

July 2011

**Department of Communications, Energy
and Natural Resources (DCENR)**
- Compliance with Directive 2003/30/EC

***“Report on measures taken to promote the use of biofuels or other
renewable fuels to replace diesel or petrol.
Compliance with Directive 2003/30/EC (Article 4)”***

1. Introduction

DIRECTIVE 2003/30/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8th May 2003 on the promotion of the use of biofuels or other renewable fuels for transport, inter alia, requires Member States to report to the Commission before 1st July each year on specific measures to promote biofuels and biomass, indicative targets for market penetration and current market status of biofuels and biomass.

The eighth report following entry into force of this Directive is now due.

This eighth report sets out Ireland’s position as follows:

- § The measures taken to promote the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes;
- § The national resources allocated to the production of biomass for energy uses other than transport;
- § The total sales of transport fuel and the share of biofuels, pure or blended, and other renewable fuels placed on the market for the preceding year.

The information provided in this report is ***additional*** to information provided in Ireland’s 2004 to 2010 (inclusive) reports to the Commission.

2. Measures taken to promote the use of biofuels or other renewable fuels to replace diesel or petrol for transport purposes.

Biofuels Mineral Oil Tax Relief Schemes

In 2005, the Department, rolled out a pilot biofuels Mineral Oil Tax Relief scheme (Scheme I) on 16m litres of biofuel, valued in the region of €6m in revenue foregone over a two year period which covered three biofuel categories – biodiesel, bioethanol and pure plant oil.

Following on the success of the scheme, a second, more ambitious scheme was announced in Budget 2006, it was valued at over €200m in excise forgone. Scheme II came to an end in December 2010. It provided for four categories of biofuel – Bioethanol, Biofuel complying with diesel standard EN590, Pure Plant Oil and Biofuel for use in Captive Fleets.

The Biofuels Mineral Oil Tax Relief Schemes were introduced in order to incentivise the use of biofuels and have resulted in a steady increase in biofuels used in Ireland. Prior to the introduction of the schemes, in common with other Member States, market penetration of biofuels in Ireland was almost non-existent. In 2007 market penetration was 0.6% and market penetration had risen to 1.6% in 2008, 2.2% in 2009 and 3.45% in 2010 while in the second half of 2010 penetration rose to 4.31%. The introduction of the scheme represents almost a doubling of size of the previous biofuel market in Ireland.

The schemes were designed as interim measures to accelerate the level of biofuels in the fuel mix, and were put in place in anticipation of the introduction of the National Biofuel Obligation Scheme.

Biofuel Obligation

The Biofuel Obligation was introduced on 1st July 2010. The relevant legislation is Energy (Biofuel Obligation and Miscellaneous Provisions) Act 2010. The biofuel obligation requires all transport fuel suppliers in the State to include 4% biofuel in their overall annual fuel sales and sets certain conditions regarding the type and origins of the biofuels which can be counted towards that target.

The Biofuel Obligation is administered by National Oil Reserves Agency (NORA). Both obligated parties and other suppliers of biofuels may apply for certificates in respect of the biofuels which they place on the Irish road transport fuels market. A Biofuels Obligation Certificate will be awarded for the supply of one litre of biofuel (or the energy equivalent of other fuels, such as biogas) providing that the following conditions have been met:

- the biofuel complies with the definition of “eligible fuels”;
- the biofuel has been placed on the Irish transport fuels market;
- The supply of the biofuel has been reported to the Administrator in the required format and by the required date;
- The supplier is registered with the Administrator.

Biofuel Obligation Certificates may be traded amongst account holders. This means that obligated parties who have not been able to fully meet their obligation by supplying biofuel themselves can purchase certificates from other obligated parties or from biofuel suppliers who have registered with the Administrator. An obligated party who has a shortfall in the number of certificates at the end of a defined period (calendar year) will be required to pay a non-compliance levy, calculated on the basis of the number of certificates short multiplied by the established amount per certificate.

Ireland's Biofuels Obligation will integrate the EU Sustainability Criteria. The objective is to ensure that all biofuels counted towards the national obligation are fully sustainable in line with EU requirements.

The requirement for increased amounts of biofuel will incentivise the sustainable growth of the Irish biofuels market, will support indigenous biofuel producers and will expand the sustainable indigenous production of biofuels.

The 2009 Renewable Energy Directive sets an overall EU target of 20% renewable energy in total energy consumption by 2020, translated into binding national targets for Member States. Only biofuels that meet the EU's sustainability requirements can count towards the targets in the Directive. Ireland is working on the implementation of the Sustainability Criteria at the moment (Articles 17-19 of the Directive) and we hope to have it in place by year end 2011.

The criteria are designed to ensure that biofuels deployed by member States are produced in a way that ensures they do not contribute towards the degradation of the natural environment, including through the destruction of forests, wetland or long established grassland. The criteria sets strict targets for biofuels in terms of the Green House gas emissions they must save before they can be considered eligible as counting towards national targets.

Biofuels must deliver greenhouse gas savings of at least 35% compared to fossil fuels, rising to 50% in 2017 and to 60%, for biofuels from new plants, in 2018.

Transport Measures

Progress has been ongoing across the 49 actions contained in the Government's *Smarter Travel* policy, launched in February 2009 and reported on in our 2009 Report to the Commission. A biennial report covering progress achieved over 2009 and 2010 will be submitted to Government in the first half of 2011 and published on www.smartertravel.ie.

Electric Vehicles

The Irish Government has set a target of 10% of all vehicles to be powered by electricity by 2020 and all our relevant Departments and Agencies are working together to ensure that the necessary policies and infrastructure are in place to meet this target. This target of 10% by 2020 will represent up to 250,000 cars on Irish roads.

An inter-Departmental agency taskforce was established to progress the framework for deployment of electric vehicles in Ireland. The taskforce,

chaired by the Department of Communications, Energy and Natural Resources (DCENR) and all relevant Departments and Agencies are represented on the taskforce. Three subgroups have been set up under the taskforce: a Transport/Infrastructure Group, a Fiscal Group, and an Enterprise Group. The Taskforce has reported on the costed options and timeframes for putting in place the necessary infrastructure and other arrangements for the cost effective deployment of electric vehicles on a national basis. Global and EU developments will be factored in as the technologies mature.

The Electricity Supply Board (ESB) is currently rolling out 1,500 charge points (including up to 30 fast charge points) on a nationwide basis by December 2011.

The VRT exemption for full battery electric vehicles (BEVs) which was due to end in December 2010 was extended until 31 May 2011. From 1 June 2011, VRT reliefs of up to €5,000 will apply to BEVs. The VRT reliefs of up to €2,500 for plug-in hybrid vehicles (PHEVs), which were also due to end in December 2010, have been extended for a further two year period. In addition to this the Minister recently announced the introduction of a grant scheme to aid those purchasing a full battery electric vehicle or PHEV. Grant aids of up to €5,000 (depending on the price of the vehicle) are available.

Agricultural Measures

The agri-food sector is a source of many of the raw materials for the production of biofuel. To encourage the cultivation of crops for energy purposes the Department of Agriculture, Fisheries and Food (DAFF) have implemented a number of incentives. These incentives are intended to complement the measures introduced by the Department of Communications, Energy and Natural Resources to stimulate demand for bioenergy.

EU Energy Crops Scheme & National Energy Crop Premium

From 2007 – 2009, the EU Energy Crops scheme provided grant aid of €45 per hectare for energy crops, mainly Oilseed, Wheat, Willow and Miscanthus. These crops can be used for production of biodiesel, ethanol and pellets respectively. A National Energy Crop Premium of €80, was also paid to these applicants. However, following a review of the Common Agricultural Policy, an EU decision was made to end the EU Energy Crops Scheme (which brought an end to the National Premium)

Bioenergy Scheme

The Bioenergy Scheme (BES) was introduced on a pilot basis in 2007 to run over 3 years to the end of 2009 to establish an agricultural sector involved in the growing of miscanthus and willow specifically to produce biomass suitable for use as a clean and renewable source of energy. The

BES made available grant aid to help towards the high cost of establishment associated with miscanthus and willow in order to encourage increased production. Nearly 2,500ha were grant aided during the pilot phase of the Scheme (2007 – 2009).

A new Bioenergy Scheme, co-funded by the EU under the Rural Development Programme, was launched in February 2010 to build on the progress made during the pilot phase. The new Scheme continues to provide establishment grants to farmers to plant miscanthus and willow. These grants cover 50% of establishment costs up to a maximum of €1,300/ha. In 2010 44 applicants (21 miscanthus and 24 willow) were grant aided to plant some 360 hectares (170 miscanthus & 190 willow). The 2011 Scheme was launched in November 2010 with a closing date of 2nd February 2011. In 2011, 89 applications were submitted and approvals have issued in respect of 50 applicants (23 miscanthus and 27 willow) and some 480 hectares (240 hectares each of willow and miscanthus). There are a further 14 applications (1 miscanthus & 13 willow) and some 260 hectares (10 hectares miscanthus & 250 hectares willow) with outstanding issues that are being pursued by D/Agriculture with a view to eventually being approved to plant. The remaining 25 applications were either withdrawn or refused.

AGRI/Energy Research

DAFF supports bioenergy research through its Research Stimulus Fund Programme which facilitates research that supports sustainable and competitive agricultural production practices and policies and contributes to a scientific research capability in the agriculture sector. Of the 12 research projects focusing specifically on the agri-energy research theme, four projects have been completed, while the other eight projects are still ongoing.

Research and Development

Bioenergy GIS

The Sustainable Energy Authority of Ireland (SEAI) has developed a Bioenergy Geographic Information System (GIS) which is now active – <http://maps.seai.ie/bioenergy>. It provides spatially visualised access to bioenergy supply and demand information in Ireland, as well as some tools for assessing actual bioenergy supply in a user specified area; and assessing the potential for energy crop development in a user specified area. The website is regularly visited by stakeholders including project developers, local authorities and academia.

Defining “useful heat” for AD CHP

SEAI has commissioned a study to define “useful heat” in anaerobic digestion CHP. A simple methodology is proposed for application by developers and regulators. The report will inform the development of evaluation criteria for support schemes for AD CHP, as well as National reporting to the European Commission.

Potential of Marine Algae/Seaweed

SEAI, in concert with Enterprise Ireland and the Marine Institute, continues to keep the area of research towards the development of biofuels from marine algae under review and will provide support as appropriate to achieve meaningful progress in this area.

Implications of Biomass Trade

SEAI has commissioned a report on the implications for Ireland of international biomass trade, particularly in the context of National renewable energy targets for 2020. The report is due for publication in the 2nd quarter of 2011.

ERA-Net Bioenergy

SEAI remains part of the European network ERA-Net Bioenergy (www.eranetbioenergy.net).

The project, **FUTURE LOW EMISSION BIOMASS COMBUSTION SYSTEMS (FutureBioTec)**, which was funded under a joint call in 2009, is continuing with the investigation and development of primary and secondary measures for biomass combustion systems in order to significantly reduce emissions. The final report will be produced at the end of November 2012.

A joint call with the Wood Wisdom ERA Net on “Sustainable Forest Management and Optimised Use of Lignocellulosic Resources”, which includes a topic on advanced biofuels / biorefineries, was launched in the 3rd quarter of 2010. Projects under this call are being evaluated and awards are expected in the 4th quarter of 2011.

ERA-Net Bioenergy is considering further joint calls and has opened a stakeholder consultation to inform the content of the calls. The areas being considered are:

- Biogas with a particular focus on small scale upgrading and feedstock conversion efficiency, and
- New types of bio-based feedstocks for multiple purposes.

It is intended to launch a joint call, possibly covering both topics, in the 4th quarter of 2011.

3. The national resources allocated to the production of biomass for energy uses other than transport

Sustainable Energy Authority of Ireland (SEAI) Miscanthus Pilot Programme

The SEAI Miscanthus Pilot Demonstration Programme (http://www.seai.ie/Grants/Renewable_Energy_RD_D/Miscanthus_pilot/), which provides support for the deployment of renewable heating systems

fuelled by miscanthus in the commercial, industrial, services and public sectors, was extended to the 30th November 2011.

To date, seven projects have been offered support under the programme, only one of which has been commissioned. The projects have ranged in size from 30 kW to 600 kW with a total capacity of 1,715 kW, and have all been based on chipped miscanthus (as opposed to baled) feed. The current economic climate is constraining uptake and it would appear that a number of the projects which have been offered support will not ultimately be developed.

Renewable Energy Grant Aid Package

The programmes - ReHeat, Combined Heat and Power (CHP) and the Greener Homes Scheme – which were reported on previously, provided grants for the installation of renewable heat technologies across a wide range of sectors including the domestic, community, voluntary, public sector, commercial and business sectors. These schemes are now closed for new applications.

There have been a total of 47,414 applications approved under the Greener Homes Scheme (GHS) since its launch in March 2006, of these 35,772 are valid applications which are either still open or are already installed. Biomass technologies represented 18% by volume and 26% by value of these valid applications – the relative uptake of biomass and heat pump technologies in the programme is decreasing due to the shift towards solar installations, and other changes to the structure of the programme which limited the grant scheme to existing homes in the later phase of the programme. Total annual CO₂ savings for the valid GHS grants is estimated as almost 65,000 tons.

There have been 936 ReHeat applications received to date, 823 of which are for capital investment and 99 of which are for feasibility studies. Of the 594 approved applications for capital investment, the technologies applied for are biomass boilers (188), solar thermal installations (243) and heat pumps (88). A total of 578 projects have been completed to date, 187 biomass boiler projects, 233 solar thermal and 85 heat pumps. The total installed boiler capacity is 78,209kw (Thermal) – with a further 130kw of capacity approved. A total of 3,997m² of solar panels have been installed, with a further 128m² approved. Finally, the 85 heat pump projects have an installed capacity of 5,727kw, with a further 187kw approved. The total estimated CO₂ savings from the installed projects is 129,702 tonnes pa, with a potential further 1107 tonnes savings arising if all approved projects are built. A total of €8,032,517 has been paid to date, for an average grant of €16,475, with an average cost of installation of €68,947.

There have been 158 applications under the CHP programme (Both the fossil fuel and Biomass CHP Deployment Programmes are now closed), which provided capital assistance (95% of the amount paid) for small scale fossil CHP, and for Biomass/Anerobic Digestion CHP, along with grants for

feasibility studies (5% of the amount paid). A total of 91 projects have been completed to date, 68 of which are capital investment and 23 of which are feasibility studies. Installed capacity to date is 15.6 MW_e , 24.43 MW_{th}Fossil CHP: A total of €4,888,678 has been paid to date, for an average grant of €74,829, with an average cost of installation of €269,719.

Ten grant applications for Biomass CHP / AD CHP were received under the call. Of these, 2 have been installed and are operating, one in Co Cork and one in Co Limerick. The plant in Co Limerick has not yet completed the operational report phase. With regard to the balance of applications, three were rejected based on failure to comply with the requirements of the programme and five applications had not completed the review phase prior to the programme being closed.

Renewable Energy Feed in Tariffs (REFIT) Biomass

Reflecting the need to support the development of biomass, in May 2010 a programme was launched with new support prices for REFIT for biomass technologies which range from 8.5 cent per kilowatt hour to 15 cent per kilowatt hour depending on the technology deployed. The technologies supported include Anaerobic Digestion Combined Heat and Power, Biomass Combined Heat and Power and Biomass Combustion, including provision for up to 30% co-firing of biomass in the three peat powered stations. Co-firing with miscanthus or willow will qualify for the rate of 9.5 per kilowatt hour which is fully payable to the generator.

These support tariffs will assist the development of a sustainable biomass supply sector in Ireland. They will ensure that there is a ready demand for biomass and will build on the measures already in place including the REHEAT programme and the Energy Crop grant schemes run by the Department of Agriculture, Fisheries and Food

The guaranteed support price (REFIT) will range from 15 cent per kilowatt hour to 8.5 cent an hour depending on the technology deployed as follows:

AD CHP less than or equal to 500 kW	15c/kWh
AD CHP >500 kW	13c/kWh
AD (non CHP less than or equal to 500 kW	11c/kWh
AD (non CHP) >500kW	10c/kWh
Biomass CHP less than or equal to 1500kW	14c/kWh
Biomass CHP >1500kW (1.5MW)	12c/kWh

Biomass Combustion (including co firing** in existing plant):

For using energy crops	9.5c/kWh
For all other biomass	8.5c/kWh

State Aid Clearance from the EU Commission is required before these tariffs can be implemented. Full notification was given to DG Competition in June 2011 and a decision is expected shortly.

Charles Parsons Energy Research Awards

The research teams funded under the Charles Parsons Energy Research Award Programme continue to be actively engaged in research in the area of biofuels/bioenergy.

Within the Microbial Bioenergy Group (MBG) at National University College, Galway research continued to progress during 2010, with several important outputs and advances. The research involved operating novel small-scale plants for biogas production and fully describing the biology involved in the process. Work also commenced on the development of a larger, pilot-scale plant with a view to commercialising the process. The work on the biological fuel cells continued, specifically the design of novel materials for more efficient energy capture and also selection of the best biological sources for the devices.

The MBG also played a major role in a number of initiatives with potentially significant commercial and industrial impact during 2010. For example, the MBG group and NUI, Galway, along with the Charles Parsons Initiative at the University of Limerick, were actively involved in the development of the Shannon Energy Valley initiative (one key theme is biomass) during the reporting period (www.shannonenergyvalley.com) with partners Shannon Development and the Irish Technology Leadership Group. The team continue to actively collaborate with industry including BioSpark, Carberry Milk Products and Kerry Group.

The MBG group also played an ongoing leadership role in supporting the Irish Biomass and biorefining sector. The group coordinates (Prof. O'Flaherty) the Competence Centre for Biorefining and Bioenergy (CCBB). The CCBB an ambitious near-to-market research and development programme, with funding from Enterprise Ireland, IDA and an industrial consortium of 13 Irish and multinational companies. The CCBB will provide a new way to undertake R&D in biorefining and bioenergy in close collaboration with the industrial partners and provides a bridge between strategic and basic research in biorefining and bioenergy, such as that being carried out by the MBG Charles Parsons programme and commercial exploitation by Irish industry.

The Bioresources Research Centre (BRC) based in University College Dublin continued to make progress in its three research strands of: *Bioresource Assessment*; *Biomass Conversion technologies*, and *Environmental Impact Assessment*.

Specific research highlights in Strand 1 include: (ii) Development of interactive GIS maps for biomass, wind and solar energy resources. It is anticipated that the final outputs will enable users to assess the resource

availability by geographical areas of interest, and to integrate transportation network and grid systems; (ii) A series of vehicle tests using Environmental Protection Agency jeeps as a trail with synthetic diesel that was developed in collaboration with Cynar plc.

Within strand two the focus remained on biomass pyrolysis in collaborative research with Hamburg university and VTi Hamburg. One aspect of the work involved the pyrolysis of wood waste in a 200-300g/h fluidised bed reactor using N₂ fluidising gas. Gasification experiments in collaboration with Texas A&M University were completed. The team also completed the project on integrated assessment of biogas systems which covered; a comprehensive review of the policy framework for biogas energy resource utilisation, energy audit of biogas systems in multiple production and utilisation pathways, and Life Cycle Assessment. A project on algal biofuels project commenced with the testing of a four-stem photobioreactor for use to optimise biofuel-directed algal-biomass production.

Within the Environmental Impact Assessment strand the potential of NIRS to predict the composition of willow and miscanthus material was demonstrated. The team has also been developing the use of hyperspectral imaging for characterisation of energy crops and will be scoping the extension of this robust analytical technique for non-destructive testing of fuel pellets. The work on the use of sensing systems to optimise algae growth for carbon sequestration is still on-going, as is the data assessment and feedback system. In parallel with this is the refining of the lab scale reactor for CO₂ sequestration studies and the series of experiments to measure the effect of the CO₂ gas temperature and concentration on the algae has commenced.

The BRC actively collaborates with SMEs, including Kedco Ltd. and Cynar Plc. A member of the BRC team is the IEA (International Energy Agency) Irish Representative for Task 43 (Biomass Feedstocks for Energy Markets).

Within the *Chemical Technologies for Biomass and Biofuels* theme of the Charles Parsons Initiative in University of Limerick a key output has been completion of the commissioning of the pilot plant gasifier. Initial results for Miscanthus gasification are promising, being comparable with literature data for gasification of similar biomass types in fluidized bed reactor.

The upgrading of bio-oil by means of a low-cost alcohol (e.g. methanol) in the presence of an acid catalyst where carboxyl and carbonyl compounds are converted into esters and acetals (or ketals), respectively, was also explored. The addition of methanol or ethanol to the oil was found to be beneficial.

Pyrolysis of Miscanthus to produce upgradable quality bio-oil (and char) was successfully carried out under medium pressure conditions in the temperature range of 300-600°C.

Pd/C and Cu/MgO catalysts for hydrogen production from biomass derived formic acid were identified. Pd/C catalysts were shown to be the best catalysts for hydrogen production from biomass derived formic acid at low temperature in terms of activity, selectivity and stability.

SFI Principal Investigator Award

Dr Henry Curran, Director of the Combustion **Centre** at National University College, Galway, is a chemist supported by SFI to undertake a theoretical and experimental study of the chemical kinetics of combustion of bio-fuels. The main objective of this project is to develop cleaner and more efficient combustion processes through the design and implementation of better defined and more accurate detailed chemical kinetic models. The group is engaged with industry including Rolls Royce Canada Ltd., Renault and Saudi Aramco, who support the research financially.

All research groups have published its findings in leading international journals, presented at major national and international meetings and also interacted strongly with Irish and international industry to support the emerging bioenergy sector in Ireland

Competence Centre for Biorefining and Bioenergy

In its Strategy for Science, Technology and Innovation (2006-2013), the Irish Government proposed the establishment of competence centres to address the 'key issue of building and reinforcing areas of strength within both industry and the academic sphere and ensuring that these are highly networked with each other'. The Competence Centre for Biorefining and Bioenergy is one of a number of these centres established and led by industry, and initially funded by Enterprise Ireland and the IDA. It began its operations in January 2010.

The Vision of the Centre is to provide cutting edge research and development outputs to support a sustainable and competitive Irish biomass (bioenergy and bioproducts) industry.

The initial research phase of work proposed by the industry group consists of two key areas

a) Next generation feedstock analysis -To investigate high potential feedstocks such as ligno cellulosic materials, algae, wastes and agri/industrial residuals that do not compete with food, and that can achieve a higher energy balance and a greater potential to reduce greenhouse gas emissions relative to current bioenergy and biorefinery feedstocks, and

b) Conversion process technology - To examine the options and develop economic applications for various conversion technologies to unlock the

energy and co-product potential from feedstock's which have a particular relevance to Ireland.

The centres development and research work is being undertaken in conjunction with a number of industry partners and is overseen by a board with representatives from industry and academia.

Bioenergy Working Group

Ireland has established ambitious targets for bioenergy for 2020. Delivering the biomass supply to meet these targets will require the mobilisation of significant additional resources compared to present level. A Bioenergy Working Group (BWG) was established by DCENR in April 2008. The aim of the BWG is to chart the sustainable path to achieve the 2020 bioenergy targets and to develop interventions to help deliver on these targets.

Ireland's National Renewable Energy Action Plan

Article 4 of Directive 2009/28/EC on renewable energy requires each Member State to adopt a national renewable energy action plan (NREAP) to be submitted to the European Commission. The plan is to set out the Member State's national targets for the share of energy from renewable sources consumed in transport, electricity and heating and cooling in 2020, demonstrating how the Member State will meet their overall national target established under the Directive.

Ireland submitted its National Renewable Energy Action Plan to the European Commission in July 2010.

3. The national resources allocated to the production of biomass for energy uses other than transport.

Agricultural Measures

On-farm waste to energy projects

The Department of Agriculture, Food and the Marine supports the development of on-farm anaerobic digestion facilities. Under the Scheme of Investment Aid for Demonstration On-Farm Waste Processing Facilities, grant-aid of €4 million was made available to ten such projects in 2007. The environmental benefits of the technology will be assessed under the scheme including a full life cycle analysis of the potential of the technology to abate greenhouse gas emissions. To date, grant-aid has been paid in respect of one completed project.

3. **Total sales of transport fuel and the share of biofuels, pure or blended, and other renewable fuels placed on the market for the preceding year.**

The table below illustrates the latest statistics available on transport volume which shows that in the 2010 biofuel penetration figures were 3.45% while the second half of 2010 biofuel penetration was 4.31%.

2010

	GASOLINE	BIOETHANOL	DIESEL	BIODIESEL	OTHER BIOFUEL	TOTAL	Percentage of Biofuel in overall Motor fuel sales (C+G+I)/(B+C+F+G+I)
Total	1,918,351,016	54,476,494	2,494,684,274	100,545,392	2,583,624	7,039,719,900	3.45%
H1	973,246,329	22,191,237	1,254,771,601	35,476,850	1,421,354	3,529,560,142	2.58%
H2	945,104,687	32,285,257	1,239,912,673	65,068,542	1,162,270	3,510,159,758	4.31%