District Heating
A Pipe Dream or Reality?

- Drivers
- Analysis
- Way forward

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Objectives

- Review potential projects and discuss future development opportunities
- Analysis of key barriers and identification of potential solutions.
- Produce a concise key policy requirements

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Nenagh Town

- Drivers
- Analysis
- Way forward

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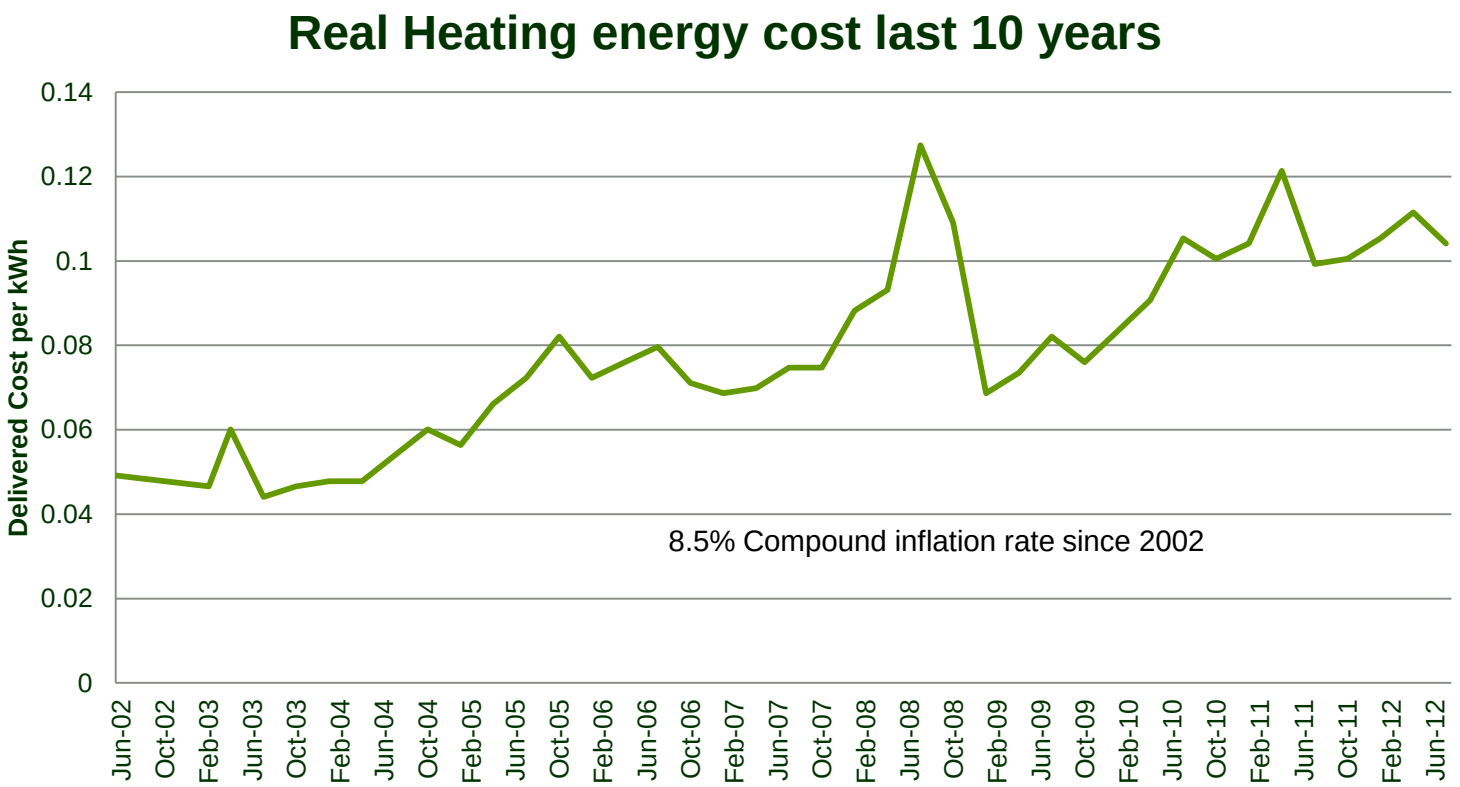
Why DH

- Oil heating Ireland paying 12-14c/kWh



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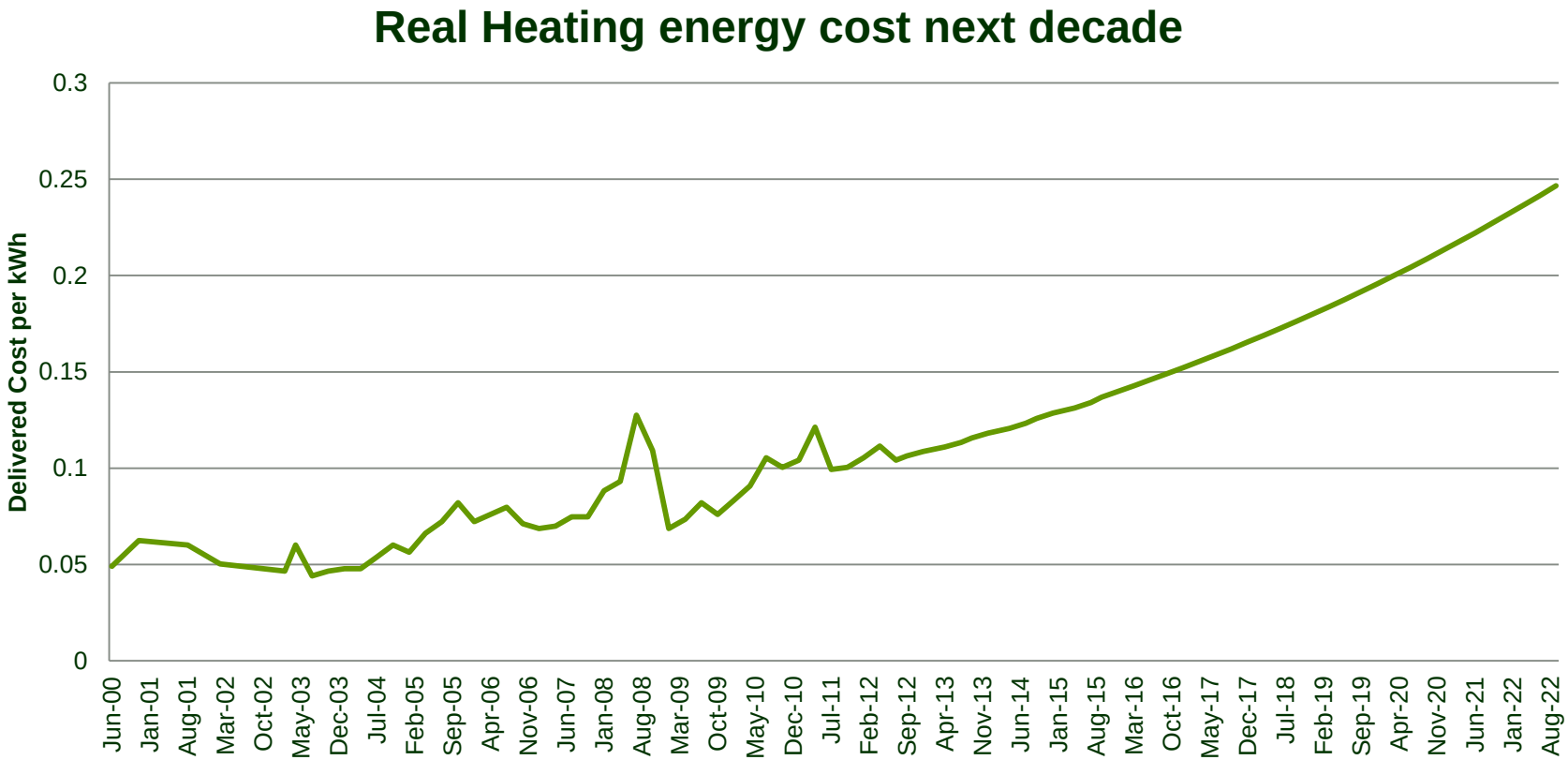
Why DH

- Next 10 years?



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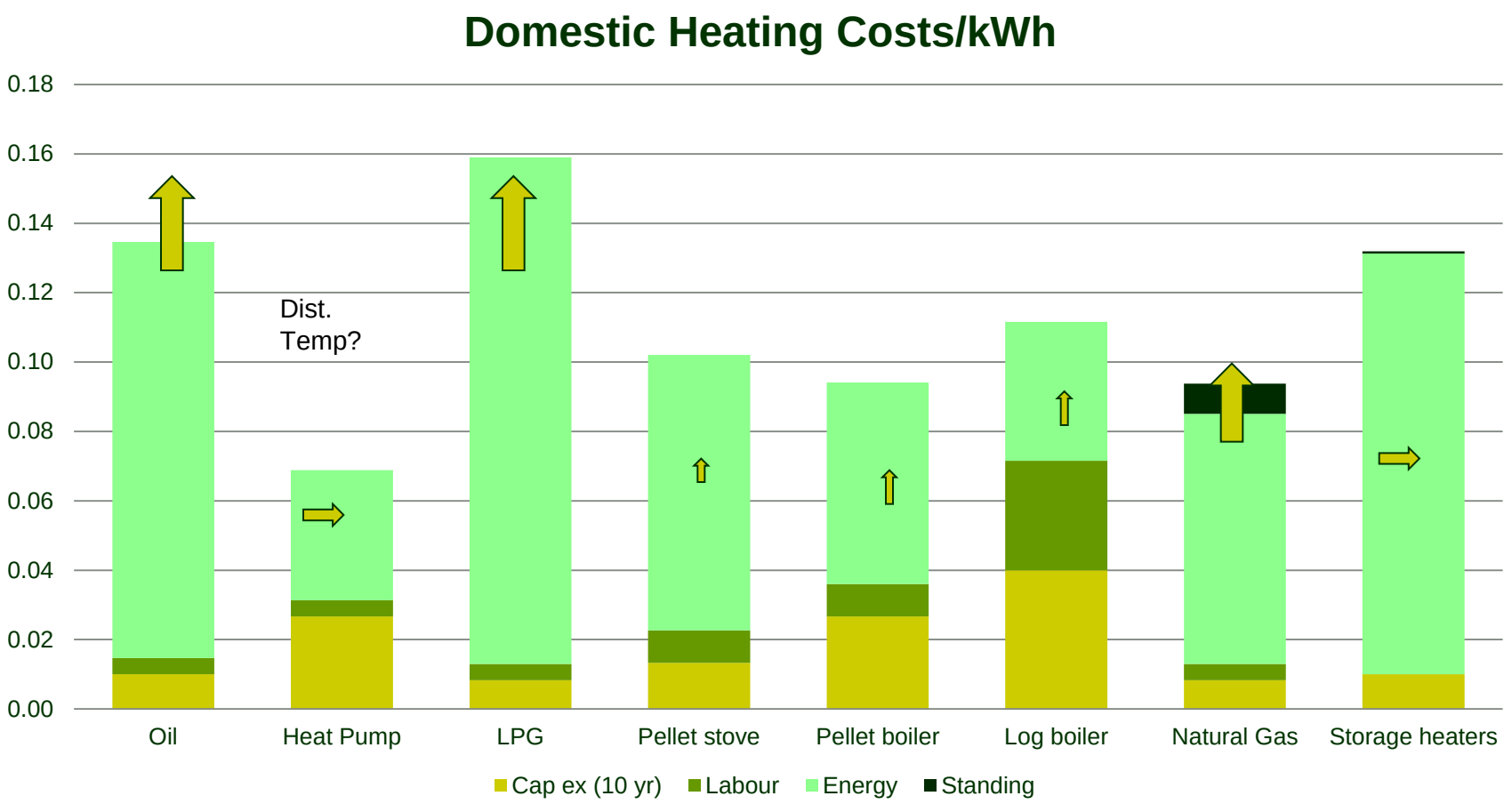
Alternate Options



- 86% New boiler Efficiency;
- 3% distribution losses (external boiler);
- 15MWh P.A. capital split over 20yrs,
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District Heating: Pipe dream or Reality

- We know locally sourced wood chip is:
  - Cheap
  - Sustainable
  - A source of jobs
- Big Questions:
  - Is it economical to generate & distribute?
  - Who will finance?
  - Energy price risks?

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4 North Tipp Wood Chip /ESCO's

- 200 – 600 kW Heat supply, maintenance, backup ~4.1c/kWh (inc Profit)
- Capital cost (inc profit) over 10 years (e.g. boiler life) per kWh ~2.3c/kWh
- Real cost inc. profit: 6.4c/kWh
- Larger Scale, Higher operational hours, better diversity of loads=> Is 5c possible?

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Nenagh DH – Why?

- Nenagh town pool & hotel tender 2008.
- DH option unviable Vs separate?
- Looked at where economies of scale required?
- DH needs 20yr finance.
- DH needs regulation, co-op or NP.

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Nenagh DH – How?

- Top Down.
- Bottom up.
- Map, divide and sort.
- Development model
- Stakeholder buy-in.

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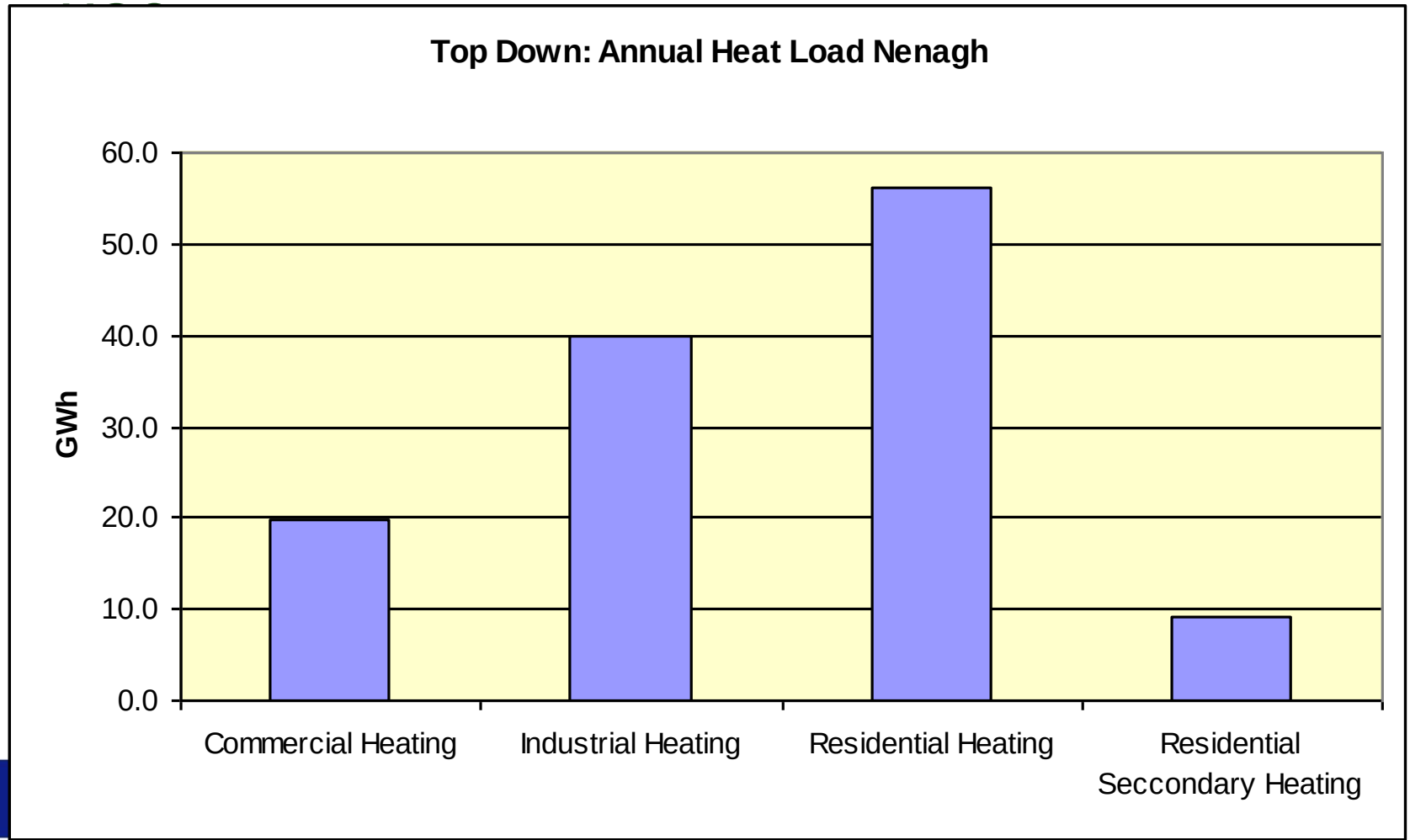
NESCO - Feasibility

- Top Down – CSO, average house energy



NESCO - Feasibility

- Bottom up – counted all ~3200 dwellings
- Estimated primary heat load (SERVE data) & estimation on a building by building basis
- Measured Distances via GIS
- Grouped into 120 “Areas”
- Map and analysis in paralell

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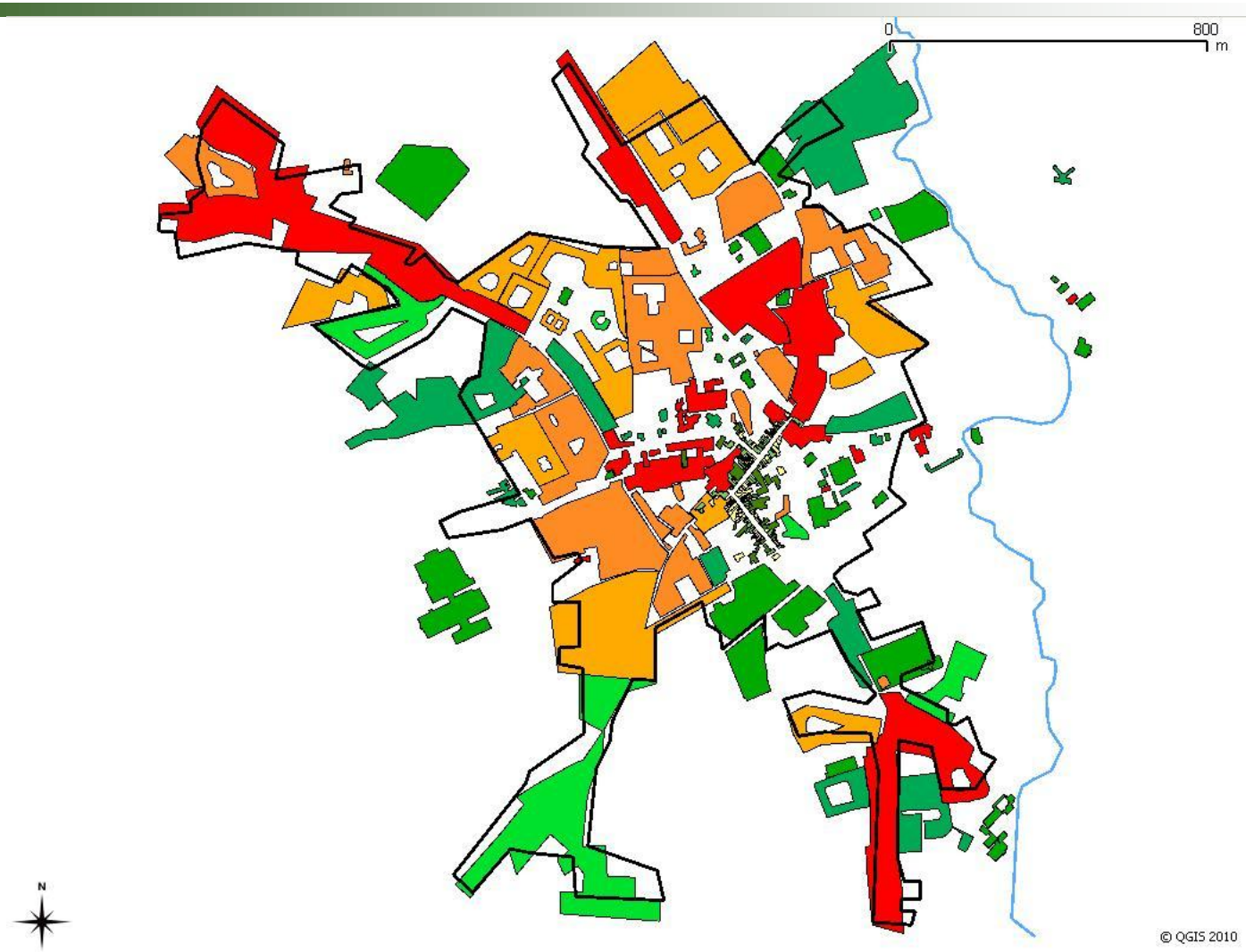
Map – Heat loads



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Pipe Work

- Top level analysis complete. (To front of house)
- Treated All pipes at DN100 & below equally, adjusted cost down to compensate.
- Biggest Unknown/ Risk.

Pipe type	Meters	Cost €/m Installed	Total Cost
DN 100	19,498	200	3,899,600
DN 125	203	300	60,900
DN 175	567	600	340,200
DN 200	75	800	60,000
DN 250	185	1200	222,000
DN 300	495	1500	742,500
Total / Average	21,023	253	5,325,200

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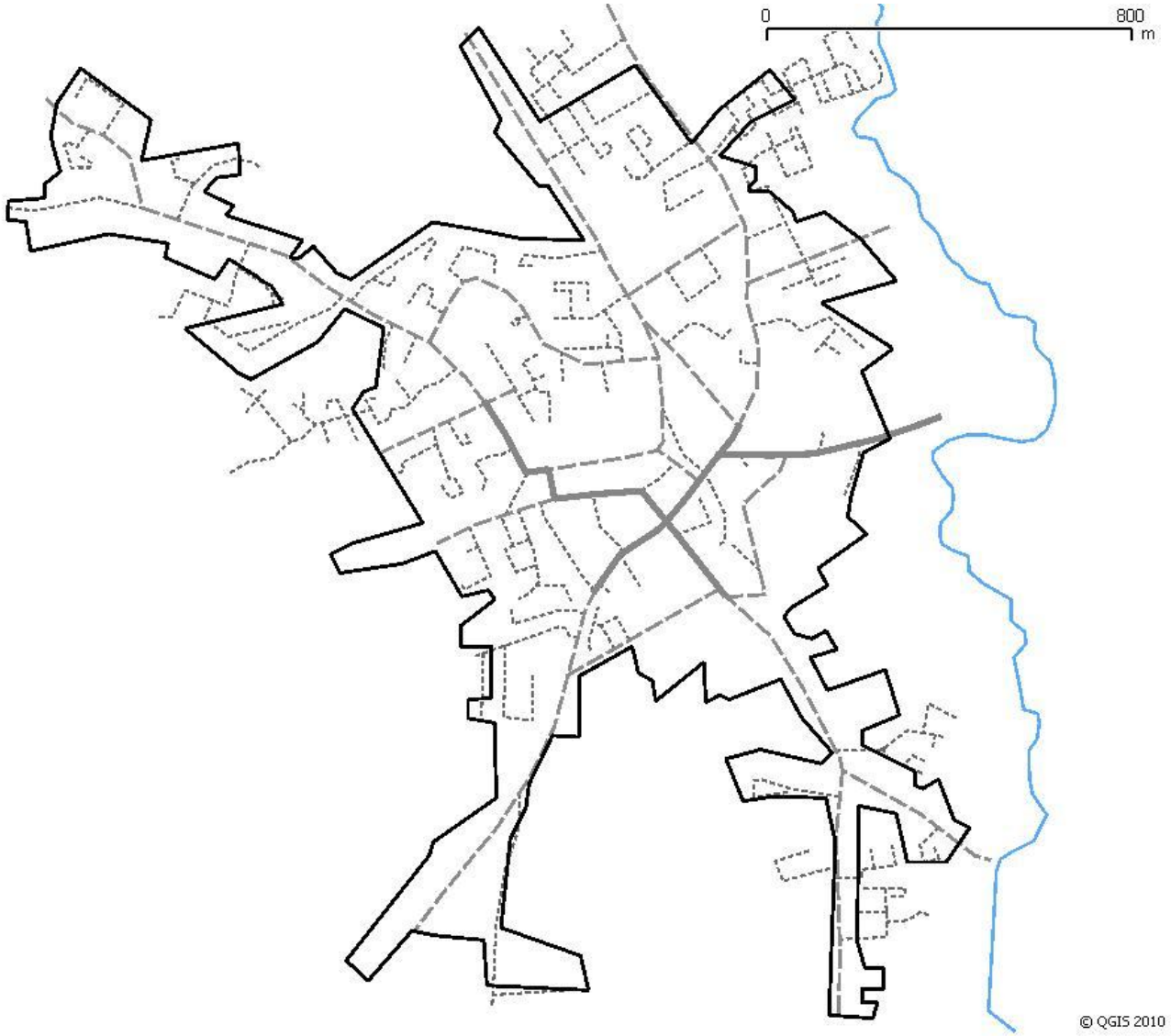
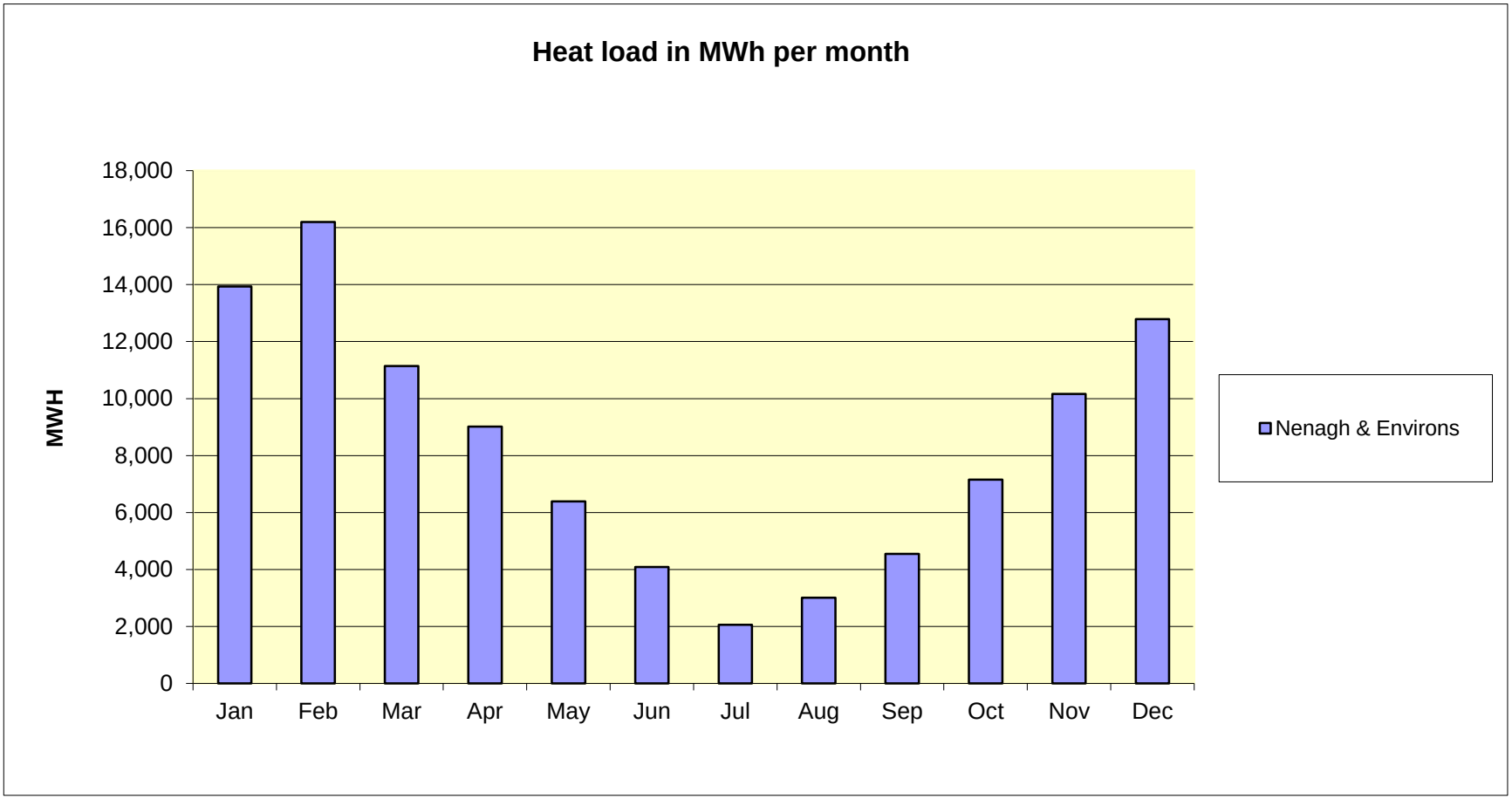
Map of Pipe work



Heat Loads

- Loads split Using (DEAP) monthly



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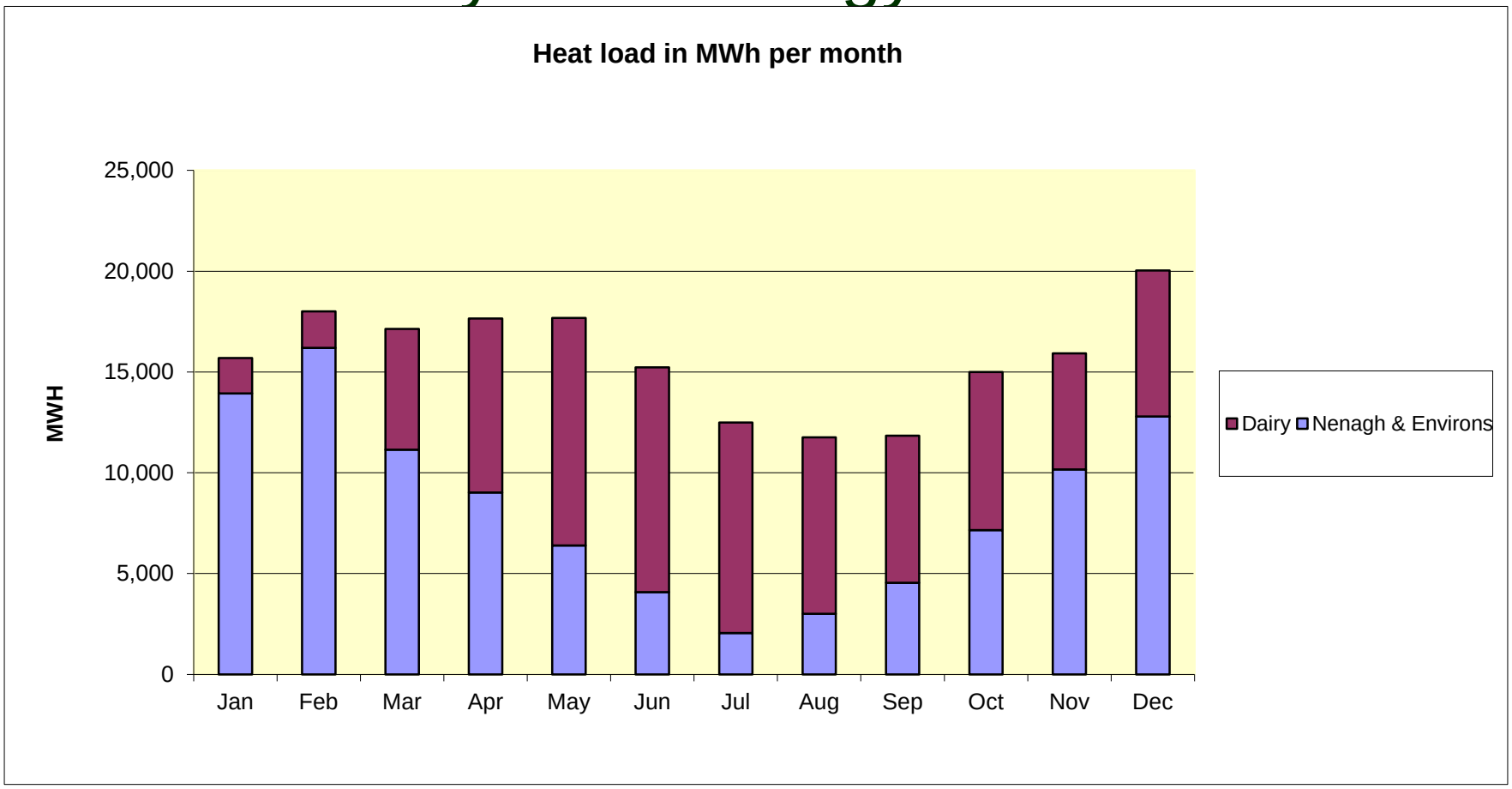
Heat Loads

- Added Dairy Real Energy Use



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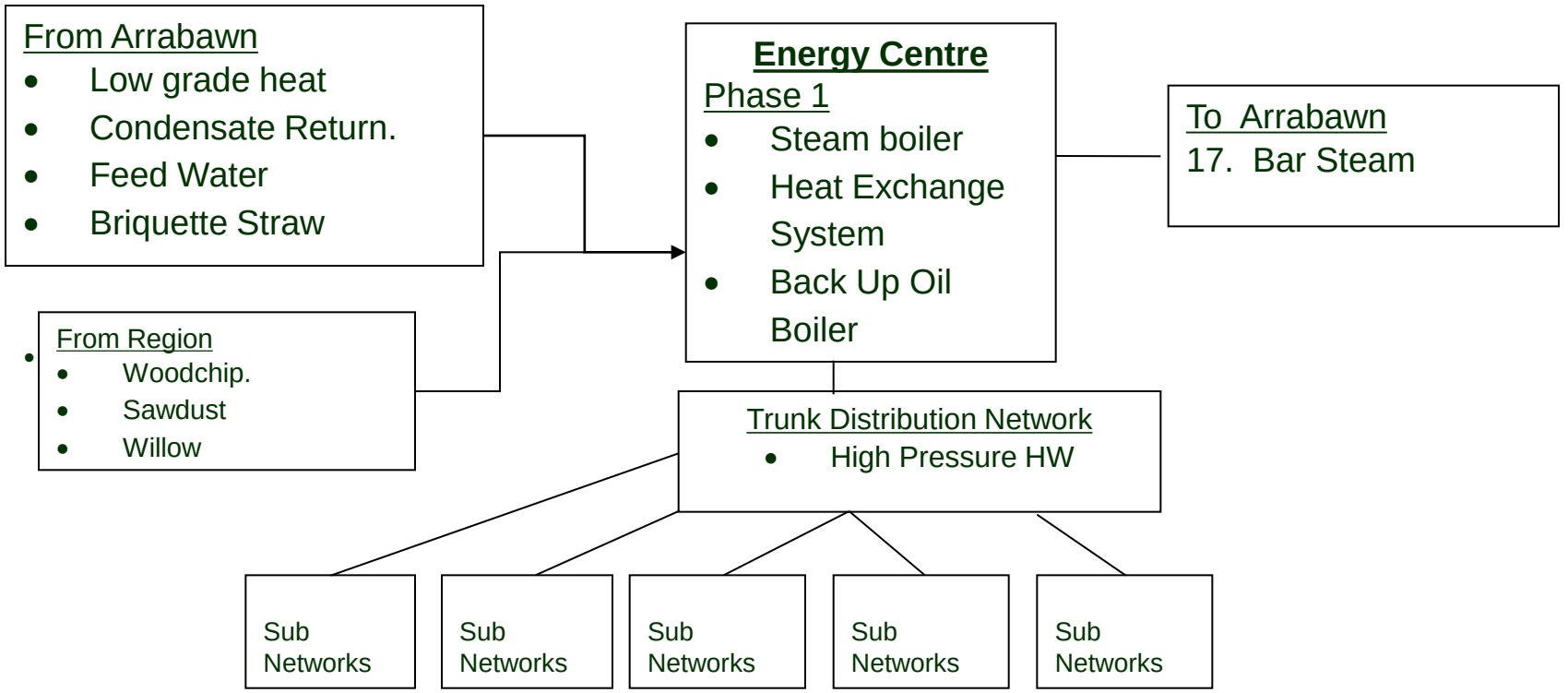
Development Model



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Business models – Energy Centre

Energy Centre:

	Price per kWh (NCV)	Carbon	Standing Charges	Capital Cost	Interest on Capital @4.5%	Total
Gas (3.3c/kWh GCV)	3.5	0.19	0.0027	0.09	0.05	3.83
Wood Chip	2.5			0.60	0.16	3.27
Oil	5.5	0.26		0.00		5.76

- Heat Sale to Dairy @3.3c/kWh (ex. Vat)
- Heat Sale to network @4.3 (ex. Vat) 5inc.

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Business models – Network

Network:

- 2c/kWh Capital, 0.5c/kWh Op Ex.
- Assuming 4% Finance:
  - 25% Town Heat load = €190,000/ €2.6M
  - 75% Town Heat load = €560,000/ €7.8M

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Business models – Home owner

- Assumption of 15MWh/annum
- 2.8c/kWh to Network (inc Vat)
- 5c/kWh to Energy Centre (inc Vat)
- 1.5c/kWh to pay connection costs (3k/house) (inc Vat)
- Net heat cost of 9c/kWh (inc Vat)
- Saving to home-owner of 3-5c/kWh
- Break even cost of 75c/ Litre (66c/l)

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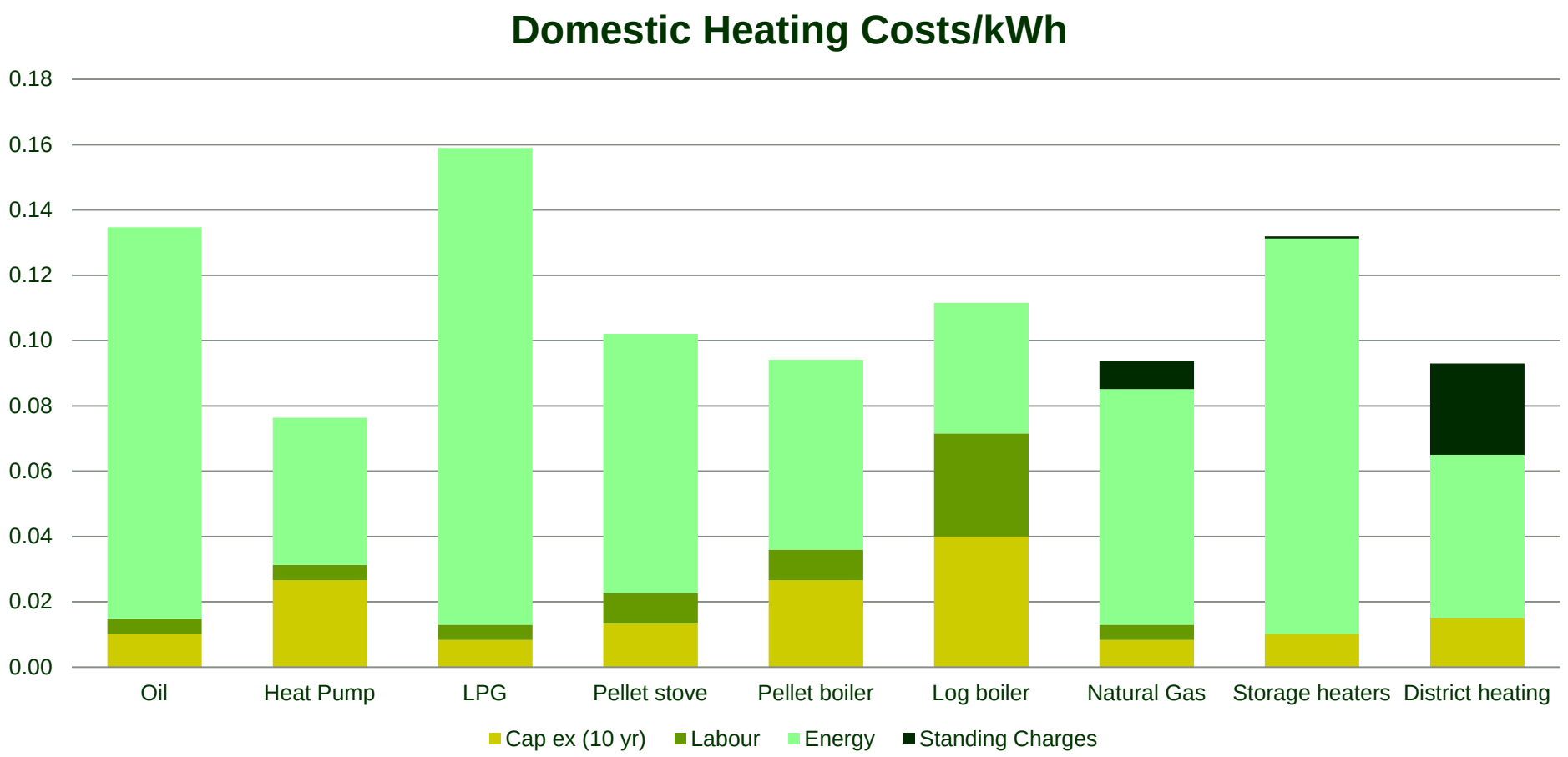
Alternate Options



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Economic Benefits to Region (100%)

	'000 Tonnes Fuel	Jobs
Mid-West Study	279	420
Nenagh DH	78	117

	Euro Invested	Jobs
WDC Study	63M	146
Nenagh DH	25M	58

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Stakeholders

- Arrabawn
- Town Council
- Landowners
- Other Stakeholders

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Conclusions

- A pipe dream?
- Project looks Viable?
- Risks too high? – State intervention?
- Gas prices?
- Level playing field?

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