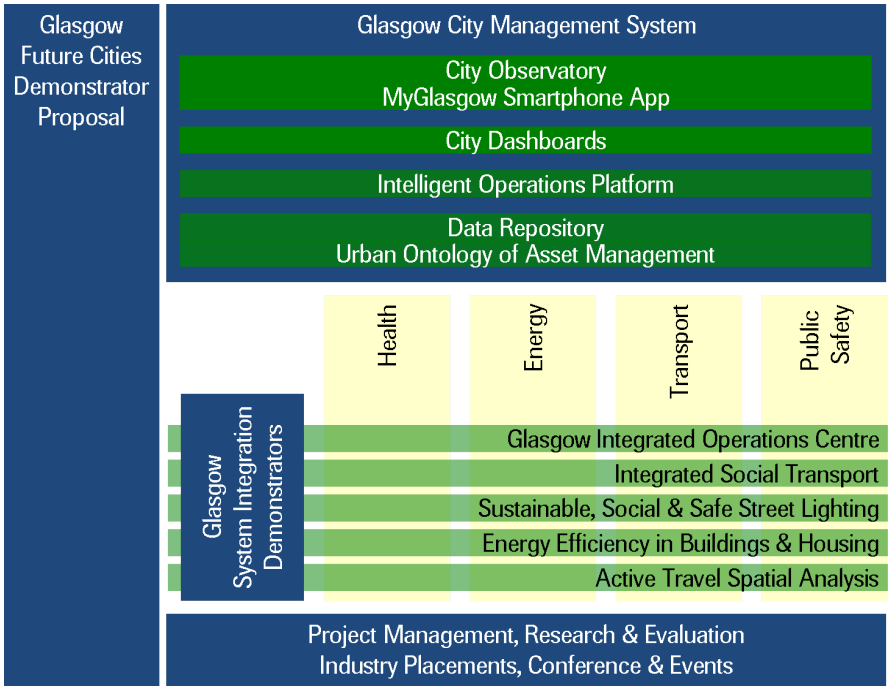
Technology Strategy Board (TSB) Future Cities Demonstrator

The Technology Strategy Board (TSB) Future Cities Demonstrator is a UK government initiative, which started in January 2013 and is due to conclude in August 2014. In this initiative, public, private and academic sectors a combine expertise and using the latest technology to enhance daily life in the city of Glasgow. By integrating technologies and applications in public safety, transport, health, technology and sustainable energy, it is expected that Glasgow will become a smarter city, with the knowledge, data and integrated systems it needs to develop further opportunities to become more sustainable.



The sections below set out how the initiative fulfils the key European Commission and STEP UP lighthouse criteria.

Integration of energy, ICT and transport

The TSB Future Cities Demonstrator is working at the intersection of the energy, transport and ICT sectors, with key initiatives including[1]:

Energy

Energy efficiency: this project will show how technology can help ensure that energy efficiency strategies are built on increasingly accurate data. It will do this by working with businesses, schools, academia and power providers to set up a pilot project which enables

[1] Project descriptions taken from http://futurecity.glasgow.gov.uk/index.aspx?articleid=10213

management systems in different buildings to ‘talk’ to the power network and reduce their energy demand by automatically adjusting their lighting and heating, taking factors like the weather into account. Data on energy consumption in public buildings will also be made available via an Open Data Platform and online mapping tools will create a clearer picture of power consumption in the city, making it easier to plan future developments.

The project also works with housing providers to address energy consumption in older, traditionally hard to heat properties. A pilot project is planned to test insulation methods for tenement flats and collect data on their impact on energy consumption. Glasgow has more than 60,000 tenement properties so the data collected will be of huge interest.

Street lighting: intelligent street lighting will be trialled in two pilot projects. Energy efficient LED lamps will be installed to demonstrate how the city could use them to reduce carbon emissions, increase safety and reduce power consumption. Sensors will also be installed on lighting columns which will collect data such as footfall, air and noise pollution levels. This real time information will feed into the Open Data Platform which, in turn, will make it available to the public.

Smart lights will be programmed to increase in brightness if noise level rises; for instance if there is a disturbance in the area. These can be operated remotely from the Operations Centre. Any faults in the system would be automatically reported to the operations centre; speeding up repair times and increasing efficiency.

Intuitive street lights will also be installed on a stretch of the city's off-road cycle routes, which are mostly unlit. This will increase safety in the area and give more people confidence to use the routes after dark.

Renewable energy mapping: working with local universities, renewable energy opportunities will be mapped within the city. This will be linked to the citizen science mapping project described below. The initiative aims to develop a tool which will enable people to identify land where they would like to position community renewables projects and to rapidly receive information on the planning/policy and technical constraints which might apply to that site.

ICT

City Technology Platform: more than 200 data streams have been identified in Glasgow. They include information on everything from bin collections to footfall in retail areas. Some

of this data is already available to the public but often it is held in isolation, difficult to access and even harder to understand. It is not personal information but anonymous data. The new City Technology Platform will integrate the data streams, analyse the information, present it in a meaningful format and make it open for use by the public, businesses and academics alike. It will be accessed through websites and smartphone apps including a data portal, a mapping portal and the MyGlasgow dashboard.

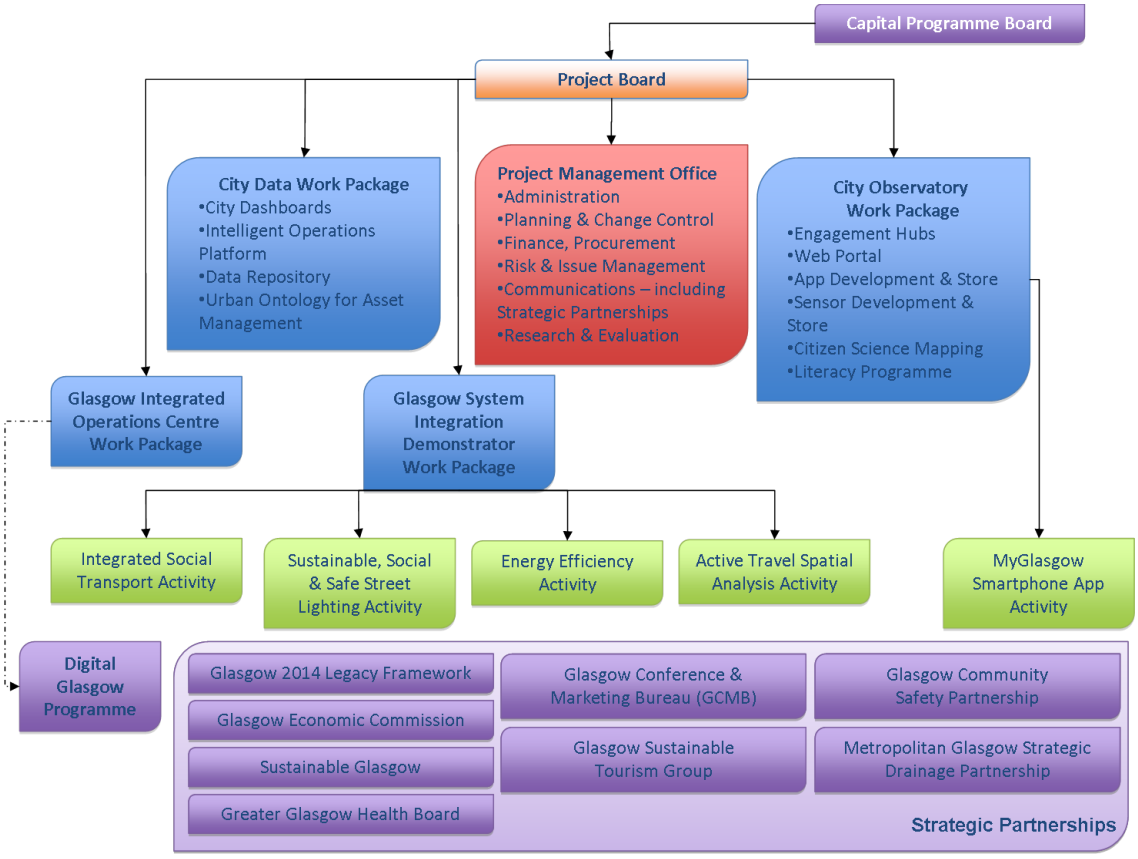
Integrated Operations Centre: a state-of-the-art Integrated Operations Centre has been created to monitor and control the city's new network of CCTV cameras. More than 400 advanced digital cameras will be installed across the city to replace the existing outdated network. Their operators, who used to work from separate locations, are now based in a new control room alongside specialists from TRAFFCOM - the team in charge of the city's traffic lights and traffic cameras.

Citizen science mapping: people will be encouraged to share their local knowledge of Glasgow as part of a Mapping Demonstrator project. They will be urged to upload information about their communities on to an online map. This could include details of their favourite beauty spots, restaurants, shops or heritage highlights.

Transport

Active travel: the Active Travel Demonstrator will show how technology can help make the city more cycle friendly. The aim is to let data drive investment so that resources can be put to best use. People who currently walk and cycle will be encouraged to use a smartphone app to help collect information which will pave the way for infrastructure improvements.

Social transport: this will demonstrate how technology can assist in the creation of a flexible, efficient and demand responsive transport service. It is exploring the use of route optimisation software and scheduling tools with providers such as Glasgow City Council's education and social work departments and Cordia (the largest provider of home care services in Scotland). This technology would modernise management of the services and enable providers to use their fleets more effectively.



Replication and scalability

The TSB Future Cities Demonstrator is linked to the Future Cities Catapult based in London. This is a global centre of excellence on urban innovation, and is intended to be a place where cities, businesses and universities come together to develop solutions to the future needs of cities.

The Future Cities Demonstrator is also helping to shape developments across the UK through the Smart Cities Forum, which aims to enable local authorities and businesses to work together in order to ensure that growth opportunities are capitalised in a growing world market. It includes cities from across the UK, together with private sector organisations and research partners from a variety of universities.

The Scottish Cities Alliance (SCA) is also developing strategies based on the learning of the Demonstrator in order to spread the knowledge across Scotland and enable its cities to develop their own city management systems and funding bids.

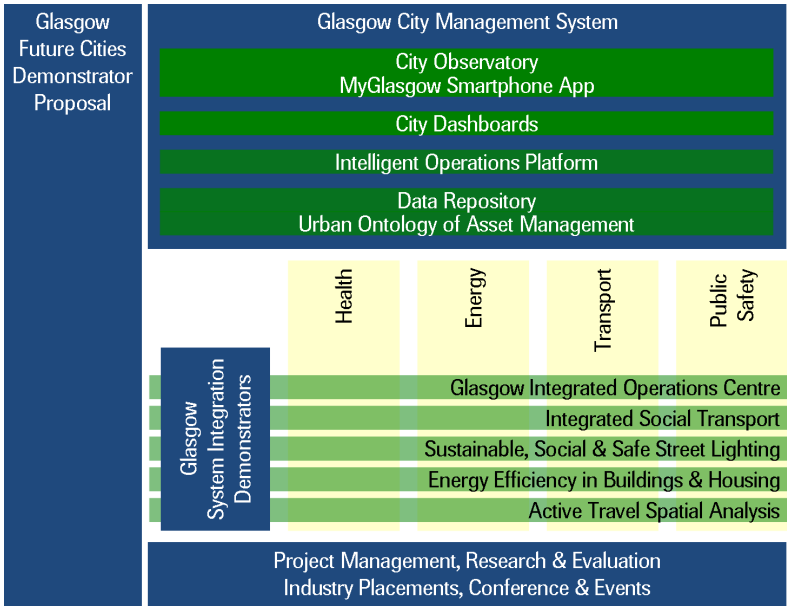
Integrated building blocks

The building blocks of the project are:

- Technology infrastructure;
- The integration of city systems and data across multiple agencies; and
- The delivery of improved and responsive city services.

The intention is to improve outcomes in the four main service areas of interest: health, energy, transport and public safety. The architecture of the Future Cities Demonstrator is described below.

Figure 1. Glasgow Future Cities Demonstrator Proposal



Glasgow System Integration Demonstrators : these join and analyse data from different sources within the same sector and systems. Part of this is the Integrated Operations Centre: the single biggest integration of systems within the TSB Future Cities Demonstrator, involving the integration of public realm CCTV systems, traffic management services, the command and control function for the Glasgow 2014 Commonwealth Games and the resilience and safety team, which has an emergency planning function.

Glasgow City Management System: this utilises data from the System Integration Demonstrators and other sources across the city, joining them in one large data repository. The main function of this is to consolidate data and make data collections more accessible and available to a wider community. It will be accessed and used either via a City Dashboard (for city operational management purposes) or through the City Observatory.

Monitoring and reporting

High level measures of success for the overall Glasgow Future Cities Demonstrator have been identified, such as its impact on the economy, life expectancy and air pollution.

Individual measures of success will be identified within each Glasgow System Integration Demonstrator as part of the Benefits Realisation Strategy, for example: access to health, travel times, exposure to anti-social behaviour and energy use and efficiency.

The continuous measurement of performance will be a key component of the Glasgow City Management System. This will build on the technological capability present within the Intelligent Operations Platform and the ongoing data captured by the Data Repository. All these projects are in the process of development so no baseline data is available yet.

Key winning elements of success

Political leadership with a long term approach

The TSB Future Cities Demonstrator is led by Glasgow City Council in partnership with key public, private and academic organisations including the University of Strathclyde. The Leader of Glasgow City Council has supported the project from its inception, highlighting that it will put Glasgow at the forefront of innovative and smart cities, not just in the UK but in Europe and beyond. The long term approach begins with the demonstrator project and will help Glasgow create a more efficient and sustainable city, contributing towards the EU 2020 climate and energy targets. The project also links with other initiatives bringing investment into Glasgow, such as the University of Strathclyde's Technology and Innovation Centre. The project will benefit from the city's research and innovation base, and will show what can be achieved by the innovative use of today's technology.

Collaboration and dialogue with all stakeholders

The Future Cities Demonstrator has a strong stakeholder relationship with the executive directors of Glasgow City Council and the Director of Digital Economy at the Scottish Government, as well as a number of leading organisations within Glasgow across the public, private and third sectors.

Many of the companies that the Demonstrator is engaged with, such as Serco, are national and multi-national companies that cross borders in their operations and help disseminate learning from the project across wider networks.

There are established partnerships of innovation driven companies ranging from small innovative design start-ups in Glasgow, to UK-wide specialist technology companies and multi-national corporations famed for innovation in the ICT sector. Some examples are ACCESS, Microsoft, Swirl, We are Snook, the University of Glasgow, the University of Strathclyde and the University of Aberdeen.

The Demonstrator has also engaged with academia, enterprise and other public sector organisations to help develop the key aspects of the programme around innovation and partnership, and to deliver cross sector collaboration and integration.

Contribution to multiple policy objectives

The Future Cities Demonstrator addresses specific challenges within health, energy, transport and public safety.

Health strategies: Glasgow is the most deprived city and local authority area in Scotland, encompassing 31% of the most deprived data zones in the country. The project helps to address health issues by providing an integrated approach to data and services, ensuring that there is an increasingly healthy living environment for residents. Active travel has been identified as a key component of a Scottish Government Health Programme that is taking a whole systems approach to improving healthy life expectancy in Scotland.

Environment and energy strategies: the project supports Glasgow's environmental and climate change strategies and also addresses air quality issues by taking a more integrated approach to transport and traffic management. To date, Glasgow has declared three Air Quality Management Areas (AQMAs) in the city in response to levels of nitrogen dioxide (NO_2) being recorded above the objective and European limit value (40ug/m3). The European limit value for particulate matter (PM10), widely recognised as a more harmful air pollutant than NO_2, is currently reached in Glasgow on some days and this must be reduced.

*Transport strategie*s: the project seeks to improve the management of traffic through the city, reduce pollution, integrate facilitation and promote active travel opportunities for citizens.

Public safety strategies: the Demonstrator, through the Operations Centre, is bringing all the CCTV monitoring for the city together with the aim of improving community safety and integrating this with traffic management and street lighting.

Business models to attract investment

The project investment is approximately €30 million (£25 million). It is funded by the Technology Strategy Board, which is a UK government initiative, following the launch of a nationwide competition for a large-scale future city demonstrator in 2012. In July 2012, 30 of the local authorities which had applied were awarded grants of £50,000 in order to develop feasibility studies for their demonstrators. Four cities (Bristol, Glasgow, London and Peterborough) were shortlisted and, in December 2012, Glasgow was chosen as the winner. The TSB project started in January 2013 and is due to complete in August 2014.

At the present time (May 2014), the focus of the Future Cities Demonstrator is on the implementation of the various projects that are described above. Many of these projects will have commercial opportunities which can be realised following their implementation. As the project approaches August 2014, the legacy aspects will be addressed more actively.

A key feature of the business model for this initiative is that partners of this project are able to develop their markets well beyond Glasgow and act as leaders in this area, as well as lock in benefit for the UK and Glasgow through economic growth in line with the Technology Strategy Board's vision for Future Cities.

Both the TSB Future Cities Demonstrator programme and Future Cities Catapult are part of a wider UK programme in this area, led by the Department for Business, Innovation and Skills (BIS) at a central Government level, and regionally through bodies such as the London Smart Cities Advisory Board and the Scottish Enterprise Smart Cities Programme. This joined up way of working between business, city governments and academia facilitates capturing the momentum gathered through the Future Cities Demonstrator project, and helps the continued development of the integrated city systems agenda across the UK.

Promotion of the initiative

As a national project the TSB Future Cities Demonstrator has dedicated support for promotion, provided by a communications officer at Glasgow City Council. The project's dissemination activities are promoted on its website (http://futurecity.glasgow.gov.uk/) and the Council's website (www.glasgow.gov.uk/FutureCities)

The Demonstrator has held a series of 'hackathons' recently to explore how technology and data can improve the future of everyone living and working in Glasgow. One of these was on energy, with the winning team developing an idea for an application which features real-time

alerts on energy consumption in buildings, with the potential to help Glasgow and other local authorities cut their energy bills substantially.

In the near future a free open air WiFi network will be available in Glasgow in time for the 2014 Commonwealth Games and publicity around this will help promote the project.