

Renewable Energy Overview

Joe Jolley : Sustainable Energy Ireland – Renewable Energy Information Office

Wednesday 27th October 2010 : Auburn Lodge, Ennis



- Sustainable Energy Authority of Ireland (SEAI)
 - Formerly the Irish Energy Centre / SEI
- Set up by government in 2002 as Ireland's National Energy Agency
 - Promote and assist the development of sustainable energy

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Facilitating Ireland's transformation to a society based on sustainable energy structures, technologies and practices.



Welcome to the Sustainable Energy Authority of Ireland

The Sustainable Energy Authority of Ireland (SEAI) has just launched a new five-year strategic plan with a mission of transforming Ireland into a society based on sustainable energy structures, technologies and practices, and a vision of making Ireland a recognised global leader in sustainable energy. [To see SEAI's Strategic Plan 2010-2015 click here.](#)

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Home Energy Saving

Insulation Grants – [Click here](#)
Ph: 1850 927000



Building Energy Rating

for information [click here](#)



Dundalk 2020

Leading Ireland Towards
a Sustainable Energy Future



Energy Show 2010

LATEST NEWS

LATEST EVENTS

LATEST PUBLICATIONS

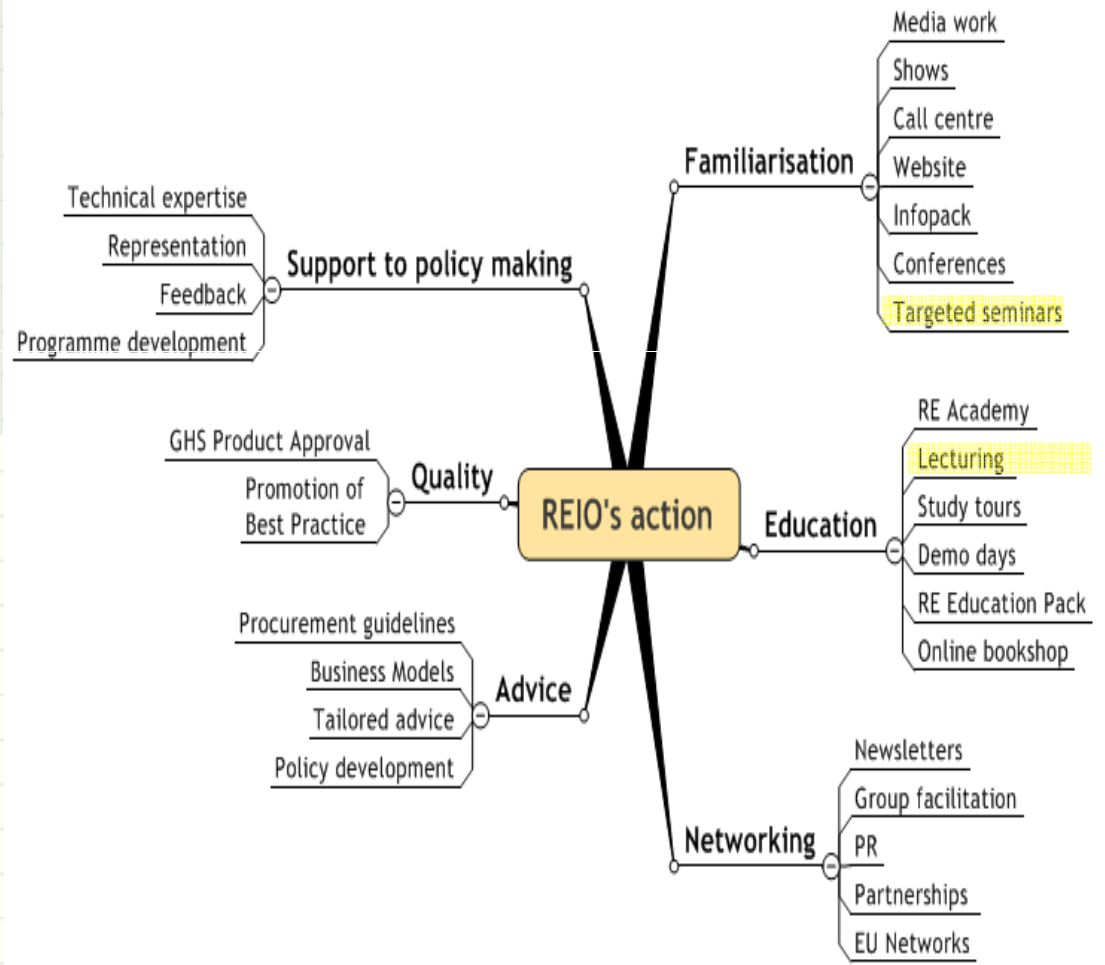
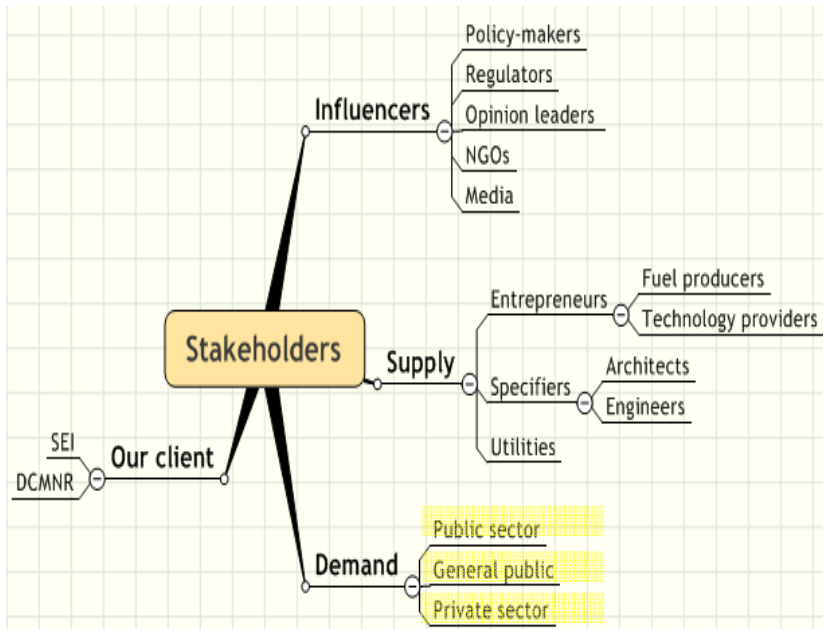
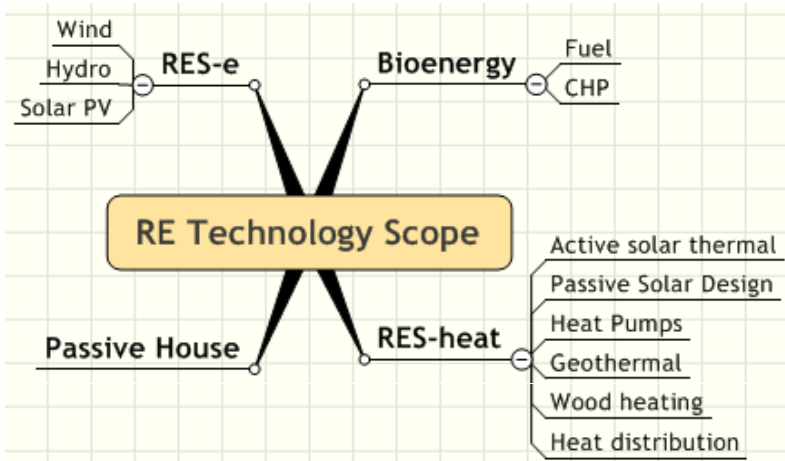
Who Are SEI REIO?



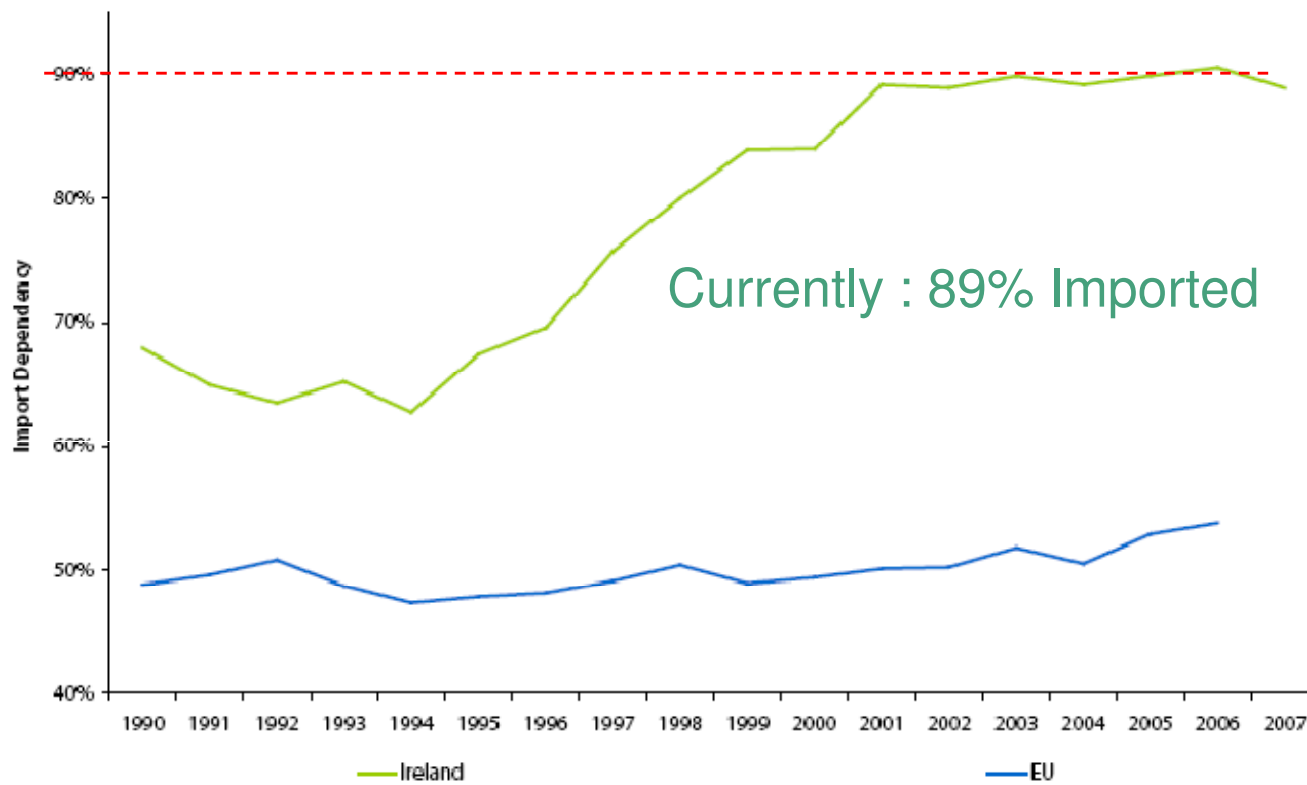
Created in 1995 as a service of SEI to promote RE in Ireland
2004 Awarded Best European RE Agency by the EC

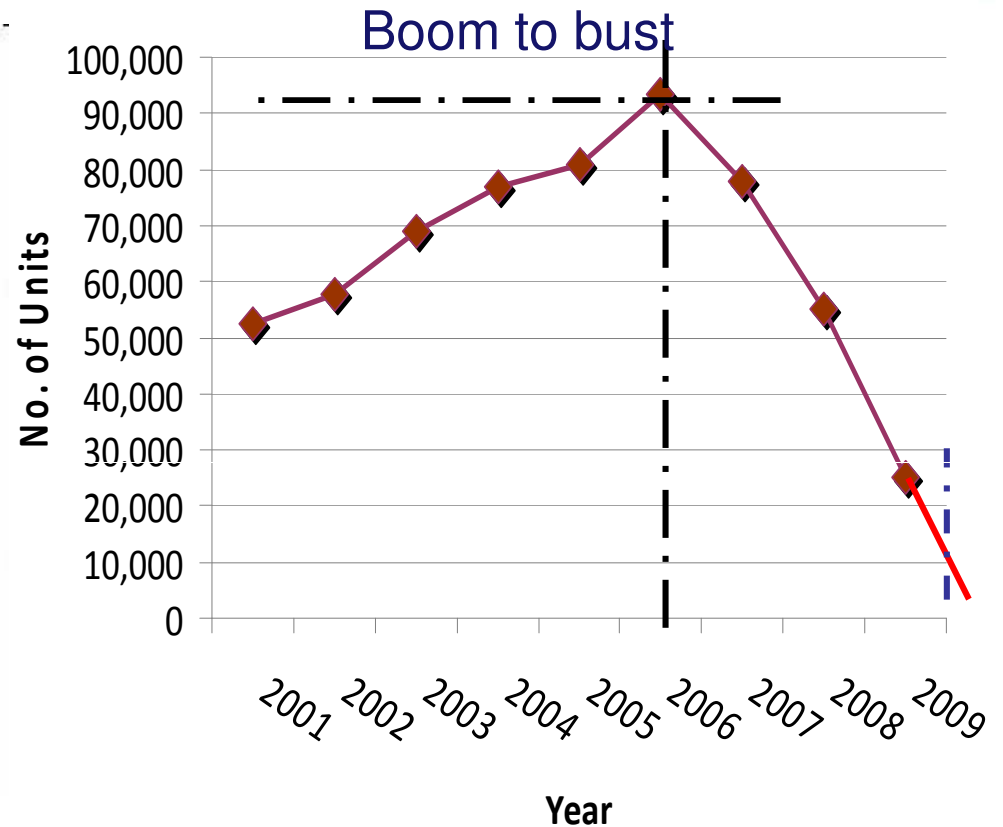
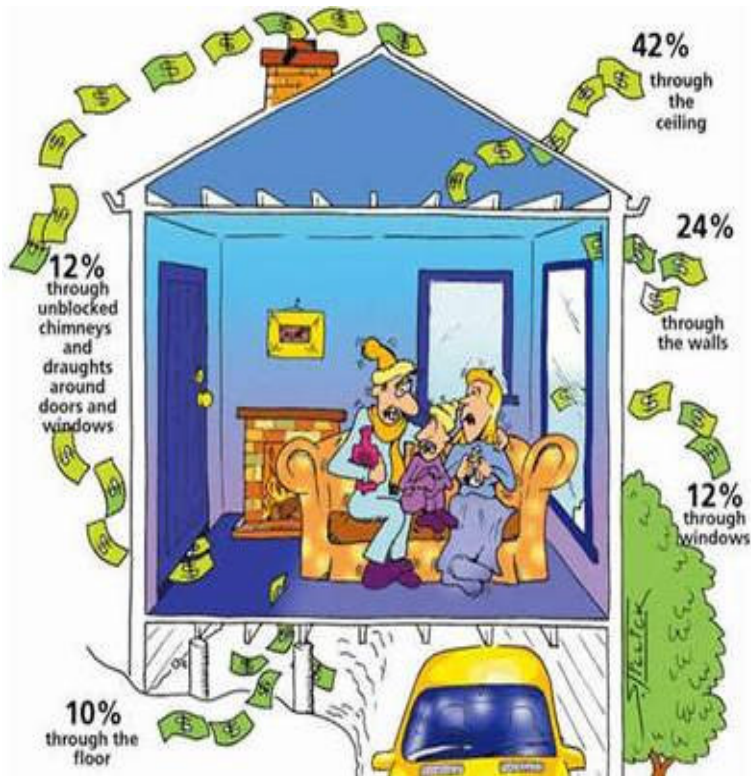
Provide Independent information and advice on RE

What we do



Quick Picture : Energy in Ireland





Now there is an opportunity to :

- Retrofit existing stock to best possible energy performance
- Ensure new builds meet high standard (Building Regulations, BER, Passive House)

- Current Situation
 - New build completions.....??
 - Energy performance of existing housing stock
 - Building regulations – 2011 / 2013 : Nearly carbon zero (Recast EPBD)
 - Incentives for RE / Insulation for homeowner – Yes
 - Incentives for RE for commercial / industrial - Yes
 - Training / upskilling required in all areas

 - Energy efficiency and demand reduction :
 - “Enablers” for renewables
 - Energy which is not used does not need to be replaced.
 - All energy costs money!!

- Manufacturing RE products?
 - Currently a handful of manufacturers in Ireland
- Supply of RE Products?
 - Large number of RE product suppliers in Ireland
- Improving existing building stock?
 - If improving to “passiv” or “zero carbon” levels - expertise required
 - HES scheme currently open as incentive for homeowners
- New buildings?
 - Significant slowdown
 - Long term view : skills needed
- Other technologies / concepts?
 - Ocean energy / Wind energy / maintaining and repairing existing offshore technology
 - Solar thermal : Correct specification, design, delivery
 - Deep Geothermal : Not mainstream yet....potential resources??
 - Carbon zero and Nearly carbon zero buildings :
 - Bioenergy : AD CHP, Energy crops...
 - Fuel cells / hydrogen
 - Energy Efficiency / Demand reduction

- 2008 Building regulations:

- 40% reduction in domestic energy consumption,
- 31% reduction in CO₂ emissions



- Draft 2011 Building Regulations:

- 60% reduction in domestic energy consumption,
- 50% reduction in CO₂ emissions

- 2013?

- All new dwellings to have net or nearly zero CO₂ emissions,

- Tightening of regulations will have a knock on effect :
 - Planning and design : Architects / Engineers / Assessors
 - Airtightness : Testing / delivery / services
 - Increased communication between disciplines : Architects, builders, mech/elec etc.
 - Co-ordination between tradespeople on site
 - New building techniques required to deliver low energy buildings : Workmanship and training
 - Even dwelling construction will require a more “project-like” structure.
 - A- rated fossil fuel boilers only ($\geq 90\%$)
 - Existing buildings : Potential to improve.



- **Boiler:** €2,500

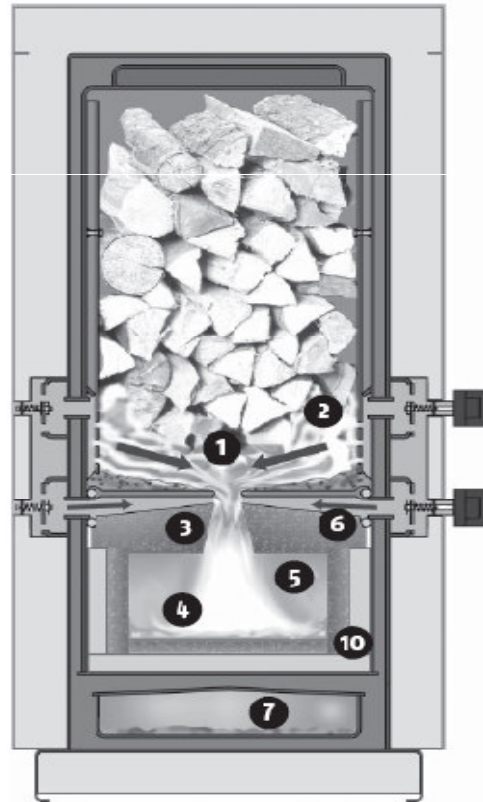
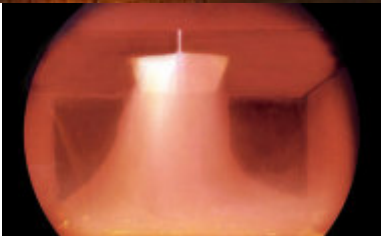
- **Stoves:**
 - Room heating : €800
 - With back boiler: €1,400



Wood Log Gasification Boilers - Grant

- Wood log gasification boilers:
€2,000

What is wood gasification?



- **Wood Pellets**

- No contaminants, additives or bark
- Lignin – binding agent “glues” pellet together
- High Energy content (5 kWh/kg)
- Pellet production in Ireland?
 - Balcas (50 kTon/yr), DPellet (70 kTon/yr), Laois Sawmills (15 kTon/yr)

“Versus”

- **Wood Chip**

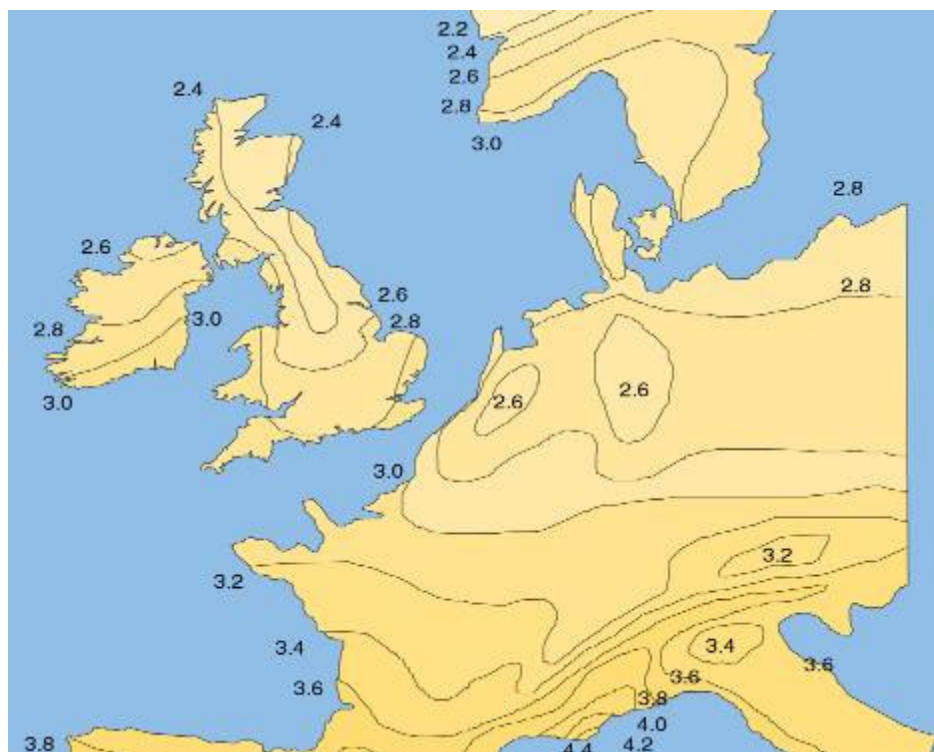
- Generally less expensive per tonne
- Greater bulk density (kg/m³)
- Lower energy content (3.5 kWh/kg)
- Higher moisture content
- Less sensitive to storage conditions



Ireland's Impressive Solar Energy Resource

The equivalent of:

- > 100 litres of oil per m² per year
- 420 x Ireland's total annual energy consumption
- 10 x annual heating consumption of a 200 m² bungalow



Need to use this energy both 'passively' and 'actively'

Solar collector – Two main types

Flat plate collectors

- Structurally robust
- Low and medium temperatures^o
- In-roof, on-roof and free-standing mounting
- Can be more optically appealing due to flat surface areas



Evacuated tube collectors

- Medium to high temperatures^o
- On – roof / free standing mounting only
- Lightweight structure : individual tubes on frame
- Approximately 20% more yield per m2 of aperture area than flat plates

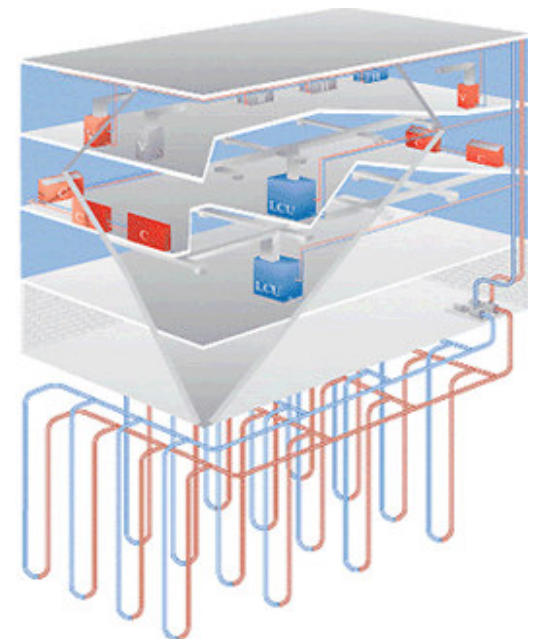
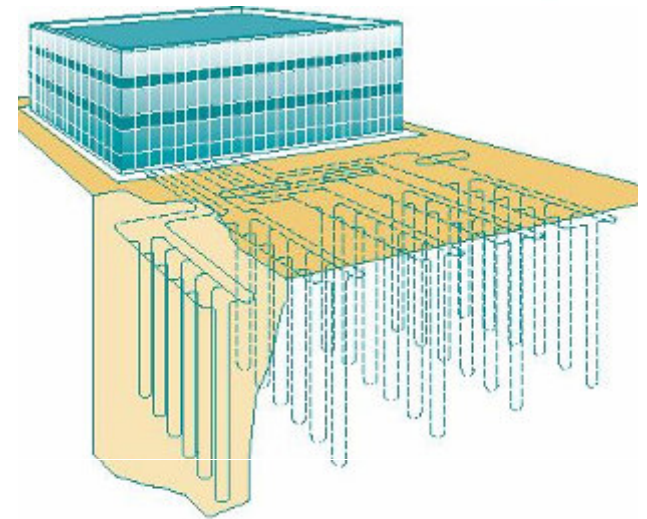


Evacuated Tube Collector - €300 per metre square

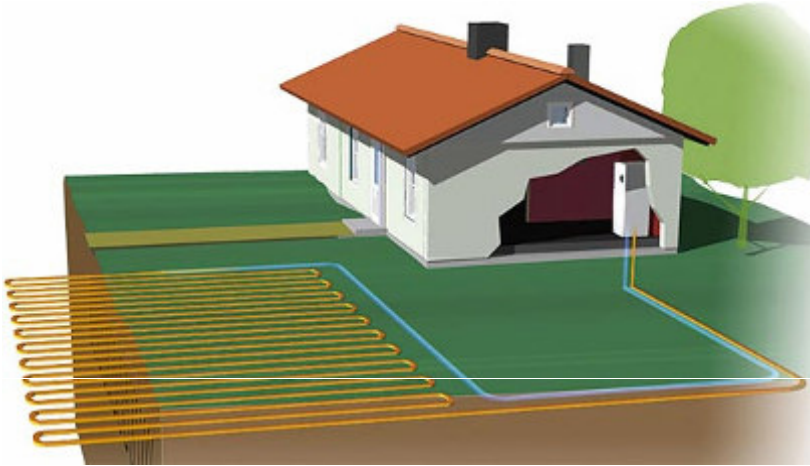
Flat Plate Collector - €250 per metre square

Heat Pumps : Ambient heat from the environment

- C.O.P. = 3 to 5
- Air / Ground / Water source
- Ideal with low-temperature distribution (air or water)
- Complete system, not “mix and match”!! :
 - Collector (air, water, ground)
 - Heat pump itself & associated components
 - Distribution system (u/f, low temp. rads) and considerations (e.g. insulation, pipe spacing etc.)
 - Control of system (thermostat position, weather compensation....)
 - Handover to customer
 - How much of the energy is renewable??
 - Primary energy factor = 2.7



Heat Pumps



- **Air Source** €2,000
- **Water Source** €2,500
- **Ground Source**
 - Horizontal €2,500
 - Vertical Bore €3,500

Scheme Applications Total	28,696
Technology	Split by volume
Heat Pump	20%
Wood pellet appliances	20%
Solar Thermal	59%
Wood gasification boiler	0.4%

MEASURE	CATEGORY	GRANT
<u>Roof</u>	Roof Insulation	€250
<u>Wall</u>	Cavity wall insulation	€400
	Internal Wall Dry-Lining	€2,500
	External wall insulation	€4,000
<u>Boiler</u>	High Efficiency Gas or Oil fired Boiler with Heating Controls Upgrade	€700
<u>Controls</u>	Heating Controls Upgrade	€500
<u>BER Assessment</u>	<i>Obligatory : After works BER assessment (1 per household)</i>	€100

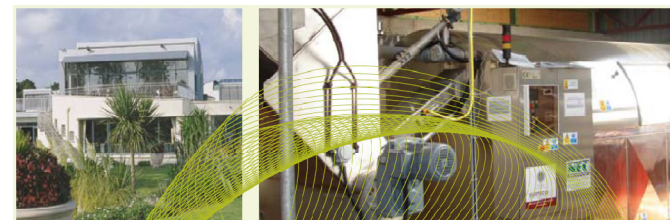
- Minimum Installation and product standards apply :
- (All criteria for homeowners and contractors available on www.seai.ie/hes)
 - NSAI agrément certificates, IEE wiring regulations, Part L additional documents (www.environ.ie), relevant EN/BS standards, relevant good practice guides.

- Establish and implement plan of action to address fuel poverty (>10% income spent on energy)
- Improve energy efficiency & comfort conditions of homes occupied by low-income households
- Measures Include :
 - Attic Insulation
 - Draught Proofing
 - Lagging Jackets
 - Energy Efficient Lighting
 - Cavity Wall Insulation
 - Energy Advice



FEASIBILITY STUDY

- Must be Completed
- 40% grant support to a maximum of €5,000
 - Supported on a discretionary basis

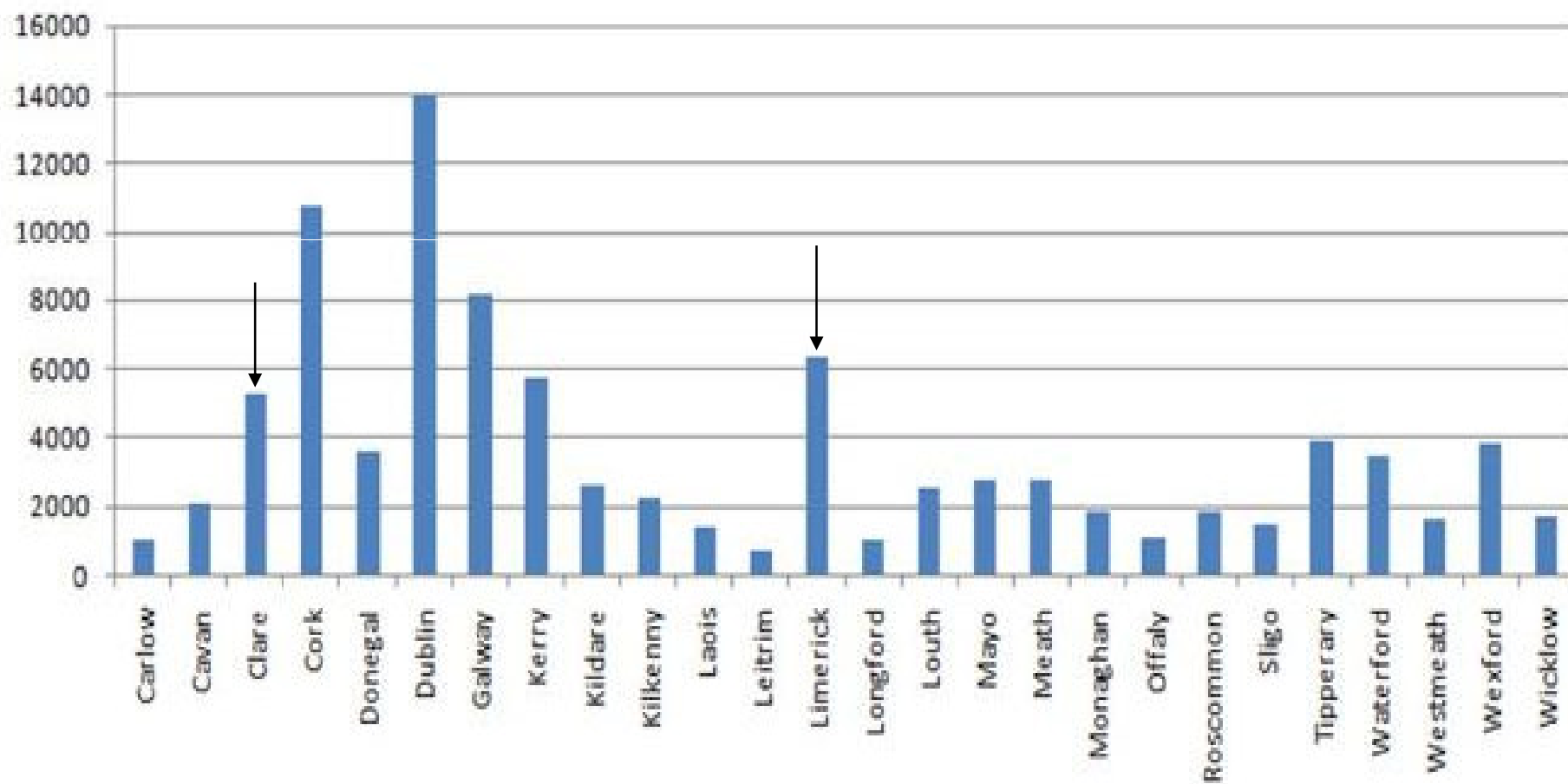


CAPITAL INVESTMENT

- Support of up to 30% of the capital investment cost
- Eligible costs include the cost of the boiler, feed mechanism, storage and installation / commissioning
 - Anything over 1MW requires special consideration

- Biomass / Anaerobic Digestion CHP – Limited availability
- Renewable Energy RD&D : RE technologies – close to market / future prospects
 - Category 1: Shared-cost Demonstration (grant support of up to 25% of eligible costs)
 - Category 2: Shared-cost R&D (grant support of up to 45% of eligible costs)
 - Category 3: Commissioned Public Good Activities (grant support of up to 100%)
- Electric vehicle grant support : €5K (BEV's), €2.5K (PHEV's)
- Public Sector programme / Business support programme : Reducing energy related costs and associated CO₂ emissions.
- ACA– Accelerated Capital Allowance : Companies paying corporation tax are eligible.
 - EEE : Excellence in Energy Efficiency – Register of “best in class” energy efficient products
- Sustainable Energy Incubator programme : incubator@seai.ie – Expected to re-open (2011)

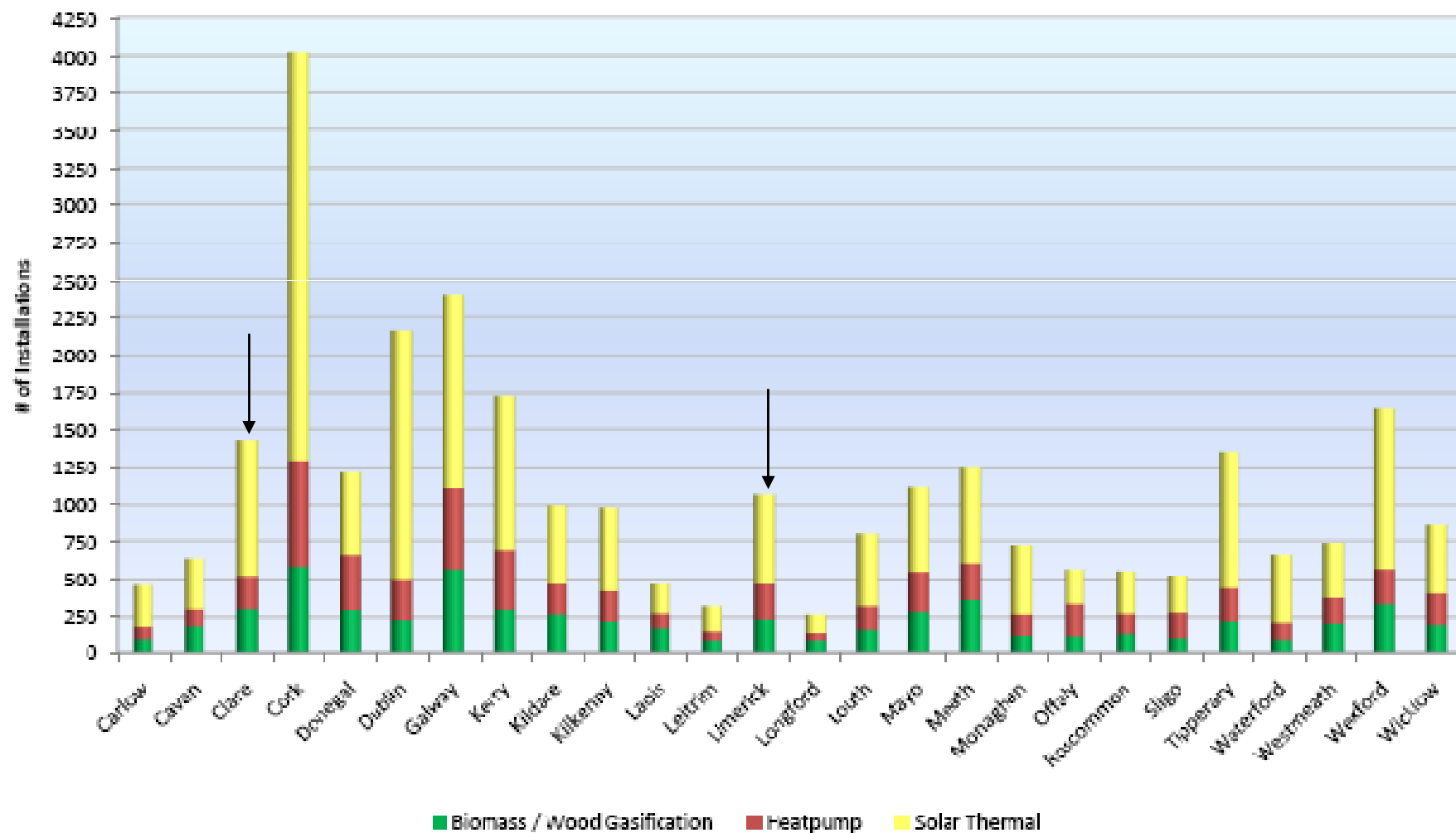
Applications by County (up to 31.08.10)



Limerick-Clare (GHS)

Greener Homes Scheme Statistics
2006-2010

Total Installed = 28935



Heat Pump	4 x installations	64 kW installed
Solar Thermal	14 x installations	252 m ² installed
Biomass Boiler	9 x installations	2.5 MW installed

- No European-wide definition, but....
- Defined by ESB Networks and EN50438 as:
 - <6kW connected at single phase (230V)
 - <11kW connected at 3-phase (400V)
- Streamlined connection process for microgeneration (form NC6)
- Units up to 50kW assessed case by case
- Units >50Kw are assessed as per large units

Microgeneration field trials

- Wind / Solar PV / Hydro
- Monitoring in progress

Solar PV : Opportunities

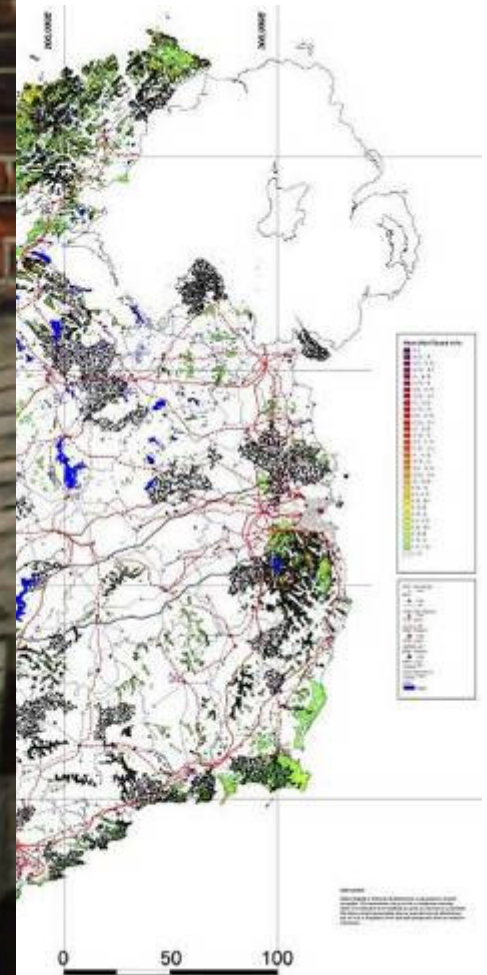


- Technology is relatively expensive, but situation is improving
- Grid connection considerations
- Can “Auto-produce” electricity on-site (if good daytime base-demand exists)
- Installed capacity growing in Ireland.
- SEAI guide to designing PV installations available soon

Ideal site for small/micro scale wind

- W/SW of
- W/SW of
- Altitude/
- Constant
- Energy e

- However
 - Can
 - Case



What does micro -scale wind look like..?



- Altitude
 - The higher the better
- Aspect
 - SW ideal, coast,
- Obstructions/Vegetation
 - Buildings, trees, in all directions
- Space/Proximity to dwellings
 - Noise, room to erect and maintain, cable run, planning regs.
- Access
 - For erection, maintenance
- Demand profile
 - Load factor, timing of demand, minimum demand

Micro-Wind : Conditional Planning Exemptions

•Domestic

- Up to 13m total height
- 6m blade diameter
- [Total height + 1m] = clearance required
- 43db(A) or +5db(A) at nearest dwelling
- One per house, to the rear or side
- Matt finish, no advertising
- Tower mounted
- Building mounted not exempt

SI 83 of 2007

•Business or industrial site

- Up to 20m total height
- 8m blade diameter
- Boundary clearance = [Total height + 5m]
- Line clearance: 5m - 20m - 30m
- 43db(A) at party boundary
- IAA permission within 5km of airport
- Not within architectural conservation area
- Mast/tower mounted only

SI 235 of 2008

• Agricultural holding

- Up to 20m total height
- 8m blade diameter
- Boundary clearance = [Total height x 1.5] + 1m
- Line clearance: 5m - 20m - 30m
- 43db(A) at party boundary
- IAA permission within 5km of airport
- 100m clearance to existing turbine
- Mast/tower mounted only

SI 235 of 2008

Remember : SI 600 of 2001

For a list of planning exemptions for all renewable technologies, see www.seai.ie/microgeneration

- Is there a grant available?
 - No grant program, but pilot study assisted host sites (40%)
- Will I get paid for exporting excess?
 - Yes, 10c/kWh for first 3,000 kWh exported
 - If you are a domestic customer of ESBCS you get a further 9c/kWh for all exported units
- Can I put a turbine on my roof or gable end?
 - Not worth it and besides, you need planning
- How long will a good quality turbine last?
 - If well maintained >15 years with some parts replaced
- Should I add batteries if I have a grid connection?
 - Export tariff available so may not be viable
 - Environmentally dubious
 - Option to heat water???

- 1459 MW connected
- +5 GW through Gate 3
- 4GW wind gets to 40%
- Challenges
 - Planning
 - Delivery of connections
 - Major grid upgrade
 - Access to finance
 - Managing variability



- **Targets and Participants**
 - 50% of the target - energy suppliers.[
 - 50% of target - energy services providers e.g. HES / GHS
- **BER**
 - Will underpin new programme
- **Funding**
 - 75% of the funding - domestic sector (of which 40% (or 30% of total programme funding) - energy poverty).
 - 25% of the funding - non-domestic sector.
 - 50% of the funding - energy suppliers.
 - 50% of the funding - energy services providers.
- **New Approach for Customers**
 - Up-front discounts on the costs of measures, not retrospective grant payments.
 - Relevant discount - clearly marked / advertised as being part of the Government backed programme.
 - Remainder of costs – customers (except in fuel poverty programmes)
- **Opportunities for Lending Institutions**
 - Opportunity for lending institutions to come up with specific, retrofit programme-based loans.

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Download our guidelines for design and construction of new dwellings to the Passivhaus standard at www.seai.ie/phguidelines

Download our new guidelines for retrofitting dwellings to the Passivhaus standard at : www.seai.ie/retrophguidelines