The University of Manchester
Sustainable
Consumption Institute

MANCHESTER 1824

What can consumer accounting tell us about measuring progress towards a low carbon society?

CCCEP and UKERC Workshop, July 2011

Dr Alice Bows: lecturer in energy & climate change

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Summary

Cumulative emissions

2°C pathways

Need for urgency

Contrasting production & consumption pathways

Application: consumption-based scenarios

Conclusions

Influencing the future

Decisions made now impact on future adaptation

Higher Mitigation = Lower Adaptation

Lower Mitigation = Higher Adaptation

Where current influence is leading…

Global emissions continuing to grow exponentially
UK policies not delivering in line with 2°C

Lower Mitigation = Higher Adaptation

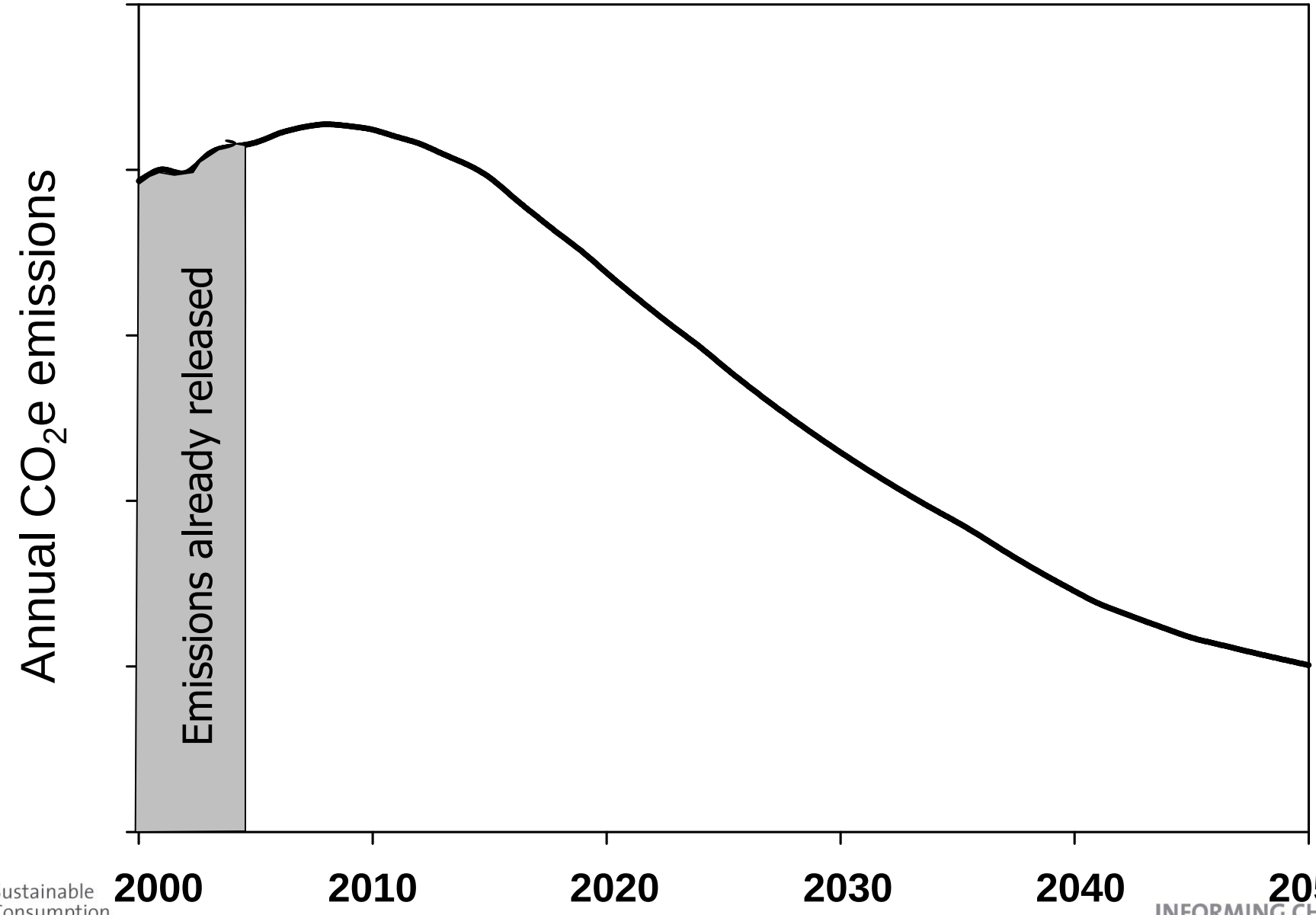
Currently policies in line with 4°C by 2100

What can be done to avoid this?

(Anderson & Bows, 2010; Betts et al., 2010; Rogelj et al., 2010)

Cumulative emissions

Illustrative pathway for a CO_2e budget



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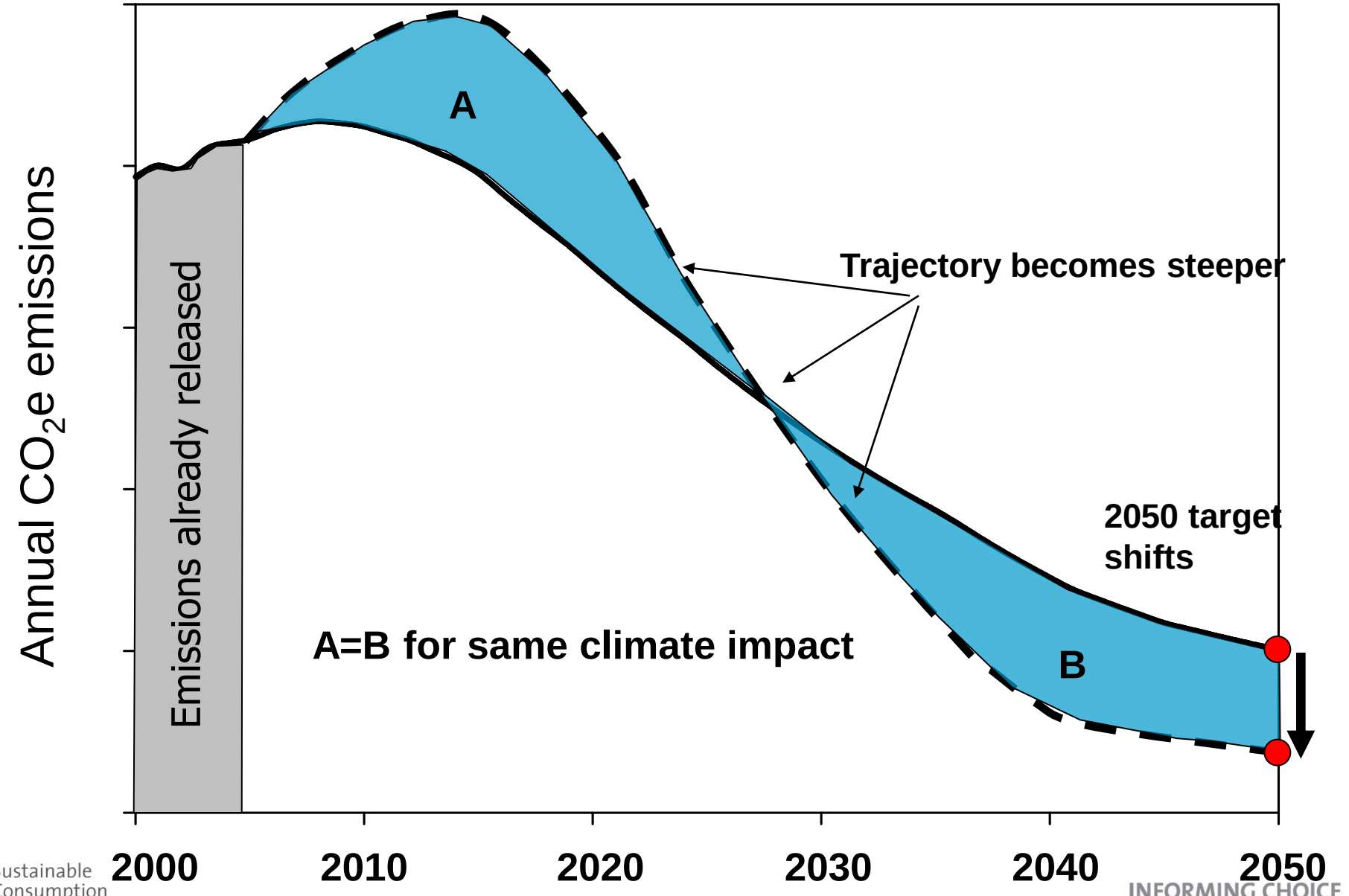
Illustrative pathway for a CO_2e budget



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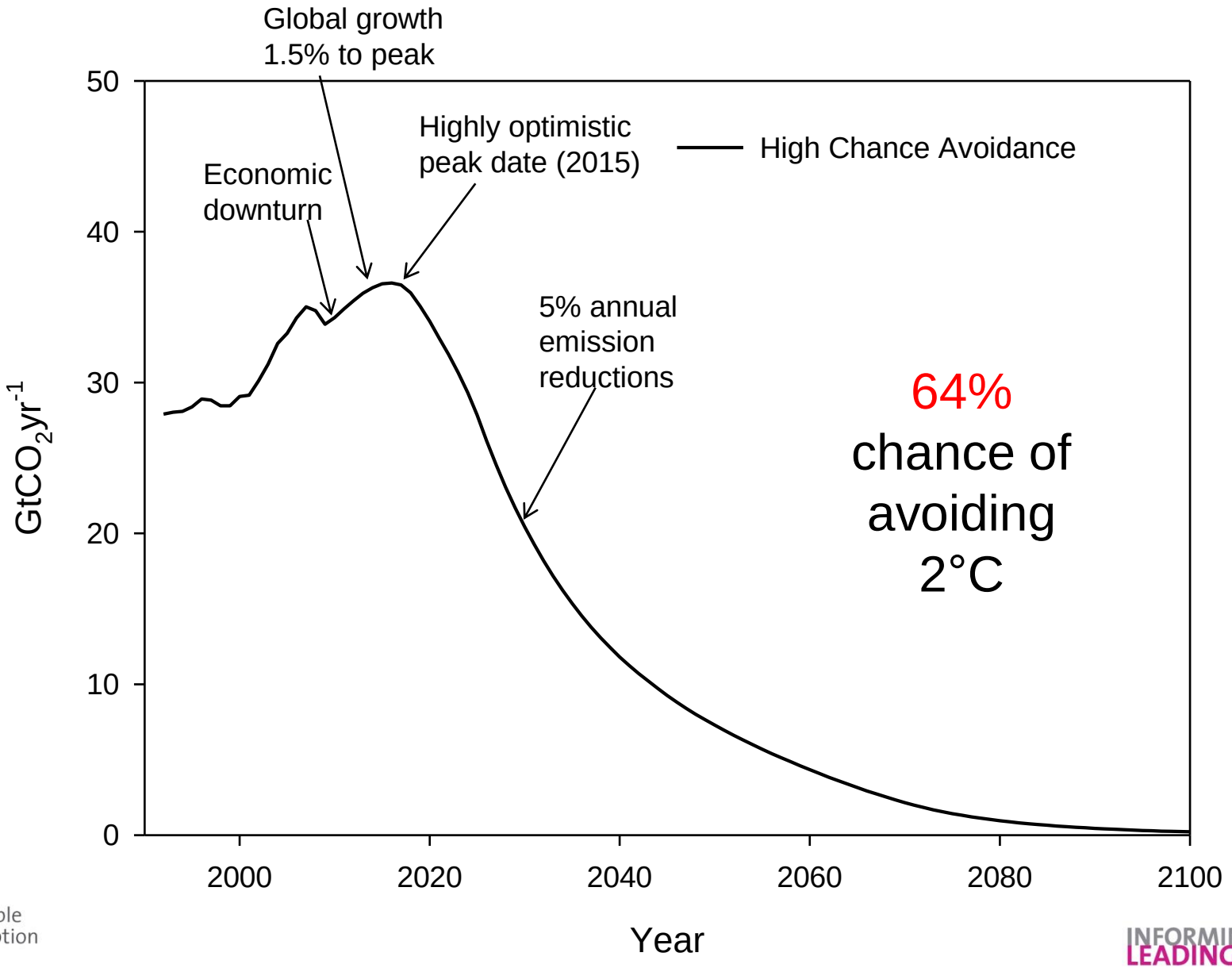
Don’t focus on end-point targets

Focus on the cumulative budget

Implications of different budgets



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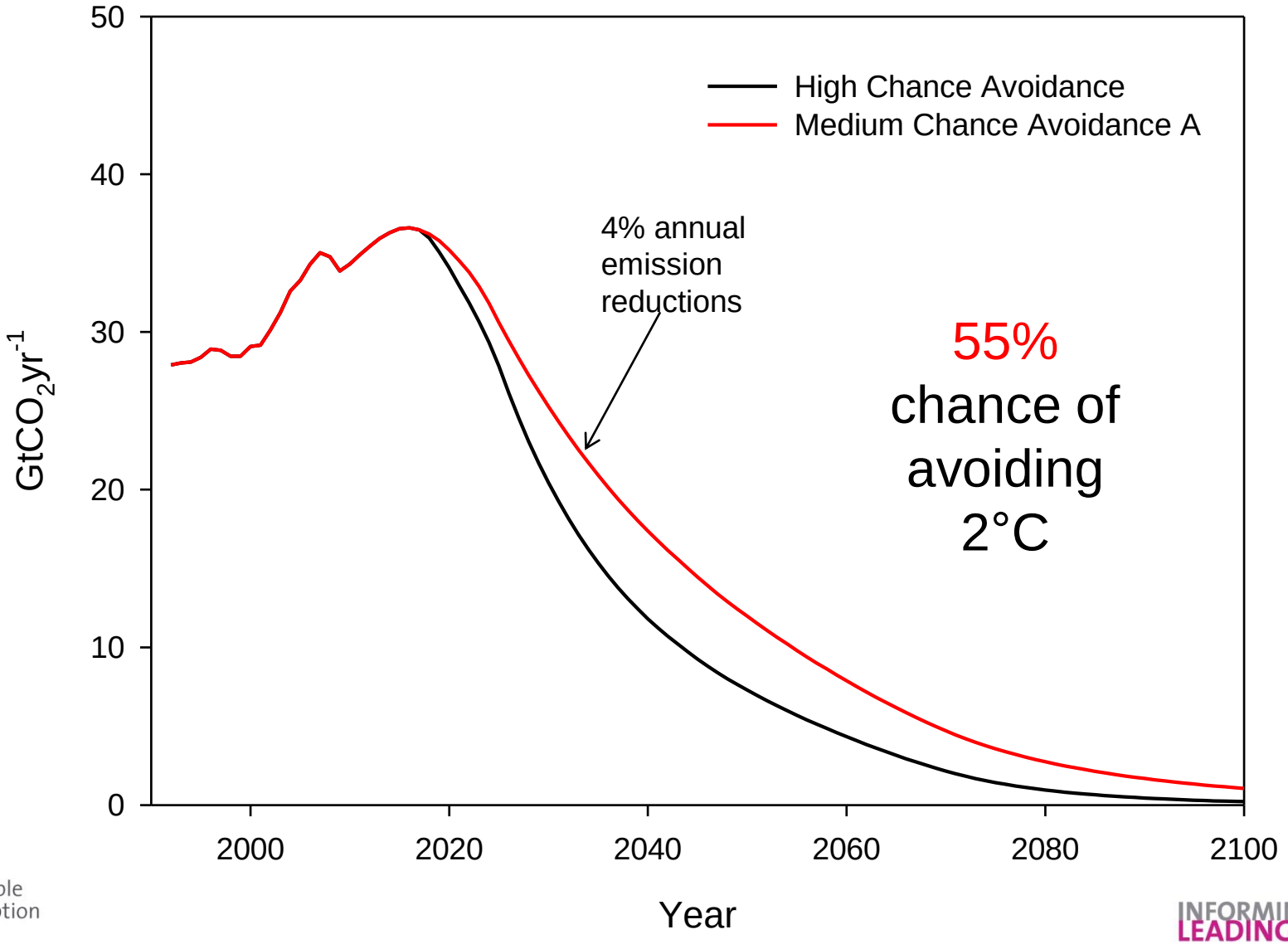
Anderson & Bows, 2011, Beyond 'dangerous' climate change: emission scenarios for a new world, *Phil Trans A*, **369**, 20-44

Implications of different budgets



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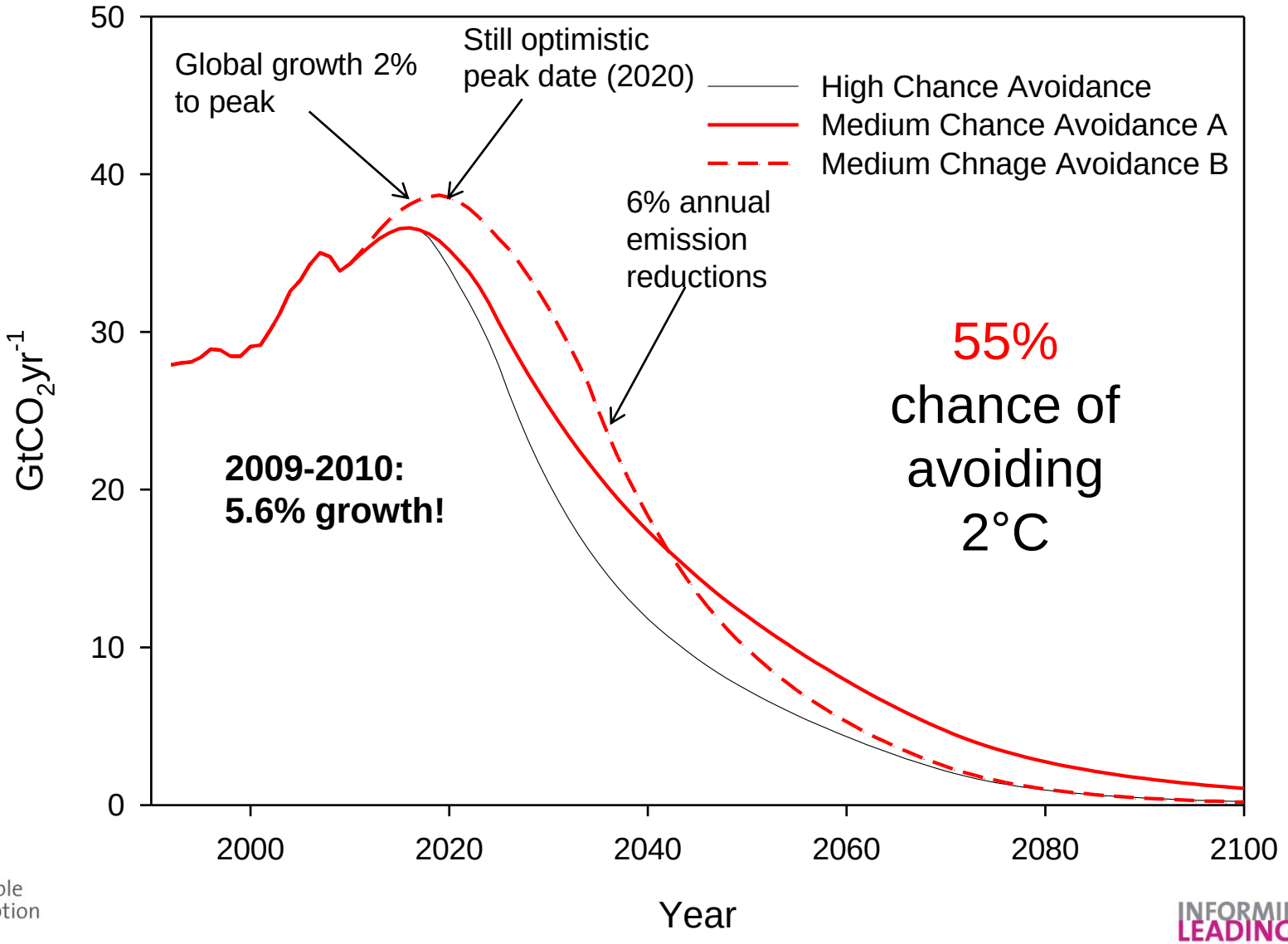
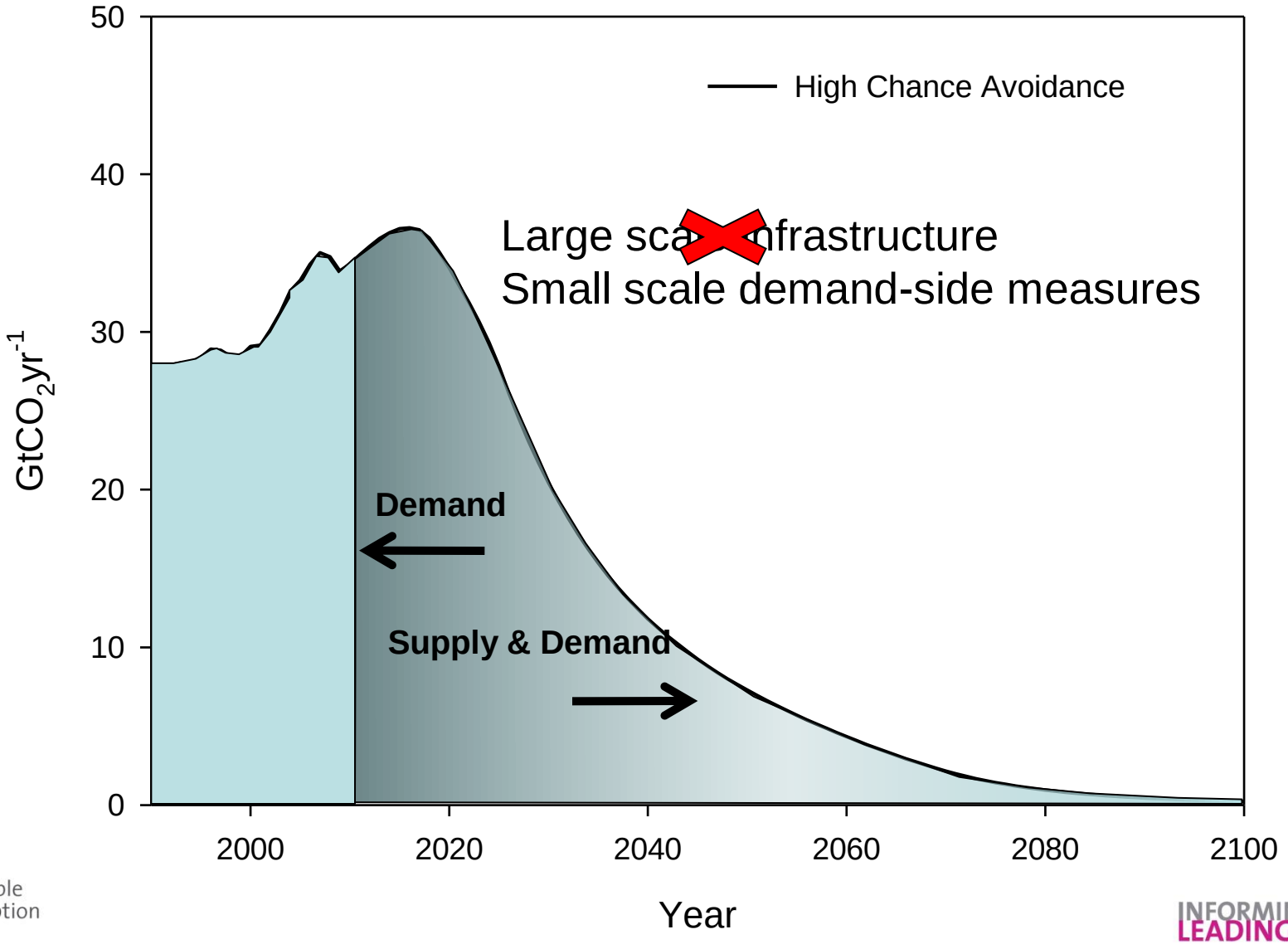
Implications of different peak



What can be tackled urgently?

Energy implications



Big picture – Energy Lens

Urgent reductions point to demand management

Sustained rapid reductions require supply & demand

Rates of reduction challenge economic orthodoxy

Down-scale to explore drivers and solutions…

Basic separation: Annex 1 vs non-Annex 1

Separate emissions by Annex 1/non-Annex 1

Conventional – use production based accounts

Unconventional – use consumption based accounts

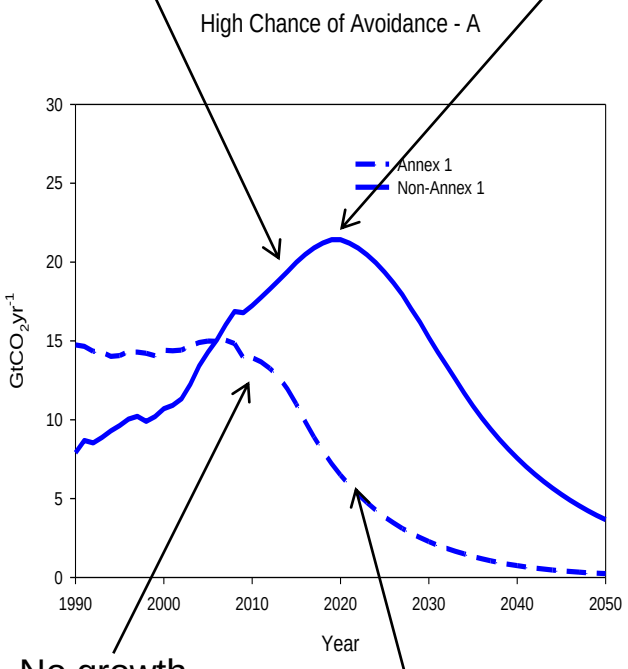
Does this change the conclusion regarding demand?

Production-based

Set non-Annex 1 pathway. Q: What is remaining for Annex 1?

<3% growth to peak (lower than historic)

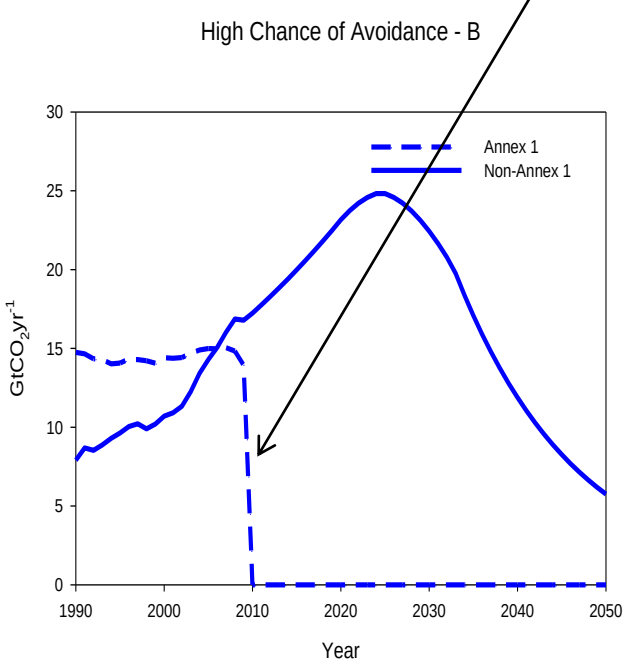
Highly optimistic peak date (2020)



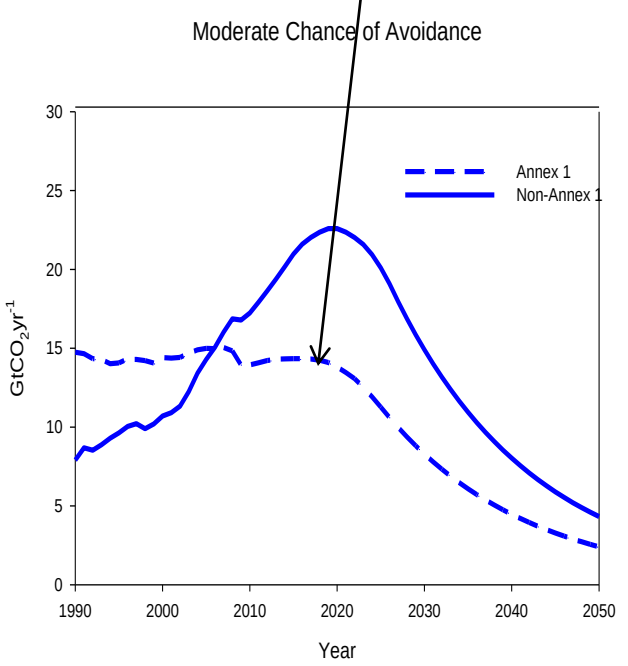
No growth following recession

11% pa reductions!

Later peak=no space for Annex 1



Bigger budgets; bigger impacts; more room to manoeuvre – still 5-6% pa reductions



Production-based implications for avoiding 2°C

Lower than trend growth in non-Annex 1 required

Little room for Annex 1

Immediate reductions in Annex 1 + early peak in non-Annex 1 essential

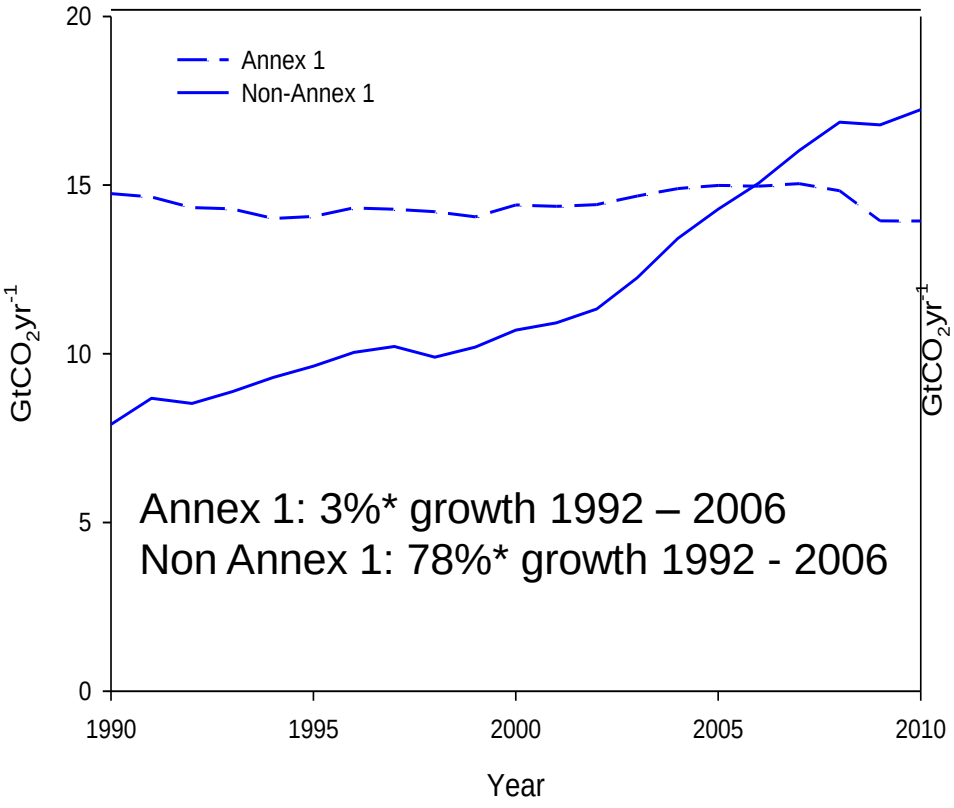
Reductions well in excess of ‘economically acceptable’ levels

Need to understand driver of growth in non-Annex 1

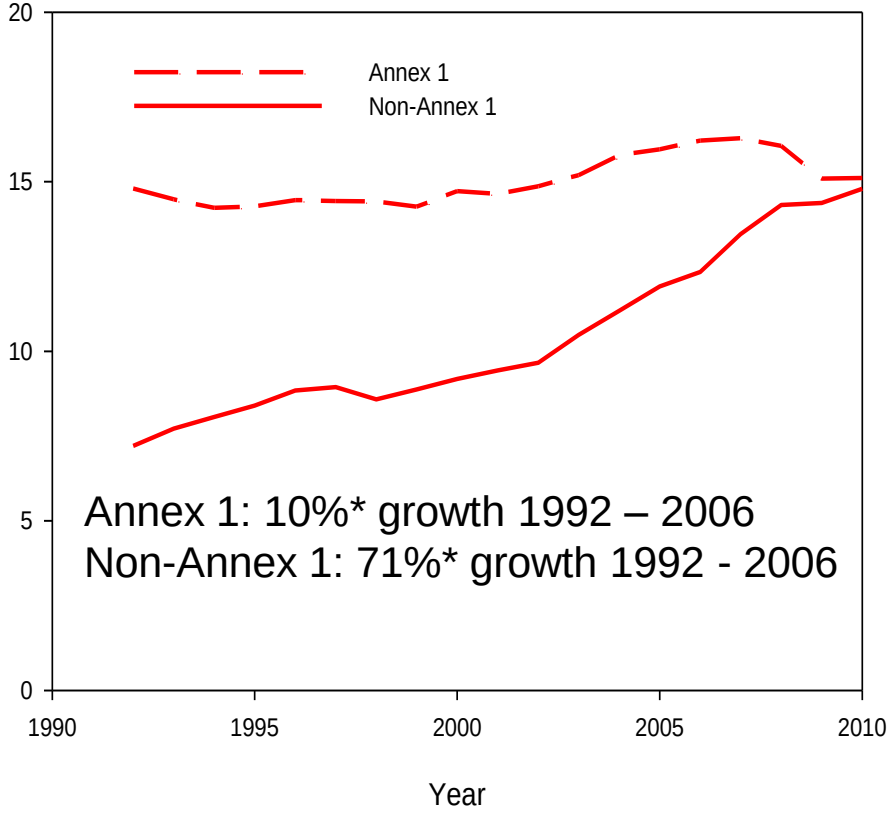
Can consumption-based accounting shed light?

Historical Trend

Production based



Consumption based



* Including international aviation and shipping

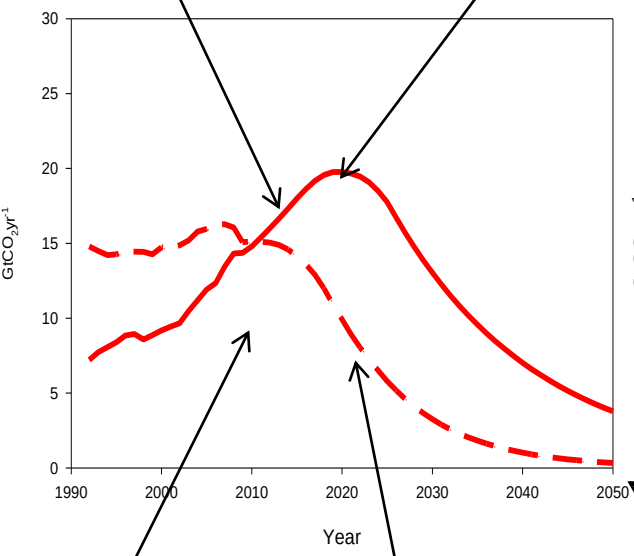
Consumption-based

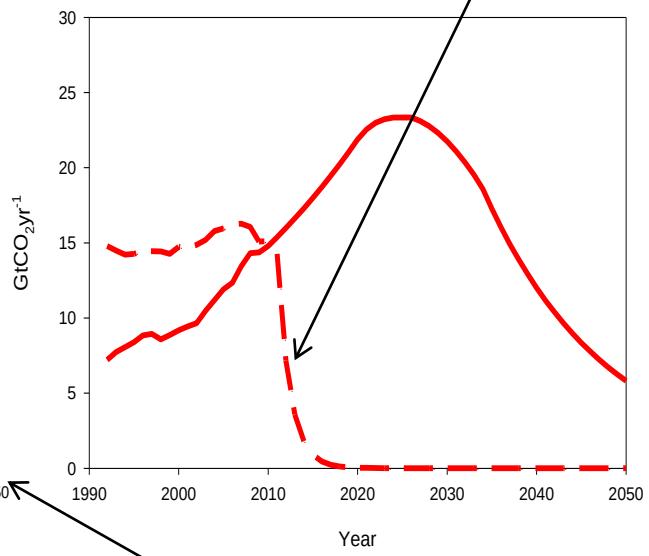
<4% growth to peak (slightly lower than historic)

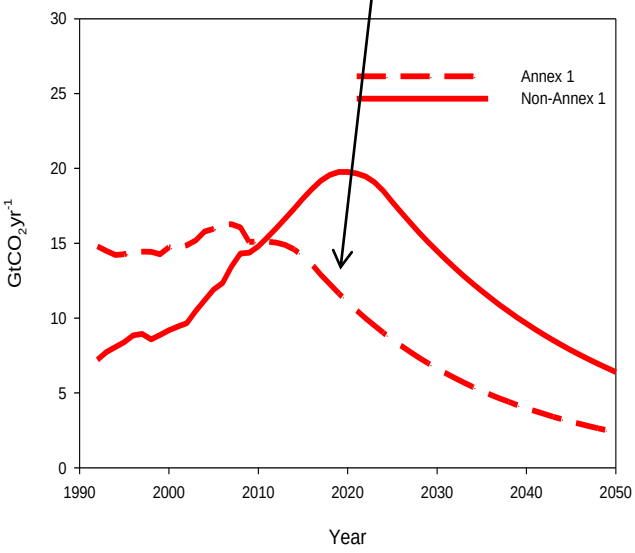
Highly optimistic peak date (2020)

Later peak=v little space for Annex 1

Bigger budgets; bigger impacts; more room to manoeuvre – still 4-5% pa reductions







No growth following recession – break from trend

11% pa reductions but less immediate!

Complete decarbonisation by 2050

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Bows & Barrett, 2010, Cumulative emission scenarios using a consumption-based approach, *Carbon Management*, **1**, 161-175

Consumption-based implications for avoiding 2°C

Recent Annex 1 emission growth more rapid under a consumption-lens

‘High Avoidance’ budget still has little room for growth

Extra burden on Annex 1 makes strictest reduction pathways more viable

Most relevant for nations like UK – but not all Annex 1 are like UK

Need to target Annex 1 consumption and influence supply chains

This could help to reduce consumption-emission growth in non-Annex 1

Otherwise non-Annex 1 consumption emissions will dominate very soon

Delay in tackling climate change means budget more important than accounting framework for 2°C targets and below

Application

SCI: Food supply chain project

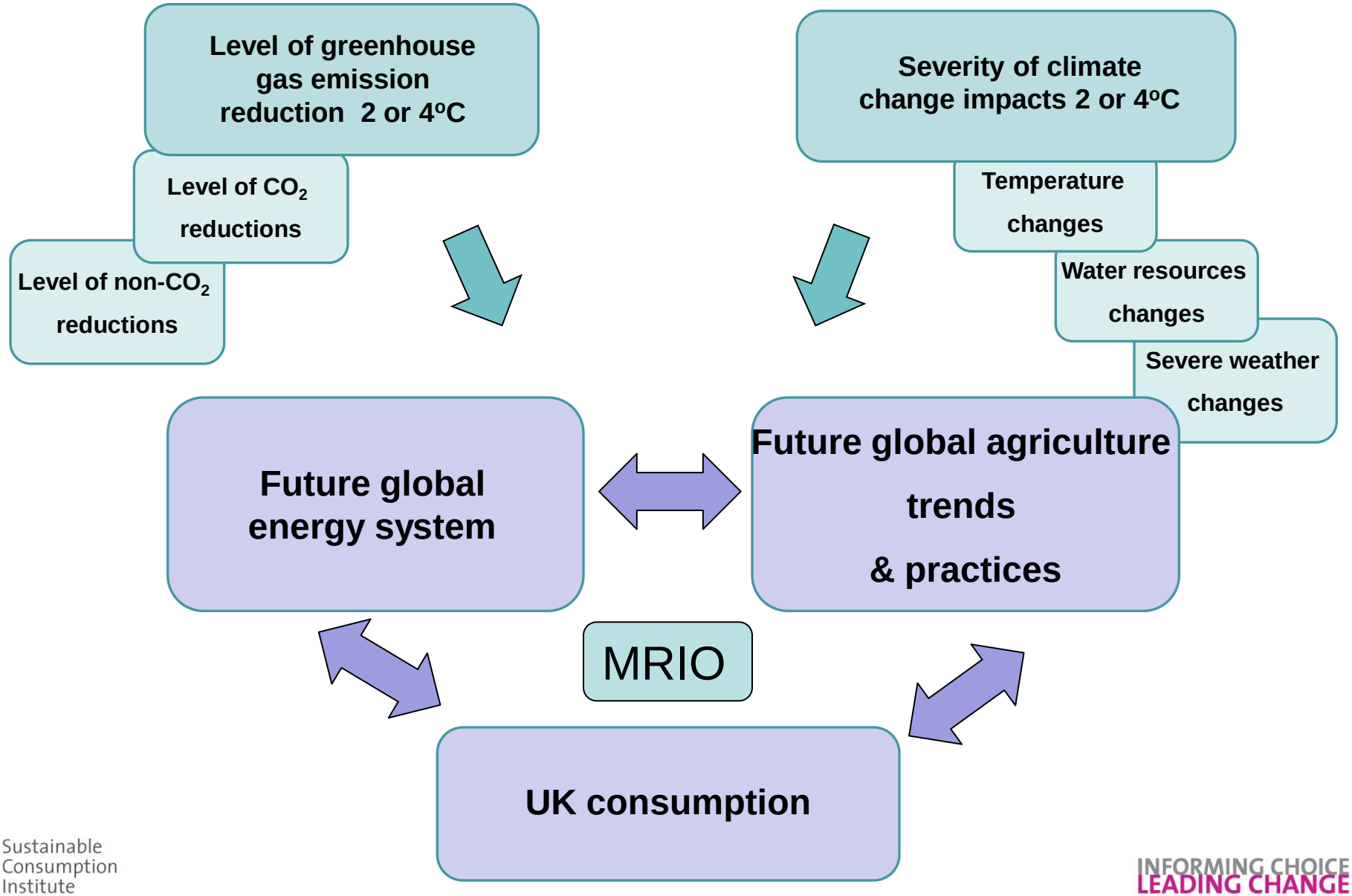
Quantitatively:

1.Multi-Regional Input Output Model (UK: EU: Other Annex B: Non Annex B)
2.Life Cycle Analysis

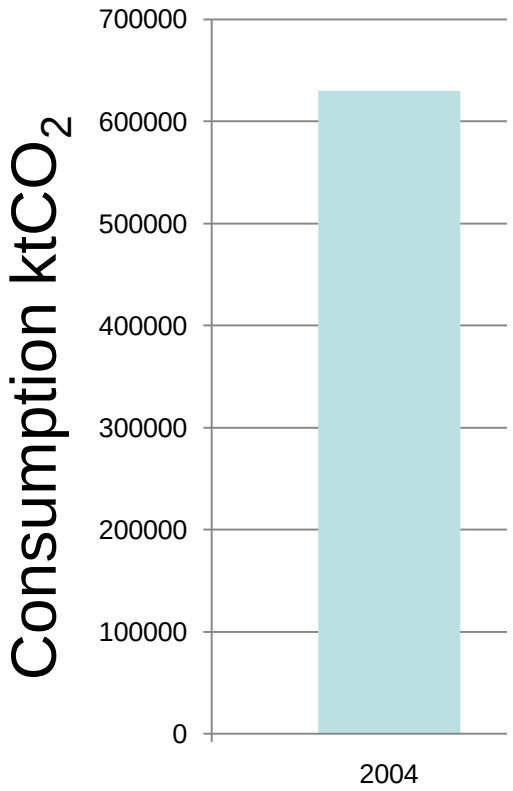
Qualitatively:

1.Stakeholder Interviews
2.Literature review

Characterise ‘final demand’, and supply systems in future



The starting point.. 2004



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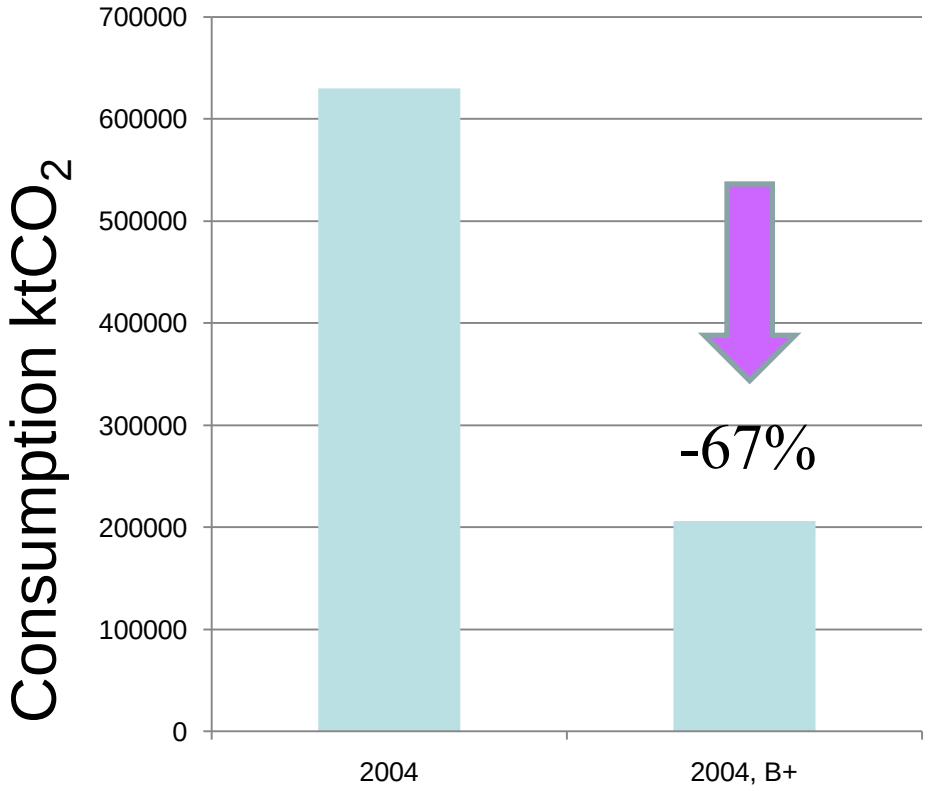
Current Ambitious Policy – Annex 1

Step 1: 90% reduction in emissions intensity from all Annex B sectors except:

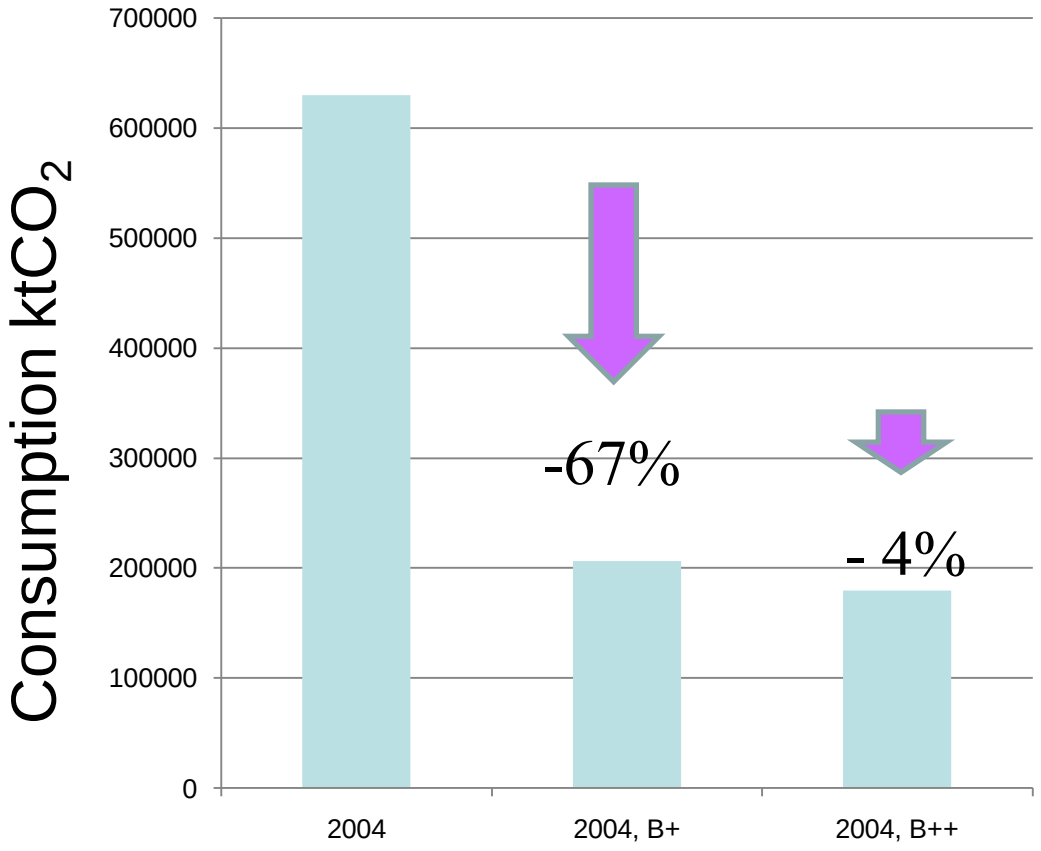


Electricity: 98%
Aviation 58%

No change in demand

Complete decarbonisation Annex 1

Remainder - imports from non-Annex 1 to intermediate demand



Step 2: Complete decarbonisation of all Annex 1 sectors except:

Aviation 58%

No change in demand

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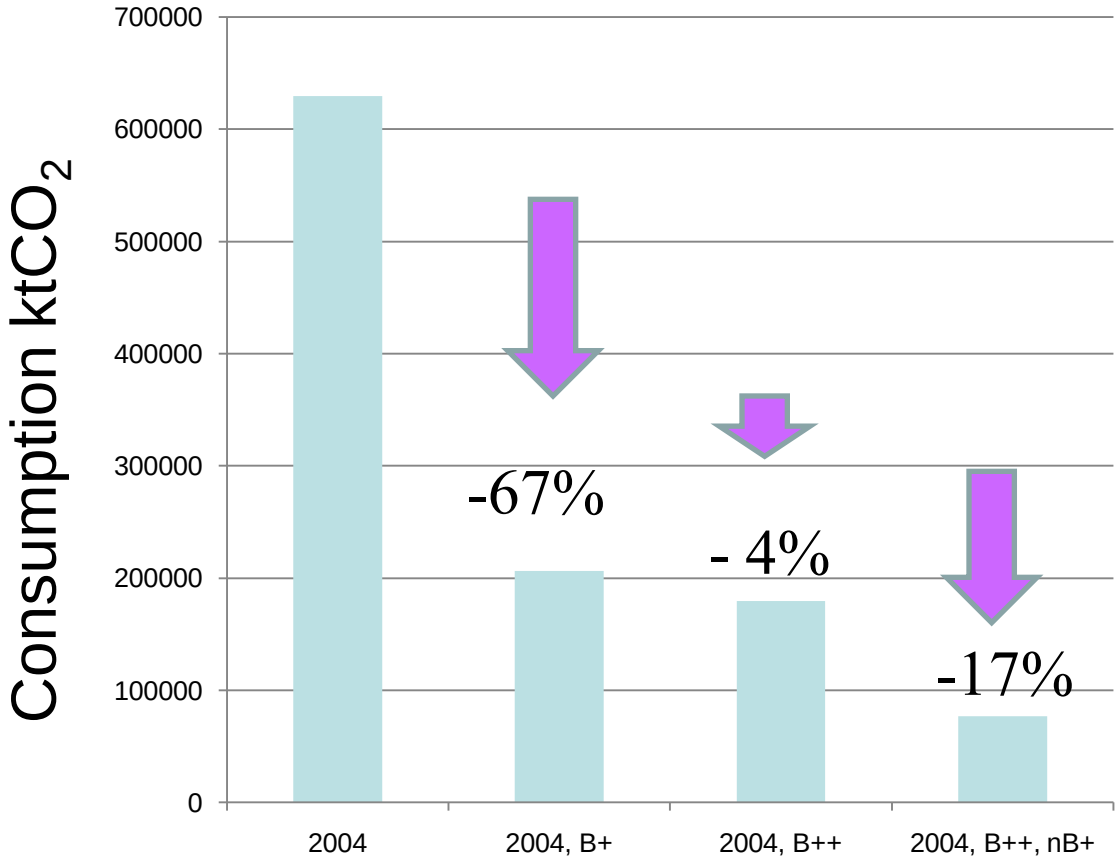
Decarbonisation Annex 1 + Non Annex 1 Effort

Step 3: 65% reduction in emissions intensity of non-Annex 1 sectors except Aviation (58%)

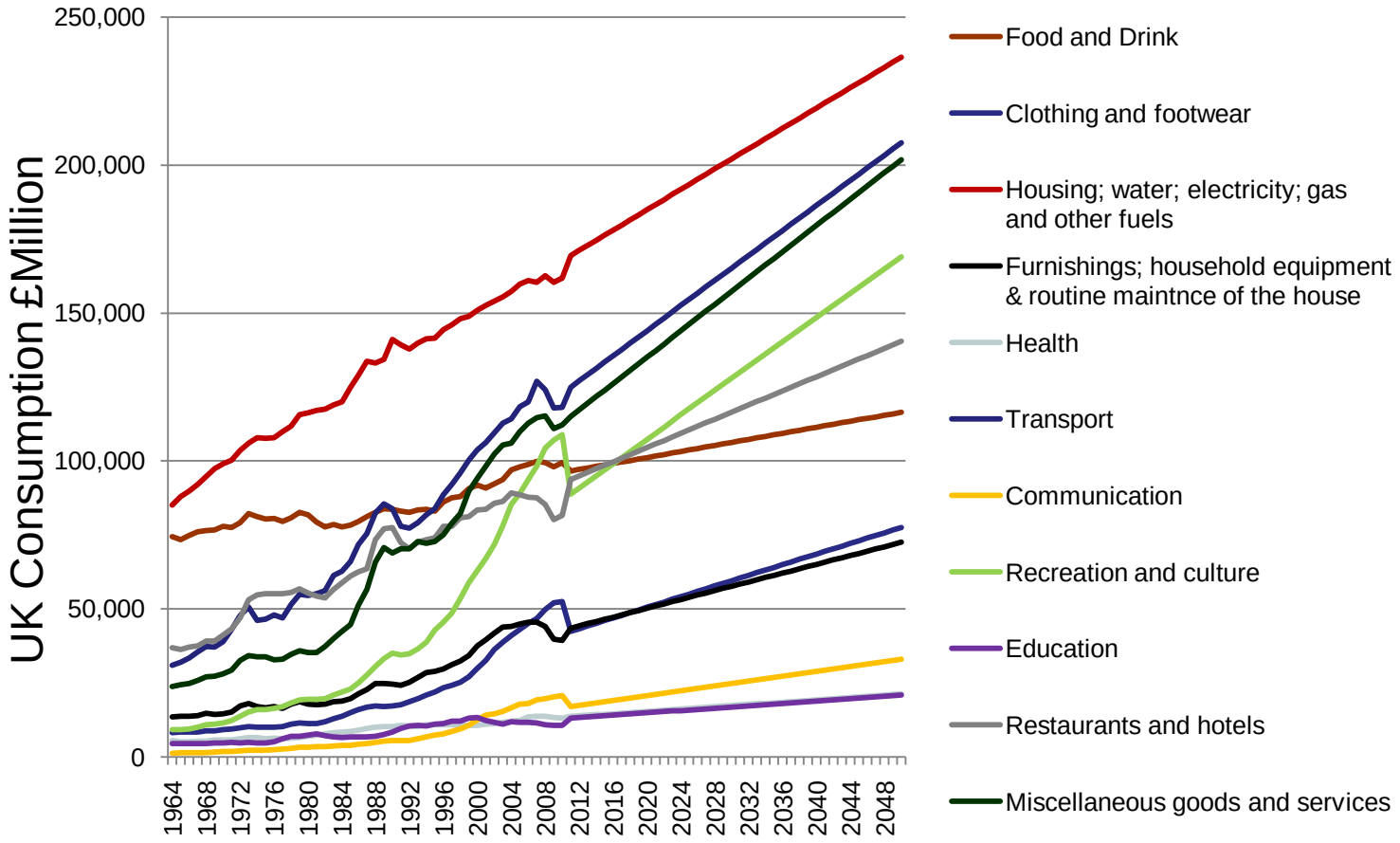


Demand: no change

Total 88% reduction

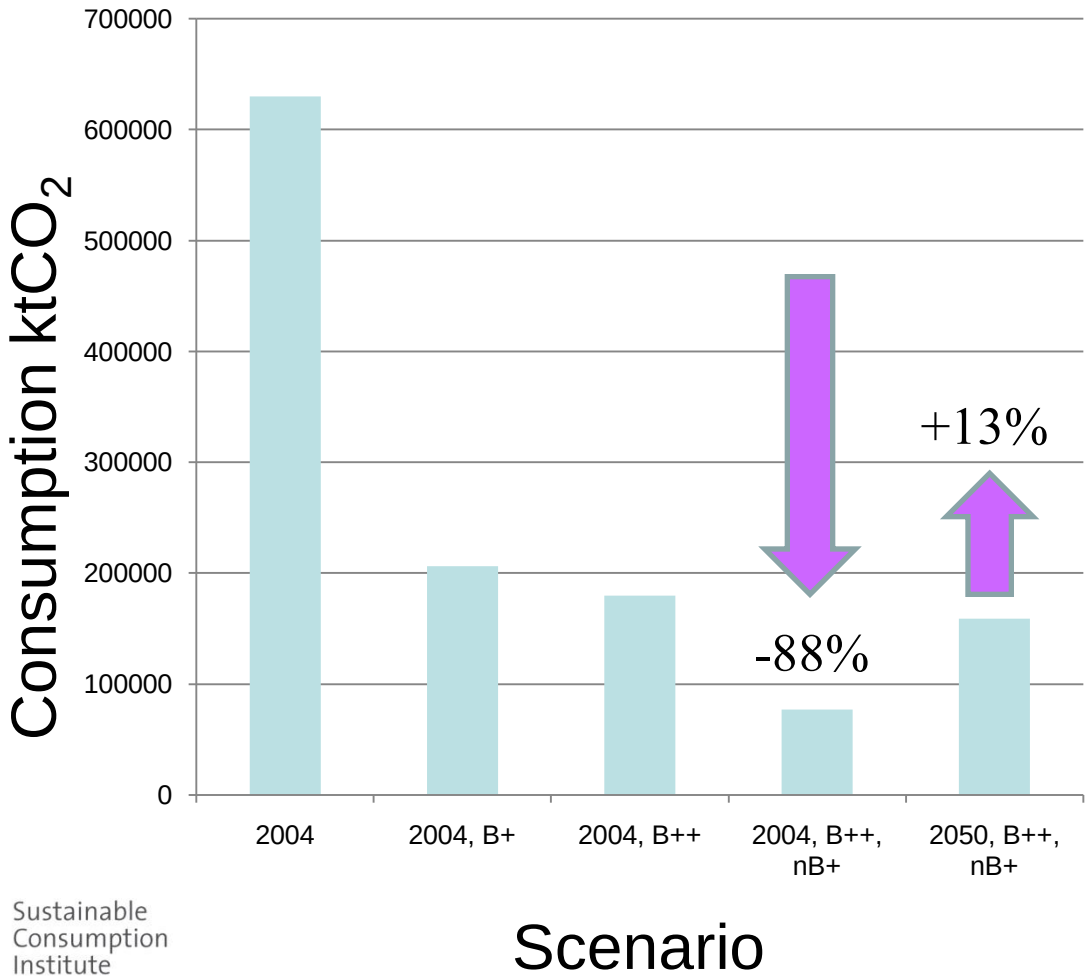
But what about economic growth?

Historic and future trends



Strong decarbonisation with growth

Step 4: Apply population and economic growth

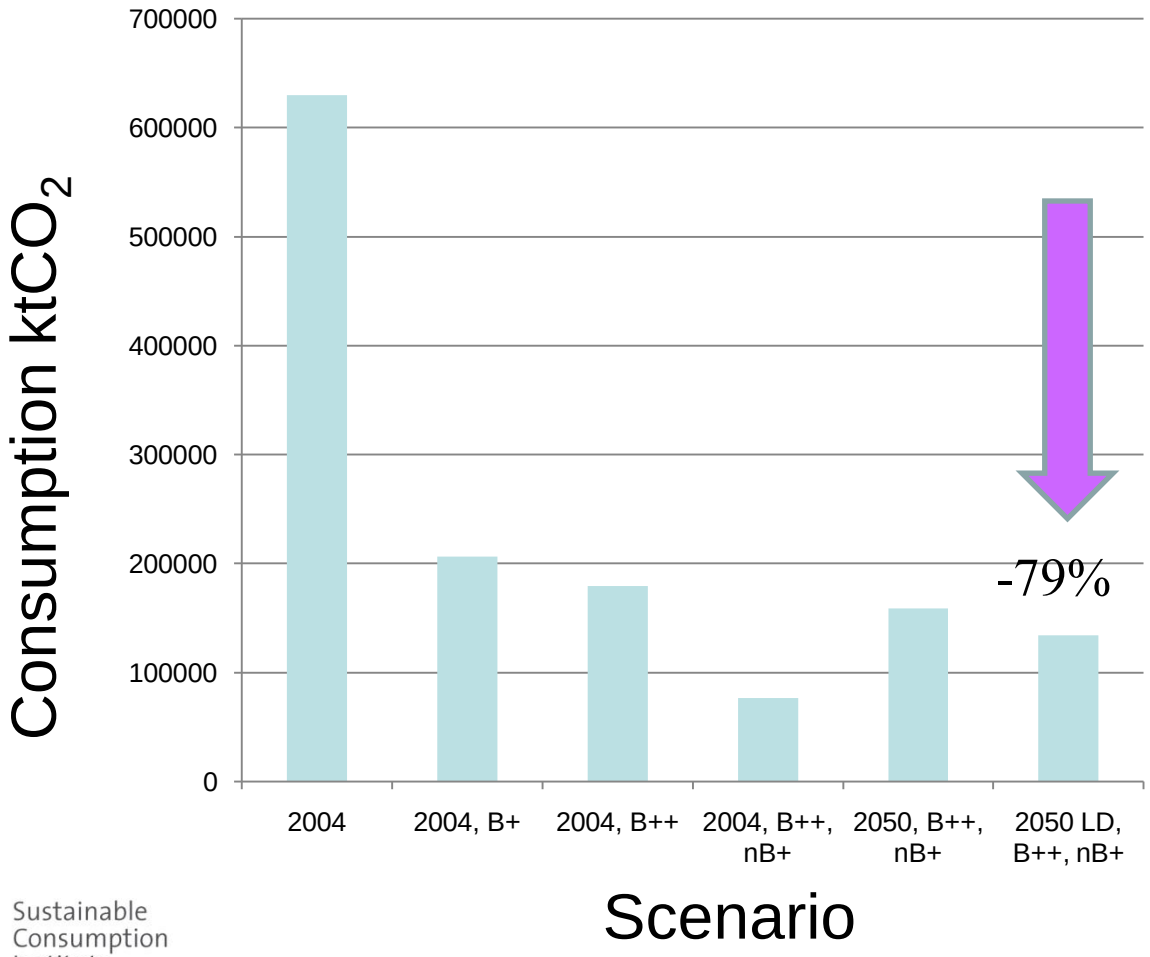


Growth across sectors off-sets 13% of the reduction

Total 75% reduction

Strong decarbonisation + lower carbon growth

Step 5: Shift consumption to lower carbon products (recreation)



Total 79% reduction

Still **not** completely decarbonised

Need to tackle level of growth further for 2°C

Applying cumulative emissions pathway would reinforce this

Conclusions

Emissions must reduce urgently for 2°C pathways

Particularly stark for Annex 1 under production based accounting

Less stark using consumption based accounting but little room for Annex 1 growth

Urgency requires a broadening of policy emphasis from tackling energy supply to tackle a) energy demand and b) what and how much citizens consume

Consumption approach increases Annex 1 influence over global emission growth

Doesn't need to be active nationally – organisations can play a role

2°C demands immediate reductions irrespective of the accounting approach

Economic growth and rising consumption impediment to 2°C emission reductions

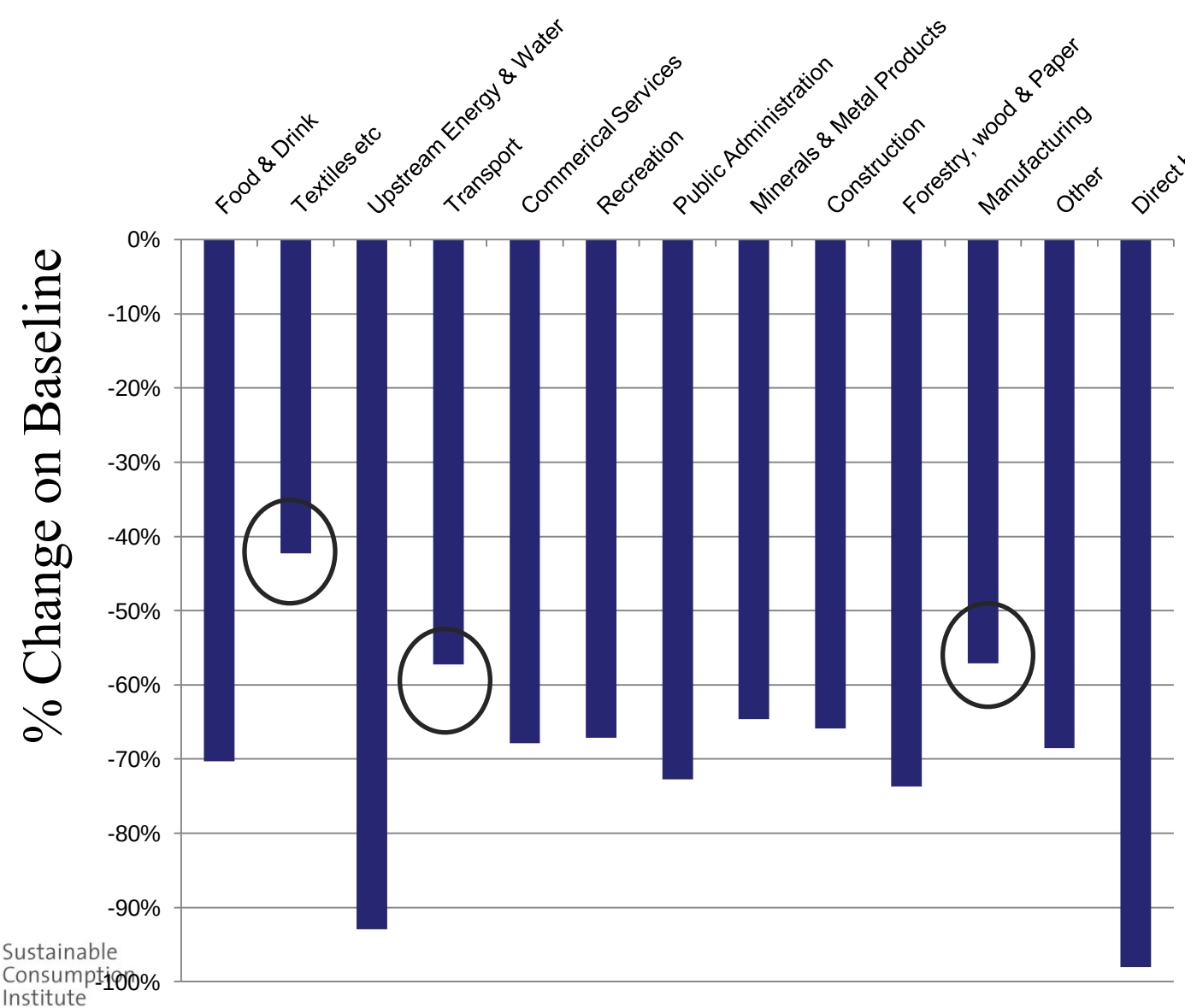
Wood, F.R., Bows A., Barrett J., Dawkins, E., Mander, S., McLachlan, C., Roeder, M., Scott, K. The development of scenarios to examine the role of technology change and consumers in delivering cumulative emission reductions and adapting to climate impacts under a 2°C& 4°C future. International Society for Industrial Ecology Conference 2011, Berkeley 9-11 June 2011.

Anderson & Bows, 2011, Beyond 'dangerous' climate change: emission scenarios for a new world, *Phil Trans A*, **369**, 20-44

Bows & Barrett, 2010, Cumulative emission scenarios using a consumption-based approach, *Carbon Management*, **1**, 161-175

Anderson & Bows, 2008, Reframing the climate change challenge in light of post-2000 emission trends, *Phil Trans A*, **366**, 3863-3882

% Change on Baseline from Annex 1 Mitigation Only

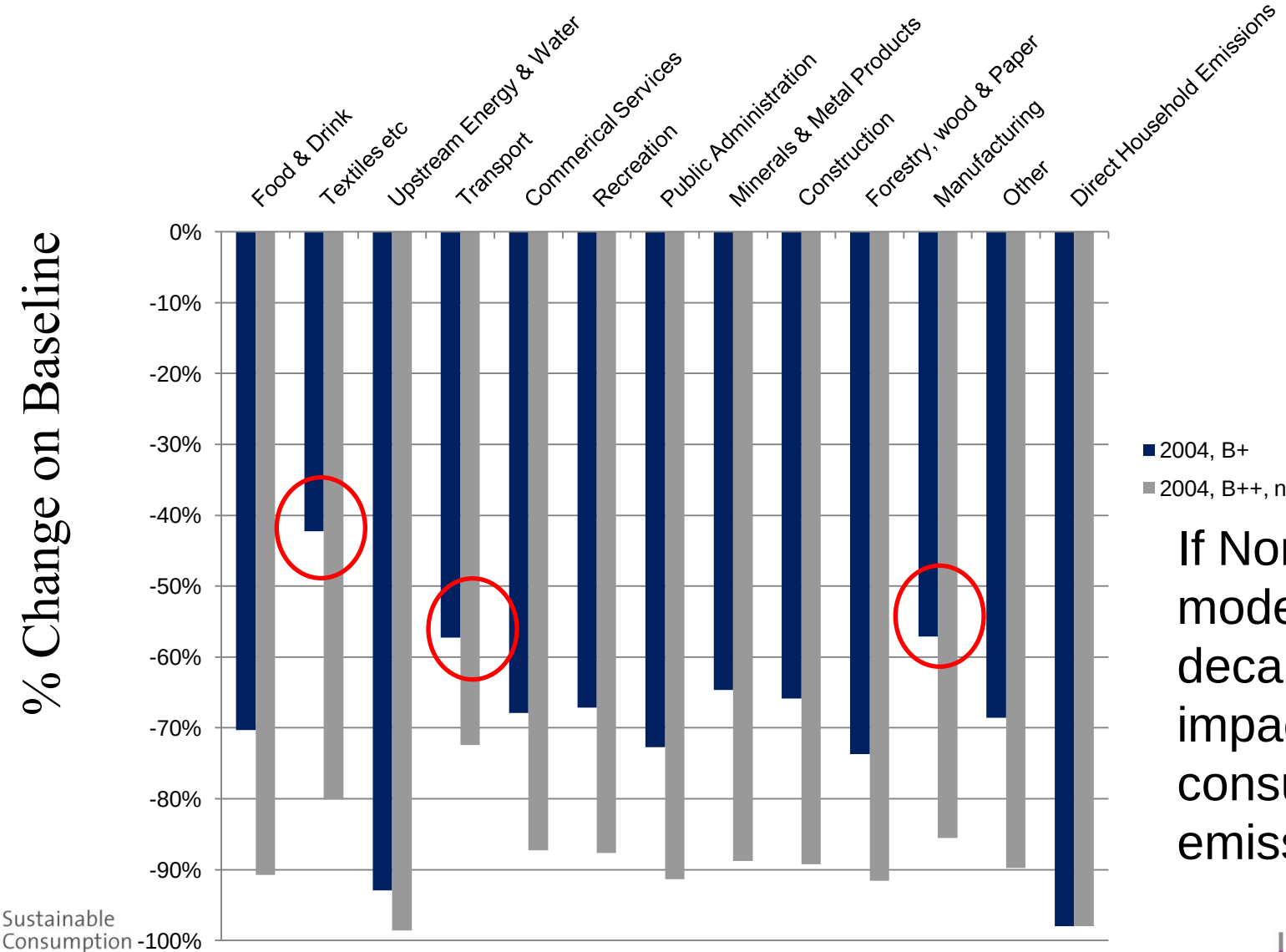


Scenario:
2004 Demand

Annex 1 – decarbonisation

Many sectors have limited reductions

% Change on Baseline from Annex 1 & Non Annex 1 Mitigation



If Non-Annex 1 moderately decarbonise, impacts UK consumption-emissions

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