Carbon Reduction Regulation and Higher Education

-The EU-Emission Trading Scheme, Display Energy Certificates and the Carbon Reduction Commitment

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Executive Summary

Three regulatory measures to reduce energy and carbon dioxide (CO_2) emissions will have a great impact on the higher education sector over the next decade.

The *European Union Emission Trading Scheme* (EU-ETS) requires all organisations in the scheme to measure and report on their CO_2 emissions, and to set targets for reductions. It creates incentives for reduction through a system of tradable carbon allowances which organisations must buy if they have exceeded their targets, or can sell if they emitted less. Some key points are:

- The scheme has had significant administrative costs in Phase I (2005-2007), but the financial impacts – and therefore additional pressure to reduce energy consumption - have been limited because of low prices for carbon allowances.
- Only half of the 40 universities currently in Phase 1 (2005-7) will be in Phase II (2008-2012), due to changes in criteria for inclusion.
- The aim of regulators is to achieve much higher prices for carbon allowances in Phase 2, so that the scheme has a greater impact on organisational decisions.

The proposed implementation of the certification elements of the *EU Environmental Performance of Buildings Directive* will:

- Require public buildings over 1,000m^2 to provide Display Energy Certificates detailing their CO_2 emissions, and to inspect and assess their cooling installations.
- Require all new buildings or those that are substantially modified, sold or rented, to display Energy Performance Certificates detailing design CO_2 emissions.
- Mandate a prescribed methodology to calculate CO_2 emissions, and in practice require a considerable higher of sub-metering to gather the information.
- Will include a benchmark or legal standard for comparison, thereby acting as a reputational driver.

The proposed *Carbon Reduction Commitment* (formerly known as the Energy Performance Commitment) will:

- Provide a new mandatory emission trading scheme which covers smaller scale electricity and fossil fuel users – it will therefore cover many universities and colleges, including those already in the EU-ETS.
- Replicate the carbon allowance features of the EU-ETS, and supplement them with a 'League Table' approach which is intended to enable comparisons between institutions, and to influence the level of costs and benefits associated with the scheme.

All three of these initiatives could have major impacts on the sector. The danger is that universities and colleges respond reactively, and faces higher costs as a result. The opportunity is to be proactive, to a) reduce costs through early action, b) gain a reputation as one of the UK's more environmentally progressive sectors, and c) work with Government departments to ensure that sector-specific features are fully taken into account. There may also be opportunities to reduce the administrative burden of the schemes by developing a common data platform.

Introduction

As with other areas of the economy, higher education (HE) is subject to an increasing number of regulatory initiatives intended to reduce energy usage and carbon dioxide (CO_2) emissions. These include:

- Phase 2 of the EU-Emission Trading Scheme (EU-ETS), which runs from 2008-2012.

- Display Energy Certificates, detailing the carbon emissions of all public buildings above 1,000 square metres (m^2), due to come into effect in April 2008 under Regulations published in March 2007.

The recently published *Energy White Paper*[1], which sets out the Government's international and domestic energy strategy to respond to the long term challenges of climate change and energy security, confirmed a further regulatory initiative:

- The Carbon Reduction Commitment (previously known as the Energy Performance Commitment), a UK mandatory cap and trade scheme. This scheme will target emissions from energy use by organisations whose mandatory half hourly metered electricity consumption is greater than 6,000 MWh per year (which includes many universities and some colleges). This will require those organisations to monitor and set targets for ALL energy usage, and create carrots and sticks to create incentives for good performance.

All three of these initiatives are driven by EU and UK Government policies to greatly reduce energy consumption, and related emissions of the greenhouse gas, carbon dioxide (CO_2), by organisations. Their collective aim is to create incentives to achieve this, especially:

- The establishment of tradeable emission allowances, so that good performers can benefit financially from selling surplus allowances, and poor performers suffer because they must purchase additional ones.
- Better information on performance, so that organisations can benchmark, both internally (e.g. between different buildings), and against each other.
- The public exposure of performance, so that good performers gain reputational and other benefits, and bad ones are 'named and shamed'.

The initiatives are likely to lead to many new actions in a sector which could, according to the Carbon Trust, reduce its CO_2 emissions by 23%, without great financial costs.[2]

This paper provides details of the three initiatives, discusses their implications, and makes suggestions as to possible responses by the sector.

[1] Department of Trade and Industry, Meeting the Energy Challenge: A White Paper on Energy, May 2007, http://www.gnn.gov.uk/environment/mediaDetail.asp?MediaDetailsID=203153&NewsAreaID=2&ClientID=201&LocaleID=

[2] Carbon Trust, HE Carbon Management Programme meeting.

1. EU Emission Trading Scheme (EU-ETS)

1.1 What is it?

The EU Emissions Trading Scheme (EU-ETS) has been implemented in the UK as a result of the European Union's Emission Trading Directive.[3] As in all EU member states, Phase I of the Scheme began on 1 January 2005 and will run until 31 December 2007. Phase II will run from 2008-2012 to coincide with the first Kyoto Protocol commitment period. Further five-year phases are expected subsequently. Currently the scheme covers only CO_2 emissions, but it could be extended to other greenhouse gases in the future. All member states must abide by the broad principles of the Directive which are:

- Coverage of all fossil-fuel intensive sites (described in detail in Annex 1 of the Directive).
- Creation of a national cap on CO_2 emissions from the relevant sites, which must be agreed by the European Commission for each five year phase.
- Creation of a National Allocation Plan to disaggregate the permitted level of national CO_2 emissions to individual sites through a system of organisational or site permits (e.g. 50,000 tonnes of CO_2 emissions for a university).[4]
- Creation of tradable allowances (each for one tonne of CO_2 emissions) for the permitted level (e.g. 50,000 allowances for the example university).
- Annual surrender by each site of allowances equivalent to the CO_2 emissions of the previous year. If the allocated allowances are not sufficient for this, the organisation must either purchase them in the market, or pay a substantial fine related to the degree of under-performance. If there is a surplus of allowances, these can either be sold or 'banked' for subsequent years of the scheme.
- Independent verification of actual CO_2 emissions.

1.2 How is it implemented in the UK?

The Greenhouse Gas Emissions Trading Scheme Regulations 2003, updated in 2005, brought into effect the EU Emissions Trading Directive.[5] Their key features for Phase I have been:

- A total national allowance for the three years of Phase I of 736.3 million tonnes of CO_2 emissions. This was divided between sectors on the basis of current and projected emissions, and then allocated to individual sites on the basis of average gas consumption during the 5 years 1998 to 2002. In general, each site was granted CO_2 emissions allowances equivalent to this average, minus a 16% reduction (so that the scheme drove down overall emissions).[6]
- During 2005, installations in the UK emitted a total of 242.3 million tonnes of CO_2. This was 27.1 million tonnes of CO_2 higher than the total number of allowances allocated for the year (215.2M).[7] This deficit was mainly due to the power stations sector emitting 36.5

[3] http://europa.eu.int/eur-lex/pri/en/oj/dat/2003/l_275/l_27520031025en00320046.pdf
[4] DEFRA, 2005, EU Emission Trading Scheme. Approved National Allocation Plan, 2005-2007. May 2005. http://www.defra.gov.uk/environment/climatechange/trading/eu/nap/pdf/0505nap.pdf
[5] For more information see http://www.DEFRA.gov.uk/environment/climatechange/trading/eu/pdf/etsregs05.pdf
[6] David Thomas, TEC, personal communication, 2007.
[7] The difference can be made up by purchasing carbon allowances from ETS schemes in ither countries, or from other trading schemes, such as the UN Clean Development mechanism (CDM).

million tonnes of CO_2 more than their total allocation, while remaining industry sectors emitted 9.4 million tonnes CO_2 less than their total.[8] The shortfall was met by the purchasing of allowances from abroad, especially organisations in other EU countries (many of whom set much more generous national allowances for the ETS than the UK, with the consequence being many surplus allowances).

Phase 2 will continue the main features of Phase 1 but with some changes:

- A total allocation of 1230.9 million tonnes CO_2 over the period 2008-13 (246 million tonnes per year). Of these 237 million tonnes CO_2 are allocated to those installations that are covered in the first Phase of the Scheme, with the remainder being allocated to emissions that were not covered or opted out in Phase I.
- For Phase II the UK government has introduced a *de minimus* threshold of 3MW in the calculation of the aggregation rule, which eliminates a number of small emitters, such as hospitals and universities.[9]

The European Commission – under pressure from the UK and som other Governments – has also stated its determination to ensure more taxing National Allocation Plans by member states in Phase 2, with the aim of creating much higher prices for carbon allowances, and therefore much greater pressures to reduce energy consumption.

Further details can be found on the DEFRA website,[10] including a list of installation level allocations.[11]

1.3 How does it affect the HE Sector?

All sites with boiler and/or CHP plant with an aggregated thermal input capacity of 20MW were automatically included in Phase 1. Around 40 universities met this criteria. They have therefore had to meet the following reporting requirements:

- An annual emissions report by 31 March each year, verified by independent commercial verifiers.
- Surrender of allowances from account by 30 April each year.
- Annual Improvement Report to Regulators by 30 June each year
- Variations to permit and Monitoring & Reporting Plan by November each year.[12]

The Energy Consortium (TEC), a non-profit energy purchaser for the HE sector, coordinates the responses of 33 of the universities who are required to participate in Phase 1 of the scheme.[13] Their experience has been that:

[8]DEFRA, 2006, EU-ETS. Results for 2005, http://www.defra.gov.uk/environment/climatechange/trading/eu/results/pdf/uk-summary.pdf.
[9] http://www.defra.gov.uk/news/latest/2006/climate-0823.htm
[10] http://www.defra.gov.uk/environment/climatechange/trading/eu/index.htm
[11] http://www.defra.gov.uk/corporate/consult/euets-phase2-install2/installationallocations-consult.xls
[12] http://www.defra.gov.uk/environment/climatechange/trading/eu/permits/pdf/checklist-permitting.pdf
[13] David Thomas, TEC, personal communication, 2007.

- In 2005 the group over-emitted its total allowance by 2.3%, with a range from 58% greater emissions than the allowance in one university to 25% less emissions than the allowance in another.
- In 2006 the group's overall excess was 5.2%, with the highest shortfall in allowances being 61%, and the highest surplus of allowances being 51%.

This is a creditable achievement considering that the allocation was based on a 16% reduction, and that student numbers rose – often considerably – in the participating universities.[14]

The TEC 'club' has also helped reduce the costs of ETS for members by using a single verifier for all members, and in other ways.

For Phase 2, the higher *de minimus* threshold introduced in the calculation of the aggregation rule, will result in about half of the universities involved in Phase 1 dropping out.[15] However, both they – and those remaining within the ETS – will probably be required to participate in the Carbon Reduction Commitment scheme (see below).

For those universities that are part of the scheme there are significant administrative costs, and for those that exceed their allowances there are also the costs of buying additional carbon credits. Additional costs are incurred if carbon credits need to be purchased, which must be done through a trader. However the scheme can financially benefit universities who have taken early action on reducing carbon emissions (and can therefore sell surplus credits), and provide financial incentives to those who are lagging.

2. Display Energy Certificates, under the EU Energy Performance of Buildings Directive (EPBD)

2.1 What is it?

The EU Energy Performance of Buildings Directive (EPBD) promotes the improvement of energy performance of buildings through four requirements:

- (1) General framework for a methodology of calculation of the integrated performance of buildings (*Article 3*).
- (2) Setting of minimum energy performance requirements (*Article 4*) in new (*Article 5*) and existing (*Article 6*) buildings.
- (3) Energy Certification of Buildings (*Article 7*), by an "accredited expert" (*Article 10*).
- (4) Inspection and assessment of heating (*Article 8*) and cooling (*Article 9*) installations.

Member States had until January 2006 to implement the provisions, or 2009 for Articles 7, 8 and 9 where there is a lack of qualified experts.

Article 7 of the Directive states:

[14] Ibid.
[15] Dave Thomas, TEC, personal communication, 2007.

"*Member States shall take measures to ensure that for buildings with a total useful floor area over 1 000 m^2 occupied by public authorities and by institutions providing public services to a large number of persons and therefore frequently visited by these persons an energy certificate, not older than 10 years, is placed in a prominent place clearly visible to the public*."

The UK has implemented part of the requirements of the EPBD through the 2006 Building Regulations.[16] However, within the new part L there is no explicit requirement for an energy performance certificate, as required by Article 7.

2.2 How will it be implemented in the UK?

The details of implementation vary between different parts of the UK. One crucial element everywhere is the rating of a building (on an A-G scale, perhaps with sub-divisions e.g. A1, A2) compared to a benchmark. The *asset rating* will be based on a calculation of CO_2 emissions from the building's design features (probably using a slightly amended version of the methodology required by the new Building Regulations). The *operational rating* will be based on the actual CO_2 emissions of the building, derived from energy consumption using a standard conversion methodology. Although the early stages of the scheme may allow for an element of estimation when calculating the operational rating, in the medium-term it will almost certainly require individual metering of all buildings which meet the criteria.

England and Wales

Regulations were published in March 2007.[17] These require (a) certification of energy performance; and (b) inspection of air-conditioning systems with a rated output > 250 kW by 2009 and >12 kW by 2011.[18]

Under the regulations there are 2 types of certificate, both of which are relevant to universities and colleges:

(1) Energy Performance Certificates (EPC) – this type of certificate is required in any sector whenever a building that meets the criteria is constructed, significantly modified, sold or rented. The exact form of the EPC will vary according to the sector use and size of the building but in all cases will be based on the asset rating. They will be valid for 10 years, but will need to be renewed each time the building is rented, refurbished or sold.
(2) Display Energy Certificates (DEC) – required for all public buildings over 1,000m^2 (with the definition probably being the same as the usable floor area criteria used in Building Regulations).

[16] http://www.planningportal.gov.uk/england/professionals/en/4000000000001.html
[17] The Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007. http://www.opsi.gov.uk/si/si2007/uksi_20070991_en.pdf. See the Communities and Local Government web site for more information - www.communities.gov.uk. To see the proposed format of a Display Energy Certificate see www.eplabel.org.
[18] Note that Article 8 of the EPBD requires Member States to introduce inspection regimes or equivalent provision of advice and information in relation to the energy performance of boilers and heating systems. The Government has chosen the second of these routes, and therefore these Regulations make no provision for Article 8. See DCLG Circular 02/2007, The Energy Performance of Buildings (Certificates and Inspections) (England and Wales) Regulations 2007, March 2007.

The Display Energy Certificates must be displayed on the building so that the public can see them. They will require an operational rating (based on energy consumed over the previous 12 month period), which is verified by an approved Energy Assessor. The asset rating must also be displayed if this is available, but does not have to be calculated if this is not the case. The requirement for Display Energy Certificates will come into effect from 6 April 2008. Guidance will be issued before October 2007 on both the methodology for the operational ratings and the definition of public building, but it is likely to include university buildings.[19] The Display Energy Certificates will need to be renewed on an annual basis.

Guidance for owners, operators and assessors on asset and operational ratings is being developed by Faber-Maunsell for Communities and Local Government, and is expected to be published in mid 2007. There is likely to be some adjustment for degree day variations.

Scotland

The Scottish Building Standards Agency updated their regulations to ensure compliance with the EPBD in May 2007.[20] Revised technical guidance has been published for domestic and non-domestic buildings.[21] Section 6.9 of the technical guidance for non-domestic buildings provides information on the calculation methodology for CO_2 emissions lists the information to be provided on the certificate and provides a definition of public buildings, which specifically includes universities and colleges.[22]

Northern Ireland

In Northern Ireland, their Part F of the building regulations that deal with energy efficiency have been revised and came into force in November 2006, and follow a very similar approach to that taken in England and Wales.[23]

2.3 How does it affect the HE Sector?

The position in Scotland is clear, but there is uncertainty about the rest of the UK. The new regulations for England and Wales will apply to "public" buildings which are either a) occupied by identified public authorities or b) occupied by public institutions providing public services to a large number of person and therefore frequently visited by those persons. Guidance on the definition of public building will be issued soon but it seems highly likely that universities will be classified as public authorities for the regulations, in which case ALL their relevant buildings will need to display certificates. Even if this is not the case, a wide definition of criteria b) (public visitation) may be adopted. And even if this not the case, student groups and others may press for voluntary adoption of the regulations as a sign of environmental commitment. Hence, the regulations are likely to have a big impact on HE.

[19] Department of Communities and Local Government, personal communication, March 2007.
[20] Scottish Building Standards Agency website. http://www.sbsa.gov.uk/tech_handbooks/tbooks2007.htm
[21] http://www.sbsa.gov.uk/tech_handbooks/th_pdf_2007/Section_6_Non-domestic_2007.pdf
[22] Scottish Building Standards Agency, Non-domestric Handbook, 2007. http://www.sbsa.gov.uk/tech_handbooks/th_pdf_2007/Section_6_Non-domestic_2007.pdf
[23] Department of Finance and Personnel, Northern Ireland, website. http://www.dfpni.gov.uk/index/law-and-regulation/building-regulations.htm

A key issue is the benchmarks which will be used for asset and operational ratings. These are currently being developed by Communities and Local Government, in collaboration with CIBSE. It is intended that the benchmarks should be as meaningful as possible, so it is possible that they could have a sectoral element. There is therefore a possibility that HE-specific benchmarks could be used as the basis of operational ratings.

The Display Energy Certificate will need to be issued by an accredited expert. It may be possible to use an in-house assessor (if suitably trained, so that a certain level of independence is achieved). Attached to the certificate will be an advisory report, which will list recommendations for improvement of the energy performance of the building. This will need to be updated every 7 years as a minimum.

The implications are that universities will be required to accurately measure the energy use in all buildings over 1000 m^2, using a prescribed methodology. This will require additional investment in metering, and the engagement or training of an accredited Energy Assessor. It will also facilitate the benchmarking of similar buildings.

In addition universities will be required to have any air conditioning systems with a rated output of over 250 kW (from 2009) and over 12 kW (from 2011) inspected every 5 years.

However, there are many questions about the scheme's implementation, including:

- Will all university buildings meeting the size criteria be affected, or just some?
- What is the methodology for calculating the operational ratings?
- What standard or benchmark will be used in the Display Energy Certificate?

3. Carbon Reduction Commitment (CRC)

3.1 What is it?

The Carbon Reduction Commitment (CRC) (previously referred to as the Energy Performance Commitment) is a proposed new mandatory auction based cap and trade scheme for the UK which goes beyond the EU ETS in:

- Requiring participation by many more organisations (including many universities and colleges).
- Covering electricity as well as fossil fuel consumption.[24]

The recently published Energy White Paper[25] proposed that the CRC will cover organisations whose electricity use is monitored by mandatory half-hourly meters; and whose half-hourly metered electricity use is over 6,000 MWh per year. Once this threshold is reached, all energy emissions

[24] For more information see DEFRA website http://www.defra.gov.uk/environment/climatechange/uk/business/crc/index.htm

[25] Department of Trade and Industry, Meeting the Energy Challenge: A White Paper on Energy, May 2007, http://www.gnn.gov.uk/environment/mediaDetail.asp?MediaDetailsID=203153&NewsAreaID=2&ClientID=201&LocaleID=

(electricity and fossil fuel) will have to be monitored (except small sources). Other details of how it might work are contained in a recent consultation paper[26], though many aspects are still to be decided:

- Coverage of all energy-related carbon emissions, from both heat and electricity (ie both direct and indirect emissions). Voluntary setting of carbon emission targets by organisations (as opposed to the involuntary targets set by DEFRA in the EU-ETS). Participants may choose to reduce their own emissions or buy allowances from the auction, the market or via a 'safety valve' (see below) to cover their annual energy use carbon emissions.
- There will be a cap or limit on the number of allowances available, set by a new Committee on Climate Change. The first capped phase will start in 2013 and each capped phase will last for 5 years. The government initially proposed a carbon saving commitment of 1.2 million tonnes carbon per year (which equates to around 4.4. million tonnes of CO_2 emissions) by 2020, but this is likely to be increased.
- The scheme will be broadly revenue-neutral to the Exchequer. Revenue raised by the auction will be recycled to participants in proportion to their average annual emissions since the start of the scheme, with a bonus/penalty depending on their position in a CRC league table (see below). Although in the early years organisations are likely to get back similar amounts of money to those they pay in, in order for the scheme to be successful it will require that over time good performers can expect a growing surplus, and poor ones a significant shortfall.
- Organisations which emit less than the allowances they purchased at the start of the year will be able to sell the surplus to other CRC participants. Organisations which emit more than their purchased allowance will have to buy additional allowances in the market from other CRC participants. The CRC will include a 'safety valve', to prevent prices rising undesirably high, in the form of a buy-only link to the EU-ETS modified by a minimum floor price.
- The league table, published at the end of each year, will rank participants and determine the bonus/penalty (a % of an organisation's recycling payment) participants receive. The level of bonus/penalty proposed is 10% but government is seeking views on this, as well as whether this should increase over time. The league table will act both as a reputational driver as well as impact on the revenue recycling. The league table will not distinguish between sectors. Government is proposing to include up to three metrics in the calculation of participants' performance:
    - an absolute carbon reduction metric (based on % carbon reduction relative to annual average emissions since the start of the scheme);
    - a possible early action metric (to reward pro-active organisations – this could be the extent of automatic metering); and
    - a possible growth metric (in light of concern about organisational growth) – this could be % reduction in carbon emissions per unit turnover (or revenue) since the start of the scheme.
- A planned "light touch" approach to monitoring, reporting and verification, e.g. by self-certification of actual emissions backed up by spot check audits. Participants will be able to use meter readings, energy bills or information from suppliers.

[26] DEFRA, Consultation on implementation proposals for the Carbon Reduction Commitment, June 2007. http://www.defra.gov.uk/corporate/consult/carbon-reduc/index.htm

- Interface with EU-ETS – organisations falling under the latter will not be exempt from the CRC but will only need to report electricity use and direct energy use emissions not covered by the EU-ETS for CRC purposes.

There will be a 3 year introductory phase to allow participants to familiarise themselves with the process. During this period there will be a simple fixed-price sale of allowances. The consultation on the details of the CRC closes in October 2007. The CRC Regulations are expected to be in place in 2008. In 2009 it will be decided which organisations qualify for the scheme, based on 2008 data, and the CRC introductory phase will begin in January 2010.

3.2 How will it affect the HE sector?

104 universities and colleges who submitted data to the last Estate Management Statistics (EMS) exercise are above the 6,000 MWh threshold (and 89 have annual electricity consumption over 10,000 MWh). Of course, not all of this electricity use will be metered by mandatory half-hour meters, and therefore some of these institutions may not meet the consumption threshold. Nonetheless, it seems likely that at least double the 40 institutions which fell under EU-ETS Phase 1 will be covered by CRC.

It is also clear that, to work, the scheme has to put real financial pressure on its members, so it has to be assumed that – unlike the EU-ETS – it will make consumption of electricity, gas and other fossil fuels significantly more expensive than at present (but also create significant rewards if it is avoided).

The league table will be especially important, as it will both influence the financial impact on HE, and provide 'raw material' for comparisons between universities and colleges, e.g. in future versions of the People and Planet ranking.

Many of the details of the proposal are still to be decided – key areas for further consideration include: whether 2008 should be used as the qualification year, the type of auction, the level of fuels *de minimus*, the level of bonus/penalty, whether the rate of bonus/penalty should increase, the inclusion of a metric for growth in the league table, and whether a percentage of auction revenues should be allocated for energy efficiency projects.[27]

Some issues for universities include:

- How this will tie in with collection of data for EMS and EU-ETS (for those universities still in the scheme)?
- What are the financial implications?
- If a growth metric isn't included to what extent this will disadvantage universities with expansion plans?
- The possible transfer of income from the public to the private sector

4. Possible Responses by the Sector

[27] Ibid.

The proposed Display Energy Certificates and Carbon Reduction Commitment, together with Phase 2 of the EU ETS, could have major impacts on the sector, both financially and through their facilitation of benchmarking and comparison. The latter will provide information which will almost certainly by student groups – for example People and Planet, in future updates to their ranking of universities - and other stakeholders.

The new schemes are complex and will be difficult to implement. There is therefore likely to be advantage to the formation of 'clubs' such as that operated by TEC for EU-ETS.

One possibility is that the benchmarking aspects will become more sector based. Given that the sector has an unusually high amount of benchmarking data – derived from the Estate Management Statistics (EMS), the Value for Money studies, HEEPI and other sources – there may be opportunities to assist Government by piloting a sector based initiative. This could enhance the sector's reputation, and avoid any problems associated with generic benchmarking schemes.

As similar data is required for all three of the regulations, as well as internal sector activities such as the EMS, there could also be additional opportunities to reduce the administrative burdens of the schemes by developing a common data platform, perhaps involving collaboration with relevant software suppliers.