



Waterford Institute of Technology  
INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE

UCD Earth Institute-NESC Workshop, UCD  
Wednesday, 16<sup>th</sup> May 2012

# USE OF WOOD FOR HEAT IN BUILDINGS IN IRELAND

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# Overview

- What is RES-H target for 2020, and what is target for non-ETS heating in buildings?
- What is the historical & current use of wood for heating?
- What is the price of wood fuel and how does that compare to fossil fuels?
- Can wood fuel supply match the proposed demand for wood heating?
- What measures will facilitate RES-H deployment?





# Renewable Energy Sources – Heating (RES-H) Target for 2020

- 12% of 4.9 Mtoe (total heating & cooling in 2020)
- 591,000 tonnes oil equivalent (1 toe = 42 GJ)

<u>Source</u>	<u>2010</u>	<u>2020</u>
<b>Solid Biomass</b>	<b>198000</b>	<b>453400</b>
Heat Pumps	18000	84300
Biogas	10000	33200
Solar	4000	20100
<u>Total</u>	<u>230000</u>	<u>591000</u>
<b>District Heating</b>	<b>0</b>	<b>131000</b>
<b>Biomass in Households</b>	<b>23000</b>	<b>24000</b>

In tonnes oil equivalent, (source: NREAP 2010)





# Projected increase in renewable energy use in buildings (Source: Table 6, NREAP 2010)

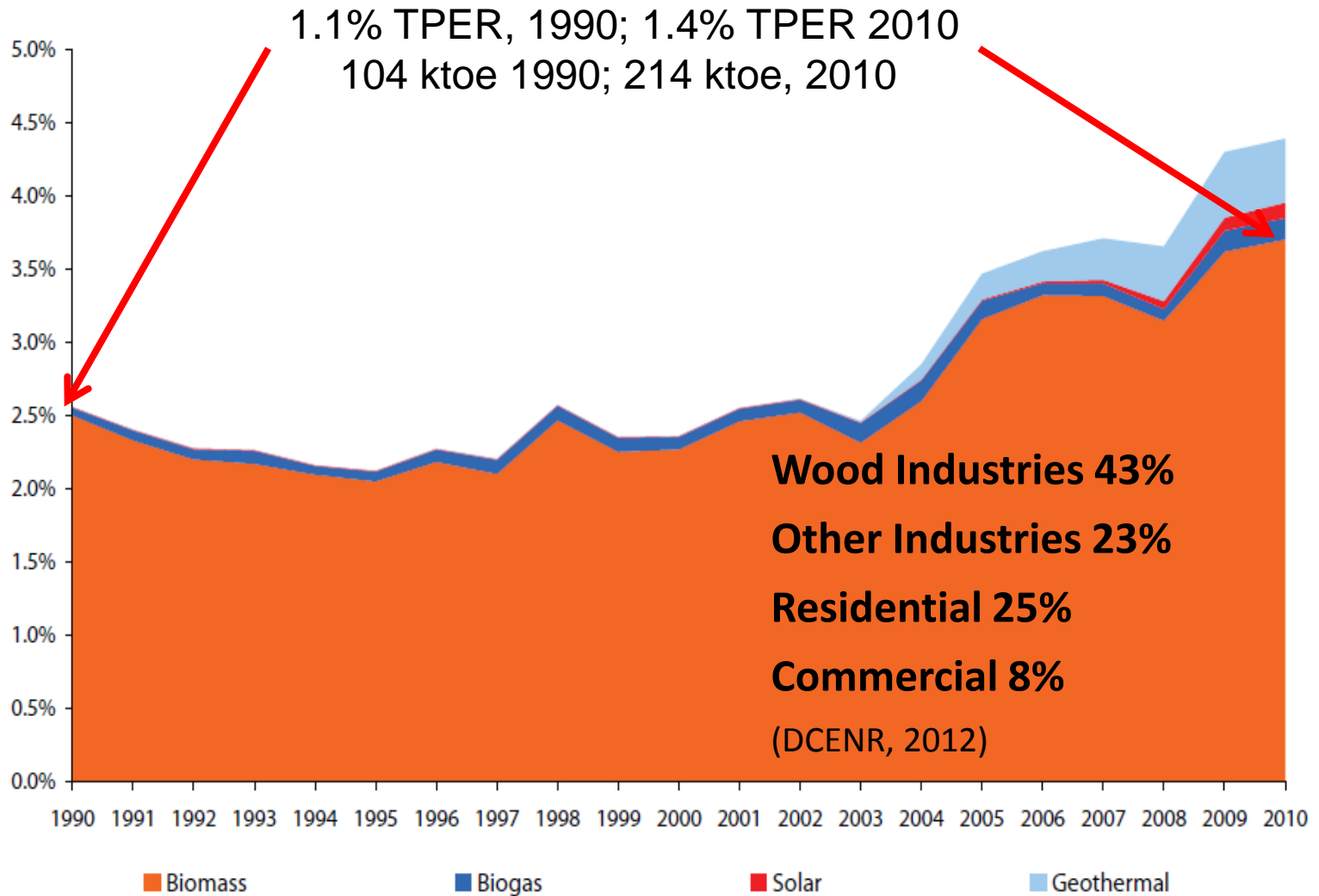
Sector	<u>2010</u>	<u>2020</u>
Residential	0.26%	0.88%
Commercial	0.09%	1.05%
Public	0.03%	0.16%
Industrial	1.45%	2.09%
Total	<u>1.84%</u>	<u>4.17%</u>

- Unclear whether this refers to number of buildings or proportion of energy use, also whether space heating or all RE.
- Most surprising is low target for public buildings given commitments to public sector deployment of renewable heat, as described in:
  - Bioenergy Action Plan
  - Green Tenders, an Action Plan on Public Procurement





# Development of Biomass Heat Use in Ireland, 1990 - 2010







# Residential Heating Stimulus: Greener Homes Scheme

- €70 million state investment (€230 million total investment) in 33000 installations, 2006 - 2010
- Approx. 7000 wood-fuelled boilers and stoves c. 205 MW installed capacity
- Wood pellet, woodchip & firewood gasification.
- Annual consumption of 30000 toe (assuming 30kW per unit, 1500 hours operating hours & 85% boiler efficiency)





# Commercial Heating Stimulus: Reheat Scheme

- 2006 – 2010 (Pilot BioHeat, BioHeat & ReHeat)
- Support of up to 30% of the capital investment in biomass heat, solar & heat pumps, with no limit on size.
- 204 wood-fuelled (woodchip / pellet) installations 88.6 MW total installed capacity
- Boiler size range from 16 – 8500 kW.
- Annual wood fuel requirement c. 20,000 toe (assuming 2500 operating hours per year, 90% boiler efficiency)





# Benefits of capital grant stimulus

- Displacement of 50,000+ toe fossil fuels per annum
- Development of commercial wood energy sector
- National & international capacity in specification, installation, commissioning and operation of wood fuel heating systems
- Establishment of commercial wood fuel supply chains
- Initiation of voluntary wood fuel quality assurance scheme
- Market price of wood fuel comparable to fossil fuels





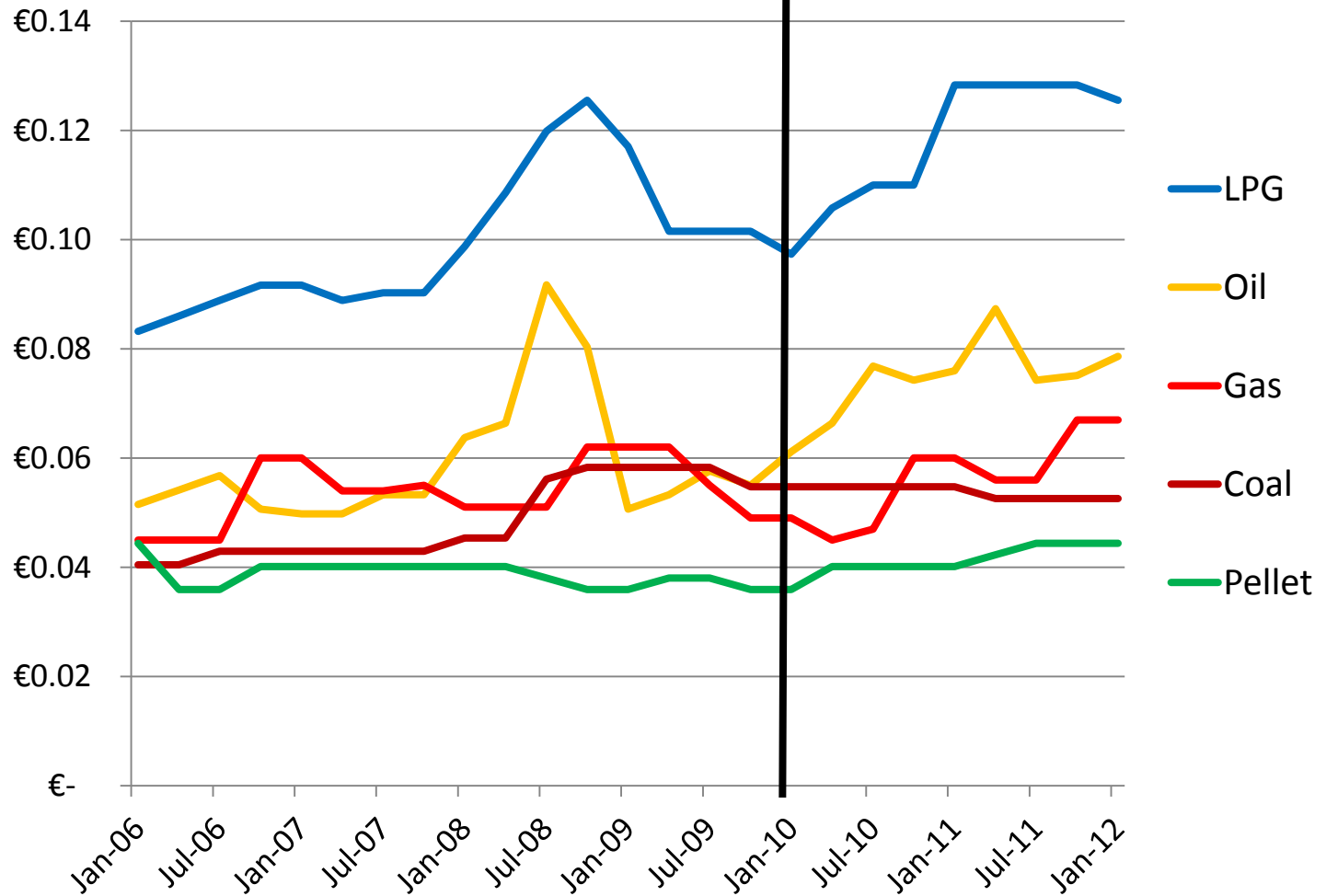


# Domestic Fuel Price Comparison, 2006 – 2012

(adapted from SEAI Archived Domestic Fuel Costs)



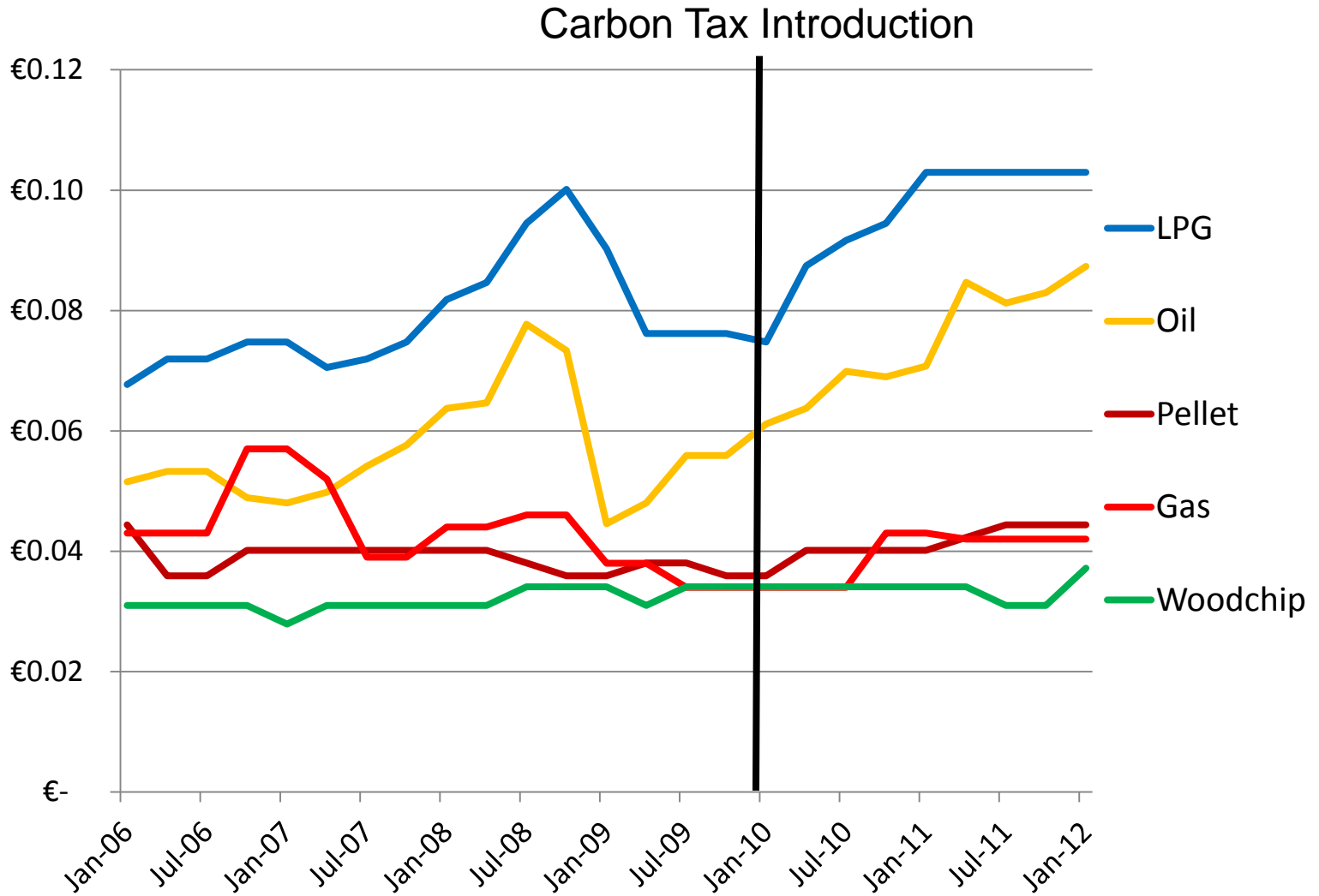
## Carbon Tax Introduction





# Commercial Fuel Price Comparison, 2006 – 2012

(adapted from SEAI Archived Commercial Fuel Costs)

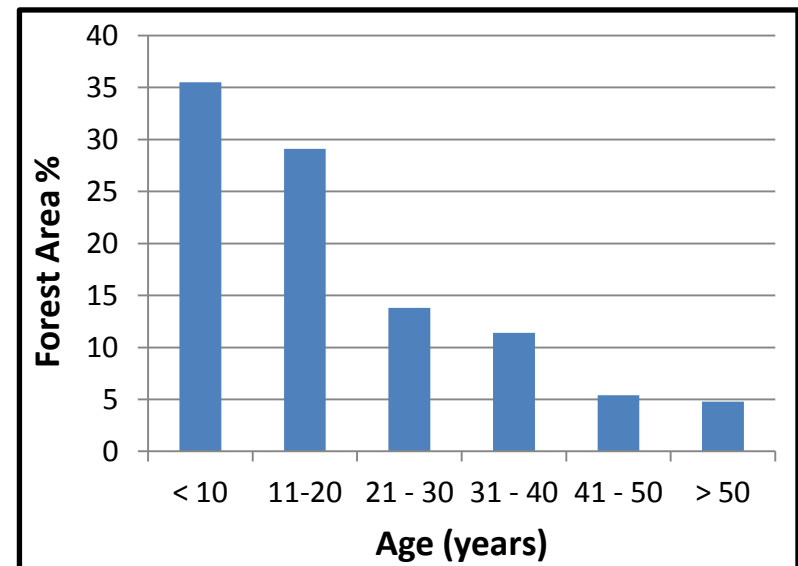
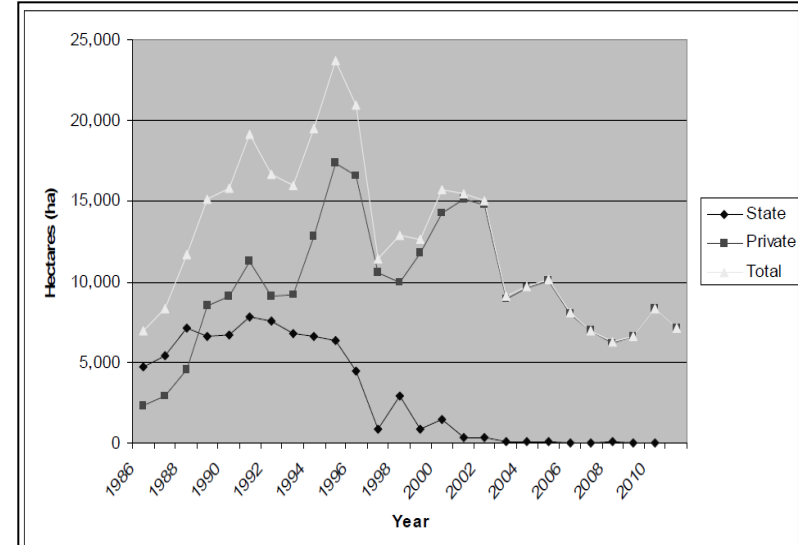




# Forestry Sector



- Total forest area of 700,000 ha in 2010, 10% land area
- 57% state, 43% private
- 60% of forest estate is <20 years
- Increase in thinning from 23000 ha in 2011 to 50000 ha per year in 2028
- Increase in final clearfells from 7500 ha to 11000 ha over same period
- Management, infrastructure & supply chain challenges







# Current wood harvesting practice in Ireland

## Cut-to-length harvesting method

- ~ 170 Harvesters
- ~ 160 Forwarders
- ~ 380 Timber Trucks
- Capacity c. 3 M m<sup>3</sup> roundwood/yr.
- Harvest 2011: 2.7 M m<sup>3</sup>
- Two-thirds from clearfelling
- One third from thinnings







# Wood Fuel Production in 2010

adapted from: O'Driscoll, E. (2011)



	'000 m <sup>3</sup>	ktoe
Roundwood Harvest	2,907	
Energy Use by Industry/Co-firing	554	92.7
Firewood <sup>1</sup>	199	44.0
Wood pellets & briquette production	121	21.9
Woodchip for commercial heat supply	39	6.7
Charcoal Production	2	
Willow Energy Crop <sup>2</sup>	1	0.2
Total Wood Energy Use	916	165.6
% Industrial Use	60%	56%
% Commercial & Domestic	40%	44%
Wood Fuel as % Total Harvest	32%	

- 1 Firewood consumption is largely unreported, likely substantial underestimate
- 2 c. 600 ha willow coppice, annual equivalent production 5 toe/ha/yr or 3000 toe per annum



# Wood fuel Demand & Supply

## Wood fuel Demand Forecast 2020:

- 12% renewable heat generation;
- 100 MW of Combined Heat & Power (CHP) by 2020;
- 30% co-firing with biomass at the three peat-fuelled power plants.
- 3 million cubic metres wood per year (COFORD, 2011)

## Wood fuel Supply Forecast 2020:

- 1.45 million m<sup>3</sup> available for wood energy (COFORD, 2011)
- 231,000 toe, assuming basic density 400kg/m<sup>3</sup> and 50% moisture.
- In addition to current wood fuel supply, solid biomass heating target for 2020 available.
- However, co-firing & biomass CHP competing for fuel.





# Conclusions

- 12% RES-H target can be supplied with wood, but investment in infrastructure, technology & training necessary to scale up supply chains
- Targeting wood for heating may leave shortfall for co-firing and biomass CHP targets, unless other sources identified & developed
- Wood fuel delivered price c. 50% that of oil and LPG, this should motivate investment in wood heating
- Biomass district heating represents 25% total RES-H target, yet no stimulus currently in place.
- Household use of wood fuel is not considered for expansion yet represents largest use of wood fuel in buildings.
- Accurate monitoring and forecasting of wood fuel use is difficult due to dispersion of resource, local enduse and ambiguous quantification methods.





# Recommendations

- Public sector procurement of biomass heat should be implemented without delay.
- District heating development requires a comprehensive stimulus package to offset the high capital cost of infrastructure.
- Residential use of wood fuel requires more accurate monitoring.
- Supply chain development will require continued support for forest road construction, advisory services and education, but may also require tax changes to encourage active private forest management.
- Maintain existing afforestation support scheme and expand to take in short rotation forestry and woodlots.








# Put a wood burning stove in your fireplace



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## Wood-burning stoves all the rage in austerity Greece

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By Harry Papachristou  
ATHENS | Wed Nov 23, 2011 1:52pm EST

(Reuters) - Once a symbol of poverty, the lowly wood burning stove is making a comeback among cash-strapped Greeks horrified by the soaring costs of central heating as winter begins.

Even the wealthiest Greeks are turning to the kind of basic heating methods that most people haven't used in decades as an economic crisis deepens, taxes rise and temperatures drop.

Costas Mitsionis who sells wood-burning stoves at the central Athens Monastiraki market, rubs his hands with glee as he talks about the doubled demand for his product. His tiny shop is bursting at the seams with stoves in all colors and shapes precariously piled on top of one another almost to the ceiling.

"Business is up 100 percent," said Mitsionis, 42, constantly interrupted



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