Developing, piloting and standardizing on-tax financing for residential energy efficiency retrofits in European cities and regions

Dissemination materials for Financial Institutions: EuroPACE and International Programmes

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Contents

Deliverable Summary

Dissemination to Financial Institutions

Original description: Climate Bonds Initiative were to look through the partners' networks to identify suitable financial institutions to work on the re-financing of the EuroPACE pipeline through the bond market. This work stream would involve communicating with investment banks and mapping which financial institution partners could be the best fit for scaling up EuroPACE.

Dissemination materials for Financial Institutions: EuroPACE and International Programmes

Revised task: GNE and CBI had several conversations as to how best to proceed with this task due to the complications imposed by COVID and a more developed understanding of what was most relevant to the project. It was agreed by both parties that the original task description should be ammended to better serve the needs of the project and align with CBI's communications policies (inability to directly promote one mechanism to their investors due to impartiality).

It was decided that CBI would write a report looking at PACE and similar initiatives in an international setting, which would include conducting interviews to gather information, following which a webinar would be held at which several international stakeholders would discuss and share their respective experiences.

To gather information for the report CBI conducted several interviews with stakeholders in China, Australia, USA, Canada, South Africa and the UK. The interviews held and research and analysis conducted provided the basis of the report which culminates in a "Lessons Learned" section the aim of which is to provide guidance from others' experience as to what is crucial to a good PACE programme. The webinar intends to bring some of those interviewed together to share their experiences allowing for an engaging discussion between all parties.

Policy Background

EU buildings, residential and non-residential, account for approximately 40% of energy consumption and 36% of CO_2 emissions. About 35% of the EU's buildings are over 50 years old and almost 75% of the building stock is energy inefficient, while only 0.4-1.2% (depending on the country) of the building stock is renovated each year. Therefore, more renovation of existing buildings has the potential to lead to significant energy savings – potentially reducing the EU's total energy consumption by 5-6% and lowering CO_2 emissions by about 5%.[1]

Consequently, improving energy efficiency (EE) of buildings is a key objective for the EU. The European Commission (EC) presented a set of legislative proposals ("Clean Energy for All Europeans") aimed at achieving secure, clean and affordable energy for all Europeans. The package provides the legislative framework to stimulate investments in renewable energies and EE to make Europe a leader in the clean energy transition.

[1] European Commission "New rules for greener and smarter buildings will increase quality of life for all Europeans" Available at *https://ec.europa.eu/info/news/new-rules-greener-and-smarter-buildings-will-increase-quality-life-all-europeans-2019-apr-15_en*

Recently, the European Commission has tabled the Fit-for-55 package, a series of legislative proposals to deliver the EU's more ambitious climate target of 55% emissions reduction by 2030. The package includes a higher renewables target and new rules to support the expansion of renewables.

Its latest goals foresee a share of at least 40% (previously 32%) renewable energy consumption by 2030, it also targets energy savings, setting a goal for EU countries to collectively cut energy consumption by 9% by 2030, compared with their projected energy use by that date under current plans. To hit that goal, countries will be required to put in place measures to cut their final energy consumption by 1.5% each year from 2024 to 2030, nearly doubling an existing requirement of 0.8%.

Unfortunately, the level of investment on improving the energy inefficiency of buildings is still far from adequate, with EUR137bn identified as the current investment gap (smartEn, 2018). Public funding cannot unlock the transition investment needs alone, which calls for mobilisation of private capital. While public funding can help lower the cost and risk of financing, private sector funding can be redirected to finance the transition and fill the investment gap.

This report hopes to introduce some of the PACE projects being undertaken currently and also a couple of international examples.

For more information please see this webinar: COVID-19 Recovery: Energy efficiency and home renewable energy in stimulus packages - https://www.climatebonds.net/events/2020/06/covid-19-recovery-energy-efficiency-and-home-renewable-energy-stimulus-packages

We would also like to bring your attention to a EuroPACE and International progammes webinar which will be held on 30th September.

What is EuroPACE trying to achieve?

As noted above the funding gap for addressing energy efficiency in buildings is large and the level of investment to date has been too slow to address the needs. So to take things into householders/owners hands the concept of PACE and then EuroPACE emerged. EuroPACE was inpired by the PACE mechanism – asset backed financing with the objective of implementing a financing structure that is attached to the asset / property and not an individual.

EuroPACE is directly in line with the EC's objectives of (1) putting EE first, including the development of renewable energy use in buildings and (2) contributing to the EU's global leadership.

Typically, energy efficiency improvements in homes are funded with savings, personal unsecured loans, and to a lesser extent other financing tools. The concept behind EuroPACE is that it provides a flexible financing mechanism and programme design which can vary based on the local context. Typically, there are four main stakeholders involved in a EuroPACE Programme:

- a local government,
- investors providing financing,

- energy experts/energy services contractors, and
- homeowners undertaking retrofits

The Inspiration: US PACE

At its core Property Assessed Clean Energy (PACE) is a financing mechanism that enables low-cost, long-term funding for energy efficiency, renewable energy and water conservation projects that is widely used in the US. PACE loans are repaid as an additional payment on a property's regular local property tax. This method has been used for many decades to finance infrastructure upgrades such as sewers.

From a public policy perspective, the innovation lies in local and state governments recognizing that energy retrofits are a public good, thus justifying the use of a tax system to support the collection of loan repayments. The respective states' legislation share common features for example establishing a valid public purpose, defining a collection mechanism via property taxes, and articulating the non-payment scenarios to facilitating private capital. In the US, PACE financing is repaid via a special charge added to a property tax bill over a term of up to 20 years. The secure repayment and collection mechanism created by PACE financing provides confidence to private investors, resulting in long-term, up-front financing, attractive to homeowners and commercial building owners.

In the US, PACE can be used to pay for energy efficiency, renewable energy, and water conservation upgrades to homes and commercial buildings. In some states, PACE laws allow for hurricane hardening and seismic measures to be covered as well. All improvements must be permanently affixed to the property; home appliances are not eligible.

Today PACE is available in nearly 40 states and more than USD 9billion[2] of energy efficiency and renewable energy improvements to homes and commercial building were financed using this innovative approach. Residential PACE accounts for 78% of the total amount and more than 300,000 upgrades have been completed, commercial PACE accounts for the remaining amount with 42,560 projects underway. Energy &

[2] PACENation data available at: *https://www.pacenation.org/*

water efficiency have been by far the most popular residential project type accounting for 70% of the total, followed by renewable energy (21%) and resilience (9%). On the commercial side energy efficiency has also been the favoured project type accounting for just under half of the projects, renewable energy comes second with 23% closely followed by mixed (22%) and then resilience (7%). In terms of building type hospitality, office and retail take first, second and third place respectively. Together residential and commercial PACE have created 152,000 jobs the lions share falling within residential projects. It is worth noting that currently just four states have residential PACE Programmes: California, Florida, Missouri and Ohio.

The US PACE Programme has come in for some criticism however it is important to put some of what has been said in context currently out of every 10,000 PACE projects completed only 4 have had a sub-optimal outcome. In California complaints regarding solar financing are collected at an industry level which includes PACE, last year they collected 17,000 complaints only 25 of which related to PACE. Many of the concerns raised could be addressed by more stringent oversight of contractors and more efforts relating to the education and information made available to clients before they sign-up.

To learn more about PACE in the US, visit www.pacenation.org.

The European adaptation: EuroPACE

EuroPACE was designed to develop an innovative financing mechanism to boost energy efficiency investment in existing residential buildings. The EuroPACE project is focused on bringing private capital into the home renovation market, which had previously been largely served by public funding.

The EuroPACE project faced a number of challenges common to any new and innovative project. The EuroPACE concept is quite complex as it incorporates novel financing which consequently required a legal review of the existing fiscal and non-fiscal legislation to find a way to secure the financing via the property and allow municipalities to participate in the collection. While in the US, the PACE mechanism relies on the property tax system, in Europe this required a full analysis of the existing legal and fiscal laws to be conducted to better understand the possibilities for attaching the loan to a property.

Originally branded as on-tax financing, building on the US experience, EuroPACE received some scepticism from European public authorities unwilling to consider changing the tax legislation. Having learned from the experience in Spain, the concept was re-branded to home-based financing, denoting financing that is attached to a property and not an individual.

The challenge in finding a suitable legal solution was multifold and involved finding one which covered the following:

(1) effective in delivering security to investors,

(2) not being overly burdensome on a public authority while enabling municipalities to participate in the collection, and

(3) realistic to implement.

After several detours, such a solution was found in Spain was found.

The EuroPACE model relies on the collection mechanism as 'safe conduit' so municipalities can have an active role remitting the loan repayments for retrofitting homes from homeowners to private investors. Such safe conduit mechanism decreases the risk of payment default, consequently attracting cheaper private funding. The municipality is there to enforce its tax collection system and therefore bestow security to the investor.

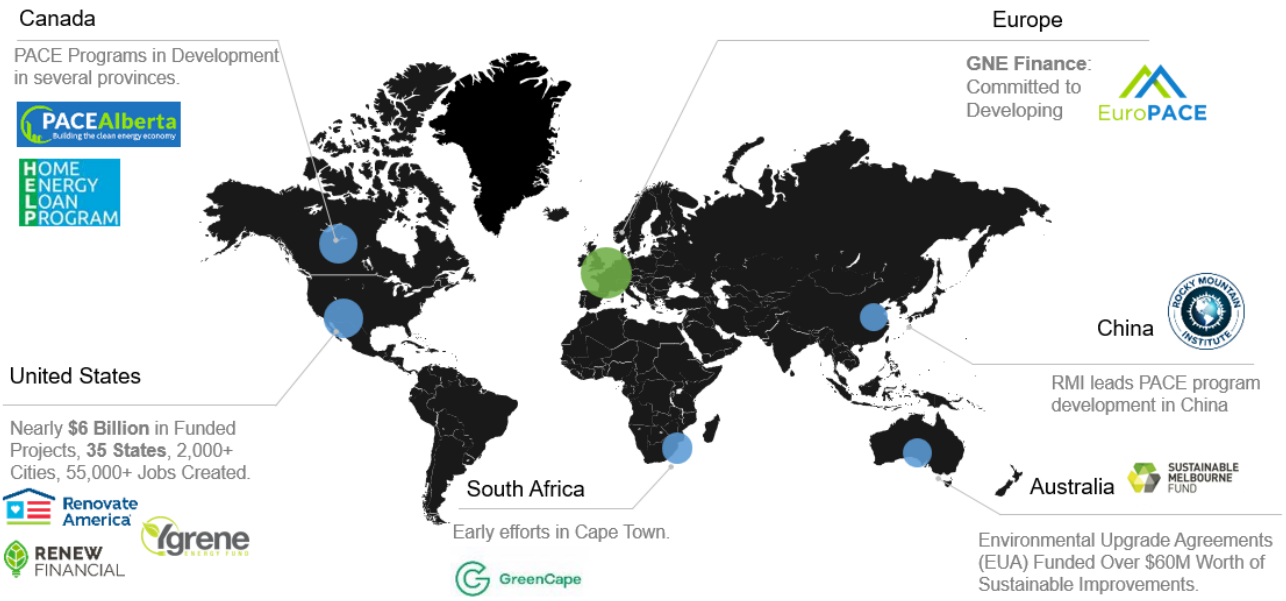
In Spain, a replication of PACE financing is based on the “Prestaciones Patrimoniales Públicas de carácter no Tributario” (PPPnT), which is a municipal levy enforced by the Law 9/2017, which is the Spanish transposition that resulted from EU Directive on Public Procurement 2014/24/UE. PPPnT is a non-fiscal right of public revenue/income. Being non-fiscal makes its implementation much easier. As a public right of public revenue, it allows municipalities to enforce legal proceedings for tax collection incase of payment delinquency.

EuroPACE project partner GNE Finance has been pioneering an amendment to the Spanish Climate Change and Energy Transition Law, which would make EuroPACE financing possible across the entire Spanish territory.Given the difficult political climate in Spain, as well as the COVID-19 pandemic taking up significant political energy and resources throughout the project, this amendment has not yet successfully passed through the Spanish Parliament. At the time of writing, this amendment is thus still an ongoing topic. Once accepted, it is foreseen that the amended Law will legitimate the active involvement of municipalities in EuroPACE Programmes and enable the mechanism of home-based financing, and therefore the enactment of the municipal ordinances and retrofitting covenants will be based on such new law.

While home-based financing legislation is pending in Spain and has not yet been adopted by the Parliament during the lifetime of the EuroPACE project, GNE and OLOT proceeded with developing an integrated home renovation programme, that offers financing in a form of renovation loans specifically tailored for the programme. These home renovation loans offered by GNE are long-term and as such, homeowners will pay low monthly installments when repaying their home renovation. The OLOT project initially intended to use the notary deed to record the ”loan” on the property to create a semblance of attachment to the property and not the owner, however this was not successful as it was too cumbersome, expensive, took too much time for those involved and importantly it didn’t add any extra security from a legal standpoint.

PACE around the world

PACE programmes vary in style and level of devlopment around the world, here are some of the countries that have developed PACE or similar projects:



Europe - Netherlands

The FITHOME project is a H2020-funded (#892214) EuroPACE sister project with the objective to in retrofit 900-1.140 ground-based family homes in 3-7 municipalities in the province of Utrecht in the Netherlands by relying on a novelty innovative home-based financing concept tied to the so-called "Betterment tax" (Baatbelasting). This home-based financing mechanism is one of the most successful examples of the implementation of the financial innovation sought after by the EuroPACE project and is a concept to be followed up on closely by PACE communities, as it paves the way for potential future replication of home-based financing in Europe.

It must be noted that the Dutch legal framework does not explicitly refer to the concept of home-based financing in and of itself, but rather of the broad concept of "object-bound financing" (objectgebonden financiering), which is still not fully defined on the national political level, but has been leveraged by the coordinator of the FITHOME project, De Woonpas3 in order to design a home-based financing offer for homeowners looking to sustainably retrofit their home. This innovation allows for homeowners to repay for their home retrofit via a municipal tax, the amount of which is equal to the savings achieved through the retrofit. It must be noted that, similarly to the original PACE mechanism, this also does not require any up-front investment from the homeowner.

At the time of writing, the FITHOME Betterment tax financing mechanism is foreseen to become available to homeowners throughout the province of Utrecht, given its successful implementation in the pioneer city of Wijk bij Duurstede.

[3] Woningverduurzaming bereikbaar voor iedereen - De Woonpas

The FITHOME project runs from 2020 to 2023. More information about the project, as well as a contact form to learn more can be found at www.fithomeproject.eu.

Australia & New Zealand

Buildings are a major contributor to global warming, accounting for at least 23% of Australia's greenhouse gas emissions, according to the Centre for International Economics and existing buildings make up around 95% of the building stock. Australian cities have a high percentage of ageing stock which is in dire need of upgrade in terms of energy efficiency as such the government has been working with the finance sector and entities like Better Building Finance to develop innovative funding schemes the most recent of which is Environmental Upgrade Agreements (EUA) which is a PACE style Programmeme, the most developed of which is in Melbourne.

Melbourne

The most developed PACE style Programme began almost a decade ago in Melbourne. The City of Melbourne created a new programme, the Environmental Upgrade Agreement (EUA), which is a variation on the PACE model. The original aim of the EUA was to finance energy retrofits in commercial buildings. This initiative was part of its Zero Net Emissions by 2020 Strategy, Melbourne launched a 1200 Buildings Programme that aimed to retrofit 1,200 existing office buildings, which represents about two-thirds of the city's building stock, to reduce energy use, save water, and lower carbon emissions. The non-residential commercial buildings sector accounts for more than half of the city's GHG emissions. The Programme aimed to reduce greenhouse gas emissions from commercial buildings by about 38 percent (384,000 tons of CO2-equivalent per year) from business-as-usual levels by 2020.[4]

To provide the legal framework for the initiative, the Victorian Parliament passed an amendment to the City of Melbourne Act on Sept. 14, 2010, allowing the city council to administer a commercial building retrofit financing model. This amendment permitted councils to enter in to EUAs with commercial property owners seeking upfront funding for permissible projects and with the financial institutions willing to fund those retrofits.

Financing structure – upon approval of the EUA the owner/lender arranges financing with a financial institution (FI) and enters in to a contract with the city of Melbourne. The FI provides upfront financing and the lender begins scheduled property tax surcharge payments equal to the interest and principal which are paid via the city to the lender. The surcharge is a statutory charge, which the city collects as it would any other tax and ranks ahead of any other debts and obligations. Assigning this level of seniority to the debt increases the likelihood that the loans will be repaid, allowing for reduced interest rates. If a property is sold, the new owner assumes the payments, reducing uncertainty about recovering project costs.

The variation to the US PACE structure is that in place of the "pooled-bond" mechanism Melbourne's programme used an owner-arranged financing model which allows the owner to find the lender with the most attractive funding terms. There are conditions around the credit rating of the owner, the size of the project, annual energy spend and projected energy savings.

[4] Center for Clean Air Policy "Melbourne Promotes Building Upgrades with Environmental Upgrade Finance" *http://ccap.org/assets/CCAP-Booklet_Australia.pdf*

This structure of EUA overcomes one of the hurdles faced by financing environmental upgrades which has been the split-incentive barrier between landlords and tenants as it allows for sharing of the surcharge payments. With the tenant's consent property owners may pass through part of the surcharge to the extent that it does not exceed the savings that the tenant benefits from.

Current status – EUA is now available in Victoria, New South Wales and South Australia. The state programmes are very similar but have individual nuances. Victoria's Programme has been extended to residential property, the residential Programme was launched in 2019, owing to the pandemic its development thus far has been somewhat limited. As of 20/21 (non-residential) EUA investments totalled AUD36mn and tCO2e emissions reduced were 585,776.07. [5]

For more information see: https://betterbuildingfinance.com.au/

New Zealand

The Energy Efficiency and Conservation Authority (EECA) has a Warmer Kiwi Homes Programmeme for low income houses which offers grants to cover:

- 80% of the total cost of ceiling and underfloor insulation. In some areas the cost to you may be even lower, thanks to generous funding from community organisations.

- 80% of the cost of an approved heater. This could be a heat pump or an efficient wood/pellet burner for the main living area. Heater grants are capped at $3000 including GST.

While New Zealand has yet to adopt a similar programme to that in Australia there are hopes that it will. New Zealand's low quality and ageing residential housing stock would be well-suited to this type of initiative and as some of the housing issues cause health problems it is thought that the demand would also be there.

Additionally, as most of the funding currently in place is ultimately funded by local governments and the debt sits on their balance sheets which are currently under pressure having been negatively impacted by the pandemic the drive to introduce something closer to Australia's EUAs may be even stronger.

Canada

Canada has programs which are similar in ambition to PACE programmes in a number of provinces and in Yukon Territory. The stage of progression of each of those varies from one province/territory to another. The Halifax solar city project has been one of the most successful to date.

Halifax: The pilot program launched in 2013, since then property owners in the Halifax Regional Municipality (HRM) have been able to access an innovative solar financing option called Solar City Halifax. The financing program allows people to invest in solar with no down payment and to repay the balance alongside their annual property tax bill.

The Solar City program involves a voluntary financing application whereby the property owner enters into an agreement with the municipality to access funds that offset the capital costs of installing solar energy systems on

[5] Better Building Finance *https://betterbuildingfinance.com.au/news/market-data/*

their property. The municipality places a voluntary Local Improvement Charge (LIC) on the property after the solar contractor is paid at the end of the project. The LIC is an additional annual charge and is *separate* from the property owner's annual property tax bill.

Alberta: PACE enabling legislation was passed into law in January 2019. Originally Energy Efficiency Alberta (EEA) was appointed by the NDP as the PACE Administrator for the Province. The UCP government have since disolved EEA and the role of PACE Administrator has been transferred to the Municipal Climate Change Action Centre (MCCAC). Municipalities who wish to make PACE (aka CEIP) can opt to work with MCCAC to develop and deliver their program. A number of municipalities are planning to make PACE available to their constituents including Canmore, Edmonton, Devon, and Rocky Mountain House. (Leduc is also exploring the adoption of a PACE program).

While these programs do not embrace the complete best practice program design being advocated by PACE Alberta due to constraints imposed by the current legislation, they may nevertheless demonstrate how well PACE can work and be a positive first step towards a sustainable future for Alberta supported by PACE.

For more details visit the MCCAC website (Clean Energy Improvement Program (CEIP) aka PACE) https://mccac.ca/programs/clean-energy-improvement-program/

How CEIP works:

STEP 1 - The municipality passes a CEIP bylaw and secures the capital required to finance CEIP projects.

STEP 2 - Once the program is in market, property owners can apply for project approval. Their chosen project must pre-qualify and then be evaluated. Then the owner selects a qualified contractor from the official directory (which was due to launch in Summer 2021), they must get at least 3 quotes. The owner completes and submits the application for approval. Once approved the CEIP is signed. The chosen contractor installs eligible upgrades and a post-retrofit NRCan Home Energy Evaluation is undertaken.

STEP 3 – When the work is verified the municipality transfers funds to AMSC to pay Qualified Contractors for the **completed work.**

STEP 4 - Property owners repay the municipality for the cost of the project through a Clean Energy Improvement charge on their regular property tax bill.

British Columbia: BC has an active PACE advocacy group (PACE BC Alliance) whose work resulted in the BC government hiring an experienced consulting firm to undertake a public consultation and develop a PACE Roadmap. The report is now in the government's hands and the next step will include drafting and passing PACE enabling legislation.

Nova Scotia: Provincial PACE legislation was passed in 2011. PACE programs exist in a number of municipalities. Halifax's Solar City program is the most successful to date at more than 800 installations and over $8M; it is currently delivering solar thermal measures, and has a maximum 10 year payback. Nova Scotia has two 3rd party PACE Administrators (Clean Foundation) and (PACE Atlantic) which is the leading model in the US because it is intended to relieve the burden of administration and risk for the participating municipality. PACE Atlantic is piloting a program funded by the Federation of Canadian Municipalities (FCM) and VanCity Credit Union for residential energy efficiency retrofits using a third party administration model, which is anticipated to be ramped up on completion.

Ontario: Ontario's law applying Local Improvement Charges to PACE was passed in 2012. Toronto has a PACE program titled "HELP" (Home Energy Loan Program). As of 2019, uptake was almost $5M with $10M supporting C-PACE program targeted to Multi-family residential (High-Rise Retrofit Improvement Support Program (Hi-RIS)). Both programs are run and funded using municipal resources. Guelph will soon be launching its own program administered by a 3rd party not-for-profit (Our Energy Guelph) who intend to use the private sector funding model.

Prince Edward Island: PACE Atlantic is simultaneously piloting an FCM/VanCity-funded third-party administrator program for Charlottetown, the provincial capital and the Town of Stratford.

Quebec: A representative from the sustainability network is working to establish a PACE advocacy working group. Letters of support for PACE Canada's vision have been provided by three municipalities: Plessisville, Varennes, and Vercheres.

Saskatchewan: Saskatoon has recently issued an ambitious blueprint for a sustainable future which includes the establishment of a PACE program (Saskatoon: The Low Emissions Community Plan).

Northwest Territory and Nunavut: Thus far, PACE programs have not been initiated in either of these Territories, although Northwest Territory passed legislation authorizing LIC financing for this purpose.

Yukon Territory: Yukon was the first ever to launch PACE-type programs using LICs in 1984, successfully financing residential PV for rural electrification as well as utilities. Yukon is examining the use of this mechanism for energy efficiency retrofits.

For information see: https://www.paceab.ca/

United Kingdom

In the UK the built environment accounts for 30% of GHG emissions, here are a few of the UK based energy efficiency initiatives:

The Green Deal was a UK government policy initiative that gave homeowners, landlords and tenants the opportunity to pay for energy efficient home improvements through the savings on their energy bills from 2012 to 2015. At the heart of the Green Deal was what was termed the 'Golden Rule' i.e., that savings on bills would exceed the cost of the work, however there was no guarantee that this would be the case. Consumers then paid back the cost of such improvements through the expected savings in their energy bills. Like other energy efficiency programmes the burden of debt stayed with the property and not the owner/tenant.

A second Green Deal was launched in 2014 which involved grants and not loans, households were eligible to claim up to £7,600 for improving their homes.

It was hoped the Green Deal would lead to the renovation of the UK's housing stock with an estimated 14 million homes however ultimately only 15,000 Green Deals were signed and the scheme was discontinued to save taxpayer money.

The Green Homes Grant Scheme first announced in July 2020 was a government initiative with the aim of upgrading energy efficiency in residential buildings. Under the scheme, £1.5bn was made available in vouchers to homeowners looking to make energy efficiency upgrades in their homes and an additional £500m was to be delivered by local authorities to carry out upgrades in low-income households. Under the

grant Programmeme, homeowners were offered vouchers between £5,000 and £10,000 to fund up to two-thirds of the cost for energy efficiency improvements. The Programmeme set out an ambitious goal of funding renovations for up to 600,000 homes between September 2020 and March 2021.

After a delayed start left homeowners a very tight four month timeframe to comply with the conditions and complicated administrative hurdles led to a very low take-up, the scheme was then extended by one year to March 2022. However subsequently it was announced without warning that the scheme would be scrapped in April 2021 having achieved just 10% of its original target to improve 600,000 houses in six months. There is speculation that a replacement scheme might be announced this year.

The Green Finance Institute, established in 2019 and backed by the UK government, focuses on the systemic transitions that need to be financed within the real economy, such as the energy efficient retrofitting of buildings, and the decarbonisation of road transport. One of GFI's key initiatives is The Coalition for the Energy Efficiency of Buildings (CEEB) was established in December 2019. "The Coalition is developing the market for financing net-zero and resilient homes, through the co-design and launch of viable and impactful financial 'demonstrators' that provide the catalyst for further financial innovation at scale." Dr Rhian-Mari Thomas, OBE, CEO, Green Finance Institute of Finance.

The Coalition operates by bringing together a multi-stakeholder group whose aim it is to develop market solutions to scale the finance needed to "to retrofit UK homes to high standards of energy efficiency, and deliver significant social and environmental benefits". https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2020/06/Financing-energy-efficient-buildings-the-path-to-retrofit-at-scale.pdf

The Coalition's "Financing energy efficient buildings: the path to retrofit at scale" report explains that by building on existing research, reviewing the UK market and seeking out international best practices the Coalition identified 21 scalable demonstrator projects. These projects have the potential to address the hurdles faced when trying to mobilise capital to meet their goal of scaling up energy efficiency retrofits across the social rented, private-rented and owner-occupied residential sectors. The objective was to progress with the demonstrator projects to demonstrate the viability of a range of financing solutions.

The demonstrators identified are split into six classifications: 5 Data and enabling frameworks, 2 Tenancy agreements, 6 Lending products, 3 Saving investment products, 3 Energy service products and 1 Guarantee mechanism.

The lending products include: Property Assessed Clean Energy 'style' financing; Green Equity Release, 'Help to Green' Equity Loan, Domestic Energy Efficiency Salary Sacrifice Scheme; Leaseholder Financing; and Add-to-my Mortgage Platform.

While the saving and investment products identified were: Community Municipal Bonds, Long-Term Retail Investment, and Energy Saving ISA.

Looking ahead GFI's Coalition for the Energy Efficiency of Buildings has made considerable progress in researching the potential solutions, analysing the market, collating consumer, industry and public sector feedback which has resulted in their being able to identify those solutions/demonstrators that might be more compatible with the UK market. Lessons have been learned from some of the issues which stifled the success of the Green Deal. The Coalition is now actively working with government and local authorities to progress to a

position where a pilot scheme can be put in place however as we have seen elsewhere patience is required to ensure success.

South Africa

While in the early stages of development South Africa has covered a lot of ground to facilitate a PACE style project. One of the potential options identified from a financiing perspective is to assign an additional cost to the Special Ratings Area (SRAs). The city of Cape Town Special Rating Areas is a municipal facility which could allow for an additional rate to be levied on individual properties. This could be payable by owners in a defined area, to raise funds for the improvement or upgrading of such an area. It might be advisable to propose the requisite legislative amendments at the national level and these could then be tailored to individual cities needs. GreenCape has been very active in their involvement in trying to develop the projects in South Africa.

For more information see: https://greencape.co.za/

Other Energy Efficiency Initiatives

In the ”Urban Efficiency II - Seven Innovative City Programmes for Existing Building Energy Efficiency” [6]report C40 showcase the different and innovative approaches taken to advancing operational energy efficiency and retrofitting in existing, private buildings by seven cities across the globe. These ranged from carbon reporting and disclosure (Tokyo), large scale urban transformation (Shenzhen), finance support (Boston and Seoul), leadership Programmes and energy reduction challenges (Chicago and London) and building certification schemes (Mexico City). The report demonstrates the wide range of approaches taken to tackle this serious issue and perhaps also that one size does not fit all. As was the experience of the EuroPACE programme energy efficiency and retrofitting initiatives should by no means be cast in stone. “They should be understood as packages of evolving governance tools, that are constantly refined in response to accumulated data, knowledge and experiences.”

They commented that, “In our survey of seven Programmes, a noteworthy feature was that the majority were voluntary (or contained a voluntary component).” As with EuroPACE they also noted that “The degree of stakeholder involvement in Programmeme design, and the careful array of incentives designed to encourage building sector involvement was a key element across all seven cities chosen Programmes.”

US – Chicago - Retrofit Chicago Energy Challenge

Looking at one of those case studies in a little more detail, Chicago mapped out the Chicago Climate Action Plan (CCAP) in 2008, within which the City of Chicago aims to reduce CO 2 emissions by 25% by 2020 and 80% by 2050, compared to 1990 levels. Residents and businesses in Chicago spend more than $3 billion each year on energy consumption, and building energy use accounts for 71% of citywide GHG emissions. Much of the

[6] C40 Cities climate Leadership Group ”Urban Efficiency II - Seven Innovative City Programmes for Existing Building Energy Efficiency”
https://c40.my.salesforce.com/sfc/p/#36000001Enhz/a/1Q000000Mo5i/z8xF0YmnG3TNkqWkqrvbtLXL1NeW1YWT_1O6DVdaHI8

building stock's energy expenditures are spent on Chicago's 3,246 heating degree days (C) 1 during cold months.

More recently in 2012 Chicago's Mayor led public and private stakeholders in creating the Sustainable Chicago Action Plan which identified energy efficiency and the promotion of renewable energy as key components of citywide sustainability efforts. The Retrofit Chicago Energy Challenge (henceforth "the Challenge") emerged from this and it forms an important part of the Better Buildings Challenge launched by President Obama in 2011. Chicago's participation in the Better Buildings Challenge comprises of three related Programmes (commercial, municipal, residential).

The residential Programmeme has covered hundreds of multifamily and single family projects with the project cost also covering a wide range. Barney Ford Apartments which is managed by the Denver Housing Authority (DHA) is one example the project size was 68,000 square feet and the cost USD 525,000. Barney Ford Heights is an 81-unit apartment building providing subsidized housing to its residents. Built in 1962 the 8-story building was operated for 38 years with minimal energy efficiency upgrades until DHA launched a multi-year, multi-phased HUD approved energy performance contract (EPC) which is a variation of a traditional EPC with financing provided through an Energy Services Company (ESCo).

In 2007, Denver Housing Authority (DHA) completed phase 1 of a portfolio wide EPC. All of phase 1 projects were managed by an Energy Services Company (ESCo). This work included upgrades at Barney Ford which yielded 8% savings when measured against a 2002 baseline. Based on the measurable success of this work, a second phase was launched to generate additional savings but with the housing authority not the ESCo managing the work so as to secure better financing and have greater control over the projects scope of work, contractor selection and equipment purchasing and selection. Buildings included in DHA's second energy performance contracting phase focused on multi-family row homes, single family scattered sites, and mid-rise buildings totaling over 2,700 public housing units across their portfolio. This city-wide EPC Programme is estimated to impact 2.7 million square feet of public housing and deliver an estimated annual cost savings of $2.4 million dollars.

Switching from an ESCo to a self-managed EPC allowed DHA to customize the scope of work for each building as well as the type of energy conservation measures (ECMs) that were implemented. DHA worked with a number of sub-contractors, to select and implement the best project specific energy improvements. For Barney Ford the ECMs included attic insulation, window and door replacements, central plant HVAC and DHW upgrades, common area lighting upgrades, residential lighting & appliance upgrades and building automated control systems.

In an effort to support the energy-efficient system installed under the EPC, DHA developed a training Programme for staff and tenants to change behaviour, thereby increasing utility cost savings. Once the training Programme is implemented, DHA anticipates an additional 5% utility cost savings in future years.

DHA partnered with engineering and financial consultants as well as with a general contractor to orchestrate the project design, financing, construction, measurement & verification and HUD approval processes.

For mre information please see:https://betterbuildingssolutioncenter.energy.gov/showcase-projects/denver-housing-authority-barney-ford-apartments.

South Korea - Seoul – Building Retrofit Programme (BRP) Loan Support Scheme

As part of its wider One Less Nuclear Power Plant policy, Seoul Metropolitan Government has formed an ambitious Building Retrofit Programme (BRP) to spur retrofitting in government, commercial and residential buildings. This initiative promotes energy efficiency refurbishments by facilitating access to attractive, low interest rate loans with generous repayment and grace periods. In parallel, it lowers financial barriers to key building technologies such as high performance insulated windows and doors.

Phase One of this plan aimed to reduce energy demand by the equivalent of 2 million tonnes of oil equivalent (TOE) by 2014. This amount equates to the output of a typical nuclear power plant for the period. The 2 million TOE goal was met within two years, in the first half of 2014, approximately six months ahead of schedule. From July 2014, Phase Two set the goal of achieving a 20% rate of self-sufficiency in electricity production by 2020 from 2012 levels whilst also achieving 4 million TOE of energy savings and production leading to a 10 million tonne savings of GHGs.

Energy consumption is particularly high in the Seoul metropolitan area, home to some 10 million residents. In 2011, Seoul was consuming 7.5% of total national energy and 10.9% of national power consumption. Between 2009 and 2013, electricity consumption grew annually at 1.12% and was forecast to reach 50,330 GWh by 2020. In 2013 just 4% of Seoul's electricity came from renewables with fossil fuels and nuclear meeting the remainder of the demand. The building sector in Seoul is responsible for 69% of the city wide emissions and the building stock is quite old and was built at a time when energy efficiency was not a priority.

In 2012, the focus and strategy of BRP expanded measures to explicitly drive retrofitting in residential buildings by integrating a loan support scheme with cooperation of private lending institutions. Anyone in the Seoul metropolitan area can apply for a BRP loan including owners and tenants of both commercial and residential buildings. ESCO registered businesses and energy saving equipment suppliers and installers may also apply to the loan to expand business operations. Financing may be used, for example, to procure and replace high performance insulation and windows, LED lighting and lighting equipment, air-conditioning and heating systems and renewable energy production facilities.

There are two types of BRP loans Housing BRP which targets the residential sector and Building BRP which is aimed at non-residential buildings, the difference between them is also the size of the loan on offer. Loans may cover up to 100% of project costs. An attractive low interest rate and long-term payback period has been set for the Programmeme. In 2016, interest rates were set to 1.45% and payback periods up to eight years.

Financial structure – once applicants have been accepted and approved the SMG Climate Change fund covers the project funds which are transferred to the applicant by a financial institution. SMG has collaborated with six banks to serve as official partners. Applicants repay the loan directly to the financial institution involved and have the option of a long-term repayment plan up to eight years. In the case of non-residential buildings, applicants are also eligible for a three-year grace period where repayments are subject only to interest.

The BRP loan scheme was the first Programmeme to cover residential buildings of all types. It is also innovative in being open to all groups of stakeholders and by offering low-interest loans to ESCOs, SMG is able to promote uptake of ESCO implemented projects. These are typically self-financing, nullifying the need for building owners to generate repayments on their own accord. An additional incentive is that SMG has forged agreements with many construction material suppliers which offers reduced prices for materials e.g. insulated windows and doors.

Since 2012 buildings involved in the BPR Programmeme can receive additional benefits through SMG eco-mileage system whereby based on energy consumption savings achieved you can earn points which can be used to by good e.g. LED lamps, ESCO services or even financial support for greening initiatives. As of 2016 almost 2 million memberships had been issued.

Between 2012-2015 4,200 projects had been implemented through the BRP loan support scheme achieving a savings of 25,841 t-CO 2. In 2015 residential buildings made up the majority of the projects with 4,034 completed that year versus 112 non-residential buildings in the same year.

A core strength of the BRP loan support scheme is seen to lie in its multiplicity of approaches to lowering the financial barriers to retrofitting commercial and residential buildings once again demonstrating the benefit of having a versatile programme.

China

Twenty eight percent of China's carbon dioxide emissions originate from energy use in buildings. China could face a growth of almost 160% in buildings' energy use by 2050. From 1995 to 2005, China's building stock nearly tripled, and it is expected to do that again by 2030. The Chinese building stock is rapidly expanding due to urbanization which is a driving force, according to statistics, from 1996 to 2008 approximately 130 million rural residents left to settle down in cities, leading to a decline in the rural population from 850 million to 720 million.[7] Under China's current development plan, its building sector will use more energy than any other country's building sector in the world by 2030 and will double by 2050 (IEA 2013a).

China's central and local governments have recognised the need to improve building energy efficiency, through the adoption of both regulatory policies and market-based / financial policies (i.e., building energy labels and incentives). While energy labelling (e.g., appliance energy information labels) has been an important policy tool in China's energy efficiency efforts, whole-building energy labelling is relatively new and still voluntary. There are currently two domestic building energy-labelling Programmes: the Green Building Evaluation and Labelling (GBEL) Programmeme and the Building Energy Efficiency Evaluation and Labelling (BEEL) Programmeme.

China must improve building energy performance to meet its ambitious goal of peaking carbon emissions by 2030. New buildings represent a major opportunity for long-term and cost-effective contribution to carbon emission reductions because China is the world's largest and fastest-growing market for new construction—adding about one billion square meters of floor area annually and reaching a 46% increase relative to today in the building stock by 2030, which amounts to an additional 1.7 billion tons of carbon emissions in 2030 compared to today.

[7] Global Buildings Performance Network https://www.gbpn.org/activities/china/

China continues to promote "green" buildings by using policy levers; China has promoted green buildings at the central and local levels through official encouragement as well as financial incentives for qualified projects. The central government set a goal in 2012 of constructing 1 billion square meters of green buildings—certified with the government-sponsored Green Building Energy Label (GBEL)—during the 12th Five Year Plan (2010-2015) and offered incentives of 45 and 80 RMB per square meter for 2-star and 3-star buildings, respectively. The Ministry of Housing and Urban-Rural Development (MOHURD) found that these incentives covered more than half of the incremental costs for residential buildings and close to one-third for non-residential construction to achieve the higher label.[8] 1-star buildings were not subsidized due to their negligible added cost compared to conventional construction. In addition to the individual building incentive, the central government offered incentives of 50 million RMB for green districts and ecological cities—helping to fund eight projects for a total cost of 400 million RMB.[9] Local governments also encouraged green building growth by promoting their own goals and incentives that sometimes matched the central government incentive.

China does not currently have a PACE programme but is exploring one, part of the reason that this has not been put in place to date is that urbanisation in China is a relatively recent occurance and so retrofitting is not a well-established concept.

Some of the challenges China has faced are similar to those experienced elsewhere including:

- Low awareness of the potential cost savings which restricts demand
- Developers having little incentive to spend extra for energy-efficient construction, however recent government Programmes are helping to build a better business case
- The private sector was slow to get onboard but is now beginning to help fuel demand for energy-efficient buildings. Companies are increasingly drawn to buildings that meet national and international green certification standards; they are also looking to meet their corporate social responsibility (CSR) objectives

Takeaways

Country Nuances – One size does not fit all, each country (and perhaps even within that each district, state, province or county) has its own nuances the goal should be to solve for an existing payment mechanism that provides longterm security over the life of the repayment schedule of the project and in some cases that is a collection mechanism which a payment can be attached to.

For example,efforts to implement and replicate EuroPACE in Europe have shown that specific national, regional and local laws and administrative frameworks require a tailored approach in every instance where a EuroPACE Programme is set up. Currently, few European countries have a fiscal framework that is fully accomodating towards on-tax financing, with the notable exception of the Netherlands, where the FITHOME project provides a key example of innovative use of tax mechanisms for repaying home retrofits.

Technical assistance – The EuroPACE experience has taught it is not the financing aspect that needs to be focused on as a stand-alone motivator for homeowners to retrofit their home, but rather that providing high-quality, accessible technical assistance and developing a holistic integrated home renovation service that

[8] "PACE Financing for New Buildings in China: A Policy Lever to Unlock Energy Performance Investments and Reach Carbon Targets" http://www.cngb.org.cn/cms/view/detailed.action?sid=aabec13351eda2360151f205532f001d
[9] "绿色生态城市迎来大考", http://www.china-gba.org/news/hangye/1193.htm

marries the technical component with the financing component is crucial in order to scale up renovation activity. As such, funds need to be deployed not only to ensure that homeowners have access to affordable financing, but also to roll out a robust technical assistance Programme which integrates this affordable financing component.

Attracting private investor momentum - Often policymakers only want to use public money to fund the initiatives however given the scale of the issue e.g. the cost to upgrade every building in the US would be approximately USD 4 trillionrelying on public money alone will not even begin to address the needs of the sector. Publicly administered Programmes which rely solely on public money cannot be scaled sufficiently. Facilitating the involvement of private investment is a must. In Canada private capital cannot be deployed for buildings upgrades. In many places this will also be the case and changing that will most probably be a long and complex process which will involve political engagement and potentially a change to the regulation/legislation in place.

As is the case in the US and elsewhere, public funds alone cannot sufficiently support the scale that is needed to make the European Renovation Wave a success. Private investors must be attracted and involved in the EuroPACE movement, which will require an ongoing effort after the project's end date; currently, private investors are not yet sufficiently warmed up to the EuroPACE mechanism, which is expected to change as more commercial Programmes based on the EuroPACE Programme take off (e.g. Opengela in the Basque Country, REGENERATE on the Balearic Islands).

Differentiation between sectors and their respective stakeholders - The commercial/industrial and residential sectors are not the same and consequently neither are the needs of the respective stakeholders, residential and commercial Programmes should recognise this.

- Residential sector - consumer protection and education should be an important element for residential Programmes.
- Commercial sector – SMEs (small and medium enterprises) occupy 96% of all commercial buildings in the US currently the administrative and financial burden posed by applying for energy efficiency upgrades or retrofits via the commercial Programmes is too onerous and consequently the uptake is extremely low. A streamlined process should be offered to them otherwise the economics don't make sense.

Scaling investment - US PACE has been very successful in creating a PACE bond market with high demand from investors attracting private investment is critical to gaining scale. PACE bonds offer a compelling combination of high(er) returns while being eligible for many sustainable finance strategies.

Education and ethical implementation – some of the concerns around PACE and similar projects have been surrounding the balance between the sales initiatives and the interests of the clients, education would assist in this mismatch.