O&M cost factors	Fixed '000$/yr	Variable $/MMBtu
District heating system		
Company administration	40	
Waste wood boiler	10	
Backup oil boiler		0.60
Distribution network		0.30
HIU (at the customers)		0.90
Individual oil boiler		3.00

5.4 Results

Table 8 and Table 9 present the findings of the calculations in a single key figure, namely the heat price that the district heating company will ask from the customers. The results are shown in more detail in the financial spreadsheet model in Appendix 8 and in the charts in Appendix 9.

Many district heating companies leave it to their customers to invest in a hydraulic interface unit (HIU) and Table 8 shows the district heating company's heat sales price to the customers without this investment. Therefore an additional investment has to be made in a HIU of typically $3-4,000 for a single-family house.

So the heat sale prices in table 8 are for heat delivered at the connection to the customer's building, assuming a pay-back period for all investments of 10, 15 or 20 years. The customer will cover the expenses to replace the existing boiler with a HIU for district heating.

Table 8 – District heating sales price to customers (2008 dollars), **exclusive** of the investments in the customers' heat unit

Scenario	10 years payback $/MMBtu	15 years payback $/MMBtu	20 years payback $/MMBtu
1A	28	23	21
1B	29	24	22
2	35	28	25

Alternatively the district heating company could include the customers' new heat units in the project and increase the heat sales price accordingly. This is thought to be a more obvious arrangement in Groveton. Table 9 shows that the consequences will be an increase of the heat price of $2-4/MMBtu depending on the payback period. It should be observed that the details in Appendix 8 and 9 are based on a costs estimate where the heat units are paid for by the customers and they are therefore not included in the investments of the district heating company.

Table 9 – District heating sales price to customers (2008 dollars), **inclusive** of the investments in the customers' heat units

Scenario	10 years payback $/MMBtu	15 years payback $/MMBtu	20 years payback $/MMBtu
1A	32	26	23
1B	33	27	24
2	39	31	27

For comparison, a fuel price for the existing individual oil boilers of $4 per gallon is equal to a heat price of approximately $36 per MMBtu at a boiler efficiency of 85%. Operation and maintenance costs of approximately $3 per MMBtu have to be added, resulting in a total heat price of $39 per MMBtu for houses with individual oil-fired boilers.

It should be noted that only the expenses to replace the customers' heat units have been taken into account in table 9. Other in-house investments might be required in some buildings to ensure that the heat supply works properly.

To ensure stable finances of the district heating company and a fair distribution of the costs among the customers, it is essential that the district heating sales price - as shown in table 8 and 9 - is transformed into appropriate tariffs. It is recom-

mended to divide them into a fixed and a variable part. Thus a customer is paying a fixed monthly payment based on a fixed tariff, and a payment that depends on either the measured heat consumption (by a heat meter) or the measured hot water delivered (by a flow meter). If the district heating company includes the customer's new heat exchanger unit in the overall project, the customer could repay the investment over a couple of years as a part of the fixed monthly payment.

6. Environmental impact

The environmental impact expressed in emitted CO_2, CH_4, N_2O, SO_2 and NO_X are based on the assumed standard flue gas emission factors as shown in Table 10. The emissions of CO_2, CH_4 and N_2O have been converted to CO_2 equivalents, weighed for their global warming potential, where CH_4 is a 21 times more powerful greenhouse gas than CO_2 and N_2O is 310 times more powerful (ref. IPCC Second Assessment Report).

Table 10 – Assumed standard flue gas emission factors

Unit: lb/MMBtu	Waste wood plant	Backup gas oil boiler	Individual boilers/furnaces		
			Oil boiler	Gas Boiler	50/50 coal+wood
CO_2 eq.	4	174	174	134	119
SO_2	0.058	0.053	0.053	0.000	0.821
NO_X	0.209	0.151	0.174	0.070	0.465

The environmental impact in terms of savings in CO_2 equivalents, SO_2 and NO_X are listed for the three scenarios along with the results of the calculations in Appendix 8 and summarized in Table 11 below.

The table shows considerable savings of CO_2 equivalents as combustion wood is regarded as almost CO_2 neutral. Emissions of SO_2 are slightly lowered while emissions of NO_X are slightly increased, here expressed as negative savings.

Table 11 – Savings of flue gas emissions over the 20 years' plan period

Scenario	CO_2 eq.		SO_2		NO_X	
	'000t	% saved	'000lb	% saved	'000lb	% saved
1A	43	18%	0.9	0%	-16	-3%
1B	71	29%	6.5	2%	-28	-5%
2	104	42%	7.1	2%	-57	-9%

7. Planning issues

The Scope of Services provided in the contract calls for a review concerning the planning and phasing of the network, including options for addressing other infrastructure needs related to water, sewer, drainage and road improvements.

The phasing and its consequences have been dealt with above and is further described under Horizons Engineering and Ramboll's thoughts about the way forward in Section 10 of this report.

The question of the possible advantages of coordinating work on existing utilities and roads with the construction of a heating network is not necessarily easy to answer. Although there may theoretically be an economic benefit from such a coordination it is Ramboll's experience that the real benefit lies in the general attention brought about by the project.

The general conditions of Groveton and the space available in roads etc. do not give reason for concern about the possible disruption of other services during the implementation of the district heating network. That being said, there is some merit in considering the replacement of aged existing infrastructure during construction of a district heating system. Many of the existing water mains and appurtenances, storm drainage, and sanitary sewers in the project area date back to the early 20th century and are in fair to poor condition. While serviceable, the installation of district heating atop this old infrastructure would make future repair and/or replacement more difficult. If the old utilities are replaced as part of an overall district heating project, the useful life of these utilities will meet or exceed that of the district heating network and will help preclude future construction conflicts. Replacement of these utilities will also improve water and wastewater service, reduce maintenance costs, and result in better quality roads and drainage.

In 2004/2005 the Town of Northumberland completed a comprehensive water, wastewater, and drainage project on the west side of Area 2 (the "Hill" area of town). Improvements to the east side of Area 2 were designed but not constructed due to lack of funding. The estimated cost for completion of this work is estimated at $3,000,000.

Design of existing utility replacement has not been completed for the other areas of town (Area 1 and Area 3) where district heating is contemplated. As a result, construction costs have not been estimated. We can, based on past experience and recent construction pricing, estimate the cost for utility replacement based on a linear yard basis. Assuming the work would include the replacement of water main, valves, hydrants, and services, gravity sewer, manholes, sewer services, storm drainage, catch basins, drain manholes, and new pavement (curb to curb), the estimated cost for utility replacement is $1,000 per linear yard.

8. Development strategies

8.1 New business development

The project for a district heating network in the Village of Groveton should be regarded as a new service and an opportunity for a reliable and economically viable heat supply for Groveton's residents and private and public enterprises in its own right. With the current business situation in Groveton it is natural to look for ways of attracting new business development but whether the proposed project will make a real difference is unknown.

It should be noted that the introduction of district heating may generally be regarded as an upgrade of the infrastructure in the cities, towns and villages, where it is introduced and in some places it is expanding rapidly.

It is therefore possible that a development in Groveton at a later stage may take advantage of a biomass based energy production, which can be expanded to include other services. Any existing or potential business that can benefit and gain a competitive advantage through the availability of low cost heat (and/or hot water) would find Groveton a more attractive location to operate. Businesses such as greenhouses, kilns, large heated warehouse or manufacturing facilities are possibilities. Whether provisions for district heating would represent a large enough incentive to attract new business could only be determined as part of a detailed business plan analysis. It should be observed that new businesses connecting to the network would also lead to a call for an increased production capacity.

8.2 Funding

The financial appraisal shows that each of the scenarios could be commercially viable, depending on proofing of the cost estimates and further evaluation of unknowns and assumptions. In terms of funding it is therefore not necessarily a question of meeting the overall capital investment but more likely to be an issue of supporting the NCRCD initiative in the early stages.

Horizons Engineering and Ramboll have not positively identified the possible sources of funding but our attention is drawn to some of the various government programs supporting rural areas that support economic development, improving infrastructure, and meeting the increasing fuel and electricity costs.

Design, construction, and implementation of a district heating system in Groveton (or any other community) are a significant undertaking. Such a project in Groveton is even more challenging in light of recent closing of the town's major employers (Groveton Paper Board and Wausau Papers), the relatively low tax base, and the limited resources of the community and its residents.

The benefits of such a project are broad and include:

- Economic viability in light of the ever-increasing cost of fuel oil

- Increased energy independence
- Reduction in amount spent on fuel assistance ($100,000 last year in Groveton alone)
- Environmental benefit due to reduced air emissions
- Economic stimulus to the north country through the production and use of biomass.

However, due to the significant upfront capital cost for implementation, these benefits need first and foremost the support of the residents, without which the project cannot be realized, but also the support of State and Federal funding agencies. We have identified the following potential funding sources for the project:

Community Development Block Grant Program (Economic Development)

The New Hampshire Community Development Finance Authority administers the Community Development Block Grant (CDBG) Program. The program can provide up to $500,000 of funding for economic development projects. In order to be eligible, the project must demonstrate a benefit to low and moderate income individuals and one full time job must be created for each $20,000 in grant money provided.

Federal Earmark

With the increasing awareness of our country's vulnerability because of our foreign oil dependence, the time is right to investigate and invest in alternative energy sources. This project represents an excellent opportunity for a federally supported demonstration project. We recommend that our elected representatives in Washington be contacted to pursue funding for further study and implementation of the project.

USDA Rural Development

Rural Development can provide low interest loans and grants for water and wastewater infrastructure improvements. Though not a likely source of funding for the district heating system, Rural Development assistance could be utilized for the design and construction of infrastructure improvements to the water, wastewater, and drainage systems in the village should that work be added to the project scope.

U.S. Department of Commerce – Economic Development Administration (EDA)

The Economic Development Administration (EDA) is also a potential source of funding for this project. One of the missions of EDA, through the Public Works and Economic Development Program, is to assist communities in the upgrade of their infrastructure to attract new industry, diversify local economies, and generate and retain long-term jobs and investments.

9. Study sensitivity

In this study we have tried to include good district heating design parameters keeping in mind the limited information available. The estimates are preliminary and we would recommend that the study be taken to a more detailed examination before the Village of Groveton commits itself to the project.

The study and its assessments highlight a number of issues where more information and/or design decisions are required.

The cost estimates make it clear that the connection of individual houses is more capital cost intensive than the connection of larger buildings in a town with higher heat density. It is likely that a reduction of the connection capital cost, especially in relation to cost of branches and service pipes can be reduced if more detailed information about the buildings is available.

A decision on whether to have direct or indirect connections and whether to have instantaneous DHW or a cylinder can make the scheme either more or less expensive.

The overall layout and especially the parameters in respect to the central heating system of individual houses and buildings also need to be established to match the parameters of the heating network.

Customer interface connections for indirect connection can be delivered as prefabricated units or they can be built by the heating installer. The choice of unit reflects the type of connection i.e. direct / indirect heating and cylinder / instantaneous DHW connection. Temperatures and pressure levels, also for the mains cold water supply and for the domestic hot water, are among the important parameters when specifying the units.

One important issue is the capacity of the unit in relation to the building's heat demand and the demand for domestic hot water. This will lead to requirements in terms of flow over the installation, combined with the obtainable supply and return temperature.

The results of this study will quite naturally be influenced by changes in fuel prices and the uncertainty in the construction costs estimates. It is therefore important that any work based on these results takes a critical view on current developments within both the oil price and the price of wood chip. Also a review of the estimated construction costs should be included in any further work.

10. Way forward

When implementing district heating there are a number of good practices and recommendations in relation to the design and installation that have been developed over the years.

The detailed specification for the installation and maintenance of the district heating network is outside the scope of this study at this early stage but it is something worth considering as early as possible in the project process.

Due to the limited information available at this stage of the study it is Rambolls' recommendation that this study be followed by additional investigation considering the network and the heat production facility in more detail.

Once the decision has been taken to establish a district heating scheme it is Ramboll's experience that the next stage should be a preliminary design. It is likely that even following a detailed feasibility there is still left open a number of questions and uncertainties and these should be thoroughly investigated and/or determined directly. It is also important to take the first steps towards establishing an organization to take the project forward.

The next stages of developing the scheme should then be preliminary design, detailed design, tendering/procurement, construction and commissioning. The tendering and procurement stage covers the preparation of technical specifications and procurement documents.

The content of these stages will be influenced by the possible ways of splitting the design into "preliminary" and "final". The same may apply to the "tendering / procurement" stage, which can be more or less comprehensive, depending on the number of work packages that will be tendered. Also the contract with contractors or suppliers may include a smaller or greater part of the design.

In parallel to this the business plan for the enterprise (or enterprises) will have to be developed and anchored within the community. This includes verification of the cost estimates on which this study has been based.

It is important that there is a close working relationship and liaison with all stakeholders throughout the project and its development. Experience shows that the best schemes with greatest customer satisfaction are those implemented with detailed communication and information sharing.

Appendix 1: Groveton Aerial photo showing the three areas.

Groveton District Energy - Attachment 3

M. Pierce

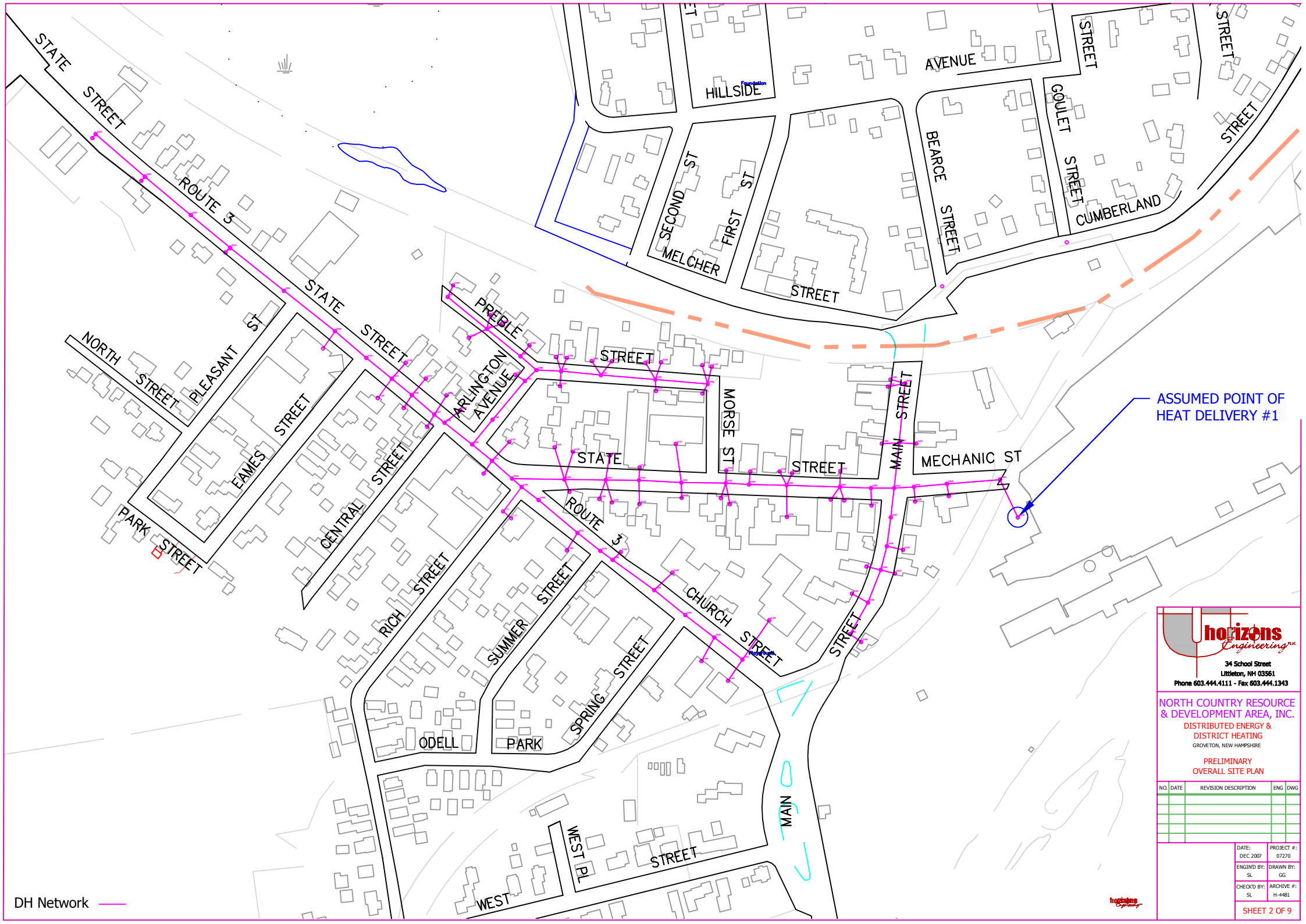
17 Oct 2007

Appendix 2: Oil consumption for ten randomly selected addresses.

Oil burner efficiency: 85%
Yearly utilisation time: 1,800 hrs/yr

Adress	Yr blt	Area	Oil cons.	Energy	Specific energy	Peak demand
-	Year	Sq. feet	Gallons/yr	MMBtu/yr	Btu/sq.feet/yr	Btu/sq.feet/hr
10 Preble st.	1950	2,866	1,250	137	47,750	26.5
17 Eames st.	1959	1,833	1,000	109	59,730	33.2
33 State st.	1965	595	650	71	119,600	66.4
58 State st.	1898	2,760	1,200	131	47,600	26.4
16 Spring st.	1880	1,686	900	99	58,440	32.5
3 Pleasant st.	1861	1,196	800	88	73,230	40.7
13 Odell Park	1920	1,223	850	93	76,090	42.3
7 Eames st.	1940	1,481	1,100	120	81,320	45.2
22 Central ave.	1900	1,624	1,000	109	67,410	37.5
8 Central ave.	1900	1,470	1,020	112	75,970	42.2

Appendix 3: Outline of the DH network for model 1A.



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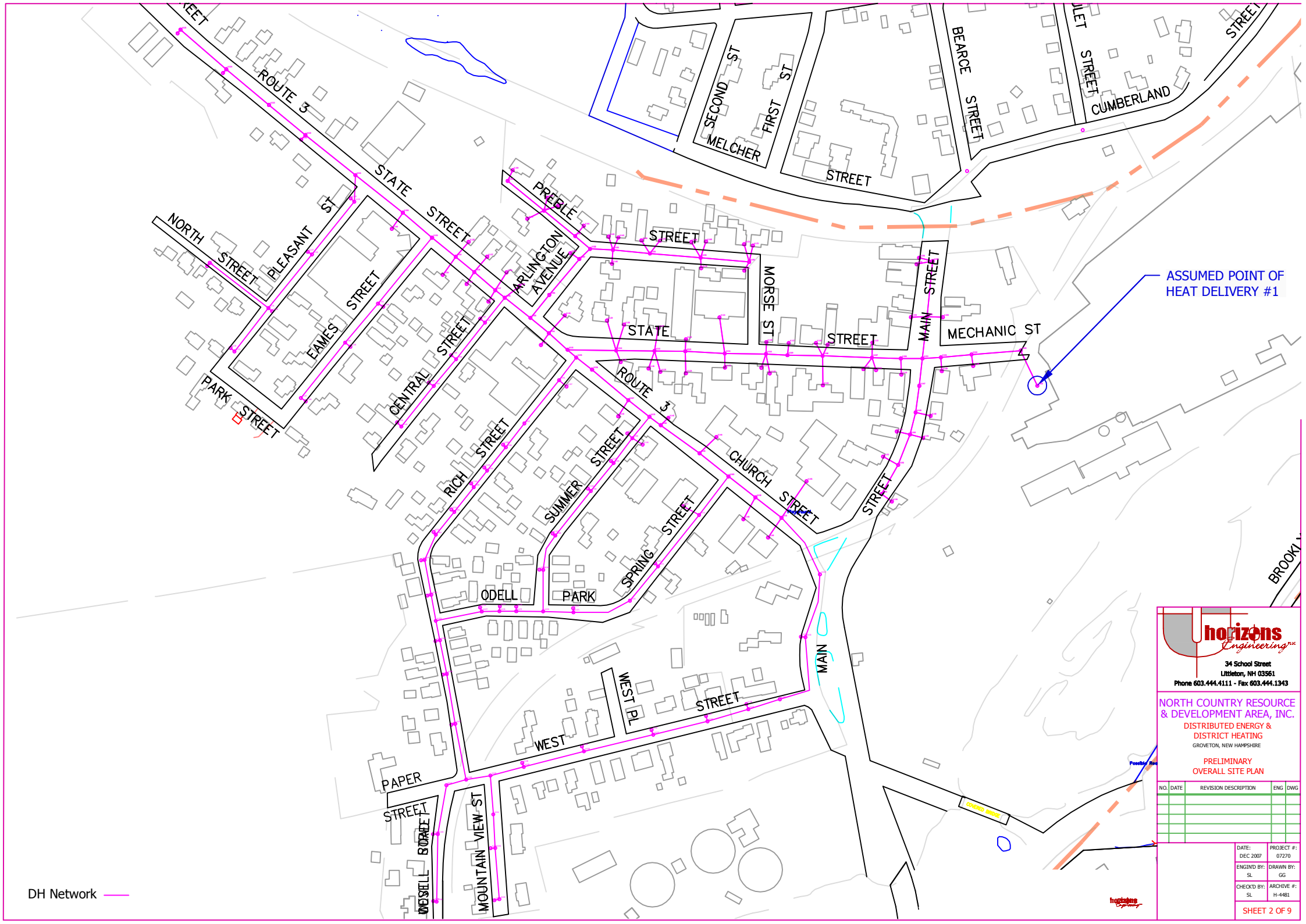
NORTH COUNTRY RESOURCE & DEVELOPMENT AREA, INC.
DISTRIBUTED ENERGY & DISTRICT HEATING
GROVETON, NEW HAMPSHIRE

PRELIMINARY
OVERALL SITE PLAN

NO.	DATE	REVISION DESCRIPTION	ENG	DWG

DATE: DEC 2007	PROJECT #: 07270
ENGIN'D BY: SL	DRAWN BY: GG
CHECK'D BY: SL	ARCHIVE #: H-4481

Appendix 4: Outline of DH network for model 1B.


ROUTE 3
STATE STREET
NORTH STREET
PLEASANT ST
EAMES STREET
PARK STREET
CENTRAL STREET
PREBLE STREET
ARLINGTON AVENUE
MELCHER STREET
SECOND ST
FIRST ST
BEARCE STREET
CUMBERLAND STREET
MORSE ST
MAIN STREET
MECHANIC ST
ASSUMED POINT OF HEAT DELIVERY #1
RICH STREET
SUMMER STREET
SPRING STREET
CHURCH STREET
ODELL PARK
WEST PL
WEST STREET
PAPER STREET
MOUNTAIN VIEW ST
MAIN
BROOKL
COVERED BRIDGE
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NORTH COUNTRY RESOURCE & DEVELOPMENT AREA, INC.
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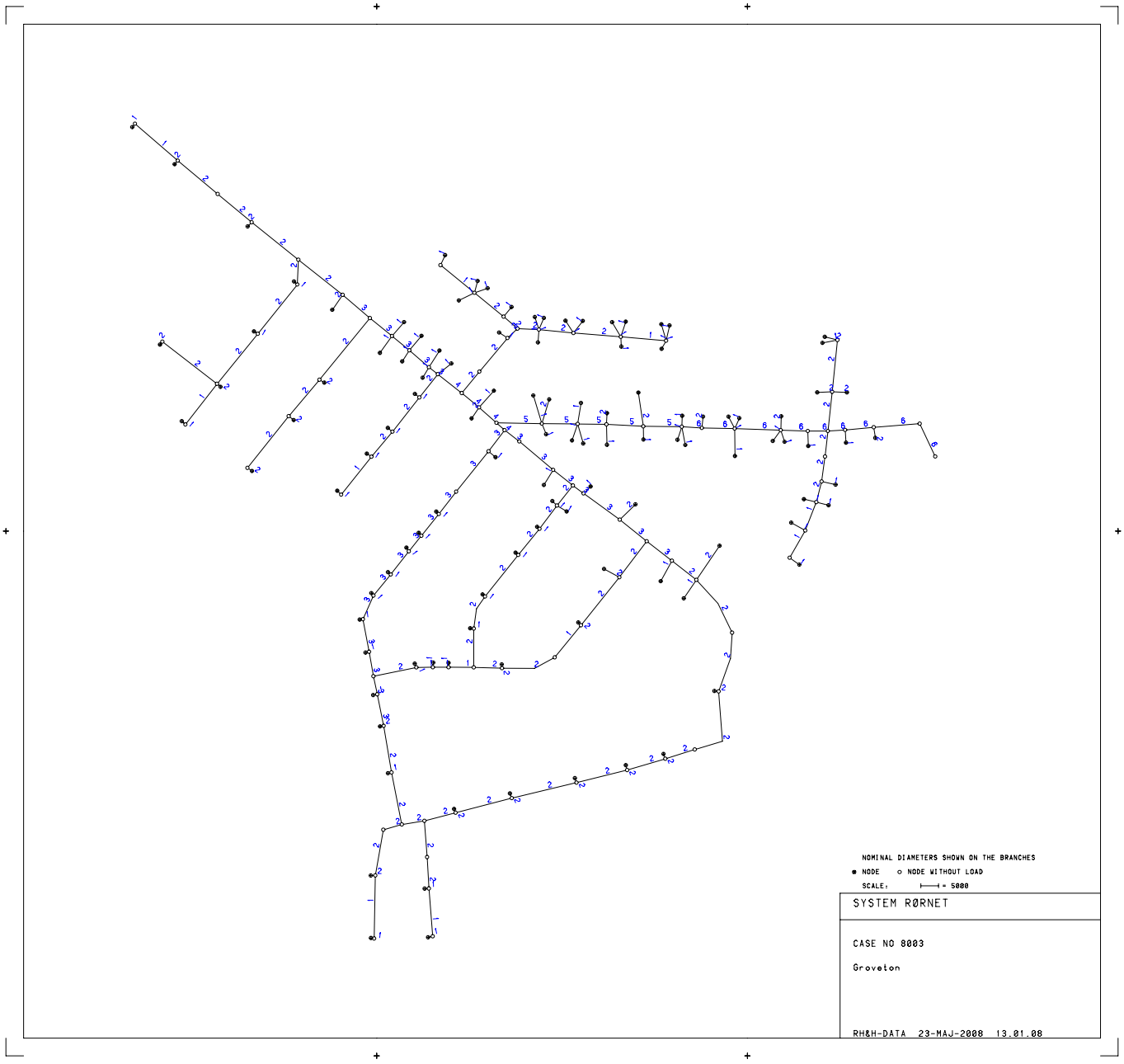
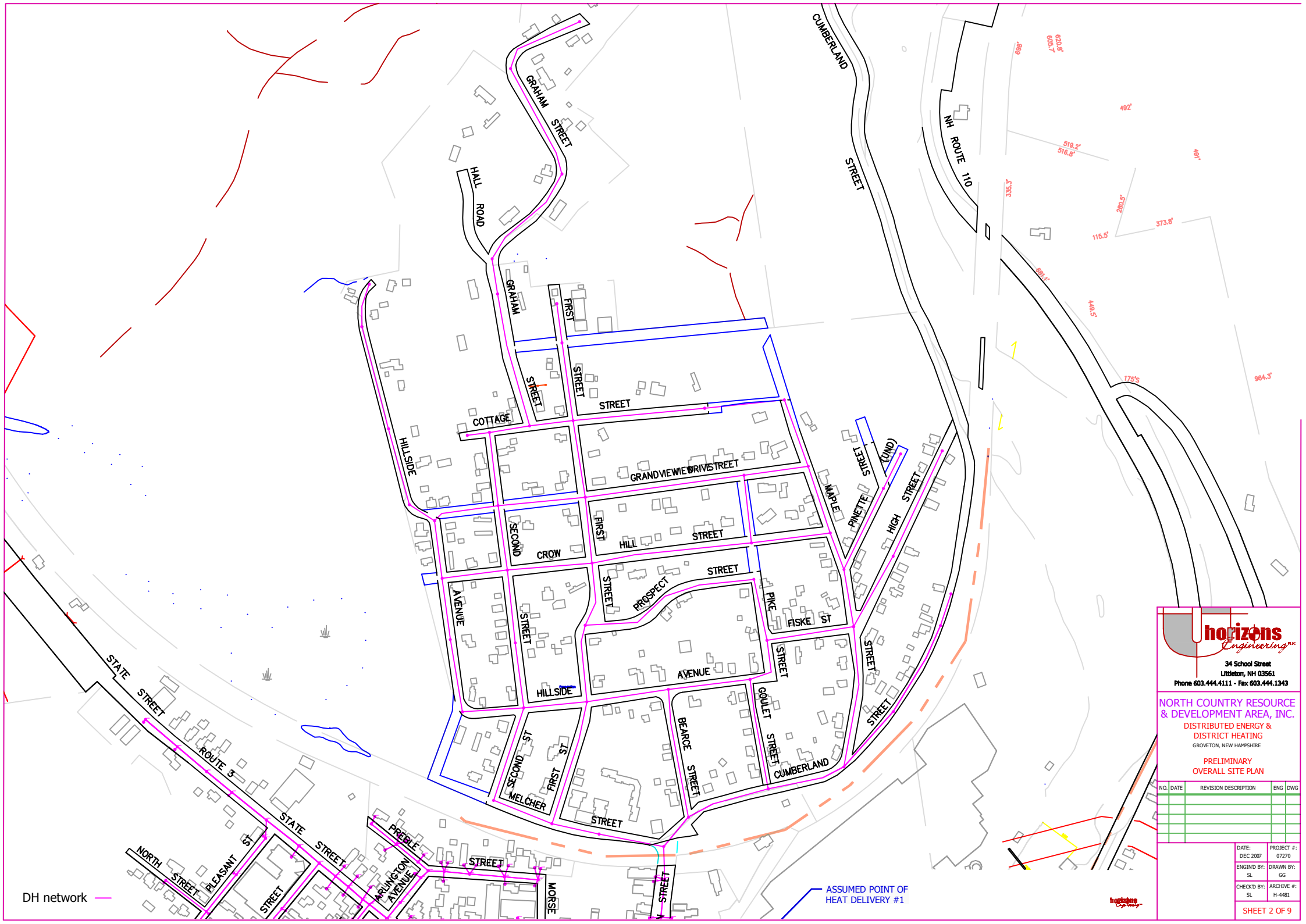
DRAWN BY: GG
CHECK'D BY: SL
ARCHIVE #: H-4481
SHEET 2 OF 9

Appendix 5: Plot of DH network for model 1B.

Pipe dimensions in DN/inches.



Appendix 6: Outline of DH network for Area 2.



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NORTH COUNTRY RESOURCE & DEVELOPMENT AREA, INC.

DISTRIBUTED ENERGY & DISTRICT HEATING

GROVETON, NEW HAMPSHIRE

PRELIMINARY

OVERALL SITE PLAN

NO.	DATE	REVISION DESCRIPTION	ENG	DWG

DATE: DEC 2007	PROJECT #: 07270
ENGINEER'D BY: SL	DRAWN BY: GG
CHECK'D BY: SL	ARCHIVE #: H-4481

Appendix 7: Building Record of the Village of Groveton

List of all buildings inclusive information about ownership, location, utilization, living area in square feet, heat type and heat source.

Owner's Name	Street No	Street Name	Area	Bldg Area Gross	Bldg Area Living	Ayb	Heat Type Desc	Heat Fuel Desc	Use Code	Use Descript	Utilization Grp
BENNETT, LARRY E	9	Central	1B	2846	1469	1940	Hot Water	Oil	1010	Single Fam	1-3 family
EMERY, MICHAEL J	6	Central	1B	2862	1133	1880	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GAGNON, CLARENCE	16	Central	1B	2152	876	1900	Hot Water	Oil	1010	Single Fam	1-3 family
MERROW, SCOTT	14	Central	1B	3842	2008	1860	Hot Water	Oil	1010	Single Fam	1-3 family
LAMBERT, SCOTT G	8	Central	1B	2690	1470	1900	Hot Water	Oil	1010	Single Fam	1-3 family
CLOUTIER, MICHAEL	26	Central	1B	4254	1638	1896	Hot Water	Oil	1010	Single Fam	1-3 family
FISHER, PATSY	10	Central	1B	2623	1313	1920	Forced Hot Air	Oil	1010	Single Fam	1-3 family
LANGKAU, JOSEPH JR	22	Central	1B	2916	1624	1900	Hot Water	Oil	1010	Single Fam	1-3 family
LEDGER, BELINDA M	19	Central	1B	2474	1161	1959	Hot Water	Oil	1010	Single Fam	1-3 family
BLODGETT, YVONNE	15	Central	1B	3090	1104	1975	Hot Water	Oil	1010	Single Fam	1-3 family
GAGNON, CLARENCE	18	Central	1B	3028	1164	1900	Hot Water	Oil	1010	Single Fam	1-3 family
NORMANDEAU, ROLAND	11	Central	1B	1966	1188	1940	Hot Water	Oil	1010	Single Fam	1-3 family
CHAMPLAIN OIL CO INC	35	Church	1A	5220	2610	1955	Forced Hot Air	Oil	3340	GAS ST SRV	Comm&Public
CASS, MICHAEL J	53	Church	1A	3466	1388	1900	Hot Water	Oil	1010	Single Fam	1-3 family
BURT, RENE P	55	Church	1A	4302	2660	1900	Hot Water	Oil	1050	THREE FAM	1-3 family
MCLEOD, NORMAN	33	Church	1A	2054	1120	1900	Hot Water	Oil	1010	Single Fam	1-3 family
PARSONS REALTY COMPANY INC	18	Church	1A	5832	2856	1961	Hot Water	Oil	3500	POST OFF	Comm&Public
WILLIAMS, PALTON	50	Church	1A	3353	1932	1920	Hot Water	Oil	1040	TWO FAMILY	1-3 family
WEEKS HOSPITAL ASSOC.	47	Church	1A	8294	4620	1998	Hot Water	Oil	3040	NURSING HM	MDL-94 Comm&Public
METHODIST CHURCH	40-46	Church	1A	15472	8691	1960	Hot Water	Oil	9060	CHURCH ETC	MDL-94 Comm&Public
ST MARKS VESTRY	49	Church	1A	5611	2794	1900	Forced Hot Air	Oil	9060	CHURCH ETC	MDL-94 Comm&Public
GROVETON VILLAGE PRECINCT	37	Church	1A	9600	4800	1967	Forced Hot Air	Oil	9032	FIRE	Comm&Public
NORTHUMBERLAND SCHOOL DIST	36	Church	1A	35321	20486	1908	Hot Water	Oil	9033	PUB-SCHOOL	MDL-94 Comm&Public
BRANN, CHARLES K	17	Eames	1B	4986	1833	1959	Hot Water	Oil	1010	Single Fam	1-3 family
BURT JR., RAYFIELD C	9	Eames	1B	2705	1440	1930	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MCCORMICK, ROBERT W	7	Eames	1B	2964	1481	1940	Steam	Oil	1010	Single Fam	1-3 family
CHESSMAN, JOAN	14	Eames	1B	2242	1344	1940	Hot Water	Oil	1010	Single Fam	1-3 family
GIROUARD, ARMAND	18	Eames	1B	3940	2540	1950	Hot Water	Oil	1010	Single Fam	1-3 family
PERRAS, PAUL	11	Eames	1B	3621	1870	1930	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CARNEY, ROBERT	21	Eames	1B	3734	1596	1852	Hot Water	Oil	1040	TWO FAMILY	1-3 family
HAWES, WINSTON	20	Eames	1B	4779	2156	1890	Forced Hot Air	Oil	1040	TWO FAMILY	1-3 family
ARMSTRONG FAMILY REVOC TRUST	13	Eames	1B	4088	1540	1920	Hot Water	Oil	1010	Single Fam	1-3 family
CANTON, CHRISTOPHER	24	Eames	1B	3972	1277	1966	Hot Water	Oil	1010	Single Fam	1-3 family
RAMSAY, JOAN E	5x2	Eames	1B	2826	1120	2002	Hot Water	Oil	1010	Single Fam	1-3 family
WILSON, LEO W	25	Eames	1B	2388	1376	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
TETREAULT, JAMES ALAN	8	Garden Way	1B	3384	1196	1952	Forced Hot Air	Oil	1010	Single Fam	1-3 family
YOUNG, FAYE	6	Garden Way	1B	1906	806	1952	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CARON, RONALD G	10	Main	1A	7064	2456	1875	Steam	Oil	1050	THREE FAM	1-3 family
AUGER, ALBERT	30	Main	1A	6711	2803	1895	Hot Water	Oil	1110	APT 4-UNT	Apt
HALL, CLIFTON	14	Main	1A	3558	2356	1900	Hot Water	Oil	1040	TWO FAMILY	1-3 family
BELAND, ALPHONSE	48	Main	1B	8559	3788	1861	Hot Water	Oil	1010	Single Fam	1-3 family
BELIVEAU, DENNIS	25	Main	1A	3284	1411	1875	Hot Water	Oil	1010	Single Fam	1-3 family
WAUSAU PAPERS OF NH INC.	36	Main	1A	2784	1392	1910	None	Coal or Wood	3542	BUS STATN	Comm&Public
JANVRIN, LLOYD A	52	Main	1B	4473	2559	1890	Hot Water	Oil	1010	Single Fam	1-3 family
HALL, CLIFTON	16	Main	1A	3476	2592	1900	Hot Water	Oil	1050	THREE FAM	1-3 family
DUPUIS, LEON	26	Main	1A	3775	1969	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BOISSELLE, ERIC	31	Main	1A	2253	1151	1900	Hot Water	Oil	1010	Single Fam	1-3 family

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HUTCHINS, DAVID E	6	Main	1A	13952	8834	1900	Hot Water	Oil	1120	APT OVER 8	Apt
JOY, LESLIE	11	Main	1A	3518	2598	1900	Hot Water	Oil	3030	PROF/APTS	Comm&Public
GROVETON PAPER BOARD	19	Main	1A	6480	4860	1980	Hot Water	Oil	3400	OFFICE BLD	Comm&Public
WAUSAU PAPERS OF NH INC.	23	Main	1A	3467	1848	1900	Hot Water	Oil	1040	TWO FAMILY	1-3 family
GROPACO FEDERAL CREDIT UNION	13	Main	1A	7865	4770	1900	Hot Water	Oil	3410	BANK BLDG	Comm&Public
USW LOCAL 4-61	8	Main	1A	4700	2475	1935	Hot Water	Oil	3530	FRATNL ORG	Comm&Public
LOYAL ORDER OF MOOSE	5	Main	1A	6133	3395	1930	Hot Water	Oil	9200	NON PROFIT MDL-94	Comm&Public
COULOMBE, CARL	12	Main	1A	4219	3212	1900	Hot Water	Oil	1050	THREE FAM	1-3 family
WAUSAU PAPERS OF NH INC.	6	Mechanic	1A	1410	1410	1900	Hot Water	Oil	3350	CAR WASH	Comm&Public
WAUSAU PAPERS OF NH INC.	10	Mechanic	1A	26988	13494	1890	Hot Air-no Duc	Oil	4000	FACTORY	Comm&Public
GROVETON PAPER BOARD	12	Mechanic	2	51002	51002	1966	None	Coal or Wood	4000	FACTORY	Comm&Public
NO NAME	6	Morse	1A		1778	1915	Hot Water	Oil	1010	Single Fam	1-3 family
BEDELL, GINA	14	Mountain View	1B	3617	1355	1967	Hot Water	Oil	1010	Single Fam	1-3 family
COLLINS REVOCABLE TRUST, ROBER	7	Mountain View	1B	3690	1456	1968	Hot Water	Oil	1010	Single Fam	1-3 family
WOODWARD, VIVIANE L	6	Mountain View	1B	2796	1172	1964	Hot Water	Oil	1010	Single Fam	1-3 family
PLATT, HADLEY	15	Mountain View	1B	2388	1012	1967	Hot Water	Oil	1010	Single Fam	1-3 family
KEDDY, DONNA C	10	Mountain View	1B	2846	1407	1968	Hot Water	Oil	1010	Single Fam	1-3 family
KELLY, ORAL	4	North	1B	3195	1548	1845	Hot Water	Oil	1010	Single Fam	1-3 family
WELLS FARGO BANK, N.A.	11	North	1B	3350	1716	1940	Hot Water	Oil	1010	Single Fam	1-3 family
BACON, GISELE PAQUETTE	9	North	1B	1430	585	1900	Hot Water	Oil	1010	Single Fam	1-3 family
KELLY, MICHAEL J	3	North	1B	2992	1453	1908	Hot Water	Oil	1010	Single Fam	1-3 family
HAAS, JON T	7	North	1B	1784	832	1955	Hot Water	Oil	1010	Single Fam	1-3 family
CHAUVETTE, ROGER P	8	North	1B	4990	2220	1958	Hot Water	Oil	1010	Single Fam	1-3 family
ASTLE, MARIAN	17	Odell	1B	1872	1001	1923	Hot Water	Oil	1010	Single Fam	1-3 family
DUPONT, JOSEPH	13	Odell	1B	2334	1223	1920	Hot Water	Oil	1010	Single Fam	1-3 family
BENNETT, JAMES JR	18	Odell	1B	2342	1289	1909	Hot Water	Oil	1010	Single Fam	1-3 family
PERRAS, ROBERT JAMES	12	Odell	1B	1884	1001	1918	Forced Hot Air	Oil	1010	Single Fam	1-3 family
LEIGHTON, JAMES A	14	Odell	1B	2412	1265	1918	Hot Water	Oil	1010	Single Fam	1-3 family
JARVIS, STEVEN M	4	Odell	1B	1832	1144	1930	Hot Water	Oil	1010	Single Fam	1-3 family
HAMILTON, DONALD	11	Odell	1B	2132	1121	1918	Hot Water	Oil	1010	Single Fam	1-3 family
NEWTON, BRIAN S	16	Odell	1B	2402	1188	1918	Hot Water	Oil	1010	Single Fam	1-3 family
PERLZAK, IRENE	7	Odell	1B	2152	1078	1920	Hot Water	Oil	1010	Single Fam	1-3 family
WHEELOCK, LLOYD & ROSELYN (LE)	15	Odell	1B	2524	1321	1918	Hot Water	Oil	1010	Single Fam	1-3 family
EMERSON, JAMES H	8	Paper	1B	3673	2112	1875	Hot Water	Oil	1010	Single Fam	1-3 family
BEDELL, HAZEL	11	Paper	1B	2268	1104	1955	Hot Water	Oil	1010	Single Fam	1-3 family
GAUTHIER JR, ROBERT W	7	Paper	1B	5280	2280	1880	Hot Water	Oil	1010	Single Fam	1-3 family
SARGENT, RITA	9	Park	1B	3544	1729	1860	Hot Water	Oil	1010	Single Fam	1-3 family
SHEDD, BRIAN J	3	Park	1B	3747	2193	1888	Hot Water	Oil	1040	TWO FAMILY	1-3 family
JEWELL, JENNIE L	8	Park	1B	2939	1456	1900	Hot Water	Oil	1010	Single Fam	1-3 family
WHEELOCK FAMILY TRUST	5	Park	1B	3369	1812	1888	Hot Water	Oil	1010	Single Fam	1-3 family
FRIZZELL, ROBERT D	14	Pleasant	1B	3507	1698	1930	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MILLER, WILLIAM	9	Pleasant	1B	3102	1846	1900	Hot Water	Oil	1010	Single Fam	1-3 family
SCHAFERMEYER, ANDREW T	1	Pleasant	1B	2667	1323	1900	Hot Water	Oil	1010	Single Fam	1-3 family
PINETTE, ROBERT J	13	Pleasant	1B	2652	1316	1900	Hot Water	Oil	1010	Single Fam	1-3 family
TETREAULT, LAWRENCE	3	Pleasant	1B	2271	1196	1861	Hot Water	Oil	1010	Single Fam	1-3 family
LITTLEHALE, KEVIN	8	Pleasant	1B	2109	1204	1930	Hot Water	Oil	1010	Single Fam	1-3 family
BREAULT, MARLENE (ALLIN)	27	Rich	1B	1624	940	1900	Hot Water	Oil	1010	Single Fam	1-3 family

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ATKINSON, ESTATE OF RESI T	37	Rich	1B	2512	1225	1935	Hot Water	Oil	1010	Single Fam	1-3 family
BERGERON, THEODORA	13	Rich	1B	3075	1563	1925	Hot Water	Oil	1010	Single Fam	1-3 family
BOURASSA, RICHARD	44	Rich	1B	2656	1248	1940	Hot Water	Oil	1010	Single Fam	1-3 family
BELAND, ALPHONSE	30	Rich	1B	4066	2236	1925	Hot Water	Oil	1040	TWO FAMILY	1-3 family
CHING, KEVIN	42	Rich	1B	3720	2208	1900	Hot Water	Oil	1010	Single Fam	1-3 family
CHARBONNEAU, TIMOTHY	35	Rich	1B	1842	1001	1918	Hot Water	Oil	1010	Single Fam	1-3 family
HOULE, RICHARD W	15	Rich	1B	2627	1338	1900	Hot Water	Oil	1010	Single Fam	1-3 family
ROBY, HERBERT	39	Rich	1B	2173	1188	1918	Hot Water	Oil	1010	Single Fam	1-3 family
MACGREGOR, LAURIE	18	Rich	1B	2368	1045	1930	Hot Water	Oil	1010	Single Fam	1-3 family
DOHERTY, PATRICK L JR	14	Rich	1B	3082	1388	1898	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GOULET, DAVID	16	Rich	1B	2837	1465	1900	Hot Water	Oil	1010	Single Fam	1-3 family
MACGREGOR, LAURIE	17	Rich	1B	5660	2757	1900	Hot Water	Oil	1050	THREE FAM	1-3 family
NEWELL, ANITA (KINGSLEY)	41	Rich	1B	2464	1225	1935	Hot Water	Oil	1010	Single Fam	1-3 family
HOMAC, ARDIS B	48	Rich	1B	4239	1428	1947	Hot Water	Oil	1010	Single Fam	1-3 family
GOSSELIN, BRIAN D	22	Rich	1B	2435	1094	1900	Hot Water	Oil	1010	Single Fam	1-3 family
MARSHALL, JEFFREY M	38	Rich	1B	2700	1641	1900	Hot Water	Oil	1010	Single Fam	1-3 family
MCCORMACK, KEVIN J	24	Rich	1B	2321	1266	1900	Hot Water	Oil	1010	Single Fam	1-3 family
PIERRE, NOELLA	31	Rich	1B	2450	1010	1900	Hot Water	Oil	1010	Single Fam	1-3 family
PAQUETTE, ALCIDE	20	Rich	1B	3576	1240	1900	Hot Water	Oil	1010	Single Fam	1-3 family
MONROE, MICHAEL W	9	Rich	1B	3766	1426	1900	Hot Air-no Duc	Gas	1010	Single Fam	1-3 family
COBBETT, DEBORAH M	21	Rich	1B	3054	1752	1900	Hot Water	Oil	1010	Single Fam	1-3 family
ROBY, ROBERT P	29	Rich	1B	3535	1116	1965	Hot Water	Oil	1010	Single Fam	1-3 family
SWIFT, SYLVIA M	40	Rich	1B	3609	1481	1900	Hot Water	Oil	1010	Single Fam	1-3 family
DUPUIS, RICHARD	28	Rich	1B	2463	1440	1940	Hot Water	Oil	1010	Single Fam	1-3 family
GUAY, CLAUDE	23	Rich	1B	2612	1212	1935	Hot Water	Oil	1010	Single Fam	1-3 family
PRESCOTT, AMIE	12	Spring	1B	4676	2858	1890	Steam	Oil	1050	THREE FAM	1-3 family
CLOUTIER, HENRY	13	Spring	1B	3320	1526	1880	Hot Water	Oil	1040	TWO FAMILY	1-3 family
HELMS 1993 REVOCABLE TRUST, EV	18	Spring	1B	2719	1289	1890	Hot Water	Oil	1010	Single Fam	1-3 family
O'BRIEN, KEVIN R	16	Spring	1B	3944	1686	1880	Hot Water	Oil	1010	Single Fam	1-3 family
HARRISON, ANNA MARIE T	9	Spring	1B	5397	2262	1880	Steam	Oil	1050	THREE FAM	1-3 family
GROVETON HOUSING CORP	6	Spring	1B	12563	7690	1986	Hot Water	Oil	1120	APT OVER 8	Apt
HOWARD, JEANNE C	271	State	1	3304	1582	1955	Forced Hot Air	Oil	1010	Single Fam	1-3 family
LEIGHTON, OWEN R.	84	State	1B	2008	924	1995	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DUNN, VICKY	80	State	1B	2852	1326	1900	Hot Water	Oil	1010	Single Fam	1-3 family
BACON, MARK L	162	State	1	2570	1374	1952	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BARTLETT FAMILY TRUST UTD	158	State	1	1951	1042	1955	Hot Water	Oil	1010	Single Fam	1-3 family
ARMSTRONG-CHARRON FUNERAL HO	100	State	1B	10520	3950	1975	Electric	Electric	3550	FUNERAL HM	Comm&Public
LEDUC SR, THOMAS J	12	State	1A	7936	4203	1900	Hot Water	Oil	3220	STORE/SHOP	Comm&Public
NORTHWAY BANK	3	State	1A	7045	4550	1930	Hot Water	Oil	3410	BANK BLDG	Comm&Public
MILLIGAN, DANIEL R	83	State	1B	3278	1860	1900	Hot Water	Oil	1010	Single Fam	1-3 family
BOUDRIAS, URGEL	196	State	1	4029	1329	1953	Hot Water	Oil	1010	Single Fam	1-3 family
DALEY, DIANE CARON	33	State	1A	2353	595	1965	Hot Air-no Duc	Oil	3320	AUTO REPR	Comm&Public
DALEY, DIANE CARON	58	State	1A	4793	2760	1898	Hot Water	Oil	1040	TWO FAMILY	1-3 family
CARON, RONALD G	10	State	1A	6838	3886	1890	Hot Water	Oil	3030	PROF/APTS	Comm&Public
CRAWFORD, BRADLEY E	118	State	1	2077	1029	1920	Hot Water	Oil	1010	Single Fam	1-3 family
CRAWFORD, RITA	182	State	1	1582	781	1955	Floor Furnace	Gas	1010	Single Fam	1-3 family
TRIO PONDS INVESTMENTS LLC	149	State	1	52866	26065	2004	Hot Water	Oil	3220	STORE/SHOP	Comm&Public

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EMERSON, JAMES H	50	State	1A	5523	2640	1893	Hot Water	Oil	1010	Single Fam	1-3 family
EMERSON & SON INC	43	State	1A	35353	24912	1930	Hot Water	Oil	3220	STORE/SHOP	Comm&Public
EMERY, STANLEY	75	State	1B	5829	2990	1900	Hot Water	Oil	1050	THREE FAM	1-3 family
EVERLETH, WILLIAM S	90	State	1B	3253	1501	1911	Hot Water	Oil	1010	Single Fam	1-3 family
DTC PROPERTIES	332-334	State	1	6000	3000	1988	Forced Hot Air	Oil	3320	AUTO REPR	Comm&Public
GIBSON, JAMES R, SR	192	State	1	2091	960	1945	Hot Water	Oil	1010	Single Fam	1-3 family
WEEKS, DEBORAH M (KEDDY)	274	State	1	1200	600	1995	None	Coal or Wood	3330	FUEL SV/PR	Comm&Public
MORTENSEN, ERIC P	79	State	1B	2615	1722	1900	Hot Water	Oil	1010	Single Fam	1-3 family
HARTLEN, GARY Z	178	State	1	2813	1572	1955	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CROSS, MICHAEL A	279	State	1	2700	1350	2000	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
CARON, RONALD G	7	State	1A	3604	2160	1892	Hot Water	Oil	3030	PROF/APTS	Comm&Public
STONE, WALTER A	14	State	1A	2793	2697	1935	Hot Water	Oil	3260	REST/CLUBS	Comm&Public
GIROUARD, SHERI	55	State	1A	5370	2912	1880	Hot Water	Oil	1040	TWO FAMILY	1-3 family
FLEURY, FREDERICK NORMAN	163	State	1	2088	980	1990	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DREYER, HENRY H	27	State	1A	5163	2756	1900	Hot Water	Oil	1110	APT 4-UNT	Apt
TILLEY, ANITA	34	State	1A	6538	2372	1890	Hot Water	Oil	1010	Single Fam	1-3 family
MILES, HERBERT	32	State	1A	6122	3024	1890	Hot Water	Oil	1040	TWO FAMILY	1-3 family
HODGE, MICHAEL C	96	State	1B	2234	1061	1900	Hot Water	Oil	1010	Single Fam	1-3 family
MARSHALL, TIMOTHY	152	State	1	2333	1754	1988	Hot Water	Oil	1010	Single Fam	1-3 family
PERRAS SELF STORAGE LLC	102	State	1B	4800	2400	2004	None	Coal or Wood	3222	COMM BLDG	Comm&Public
MAYHEW, ROBERT	6	State	1A	8394	5136	1890	Hot Water	Oil	3400	OFFICE BLD	Comm&Public
EMERSON, JAMES H	164	State	1	2836	1296	1955	Hot Water	Oil	1010	Single Fam	1-3 family
VERIZON	23	State	1A	3910	1916	1963	None	Coal or Wood	4022	IND BLDG	Comm&Public
STEWART FAMILY TRUST, WM & JOA	19	State	1A	8443	5186	1900	Hot Water	Oil	1110	APT 4-UNT	Apt
GONYER MELINDA	92	State	1B	2502	1143	1963	Hot Water	Oil	1010	Single Fam	1-3 family
PARKS, ARTHUR L	88	State	1B	4209	1495	1911	Hot Water	Oil	1010	Single Fam	1-3 family
PARKS, TRAVIS J	128	State	1	2180	1074	1972	Hot Water	Oil	1010	Single Fam	1-3 family
GROLEAU, REAL	56	State	1A	4299	2352	1898	Hot Water	Oil	1010	Single Fam	1-3 family
MORRISON, JOSHUA D	54	State	1A	3658	2715	1890	Steam	Oil	1010	Single Fam	1-3 family
ROCHEFORT, RICHARD J	18	State	1A	2925	1425	1985	Forced Hot Air	Oil	3220	STORE/SHOP	Comm&Public
RUSS-STROUT, DORIS L	174	State	1	3380	1302	1978	Hot Water	Oil	1010	Single Fam	1-3 family
MURPHY REALTY COMPANY INC.	24	State	1A	17895	8943	1973	Forced Hot Air	Gas	3240	SUPERMKT	Comm&Public
ROBINSON, FREDERICK G	17	State	1A	5305	3016	1850	Hot Water	Oil	1010	Single Fam	1-3 family
FEB REALTY LLC	16	State	1A	9412	7149	1890	Hot Water	Oil	3220	STORE/SHOP	Comm&Public
PASSUMPSIC BANK	40	State	1A	4941	2979	1890	Forced Hot Air	Oil	3410	BANK BLDG	Comm&Public
LABRECQUE, GERARD	144	State	1	2389	1175	1989	Hot Water	Oil	1010	Single Fam	1-3 family
SMITH, LORRAINE	201	State	1	2718	1176	1958	Hot Water	Oil	1010	Single Fam	1-3 family
SMITH, VERA	142	State	1	2734	1404	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CARON, RONALD G	8	State	1A	2181	1083	1890	Floor Furnace	Oil	3220	STORE/SHOP	Comm&Public
SHOSA, JEREMY A	36	State	1A	7833	2928	1890	Hot Water	Oil	1010	Single Fam	1-3 family
SCIARAPPA, ARTHUR	9	State	1A	9798	6400	1890	Hot Water	Oil	3222	COMM BLDG	Comm&Public
ROGERS, R/LAPOINT S/STINSON P	29	State	1A	3150	1994	1936	Hot Water	Oil	1010	Single Fam	1-3 family
WILLIAMS, PALTON	93	State	1B	5964	3115	1900	Hot Water	Oil	1110	APT 4-UNT	Apt
SCOTT, ALICE	337	State	1	3480	1260	1960	Hot Water	Oil	1010	Single Fam	1-3 family
GRAY, GORDON	361	State	1	2348	936	1960	Hot Water	Oil	1010	Single Fam	1-3 family
LEWIS, ARCHIE L JR	184	State	1	2376	1188	1996	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
NILES, TERRY L	53	State	1A	2279	1163	1920	Hot Water	Oil	1010	Single Fam	1-3 family

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AMERICAN LEGION	206	State	1	9205	4536	1963	Hot Water	Oil	9200	NON PROFIT MDL-94	Comm&Public
NORTHUMBERLAND, TOWN OF	76	State	1B	2967	1380	1954	None	Coal or Wood	903C	MUNICPAL MDL-94	Comm&Public
NORTHUMBERLAND SCHOOL DIST	65	State	1A	89250	56010	1987	Hot Water	Oil	9033	PUB-SCHOOL MDL-9	Comm&Public
ST FRANCIS XAVIER	11	State	1A	6228	5593	1899	Forced Hot Air	Oil	9060	CHURCH ETC MDL-9	Comm&Public
ST FRANCIS XAVIER	28	State	1A	27212	11250	1964	Hot Water	Oil	9060	CHURCH ETC MDL-9	Comm&Public
RAINBOW CONNECTION LLC	248	State	1	12600	6300	1995	Forced Hot Air	Gas	3140	TRK TERM	Comm&Public
WOODWARD, ERIC J	233	State	1	3782	1800	1985	Hot Water	Oil	1010	Single Fam	1-3 family
NORTHUMBERLAND, TOWN OF	31	State	1A	4310	2120	1970	Hot Water	Oil	903C	MUNICPAL MDL-94	Comm&Public
GUYETTE, LINDA	10	Summer	1B	3218	1932	1900	Hot Water	Oil	1040	TWO FAMILY	1-3 family
COTTER, SIMONNE	13	Summer	1B	3964	1448	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
FORTUCCI, CURTIS J	20	Summer	1B	2124	1264	1950	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BENOIT, RAYMOND A	23	Summer	1B	1772	822	1920	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HART TRUST, THE LILLIAN M	8	Summer	1B	2846	1331	1900	Hot Water	Oil	1010	Single Fam	1-3 family
SAVAGE, TIMOTHY	14	Summer	1B	6152	1829	1850	Hot Water	Oil	1010	Single Fam	1-3 family
KONDZELA, MICHAEL A	18	Summer	1B	1207	540	1935	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GUYETTE, RENE L	12	Summer	1B	2642	1005	1900	Hot Water	Oil	1010	Single Fam	1-3 family
CONNARY, BRYAN	19	Summer	1B	2140	660	1930	Floor Furnace	Oil	1010	Single Fam	1-3 family
SHUFELT FAMILY TRUST	21	Summer	1B	1660	800	1920	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BRASSEUR, ALAN Y	14	West	1B	5536	3020	1900	Forced Hot Air	Oil	1050	THREE FAM	1-3 family
BOUDLE, STEVEN I	29	West	1B	3624	1943	1928	Hot Water	Oil	1010	Single Fam	1-3 family
BENNETT, JAMES JR	8	West	1B	10452	4999	1900	Hot Water	Oil	1110	APT 4-UNT	Apt
PATRY, RICHARD R	35	West	1B	2520	1440	1900	Hot Water	Oil	1010	Single Fam	1-3 family
GRIMES, LISA (SIMONDS)	12	West	1B	3182	1902	1900	Hot Water	Oil	1010	Single Fam	1-3 family
CLOUTIER, LORENZO J	26	West	1B	5345	3183	1900	Hot Water	Oil	1050	THREE FAM	1-3 family
CRAGGY, PAULINE	32	West	1B	7612	3449	1850	Hot Water	Oil	1050	THREE FAM	1-3 family
TREAMER, WALTER W	19	West	1B	3994	1701	1955	Hot Water	Oil	1010	Single Fam	1-3 family
MILES, HERBERT	2	West	1B	2216	1028	1935	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HART, KATHRYN	60	West	1B	4072	1566	1950	Hot Water	Oil	1010	Single Fam	1-3 family
CRAGGY, BARRY	28	West	1B	3037	1443	1940	Hot Water	Oil	1010	Single Fam	1-3 family
JOHNSON, STANFORD	20	West	1B	2573	1240	1952	Hot Water	Oil	1010	Single Fam	1-3 family
CHRISTIANSEN, JUD	23	West	1B	3555	1650	1920	Hot Water	Oil	1010	Single Fam	1-3 family
EMERSON, BRIAN	17	West	1B	4902	1972	1865	Forced Hot Air	Oil	1010	Single Fam	1-3 family
PAQUETTE, CHRISTOPHER A	7	West	1B	3888	1665	1900	Hot Water	Oil	1010	Single Fam	1-3 family
DOYON, THOMAS	52	West	1B	2433	1450	1930	Hot Water	Oil	1010	Single Fam	1-3 family
MARSHALL, RICHARD L	18	West	1B	3596	2080	1952	Hot Water	Oil	1010	Single Fam	1-3 family
KEDDY, BRUCE E	11	West	1B	3568	1529	1900	Hot Water	Oil	1010	Single Fam	1-3 family
POTTER REVOCABLE TRUST, 1998 H	27	West	1B	3353	1750	1916	Hot Water	Oil	1010	Single Fam	1-3 family
BATCHELDER, SUZANNE	31	West	1B	2400	588	1996	Hot Water	Oil	1010	Single Fam	1-3 family
WILSON, PAUL E	9	West	1B	4216	1573	1900	Steam	Oil	1010	Single Fam	1-3 family
COLLINS, CATHY	56	West	1B	2256	1080	1990	Hot Water	Oil	1010	Single Fam	1-3 family
MASON, SANDRA	7	Arlington	1A	4849	2208	1900	Hot Water	Oil	1010	Single Fam	1-3 family
COLEBANK, WILLIAM	30	Preble	1A	3823	1843	1900	Hot Water	Oil	1040	TWO FAMILY	1-3 family
CRAWFORD-BATT, DIANE	3	Preble	1A	3284	1488	1850	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HURLBUTT, BRIAN C	18	Preble	1A	2396	1089	1890	Hot Water	Oil	1010	Single Fam	1-3 family
GILBERT, MARGUERITE R	4	Preble	1A	2970	1768	1890	Hot Water	Oil	1010	Single Fam	1-3 family
HAWKSLEY, LEE	14	Preble	1A	4198	1343	1920	Hot Water	Oil	1010	Single Fam	1-3 family
BRANN, SUSAN	2	Preble	1A	3409	1560	1890	Hot Water	Oil	1010	Single Fam	1-3 family

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GOULD, BRYANT	6	Preble	1A	3510	2253	1900	Hot Water	Oil	1010	Single Fam	1-3 family
YOUNG, THOMAS J	10	Preble	1A	5902	2866	1950	Hot Water	Oil	1040	TWO FAMILY	1-3 family
LADD, CARL M	24	Preble	1A	3908	2151	1920	Hot Water	Oil	1010	Single Fam	1-3 family
CRAWFORD, CALVIN B	26	Preble	1A	4519	2578	1900	Hot Water	Oil	1010	Single Fam	1-3 family
SHANNON, IVAN	25	Preble	1A	3373	1568	1900	Hot Water	Oil	1010	Single Fam	1-3 family
HILL, LORI (GILL)	16	Preble	1A	2780	1762	1890	Hot Water	Oil	1010	Single Fam	1-3 family
SHOFF, EVELYN	8	Preble	1A	5965	3216	1890	Hot Water	Oil	1040	TWO FAMILY	1-3 family
DUNN JT TEN, ALASTAIR	5	Preble	1A	3460	1590	1890	Forced Hot Air	Oil	1010	Single Fam	1-3 family
YOUNG, THOMAS J	22	Preble	1A	3890	2148	1890	Hot Water	Oil	1010	Single Fam	1-3 family
NORTHUMBERLAND SCHOOL DIST	15	Preble	1A	3780	1595	1890	Hot Water	Gas	903C	MUNICPAL MDL-94	Comm&Public
NO NAME	7	Preble	1A		1778	1915	Hot Water	Oil	1010	Single Fam	1-3 family
NO NAME	36	Preble	1A		1778	1915	Hot Water	Oil	1010	Single Fam	1-3 family
DOHERTY, LAWRENCE	11	Bearce	2	1557	648	1920	None	Coal or Wood	1010	Single Fam	1-3 family
BROWN, STEPHEN	5	Bearce	2	4981	2600	1910	Hot Water	Oil	1010	Single Fam	1-3 family
WARD, DAVID	7	Bearce	2	1891	1047	100	Floor Furnace	Gas	1010	Single Fam	1-3 family
YOUNG, THOMAS J	13	Cottage	2	2514	1344	1940	Hot Water	Oil	1040	TWO FAMILY	1-3 family
PICO, BRIDGET A	28	Cottage	2	2048	924	1994	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
KRUPULA, ARNIE E SR	5	Cottage	2	1823	924	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
ROBERGE, ROLAND	3	Cottage	2	2351	1362	1917	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MARTIN, CHRISTOPHER	25	Cottage	2	3472	1560	1989	Hot Water	Oil	1010	Single Fam	1-3 family
STINSON, COREY A	20	Cottage	2	2301	1008	1980	Hot Water	Oil	1010	Single Fam	1-3 family
BARTLETT, KENNETH	24	Crow Hill	2	2040	1008	1977	Hot Water	Oil	1010	Single Fam	1-3 family
FONTAINE, RICHARD M	16	Crow Hill	2	2413	1144	1959	Hot Water	Oil	1010	Single Fam	1-3 family
DUNHAM, LESLIE	42	Crow Hill	2	3030	1170	1950	Hot Water	Oil	1010	Single Fam	1-3 family
FONTAINE, ALBERT	46	Crow Hill	2	2438	1564	1964	Forced Hot Air	Oil	1010	Single Fam	1-3 family
DEFOSSE, JILLIAN P	45	Crow Hill	2	3812	1511	1920	Hot Water	Oil	1010	Single Fam	1-3 family
HARTLEN, DONALD	30	Crow Hill	2	1965	950	1971	Hot Water	Oil	1010	Single Fam	1-3 family
HUTCHINSON REVOC TRUST, DONALD	41	Crow Hill	2	1728	804	1976	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
KENNEY, THOMAS W	59	Crow Hill	2	3719	1368	1955	Hot Water	Oil	1010	Single Fam	1-3 family
HOPPS, LINDA KING	6	Crow Hill	2	2287	960	1984	Hot Water	Oil	1010	Single Fam	1-3 family
LANGLOIS, DONALD	22	Crow Hill	2	3823	1538	1970	Hot Water	Oil	1010	Single Fam	1-3 family
MASON, PAUL E	32	Crow Hill	2	2360	1060	1970	Hot Water	Oil	1010	Single Fam	1-3 family
CARON, ROLAND SR	31	Crow Hill	2	3593	984	1960	Forced Hot Air	Oil	1010	Single Fam	1-3 family
TILTON, CHANNIE	58	Crow Hill	2	2615	1856	1916	Hot Water	Oil	1010	Single Fam	1-3 family
TISDALE, CECIL	12	Crow Hill	2	2874	1312	1972	Hot Water	Oil	1010	Single Fam	1-3 family
FRECHETTE, LOUIS	25	Cumberland	2	3558	1871	1890	Hot Water	Oil	1010	Single Fam	1-3 family
BENOIT, JERRY	51	Cumberland	2	3901	1762	1890	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MORRIS, KIMBERLY	23	Cumberland	2	2924	1258	1870	Hot Water	Oil	1010	Single Fam	1-3 family
GAUDETTE, RUTH	43	Cumberland	2	1474	671	1939	Hot Water	Oil	1010	Single Fam	1-3 family
GILCRIS, TRACY	69	Cumberland	2	2225	660	1900	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
SAVAGE, KEITH	11	Cumberland	2	2520	1170	1890	Hot Water	Oil	1010	Single Fam	1-3 family
MALAS, CHARAY A	9	Cumberland	2	3773	1918	1900	Hot Water	Oil	1010	Single Fam	1-3 family
TIPPITT, GLEN E	53	Cumberland	2	1969	922	1900	Hot Water	Oil	1010	Single Fam	1-3 family
GOSSELIN, BRIAN D	3	Cumberland	2	4373	2089	1930	Hot Air-no Duc	Coal or Wood	3320	AUTO REPR	Comm&Public
BLANCHETTE, TIMOTHY A	57	Cumberland	2	2904	1466	1890	Forced Hot Air	Oil	1010	Single Fam	1-3 family
NOUGIAS TRUST, BRENDA C	71 & 73	Cumberland	2	3341	1790	1890	Hot Water	Oil	1010	Single Fam	1-3 family
WEMYSS JR REVOC. TRUST, JAMES		Cumberland	2	7655	4119	1967	Hot Water	Oil	1010	Single Fam	1-3 family

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WHITE, CASSANDRA A	13	Cumberland	2	1821	1313	1927	Hot Water	Oil	1010	Single Fam	1-3 family
WILD RIVER CORP.	459	Cumberland	2	5076	2538	1965	None	Coal or Wood	3541	AIRPORT	Comm&Public
WEMYSS JR REVOC. TRUST, JAMES	281	Cumberland	2	7197	3820	1992	Hot Water	Oil	1010	Single Fam	1-3 family
BOUTIN, KENNETH M	47	Cumberland	2	2557	1253	1890	Hot Water	Oil	1010	Single Fam	1-3 family
COVELL, THOMAS	84	First	2	3750	1662	1967	Hot Water	Oil	1010	Single Fam	1-3 family
SHANNON, JOANNE M	30	First	2	2234	1157	1896	Hot Water	Oil	1010	Single Fam	1-3 family
SWIFT, MICHAEL P	8	First	2	2387	900	1900	Hot Water	Oil	1010	Single Fam	1-3 family
BALL, SHERRI L	73	First	2	1012	506	1920	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GAGNON, EVELYN	60	First	2	1712	760	1971	Forced Hot Air	Oil	1010	Single Fam	1-3 family
ALDRICH, ROGER	46	First	2	2478	950	1950	Hot Water	Oil	1010	Single Fam	1-3 family
LEDGER, STEWART A	50	First	2	2080	912	1976	Hot Water	Oil	1010	Single Fam	1-3 family
BARBARA REYNOLDS	40	First	2	2418	1116	1950	Hot Water	Oil	1010	Single Fam	1-3 family
CLAUSS, ASHLEY R	72	First	2	2908	1904	1986	Hot Water	Oil	1010	Single Fam	1-3 family
COOKSON, SARA	5	First	2	2768	1060	1960	Hot Water	Oil	1010	Single Fam	1-3 family
MEUNIER, JOSHUA D	63	First	2	1988	964	1900	Hot Water	Oil	1010	Single Fam	1-3 family
WOODWARD, TIMOTHY	11	First	2	6778	4756	1890	Hot Water	Oil	1010	Single Fam	1-3 family
AUDIT, MARIO J	23	First	2	3528	1632	2005	Hot Water	Oil	1010	Single Fam	1-3 family
ST CYR, RICHARD	29	First	2	2224	1300	1897	Hot Water	Oil	1010	Single Fam	1-3 family
THERIAULT, ARLENE E D	56	First	2	2700	1248	1942	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HAAS, JULIE M	57	First	2	2360	1218	1947	Hot Water	Oil	1010	Single Fam	1-3 family
LAVIGNE, PATRICK	49	First	2	3620	2016	1947	Hot Water	Oil	1040	TWO FAMILY	1-3 family
LAMBERT, LEE	74	First	2	2401	1381	1900	Hot Water	Oil	1010	Single Fam	1-3 family
ANNIS, RUSSELL O	6	Fiske	2	2142	1133	1890	Hot Water	Oil	1010	Single Fam	1-3 family
BROEK, ETHEL	8	Fiske	2	1972	1416	1890	Forced Hot Air	Oil	1010	Single Fam	1-3 family
STONE, SEATON	4	Fiske	2	2270	1076	1978	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
ORDWAY, NEIL	13	Fiske	2	2420	816	1940	Hot Water	Oil	1010	Single Fam	1-3 family
LAFLAMME, ROLAND H	12	Fiske	2	4736	2284	1884	Hot Water	Oil	1040	TWO FAMILY	1-3 family
REYNOLDS, BRIAN K	7	Fiske	2	2580	900	1940	Hot Water	Oil	1010	Single Fam	1-3 family
GAUDETTE, THOMAS	14	Fiske	2	2367	1307	1936	Hot Water	Oil	1010	Single Fam	1-3 family
MORSE, JAMES	10	Fiske	2	1756	952	1936	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CURRIER, MICHAEL	14	Goulet	2	3694	2173	1900	Forced Hot Air	Oil	1040	TWO FAMILY	1-3 family
HYSLOP, RUTH E	4	Goulet	2	1680	680	1942	Hot Water	Oil	1010	Single Fam	1-3 family
BOWMAN PROPERTIES, LLC	12	Goulet	2	2188	1117	1940	Floor Furnace	Gas	1010	Single Fam	1-3 family
ROBY, FRANCIS E	13	Goulet	2	2524	1176	1890	Floor Furnace	Gas	1010	Single Fam	1-3 family
WHITTUM, PATRICK C	8	Goulet	2	1008	1008	1920	None	Coal or Wood	1010	Single Fam	1-3 family
TILLEY, ANITA	6	Goulet	2	1889	819	1920	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MARSHALL, GARY D	6	Graham	2	3372	2016	1975	Hot Water	Oil	1010	Single Fam	1-3 family
BENOIT, LAWRENCE	61	Graham	2	3280	1198	1968	Hot Water	Oil	1010	Single Fam	1-3 family
ADAIR, DEBORAH J	77	Graham	2	4131	1649	1920	Hot Water	Oil	1010	Single Fam	1-3 family
WATSON, GARY R	43	Graham	2	2289	1137	1968	Hot Water	Oil	1010	Single Fam	1-3 family
DOOLAN, MICHAEL J	13	Graham	2	2400	960	1979	Hot Water	Oil	1010	Single Fam	1-3 family
KENISON, DONALD G JR	48	Graham	2	2847	1292	1940	Forced Hot Air	Oil	1010	Single Fam	1-3 family
WATSON, RICHARD P	33	Graham	2	3737	2555	1965	Hot Water	Oil	1010	Single Fam	1-3 family
MARSHALL, STANLEY	71	Graham	2	1547	684	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
ALCANTARA, ALEX	65	Graham	2	4104	2052	1995	Forced Hot Air	Gas	1030	Mobile Hom	1-3 family
HAMILTON, DAVID H	21	Graham	2	3272	1760	1986	Hot Water	Oil	1010	Single Fam	1-3 family
HAND, DONALD W	60	Graham	2	4011	1500	1975	Hot Water	Oil	1010	Single Fam	1-3 family

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HAND, RANDY	72	Graham	2	2894	920	1965	Hot Water	Oil	1010	Single Fam	1-3 family
BISHOP, CATHERINE HUTCHINSON	18	Graham	2	1969	966	1987	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
ROBY, SCOTT A	67	Graham	2	1625	896	1970	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
PLATT REVOCABLE TRUST, CORINNE	40	Graham	2	3204	1188	1988	Hot Water	Oil	1010	Single Fam	1-3 family
CORRELL, FRANK	24	Graham	2	1992	924	1989	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BROOKS JR. JT TEN, PHILBERT	23	Grandview	2	2244	1026	1961	Forced Hot Air	Oil	1010	Single Fam	1-3 family
ADAMS, WAVA CLARK	10	Grandview	2	2154	960	1975	Hot Water	Oil	1010	Single Fam	1-3 family
TIERNEY JR, JAMES W	6	Grandview	2	3672	2236	1973	Forced Hot Air	Oil	1010	Single Fam	1-3 family
LAVIGNE, RICHARD J	26	Grandview	2	2534	960	1984	Hot Water	Oil	1010	Single Fam	1-3 family
LEDGER, GREGORY	30	Grandview	2	2628	1230	1955	Hot Water	Oil	1010	Single Fam	1-3 family
ROBINSON, MARCIA	3	Grandview	2	1352	1240	1992	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
GOODWIN, DANA	17	Grandview	2	2772	864	1975	Forced Hot Air	Oil	1010	Single Fam	1-3 family
RIVERS, GARY H	7	Grandview	2	3289	1218	1960	Forced Hot Air	Oil	1010	Single Fam	1-3 family
TETREAULT, DAVID R	14	Grandview	2	5288	2800	1995	Hot Water	Oil	1010	Single Fam	1-3 family
WHITE FAMILY TRUST	18	Grandview	2	3648	1344	1973	Hot Water	Oil	1010	Single Fam	1-3 family
DEBLOIS, RICKY ALLEN	24	Hall	2	3684	1568	2004	Hot Water	Oil	1010	Single Fam	1-3 family
DEBLOIS, RICKY ALLEN	22	Hall	2	2072	1008	1994	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
ALEXANDER, EARL	29	High	2	1832	856	1891	Forced Hot Air	Oil	1010	Single Fam	1-3 family
STOCKWELL, TYSON	26	High	2	1632	848	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
SIMPSON JT TEN, JOSHUA	30	High	2	1905	1071	1890	Hot Water	Oil	1010	Single Fam	1-3 family
CHAUVETTE, ROGER	22	High	2	3104	1808	1947	Steam	Oil	1010	Single Fam	1-3 family
HOPPS, KERRY V	31	High	2	1936	914	1855	Hot Water	Oil	1010	Single Fam	1-3 family
KEENAN & SON LLC, B.C.	5	High	2	3641	1830	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
PETERSEN, LORRAINE	10	High	2	2610	885	1900	Hot Water	Oil	1010	Single Fam	1-3 family
JOHNSON, DAVID W	14	High	2	3696	2448	1940	Hot Water	Oil	1010	Single Fam	1-3 family
NAPLES, CARL B	13	High	2	2125	1015	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
PADULA, ELIZABETH	25	High	2	1704	1080	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HERSEY, JOHN R	6	High	2	1860	832	1964	Hot Water	Oil	1010	Single Fam	1-3 family
SZURLEY, JOHN	12	High	2	1796	768	1992	Hot Water	Oil	1010	Single Fam	1-3 family
LABRECQUE, BETHANY A	8	High	2	1384	672	1987	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
FORTIN, ANTHONY	23	High	2	1725	830	1970	Hot Water	Oil	1010	Single Fam	1-3 family
DUPUIS, JOEL R	20	Hillside	2	3252	1400	1900	Hot Water	Oil	1010	Single Fam	1-3 family
LAKIN, DEBRA (JAMESON)	14	Hillside	2	2240	1176	1946	Hot Water	Oil	1010	Single Fam	1-3 family
BUSHEY, JEANNE	90	Hillside	2	3928	1320	1900	Hot Water	Oil	1010	Single Fam	1-3 family
CASS, CHRISTINE	78	Hillside	2	1725	750	1935	Hot Water	Oil	1010	Single Fam	1-3 family
JOHNSTON, ALEXANDER D	80	Hillside	2	1762	1241	1900	Hot Water	Oil	1010	Single Fam	1-3 family
DUPUIS, ALBERT	44	Hillside	2	2717	1491	1890	Hot Water	Oil	1010	Single Fam	1-3 family
FOGG, THERESA	4	Hillside	2	2232	1001	1817	Hot Water	Oil	1010	Single Fam	1-3 family
SHANNON, KATHY ANN	48	Hillside	2	1780	988	1950	Hot Water	Oil	1010	Single Fam	1-3 family
GOULET, MAURICE	66	Hillside	2	1664	792	1900	Hot Water	Oil	1010	Single Fam	1-3 family
HOPPS, BEATRICE	75	Hillside	2	2186	962	1951	Hot Water	Oil	1010	Single Fam	1-3 family
HOPPS, HAROLD	82	Hillside	2	2496	1288	1930	Hot Water	Oil	1010	Single Fam	1-3 family
HUTCHINSON REVOC TRUST, DONALD	106	Hillside	2	3663	1528	1950	Hot Water	Oil	1010	Single Fam	1-3 family
SIMPSON, DEBORAH A	19	Hillside	2	2816	1260	1920	Hot Water	Oil	1010	Single Fam	1-3 family
RUSSELL, KELLY G	4	Hillside	2	1963	874	1958	Hot Water	Oil	1010	Single Fam	1-3 family
BUNDSCHUH, JOE	22	Hillside	2	4225	1564	1900	Hot Water	Oil	1010	Single Fam	1-3 family
LANGLOIS, DAWNIE J	52	Hillside	2	2242	1024	1930	Hot Water	Oil	1010	Single Fam	1-3 family

Owner's Name	Street No	Street Name	Area	Bldg Area Gross	Bldg Area Living	Ayb	Heat Type Desc	Heat Fuel Desc	Use Code	Use Descript	Utilization Grp
MEUNIER, BRIAN	8	Hillside	2	1776	1260	1946	Forced Hot Air	Gas	1010	Single Fam	1-3 family
NORMANDEAU REVOCABLE TRUST	27	Hillside	2	2796	1596	1910	Hot Water	Oil	1010	Single Fam	1-3 family
GRENIER, DENNIS B	10	Hillside	2	2522	1020	1940	Hot Water	Oil	1010	Single Fam	1-3 family
HOPPS, KEITH	1	Hillside	2	2289	717	1955	Hot Water	Oil	1010	Single Fam	1-3 family
NEWTON, WAYNE	79	Hillside	2	2682	1084	1955	Hot Water	Oil	1010	Single Fam	1-3 family
PLATT, MARCEL E	38	Hillside	2	2546	1249	1920	Steam	Oil	1010	Single Fam	1-3 family
SHANNON, SYLVIA M	94	Hillside	2	2184	960	1959	Hot Water	Oil	1010	Single Fam	1-3 family
LAUNDRY, SAMANTHA	114	Hillside	2	2230	1152	1920	Hot Water	Oil	1010	Single Fam	1-3 family
NORMAND, JAMES J	84	Hillside	2	2244	1296	1900	Hot Water	Oil	1010	Single Fam	1-3 family
TILTON, ARNOLD	102	Hillside	2	1764	910	1900	Hot Water	Oil	1010	Single Fam	1-3 family
STRONG, KENNETH F	73	Hillside	2	1701	798	1930	Hot Water	Oil	1010	Single Fam	1-3 family
D'AVENI, ANTHONY J	13	Hillside	2	2454	660	1947	Hot Water	Oil	1010	Single Fam	1-3 family
SANBORN, JAMES	116	Hillside	2	2320	920	1999	Forced Hot Air	Gas	1030	Mobile Hom	1-3 family
CAMARA, RAOUL	28	Hillside	2	3560	2079	1900	Hot Water	Oil	1050	THREE FAM	1-3 family
MILES, DAVID B	60	Hillside	2	2940	1180	1920	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HAND, KENNETH	74	Hillside	2	1748	858	1987	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
SULESKI, LISA G	47	Maple	2	1342	630	1930	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
LAROSE FAMILY TRUST, RITA	48	Maple	2	2288	1048	1972	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BOUDLE, SANDRA	31	Maple	2	2429	1180	1900	Hot Water	Oil	1010	Single Fam	1-3 family
WRIGHT, STANLEY	38	Maple	2	1100	520	1900	Hot Water	Oil	1010	Single Fam	1-3 family
CALL, SANDOW	43	Maple	2	2754	1209	1950	Hot Water	Oil	1010	Single Fam	1-3 family
FOX, MICHAEL W	17	Maple	2	2750	1468	1900	Hot Water	Oil	1010	Single Fam	1-3 family
CHARLETTE TRUST, THE RUTH E	13	Maple	2	2284	1408	1955	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GUAY, MONIKA	21	Maple	2	2184	768	1955	Forced Hot Air	Gas	1010	Single Fam	1-3 family
CHARLETTE, DONALD A	9	Maple	2	3650	1548	1920	Hot Water	Oil	1010	Single Fam	1-3 family
FRIZZELL, LEO	32	Maple	2	1724	973	1900	Hot Water	Oil	1010	Single Fam	1-3 family
BLAIS, GINETTE	37	Maple	2	1638	728	1980	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BRANN (HICKEY), DIANA	50	Maple	2	2638	1222	1890	Hot Water	Oil	1010	Single Fam	1-3 family
HUNT, ROBERT E	44	Maple	2	3030	1395	1912	Hot Water	Oil	1010	Single Fam	1-3 family
ALDRICH (HURLBUTT), LORNA	22	Maple	2	3771	1696	1951	Hot Water	Oil	1010	Single Fam	1-3 family
KIMBALL, RICHARD	35	Maple	2	1874	888	1964	Hot Water	Oil	1010	Single Fam	1-3 family
HOUSEHOLD FINANCE CORP. II	29	Maple	2	2579	1155	1890	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BISHOP, JACOB	16	Maple	2	2279	1123	1920	Hot Water	Oil	1010	Single Fam	1-3 family
MONTANYE, HOWARD R	58	Maple	2	2048	960	1976	Hot Water	Oil	1010	Single Fam	1-3 family
TETREAULT (GRAY), SANDRA	63	Maple	2	3202	1421	1979	Hot Water	Oil	1010	Single Fam	1-3 family
WEAGLE, BARBARA	3	Maple	2	3267	1520	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MCLAIN, REGINALD	24	Melcher	2	4755	3332	1891	Hot Water	Oil	1110	APT 4-UNT	Apt
AFFORDABLE HOUSING EDUCATION	10	Melcher	2	7428	6576	1978	Hot Water	Oil	1120	APT OVER 8	Apt
ROBINSON, EDMUND	26	Melcher	2	2098	1764	1895	Hot Water	Oil	1010	Single Fam	1-3 family
TREMAIN LIMITED PARTNERSHIP	10	Melcher	2	1206	1154	1994	Hot Water	Oil	1120	APT OVER 8	Apt
MOREAU, ERNEST	7	Pike	2	2674	1170	1955	Hot Water	Oil	1010	Single Fam	1-3 family
HOPPS, JANICE	12	Pike	2	2680	1040	1955	Hot Water	Oil	1010	Single Fam	1-3 family
DALEY, DIANE CARON	10	Pike	2	1930	944	1950	Forced Hot Air	Oil	1010	Single Fam	1-3 family
LAKIN, KEVIN J	16	Pike	2	2583	1133	1900	Hot Water	Oil	1010	Single Fam	1-3 family
CHENEY, DONALD M	13	Pike	2	2500	1152	1949	Hot Water	Oil	1010	Single Fam	1-3 family
BATCHELDER 2004 REVOC TRUST, B	11	Pinette	2	1772	624	1929	Hot Water	Oil	1010	Single Fam	1-3 family
HUNTER, KIM	18	Pinette	2	1594	704	1925	Forced Hot Air	Oil	1010	Single Fam	1-3 family

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BARRY, BETTY MAE	9	Pinette	2	2744	944	1929	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MURRAY, TAMERA A	7	Pinette	2	2161	900	1929	Hot Water	Oil	1010	Single Fam	1-3 family
SHUFELT JR, EDWARD D	24	Pinette	2	2602	1344	1970	Hot Water	Oil	1010	Single Fam	1-3 family
NAPLES, CARL B	4	Pinette	2	1821	888	1930	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BOUCHER, ESTATE OF CARLINE	17	Prospect	2	2722	812	1955	Forced Hot Air	Oil	1010	Single Fam	1-3 family
FOGG, DOUGLAS	20	Prospect	2	2746	1240	1920	Hot Water	Oil	1010	Single Fam	1-3 family
PAQUETTE, JOSIE R (MCKENZIE)	26	Prospect	2	2804	1512	1960	Hot Water	Oil	1010	Single Fam	1-3 family
BATCHELDER 2004 REVOC TRUST, B	13	Prospect	2	1134	490	1950	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
KINGSTON, FLORENCE	15	Prospect	2	2377	760	1956	Forced Hot Air	Oil	1010	Single Fam	1-3 family
JOHNSTON, DENISE D	7	Second	2	2604	1312	1895	Hot Water	Oil	1040	TWO FAMILY	1-3 family
BENWAY, EDMUND L	26	Second	2	2219	863	1959	Floor Furnace	Gas	1010	Single Fam	1-3 family
REED, MARGARET	55	Second	2	4072	1454	1948	Hot Water	Oil	1010	Single Fam	1-3 family
DESAUTELS, JERRY P	32	Second	2	2104	1176	1900	Hot Water	Oil	1010	Single Fam	1-3 family
FRECHETTE, ROLAND	58	Second	2	2458	1110	1920	Forced Hot Air	Oil	1010	Single Fam	1-3 family
YOUNG, KEITH B	25	Second	2	2638	1512	1900	Hot Water	Oil	1010	Single Fam	1-3 family
KENNETT, JOEL DAVID	28	Second	2	2194	1152	1800	Hot Water	Oil	1010	Single Fam	1-3 family
JOY, NANCY	47	Second	2	1976	924	1987	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
JOY, NANCY	45	Second	2	1944	924	1986	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DEFOSSE JR, FLORIEN J	1	Second	2	2490	1266	1915	Floor Furnace	Oil	1010	Single Fam	1-3 family
WEBBER, PHYLLIS A	46	Second	2	2367	1480	1920	Hot Water	Oil	1010	Single Fam	1-3 family
PELLETIER, KERRY	29	Second	2	2784	1584	1920	Hot Water	Oil	1010	Single Fam	1-3 family
ROY, WILFRED	27	Second	2	2232	1092	1940	Floor Furnace	Gas	1010	Single Fam	1-3 family
TAYLOR, FREDERICK	11	Second	2	4278	1837	1930	Hot Water	Oil	1010	Single Fam	1-3 family
DOOLAN, MICHAEL J	59	Second	2	2494	1620	1948	Hot Water	Oil	1010	Single Fam	1-3 family
PELLETIER, RANDALL D	51	Second	2	3005	1405	1950	Hot Water	Oil	1010	Single Fam	1-3 family
RAMSDELL, RICHARD	50	Second	2	2411	1036	1970	Hot Water	Oil	1010	Single Fam	1-3 family
STINSON, ROBERT	31	Second	2	2454	1512	1920	Forced Hot Air	Oil	1010	Single Fam	1-3 family
SHEEHAN, JOHN F	10	Second	2	5435	2735	1900	Hot Water	Oil	1050	THREE FAM	1-3 family
SAWYER, SHIRLEY J	5	Second	2	3189	1601	1896	Hot Water	Oil	1010	Single Fam	1-3 family
TAGUE, KELI	54	Second	2	1636	798	1900	Hot Water	Oil	1010	Single Fam	1-3 family
EMERY, CHERYL	42	Second	2	1927	798	1965	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
ARSENAULT, ELIZABETH	41	Brooklyn	3	2776	1260	1902	Hot Water	Oil	1010	Single Fam	1-3 family
LAUZON, RICK	75	Brooklyn	3	2808	1329	1995	Forced Hot Air	Oil	1010	Single Fam	1-3 family
WAUSAU PAPERS OF NH INC.		Brooklyn	3	920	460	1990	Electric	Electric	1030	Mobile Hom	1-3 family
ROY, KEVIN	15	Brooklyn	3	3462	1529	1920	Hot Water	Oil	1010	Single Fam	1-3 family
PEEL, DEAN R	57	Brooklyn	3	1482	675	1960	Floor Furnace	Gas	1010	Single Fam	1-3 family
MCLEOD, JOHN D	83	Brooklyn	3	2869	1785	1923	Hot Water	Oil	1010	Single Fam	1-3 family
GRIFFITHS, JOSEPH	53	Brooklyn	3	4335	2002	1900	Steam	Oil	1040	TWO FAMILY	1-3 family
KUCHINSKY, GLENN P	73	Brooklyn	3	2885	1502	1920	Hot Water	Oil	1040	TWO FAMILY	1-3 family
MONTGOMERY, EUGENE P	65	Brooklyn	3	4230	1971	1850	Hot Water	Oil	1010	Single Fam	1-3 family
COTE, ANDREW	49	Brooklyn	3	4506	1706	1900	Hot Water	Oil	1010	Single Fam	1-3 family
FERLAND, SUSAN T	87	Brooklyn	3	2387	1269	1850	Hot Water	Oil	1010	Single Fam	1-3 family
GONYER, THOMAS	13	Brooklyn	3	3406	1190	1930	Hot Water	Oil	1010	Single Fam	1-3 family
PERRAS TRUSTEE, REAL	29	Brooklyn	3	2278	1092	1940	Hot Water	Oil	1010	Single Fam	1-3 family
KING, DANIEL W	37	Brooklyn	3	3717	1832	1900	Hot Water	Oil	1010	Single Fam	1-3 family
EMDE JR, KARL H W	27	Brooklyn	3	2159	1012	1930	Hot Water	Oil	1010	Single Fam	1-3 family
GILCRIS, NADINE (KENNETT)	47	Brooklyn	3	1896	924	1978	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family

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LEIGH, JAYNE L	89	Brooklyn	3	1916	924	1900	Hot Water	Oil	1010	Single Fam	1-3 family
DOWLAND, ROBERT	35	Brooklyn	3	1934	1152	1928	Floor Furnace	Coal or Wood	1010	Single Fam	1-3 family
SHALLOW RIVER PROP. INC.	69	Brooklyn	3	3720	2100	1900	Hot Water	Oil	9200	NON PROFIT MDL-94	Comm&Public
MCLAIN, WAYNE	39	Brooklyn	3	3432	1368	1900	Hot Water	Oil	1010	Single Fam	1-3 family
HODGE, STEVE	11	Brooklyn	3	3392	1040	1930	Hot Water	Oil	1010	Single Fam	1-3 family
MONTGOMERY, EUGENE P	59	Brooklyn	3	4240	1886	1900	Hot Water	Oil	1040	TWO FAMILY	1-3 family
BLODGETT, RANDY A	19	Brooklyn	3	2473	1255	1940	Forced Hot Air	Oil	1010	Single Fam	1-3 family
PLATT, CLYDE	81	Brooklyn	3	2692	1750	1900	Hot Water	Oil	1010	Single Fam	1-3 family
LUFKIN, DANNY	61	Brooklyn	3	3462	1917	1900	Hot Water	Oil	1040	TWO FAMILY	1-3 family
WAUSAU PAPERS OF NH INC.		Brooklyn	3	2070	2070	0	None	Coal or Wood	4000	FACTORY	Comm&Public
ACHILLES, NORMAN	505	Lancaster Rd	3	3703	2189	1979	Forced Hot Air	Oil	1010	Single Fam	1-3 family
COLLINS, LINDA B	1099	Lancaster Rd	3	1898	944	1986	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
AUGER, DAVID P	116	Lancaster Rd	3	5957	1878	1981	Hot Water	Oil	1010	Single Fam	1-3 family
DESILETS, ANGELINA R	1019	Lancaster Rd	3	3520	1728	2006	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
PEEL, SUSAN G	112	Lancaster Rd	3	3162	1696	1948	Hot Water	Oil	1010	Single Fam	1-3 family
BAILEY, EVERETT	115	Lancaster Rd	3	2677	1056	1974	Hot Water	Oil	1010	Single Fam	1-3 family
BARNEY, JEFFREY	1126	Lancaster Rd	3	4533	1641	1936	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BARTLETT, SHARAN	844	Lancaster Rd	3	1116	552	1965	Forced Hot Air	Gas	1030	Mobile Hom	1-3 family
BEAN, JOHN	1219	Lancaster Rd	3	2208	1104	2000	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
BORG, CARL	755	Lancaster Rd	3	2208	840	1950	Hot Water	Oil	1010	Single Fam	1-3 family
BOUDRIAS, LOUIS	317	Lancaster Rd	3	1744	744	1968	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
WOODWARD, MICHAEL J	1050	Lancaster Rd	3	2963	1238	1945	Hot Water	Oil	1010	Single Fam	1-3 family
BRIERE, ROBERT P	1109	Lancaster Rd	3	3105	1531	1920	Hot Water	Oil	1010	Single Fam	1-3 family
COLBURN ASSOCIATES INC		Lancaster Rd	3	768	384	2001	None	Coal or Wood	1010	Single Fam	1-3 family
AUBUT, GERARD	1025	Lancaster Rd	3	2024	924	1995	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
COTTER, SIMONNE	862	Lancaster Rd	3	6992	3664	1890	Forced Hot Air	Oil	1010	Single Fam	1-3 family
COTTER, NORMAN	897	Lancaster Rd	3	3412	2208	1965	Hot Water	Oil	1010	Single Fam	1-3 family
NORMANDEAU, BARRY	130	Lancaster Rd	3	3110	1525	1997	Hot Water	Oil	3400	OFFICE BLD	Comm&Public
WILES/CURRIER/CURRIER	733	Lancaster Rd	3	2100	1400	1945	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CURRIER SALES & SERVICE	1149	Lancaster Rd	3	10849	5400	1986	Forced Hot Air	Oil	3320	AUTO REPR	Comm&Public
NORTHUMBERLAND, TOWN OF	645	Lancaster Rd	3	12595	6296	1946	Forced Hot Air	Oil	3220	STORE/SHOP	Comm&Public
DUPUIS, BERNARD	649	Lancaster Rd	3	6332	3773	1969	Electric	Electric	1010	Single Fam	1-3 family
WYNN SR, RUSSELL G & FRANCES C	765	Lancaster Rd	3	2722	1600	1930	Hot Water	Oil	1010	Single Fam	1-3 family
YELLE, MARK J	962	Lancaster Rd	3	8552	4250	1928	Forced Hot Air	Oil	3220	STORE/SHOP	Comm&Public
REYNOLDS, EUGENE	363	Lancaster Rd	3	4555	2048	1960	Hot Water	Oil	1010	Single Fam	1-3 family
GIGGEY, LEATHA G	1084	Lancaster Rd	3	1714	775	1938	Hot Water	Oil	1010	Single Fam	1-3 family
KAPRAUN, JOSEPH W	954	Lancaster Rd	3	2912	1891	1890	Hot Water	Oil	1010	Single Fam	1-3 family
GOULET, LEO	146	Lancaster Rd	3	1740	644	2003	Forced Hot Air	Oil	1010	Single Fam	1-3 family
COLLINS, JEFFREY L	1080	Lancaster Rd	3	2530	1020	1963	Hot Water	Oil	1010	Single Fam	1-3 family
BODNAR, DARRELL C	254	Lancaster Rd	3	2307	1664	1976	Hot Water	Oil	1010	Single Fam	1-3 family
DINGMAN TRUST, THE MARGARET	218	Lancaster Rd	3	3098	1157	1957	Hot Water	Oil	1010	Single Fam	1-3 family
HAYEN, SALLY		Lancaster Rd	3	3385	1106	1917	None	Coal or Wood	1010	Single Fam	1-3 family
AMERI VEST PROPERTIES LLC	1034	Lancaster Rd	3	8985	3777	1960	Steam	Oil	3010	MOTELS	Comm&Public
HOBART, KENNETH	938	Lancaster Rd	3	6619	2987	1920	Hot Water	Oil	1010	Single Fam	1-3 family
PROSPER, BRUCE	735	Lancaster Rd	3	4708	2160	1930	Hot Water	Oil	1010	Single Fam	1-3 family
HOLDEN, JOHN	374+384	Lancaster Rd	3	6736	3505	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BOUTHILLIER, MARK W	375	Lancaster Rd	3	3460	2302	1978	Hot Water	Oil	1010	Single Fam	1-3 family

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LUNDERVILLE, TINA (STANFORD)	743	Lancaster Rd	3	3385	2160	1935	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HUNT, ARTHUR D	799	Lancaster Rd	3	2718	1612	1955	Forced Hot Air	Oil	1010	Single Fam	1-3 family
IRVING, SHARON A	157	Lancaster Rd	3	3308	2600	1968	Hot Water	Oil	1010	Single Fam	1-3 family
NELSON, DOUG	948	Lancaster Rd	3	2864	1456	1965	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MCMINN, DANIELLE A	1253	Lancaster Rd	3	3776	1458	1900	Hot Water	Oil	1010	Single Fam	1-3 family
JORDAN, RUBERTA M	504	Lancaster Rd	3	5519	2129	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
JOY, LESLIE	413	Lancaster Rd	3	3656	1768	1975	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MCLAIN, JULIE	228	Lancaster Rd	3	4191	1630	1970	Hot Water	Oil	1010	Single Fam	1-3 family
LAROCHE, REGINA	0	Lancaster Rd	3	504	204	1955	None	Coal or Wood	1010	Single Fam	1-3 family
ROY, GORDON	1022	Lancaster Rd	3	1574	486	1935	Forced Hot Air	Oil	1010	Single Fam	1-3 family
LUNN JR, GLENN J	123	Lancaster Rd	3	4497	2124	1953	Forced Hot Air	Coal or Wood	3320	AUTO REPR	Comm&Public
MUNCE'S REAL ESTATE VENTURES	25	Lancaster Rd	3	3684	1807	1920	Forced Hot Air	Gas	3110	RTL GAS ST	Comm&Public
LACASSE, RONALD	251	Lancaster Rd	3	3404	1572	1966	Hot Water	Oil	1010	Single Fam	1-3 family
MARSHALL, RICHARD L	208	Lancaster Rd	3	5357	2056	1800	Hot Water	Oil	1010	Single Fam	1-3 family
DEBLOIS, DANA L	528	Lancaster Rd	3	5806	2142	1900	Hot Water	Coal or Wood	1010	Single Fam	1-3 family
MARSHALL, KATHY ELAINE	202	Lancaster Rd	3	3216	988	1978	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MARSHALL, HAROLD E JR	1001	Lancaster Rd	3	3436	1512	1995	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
WEEKS, DEBORAH M (KEDDY)	103	Lancaster Rd	3	4488	1704	1938	Hot Water	Oil	1010	Single Fam	1-3 family
WEBSTER, RICHARD J	1090	Lancaster Rd	3	4236	1464	1995	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
JORDAN, KEVIN J	351	Lancaster Rd	3	4266	2026	1982	Hot Water	Oil	1010	Single Fam	1-3 family
MCLEAN, EDWARD	637	Lancaster Rd	3	4499	3204	1955	Hot Water	Oil	3010	MOTELS	Comm&Public
MERROW, ALLAN L	145	Lancaster Rd	3	2730	1040	1958	Hot Water	Oil	1010	Single Fam	1-3 family
MCLAIN FAMILY TRUST	192	Lancaster Rd	3	2847	960	1955	Hot Water	Oil	1010	Single Fam	1-3 family
DUNHAM, CATHY A	553	Lancaster Rd	3	2541	1356	1885	Forced Hot Air	Oil	1010	Single Fam	1-3 family
OSJ OF NORTHUMBERLAND, LLC	583	Lancaster Rd	3	126592	61664	1970	Forced Hot Air	Gas	3230	SHOPNGMALL	Comm&Public
SCHUTT, BRIAN	216	Lancaster Rd	3	2848	1722	1964	Hot Water	Oil	1010	Single Fam	1-3 family
STYLES, DAEGAN	257	Lancaster Rd	3	2384	988	1965	Hot Water	Oil	1010	Single Fam	1-3 family
PARADIS, RICHARD	241	Lancaster Rd	3	2162	1012	1970	Hot Water	Oil	1010	Single Fam	1-3 family
PATRICK, DOROTHY A	260	Lancaster Rd	3	1690	800	1965	Electric	Electric	1010	Single Fam	1-3 family
GILCRIS, RACHELLE LYNN	529	Lancaster Rd	3	4470	1824	1978	Hot Water	Oil	1010	Single Fam	1-3 family
PERRAS REVOCABLE TRUST 1993	1005/7	Lancaster Rd	3	4464	1602	1955	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HICKEY, BENJAMIN	893	Lancaster Rd	3	3962	1438	1900	Hot Water	Oil	1010	Single Fam	1-3 family
PERRAS, ROBERT	1196	Lancaster Rd	3	5848	2521	1982	Hot Water	Oil	1010	Single Fam	1-3 family
WHITNEY, ALAN	789	Lancaster Rd	3	3540	1104	1971	Steam	Oil	1010	Single Fam	1-3 family
TETREAULT, OLIVA J	129	Lancaster Rd	3	8254	4452	1960	Hot Water	Oil	3010	MOTELS	Comm&Public
MUNDELL, CYNTHIA	541	Lancaster Rd	3	3140	1224	1977	Forced Hot Air	Oil	1010	Single Fam	1-3 family
SHELTRY, MARGARET E	247	Lancaster Rd	3	3842	1377	1961	Hot Water	Oil	1010	Single Fam	1-3 family
STILES SR TRUST, THE ROBERT	1060	Lancaster Rd	3	2646	994	1970	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GAGNON, RISA P	292	Lancaster Rd	3	7402	4111	1828	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
POTTER, LEROY	779	Lancaster Rd	3	1978	1127	1950	Hot Water	Oil	1010	Single Fam	1-3 family
GLINES, MURRAY A	1252	Lancaster Rd	3	2640	960	1973	Hot Water	Oil	1010	Single Fam	1-3 family
REYNOLDS, TRACY	1151	Lancaster Rd	3	1776	854	1981	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
RICH, JOHN	328	Lancaster Rd	3	3530	1560	1850	Hot Water	Oil	1010	Single Fam	1-3 family
HART, KATHLEEN M	284	Lancaster Rd	3	6204	2477	1960	Hot Water	Oil	1010	Single Fam	1-3 family
CLAY JR, HARRIMAN F	563	Lancaster Rd	3	2696	1296	1999	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DEBLOIS, SHAWN E	407	Lancaster Rd	3	3122	1389	1985	Hot Water	Oil	1010	Single Fam	1-3 family
PADULA, JOHN A	834	Lancaster Rd	3	3489	2085	1940	Forced Hot Air	Gas	3260	REST/CLUBS	Comm&Public

Owner's Name	Street No	Street Name	Area	Bldg Area Gross	Bldg Area Living	Ayb	Heat Type Desc	Heat Fuel Desc	Use Code	Use Descript	Utilization Grp
SMITH, CARILYN J	519	Lancaster Rd	3	2820	1296	1978	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HURLBERT JR, DARWIN B	540	Lancaster Rd	3	1924	1050	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
DUNHAM, CATHY A	565	Lancaster Rd	3	3514	1008	1991	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
ABBOTT, GREGORY, SR	1210	Lancaster Rd	3	3096	1440	2006	Hot Water	Gas	1010	Single Fam	1-3 family
BERRY, JEFFREY	1075	Lancaster Rd	3	2294	744	1950	Hot Water	Oil	1010	Single Fam	1-3 family
STYLES, PEARL	731	Lancaster Rd	3	5543	2892	1875	Steam	Oil	1040	TWO FAMILY	1-3 family
WAGNER, ADELENE	753	Lancaster Rd	3	2746	1008	1935	Hot Water	Oil	1010	Single Fam	1-3 family
WELCH, J. MERLYN	341	Lancaster Rd	3	2810	1235	1975	Hot Water	Oil	1010	Single Fam	1-3 family
YOUNG, DANIEL W	545	Lancaster Rd	3	3344	1296	1960	Forced Hot Air	Oil	1010	Single Fam	1-3 family
WILKINSON REVOCABLE TRUST 1997	429	Lancaster Rd	3	3990	1890	1967	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BODNAR, JOSEPH J	1068	Lancaster Rd	3	2676	1280	1970	Hot Water	Oil	1010	Single Fam	1-3 family
PIERCE-MERNER, OTILLA J	1041	Lancaster Rd	3	4146	2073	1950	Forced Hot Air	Oil	1040	TWO FAMILY	1-3 family
BELAND, ALPHONSE	809	Lancaster Rd	3	3593	1761	1950	Hot Water	Oil	1040	TWO FAMILY	1-3 family
MILLER, EVELYN	687	Lancaster Rd	3	2016	876	1952	None	Coal or Wood	1010	Single Fam	1-3 family
WINN, GERALD	1112	Lancaster Rd	3	9000	4500	1987	None	Coal or Wood	4010	IND WHSES	Comm&Public
MAY, ROGER	1267	Lancaster Rd	3	2224	1092	1989	Hot Water	Oil	1010	Single Fam	1-3 family
NORTHUMBERLAND, TOWN OF	299	Lancaster Rd	3	2046	1023	1799	None	Coal or Wood	903C	MUNICPAL MDL-94	Comm&Public
PERKINS, DANA	1037	Lancaster Rd	3	3275	1440	1955	Hot Water	Oil	1010	Single Fam	1-3 family
CUNNINGHAM, MARY JANE	1236	Lancaster Rd	3	2344	1064	1990	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
HEON, RAYMOND		Lancaster Rd	3	512	256	1960	None	Coal or Wood	1010	Single Fam	1-3 family
NORTHUMBERLAND, TOWN OF		Lancaster Rd	3	336	168	1965	Forced Hot Air	Gas	903C	MUNICPAL MDL-94	Comm&Public
CARON, DAVID A	1148	Lancaster Rd	3	10242	4800	2001	None	Gas	3220	STORE/SHOP	Comm&Public
HERSOM, RUTH L	179	Lancaster Rd	3	2236	960	1992	Hot Water	Oil	1010	Single Fam	1-3 family
GONYER, JONATHAN	446	NH RT 110	3	2158	960	1975	Hot Water	Oil	1010	Single Fam	1-3 family
MCCARTHY, DARRIN L	366	NH RT 110	3	3654	1352	1976	Hot Water	Oil	1010	Single Fam	1-3 family
BEZANSON, EDWARD S	8	NH RT 110	3	2592	1170	1940	Hot Water	Oil	1010	Single Fam	1-3 family
BENOIT, SIMONE	22	NH RT 110	3	3172	1385	1900	Hot Water	Oil	1010	Single Fam	1-3 family
BERUBE, DWIGHT E	424	NH RT 110	3	3724	1372	1978	Hot Water	Coal or Wood	1010	Single Fam	1-3 family
BLODGETT, DELORES	474	NH RT 110	3	2464	960	1978	Hot Water	Oil	1010	Single Fam	1-3 family
CHARRON, DENNIS	26	NH RT 110	3	2939	1120	1976	Hot Water	Oil	1010	Single Fam	1-3 family
BLODGETT, DELORES	482	NH RT 110	3	2033	924	1984	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DONNELLY, ELSIE	14	NH RT 110	3	2067	912	1962	Hot Water	Oil	1010	Single Fam	1-3 family
KENISON, MARY E	220	NH RT 110	3	4439	1800	1915	Hot Water	Oil	1010	Single Fam	1-3 family
HAAS, JON T	462	NH RT 110	3	2980	960	1974	Hot Water	Oil	1010	Single Fam	1-3 family
HAND, GERARD	459	NH RT 110	3	2648	851	1875	Hot Water	Oil	1010	Single Fam	1-3 family
HART, RICHARD D	6	NH RT 110	3	3599	1404	1951	Hot Water	Oil	1010	Single Fam	1-3 family
STIMPSON, WENDA D	24	NH RT 110	3	3058	884	1940	Hot Water	Oil	1010	Single Fam	1-3 family
HIBBARD, ALBERTA B	402	NH RT 110	3	1768	720	1935	Forced Hot Air	Oil	1010	Single Fam	1-3 family
KARL, WAYNE R	441	NH RT 110	3	3955	1507	1975	Hot Water	Oil	1010	Single Fam	1-3 family
TETU, CHARLES JR	406	NH RT 110	3	2496	933	1994	Hot Water	Oil	1010	Single Fam	1-3 family
DAVENPORT, DANIEL B II	412	NH RT 110	3	1962	924	1971	Hot Water	Oil	1010	Single Fam	1-3 family
MACNEVINS, ANDREW J	563	NH RT 110	3	3215	1536	1985	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
SPOTTISWOOD, KEVIN		NH RT 110	3	2105	880	1946	Hot Water	Oil	1010	Single Fam	1-3 family
GILL, RONALD	256	NH RT 110	3	4396	1596	1990	Forced Hot Air	Gas	1010	Single Fam	1-3 family
BELAND, ALPHONSE	58	Riverside	3	2963	1502	1948	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BELAND, ALPHONSE	34	Riverside	3	2426	891	1955	Hot Water	Oil	1010	Single Fam	1-3 family
MARSHALL, JULIE A	10	Riverside	3	2408	864	1955	Forced Hot Air	Oil	1010	Single Fam	1-3 family

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WELCH, BERNARD F	30	Riverside	3	3411	1184	1955	Hot Water	Oil	1010	Single Fam	1-3 family
RIENDEAU, GEORGE	46	Riverside	3	2698	1305	1963	Hot Water	Oil	1010	Single Fam	1-3 family
DEYETTE, FARON W	52	Riverside	3	3765	1628	1935	Hot Water	Oil	1010	Single Fam	1-3 family
AICARDI JR, WILLIAM F	56	Riverside	3	1680	672	1965	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
RICHARD JR, JOHN F	22	Riverside	3	2988	993	1954	Hot Water	Oil	1010	Single Fam	1-3 family
ASHE, ROBIN J	42	Riverside	3	3184	1378	1955	Hot Water	Oil	1010	Single Fam	1-3 family
ROBINSON, EDMUND	50	Riverside	3	3027	1782	1950	Hot Water	Oil	1010	Single Fam	1-3 family
RIVERS, GARY H	38	Riverside	3	2873	1016	1955	Hot Water	Oil	1010	Single Fam	1-3 family
BAILEY, LORIE A	104	Wemyss	3	2967	912	1975	None	Coal or Wood	1010	Single Fam	1-3 family
SHATNEY, JOHN N	101	Wemyss	3	2749	1137	1981	Hot Water	Oil	1010	Single Fam	1-3 family
COLLINS REVOCABLE TRUST-2000	113	Wemyss	3	5460	2484	1975	Hot Water	Oil	1010	Single Fam	1-3 family
DAIGNEAULT, RONALD W	57	Wemyss	3	3076	1350	1973	Hot Water	Oil	1010	Single Fam	1-3 family
GONYER, JAMES M	106	Wemyss	3	3000	1320	1979	Hot Water	Oil	1010	Single Fam	1-3 family
HAWES, ROBERT D	49	Wemyss	3	2250	1642	1974	Hot Water	Oil	1010	Single Fam	1-3 family
LAMBERT, STEPHAN G	85	Wemyss	3	3024	1280	1970	Hot Water	Oil	1010	Single Fam	1-3 family
RUCH, KARL L	33	Wemyss	3	4377	2304	1972	Hot Water	Oil	1010	Single Fam	1-3 family
SEQUIN, DENIS	67	Wemyss	3	3046	1456	1973	Hot Water	Oil	1010	Single Fam	1-3 family
RAINVILLE, FREDERICK J	129	Wemyss	3	3082	1686	1976	Hot Water	Oil	1010	Single Fam	1-3 family
MOREY, PETER	91	Wemyss	3	3556	1288	1975	Hot Water	Oil	1010	Single Fam	1-3 family
ORDZIE, THOMAS	100	Wemyss	3	3863	1960	1976	Hot Water	Oil	1010	Single Fam	1-3 family
IRVING, MICHAEL J	43	Wemyss	3	2807	1648	1973	Hot Water	Oil	1010	Single Fam	1-3 family
REYNOLDS, NANCY C M	122	Wemyss	3	3501	1700	1981	Hot Water	Oil	1010	Single Fam	1-3 family
REYNOLDS, WILLIAM T	75	Wemyss	3	4194	1638	1973	Hot Water	Oil	1010	Single Fam	1-3 family
PIKE, JOHN W	123	Wemyss	3	2752	1170	1981	Hot Water	Oil	1010	Single Fam	1-3 family
HASKINS, TIMOTHY	43	Winter	3	2265	1164	1940	Hot Water	Oil	1010	Single Fam	1-3 family
THIBEAULT, BERNARD	49	Winter	3	1941	992	1900	Hot Water	Oil	1010	Single Fam	1-3 family
BENOIT, SHARON	58	Winter	3	2406	1063	1900	Hot Water	Oil	1010	Single Fam	1-3 family
NEWTON, RAYMOND R	34	Winter	3	2306	1131	1965	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HOPPS, KEVIN B	6	Winter	3	2244	1260	1925	Hot Water	Oil	1010	Single Fam	1-3 family
MORRISSETTE, ALAN R	15	Winter	3	1976	924	1986	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
BRAASE, HEATHER	44	Winter	3	3070	1357	1900	Hot Water	Oil	1010	Single Fam	1-3 family
HAWES, NEVA	42	Winter	3	2768	1120	1955	Hot Water	Oil	1010	Single Fam	1-3 family
GADWAH, BRIAN S	45	Winter	3	3248	1736	1900	Hot Water	Oil	1010	Single Fam	1-3 family
OAKES, PHILIP	53	Winter	3	2472	1309	1900	Hot Water	Oil	1010	Single Fam	1-3 family
SHANNON, ERIN M	61	Winter	3	1176	588	1960	Floor Furnace	Oil	1010	Single Fam	1-3 family
BOIVIN, LAWRENCE T	41	Winter	3	2237	1312	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CHUMACK, MARIE (SMITH)	14	Winter	3	1730	835	1940	Hot Water	Oil	1010	Single Fam	1-3 family
TETREAULT, JOSEPH T	31	Winter	3	2839	1495	1925	Hot Water	Oil	1010	Single Fam	1-3 family
HOPPS, KEVIN B	10	Winter	3	2033	800	1950	Hot Water	Oil	1010	Single Fam	1-3 family
BERUBE, DWIGHT E	83	Ball Rd	4	3479	1318	1954	Forced Hot Air	Oil	1010	Single Fam	1-3 family
STONE, NICHOLAS	19	Ball Rd	4	3486	1263	1950	Hot Water	Oil	1010	Single Fam	1-3 family
SULLIVAN IRREVOCABLE TRUST, JO	47	Ball Rd	4	3943	1394	1943	Hot Water	Oil	1010	Single Fam	1-3 family
WILES, KATHY (LOCKE)	72	Ball Rd	4	5555	3039	1818	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MONAGHAN, KIM	401	Brown	4	2224	1040	1988	Hot Water	Oil	1010	Single Fam	1-3 family
BEATON, ARTHUR R	263	Brown	4	1945	924	1994	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BELISLE, BERNARD	456	Brown	4	4105	1572	1962	Hot Water	Oil	1010	Single Fam	1-3 family
CURRIER, STEPHEN	251	Brown	4	2868	1209	1968	Forced Hot Air	Oil	1010	Single Fam	1-3 family

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POTTER, III, LINWOOD	269	Brown	4	2144	952	1994	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
HART, ROBERT	235	Brown	4	4881	1760	2002	Hot Water	Oil	1010	Single Fam	1-3 family
COVILL, KEITH L	58	Brown	4	2180	1058	1920	Hot Water	Oil	1010	Single Fam	1-3 family
GRAY, GORDON	317	Brown	4	3820	2414	1890	Hot Water	Oil	1010	Single Fam	1-3 family
DILBOY, KENNETH E	404	Brown	4	2241	1032	1967	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
FYSH, EUGENE A	46	Brown	4	1657	786	1955	Hot Water	Oil	1010	Single Fam	1-3 family
GILBERT, RONALD J	199	Brown	4	3534	1506	1985	Hot Water	Oil	1010	Single Fam	1-3 family
GLIDDEN, WILLIAM	350	Brown	4	2362	1100	1974	Hot Water	Oil	1010	Single Fam	1-3 family
TAYLOR, RICHARD L	438	Brown	4	3564	1632	1985	Hot Water	Oil	1010	Single Fam	1-3 family
BREAULT, CHESTER	397	Brown	4	2221	986	1970	Hot Water	Oil	1010	Single Fam	1-3 family
HAPGOOD, WALTER	442	Brown	4	2070	780	1962	Hot Water	Oil	1010	Single Fam	1-3 family
JEWELL, BRADLEY P	418	Brown	4	1911	912	1960	Forced Hot Air	Oil	1010	Single Fam	1-3 family
KENNETT, JOSEPH	23	Brown	4	2835	1208	1972	Hot Water	Oil	1010	Single Fam	1-3 family
FRIZZELL, SHARON (MAGUIRE)	409	Brown	4	3411	1918	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
LACROIX, LEON J	49	Brown	4	2600	924	1996	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BILODEAU, TIMMY J	60	Brown	4	2640	902	1959	Hot Water	Oil	1010	Single Fam	1-3 family
TYLER, ARLAND	389	Brown	4	2330	924	1989	Hot Water	Oil	1030	Mobile Hom	1-3 family
MARSHALL, GREGG R	379	Brown	4	2338	1056	1985	Hot Water	Oil	1010	Single Fam	1-3 family
OSGOODE, WILLIAM L	53	Brown	4	2538	1024	1955	Floor Furnace	Gas	1010	Single Fam	1-3 family
BENARD, DAVID W	376	Brown	4	3483	1347	1976	Hot Water	Oil	1010	Single Fam	1-3 family
PINETTE, DENNIS	466	Brown	4	2256	1050	1960	Hot Water	Oil	1010	Single Fam	1-3 family
CARSON, MICHAEL R	189	Brown	4	2216	1024	1985	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
RICHARDS, ESTATE OF FRANK J	441	Brown	4	2034	858	1959	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
ROBINSON, MAURICE	48	Brown	4	2330	1012	1960	Hot Water	Oil	1010	Single Fam	1-3 family
MANCHESTER, SHIRLEY	54	Brown	4	3284	1536	1957	Forced Hot Air	Oil	1010	Single Fam	1-3 family
SMITH, ROBERT P	398	Brown	4	6396	2388	1810	Hot Water	Oil	1010	Single Fam	1-3 family
ST ONGE, MICHAEL	37	Brown	4	2180	958	1972	Hot Water	Oil	1010	Single Fam	1-3 family
FOY, DAVID T	414	Brown	4	3704	1782	1998	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
WHITE, TERRENCE	356	Brown	4	1939	868	1971	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DUPUIS, RICHARD	38	Brown	4	2538	1230	1958	Hot Water	Oil	1010	Single Fam	1-3 family
NEW HAMPSHIRE, STATE OF	116	Brown	4	6000	3000	1970	Forced Hot Air	Oil	903C	MUNICPAL MDL-94	Comm&Public
GRAY, LAWRENCE	368	Brown	4	4612	1790	2005	Hot Water	Oil	1010	Single Fam	1-3 family
FRIZZELL, MARION L	367	Brown	4	4114	1260	1983	Hot Water	Oil	1010	Single Fam	1-3 family
SWEATT, DEAN O	27	Brown	4	1976	924	1995	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
CHAMPAGNE (ALLIN), KATHY	41	Brown	4	1089	480	1968	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
LABOUNTY, TIMOTHY	296	Brown	4	3240	1574	2006	Hot Water	Oil	1010	Single Fam	1-3 family
CUMMINGS, HERBERT	31	Brown	4	2280	960	1976	Hot Water	Oil	1010	Single Fam	1-3 family
SIMINO JR, MICHAEL A	14	Craggy	4	2973	1528	1974	Hot Water	Oil	1010	Single Fam	1-3 family
BRONSON, ROBERT	20	Craggy	4	4602	1720	1984	Forced Hot Air	Oil	1010	Single Fam	1-3 family
WHITING III, LEONARD E	4	Craggy	4	3457	1478	1945	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CAR TRUST/ROBINSON, C J	78	Craggy	4	288	216	1986	None	Coal or Wood	3670	RACETRACK	Comm&Public
ST CYR, RYAN M	8	Craggy	4	3317	1470	1957	Forced Hot Air	Oil	1010	Single Fam	1-3 family
POTTER, RANDY R	28	Craggy	4	3288	1500	1979	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GUAY, DANNY L	57	Craggy	4	6780	2420	2005	Hot Water	Oil	1010	Single Fam	1-3 family
TWIN RIVERS CORPORATION	78	Craggy	4	1536	728	1986	Forced Hot Air	Gas	3670	RACETRACK	Comm&Public
HUNTINGTON, NATHAN	38	Tetu	4	1946	841	1960	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CURTIS JR, WOODBURY	14	Tetu	4	4912	2399	1935	Forced Hot Air	Oil	1010	Single Fam	1-3 family

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SAWYER, HOLLIS H	10	Tetu	4	1744	720	1934	Forced Hot Air	Oil	1010	Single Fam	1-3 family
ROY, OMER J	34	Tetu	4	1988	955	1973	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
COLLINS, JOY V	30	Tetu	4	3348	1267	1950	Hot Water	Oil	1010	Single Fam	1-3 family
DINGMAN, AL	24	Tetu	4	4685	2456	1973	Hot Water	Oil	1010	Single Fam	1-3 family
BLODGETT, ROBERT	6	Tetu	4	2717	1664	1934	Steam	Oil	1010	Single Fam	1-3 family
ADAIR, KENNETH	1543	Lost Nation	3A	3294	1274	1987	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
AKESSON, ROBERT	727	Lost Nation	3A	3294	1485	1977	Forced Hot Air	Oil	1010	Single Fam	1-3 family
ALDRICH, RONALD	1441	Lost Nation	3A	1492	720	1968	None	Coal or Wood	1010	Single Fam	1-3 family
SWEATT (ASH), MARION	1232	Lost Nation	3A	2346	960	1972	Hot Water	Oil	1010	Single Fam	1-3 family
FASS, RICHARD	400	Lost Nation	3A	2934	1208	1900	Forced Hot Air	Gas	1010	Single Fam	1-3 family
BERNARD, ULDRIC	1265	Lost Nation	3A	2872	1738	1979	Hot Water	Oil	1010	Single Fam	1-3 family
BOUCHARD, WALTER	1174	Lost Nation	3A	3076	1248	1965	Hot Water	Oil	1010	Single Fam	1-3 family
CHARBONNEAU, TIMOTHY	1142	Lost Nation	3A	3508	1432	1992	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
CALL, JOHN	1192	Lost Nation	3A	3556	1587	1967	Hot Water	Oil	1010	Single Fam	1-3 family
CANTIN, REYNOLD	1204	Lost Nation	3A	1776	888	1964	Hot Water	Oil	1010	Single Fam	1-3 family
SAVAGE, SHARON L	28	Lost Nation	3A	876	428	1950	None	Gas	1010	Single Fam	1-3 family
FONTAINE, CHRISTINA	1195	Lost Nation	3A	2354	1056	1971	Hot Water	Oil	1010	Single Fam	1-3 family
DURANT, KEVIN	403	Lost Nation	3A	1092	546	1965	None	Coal or Wood	1010	Single Fam	1-3 family
CUNNINGHAM, MARY JANE	1257	Lost Nation	3A	2568	1196	1971	Forced Hot Air	Oil	1010	Single Fam	1-3 family
ARMSTRONG, JAMIE (DAMON)	1310	Lost Nation	3A	1704	840	1972	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
DAMON, MERLE	1284	Lost Nation	3A	3180	1512	1990	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BOIVIN, MARC	1292	Lost Nation	3A	2528	1188	2000	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
FACCONE, ROBERT P	1276	Lost Nation	3A	3270	1400	1989	Forced Hot Air	Oil	1010	Single Fam	1-3 family
DESAUTELS, ANDRE	234	Lost Nation	3A	2684	1204	1981	Hot Water	Oil	1030	Mobile Hom	1-3 family
DEYETTE, TYRONE J	869	Lost Nation	3A	2728	1648	1974	None	Coal or Wood	1010	Single Fam	1-3 family
DIFFENBACHER, JAMES	1573	Lost Nation	3A	2409	1012	1945	Forced Hot Air	Oil	1010	Single Fam	1-3 family
DOYLE, MATTHEW A	66	Lost Nation	3A	2360	1100	1971	Forced Hot Air	Oil	1010	Single Fam	1-3 family
FORTIER, DONALD	1318	Lost Nation	3A	4027	1281	1976	Forced Hot Air	Oil	1010	Single Fam	1-3 family
BALMORAL REALTY TRUST	1264	Lost Nation	3A	6519	4160	1972	Floor Furnace	Oil	1110	APT 4-UNT	Apt
BRYANT, ALLAN E	1266	Lost Nation	3A	3864	1904	1980	Forced Hot Air	Oil	1010	Single Fam	1-3 family
EMERSON JR, LESLIE Z		Lost Nation	3A	1152	480	1962	None	Coal or Wood	1010	Single Fam	1-3 family
FONTAINE, NELSON S	1139	Lost Nation	3A	2874	1215	1965	Hot Water	Coal or Wood	1010	Single Fam	1-3 family
MORRILL, TRACEY E	641	Lost Nation	3A	5178	1845	1880	None	Coal or Wood	1010	Single Fam	1-3 family
GILCRIS, RONAL C	1557	Lost Nation	3A	2168	864	1970	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GILMAN, THERESA M L	1254	Lost Nation	3A	3088	1500	1970	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GOULET, AIME A	1219	Lost Nation	3A	2256	1106	1850	Forced Hot Air	Oil	1010	Single Fam	1-3 family
GOULET, MARK	1201	Lost Nation	3A	2937	1456	1999	Hot Water	Oil	1010	Single Fam	1-3 family
GUILE, LARRY ALAN	336	Lost Nation	3A	2162	960	1975	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
CAOUETTE, ANDREW E	1180	Lost Nation	3A	3280	1002	1974	Hot Water	Oil	1010	Single Fam	1-3 family
HOLMES, CHRISTIAN	1403	Lost Nation	3A	2161	768	1970	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HOLMES, ALLEN E	1381	Lost Nation	3A	4074	1727	1985	Hot Water	Coal or Wood	1010	Single Fam	1-3 family
HURLBUTT, DAVID	550	Lost Nation	3A	3240	1362	1972	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
SKOUSEN, DANIEL	475	Lost Nation	3A	1658	989	1960	Hot Water	Oil	1010	Single Fam	1-3 family
BRONSON, KEITH	1326	Lost Nation	3A	2447	1056	1978	Forced Hot Air	Oil	1010	Single Fam	1-3 family
LIVINGSTONE, ERIC SEEGER		Lost Nation	3A	154	112	2006	None	Coal or Wood	1010	Single Fam	1-3 family
GREENE, WILLIAM C.	40	Lost Nation	3A	2828	1310	1970	Hot Water	Oil	1010	Single Fam	1-3 family
ROBINSON, MARK	1184	Lost Nation	3A	4348	1725	1965	Hot Water	Oil	1010	Single Fam	1-3 family

Owner's Name	Street No	Street Name	Area	Bldg Area Gross	Bldg Area Living	Ayb	Heat Type Desc	Heat Fuel Desc	Use Code	Use Descript	Utilization Grp
WILSON, ROBERT F	558	Lost Nation	3A	2248	1020	1974	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
BUSS, JAMES R	792	Lost Nation	3A	3415	1470	1900	Forced Hot Air	Oil	1010	Single Fam	1-3 family
REYNOLDS, MICHAEL	772	Lost Nation	3A	1800	864	1960	None	Coal or Wood	1010	Single Fam	1-3 family
MCDONOUGH, PATRICE	158	Lost Nation	3A	3148	1428	1840	None	Coal or Wood	1010	Single Fam	1-3 family
AYERS, CHARLES H JR	1240	Lost Nation	3A	2668	1104	1972	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CARTER, BRUCE	1447	Lost Nation	3A	2342	1610	1972	Hot Water	Oil	1010	Single Fam	1-3 family
GREEN, EVELYN L	1584	Lost Nation	3A	2760	1380	1990	Forced Hot Air	Oil	1010	Single Fam	1-3 family
DOWNING, GARY P	521	Lost Nation	3A	1092	540	1965	Hot Water	Oil	1010	Single Fam	1-3 family
NOYES, NORMA	1164	Lost Nation	3A	1484	672	1970	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
CENTNER, THOMAS	1448	Lost Nation	3A	2488	1188	2002	Hot Water	Oil	1010	Single Fam	1-3 family
NOWAK, MARK E		Lost Nation	3A	2153	990	1950	None	Coal or Wood	1010	Single Fam	1-3 family
COUTURE, VIRGINIA PELCHAT	1196	Lost Nation	3A	1957	932	1972	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
AKESSON, PATRICIA	718	Lost Nation	3A	2088	1008	1992	Forced Hot Air	Oil	1010	Single Fam	1-3 family
PHILLIPS, MICHAEL R	859	Lost Nation	3A	4016	2184	1880	Radiant	Oil	1010	Single Fam	1-3 family
ROGERS TRUST, JOHN P		Lost Nation	3A	476	238	1950	None	Coal or Wood	1010	Single Fam	1-3 family
TYLER, JIMMY	961	Lost Nation	3A	2142	960	1995	Hot Water	Oil	1010	Single Fam	1-3 family
SOUZA, THOMAS G		Lost Nation	3A	2189	924	1980	Electric	Electric	1030	Mobile Hom	1-3 family
SHORES, JOHN C	188	Lost Nation	3A	2343	1142	1850	Forced Hot Air	Oil	1010	Single Fam	1-3 family
PITTS, ARTHUR	689	Lost Nation	3A	3607	1722	1850	Floor Furnace	Gas	1010	Single Fam	1-3 family
PIVIN, ROBERT A	958	Lost Nation	3A	2712	1170	1979	Hot Water	Oil	1010	Single Fam	1-3 family
PLUNKETT, JOHN EDWARD	134	Lost Nation	3A	2830	1387	1903	Hot Water	Oil	1010	Single Fam	1-3 family
REYNOLDS, DANIEL	873	Lost Nation	3A	1920	960	1970	Hot Water	Oil	1010	Single Fam	1-3 family
GRACIE, HEATHER J	907	Lost Nation	3A	1648	809	1900	Hot Water	Oil	1010	Single Fam	1-3 family
SAVAGE, JEFFREY	30	Lost Nation	3A	1015	500	1950	Electric	Electric	1010	Single Fam	1-3 family
LAURINO, PATRICIA ANN	1	Lost Nation	3A	5404	2037	1792	Hot Water	Oil	1010	Single Fam	1-3 family
ST ONGE, MICHAEL & KATHY A	1435	Lost Nation	3A	3128	1451	1850	Forced Hot Air	Oil	1010	Single Fam	1-3 family
RUSKOWSKI, DEBORAH L	824	Lost Nation	3A	3324	1740	1875	Hot Water	Oil	1010	Single Fam	1-3 family
SAVAGE SR, DANIEL A	585	Lost Nation	3A	1976	931	1840	Forced Hot Air	Gas	1010	Single Fam	1-3 family
VIGER, GERARD	948	Lost Nation	3A	3378	1710	1890	None	Coal or Wood	1010	Single Fam	1-3 family
CHUMACK, ROBERT G	1305	Lost Nation	3A	5062	1877	1984	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
ALLEY, MAURICE L	580	Lost Nation	3A	3360	1512	1985	Forced Hot Air	Oil	1010	Single Fam	1-3 family
MELLETT, EDWIN	1165	Lost Nation	3A	3012	1368	1990	Forced Hot Air	Oil	1010	Single Fam	1-3 family
REXFORD, GARY	853	Lost Nation	3A	864	504	1980	None	Coal or Wood	1010	Single Fam	1-3 family
SLOCUM, PHILIP H	1279	Lost Nation	3A	1512	684	1972	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
HALL, CLIFTON	1333	Lost Nation	3A	9070	3986	1995	Forced Hot Air	Coal or Wood	3222	COMM BLDG	Comm&Public
CROMPTON, GERALD H	1367	Lost Nation	3A	2994	1353	1925	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CONOVER, KIMBERLY A	766	Lost Nation	3A	3121	1238	2004	None	Coal or Wood	1010	Single Fam	1-3 family
KING, JOHN	751	Lost Nation	3A	2168	1240	2002	None	Coal or Wood	1010	Single Fam	1-3 family
ST TIMOTHY'S CHURCH	87	Lost Nation	3A	1856	928	1925	None	Coal or Wood	9060	CHURCH ETC	MDL-9 Comm&Public
BACON, DONALD J	448	Lost Nation	3A	3474	1134	1991	Forced Hot Air	Oil	1010	Single Fam	1-3 family
VIKE, RICHARD J	1000	Lost Nation	3A	2600	1120	2005	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
BECKER, DANIEL W	791	Lost Nation	3A	3240	1890	1991	None	Coal or Wood	1010	Single Fam	1-3 family
REYNOLDS, TOBY	895	Lost Nation	3A	1732	858	1985	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BENOIT, RAYMOND J	814	Lost Nation	3A	2752	1296	1999	Hot Water	Oil	1010	Single Fam	1-3 family
FONTAINE, RICHARD L	296	Lost Nation	3A	960	432	1975	None	Coal or Wood	1010	Single Fam	1-3 family
LANGFORD, RICHARD M JR	856	Lost Nation	3A	2103	1102	1900	Hot Air-no Duc	Coal or Wood	1010	Single Fam	1-3 family
PUBLIC SERVICE CO. OF NH		Lost Nation	3A	0		0	None	Coal or Wood	4240	ELECSUBSTA	Comm&Public

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GREENE, WILLIAM C		Lost Nation	3A	216	108	1990	None	Coal or Wood	1010	Single Fam	1-3 family
GREENE, WILLIAM C	57	Lost Nation	3A	9008	4537	1990	Hot Water	Oil	1010	Single Fam	1-3 family
MCMANN JT TEN, MICHAEL W	608	Lost Nation	3A	2304	1176	1910	Forced Hot Air	Oil	1010	Single Fam	1-3 family
SAVAGE, JAMES	95	Lost Nation	3A	1968	960	1972	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
NORTHUMBERLAND, TOWN OF	1146	Lost Nation	3A	280	140	1995	Forced Hot Air	Gas	903C	MUNICPAL MDL-94	Comm&Public
AITKEN, HUGH	59	Lost Nation	3A	4525	2132	1875	Floor Furnace	Coal or Wood	1010	Single Fam	1-3 family
GRIES, DANIEL		Lost Nation	3A	2262	1131	2006	None	Coal or Wood	1010	Single Fam	1-3 family
NEWTON REVOCABLE TRUST, ANNE	55	Lost Nation	3A	4220	1908	1830	Forced Hot Air	Oil	1010	Single Fam	1-3 family
HAWKINS, CHRISTOPHER	26	Lost Nation	3A	5191	2620	1875	Hot Water	Oil	1010	Single Fam	1-3 family
KEENAN, JOSEPH T	79	Lost Nation	3A	6106	1855	1840	Hot Water	Oil	1010	Single Fam	1-3 family
FREEMAN, RUSSELL	50			3680	1280	2000	Hot Water	Oil	1010	Single Fam	1-3 family
STINSON, BENJAMIN	62			3008	1120	2005	Electric	Electric	1010	Single Fam	1-3 family
WHEELOCK, CHRISTOPHER	78			3598	1540	2006	Hot Water	Oil	1010	Single Fam	1-3 family
BURKE, JEREMY M	10			1980	1684	1975	Forced Hot Air	Oil	1010	Single Fam	1-3 family
PAQUETTE, ALBERT	40	South of		5783	2252	1989	Hot Water	Oil	1010	Single Fam	1-3 family
FAUTEUX, PHILIP JR	13	South of		3768	1574	2004	Forced Hot Air	Oil	1010	Single Fam	1-3 family
CLOUTIER, GERARD	54	South of		5296	2205	1990	Hot Water	Oil	1010	Single Fam	1-3 family
DUPUIS, JOHN	26	South of		4208	2000	1998	Hot Water	Oil	1010	Single Fam	1-3 family
TORREY JR, STEPHEN A	31	South of		5110	2225	1990	Hot Water	Oil	1010	Single Fam	1-3 family
GRAHAM, WAYNE W	41	South of		4576	1967	1999	Hot Water	Oil	1010	Single Fam	1-3 family
BROWN, RAY	14	South of		4024	1764	1999	Hot Water	Oil	1010	Single Fam	1-3 family
HUBER JR, GEORGE S	66			5838	2055	1979	Hot Water	Oil	1010	Single Fam	1-3 family
LABOSKY, ROBERT	57			5846	2536	1979	Hot Water	Oil	1010	Single Fam	1-3 family
COVELL FAMILY TRUST	9			4004	1974	1996	Hot Water	Oil	1010	Single Fam	1-3 family
SHANNON, BRADLEY	157			1904	832	1969	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BARNETT, WILBUR	86			1140	924	1976	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
BEESLEY, PAUL	108			1986	924	1981	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BICKFORD, MANNIX	71			1930	868	1977	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BREAULT, ANN CT	145			2223	864	1972	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
LOW, PATRICK	75			2184	1032	1981	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
LEIGHTON, MARK	149			2228	924	1981	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DAVIS, RANDALL S	82			2016	924	1986	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
GOULETTE, ARTHUR	100			2232	1102	1979	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
GULICK, RAYMOND	69			2304	1064	1987	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
BOUCHARD, PAUL	162			2656	1216	1999	Forced Hot Air	Gas	1030	Mobile Hom	1-3 family
HAMILTON, SCOTT	139			4022	1904	1999	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
HUNTINGTON, SIDNEY	78			1976	924	1979	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
KEGELES, BERTHA	51			4927	1688	1974	Hot Water	Oil	1010	Single Fam	1-3 family
PINETTE, PHILIP	144			1976	910	1985	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
CASSADY, GLENN A	169			3268	1682	1982	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
LANGLEY, DENNIS	91			1964	924	1983	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
KENISON, GREGORY E	152			1864	924	1985	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
MARDIN, STEVEN R	79			2196	1064	1999	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
DORR, TYLER	106			1856	924	1998	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
MCLAUGHLIN, PATRICK	87			1951	952	1992	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
HARVEY, CLAYTON R	107			2008	924	1980	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
WRIGHT, TAMMY M	165			1568	672	1976	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family

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BOYLE, JAMES	98			1764	840	1973	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
COLLINS, CHEREEN R	164			2408	1002	1978	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
LOW, PATRICK	158			1410	672	1972	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
MONAHAN JR, RODNEY J	95			2079	924	1984	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
TAYLOR, JOHN M	70			3056	1400	1976	Hot Water	Oil	1030	Mobile Hom	1-3 family
CASSADY, KATHLEEN MACKILLOP	110			1848	924	1978	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
NORTHUMBERLAND, TOWN OF	90			2032	924	1990	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BURNS, EMILY	104			1997	924	1990	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
HOLDEN, RONALD E	148			1428	672	1974	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
HOPKINS, MICHAEL J	101			2052	1008	1987	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
MCLAIN, MAC	109			1896	924	2000	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
HUNTINGTON, DAVID L JT TEN	161			1805	840	1984	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
FREGEAU, CAMILLE	38			3405	1444	1995	Hot Water	Oil	1010	Single Fam	1-3 family
FREGEAU, RAYMOND	48			7774	4672	1995	Hot Water	Oil	1010	Single Fam	1-3 family
GADWAH, VERN W	74			2152	1064	1997	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
RIVERS, LEORA	94			1924	952	1978	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
LEIGH, LORI	153			2140	1050	1968	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
PYCHEVICZ, JOSEPH	83			2128	1064	2000	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
COLEBANK, BARRY	154			2128	1064	2001	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
MORSE, WILBUR	99			672	672	1972	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
LEVESQUE, EUNICE	27			1656	1456	2007	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
HUNT, PHILIP B SR	24			2126	960	1989	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
REILLY, RICHARD R	22			1988	910	1989	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
HOPPS, ELIAS E JR	10			2144	960	1990	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
CHESSMAN, KEVIN	8			2074	1034	1990	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
WINN, MICHELLE	18			1068	940	1990	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
BOISSELLE, PAUL	12			2112	960	1991	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
PEREZ, REINALDO	13			1944	924	1992	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
ANDERSON, SCOTT B	23			2040	924	1977	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BATCHELDER 2004 REVOC TRUST, S	5			2042	1021	1989	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
HAND, KAREN S	31			1792	896	2000	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
BOUDLE, LAWRENCE	3			1568	784	1993	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
ROCK, WENDELL E	14			1888	938	1995	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
WARD, DEBORAH	9			1800	780	1972	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BEATON, WENDY	11			2646	1188	2000	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
CASS, STEPHEN K	25			2088	960	1995	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
BEDELL, JOHN A	30			2604	1152	1998	Forced Hot Air	Gas	1030	Mobile Hom	1-3 family
HARTLEN, BARBARA	29			2336	1088	1997	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
STUART, JAY	4			2128	1064	2000	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
WRIGHT, DAVID	20			1892	896	1998	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
SZURLEY, JUDITH A	33			1171	1011	1992	Forced Hot Air	Gas	1030	Mobile Hom	1-3 family
JOHNSTON, DAVID	7			2418	1164	1996	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
PEDRICK, THOMAS A	35			1064	1064	2005	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
YOUNG, ARLENE E	100			2173	1010	1990	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
VERRATTI, JENNIE	118			3436	1040	1965	Forced Hot Air	Oil	1010	Single Fam	1-3 family
STYLES, MARK W	109			3187	1324	1962	Hot Water	Oil	1010	Single Fam	1-3 family
CONNARY, ERVIN	116			4119	2374	1935	Hot Water	Oil	1010	Single Fam	1-3 family

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DUPUIS, GARY	101			8177	4422	1930	Hot Water	Oil	1110	APT 4-UNT	Apt
STEVENS, BRIAN	102			2604	952	1965	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
BALOG, LAURETTE	120			2574	806	1934	Forced Hot Air	Oil	1010	Single Fam	1-3 family
DUNHAM, CATHY A	110			1588	728	1977	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DUPUIS, BERNARD	99			2204	982	1955	Forced Hot Air	Oil	1010	Single Fam	1-3 family
SPENCER, DAVID L	146			11122	5381	1900	Hot Water	Oil	1110	APT 4-UNT	Apt
GONYER 2002 FAMILY TRUST	89			5531	2679	1886	Hot Water	Oil	1010	Single Fam	1-3 family
COOK, RICHARD K JR	126			3272	1428	1900	Hot Water	Oil	1010	Single Fam	1-3 family
NOYES, DWIGHT D	150			4690	2371	1806	Forced Hot Air	Oil	1010	Single Fam	1-3 family
STEWART FAMILY TRUST, WM & JOA	147			41100	27300	1950	None	Coal or Wood	4010	IND WHSES	Comm&Public
GLOVER, NATHAN J	112			3386	1643	1935	Hot Water	Oil	1010	Single Fam	1-3 family
ST LAURENT, JAMES	66			3351	2313	1989	Forced Hot Air	Gas	1010	Single Fam	1-3 family
FOSTER, EDDIE J	60			3684	1416	1987	Forced Hot Air	Gas	1010	Single Fam	1-3 family
MACDOW JOINT REVOCABLE TRUST	85			3298	1234	1973	Hot Water	Oil	1010	Single Fam	1-3 family
STEWART FAMILY TRUST, WM & JOA	141			6766	2982	1930	Hot Water	Oil	1110	APT 4-UNT	Apt
CASEY REALTY TRUST, R & R	125			5208	2640	1850	Hot Water	Oil	1050	THREE FAM	1-3 family
LEIGHTON, OWEN R	133			1857	852	1985	Hot Water	Oil	1030	Mobile Hom	1-3 family
MEUNIER TRUST, THE DAWN E	93			3709	1400	1900	Hot Water	Oil	1010	Single Fam	1-3 family
OAKES, KENNETH	94			3264	1440	1977	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
SHANNON, FRED	135			3906	1721	1800	Forced Hot Air	Oil	1010	Single Fam	1-3 family
DUNCAN, PAMELA	106			3109	1734	1900	Hot Water	Oil	1010	Single Fam	1-3 family
FRANK, AMY E (HALL)	41			3452	1392	1979	Hot Water	Oil	1010	Single Fam	1-3 family
PELLETIER, BRUCE	119			5109	2352	1989	Hot Water	Oil	1010	Single Fam	1-3 family
YORK, REX E	63			3164	1076	1936	Hot Water	Oil	1010	Single Fam	1-3 family
MAHONEY, PAUL J	138			2064	924	1983	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DUPUIS, HARVEY	123			2789	672	1997	None	Coal or Wood	1010	Single Fam	1-3 family
KNAPP, JOHN A	131			2394	1072	1985	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
PERRAS ACE INC	40			1928	840	1987	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
PERRAS REVOCABLE TRUST 1993	45			44477	21132	1998	Forced Hot Air	Oil	3130	LUMBER YRD	Comm&Public
NORTHUMBERLAND, TOWN OF	17			288	144	1995	Electric	Electric	903C	MUNICPAL MDL-94	Comm&Public
HAND, DANIEL	6			1944	924	1995	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
AKESSON, ROBERT	3			2449	1188	1995	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
NORTHUMBERLAND, TOWN OF	10			2244	1064	1995	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
EMERSON, MADELENE	5			2244	1104	2000	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
MONAHAN, JEREMY	8			1392	1296	2006	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
TIPPITT, TIMONEE L	9			1920	924	1984	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
CARON, BEAU M	8			1592	776	1984	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
RICE JR, HARRY LEE	11			1668	814	1970	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
BARTLETT, KENNETH	18			1860	924	1986	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
PHELPS, FREDERICK	14			2206	1008	1974	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
MCLEAN, EDWARD	7			1884	924	1986	Forced Hot Air	Gas	1030	Mobile Hom	1-3 family
SINGER, GAIL	10			1536	704	1969	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
DAMON, TINA M	13			2976	1344	1995	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
DOWLAND, EDWARD	23			2934	1426	1978	Hot Water	Oil	1030	Mobile Hom	1-3 family
GRANT, KAREN L	13			3022	1008	1974	Hot Water	Oil	1010	Single Fam	1-3 family
GLADUE, THEODORE W	12			2656	1152	1973	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
REYNOLDS, ROBIN	5			2840	1008	1973	Hot Water	Oil	1010	Single Fam	1-3 family

Owner's Name	Street No	Street Name	Area	Bldg Area Gross	Bldg Area Living	Ayb	Heat Type Desc	Heat Fuel Desc	Use Code	Use Descript	Utilization Grp
WHITE, MINNIE	6			2294	1315	1973	Hot Water	Oil	1010	Single Fam	1-3 family
GAGNE, JERRY L	18			2200	1022	1986	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
SIMONDS IRREVOC TRUST, A & L	29			3798	1421	1979	Hot Water	Oil	1010	Single Fam	1-3 family
BURT, RENE P	43			3742	1404	1989	Hot Water	Oil	1010	Single Fam	1-3 family
GEMME, CHARLES	32			3968	1754	1935	Hot Water	Oil	1010	Single Fam	1-3 family
MASON, COREY E	8			3600	1680	2005	Hot Water	Oil	1010	Single Fam	1-3 family
GOULET, TODD D	16			5536	3708	1976	Hot Water	Oil	1010	Single Fam	1-3 family
PAQUETTE, DONALD	13			4559	1990	1977	Hot Water	Oil	1010	Single Fam	1-3 family
FONTAINE, LEONARD	30			2032	1244	1975	Hot Water	Oil	1010	Single Fam	1-3 family
LEPINE, GERARD	10			2965	1560	1975	Hot Water	Oil	1010	Single Fam	1-3 family
SUTHERLAND, TIMOTHY W	10			2608	1280	2004	Forced Hot Air	Coal or Wood	1010	Single Fam	1-3 family
PRESCOTT, DONALD C	35			3228	1428	2004	Forced Hot Air	Oil	1010	Single Fam	1-3 family
ROSSETTO, ALAN C	23			4974	2304	2005	Hot Water	Gas	1010	Single Fam	1-3 family
HOWSON, KIM A	56			3200	1440	2005	Hot Water	Oil	1010	Single Fam	1-3 family
MARSHALL, CAROL	17			2272	1052	1979	Forced Hot Air	Coal or Wood	1031	Trailer	1-3 family
BOISSONNAULT, LUC	23			1216	564	1972	Forced Hot Air	Coal or Wood	1030	Mobile Hom	1-3 family
NORTHUMBERLAND, TOWN OF	36			2816	1408	1990	Forced Hot Air	Oil	903C	MUNICPAL MDL-94	Comm&Public
JANEWAY, ELIZABETH C				1537	594	1998	None	Coal or Wood	1010	Single Fam	1-3 family
WAUSAU PAPERS OF NH INC.				0		0	None	Coal or Wood	4000	FACTORY	Comm&Public
LURVEY JT TEN, ELEANOR L	294			2505	1164	1970	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
COLEMAN, JOHN	287			2400	1062	1958	None	Coal or Wood	1010	Single Fam	1-3 family
DWYER, AUGUSTUS	97			472	144	2002	None	Coal or Wood	1010	Single Fam	1-3 family
GRIES, ELLEN	282			3064	1371	1969	None	Coal or Wood	1010	Single Fam	1-3 family
GONYER, ROBERT CLYDE	346			2016	1176	1999	None	Coal or Wood	1010	Single Fam	1-3 family
MENZIES, DOUGLAS	339			2234	1117	1960	Electric	Electric	1010	Single Fam	1-3 family
SNELL, ROBERT A	123			2790	1220	1991	Hot Water	Oil	1010	Single Fam	1-3 family
LARSON, ROBERT H	359			2655	960	1967	Hot Water	Oil	1010	Single Fam	1-3 family
GRIFFITH, ANTHONY W	62			1826	825	1981	None	Coal or Wood	1010	Single Fam	1-3 family
BURT, MARY DYSON	85			785	360	1970	None	Coal or Wood	1010	Single Fam	1-3 family
GONYER, ROBERT CLYDE	348			2548	1112	1989	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
GOULART, ARNOLD F	98			2931	1440	2004	Hot Water	Oil	1010	Single Fam	1-3 family
CARON, HOLLY	6			2316	1176	1953	Hot Water	Oil	1010	Single Fam	1-3 family
GOULET, BRIAN J	10			2388	1008	1957	Hot Water	Oil	1010	Single Fam	1-3 family
HALL, BLAINE	5			3114	1820	1900	Hot Water	Oil	1010	Single Fam	1-3 family
MERRILL, JUANITA	3			2997	953	1950	Hot Water	Oil	1010	Single Fam	1-3 family
GAGNON, ALAN W	12			2370	1075	1972	Hot Water	Oil	1010	Single Fam	1-3 family
TILTON, STEPHEN	67			3178	1470	1900	Hot Water	Oil	1010	Single Fam	1-3 family
DELSESTO, MICHAEL J				204	204	1995	None	Coal or Wood	1010	Single Fam	1-3 family
GONYER, ZELDA				1440	840	2003	None	Gas	1010	Single Fam	1-3 family
MARSHALL, ANDREW E	55			2844	1170	1978	Hot Water	Oil	1010	Single Fam	1-3 family
PERRAS LUMBER INC.				2011	882	2001	None	Coal or Wood	1010	Single Fam	1-3 family
BENNETT, AARON	239			3261	1444	1976	Hot Water	Oil	1010	Single Fam	1-3 family
BERUBE, JOSEPH	266			2865	1260	1900	Hot Water	Oil	1010	Single Fam	1-3 family
JOHNSTON, ALEXANDER D	265			9517	2405	1850	Hot Water	Oil	1110	APT 4-UNT	Apt
CLOUTIER, MARK F	285			3722	1196	1984	Hot Water	Oil	1010	Single Fam	1-3 family
SYRIAC IRREVOC TRUST OF 1992	358			592	192	1991	None	Coal or Wood	1010	Single Fam	1-3 family
CRAWFORD, RAYMOND	221			3444	1251	1950	Forced Hot Air	Oil	1010	Single Fam	1-3 family

Owner's Name	Street No	Street Name	Area	Bldg Area Gross	Bldg Area Living	Ayb	Heat Type Desc	Heat Fuel Desc	Use Code	Use Descript	Utilization Grp
GILCRIS, MICHAEL	422			2592	1232	1970	Hot Water	Oil	1030	Mobile Hom	1-3 family
GILCRIS, KURT	434			4028	1720	1800	Hot Water	Oil	1010	Single Fam	1-3 family
GOULD, BETHANY	40			5285	2331	1963	Hot Water	Oil	1010	Single Fam	1-3 family
EGAN, LEONARD	348			2096	923	1880	Hot Water	Oil	1010	Single Fam	1-3 family
GILCRIS, WAYNE	415			2250	1104	1970	Hot Water	Oil	1010	Single Fam	1-3 family
MCMANN, JUSTIN	201			3101	1456	1988	Hot Water	Oil	1010	Single Fam	1-3 family
MCMANN, STEPHEN H	317			4086	1400	1979	Hot Water	Oil	1010	Single Fam	1-3 family
ROUTHIER, GERARD	324			4570	1735	1979	Hot Water	Oil	1010	Single Fam	1-3 family
RIENDEAU, MONA	360			6650	3152	1840	Forced Hot Air	Oil	1010	Single Fam	1-3 family
WHITING, NORMAN	401			4518	1894	1970	Hot Water	Oil	1010	Single Fam	1-3 family
GOULET, WAYNE	16			2368	1048	1975	Hot Water	Oil	1010	Single Fam	1-3 family
OLSON, HAROLD	81			2802	1288	1984	Forced Hot Air	Oil	1010	Single Fam	1-3 family
ASH, RONALD K JR	43			2725	1242	1996	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
HAAS, SCOTT (JTROS)	95			3642	1568	2000	Hot Water	Oil	1010	Single Fam	1-3 family
DUPUIS, RICHARD	107			4768	2120	2000	Hot Water	Oil	1010	Single Fam	1-3 family
NORTHUMBERLAND, TOWN OF	7			9600	4800	1975	Hot Water	Oil	903C	MUNICPAL MDL-94	Comm&Public
WHEELOCK, PATRICK	16			3230	1465	2005	Hot Water	Oil	1010	Single Fam	1-3 family
NELSON, DOUG	21-29			1888	924	1995	Forced Hot Air	Oil	1030	Mobile Hom	1-3 family
NELSON, DOUG	10			8269	3540	1900	Forced Hot Air	Oil	1040	TWO FAMILY	1-3 family
1.006				3.696.806	1.834.389	1938	All				All

Totals - buildings	Totals sq ft	Totals sq ft	Avg	Criteria	Criteria	Criteria
1.006	3.696.806	1.834.389	1938	All		All
						All
534	1.711.191	801.919	1938	Hot Water	All	1-3 family
381	965.051	451.935	1953	Not Hot Water	All	1-3 family
14	112.219	61.635	1918	Hot Water	All	Apt
1	6.519	4.160	1972	Not Hot Water	All	Apt
30	402.004	234.911	1936	Hot Water	All	Comm&Public
46	499.822	279.829	1828	Not Hot Water	All	Comm&Public

Appendix 8: Model for Economic and Financial Appraisal

The appendix shows the 3 scenarios A1, A2 and A2 with financial balance for the district heating company after 10 years and accumulation of assets for full system renewal after 20 years.

District Heating Project in Groveton, New Hampshire, USA
All prices in fixed prices - year 2008 US units

Scenario 1A: Heat supply to larger buildings in district 1 of the town

Fuel parametres		
Waste wood water content		45%
Waste wood heating value	MMBtu/t	8,06
Light fuel oil heating value	MMBtu/g	0,131
Boiler efficiencies		
Waste wood boiler		94%
Fuel oil boiler		92%
Individual boilers		85%
Specific operation and maintenance costs		
Waste wood boiler, fixed cost	1000 $/yr	10
Fuel oil boiler, variable cost	$/MMBtu	0,60
Administration of DH company	1000 $/yr	40
Distribution network	$/MMBtu	0,30
Customers' heat exchangers (CHE)	$/MMBtu	0,90
Individual oil boiler	$/MMBtu	3,00
Fuel prices		
Wast wood price	$/t	40
Annual real price increase		2%
Light fuel oil price	$/g	4,00
Annual real price increase		2%
Heat sales price to customers	$/MMBtu	**28**
Annual real price increase		0%

	Unit	NPV	*0* 2008	*1* 2009	*2* 2010	*3* 2011	*4* 2012	*5* 2013	*6* 2014	*7* 2015	*8* 2016	*9* 2017	*10* 2018	*15* 2023	*20* 2028
Discount Rate 5%															
Discount Factor		13,5	1,000	0,952	0,907	0,864	0,823	0,784	0,746	0,711	0,677	0,645	0,614	0,481	0,377
Fuel costs in fixed prices															
Waste wood	$/t	47,42	40,00	40,80	41,62	42,45	43,30	44,16	45,05	45,95	46,87	47,80	48,76	53,83	59,44
Light fuel oil	$/g	4,75	4,00	4,08	4,17	4,25	4,33	4,42	4,51	4,60	4,69	4,79	4,88	5,39	5,95

Development of district heating

Market share of district heating		*1st year*													
No of customers		*70%*		57	62	67	71	76	81	81	81	81	81	81	81
Building area	sqft	*75%*		257.694	274.989	292.284	309.579	326.874	344.168	344.168	344.168	344.168	344.168	344.168	344.168
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Space heating	MBtu/sqft		52	52	52	52	52	52	52	52	52	52	52	52	52
DHW	MBtu/sqft		17	17	17	17	17	17	17	17	17	17	17	17	17

	Unit	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028
Net heat demand	MMBtu	282.946		17.971	19.178	20.384	21.590	22.796	24.002	24.002	24.002	24.002	24.002	24.002	24.002
Heat distribution losses	MMBtu	7,7%		1.799	1.839	1.879	1.919	1.959	1.999	1.999	1.999	1.999	1.999	1.999	1.999
Heat production demand	MMBtu			19.770	21.016	22.263	23.509	24.755	26.001	26.001	26.001	26.001	26.001	26.001	26.001
Heat production of boiler house															
Waste wood boiler	MMBtu			19.276	20.361	21.446	22.531	23.616	24.701	24.701	24.701	24.701	24.701	24.701	24.701
Fuel oil boiler	MMBtu			494	655	817	978	1.139	1.300	1.300	1.300	1.300	1.300	1.300	1.300
Fuel consumption of boiler house															
Waste wood	MMBtu			20.506	21.661	22.815	23.969	25.123	26.277	26.277	26.277	26.277	26.277	26.277	26.277
Light fuel oil	MMBtu			537	712	888	1.063	1.238	1.413	1.413	1.413	1.413	1.413	1.413	1.413
Waste wood	t			2.545	2.688	2.832	2.975	3.118	3.261	3.261	3.261	3.261	3.261	3.261	3.261
Light fuel oil	gallon			4.095	5.431	6.766	8.101	9.437	10.772	10.772	10.772	10.772	10.772	10.772	10.772
Investments in district heating system															
Boiler plant	1000 $	1.300	1.300												
Distribution network	1000 $	1.917	1.749	39	39	39	39	39							
Service lines (included in network)	1000 $	0		0	0	0	0	0	0						
Customers' heat exchangers (CHE)	1000 $	626		504	35	35	35	35	35						
Sum	1000 $	3.843	3.049	543	74	74	74	74	35						
Scrap value in 2028 (after 20 years' operation)															
Boiler plant (20 years liftetime)	1000 $	0	0												
Distribution network (40 years)	1000 $	-372	-874	-20	-21	-22	-23	-24							
Service lines (40 years)	1000 $			0	0	0	0	0	0						
CHE (20 years)	1000 $	-23	0	-25	-4	-5	-7	-9	-11						
Sum	1000 $	-395	-874	-46	-25	-28	-30	-33	-11						
Operation and maintenance costs															
Waste wood	1000 $	1.871		104	112	120	129	138	147	150	153	156	159	176	194
Light fuel oil	1000 $	570		17	23	29	35	42	49	50	51	52	53	58	64
Administration	1000 $	498		40	40	40	40	40	40	40	40	40	40	40	40
O&M of boilers	1000 $	133		10	10	10	11	11	11	11	11	11	11	11	11
O&M of distribution network	1000 $	92		6	6	7	7	7	8	8	8	8	8	8	8
O&M of CHE's	1000 $	277		18	19	20	21	22	23	23	23	23	23	23	23
Total O&M costs	1000 $	3.442		195	210	226	243	260	277	281	285	289	294	316	340
Net present value/20 years	1000 $	6.890													
Balance heat sales price	$/MMBtu	24													
Annual balance for the district heating company															
Heat sales price (in fixed prices)	$/MMBtu	27	28	28	28	28	28	28	28	28	28	28	28	25	22
Real interest rate (in fixed prices)			4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Income															
Heat sale	1000 $	7.644		508	542	576	610	644	679	679	679	679	679	604	537

	Unit	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028
Expenses															
Investments excl. CHE	1000 $	3.217	3.049	39	39	39	39	39	0						
Administration	1000 $	498		40	40	40	40	40	40	40	40	40	40	40	40
Fuels costs	1000 $	2.441		121	135	149	164	179	195	199	203	207	212	234	258
O&M costs	1000 $	133		10	10	10	11	11	11	11	11	11	11	11	11
Capital expenses (interest costs)	1000 $	638	61	118	111	102	92	81	68	54	39	24	8	0	0
Sum expenses	1000 $	6.928	3.110	328	335	340	346	350	315	304	293	282	270	284	309
Annual balance	1000 $	716	-3.110	180	208	236	265	294	364	374	385	397	408	319	229
Accumulated balance	1000 $		-3.110	-2.930	-2.722	-2.487	-2.222	-1.928	-1.564	-1.190	-805	-408	0	1.788	3.110

Typical average customer / single family house

Building area	sqft			1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400
Heat demand	MMBtu	1.217		98	98	98	98	98	98	98	98	98	98	98	98
Existing heat supply (excl. reinvestments)															
Light fuel oil	$/MMBtu		36	37	37	38	39	40	40	41	42	43	44	48	53
Operation and maintenace	$/MMBtu			3	3	3	3	3	3	3	3	3	3	3	3
Sum	$/MMBtu			40	40	41	42	43	43	44	45	46	47	51	56
Investment	$														
Annual expenses	$	56.098		3.869	3.941	4.014	4.088	4.164	4.241	4.320	4.401	4.483	4.567	5.012	5.503
Average annual expenses	$	4.167													
Balance heat price	$/MMBtu	46													
New heat supply based on district heating (incl. investments)															
Purchase of heat	$/MMBtu		28	28	28	28	28	28	28	28	28	28	28	25	22
O&M costs of CHE	$/MMBtu			1	1	1	1	1	1	1	1	1	1	1	1
Sum	$/MMBtu			29	29	29	29	29	29	29	29	29	29	26	23
Investment	$		4.000												
Annual expenses	$	38.049	4.000	2.848	2.848	2.848	2.848	2.848	2.848	2.848	2.848	2.848	2.848	2.544	2.273
Average annual expenses	$	2.826													
Balance heat price	$/MMBtu	31													

Energy use of residual consumers without district heating

Residual consumers without district heating														
No. of consumers		1.006	949	944	939	935	930	925	925	925	925	925	925	925
Building area	sqft	1.834.390	1.576.696	1.559.401	1.542.106	1.524.811	1.507.516	1.490.221	1.490.221	1.490.221	1.490.221	1.490.221	1.490.221	1.490.221
Market share of individual oil-fired boilers														
Building area	sqft	1.496.840	1.239.146	1.224.620	1.210.094	1.195.569	1.181.043	1.166.517	1.166.517	1.166.517	1.166.517	1.166.517	1.166.517	1.166.517
Specific heat demand	MBtu/sqft	70	70	70	70	70	70	70	70	70	70	70	70	70
Use of oil, energy content	MMBtu	122.811	101.668	100.476	99.284	98.092	96.901	95.709	95.709	95.709	95.709	95.709	95.709	95.709

	Unit	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028
Market share of individual gas-fired boilers/furnaces															
Building area	sqft		121.484	121.484	119.377	117.269	115.161	113.054	110.946	110.946	110.946	110.946	110.946	110.946	110.946
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Use of gas, energy content	MMBtu		9.967	9.967	9.794	9.622	9.449	9.276	9.103	9.103	9.103	9.103	9.103	9.103	9.103
Market share of other individual energy sources															
Building area	sqft		216.066	216.066	215.405	214.743	214.081	213.420	212.758	212.758	212.758	212.758	212.758	212.758	212.758
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Use of other sources, content	MMBtu		17.728	17.728	17.673	17.619	17.565	17.510	17.456	17.456	17.456	17.456	17.456	17.456	17.456
Flue gas emissions															
		Sum													
District heating															
CO2 equivalents	t	3.356	0	92	110	128	146	163	181	181	181	181	181	181	181
SO2	lb	30.925	0	1.221	1.298	1.374	1.451	1.527	1.604	1.604	1.604	1.604	1.604	1.604	1.604
NOx	lb	110.270	0	4.374	4.642	4.910	5.178	5.446	5.715	5.715	5.715	5.715	5.715	5.715	5.715
Residual consumers without district heating															
CO2 equivalents	t	213.228	12.380	10.545	10.427	10.308	10.190	10.072	9.954	9.954	9.954	9.954	9.954	9.954	9.954
SO2	lb	411.812	21.126	19.995	19.886	19.778	19.670	19.561	19.453	19.453	19.453	19.453	19.453	19.453	19.453
NOx	lb	543.088	30.367	26.678	26.433	26.188	25.943	25.697	25.452	25.452	25.452	25.452	25.452	25.452	25.452
Total															
CO2 equivalents	t	216.584	12.380	10.637	10.537	10.436	10.336	10.235	10.135	10.135	10.135	10.135	10.135	10.135	10.135
SO2	lb	442.737	21.126	21.216	21.184	21.152	21.120	21.089	21.057	21.057	21.057	21.057	21.057	21.057	21.057
NOx	lb	653.358	30.367	31.052	31.075	31.098	31.121	31.144	31.167	31.167	31.167	31.167	31.167	31.167	31.167
Savings of emissions compared to reference															
CO2 equivalents	t	43.407	0	1.743	1.844	1.944	2.045	2.145	2.246	2.246	2.246	2.246	2.246	2.246	2.246
SO2	lb	905	0	-90	-58	-26	5	37	69	69	69	69	69	69	69
NOx	lb	-15.658	0	-686	-709	-731	-754	-777	-800	-800	-800	-800	-800	-800	-800

District Heating Project in Groveton, New Hampshire, USA
All prices in fixed prices - year 2008 US units

Scenario 1B: Heat supply to district 1 of the town

Fuel parametres		
Waste wood water content		45%
Waste wood heat value	MMBtu/t	8,06
Light fuel oil heat value	MMBtu/g	0,131
Boiler efficiencies		
Waste wood boiler		94%
Fuel oil boiler		92%
Individual boilers		85%
Specific operation and maintenance costs		
Waste wood boiler, fixed cost	1000 $/yr	10
Fuel oil boiler, variable cost	$/MMBtu	0,60
Administration of DH company	1000 $/yr	40
Distribution network	$/MMBtu	0,30
Customers' heat exchangers (CHE)	$/MMBtu	0,90
Individual oil boiler	$/MMBtu	3,00
Fuel prices		
Wast wood price	$/t	40
Annual real price increase		2%
Light fuel oil price	$/g	4,00
Annual real price increase		2%
Heat sales price to customers	$/MMBtu	**29**
Annual real price increase		0%

	Unit	NPV	*0* 2008	*1* 2009	*2* 2010	*3* 2011	*4* 2012	*5* 2013	*6* 2014	*7* 2015	*8* 2016	*9* 2017	*10* 2018	*15* 2023	*20* 2028
Discount Rate 5%															
Discount Factor		13,5	1,000	0,952	0,907	0,864	0,823	0,784	0,746	0,711	0,677	0,645	0,614	0,481	0,377
Fuel costs in fixed prices															
Waste wood	$/t	47,42	40,00	40,80	41,62	42,45	43,30	44,16	45,05	45,95	46,87	47,80	48,76	53,83	59,44
Light fuel oil	$/g	4,75	4,00	4,08	4,17	4,25	4,33	4,42	4,51	4,60	4,69	4,79	4,88	5,39	5,95

Development of district heating

Market share of district heating		*1st year*													
No of customers		*71%*		156	169	182	194	207	220	220	220	220	220	220	220
Building area	sqft	*74%*		419.275	449.197	479.120	509.042	538.965	568.888	568.888	568.888	568.888	568.888	568.888	568.888
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Space heating	MBtu/sqft		52	52	52	52	52	52	52	52	52	52	52	52	52
DHW	MBtu/sqft		17	17	17	17	17	17	17	17	17	17	17	17	17

	Unit	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028
Net heat demand	MMBtu	466.441		29.240	31.327	33.414	35.500	37.587	39.674	39.674	39.674	39.674	39.674	39.674	39.674
Heat distribution losses	MMBtu	*10,0%*		3.978	4.066	4.154	4.243	4.331	4.420	4.420	4.420	4.420	4.420	4.420	4.420
Heat production demand	MMBtu			33.218	35.393	37.568	39.743	41.919	44.094	44.094	44.094	44.094	44.094	44.094	44.094
Heat production of boiler house															
Waste wood boiler	MMBtu			32.387	34.288	36.188	38.088	39.989	41.889	41.889	41.889	41.889	41.889	41.889	41.889
Fuel oil boiler	MMBtu			830	1.105	1.380	1.655	1.930	2.205	2.205	2.205	2.205	2.205	2.205	2.205
Fuel consumption of boiler house															
Waste wood	MMBtu			34.455	36.476	38.498	40.520	42.541	44.563	44.563	44.563	44.563	44.563	44.563	44.563
Light fuel oil	MMBtu			903	1.201	1.500	1.799	2.098	2.396	2.396	2.396	2.396	2.396	2.396	2.396
Waste wood	t			4.276	4.527	4.778	5.029	5.280	5.531	5.531	5.531	5.531	5.531	5.531	5.531
Light fuel oil	gallon			6.881	9.158	11.436	13.713	15.991	18.268	18.268	18.268	18.268	18.268	18.268	18.268
Investments in district heating system															
Boiler plant	1000 $	1.500	1.500												
Distribution network	1000 $	3.430	3.129	70	70	70	70	70							
Service lines (additional)	1000 $	783		609	49	49	49	49	49						
Customers' heat exchangers (CHE)	1000 $	1.200		952	71	71	71	71	71						
Sum	1000 $	6.913	4.629	1.630	190	190	190	190	120						
Scrap value in 2028 (after 20 years' operation)															
Boiler plant (20 years liftetime)	1000 $	0	0												
Distribution network (40 years)	1000 $	-665	-1.565	-37	-38	-40	-42	-43							
Service lines (40 years)	1000 $			-320	-27	-28	-30	-31	-32						
CHE (20 years)	1000 $	-45	0	-48	-7	-11	-14	-18	-21						
Sum	1000 $	-886	-1.565	-404	-72	-79	-85	-92	-53						
Operation and maintenance costs															
Waste wood	1000 $	3.169		174	188	203	218	233	249	254	259	264	270	298	329
Light fuel oil	1000 $	966		28	38	49	59	71	82	84	86	87	89	98	109
Administration	1000 $	498		40	40	40	40	40	40	40	40	40	40	40	40
O&M of boilers	1000 $	139		10	11	11	11	11	11	11	11	11	11	11	11
O&M of distribution network	1000 $	156		10	11	11	12	13	13	13	13	13	13	13	13
O&M of CHE's	1000 $	468		30	32	34	36	38	40	40	40	40	40	40	40
Total O&M costs	1000 $	5.397		293	320	347	376	405	436	442	449	456	463	500	542
Net present value/20 years	1000 $	11.424													
Balance heat sales price	$/MMBtu	24													
Annual balance for the district heating company															
Heat sales price (in fixed prices)	$/MMBtu	27	29	29	29	29	29	29	29	29	29	29	29	24	19
Real interest rate (in fixed prices)			4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Income															
Heat sale	1000 $	12.548		850	911	971	1.032	1.093	1.153	1.153	1.153	1.153	1.153	937	761

	Unit	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028
Expenses															
Investments excl. CHE	1000 $	5.713	4.629	678	119	119	119	119	49						
Administration	1000 $	498		40	40	40	40	40	40	40	40	40	40	40	40
Fuels costs	1000 $	4.135		203	227	251	277	304	332	338	345	352	359	396	437
O&M costs	1000 $	139		10	11	11	11	11	11	11	11	11	11	11	11
Capital expenses (interest costs)	1000 $	1.083	93	191	189	176	160	142	121	96	70	42	14	0	0
Sum expenses	1000 $	11.569	4.722	1122	585	597	607	616	553	486	466	446	424	448	489
Annual balance	1000 $	979	-4.722	-272	325	375	425	477	600	668	687	708	729	490	272
Accumulated balance	1000 $		-4.722	-4.994	-4.668	-4.294	-3.869	-3.392	-2.792	-2.124	-1.437	-729	0	2.939	4.722

Typical average customer / single family house

Building area	sqft			1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400
Heat demand	MMBtu	1.217		98	98	98	98	98	98	98	98	98	98	98	98
Existing heat supply (excl. reinvestments)															
Light fuel oil	$/MMBtu		36	37	37	38	39	40	40	41	42	43	44	48	53
Operation and maintenace	$/MMBtu			3	3	3	3	3	3	3	3	3	3	3	3
Sum	$/MMBtu			40	40	41	42	43	43	44	45	46	47	51	56
Investment	$														
Annual expenses	$	56.098		3.869	3.941	4.014	4.088	4.164	4.241	4.320	4.401	4.483	4.567	5.012	5.503
Average annual expenses	$	4.167													
Balance heat price	$/MMBtu	46													
New heat supply based on district heating (incl. investments)															
Purchase of heat	$/MMBtu		29	29	29	29	29	29	29	29	29	29	29	24	19
O&M costs of CHE	$/MMBtu			1	1	1	1	1	1	1	1	1	1	1	1
Sum	$/MMBtu			30	30	30	30	30	30	30	30	30	30	25	20
Investment	$		4.000												
Annual expenses	$	37.977	4.000	2.926	2.926	2.926	2.926	2.926	2.926	2.926	2.926	2.926	2.926	2.394	1.961
Average annual expenses	$	2.821													
Balance heat price	$/MMBtu	31													

Energy use of residual consumers without district heating

Residual consumers without district heating														
No. of consumers		1.006	850	837	824	812	799	786	786	786	786	786	786	786
Building area	sqft	1.834.390	1.415.115	1.385.193	1.355.270	1.325.347	1.295.425	1.265.502	1.265.502	1.265.502	1.265.502	1.265.502	1.265.502	1.265.502
Market share of individual oil-fired boilers														
Building area	sqft	1.496.840	1.077.565	1.052.243	1.026.921	1.001.598	976.276	950.954	950.954	950.954	950.954	950.954	950.954	950.954
Specific heat demand	MBtu/sqft	70	70	70	70	70	70	70	70	70	70	70	70	70
Use of oil, energy content	MMBtu	122.811	88.411	86.333	84.255	82.178	80.100	78.023	78.023	78.023	78.023	78.023	78.023	78.023

	Unit	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028
Market share of individual gas-fired boilers/furnaces															
Building area	sqft		121.484	121.484	119.091	116.699	114.306	111.913	109.520	109.520	109.520	109.520	109.520	109.520	109.520
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Use of gas, energy content	MMBtu		9.967	9.967	9.771	9.575	9.378	9.182	8.986	8.986	8.986	8.986	8.986	8.986	8.986
Market share of other individual energy sources															
Building area	sqft		216.066	216.066	213.859	211.651	209.443	207.236	205.028	205.028	205.028	205.028	205.028	205.028	205.028
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Use of other sources, content	MMBtu		17.728	17.728	17.546	17.365	17.184	17.003	16.822	16.822	16.822	16.822	16.822	16.822	16.822
Flue gas emissions															
		Sum													
District heating															
CO2 equivalents	t	5.686	0	155	185	216	246	277	307	307	307	307	307	307	307
SO2	lb	52.387	0	2.052	2.185	2.319	2.452	2.586	2.720	2.720	2.720	2.720	2.720	2.720	2.720
NOx	lb	186.796	0	7.349	7.818	8.286	8.754	9.223	9.691	9.691	9.691	9.691	9.691	9.691	9.691
Residual consumers without district heating															
CO2 equivalents	t	182.899	12.380	9.394	9.190	8.985	8.781	8.577	8.373	8.373	8.373	8.373	8.373	8.373	8.373
SO2	lb	384.746	21.126	19.285	19.026	18.766	18.506	18.246	17.986	17.986	17.986	17.986	17.986	17.986	17.986
NOx	lb	478.545	30.367	24.366	23.905	23.445	22.984	22.524	22.064	22.064	22.064	22.064	22.064	22.064	22.064
Total															
CO2 equivalents	t	188.585	12.380	9.549	9.375	9.201	9.027	8.854	8.680	8.680	8.680	8.680	8.680	8.680	8.680
SO2	lb	437.134	21.126	21.337	21.211	21.085	20.958	20.832	20.706	20.706	20.706	20.706	20.706	20.706	20.706
NOx	lb	665.341	30.367	31.715	31.723	31.731	31.739	31.747	31.755	31.755	31.755	31.755	31.755	31.755	31.755
Savings of emissions compared to reference															
CO2 equivalents	t	71.405	0	2.832	3.005	3.179	3.353	3.527	3.701	3.701	3.701	3.701	3.701	3.701	3.701
SO2	lb	6.508	0	-211	-85	41	167	294	420	420	420	420	420	420	420
NOx	lb	-27.640	0	-1.348	-1.356	-1.364	-1.372	-1.380	-1.388	-1.388	-1.388	-1.388	-1.388	-1.388	-1.388

District Heating Project in Groveton, New Hampshire, USA
All prices in fixed prices - year 2008 US units

Scenario 2: Heat supply to district 1+2 of the town

Fuel parametres		
Waste wood water content		45%
Waste wood heat value	MMBtu/t	8,06
Light fuel oil heat value	MMBtu/g	0,131
Boiler efficiencies		
Waste wood boiler		94%
Fuel oil boiler		92%
Individual boilers		85%
Specific operation and maintenance costs		
Waste wood boiler, fixed cost	1000 $/yr	10
Fuel oil boiler, variable cost	$/MMBtu	0,60
Administration of DH company	1000 $/yr	40
Distribution network	$/MMBtu	0,30
Customers' heat exchangers (CHE)	$/MMBtu	0,90
Individual oil boiler	$/MMBtu	3,00
Fuel prices		
Wast wood price	$/t	40
Annual real price increase		2%
Light fuel oil price	$/g	4,00
Annual real price increase		2%
Heat sales price to customers	$/MMBtu	**35**
Annual real price increase		0%

	Unit	NPV	*0* 2008	*1* 2009	*2* 2010	*3* 2011	*4* 2012	*5* 2013	*6* 2014	*7* 2015	*8* 2016	*9* 2017	*10* 2018	*15* 2023	*20* 2028
Discount Rate 5%															
Discount Factor		13,5	1,000	0,952	0,907	0,864	0,823	0,784	0,746	0,711	0,677	0,645	0,614	0,481	0,377
Fuel costs in fixed prices															
Waste wood	$/t	47,42	40,00	40,80	41,62	42,45	43,30	44,16	45,05	45,95	46,87	47,80	48,76	53,83	59,44
Light fuel oil	$/g	4,75	4,00	4,08	4,17	4,25	4,33	4,42	4,51	4,60	4,69	4,79	4,88	5,39	5,95

Development of district heating

Market share of district heating		*1st year*													
No of customers		*65%*		279	309	338	368	397	427	427	427	427	427	427	427
Building area	sqft	*71%*		592.265	641.691	691.116	740.542	789.967	839.393	839.393	839.393	839.393	839.393	839.393	839.393
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Space heating	MBtu/sqft		52	52	52	52	52	52	52	52	52	52	52	52	52
DHW	MBtu/sqft		17	17	17	17	17	17	17	17	17	17	17	17	17

	Unit	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028
Net heat demand	MMBtu	683.301		41.304	44.751	48.198	51.645	55.092	58.539	58.539	58.539	58.539	58.539	58.539	58.539
Heat distribution losses	MMBtu	*15,0%*		9.280	9.486	9.693	9.899	10.105	10.311	10.311	10.311	10.311	10.311	10.311	10.311
Heat production demand	MMBtu			50.585	54.238	57.891	61.544	65.197	68.850	68.850	68.850	68.850	68.850	68.850	68.850
Heat production of boiler house															
Waste wood boiler	MMBtu			49.320	52.538	55.755	58.973	62.190	65.408	65.408	65.408	65.408	65.408	65.408	65.408
Fuel oil boiler	MMBtu			1.265	1.700	2.136	2.571	3.007	3.443	3.443	3.443	3.443	3.443	3.443	3.443
Fuel consumption of boiler house															
Waste wood	MMBtu			52.468	55.891	59.314	62.737	66.160	69.583	69.583	69.583	69.583	69.583	69.583	69.583
Light fuel oil	MMBtu			1.375	1.848	2.321	2.795	3.268	3.742	3.742	3.742	3.742	3.742	3.742	3.742
Waste wood	t			6.512	6.937	7.362	7.787	8.212	8.636	8.636	8.636	8.636	8.636	8.636	8.636
Light fuel oil	gallon			10.479	14.088	17.697	21.306	24.915	28.525	28.525	28.525	28.525	28.525	28.525	28.525
Investments in district heating system															
Boiler plant	1000 $	1.800	1.800												
Distribution network	1000 $	7.048	6.430	143	143	143	143	143							
Service lines (additional)	1000 $	1.882		1.332	149	149	149	149	149						
Customers' heat exchangers (CHE)	1000 $	1.956		1.468	135	135	135	135	135						
Sum	1000 $	12.686	8.230	2.942	427	427	427	427	284						
Scrap value in 2028 (after 20 years' operation)															
Boiler plant (20 years liftetime)	1000 $	0	0												
Distribution network (40 years)	1000 $	-1.366	-3.215	-75	-79	-82	-86	-89							
Service lines (40 years)	1000 $			-699	-82	-86	-89	-93	-97						
CHE (20 years)	1000 $	-79	0	-73	-14	-20	-27	-34	-41						
Sum	1000 $	-1.877	-3.215	-848	-174	-188	-202	-216	-137						
Operation and maintenance costs															
Waste wood	1000 $	4.929		266	289	313	337	363	389	397	405	413	421	465	513
Light fuel oil	1000 $	1.506		43	59	75	92	110	129	131	134	136	139	154	170
Administration	1000 $	498		40	40	40	40	40	40	40	40	40	40	40	40
O&M of boilers	1000 $	147		11	11	11	12	12	12	12	12	12	12	12	12
O&M of distribution network	1000 $	243		15	16	17	18	20	21	21	21	21	21	21	21
O&M of CHE's	1000 $	728		46	49	52	55	59	62	62	62	62	62	62	62
Total O&M costs	1000 $	8.051		420	463	508	555	603	652	663	673	684	695	753	818
Net present value/20 years	1000 $	18.860													
Balance heat sales price	$/MMBtu	28													
Annual balance for the district heating company															
Heat sales price (in fixed prices)	$/MMBtu	32	35	35	35	35	35	35	35	35	35	35	35	26	20
Real interest rate (in fixed prices)			4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Income															
Heat sale	1000 $	21.485		1.438	1.558	1.678	1.798	1.918	2.038	2.038	2.038	2.038	2.038	1.540	1.164

	Unit	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028
Expenses															
Investments excl. CHE	1000 $	10.730	8.230	1.475	292	292	292	292	149						
Administration	1000 $	498		40	40	40	40	40	40	40	40	40	40	40	40
Fuels costs	1000 $	6.435		308	347	388	429	473	518	528	539	549	560	619	683
O&M costs	1000 $	147		11	11	11	12	12	12	12	12	12	12	12	12
Capital expenses (interest costs)	1000 $	2.009	165	344	348	326	299	269	231	185	134	81	27	0	0
Sum expenses	1000 $	19.819	8.394	2178	1038	1056	1072	1085	949	765	724	683	640	671	735
Annual balance	1000 $	1.666	-8.394	-740	520	622	727	834	1.089	1.274	1.314	1.356	1.399	870	429
Accumulated balance	1000 $		-8.394	-9.134	-8.614	-7.991	-7.265	-6.431	-5.342	-4.068	-2.754	-1.399	0	5.408	8.394
Typical average customer / single family house															
Building area	sqft			1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400	1.400
Heat demand	MMBtu	1.217		98	98	98	98	98	98	98	98	98	98	98	98
Existing heat supply (excl. reinvestments)															
Light fuel oil	$/MMBtu		36	37	37	38	39	40	40	41	42	43	44	48	53
Operation and maintenace	$/MMBtu			3	3	3	3	3	3	3	3	3	3	3	3
Sum	$/MMBtu			40	40	41	42	43	43	44	45	46	47	51	56
Investment	$														
Annual expenses	$	56.098		3.869	3.941	4.014	4.088	4.164	4.241	4.320	4.401	4.483	4.567	5.012	5.503
Average annual expenses	$	4.167													
Balance heat price	$/MMBtu	46													
New heat supply based on district heating (incl. investments)															
Purchase of heat	$/MMBtu		35	35	35	35	35	35	35	35	35	35	35	26	20
O&M costs of CHE	$/MMBtu			1	1	1	1	1	1	1	1	1	1	1	1
Sum	$/MMBtu			36	36	36	36	36	36	36	36	36	36	27	21
Investment	$		4.000												
Annual expenses	$	43.614	4.000	3.488	3.488	3.488	3.488	3.488	3.488	3.488	3.488	3.488	3.488	2.657	2.029
Average annual expenses	$	3.240													
Balance heat price	$/MMBtu	36													
Energy use of residual consumers without district heating															
Residual consumers without district heating															
No. of consumers			1.006	727	697	668	638	609	579	579	579	579	579	579	579
Building area	sqft		1.834.390	1.242.124	1.192.699	1.143.273	1.093.848	1.044.422	994.997	994.997	994.997	994.997	994.997	994.997	994.997
Market share of individual oil-fired boilers															
Building area	sqft		1.496.840	904.574	863.323	822.071	780.820	739.568	698.317	698.317	698.317	698.317	698.317	698.317	698.317
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Use of oil, energy content	MMBtu		122.811	74.217	70.833	67.448	64.064	60.679	57.295	57.295	57.295	57.295	57.295	57.295	57.295

	Unit	NPV	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2023	2028
Market share of individual gas-fired boilers/furnaces															
Building area	sqft		121.484	121.484	117.032	112.581	108.129	103.677	99.225	99.225	99.225	99.225	99.225	99.225	99.225
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Use of gas, energy content	MMBtu		9.967	9.967	9.602	9.237	8.872	8.506	8.141	8.141	8.141	8.141	8.141	8.141	8.141
Market share of other individual energy sources															
Building area	sqft		216.066	216.066	212.344	208.622	204.900	201.177	197.455	197.455	197.455	197.455	197.455	197.455	197.455
Specific heat demand	MBtu/sqft		70	70	70	70	70	70	70	70	70	70	70	70	70
Use of other sources, content	MMBtu		17.728	17.728	17.422	17.117	16.811	16.506	16.201	16.201	16.201	16.201	16.201	16.201	16.201

Flue gas emissions

		Sum													
District heating															
CO2 equivalents	t	8.861	0	236	285	333	382	431	480	480	480	480	480	480	480
SO2	lb	81.563	0	3.125	3.349	3.573	3.798	4.022	4.246	4.246	4.246	4.246	4.246	4.246	4.246
NOx	lb	290.822	0	11.191	11.980	12.768	13.556	14.344	15.132	15.132	15.132	15.132	15.132	15.132	15.132
Residual consumers without district heating															
CO2 equivalents	t	147.023	12.380	8.162	7.825	7.489	7.153	6.816	6.480	6.480	6.480	6.480	6.480	6.480	6.480
SO2	lb	354.944	21.126	18.526	18.094	17.663	17.231	16.799	16.367	16.367	16.367	16.367	16.367	16.367	16.367
NOx	lb	403.729	30.367	21.890	21.132	20.374	19.616	18.858	18.100	18.100	18.100	18.100	18.100	18.100	18.100
Total															
CO2 equivalents	t	155.884	12.380	8.398	8.110	7.822	7.535	7.247	6.959	6.959	6.959	6.959	6.959	6.959	6.959
SO2	lb	436.507	21.126	21.651	21.443	21.236	21.028	20.821	20.613	20.613	20.613	20.613	20.613	20.613	20.613
NOx	lb	694.550	30.367	33.081	33.111	33.141	33.171	33.202	33.232	33.232	33.232	33.232	33.232	33.232	33.232
Savings of emissions compared to reference															
CO2 equivalents	t	104.106	0	3.983	4.270	4.558	4.846	5.133	5.421	5.421	5.421	5.421	5.421	5.421	5.421
SO2	lb	7.135	0	-525	-317	-110	97	305	512	512	512	512	512	512	512
NOx	lb	-56.850	0	-2.714	-2.745	-2.775	-2.805	-2.835	-2.865	-2.865	-2.865	-2.865	-2.865	-2.865	-2.865

Appendix 9: Charts with Project Key Figures

The charts show the 3 scenarios A1, A2 and A2 and are based on the calculations from Appendix 8.

Chart 1: Scenario 1A
Heated floor area (in thousand square feet) by different energy sources

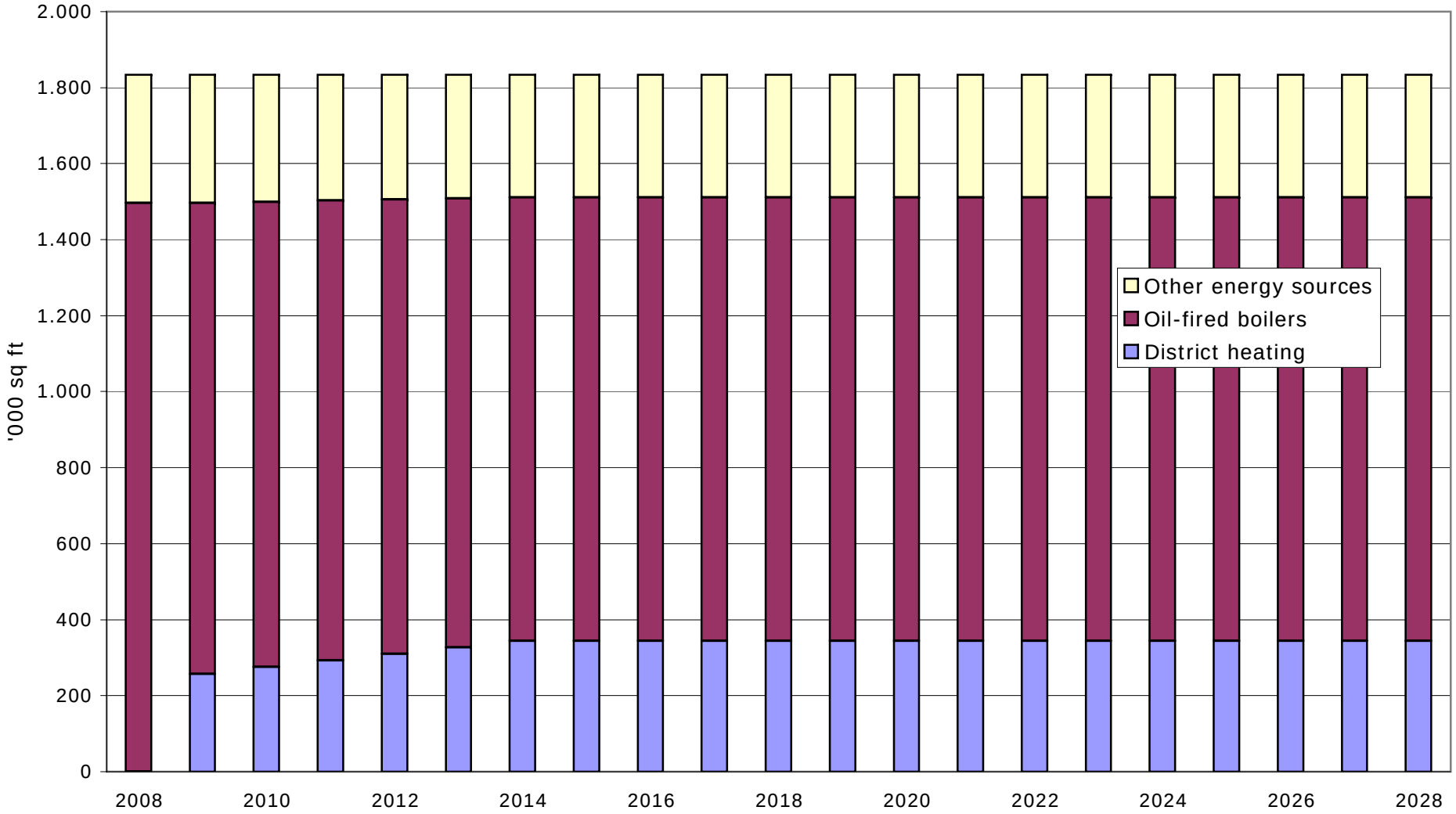


Chart 1: Scenario 1B
Heated floor area (in thousand square feet) by different energy sources

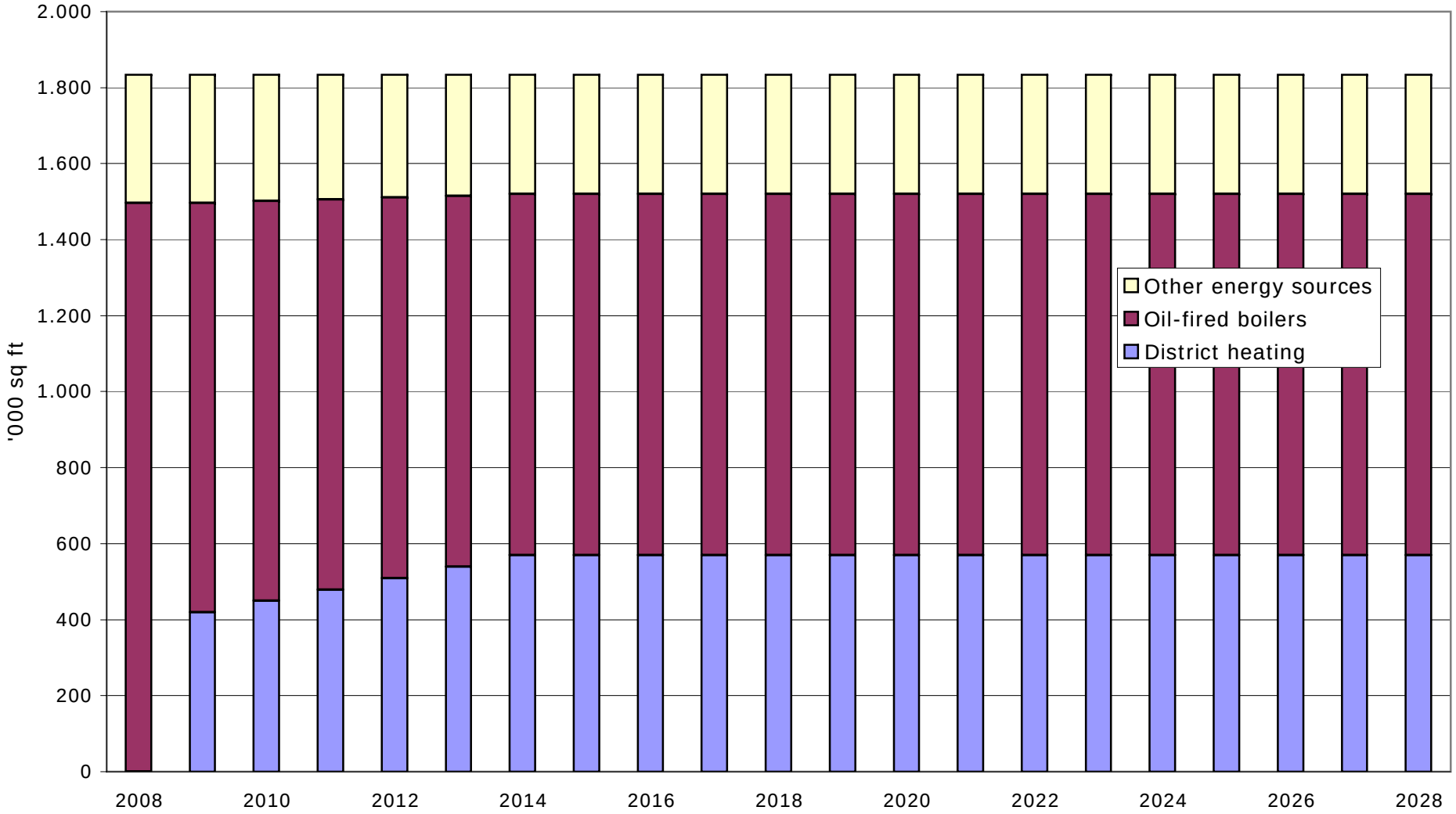


Chart 1: Scenario 2
Heated floor area (in thousand square feet) by different energy sources

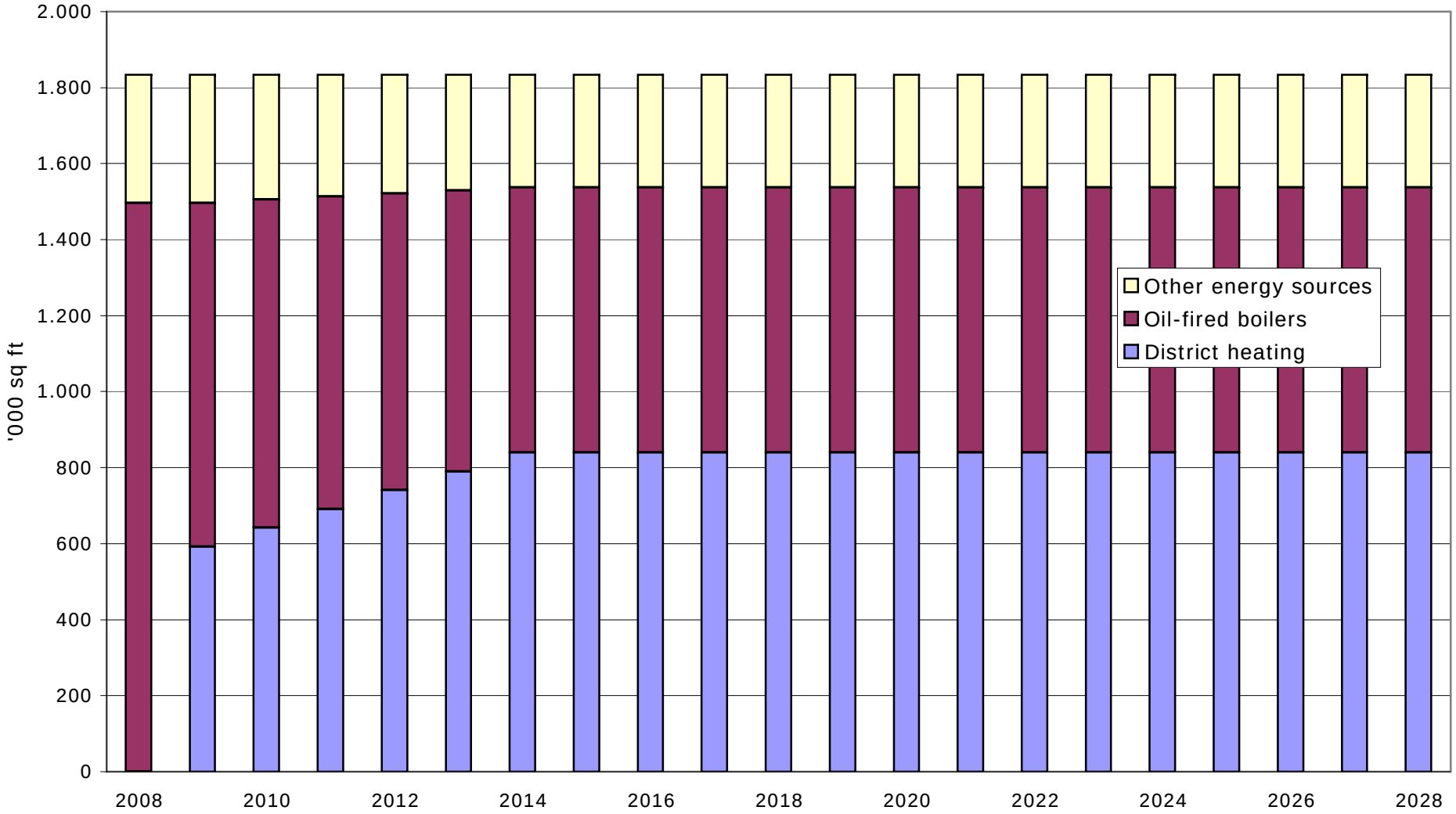


Chart 2: Scenario 1A

The DH Company's heat sales price and accumulated balance
providing: accumulated balance after 10 years and assets for full system renewal after 20 years

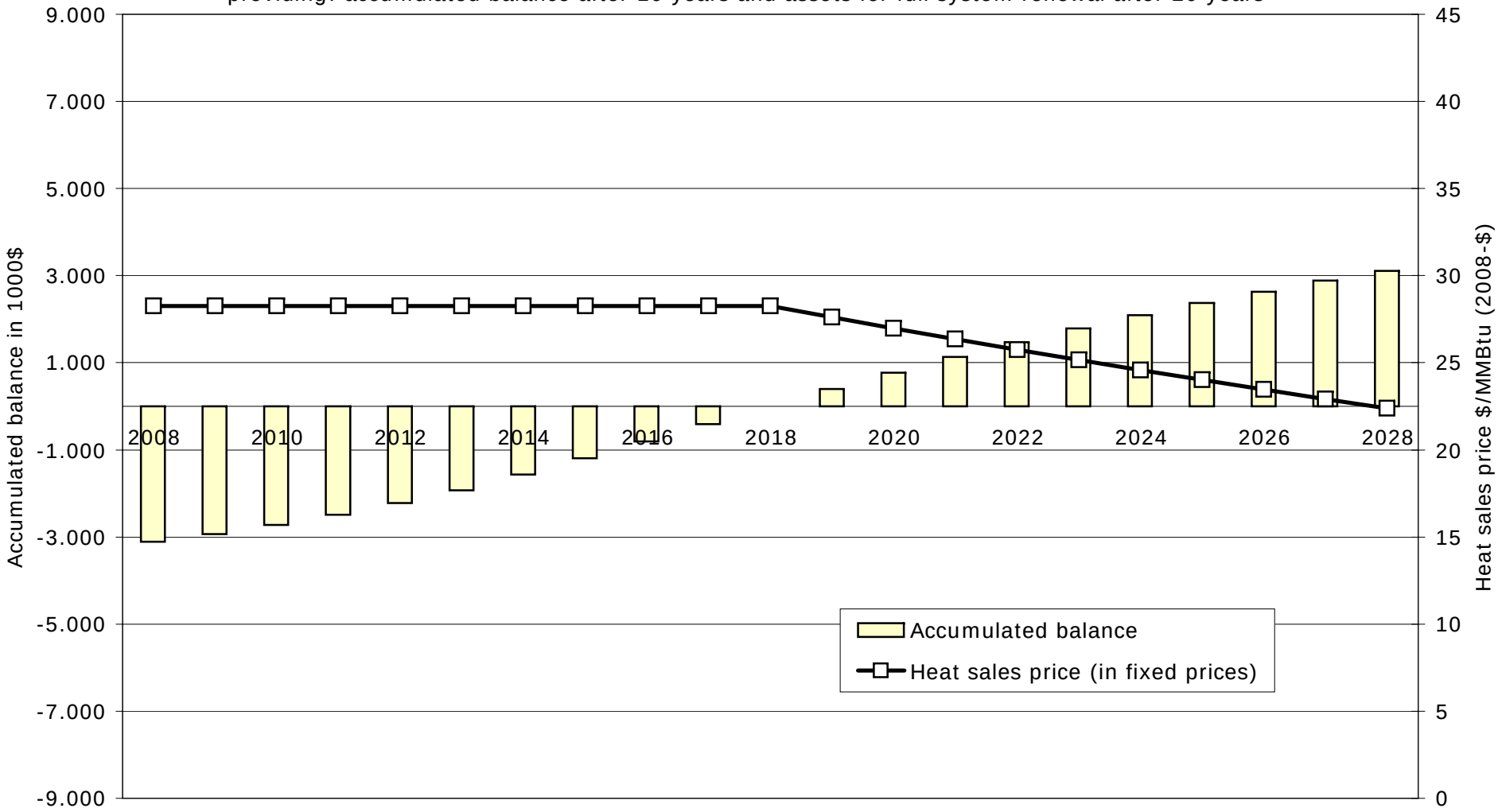


Chart 2: Scenario 1B

The DH Company's heat sales price and accumulated balance
providing: accumulated balance after 10 years and assets for full system renewal after 20 years

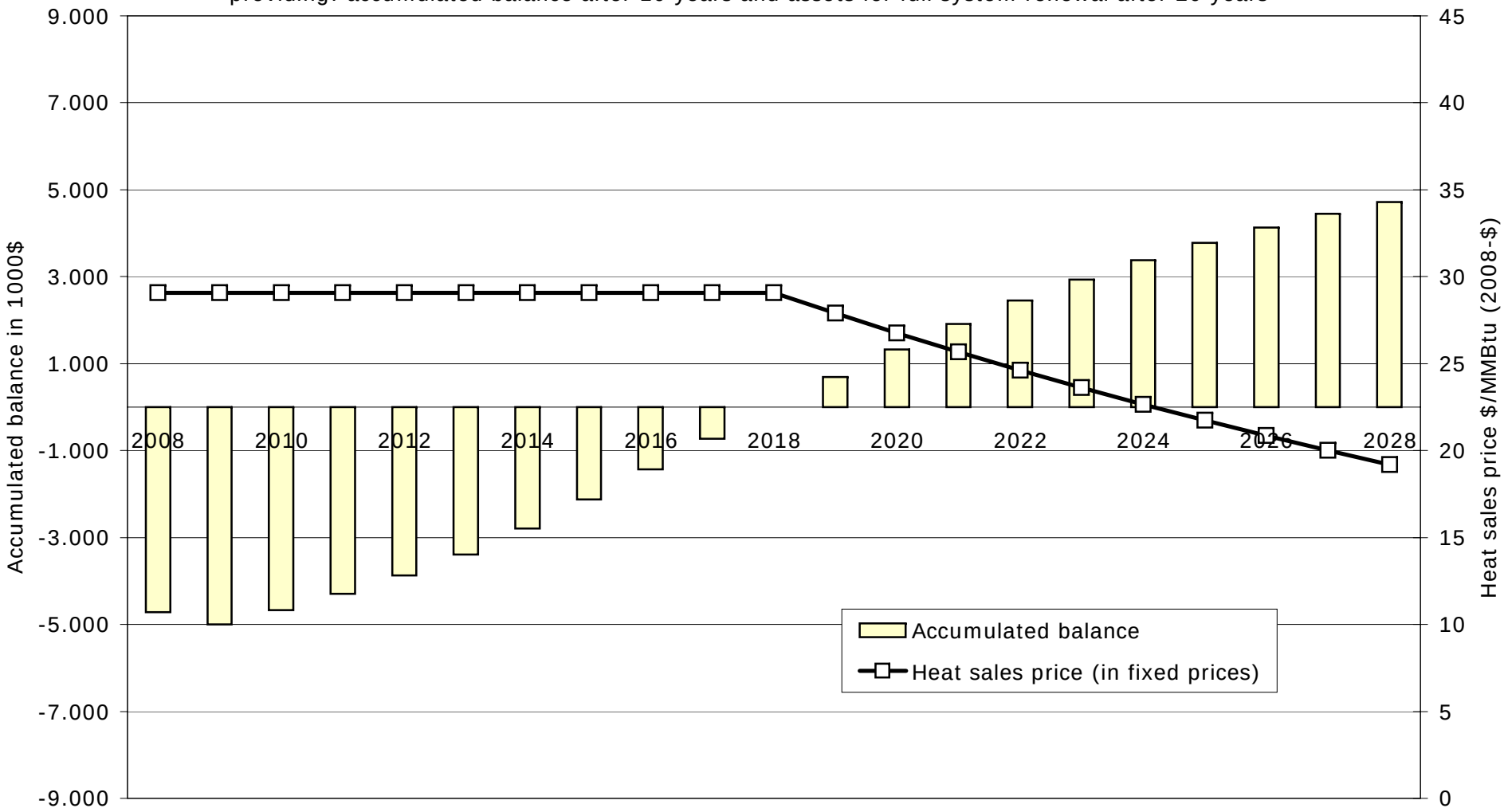


Chart 2: Scenario 2

The DH Company's heat sales price and accumulated balance
providing: accumulated balance after 10 years and assets for full system renewal after 20 years

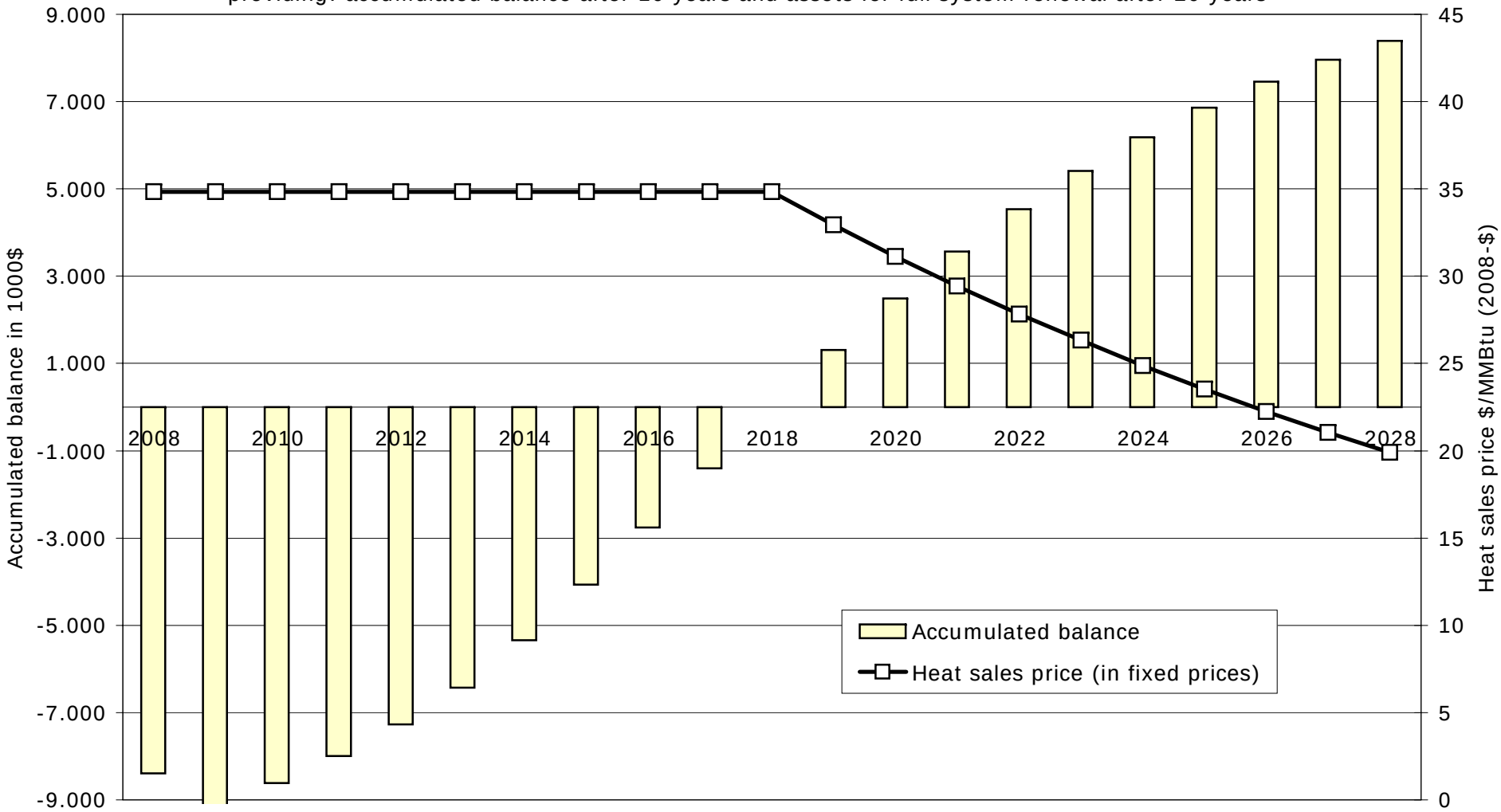
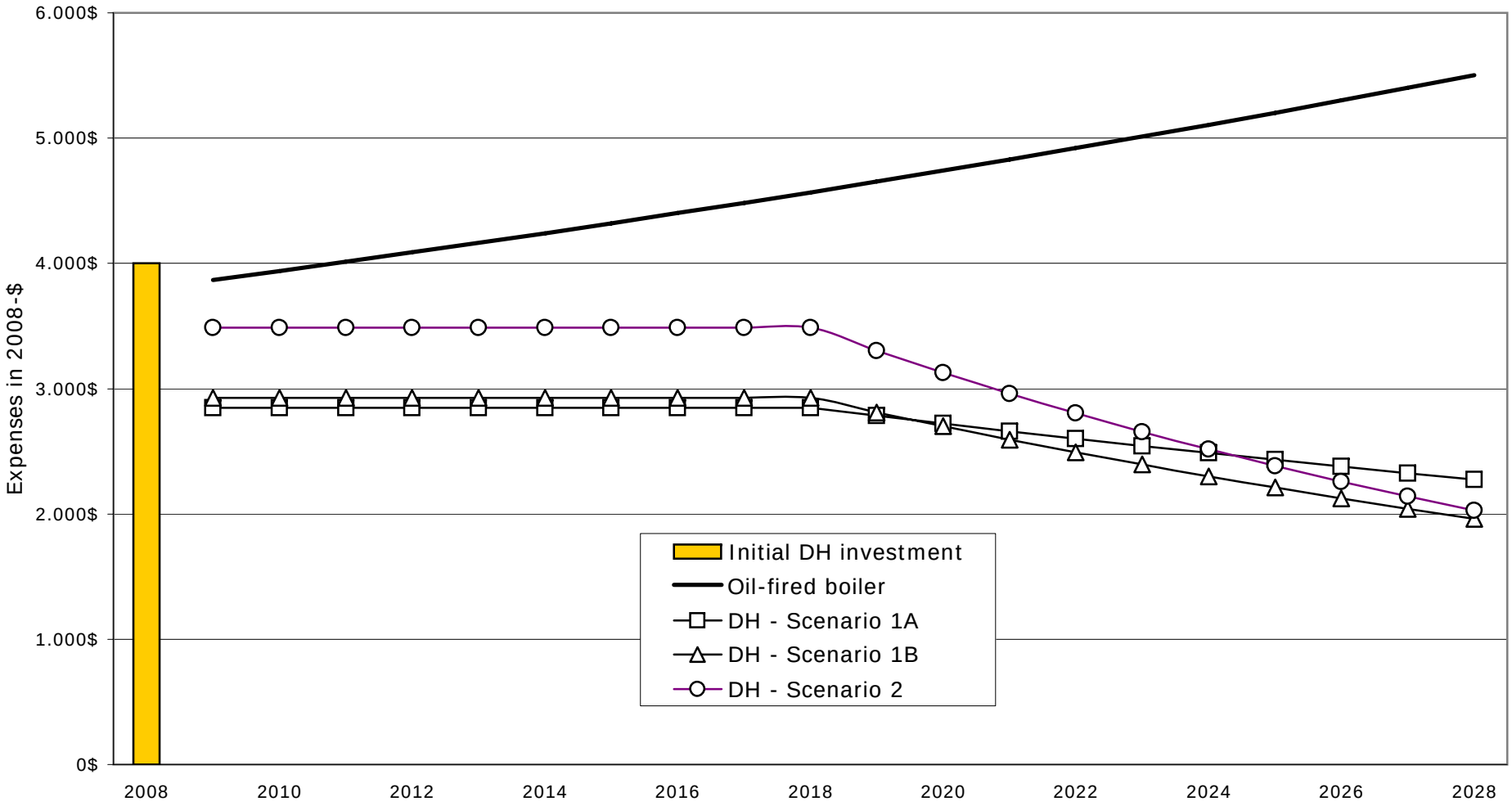


Chart 3: Initial and annual heating expenses for a single-family household - provided that:
the district heating company obtains full debt repayment after 10 years
and accumulates assets for full system renewal after 20 years



Char 4: Scenario 1A
Total annual flue gas emissions - tons CO2 equvivalents

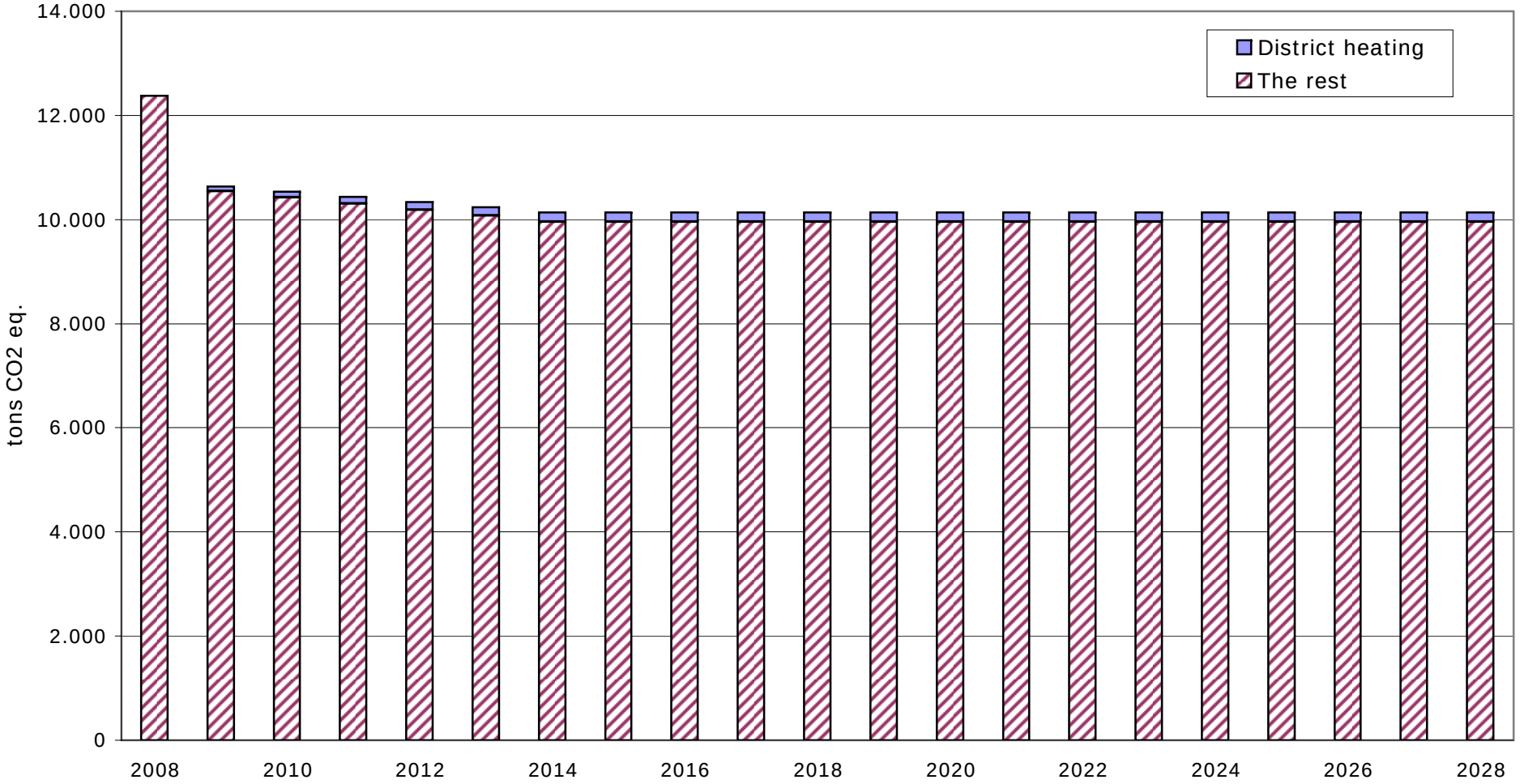


Chart 4: Scenario 1B
Total annual flue gas emissions - tons CO2 equivalents

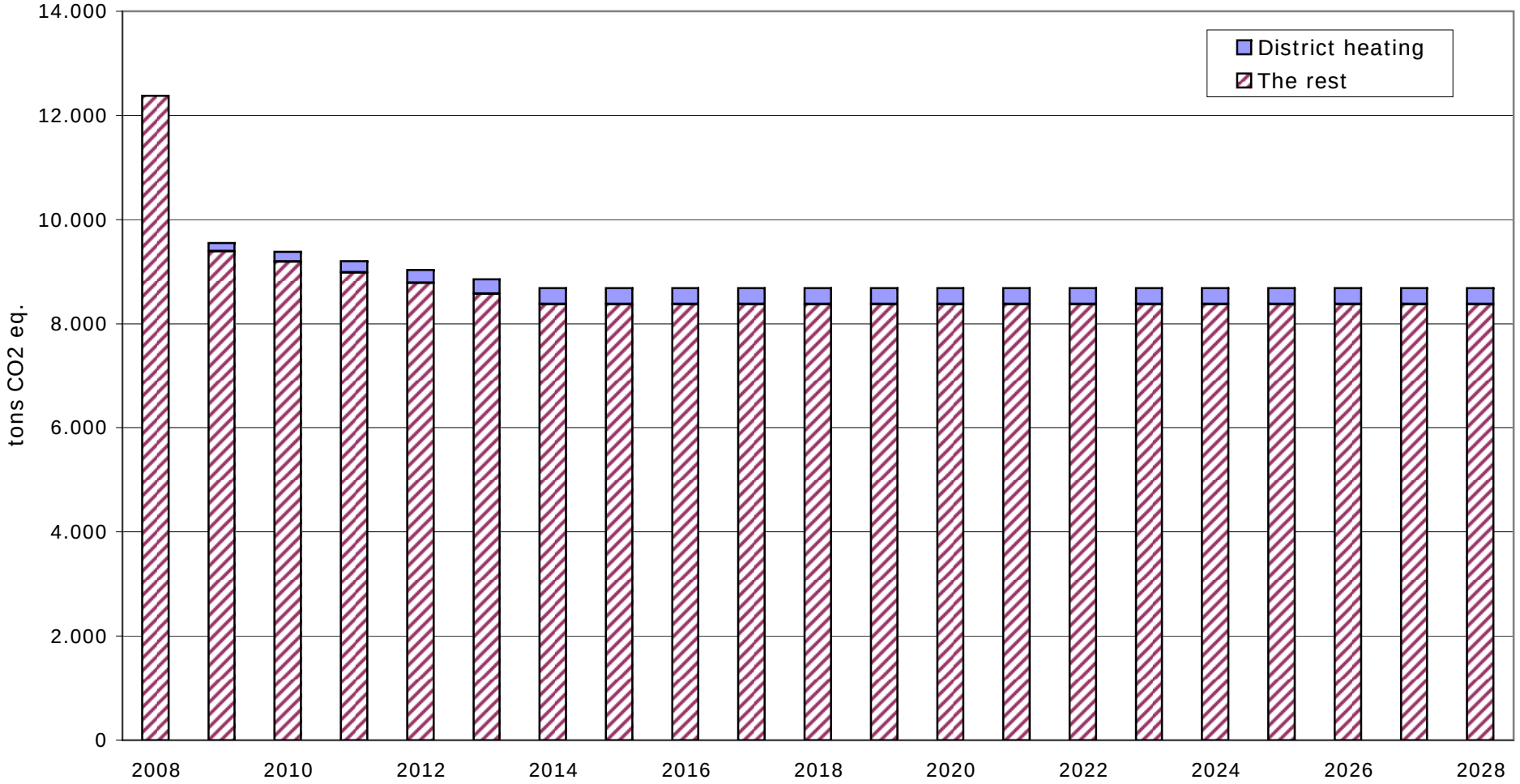


Chart 4: Scenario 2
Total annual flue gas emissions - tons CO2 equivalents