

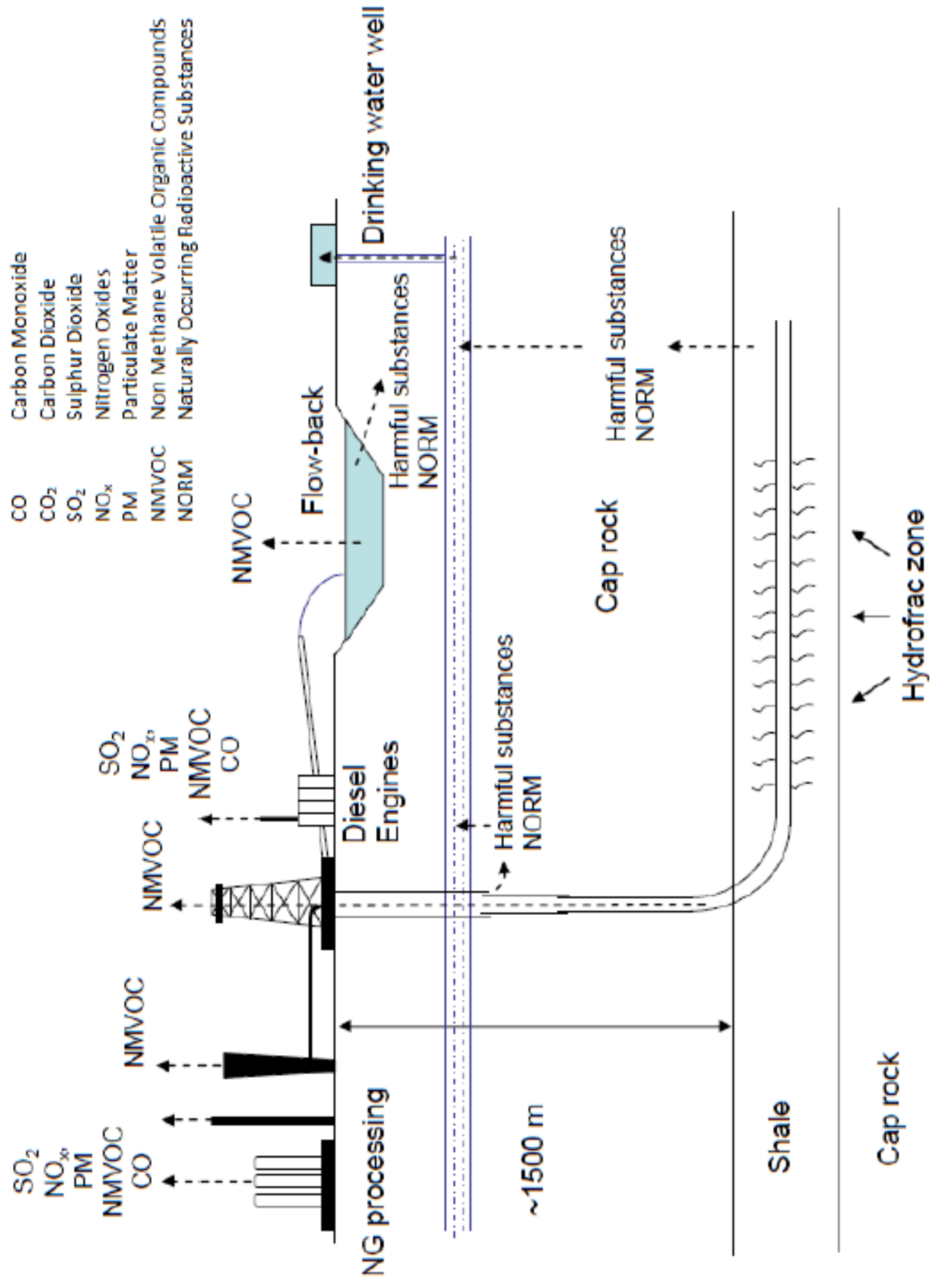
Fracking The costs The gains

**Fracking Research and Information Centre
October 2011**

Greenhouse

gas

emissions



Two causes for GHG emissions from fracking:

1. **Carbon dioxide**

from:

- well construction
- well drilling
- trucking
- pipeline laying
- forest felling
- combustion
- production
- distribution

2. **Methane** from:

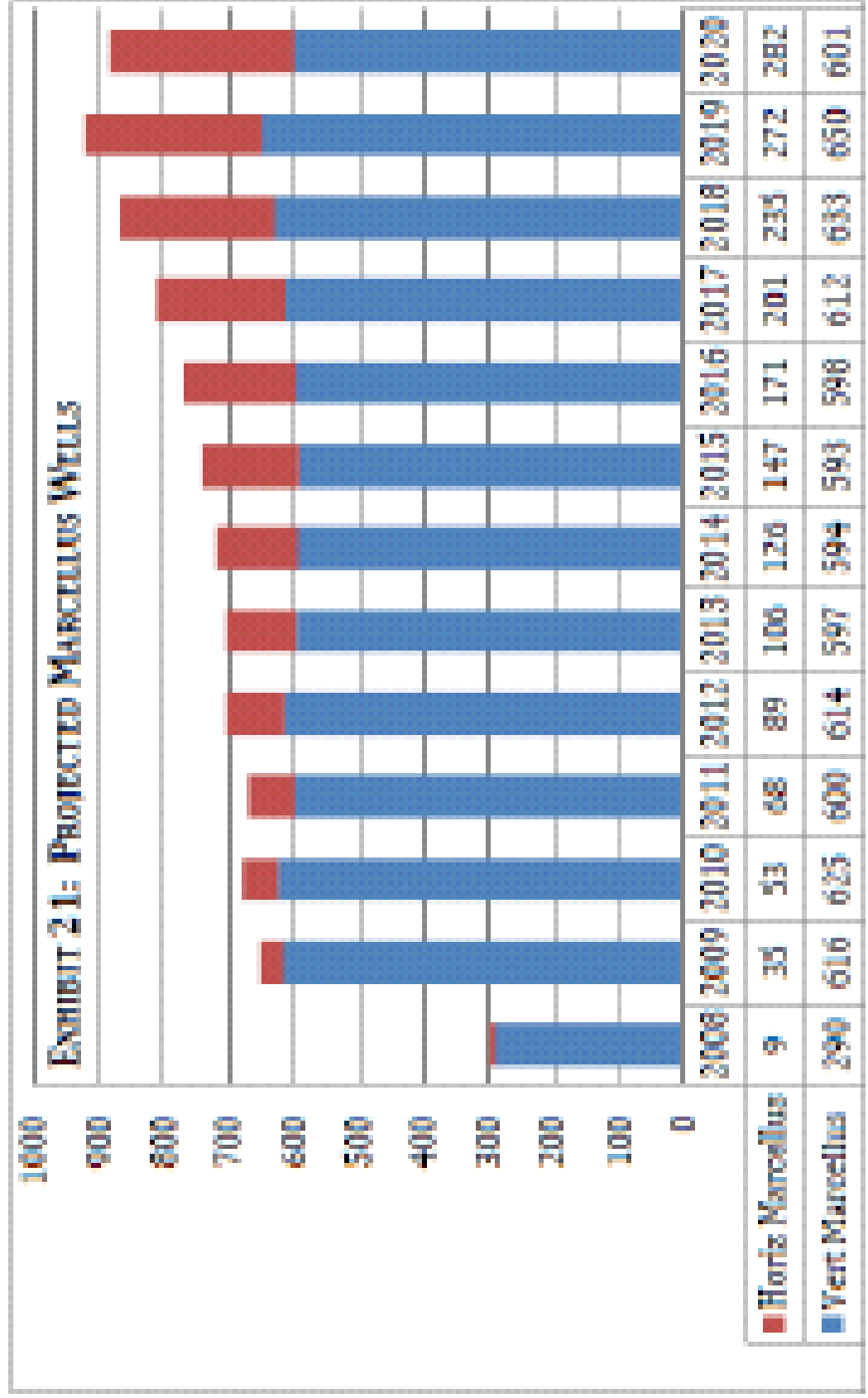
- flowback return fluids
- drill-out following the fracturing
- venting and leaks

“**3.6 to 7.9%** of the total production of the well is emitted to the atmosphere as methane .”
(Howarth report)

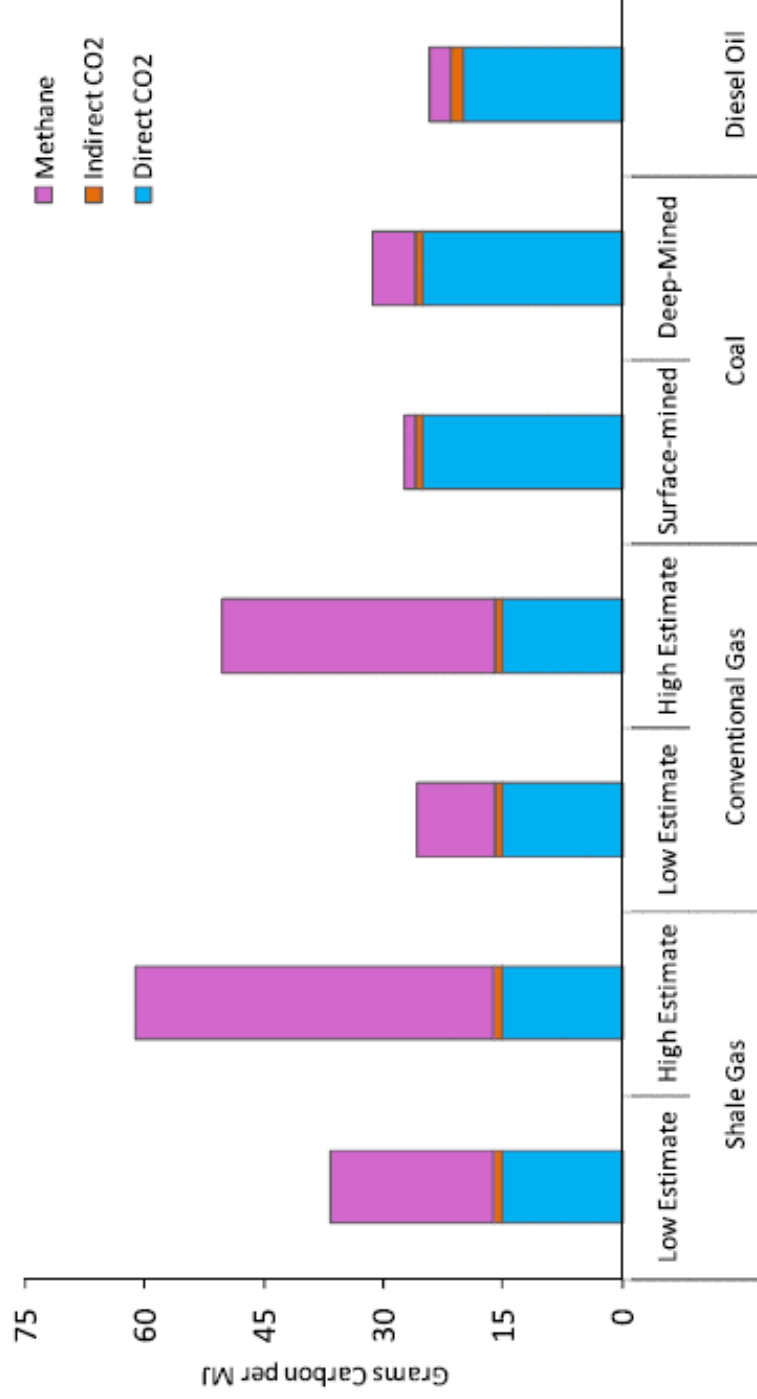
Methane has **105 times more** warming impact pound for pound than CO₂.

In January this year the USA EPA found that GHE from fracking were almost **9000 times** higher than previously calculated.

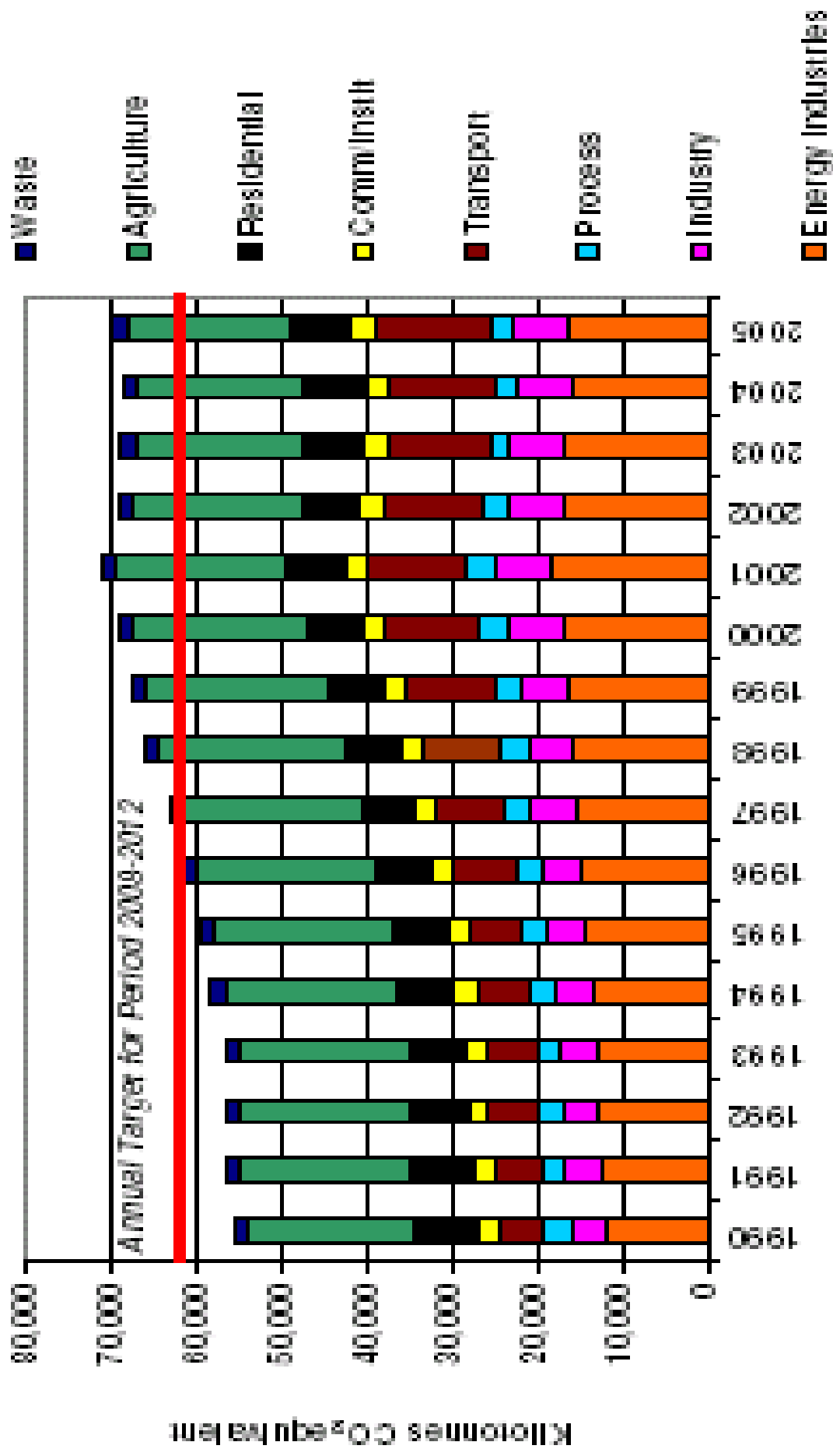
Figure 2.11: Cumulative Marcellus Wells, by Year.



**GHG emissions from shale gas fracking:
 22 to 43% higher than from conventional gas
 20 to 50% greater over twenty years than from coal
 50-250% more than from diesel oil.**



Greenhouse gas emissions Ireland 1990-2005



Kyoto: 315 Million tonnes CO2 equivalent for the period 2008-2012

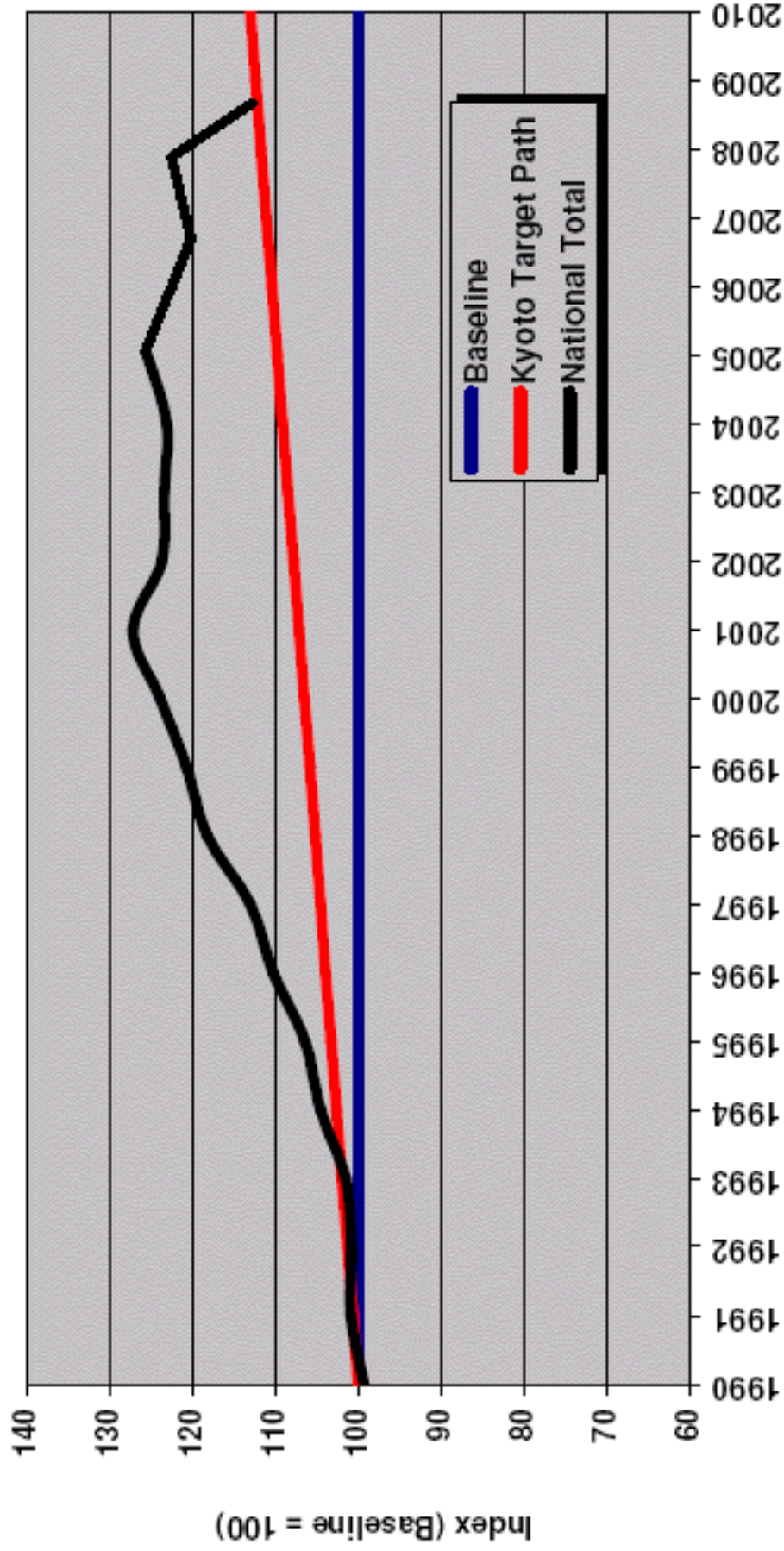


Figure 4. Total GHG Emissions compared to Baseline Level and Kyoto Target Path
(The straight line from baseline in 1990 to 13% above baseline in 2010 represents the Kyoto Target Path)

THE REAL COST

Emission laws are put in place to try and limit the effects of global warming.

High greenhouse gas emissions add to global warming.

We are already paying on a world wide basis for this: higher food prices, insurance for natural disasters, and governments have to deal with the costs and effects of floods, hurricanes etc.

Water

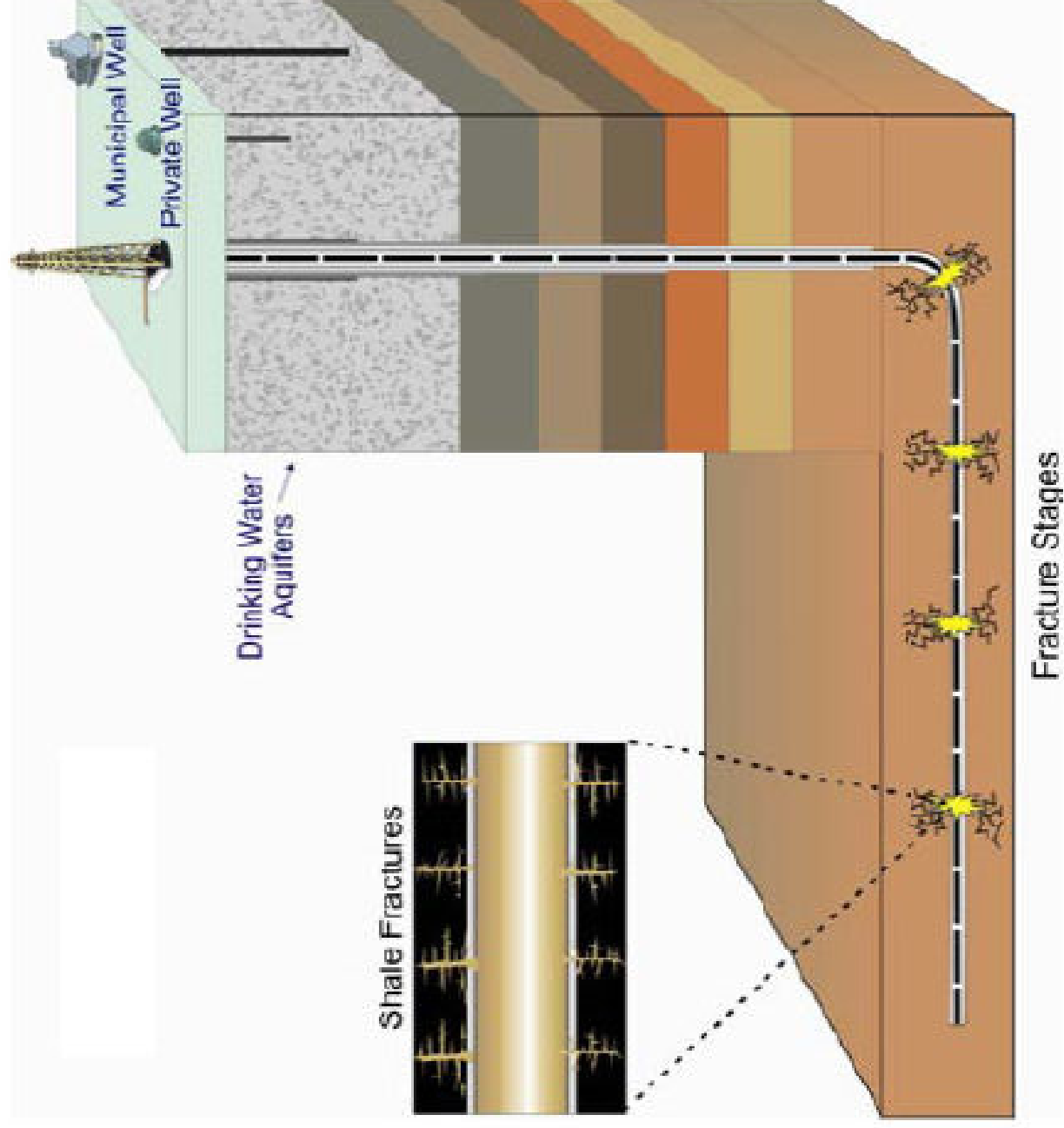
The potential for contamination depends on:

- The toxicity of the water,
- How close the gas well and fracture zone are to shallow ground water,
- Transport and disposal of waste water.

Contamination can occur due to:

- Blow out with frack water spills.
- Leakages from waste water or from fracture fluid pond or pipes.
- Groundwater contamination due to improper handling or unprofessional cementing of the well casing.

Figure 2.1: Schematic diagram of hydraulically fractured horizontal well – not to scale (US EPA Hydraulic Fracturing Research Study – Scoping Background, 2010)



- **Transport to treatment centres where it is treated and released to local surface water.**
- **Injections into the ground.**
- **Recycle for other uses or re-injected as fracking fluid.**
- **Spread on roads for dust suppression.**
- **Evaporation into the air**



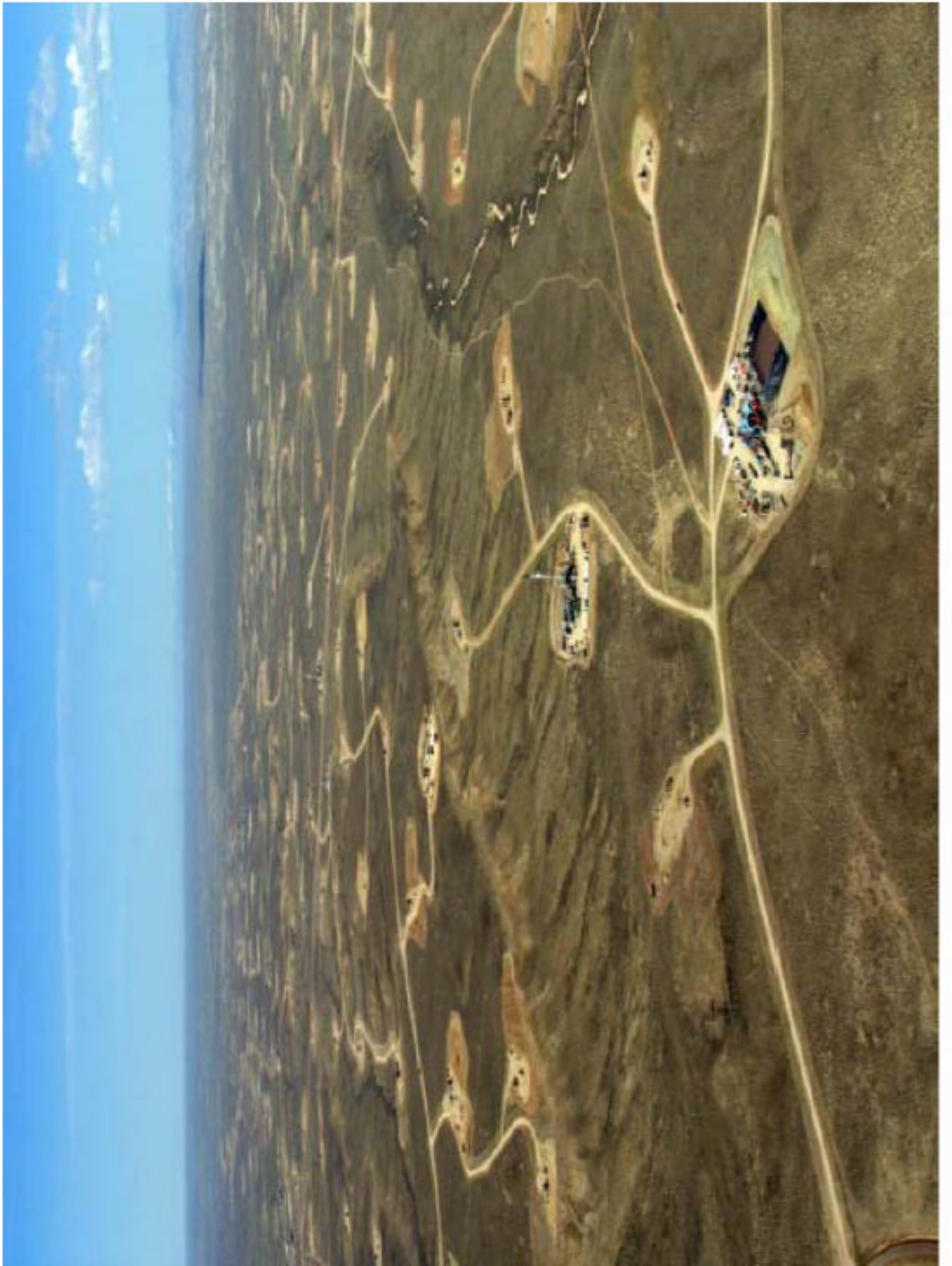


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Truck visits : Purpose	Per well		Per 16-well pad	
	Low	High	Low	High
Drill pad and road construction equipment			60	270
Drilling rig			30	30
Drilling fluid and materials	25	50	400	800
Drilling equipment (casing, drill pipe, etc)	25	50	400	800
Completion rig			15	15
Completion fluid and materials	10	20	160	320
Completion equipment (pipe, wellhead)	5	5	80	80
Hydraulic fracture equipment			150	200
Hydraulic fracture water	400	600	6400	9600
Hydraulic fracture sand	20	25	320	400
Flowback water removal	200	300	3200	4800
Total			11.215	17.315

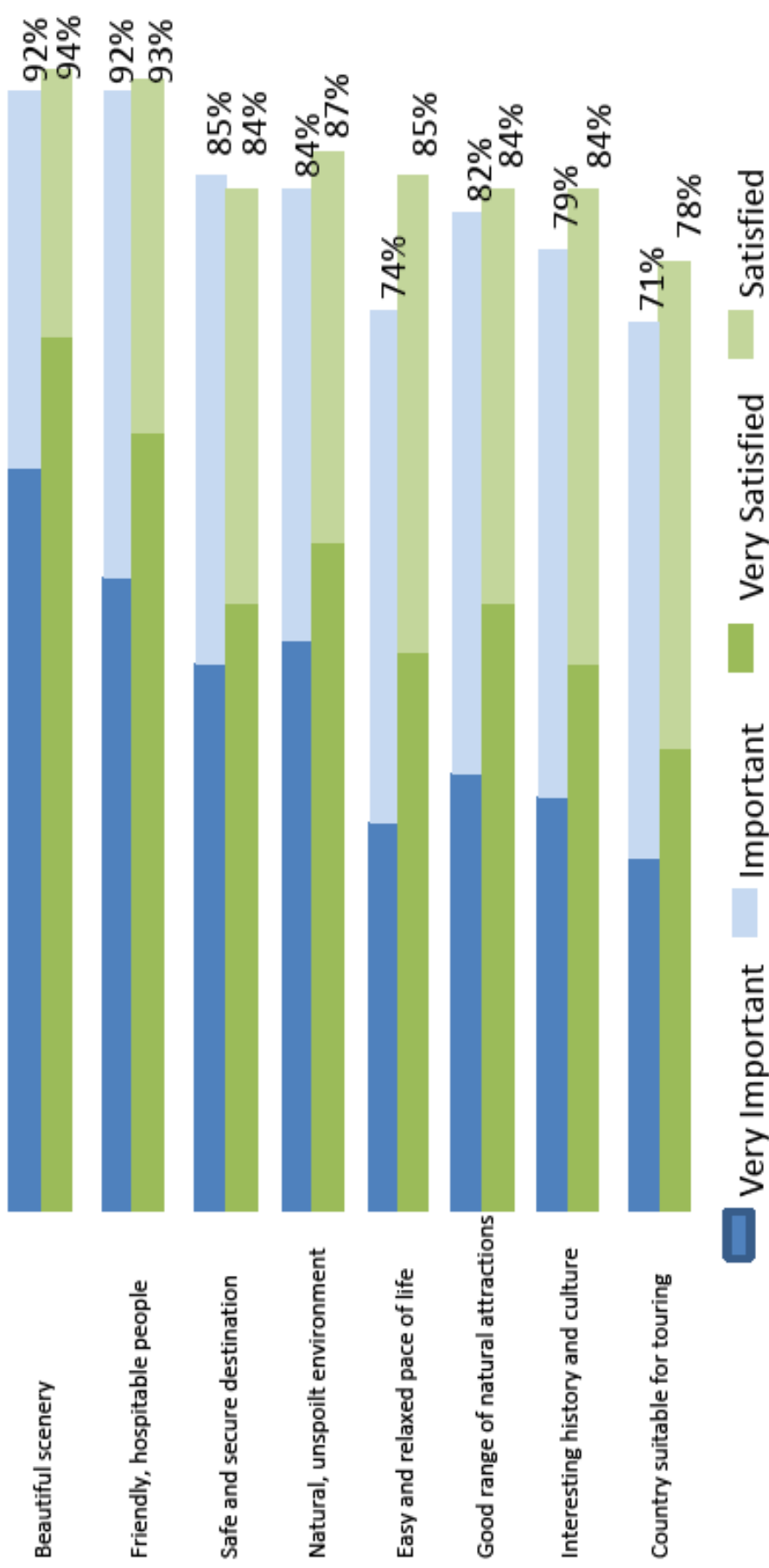


Tourism



Why do people visit Ireland?

Important and Rating of Destination Issues



Numbers (000s)	Britain	Mainland Europe	North America	Other Areas	Overseas Tourists
Dublin	1,264	1,355	608	257	3,484
East & Midlands	253.0	448.0	198.0	137.0	1,036.0
South-East	402	247	93	31	772
South-East	141.0	100.0	29.0	29.0	299.0
South-East	290	194	139	62	685
South-East	92.0	47.0	23.0	13.0	175.0
South-West	507	513	338	106	1,464
Shannon	75.0	100.0	115.0	23.0	300.0
West	394	422	255	77	1,148
North-West	127.0	111.0	92.0	17.0	347.0
North-West	307	400	69	20	806
North-West	174	170	103	3.0	450
North-West	170	134	83	322	519
Total	946.0	1,033.0	532.0	233.0	2,744.0

3,914,000 tourists

1.234 billion euro

Region Visited for Holiday

The South-West maintained its position as the most popular holiday destination for Irish residents in 2009 accounting for over one-quarter of all holiday trips taken. The West (18%) was the next most popular destination followed by the South-East (17%).

Regions Visited - Domestic Holidays (%)

	2005	2006	2007	2008	2009
Dublin	8	10	10	10	10
Midlands-East	9	9	11	10	9
South-East	20	18	17	19	17
South-West	25	26	27	26	25
Shannon	9	10	10	9	10
West	19	19	16	17	18
North-West	9	11	11	10	10

5.3 million trips

Based on Fáilte Ireland estimates

0.95 billion euro

What activities did they engage in 2010 (p)?

<i>Preliminary Estimates</i>	Overseas Participants (000s)
Hiking/Cross Country Walking	693
Golf	164
Angling	123
Cycling	164
Equestrian	60

The total number of people employed in tourism in Ireland is 200.000.

Finally, Ireland has been voted the Frommer's Guide readers' favourite destination, ranked No. 1 out of 10 destinations based on factors such as our countryside, our history and opportunities to ramble and explore.

Agriculture



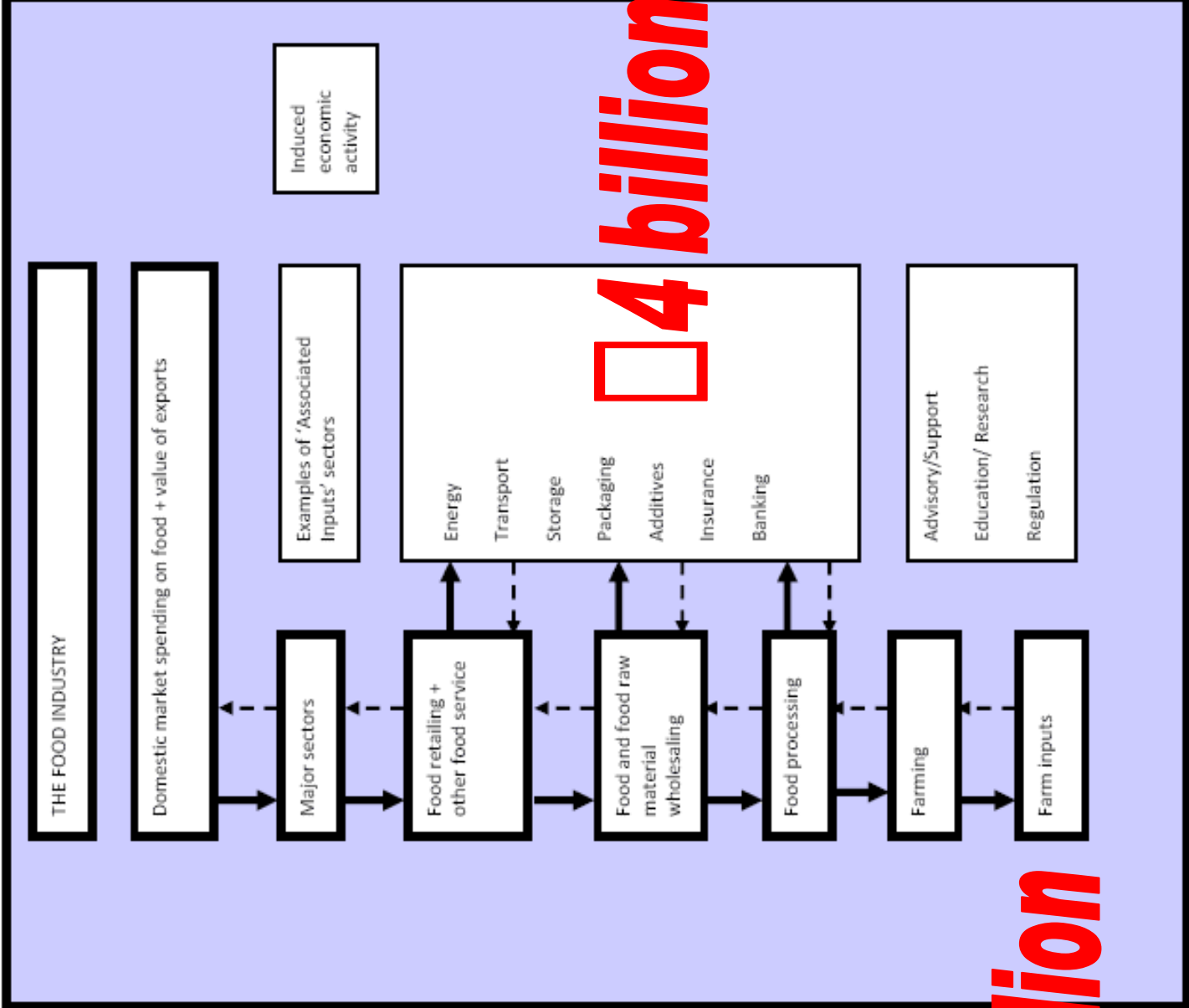
14 -15% of Irish jobs

287.000 to 308.000 jobs

€ 9.25 billion per year

60% of exports

Cuadrilla Preese Hall-1 Well, Lancashire, UK



□ 4 billion

□ 4 billion

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1: Total Gas Extracted

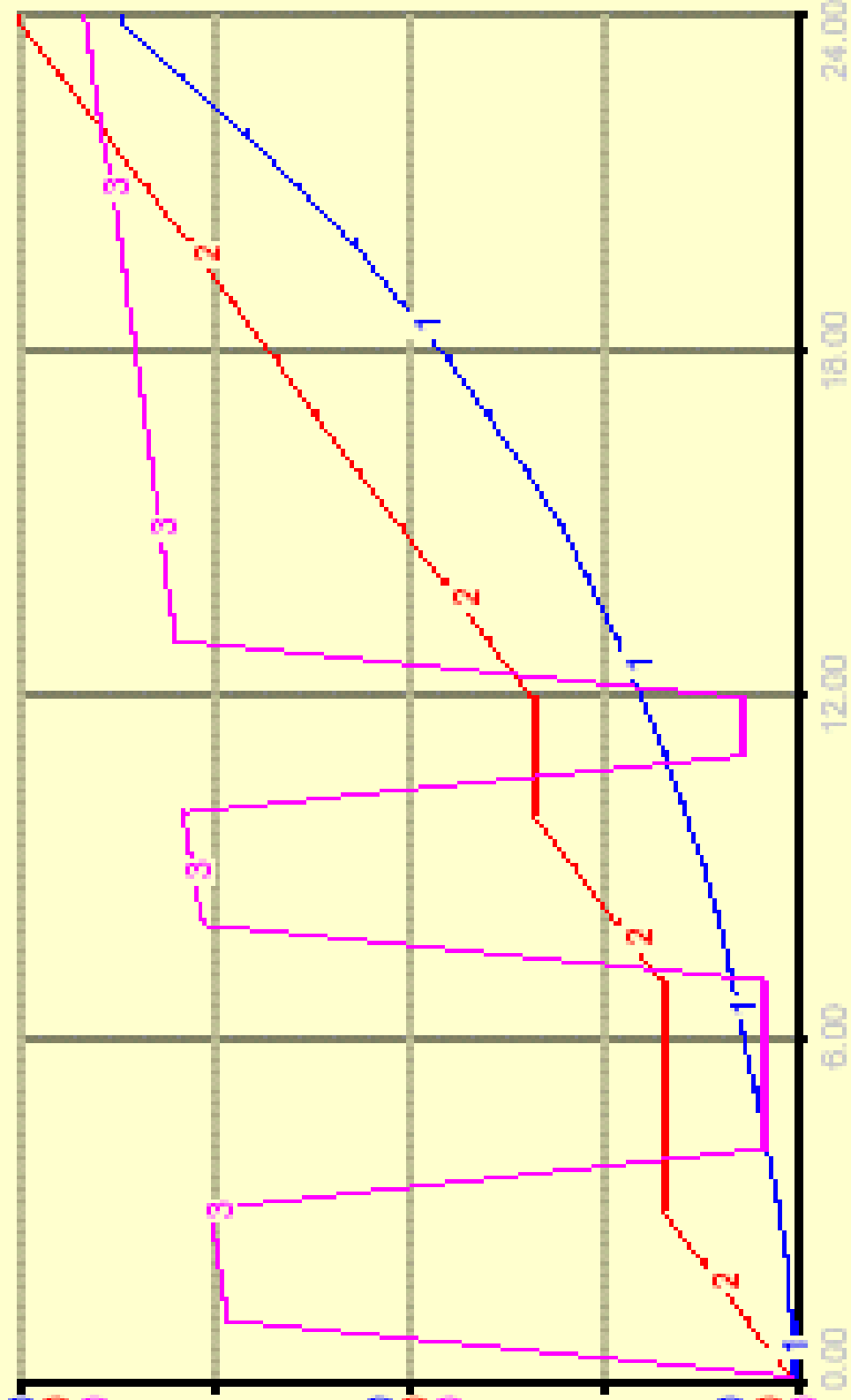
3: Industry Jobs

2: Active Wells

1: 500000000
 2: 9000
 3: 80000

1: 250000000
 2: 4500
 3: 40000

1: 0
 2: 0
 3: 0



Economics!

Irish gas consumption in 2009 was 4.999 billion cubic meters, of which 4.628 billion cubic meters was imported.

Potential

**Possible (speculative) G I P ~ 10 – 19 TCF
Connector to UK & Europe – high value market**

“we don’t know if there is any gas at all”

Financial markets

So it will not:

- Alleviate fuel poverty.

We buy back at market prices; it could even be that we could buy gas from let's say Russia cheaper, in the same way as it is cheaper to buy chickens from Thailand.

- Secure our energy supply;

Because we have to buy it back.

We have no secure regulation yet on hydraulic fracturing. This could mean we end up with:

- Having to clean up our water
- Paying fines for breaching directives
- Paying fines for GHE
- Losing a large amount of tourism
- Possibly losing part of agriculture

- Gas production in Europe has declined in the last years and is expected to decline further.
- Demand is expected to rise

alternatives:

- savings
- efficiency
- substitution

References