



# CIRCULAR CITY COMMITTEES REPORT Narrowing The Gaps

NTINI I

## ACHIEVING CIRCULARITY IN CITIES THROUGH ENVIRONMENTAL SUSTAINABILITY OF SPORTS

## 3.2. CCC Report

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### Abstract

Large sports events often resemble the operations of a mid-sized town, involving tens of thousands of spectators, extensive logistics, and substantial environmental impacts related to mobility, energy use, food consumption, and waste. In response, environmental management has become increasingly integrated into the planning and execution of sporting events by clubs, organizations, and authorities, aligning with broader environment, social, and governance (ESG) strategies.

This report, prepared for the ACCESS Circular City Committee under the Erasmus+ Sport-funded ACCESS project, highlights how cross-sectoral collaboration can narrow the gap between the environmental practices of sports organizations and those of their host cities or regions. Coordinated by ACR+, the ACCESS project fostered cooperation between sport stakeholders and local communities to promote circular approaches to event planning and operations.

The goal is to inspire and inform clubs, municipalities, and regional actors on how to co-create sustainable, circular sports events that benefit both the environment and local communities.

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## **INTRODUCTION**

Large sports events can attract between 20,000 and 50,000+ spectators, who may spend up to 3-5 hours within or outside the venue in fan zones or pubs and bars. For the teams and administration game day includes the arrival, warm-ups, press conferences, and accommodation, resulting in a full day of operations and logistics in and around the stadium. This is almost equivalent to the daily rhythm and functioning of a mid-sized town, with environmental aspects such as mobility, waste management, energy and food consumption. Tournaments and similar events over longer periods can increase climate and environmental impact.

Therefore, in clubs, sport organisations, public authorities and European institutions, environmental management is becoming ever more present in executing sport events in the framework of environment, social and governance strategies.

This report is for the ACCESS Circular city Committees: Narrowing the Grap. This program has opened the doors to engage cross-sectoral cooperation and synergies between sport organisations and their local and regional stakeholders. The ACCESS project is funded by the Erasmus+ Sport program of the European Union and coordinated by the Association of Cities and Regions for sustainable Resource management (ACR+); among its main objectives is to reduce the gap between the current environmental performance of sports clubs and associations, their strategies and practices and the strategies of the respective city or region where they are located and where their activities take place.

This cooperation whit some of the sports in Europe will drive forward the learning and acquisition of new skills and knowledge among sport organisations while narrowing the gaps between the local stakeholders and sport organisations.

The purpose of this report is to inspire and provide insights through our project partners' pilot projects, where the events taking place should be developed in a circular direction. The pilot projects should demonstrate how clubs and local communities can collaborate to leverage the opportunities already offered by the established synergies where the partners operate today, or the opportunities that can potentially be pursued by having a deeper impact on organizational choices and approaches (e.g., accommodation, food and beverages, mobility, purchasing and supplier selection. waste management, stadium infrastructural improvement and maintenance).

This report has been developed to demonstrate how local communities can collaborate and work together on circular events and activities. Below, the initiatives from Access project partners will be presented, which have taken place in collaboration with municipalities, local businesses, and volunteer organizations, with the aim of inspiring and sharing the knowledge and experiences that Access project partners have gained while working to make sports events sustainable.

## 2. GAELIC ATHLETIC ASSOCIATION (GAA)

## 2.1 CCC OVERVIEW AND FUNCTIONING

The Croke Park-GAA Circular Cities Committee was established to address the sustainability challenges and opportunities of and for sports venues in Dublin, with a focus on Dublin's north city, where Croke Park is located. Therefore, care was taken with the initial composition of the CCC to include the key stakeholders from both sports and the city, rather than to focus initially on any one action area. However, early on in the process it became clear that mobility was a shared priority for both sports and city stakeholders and was also an area in which there was scope for both short- and long-term sport-and-city collaboration. This section below details the establishment and development of the Croke Park-GAA CCC and the emergence of mobility as the focus of the CCC's action plans

Administration of the CCC was driven and managed by the GAA from the outset and this remained the case throughout. However, in developing Action Plan 3 – the High-Density Bike Parking Pilot – Dublin City Council took the lead in the scheduling of some of the meetings and in the communications with and between CCC members and other action plan stakeholders.

In convening the CCC, the GAA team liaised with colleagues in Croke Park as well as the Climate Justice Officer in Bohemians Football Club. Croke Park and Dalymount Park, the home stadium of Bohemians FC, are located within 1.5km of each other, both situated on the banks of the Royal Canal in the northside of Dublin city. The CCC provided the opportunity for sustainability actors from both stadia to come together to identify shared challenges and joint opportunities, and this relationship was to be maintained and develop throughout the duration of this project. Although Bohemians FC could not attend the first CCC meeting, the GAA and Bohemians held a bilateral meeting shortly after to ensure that all CCC members and stakeholders had a shared understanding of and an equal input into the development of this new collaborative structure

Dublin City Council (DCC) were, of course, a key stakeholder in the CCC process from the very first. However, the DCC representation on the CCC evolved as the project advanced. The project manager involved in the development of sports facilities in the city was involved throughout but whereas the other primary DCC contact had initially been from the Climate Action Team, as the focus on mobility actions become increasing clear and as the action plans became more defined, relationships were developed with the Transport Planning Department and the Active Travel teams in DCC and these became the primary city actor contacts within the CCC.

The Regional Waste Management Planning Offices (RWMPO) were another original member of the CCC and were present at the first CCC meeting. The GAA owes its participation in the CCC to RWMPO and their membership of ACR+. However, once it became clear - from the discussions at the first CCC meeting, bilateral conversations with CCC members and based on the results of the ACCESS engagement with Croke Park stakeholders in WP2 - that mobility would be the primary focus of the CCC, the RWMPO stepped back. However, representatives of the RWMPO continue to engage with the GAA on sustainability and circularity though the GAA's Green Club Programme and have been kept updated on the ACCESS project through the Green Club Programme's partnership structure. The CCC also engaged with academic experts, with a representative of the Sustainable Mobility team from Technical University Dublin joining the CCC from its second meeting

CCC meetings were held in person, online and in hybrid format. This flexibility optimised the participation of Committee members and also facilitated the ad hoc attendance of other stakeholders. As well as the four recorded CCC meetings, there were a number of additional planning meetings held for specific actions as well as bilateral calls and meetings between and among CCC members.

On the whole, the CCC has worked very well. It took some time to move from composition to action plan as it was first necessary for the stakeholders to become familiar with the project approach and aims and to understand and align with the priorities and challenges of other stakeholders. It also took some time to identify who the main CCC contacts/members should be. However, this was time well spent as it has resulted in the development of new understanding and relationships between the sport bodies and the different departments of Dublin City Council.

### 2.2 CCC LEGACY

One of the most exciting things about the GAA-Croke Park CCC has been the possibility that partnerships and structure established will endure beyond the lifetime of the ACCESS project. While the issues of sustainability mobility to and from sports venues in Dublin city were known to all parties ahead of the composition of the CCC, there was a dearth of dedicated sport-city structures and relationships to address these. Both sports organisations and city authorities have, in the past, identified and implemented various measures and programmes to promote active and sustainable travel, sometimes with the input of stakeholders from the other side of the sport-city dyad, but not in concerted collaboration as we have seen through the CCC. CCC members have expressed a desire to maintain the current collaboration beyond the lifetime of the ACCESS project. The exact structure of this remains to be confirmed but it may include the identification of one or more initial collaborative projects as well as a number of standing meetings throughout the year.

The GAA is currently developing its national sustainability strategy and it is envisaged that the CCC – or at least the relationships established through the CCC – will feed into the mobility objectives and actions under this new strategy. Under the GAA Sustainability Strategy

and through the continued CCC structure and/or relationships, the objective would be to identify and take action that will make it easier for stakeholders within cities and sport to take more sustainable decisions. Therefore, in terms of clubs and smaller grounds, the objective would not be so much as to engage them in or make them aware of the CCC but rather for CCC members to take action to support clubs and grounds make sustainable choices and to reduce the practical and administrative burden of sustainability transitions at volunteer level.

## 2.3 ACTION PLAN

The CCC engaged in three pilot actions, each reflecting different elements of the city-sport circularity dynamic. Each of the actions involved different priority stakeholders and the engagement of partnerships at different levels of city and of the sports organisations. In all cases, the actions were in response both to the challenges of the sports organisations and to the strategic objectives of the city authorities, not least the Dublin City Climate Action Plan and the Dublin City Centre Transport Plan.

The three action plans emerged from discussions at CCC meetings, based on the experience and current priorities of various stakeholders as well as on transport surveys from Croke Park, transport survey and data included in the recent planning application for Dalvmount Park and the results of the Croke Park stakeholder consultation carried out by ACR+. The GAA was the administrative and planning lead throughout; however, CCC members were instrumental in both action planning and realisation, especially in Action 3 (the High-Density Bike Parking Pilot). Two of the actions built upon existing programmes. Action 1 (Club Activation) was greatly facilitated by existing club engagement in the national Green Club programme while Action 2 (Non-Match Day Mobility in Croke Park) emerged from the Croke Park sustainability programme. The third action - the high-density bike parking pilot- was a completely new initiative and was identified during discussions at a CCC meeting. While, as detailed below, the final actions may not have been exact reflections of the initial actions plans they were, for the most part, a close match. The definition and objectives of the three actions remained broadly the same from start to finish, though the planning and execution was adapted in each case to learnings and challenges along the way.



Figure 1. Croke Park Sustainability Officer Colin O'Brien receiving the Bronze Smarter Travel Award from the National Transport Authority (NTA)

## Activating Dublin GAA clubs for sustainable mobility

The initial action plan had been for the GAA and Croke Park, with the support and advice of their CCC partners, to run a Dublin GAA activation in Croke Park on a match day that would include a communications campaign to encourage active and sustainable travel to the game, coordinate a number of sustainable travel practices like cycle buses from clubs and host a pre-match training and engagement event on sustainable mobility solutions for Dublin GAA clubs. However, this proved impracticable in the time period envisaged. The timetable of Croke Park matches in the period planned for this action consisted primarily of night time matches and the CCC decided that for both health and safety reasons - given the dark evenings and the likelihood of inclement weather during the Irish winter – and for promotional reasons – with daytime events more likely to attract families

and to be more convenable to engagement and interaction - that this action would not be workable as was initially conceived. Therefore, this action was spilt into two. To meet the objective of encouraging sustainable travel to Croke Park, the CCC decided that the High-Density Bike Parking action would run in not one stadium but in two: both Bohemians FC and Croke Park would organise and promote highdensity bike parking pilot. To meet the objective of engaging clubs in sustainable travel practices, the GAA decided to engage through its existing Green Club programmes with Dublin clubs on active travel. Three clubs in particular focused on developing active travel initiatives with their membership

Round Towers GAA in Clondalkin carried out an Active Travel Survey and did walk abouts and exploratory cycles with committee members to gather further information on Active Travel and to identify some of the potential barriers to active travel for club members. The club also worked closely with Bleeper bikes to set up an ebike library for the club - to promote active travel in the local area. The club also actively promotes walking to the club and events locally.

Clontarf GAA club, a seaside club to the north of Dublin city and within cycling distance of Croke Park, focussed on encouraging cycling as their active travel action. Clontarf GAA are endeavouring to reduce their transport carbon emissions by encouraging players to walk or cycle to the club rather than to drive or to take a lift from their parents. To support this initiative, the club administration is focussing on providing improved infrastructure for cyclists. The two primary actions taken by the club are the installation of secure bike racks for club members and membership of the Bike Library (https://www.bikelibrary.eu/) where club members can have temporary access to a range of different type of bikes for use around the club and community.



St Maurs club in north county Dublin engages in Bike Week initiatives in collaboration with the local authorities and this year built upon this engagement with the installation of bike rack in the club along with new bike lockers. The objective of the cycling projects in the club is to support member health and well-being and to reduce the safety risk by reducing the number of cars travelling into the club.

## Non-match day sustainable mobility in Croke park

The objective of this Pilot action was to increase the non-match day active and sustainable options for travel to Croke Park. Croke Park is not solely a match-day facility - it is also the headquarters of а national sporting organisation, a sporting destination - for the GAA Museum and Stadium Tours - and one of Dublin city's leading conference venues. The not-insignificant parking facilities at Croke Park had traditionally been marketed as a benefit for staff and as a selling-point for conference centre clients, which has encouraged a culture of car and very often single-occupancy car - travel to and from the stadium. Changing this culture requires not only organisational changes to the management of stadium car parks but also a programme of behavioural change. Under this action, the Croke Park Sustainability Team aimed to assess and, where necessary, upgrade travel facilities within the stadium as well as engage with primary stakeholders, including stadium staff and managers of nonmatch day stadium events, to reduce the number of people travelling to the stadium by single occupancy car.

The National Transport Authority (NTA) of Ireland runs a Smarter Travel Programme for different sectors and types of campus and the Croke Park sustainability team took the decision to sign up to the NTA Smarter Travel Workplaces programme as the basis for this pilot CCC action. Benefits of the Smarter Travel Programme are that it involves a self-audit as well as an independent review and the issuing of recommendations for further improvement.

The main success under this action plan was the achievement of a Bronze Award in the Smart Travel Workplaces programme. Since achieving this award, the stadium team has gone on to implement some of the actions from the list of recommendations of improvements issued as part of the awards process (as included in the photos at the end of this section), including new covered bike parking (see photo below). The stadium is also a participant in a government scheme for the installation of e-car charge points and, in an external development, sustainable travel options to the stadium are expanding with the overhaul of bus routes in Dublin city and the development of a cycle way along the Royal Canal, which runs underneath Croke Park stadium. Croke Park has been engaging with the city council and other lead stakeholders as these active and sustainable solutions for the city are being developed.

While the pilot action had successes in improving the infrastructure and providing more options for sustainable and active travel to the stadium, where it was less successful was in addressing the habits of single-occupancy car travel to the stadium directly. It is much more straightforward to change physical space than it is to change habits, and a more concerted and engaged engagement, awareness and behavioural change programme will be required. This is expanded upon in the 'Impact assessment' section below.

### Match-day hi-density bike parking pilot

An early objective of the CCC was to run a secure high-density bike parking pilot for sports events in North Dublin; however, the match calendar dictated that this action could not take place until May 2025. Nonetheless, the action as implemented remained the same as that outlined in the initial CCC action plan. Both Croke Park, the national stadium of the Gaelic Athletic Association, and Dalymount Park, home of Bohemian's FC and due to undergo a significant redevelopment, which will include an increase in spectator capacity, are situated along the Roval Canal in Dubin's North City. Spectator travel for match events to both stadia has a significant impact on the local area, in terms of congestion, on-street parking and air quality. Although both venues are easily accessible by bike for both Dublin-based fans and for match attendees using public transport or park-and-ride options, the current lack of adequate bike parking facilities is an obstacle to the practice and promotion of cycling to the stadia on match day. On of the key challenges faced by management of both venues is that posed by the management of the safety cordon operated for big matches events and how to develop high-density bike parking sufficiently close to the venues while maintaining the necessary safety and ease of movement within the match-day cordon areas.

CCC partners the GAA, Bohemians FC and Dublin City Council worked very closely across series of meetings and bilateral а communications to plan and implement this action. The partners identified a number of sites beside and within Croke Park and Dalymount Park suitable for a High-Density Bike Parking Pilot and installed and promoted new temporary, secure bike parking for the GAA's Leinster Football Final on Sunday 11 May and Bohemian FC's home match against near neighbours Shelbourne FC on Friday 16 May. The three temporary bike parking venues for this action were O'Connell School's car park (privately-owned facility) and Ballybough Community Centre (Dublin City Council managed facility), both very close to Croke Park but located just outside the inner safety cordon, and the new Bohemians FC fan zone at **Dalymount Park** 

That this action took place so late in the project was necessary for the successful planning and implementation of the initiative. The CCC members agreed that it would not be practical or sensible to hold this action in the winter months - where the League of Ireland's Premier League (in which Bohemians FC play) would not yet have started and a period in which the GAA's National League matches in Croke Park take place mostly in the evenings, and thus not being ideal for the promotion of cycling, especially to new and younger cyclists. The chosen week in May not only saw each stadium hosting a major match but was also both National Bike Week and Dublin Climate Action Week, which was ideal for the promotion of this pilot action and supported the local and national objectives of the GAA's CCC and Green Club partners.

### 2.4 SUCCESS FACTORS VS INHIBITORS:

## Activating Dublin GAA clubs for sustainable mobility

There were a number of common success factors across the Dublin clubs taking action for sustainable travel. One of these was the membership of the GAA Green Club Programme. While these were wholly club-led actions - identified and implemented by clubs they were developed within the support structures of the Green Club programmes and in some cases were financially supported by Green Club seed funding. Two internal success factors were (i) the dedication of the volunteers - in all clubs there was either a committed individual champion or a dynamic Green Team driving the initiative and (ii) support from the the executive club leadership, e.g. or committee. These initiatives succeeded support they received because and encouragement from club management, which this was essential in ensuring club-wide engagement.



A final success factor was that all actions were taken in partnership with other stakeholders – the local authorities in all cases, local schools, and Bleeper Bikes and the NTA in the case of the bike library schemes.

Some of the inhibitors related to the difficulties in effecting behavioural change – a challenge common across all actions. Some of the clubs highlighted the need to awareness within the club – of the initiatives themselves but also of the options for and benefits of moving away from a dependence on the car for club-related travel. Making the changes stick was also a challenge – e.g., that gains weren't lost with periods of bad weather or weren't limited to certain sections of club membership or activities. In the case of engaging younger members in cycling and walking, the need to raise awareness of the hazards and to build safe cycling and walking habits was also raised.

Round Towers Clondalkin reported that gathering data for an active travel baseline was a process that took considerably longer than expected. However, issuing an active travel survey proved a great way to get quick responses and the results of the process were shared by the club with the local authority and the Department of Transport.

## Non-match day sustainable mobility in Croke park

There were two main elements to this pilot action - the physical and infrastructural changes required to support and incentivise sustainable and active travel to Croke Park and the behavioural changes needed to shift the main mode of non-match day transport away from single-occupancy car. Considerable progress was made in the first of these. This progress was facilitated significantly by the participation in the National Transport Authority's Smarter Travel Programme, which provided a very useful structure and included the benefit of outside expert assessment in its audit-action-review approach to encouraging sustainable workplace travel. That some building and engineering works were also already planned on the Croke Park campus facilitated the introduction of new active travel facilities, including the new covered bike parking spaces, as pictures in the 'photos' section below. The stadium team's strong relationship with eternal and city actors, including the transport companies and authorities and Dublin City Council (also CCC members) allowed the stadium to engage on new travel plans for public transport and cycle routes in the Croke Park area and to ensure a joined-up approach to sustainable and active travel planning both within and without the stadium boundaries. The support of stadium leadership for sustainable action, including the investment in new infrastructure on site, was also a significant success factor.

Less initial progress was made in effecting immediate behavioural change. There were two

primary inhibiting factors. The first of these was the resourcing needed to engage stadium users to effect behavioural change. This requires broad and deep engagement across a range of communication channels. Work was begun on this consultation and engagement project but the time pressures on the Croke Park team in their overall stadium management responsibilities meant that this was not progressed as much as would have been hoped. However, this programme of engagement for behavioural change is and continuing is facilitated by the infrastructural changes that have been made to make it easier and more attractive to chose sustainable and active travel options. The second inhibiting factor is the availability of car parking space in the grounds of Croke Park, somewhat of a rarity in Dublin city. That there is extensive parking available on site has been and continues to be a selling point for events in the stadium's conference centre and is seen as an advantage by many stadium staff and contractors. As long as driving and parking on site is seen as a more convenient option that using active or sustainable modes, larger scale behavioural change is unlikely. Therefore, changes to car parking policy and layout for non-match days to prioritise, for example, carpooling and active travel modes may be necessary to effect the meaningful and lasting behavioural change that is required. This will be a longer-term project as it will necessitate considerable stakeholder engagement along the wav.

### Match-day hi-density bike parking pilot

There were considerable challenges experienced in the planning of this action. This was a completely new initiative, developed by the CCC especially for the ACCESS project, and therefore there was considerable work to be done to identify potential sites and engage local stakeholders to secure use of the sites. Given that this was a completely new action. there was also a big data and experience gap, which meant that decision-making around the scale of the facilities and the extent of promotion was, in reality, little more than informed guesswork. However, further stakeholders such as Dublin Cycling Campaign were a support in this. The biggest challenge for the Croke Park match was the lack of certainty around the match itself. It was only a forthight before the date that the finalists in the Leinster Football

Final were known, meaning that planning for scale and communications had to be postponed until it was confirmed from what parts of the country the majority of match attendees would be travelling. That the Dublin County GAA team did not make the final had a considerable impact on planning as having Dublin in the men's final would have resulted in a potentially very large target group for a cycling campaign for the match. As it was, quite apart from the travel distance involved for fans, matters were complicated by the fact that neither of the two counties who did make the final are located on safe cycling routes to Croke Park. The CCC met once the match line-up was known and debated whether the action should be postponed. Given that Dublin were in the Ladies final that same day it was decided to proceed with the pilot but in the anticipation that engagement would be a lot less than initially hoped. Not having Dublin or even Kildare, a nearby county where some clubs are located within cycling distance of Croke Park along a canal cycle path - also meant that the targeting of communications, e.g. to clubs and supporter groups, was a lot more challenging.

Although the ambitions for the action did have to be scaled back, the success it did achieve was due to the relationships built through the CCC for this action, relationships which will be maintained into the future, and contacts established with cycling partners, including the Dublin Cycling campaign and some local clubs. The support and collaboration of the management team from the new venues at O'Connell Schools and Ballybough Community Centre was also much appreciated and contributed to the smooth planning and running of the event. That, as detailed below, that Dublin City Council were able to secure funding for the pilot from the National Transport Authority was also a very important enabler for this pilot event. This funding also allowed for the purchase of match tickets as part of an incentive scheme for the pilot

## 2.5 ECONOMICS AND FEASIBILITY

## Activating Dublin GAA clubs for sustainable mobility

While many of these actions were not very high cost, given the financial pressure on sports club in most cases they could not have been completed without external funding or additional financial support.

Two of the clubs received funding through the Community Climate Action Fund, a new scheme administered through the local authorities. This funded a bike hub at one club, including secure bike lockers, and a bike repair station in another. The GAA actively promoted this fund to its Green Clubs, and Green Clubs were at some advantage in applying as the funders looked for sustainability engagement across a number of areas - not just mobility with these categories aligning guite closely with the Green Club Programme's own action areas. Another club received funding from the GAA directly – €1000e under the Green Club seed funding scheme - to install bike parking.



For the Round Towers club, funding was required to apply for a planning application to South Dublin County Council: this related to the investigation of the possibility of having a pedestrian gate entrance at land behind the club grounds. This funding was secured from the local Credit Union. There was no cost on the clubs for the Bleeper bikes, or the bike library schemes, and one club was donated a number of bicycle racks from the local school. These pilot actions were all club driven and there was no cost for staffing resources.

## Non-match day sustainable mobility in Croke park

There were costs associated with some of the active travel infrastructure installs and facilities upgrades undertaken as part of this project. These costs were borne by Croke Park. The objectives of this pilot action aligned with the sustainability commitments of the stadium and were fully supported by stadium leadership and therefore these costs were budgeted for under the stadium's capital and sustainability budgets. The stadium also engaged in the Government of Ireland's Zero Emissions Vehicles Ireland (ZEVI - www.gov.ie/zevi) scheme for sports clubs and grounds which funds the installation of electric vehicle chargers in sports grounds that allow public access. This grant-funded installation of charge points in the stadium is anticipated but has not yet occurred.

The pilot action did not require any additional staff, but additional support may be required in the future as the behavioural change programme is expanded.

### Match-day hi-density bike parking pilot

There were some significant cost items associated with this initiative, not least for the hiring of the temporary bike racks, for venue rental and for security cover for the day. Dublin City Council were successful in obtaining funding from the National Transport Authority, which allowed for these costs to be covered, while Croke Park also covered some of the security costs. Were this pilot to be developed into a more-longstanding bike parking arrangement for match days, as is hoped, the rental model adopted for the pilot action might not be economically viable. It would be more financially sustainable for the sporting partners to purchase and store their own equipment or enter into some other longer-term sourcing arrangement.

As this was an entirely new action, there was some work to be done around the identification and securing of bike parking locations; however, while this took some time no major difficulties were encountered and once the preferred sites were identified there were no issues in securing these for match-day. There were no major logistical issues involved in planning and implementing this pilot action.

## 2.6 IMPACT ASSESSMENT

## Activating Dublin GAA clubs for sustainable mobility

All three clubs who participated in this action reported a positive impact on their clubs. As with many grassroots initiatives, the collection of data can be a challenge, not least due to the volunteer-led nature of these initiatives. There is data pending from one of the club partners on the ebike lending scheme; unfortunately, this was not vet available at the time of writing. However, as expanded on in the final section below, the qualitative observations from these actions provide a firm basis for expansion of these actions to other clubs in the Dublin area and the CCC – especially through the central partnership of the GAA and the Dublin City Council Transport Planning Department intend on building on this beyond the lifetime of the ACCESS project, which would bring some additional resources in terms of time and access to expert tools and advice.

The impact as identified by the clubs themselves was, in the case one club: that there were fewer cars commuting back and forth to the club to drop off youth players, a positive promotion of the co-benefit of good health and exercise and the perhaps unexpected social impact of friends meeting downtown to cycle together, thus building friendships. It is yet to be measured but it is hoped that there will be an improvement in safety too. There is a restricted entrance to the club with multiple small car crashes per annum which the club now hopes to see a reduction in.

In the case of another club, the massive tangible impact is that results from the active travel survey and study carried out by the club have fed into a planning application for a new pedestrian entrance at the back of the club. This will provide a great advance for walkers on both sides of the club grounds and prevent so many people getting into their cars to attend training when they live so close. The survey itself had an unexpected additional impact in that it created awareness amongst club members and the committee and the club executive on the challenges faced for active travel to the club. As a result, there is now club-wide support for accessibility and sustainability and in turn the opening of a back entrance for safe pedestrian access is being actively pursued by the club at present.

In the same club, the impact of the Bleeper ebike lending scheme is attested to by the fact that the scheme has been massively oversubscribed, with community members and groups from beyond the club expressing an interest. Under this action the club has worked closely with Bleeper Bikes to run an ebike library whereby members receive an ebike to take home for a period of three months or more and trial the bike for free - the community and club members see the use of bikes as an alternative to driving to the club or locally - and this initiative has created greater awareness of the benefits of active travel in the community and club users as a result have since purchased their own ebike. Travel in the area can hit the village on a rainy day or as a knock-on effect of traffic on the nearby motorway; therefore, whatever the club can do to promote active travel and have a good bike infrastructure is of great benefit to the local environment, cleaner air quality and more people becoming healthier and active. The club is expecting a full report at the end of the trial period from Bleeper Bike on the success following this period. However, the club has reported that it can already see the success in the take-up on the bikes which is at max capacity since the initiative was launched

In the final club, the installation of new bike racks, the provision of cycling support services within the clubs and the participation in a bike library has had an impact on reducing traffic emissions, creating a heathier and more liveable local community, increasing health and wellbeing and contributes to the local environment and improving local air quality and helping club members connect with the wider community, as well as saving club members money on car travel. In collaboration with the bike library scheme and Dublin cycling campaign, the club hopes to put a number on transport emission savings in the near future

## Non-match day sustainable mobility in Croke park

Given how recent its implementation has been, full impact of this action is yet to been seen but the Croke Park team is taking clear steps for the ongoing monitoring and measuring of impact of the measures undertaken in this pilot action, through staff surveys and carpark monitoring. Immediate physical impacts include the installation of 25 new covered bike parking spaces withing the stadium grounds and the upgrading and expansion of active travel facilities, including storage and hygiene facilities for those walking and cycling. As well as serving as practical support and incentives to active travel, these physical changes around the Croke Park campus - as well as the pending evehicle charging facilities - are important visual manifestations of the stadium's commitment to sustainable travel and play a supporting role in the efforts to change the travel and transport culture of stadium staff and visitors. Further measures that are either in the control of or in partnership with external partners (e.g., the new bus routes and new and upgraded cycle routes of the transport companies and local authorities respectively) are ongoing and were not completed at the time of writing. However, this pilot action is being extended into an ongoing sustainability priority for Croke Park stadium and therefore these pending measures will have both a near and longer-term impact on the culture of travel to and from the stadium.

As detailed in the section above on Success Factors and Inhibitors, there were two elements to this action plan: the physical and infrastructural changes required to support and incentivise sustainable and active travel to Croke Park and the behavioural changes needed to shift the main mode of non-match day transport away from single-occupancy car. While anecdotally - through observations of car park management - there has been an increase in staff cycling to work, more reliable data is not yet available to support this. The initial audit carried out as part of this action was under the Smarter Travel Workplaces programme, which was an audit of physical space and facilities. A full baseline audit of staff and visitor travel patterns has not yet been completed. As part of the next stage of the engagement programme that has arisen out of this pilot action, a more complete travel audit will be conducted, covering both staff travel and conference centre activity. This will facilitate the ongoing monitoring of non-match day travel behaviours. (A parallel survey and monitoring programme is already in place for match day travel, as detailed in Pilot Action 3 below)

As described above, the immediate impact of this pilot action on staff and visitor behaviour was less significant than might have been hoped. This was due in large part to resource restrictions that meant that a stakeholder awareness, engagement and behavioural change programme could not be fully planned and implemented. Nonetheless, the physical and infrastructural changes that were successfully put in place during this action, as well as the behavioural change measure that have been adopted, including sustainable mobility content in staff inductions, will greatly facilitate the promotion of active travel as this stakeholder engagement is further developed.

### Match-day hi-density bike parking pilot

While the immediate impact of this pilot action was limited - due to Dublin not making the Leinster football final and men's the communication and engagement issues that this presented - it is anticipated that there will be a very positive long-term impact from this action. It will serve as a blueprint for longer-term high-density bike-parking provision for matches in Croke Park, with planning already started for a follow-up, expanded trial. The learnings from the pilot - especially in terms of pre-event communication and on-the-day wayfinding - will be applied for future events. Crucially, key relationships were established and developed through this pilot action, especially with different departments within Dublin City Council, with Dublin Cycling Campaign and with the management of the two locations used for the high-density bike parking, and these relationships will be the basis of the expansion and maintaining of this sustainable mobility action into the future.



## 2.7 REPLICABILITY POTENTIAL

## Activating Dublin GAA clubs for sustainable mobility

The actions taken by the three clubs are hugely important in creating a template and provide case studies that will provide an example and inspiration to other clubs and, crucially, break down the fear, knowledge and wariness barriers that can make clubs reluctant to take the first steps in sustainability projects. (In a survey of 200 GAA clubs carried out in 2000, almost 90% of clubs responded that (a) they were eager to take action for climate and nature but didn't know how or where to start, and (ii) that they were more likely to take sustainability action if and where they saw other clubs already doing so.) The actions of these clubs will be used to guide and inspire action in other clubs - not only GAA but across other sports too – through three main channels:

The GAA Green Club programme has recently launched its Phase 3, with over 200 clubs joining those who had participated in the very successful second phase of the programme. One of the objectives of Phase 3 is to expand on the uptake of sustainable travel and mobility actions, which have proven among the more challenging of areas. In the updated Green Club Toolkit, due for publication in summer 2025, the pilot actions outlined in this ACCESS project will form a case study for other clubs looking to get started with active and sustainable travel projects. Through the extended CCC structure. Dublin City council's Transport Planning Department, who are current CCC members, have expressed a strong interest in expanding engagement to support clubs around Dublin to plan and manage their grounds for active and sustainable travel, as have fellow CCC members the Technological University of Dublin (TUD). Therefore, this will be one of the focus areas of the CCC as it begins its existences beyond the ACCESS project.

Finally, the Department of Environment, Climate and Communications, who are major funders of the Green Club Programme, are working with the GAA to adapt the GAA toolkit to other sports and the Department of Transport is working with clubs, including one of those involved in this pilot action, to extract transferable learnings to influence national policy and programmes on sustainable travel in sport.

## Non-match day sustainable mobility in Croke park

This pilot action was greatly facilitated by the participation in the National Transport Authority's Smarter Travel Programme. The stadium achieved the Bronze award in this programme and was furnished with a set of recommendations for further improvement. Therefore, a strong structure exists for the continued improvement of physical facilities and improved management of the site to support sustainable travel choices. active and Participation in this programme has helped embed sustainable travel for nonmatch days into the stadium's sustainability priorities and highlights the value of partnership with external experts and participation in proven successful programmes in implementing sustainable mobility solutions in stadia and sports campuses.

The action was less successful in engaging staff and visitors in immediate behavioural change. This is a longer-term project and will need sustained engagement with the key stakeholders over a considerable period of time. However, work on this pilot action very much highlighted the need for this stakeholder engagement with two key groups: (i) stadium staff – to raise awareness on the environmental, health and well-being and financial benefits for smarter travel solutions and the promotion of the resources that are now available in the stadium to make active travel a preferred option and (ii) conference centre managers – to work with the conference centre team to evolve messaging on travel within event sales and promotion as well as in direct engagement with clients and eventual guests.

### Match-day hi-density bike parking pilot

The CCC is already looking at replicating this initiative for future events. This will be most likely done on an ad hoc basis for the 2025 season but is anticipated that the inter-season break will allow for more sustainable planning and embedding of high-density bike parking, along with other sustainable mobility actions and communications, into future event planning and management. This action is not only replicable for future Croke Park events but also for larger GAA events across the country, and learnings will be disseminated through the GAA's Green Club network as well as through its planned national sustainability strategy



## 3. DANISH FOOTBALL ASSOCIATION (DBU)

## 3.1 CCC OVERVIEW AND FUNCTIONING

### Action plan development

The Danish football association, through our CCC projects, aimed to ensure that the time and resources spent on development would be sustainable after the ACCESS project's lifetime and serve as a platform to inspire other organizations to do the same. We also aim to continue thinking about circular solutions when hosting events. Therefore, we see the CCC existing and collaborating beyond the ACCESS project's lifetime. We see that our project with reusable cups in the fan zone is here to stay, and our collaboration with Danish Handball (DH) and the Danish Sports Federation (DIF) has led to future collaborations. We hope and believe that our fan project with DIF and DH will provide insights and be a good knowledgeopportunity for other sharing sports organizations. Additionally, our implementation of reusable cups and recycling stations in fan zones can be replicated at other sports events, not only in Denmark but also internationally. The CCC has helped inspire our members to focus on the sports sector when it comes to green transition, raising awareness among members and placing the sports sector as part of the climate and environmental agenda, and recognizing the value it creates.

## **3.2 CCC LEGACY**

## Green and Active Mobility: Engage Early, Engage Often

Efforts to promote green and active mobility encouraging walking and cycling to venuesrevealed a clear divide between institutional willingness and on-the-ground implementation. While federations like DBU, local authorities, and club administrations are eager to support sustainable transportation, the engagement of club volunteers remains a sticking point. Volunteers often prioritize immediate, practical needs over sustainability goals. The key legacy here is the importance of involving volunteers earlier in the planning process. Sustainability must be integrated not as an afterthought but as a co-created objective. Future projects should focus on building capacity, ownership, and awareness among club volunteers to ensure long-term commitment to green mobility solutions.

## Circular Economy in Fan Zones: Make It Easy, Make It Visible

The circular economy initiative focused on reducing single-use plastic in fan zones by introducing reusable cups in partnership with Carlsberg. While the availability of suppliers and alignment with corporate partners were strengths, the success of the initiative hinged on fan behavior and logistical support. A remarkable 80% return rate of cups was achieved, demonstrating the feasibility of behavior change in large crowds. However, challenges in staffing and lack of clear deposit incentives hindered full potential. The lasting lesson is that infrastructure alone is not enough-behavioral nudges, clear communication, and visible collection points are essential. This initiative will now become a permanent part of national matches at Parken Stadium, setting a precedent for others aiming to implement similar solutions.

## Green Fan Commitment: Sustainability as a Core Value

Involving fans in sustainability conversations through interviews and focus groups revealed that supporters are ready to view sustainability not as an extra, but as an expectation. Despite recruitment challenges, the insights gathered emphasized the need for well-established fan networks and a practical, experience-based approach to dialogue. The main legacy of this project is a mindset shift: sustainability should be embedded in fan culture and club operations. Football organizations must work not only to inform fans but to co-create sustainability norms with them, shaping a shared vision of what responsible fandom looks like.

## **3.3 PILOT ACTION**

## Circular Economy on plastic use in Fan zones

In our first CCC project "Circular Economy on Plastic in Fan Zones," there has been a joint strategy with our partner Carlsberg, which has led to success. Carlsberg and DBU have been partners for more than 40 years and have decided to co-create a sustainability action on green fan zones regarding national matches played at Parken Arena in Copenhagen. This is because both parties share the responsibility to ensure that the reusable cups served in the fan zone are recycled and not discarded.

### Green and active mobility

The pilot action is co-created with DIF and the municipality of Brøndby. The pilot action supports the Climate Plan for Brøndby - the path towards a CO2-neutral and climate-adapted community, as well as DIF Political Program 2021-2024 strategic landmark 3 "Sports take responsibility." Thus, the local strategies align with our pilot action, making it a success factor that the partners themselves wanted to work with sustainability and combine it with sports and the CO2 footprint generated by transportation as part of daily training and matches.

### Green Fan commitment

There have been some local strategies that have helped ensure the success of the CCC program "Green Football Events in Copenhagen." DIF has previously developed a policy program that this pilot action aligns with through point 3 of the program "Sports Take Responsibility." DBU and DanskHandbold represent the biggest sports organizations in Denmark. Therefore, gaining knowledge of green fan commitment in these two organizations provides a general good understanding of the Danish sports fan, which is beneficial to other specialized sports organizations and thus in the interest of DIF. In this pilot action, collaboration with an external partner helped us with the empirical data collection needed for this study. The most important success factor for this study was being able to gather a competent panel of fans who could participate in both interviews before a national match and follow-up focus group interviews. The inhibiting factor was coordinating with the fans who attended the match and finding a time that suited all parties for data collection.



Figure 3. Cup station in the fan zone

## 3.4 SUCCESS FACTORS VS INHIBITORS

### Green and Active Mobility

The pilot action is co-created with DIF and the municipality of Brøndby. The pilot action supports the Climate Plan for Brøndby - the path towards a CO2-neutral and climate-adapted community, as well as DIF Political Program 2021-2024 strategic landmark 3 "Sports Take Responsibility." Thus, the local strategies align with our pilot action, making it a success factor that the partners themselves wanted to work with sustainability and combine it with sports and the CO2 footprint that transportation generates as part of daily training and matches. For this action to be successful, it was necessary to draw on municipal resources, which was possible because the plan's content aligned with local visions such as sustainable transport. The most important factor for success has been involving stakeholders from all levels in the football world, so it does not become an agreement between the club's management and the municipality but includes team leaders, coaches, and players early in the process.

### Circular Economy on Plastic in Fan Zones

In our CCC project "Circular Economy on Plastic in Fan Zones," there has been a common strategy between our partner Carlsberg, which has led to success. Carlsberg and DBU have been partners for more than 40 years and have decided to co-create a sustainability action on green fan zones regarding national matches played at Parken Arena in Copenhagen. This is because both parties share responsibility for ensuring that the reusable cups served in the fan zone are recycled and not thrown away. For this program to be successful, it was necessary to secure external financial support. This was possible through Carlsberg's own funding. The funds have been used to hire additional staff in the fan zone to handle the task of emptying collection containers and materials for information and visibility of recycling stations. A limiting factor for the program has been low practicality with the

storage of materials afterward. Therefore, it is necessary to allocate or agree with the parties on storage space for the products.

### Green Fan Commitment

There have been some local strategies that have helped ensure the success of the CCC program "Green Football Events in Copenhagen." DIF has previously developed a policy program that this pilot action aligns with through point 3 of the program "Sports Take Responsibility." DBU and DanskHåndbold represent the biggest sports organizations in Denmark. Therefore, gaining knowledge of areen fan commitment in these two organizations provides a general good understanding of the Danish sports fan, which is beneficial to other specialized sports organizations and thus in the interest of DIF. In this pilot action, collaboration with an external partner helped us with the empirical data collection needed for this study. The most important success factor for this study was being able to gather a competent panel of fans who could participate in both interviews before a national match and follow-up focus group interviews. The inhibiting factor was coordinating with the fans who attended the match and finding a time that suited all parties for data collection.



Figure 4. Focus group interview

## 3.5 ECONOMICS AND FEASIBILITY

## Green and Active Mobility: Cost-Light but Coordination-Heavy

From an economic perspective, green and active mobility initiatives—such as promoting walking and cycling to stadiums—require relatively low financial investment but depend heavily on human capital and coordination. The main barrier is not cost but capacity. Volunteers within clubs are essential actors in activating and informing fans, yet these individuals often face competing responsibilities that push sustainability lower on their priority list.

While interest is high among municipalities, federations, and clubs, the long-term feasibility of these mobility initiatives hinges on integrating sustainability into volunteers' roles early and meaningfully. Investing in training, communication tools, and coordination mechanisms can be a low-cost yet high-impact strategy for municipalities and clubs alike. As such, the replicability potential is strong, particularly if governance structures and incentives are put in place to support volunteers' involvement.

### Circular Economy in Fan Zones: Proven Value with Manageable Costs

The reusable cup system piloted in the fan zones showed high feasibility and replicability, thanks to a competitive supplier market and a strong corporate partnership with Carlsberg. The core infrastructure—the cups themselves was readily available and aligned with partner sustainability goals, meaning entry costs were manageable and scalable.

The main economic challenge was staffing having enough personnel to inform fans and facilitate proper cup return. While deposit incentives were not used in this case, future projects may consider implementing modest refundable deposits or other motivators to increase return rates further without significantly increasing overall costs.

With an impressive 80% return rate and the initiative now set to become a permanent feature at Parken Stadium, the pilot proves that behaviour change is economically feasible—if operational logistics are well-planned. The takeaway is clear: sustainability in fan zones does not necessarily require large investments, but it does require clarity, visibility, and a people-first approach.

### Green Fan Commitment: Low-Cost, High-Value Insight

Engaging fans on sustainability through interviews and focus groups is a low-cost endeavour with high strategic value. The pilot encountered difficulties in recruiting consistent participants, but those involved provided valuable insights that shaped new ways of thinking about fan responsibility and expectations. The key takeaway was that fans increasingly view sustainability as an expected standard, not an optional extra.

Economically, this kind of engagement is feasible and scalable, especially when built into existing fan networks and communication channels. It highlights that mindset shifts can be achieved through inclusive dialogue and cocreation rather than through costly campaigns. The replicability of this initiative depends largely on clubs' willingness to invest time and effortnot necessarily funding—into meaningful fan engagement.

## Replicability Potential: Strong with the Right Frameworks

Across all three pilot areas, the projects demonstrated strong potential for replication across European sports clubs and municipalities. However, this requires:

Strategic alignment with local and national sustainability goals

Cross-sector partnerships with businesses, public authorities, and NGOs

Operational support, particularly in the form of staffing and volunteer engagement

Behavioural insights to inform communication and design choices

Economic feasibility is not a barrier to success in most cases. Instead, it is the organizational capacity, clarity of roles, and stakeholder coordination that determine whether a good idea can be brought to life.

## Conclusion: Scalable, Affordable, and Achievable

The ACCESS pilot projects have shown that sustainable change in sport is not only desirable, but also economically and operationally achievable. Green mobility can thrive with early volunteer engagement. Circular fan zones are viable with modest investments in communication and staffing. Fan commitment to sustainability can be fostered through dialogue and inclusion, not dollars.

The path forward is clear: with targeted resources, strategic partnerships, and inclusive processes, these sustainability initiatives can be replicated and scaled across Europe, transforming how we think about sports, events, and our shared responsibility to the planet.



Figure 4. Cup station in the fan zone

## 3.6 IMPACT ASSESSMENT

### **Green and Active Mobility**

In collaboration between the Danish Sports Federation, Brøndby Municipality, and the Danish Football Association, the goal has been clear: to make it easier for children and young transport themselves people to more sustainably to football activities such as training and matches. The goal is to get children to use their bikes for short-distance transportation and to use carpooling for long-distance travel. Interviews conducted with volunteers and players show a strong willingness to cycle to and from training and matches. The project has had a positive social impact by reducing CO2 emissions associated with transportation to football activities and improving public health for children and young people in the local area. The impact of the pilot project has contributed to the local strategy by reducing local CO2 emissions and promoting greener sports that take responsibility. It also aligns with Brøndby Municipality's political strategy of having good and safe cycling facilities in the municipality.

### Circular Economy on Plastic in Fan Zones

The pilot project on circular economy on plastic in fan zones has an expected success rate of more than 90% of returned reusable cups and mugs in our fan zones in relation to national

matches at Parken. However, it turned out that despite more measures in the fan zone, such as more staff in and around the fan zone, more visible sorting options, and measures that made it impossible to steal the cups, it has only been possible to achieve an 80% return rate of reusable cups and mugs in our fan zones. Although the overall target was not met, the process and social impact have had a positive effect. It has shown that with green initiatives, it is possible to create frameworks that enable fans and citizens to choose the sustainable option and reduce the use of single-use plastic. This pilot project has helped to ensure both Carlsberg's and DBU's visions of having a green and more sustainable fan zone for all national matches played at the national stadium. Parken, in Copenhagen. The reusable cups and collection options will continue to be available in the Danish fan zone in the future. To make this program more purposeful, more staff who can inform about the cups and collect and empty the collection containers will be required.

### **Green Fan Commitment**

The pilot project, together with the Danish Sports Federation, Danish Handball Federation, and Danish Football Association, has had a clear goal of understanding Danish sports fans. The collaboration has aimed to ensure an understanding of Danish sports fans' commitment to green transition and sustainable initiatives. To find the results, a series of interviews were conducted with both handball and football fans. A key conclusion is that sustainability should be a given. As part of the survey, DBU has spoken with many different national team fans who have shared their views on sustainability in sports.

Danish football fans, among others, state:

- "DBU should do what they can without compromising the good experience."
- "I hope that as a societal actor, they do some things. I believe their impact is greater around the country's football clubs. Get parents to carpool when they go to see their children play, etc."
  - 'DBU can be the informative part or good example, provide good habits, and encourage people to do the small things they can when attending national matches."

This project has helped provide all partners with a valuable understanding of what their fans want from them and where fans believe it is important to transition and contribute, among other things, to the Danish Sports Federation's strategy of sports taking responsibility. It has also provided valuable insights for both DBU and Danish Handball in understanding their fans and identifying focus areas. The project will continue and be a valuable source of information for future projects for both the Danish Sports Federation, Danish Handball, and DBU.

## 3.7 REPLICABILITY POTENTIAL

### **Green and Active Mobility**

Green and active mobility has faced challenges in activating volunteers in the clubs. There is great interest and willingness from both DBU, municipality, and the the local club administrations, but when it comes to involving the volunteers in the clubs, there are fewer resources to prioritize sustainability, and practical matters take precedence. Results show a strong willingness to transport themselves by bike or on foot. To avoid mistakes in the future or where improvements can be made, it is important to involve the volunteers in the clubs earlier in the process. What we have learned as a federation from this study is that there is a willingness to act on transportation issues from municipalities, federations, and clubs, but it is important that the volunteers see the same value and understand the need.

## Circular Economy on Plastic in Fan Zones

This project has not faced challenges in finding producers of reusable cups, as there have been many suppliers on the market, and with the collaboration with Carlsberg, it was easy to align with their goals of having a green fan zone. The problem has been a lack of staff to inform and collect these cups. Additionally, deposit collectors have been an issue, even though the cups do not have a deposit value for this very reason. The main conclusion of this project is that 80% of the cups at each fan zone event are returned. For others in the future who aim to do the same, it is important to put a significant effort into informing the staff in the fan zone and making the collection stations easy and visible for consumers. The project will become a permanent practice in the fan zone for national matches at the Danish national stadium, Parken. The overall lesson from this pilot action is that it is possible to change sports fans' behaviour in the fan zone to sort their reusable cups. However, this requires an appropriate number of staff and targeted information.

### **Green Fan Commitment**

This pilot project has faced challenges in finding informants who could participate in both interviews, matches, and focus group interviews. However, the informants DBU has found have been highly competent. A key conclusion is that sustainability should be a given. To avoid mistakes, it is important to have a good fan network to reach out to and have a practical understanding of how to conduct such a study, which others should keep in mind if they wish to carry out a similar project. This pilot project has led us to think in new ways about how to ensure more sustainable practices in collaboration with our fans and has given us the experience that sustainability should be a given and should be prioritized in several aspects when it comes to football and sports events. The overall lesson from this project is that fans have an expectation that the product we deliver to them is sustainable and responsible when they come to the stadium.

Conclusion: А Path Forward The combined legacy of these pilot projects is a growing foundation for replicable, scalable sustainability practices in sports. Success requires early and inclusive stakeholder engagement, user-friendly systems, strategic partnerships, and a reimagining of the role of fans and volunteers. The ACCESS project has shown that sustainable transformation is not only possible — it's already underway. What remains is to carry these insights forward, turning pilot experiences into long-term policy, practice, and cultural change within European sport.

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## 4. FOOTBALL ASSOCIATION OF WALES (FAW)

## 4.1 CCC OVERVIEW AND FUNCTIONING

The recruitment of the CCC members was invitation-based. targeted and ensuring individuals with relevant expertise were approached directly. The process of establishing the CCC was relatively smooth with no major challenges or potential identified risks taking place. Some initially identified risks materialised, such as scheduling conflicts and occasional delays, which were mitigated through flexible scheduling and maintaining open lines of communication. Some initial connections with potential members were established before the project and some took place during the project. The CCC's structure was diverse, encompassing individuals from a variety of backgrounds and expertise including local authority representatives. Gender balance was considered during the recruitment process and the CCC has gender parity. Roles within the CCC were clearly allocated: a moderator/chair Sophie Howe (former Future Generations Commissioner for Wales) facilitated discussions, a minutetaker (FAW staff member) documented meetings, and a coordinator maintained communication between the CCC and the FAW's Sustainability team. Meetings occurred both as group sessions and bilateral discussions for pilot actions, with a hybrid approach of online and in-person gatherings to accommodate members' availability. The group discussed the implementation and progress of the pilot actions collectively though some meetings and discussions took place with relevant members outside the CCC meetings. The training module on Communities of Practice in Pisa proved highly beneficial, equipping our staff with tools to foster collaboration and apply learnings to the CCC processes. A key positive takeaway was the strong cross-sector collaboration fostered through the CCC. A negative lesson was the occasional difficulty in sustaining engagement

between meetings. If starting over, enhancing communication channels to keep momentum between meetings would be put in place.



Figure 5.

## 4.2. CCC LEGACY

The CCC will continue beyond the ACCESS project, with members expressing interest in ongoing collaboration. Several methodologies and pilot actions have sparked interest among other football clubs and organisations, showing promise for replication with clubs and or the FAW's Area Associations creating their own CCCs. The CCC has inspired its members to stay engaged in working in partnership with the FAW with increased awareness and motivation to champion environmental initiatives. Knowledge sharing within the group significantly enhanced members' understanding of sustainability challenges and opportunities in football. Communication activities increased local awareness of the CCC, though there is room to improve public visibility through targeted outreach and storytelling. The foundation has been set for long-term impact, paving the way for continued action in sustainability through sport

## 4.3 ACTION PLAN

The development Action Plan was а collaborative effort, led by FAW with significant input from CCC members. While the FAW suggested priorities aligned with the FAW's Sustainability Strategy, ample space was given for CCC members to influence the action plan priorities and pilot actions. National and Local authority policies and strategies were identified through a review of existing sustainability plans and direct consultations with local government representatives. The selected Pilot Actions aligned closely with the CCC's initial priorities and the FAW's Sustainability Strategy. All Piolet Actions were newly conceived and shaped through CCC discussions and support rather than pre-existing initiatives. Insights from WP2 interviews and study visits played a crucial role in shaping the actions, The ACCESS project offered practical examples and lessons learned from other partners that informed FAW's approach.

### Modal shift for Wales fans

The Pilot Action aimed to increase the number of Wales fans using public transport and active travel to attend matches, reducing reliance on cars. This involved collaboration with Transport for Wales (TfW) to improve train accessibility and scheduling for matchdays. Implementation largely followed the original plan, but adjustments were necessary. Key deviations included train capacity issues and scheduling conflicts. mitigated through increased communication with Transport for Wales (TfW) and additional fan information campaigns. Identified risks, such as public scepticism due to train delays and cancellations, past materialised. In response, real-time updates and travel guides were provided. Discussions also took place with fan groups to provide updates on the Cymru matches categorization changes to a 'special event' and specific route information updates. The CCC composition proved suitable, with FAW coordinating and TfW handling transport logistics. Tasks were divided accordingly: FAW conducted fan discussions and communication, while TfW focused on service provision. An additional action that came out of discussions was the FAW arranging for a bus shuttle service from the City Centre to the stadium which was piloted during the March International Cymru Men's match. The timeline spanned one football season, with a two-month preparation period for and logistics, followed discussions by implementation and ongoing monitoring/feedback. Steps included fan travel surveys, data analysis, scheduling adjustments, and communication campaigns. No internal rules were modified but adapted and additional train services were secured. Briefings were sent to spectators as part of match day information on promoting both active and sustainable travel options. This piolet action was also supported by piolet action 3.

FA WALES

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Figure 6. Example of an image

### Reduction of waste on FAW sites

The Pilot Action was largely implemented as originally planned. The CCC composition was optimal for the project, with members effectively covering areas like recycling guidance on the new Welsh Government legislation and staff communication. Tasks were allocated according to expertise. Additional stakeholders were also consulted to provide insight and support. The Pilot Action spanned six months, including a two-month preparatory period. Key steps included initial research, FAW current supplier vetting, installation of new bins and signage, and post-implementation assessment. Internal briefings were conducted to train staff on new practices and their environmental impact through internal communications in addition to an all-staff lunch and learn and several informal discussions. A baseline measure of waste at all FAW offices was established and discussions are ongoing with current providers and site managers. All waste is now separated and disposed of efficiently and sustainably

## Education and awareness – sustainability-themed match

The Sustainability Themed Match Pilot Action was implemented largely as planned, aligning with the FAW's sustainability strategy and Welsh Government policies. Key deviations included adjusting communication methods to better engage fans and focusing more on digital platforms. These changes were made to maximise reach and align with fan preferences. The deviations aligned with identified risks engagement levels. The around CCC composition was suitable, with FAW leading coordination and engaging Cardiff City FC, FGC, Welsh Government, environmental charities, and Transport for Wales. Task allocation was clear, with FAW managing overall delivery, environmental charities providing educational content, and Transport for Wales promoting sustainable travel. Additional stakeholders were engaged for broader communication. The project spanned several months, with preparation including stakeholder coordination and content creation, followed by the match-day activities and post-event evaluation. Steps included discussions with fan groups to gauge fan awareness, collaboration with stadium staff on waste reduction measures, and FAW staff on communication campaigns. Awareness activities included posts social media and website and infographics/messaging on the stadium's LED boards and TV screens. No internal procedures were modified, but additional training was provided to staff and volunteers on sustainability messaging. We also organised an ACCESS 'Local Multiplier event' titled 'Football and a sustainable future' on the day of the sustainability-themed match.

## 4.4 SUCCESS FACTORS VS INHIBITORS,

### Modal shift for Wales fans

Challenges included a legacy of public mistrust of train reliability and scheduling. Enablers were strong FAW-TfW collaboration and Welsh Government support, aligning with the National Transport Delivery Plan. Discussions with fan groups revealed fans were open to using trains if reliabilitv and scheduling improved. Communication played a crucial role. Social media, face-to-face discussion, and matchday travel information within the fan's matchday guide informed fans of improved transport options, enhancing uptake. While no dedicated campaign was launched, messages aligned with the original communication plan, ensuring consistency

### Reduction of waste on FAW sites

The main enabler was the alignment with national sustainability strategies and the new Welsh Government legislation. Challenges arose from a delay in response from waste disposal suppliers and the time taken to build a relationship with them. Social acceptance from staff was high, with positive feedback from discussions indicating readiness to support sustainable initiatives. Communication played a critical role: regular updates via newsletters and staff emails increased engagement and transparency, enhancing trust in the process. While the initial communication plan was largely followed, additional outreach was required to address questions from staff. Overall, effective communication strengthened the project's credibility and participation.

## Education and awareness – sustainability-themed match

A key success factor was the increase in attention and coverage of the FAW's sustainability initiatives and messaging through digital engagement via social media and stadium screens which effectively raised awareness. Challenges included difficulty in measuring behavioural change among fans. Communication played a pivotal role, with digital channels enhancing reach. The campaign aligned with local waste reduction strategies, and discussions and feedback revealed a positive reception, with fans appreciating the initiative. However, some fans from rural areas of Wales still found the sustainable travel options inconvenient, indicating room for improved transport coordination and an additional focus on carsharing messaging for those fans where public transport is more difficult to access

# 4.5 ECONOMICS AND FEASIBILITY:

### Modal shift for Wales fans

The Pilot Action was jointly funded by FAW and TfW. Costs included, communication materials, and additional train services. TfW covered service costs, while FAW funded communication. No sponsorships were secured, but synergies with ongoing Welsh Government transport initiatives minimised expenses. No direct financial returns were observed, though increased train use may reduce infrastructure strain long-term.

### Reduction of waste on FAW sites

The project was funded through internal budgets. Costs primarily included materials, installation, and training sessions. No direct financial returns were measured, but long-term savings are expected through waste management improvements. No additional visitor costs were introduced, and existing staff managed most tasks, minimising the need for external hires.

## Education and awareness – sustainability-themed match

Costs included digital content production, educational materials, and staff training. FAW covered the majority, with in-kind support from environmental charities. No direct financial returns were observed. Sponsorships weren't secured, though partnerships reduced costs.

## 4.6 IMPACT ASSESSMENT:

### Modal shift for Wales fans

The action met its goal of increasing public transport use. Discussions with fans indicated a rise in train users particularly those travelling from North Wales while car use dropped. Improved scheduling reduced overcrowding along with a reduction in cancellations. Staff noted smoother crowd management due to fewer cars, and fans reported higher satisfaction with travel experiences. The actioninformed policy discussions and ongoing FAW-TfW collaboration aim to sustain improvements

### Reduction of waste on FAW sites

The Pilot Action achieved its key objectives, reducing single-use plastic and increasing recycling rates compared to baseline data. Interviews with staff highlighted increased awareness and enthusiasm for sustainable practices. These results were presented to the CCC, and findings have informed adjustments to internal sustainability policies. The project is expected to become a permanent practice, with plans to scale up efforts.

## Education and awareness – sustainability-themed match

The Pilot Action met its objectives, raising awareness about sustainability and encouraging fan participation. Feedback and discussions showed fans noticed the sustainability messaging, with fans considering using public transport for future matches. Feedback highlighted increased awareness but suggested the need for more practical transport options for those from rural areas. Results were shared with CCC members, contributing to refining the FAW sustainability strategy.

## 4.7 REPLICABILITY POTENTIAL

#### Modal shift for Wales fans

The action demonstrated that with stakeholder collaboration and targeted communication, shifting fan transport habits is achievable. Key lessons include early engagement with transport providers and clear fan communication. Making the practice permanent would require continued investment in service reliability and communication of improved services to increase fan trust. Overall, the action proved replicable in contexts with similar infrastructure and stakeholder alignment

#### Reduction of waste on FAW sites

The Pilot Action demonstrated high replicability, with manageable costs and clear environmental benefits. Key success factors included strong internal support and effective engagement, while challenges like supply chain delays could be addressed by diversifying suppliers. Recommendations for others include ensuring early stakeholder involvement and clear communication. Given the positive outcomes, the project has strong potential to become a standard practice, with minor adjustments to optimise performance.

## Education and awareness – sustainability-themed match

The Pilot Action showed strong replicability potential, with digital communication proving effective cost and impactful. Key recommendations include earlier fan enhancing engagement and transport partnerships. The project demonstrated that sustainability-themed events can effectively raise awareness and inspire behaviour change, making it a viable model for future matches. We plan to implement this action yearly as part of an annual 'green match' initiative.



Figure 7. Example of an image

Circular City Committee Reports

## 5. FC PORTO 5.1 CCC OVERVIEW AND FUNCTIONING

At the outset of the project, the initiative was introduced to Porto Ambiente, where the key objectives were outlined, and a collaborative discussion took place regarding which entities could be involved. Together, we considered which pilot projects would best align with both the city and the club's goals. Both Porto Ambiente and LIPOR (two of the founding entities of the CCC) signed letters of support for the project, leading to preliminary discussions before the formal signing of the CCC. The city's commitment to the project was crucial, with the Porto Ambiente team demonstrating considerable proactivity in identifying key stakeholders. Most of the meetings were held bilaterally, and there were no significant changes in the CCC's composition. However, one pilot project faced a delay due to the need for additional investment, which delayed its implementation.

The training module was helpful, although we encountered some challenges in understanding the functioning of the CCC and how to facilitate smoother communication between entities, as there was no established open channel for dialogue. Undoubtedly, the most significant positive outcome was the strengthening of relationships among CCC members, allowing us to move beyond the initially defined projects and create new synergies between the city of Porto and the club. Meetings took place in person, online, and in a hybrid format, which ensured broad participation and allowed other stakeholders to attend when needed.

Overall, the CCC has worked well, although it took time for all involved parties to fully familiarise themselves with the project's approach and objectives. Ultimately, this time was well spent, as it resulted in a deeper mutual understanding and the creation of new, fruitful partnerships between the club and the Porto City Council.

## 5.2. CCC LEGACY

The success of the relationship established between the CCC members is undoubtedly a key factor in ensuring that the collaboration continues beyond the ACCESS project's duration. The close relationship with the Municipality of Porto also facilitated the creation of partnerships with other European cities and clubs, with the shared goal of strengthening the connection between clubs and cities. This model of collaboration and exchange of experiences has great potential to be replicated by other clubs or associations in their own projects, particularly those focused on sustainability and environmental responsibility.

Another example of the continuation of the established relationship is the expansion of the Green Certification project from the Estádio do Dragão to other FC Porto Group facilities, such as Casa do Dragão.This initiative demonstrates the lasting impact of the CCC's work, extending beyond the Estádio do Dragão to other areas, and fostering sustainable practices throughout the club.

Regarding the local community and the public, communication played a crucial role in increasing the visibility and recognition of the CCC's actions. Awareness-raising efforts and the dissemination of results have helped increase understanding of the importance of sustainability in sport. However, there is always room to improve communication with a broader audience. Continuous interaction with the community and ongoing promotion of the CCC's actions ensure that the results and lessons learned are well shared, ensuring the project's impact will continue to be felt in the future.

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### **5.3 ACTION PLAN**

The club was responsible for ensuring the implementation of the actions, maintaining an integrated approach that balanced the project's objectives with the club's challenges. Each of these actions was carefully aligned with both the city's and the club's needs, reflecting a collaborative effort to promote sustainable and innovative solutions that benefited both parties. The role of the CCC was therefore crucial to the success of the actions, with its members contributing at every stage of the process.

A key player in this process was Porto Ambiente, whose involvement was essential in identifying the relevant city policies and strategies. They also played a pivotal role in selecting stakeholders. The three pilot actions each addressed different areas and engaged distinct stakeholders. Action 1 focused on the study of water reuse for irrigation at the stadium, tested in collaboration with Águas e Energia do Porto. Action 2, in partnership with LIPOR (the municipal waste management entity), involved implementing the "Coração Verde" certification, which recognises best practices in waste management. Finally, Action 3 consisted of developing a roadmap for the stadium's decarbonisation, in collaboration with the Porto Energy Agency.

#### 'Green Heart' Certification

The Coração Verde project is a collaborative initiative aimed at promoting sustainable practices and improving waste management in various areas of the Estádio do Dragão. Created in partnership with LIPOR and Porto project Ambiente, the aims to raise environmental awareness and engage the community in adopting circular practices. The main challenge faced by the project is transforming the way the club and the community manage waste, reducina contamination and optimising recycling rates. The pilot project was carried out over several months, following the defined stages: initial diagnosis, implementation, and certification.

The action was implemented as planned, with a clear focus on evaluating and improving the existing waste management systems in the Fan Zone, Concessions, and Offices of the Estádio do Dragão. The methodology followed several well-defined phases: diagnosis, implementation, certification, and monitoring. Each of these phases was carried out in close collaboration with LIPOR, and FC Porto ensured constant communication with all parties involved. Training sessions were organised for all teams involved, with special focus on the staff directly dealing with waste management. In addition, awareness campaigns were carried out to engage both employees and fans, promoting recycling and reducing plastic usage.

This pilot project has provided a solid foundation for FC Porto and its partners to implement long-term sustainable waste management practices, and the lessons learned along the way will help improve and expand the impact of these actions in the future.

### Roadmap for decarbonization

This pilot project emerged from the strategic challenge undertaken by FC Porto, in collaboration with Agência de Energia do Porto (AdEPorto), aiming to identify the key actions that can lead to carbon neutrality in relation to energy use within its infrastructures. This decarbonisation roadmap seeks to align with the club's current sustainability objectives, as well as its future vision for growth and sporting excellence, while also committing to its various internal and external stakeholders, particularly the porto climate pact.

The plan was developed based on a series of audits carried out at the stadium; however, this work can be replicated for other facilities, particularly for the remaining infrastructures of the FC Porto Group.

The purpose of this plan is to guide the club's future actions in sustainability, particularly in areas that promote energy efficiency, renewable energy use, and the reduction of greenhouse gas emissions. To achieve this, an initial assessment of the energy performance of FC Porto's facilities was carried out, with a focus on identifying potential improvements. This plan outlines the current situation and proposes solutions for reducing CO<sub>2</sub>eq emissions related to the club's energy activities. the plan adopts a community perspective, recognising the club's influential role among its staff, fans, and partners, and aims to catalyse changes that will have a lasting, positive impact.

Building on the technical audits performed, which included a review of the installed equipment and an analysis of the operational details of the various systems at the stadium, a set of energy efficiency measures were defined: optimisation of the ventilation and thermal diffusion system; optimisation of the thermal plant control and distribution; optimisation of the lighting system; optimisation of the hot water system and showers; and optimisation of the energy consumption management system. The details of the proposed measures, as well as compensation strategies and funding options, can be found in the attached report.

The implementation of the defined pilot action faced a significant delay at the start, but this did not compromise its execution.

### Water for Reuse (WfR)

The pilot project for water for reuse at the Estádio do Dragão was designed with the aim of optimizing the use of treated water from the Wastewater Treatment Plant (ETAR) for non-potable purposes such as field irrigation and cleaning the stadium facilities. This project is in line with the water resource management strategy of the City of Porto, promoting sustainability by reducing the consumption of potable water and minimising the stadium's environmental footprint.

To ensure the feasibility of using treated water, regular analyses of the water's physicochemical and bacteriological parameters, such as BOD<sub>5</sub>, TSS, Turbidity, E. coli, ammoniacal nitrogen, total nitrogen, and total phosphorus, were carried out. These results were shared with RED, the company responsible for the stadium's pitch maintenance, for a detailed technical evaluation of the treated water's suitability for irrigation. Based on this analysis, additional parameters were requested. including salinity, pH, Sodium Adsorption Ratio (SAR), boron, zinc, and a more comprehensive bacteriological analysis, to ensure the safety and suitability of the water for continuous use, especially considering the presence of athletes. After the requested additional analyses were completed, the results confirmed that the water is within the required parameters for irrigation.

However, the delivery of water via a distribution network is not feasible in the short term due to the high costs associated with building the lifting station and the required infrastructure. While this infrastructure is not yet feasible, water can be supplied by tanker, offering a temporary solution for specific situations, such as during the summer months when the underground well may not have sufficient capacity to meet the irrigation needs of the pitch.

Furthermore, an assessment of the water required for field irrigation was conducted, revealing that the amount of treated water produced by the ETAR exceeds the stadium's needs. This ensures that the water reuse project is an effective solution, capable of reducing the consumption of potable water and contributing to the operational sustainability of the Estádio do Dragão.

## 5.4 SUCCESS FACTORS VS INHIBITORS

### 'Green Heart' Certification

### Success Factors:

- Collaborative Approach: The partnership between FC Porto, LIPOR, and Porto Ambiente played a central role in the project's success. By combining the expertise and resources of these stakeholders, the project was built on a strong foundation, with technical knowledge and local engagement that ensured effective implementation.
- Clear Methodology and Structure: The Coração Verde Certification followed a well-organised methodology, with distinct phases: diagnosis, implementation, certification. and monitoring. This structured approach allowed for a focused, systematic effort to improve waste management practices and achieve sustainability goals, with clear milestones and deliverables.
- Community Engagement: FC Porto, as a major football club, leveraged its influence to engage the community and fans in sustainability efforts. The project used the high visibility of football matches and campaigns to promote recycling and sustainability, fostering a sense of shared responsibility for the environment. This community engagement was essential for creating long-term behavioural change.
- Continuous Monitoring and Improvement: The monitoring phase ensured that the improvements made were sustained over time. This allowed the project team to continuously evaluate practices, adjust where necessary, and keep refining the waste management systems to ensure their effectiveness.
- Recognition and Certification: The Coração Verde Certification was a significant achievement, not only for FC Porto, but also as a model for other

organisations. The certification served as an incentive to maintain the practices implemented and set a benchmark for other entities to adopt similar sustainable waste management practices.

### Inhibitor:

 Resistance to Change, Particularly from Staff: The most significant challenge faced during the project was resistance to change,

### Roadmap for decarbonization

The partnership between FC Porto, AdEPorto, and the Porto City Council was crucial in ensuring that the pilot action aligned with the broader sustainability goals of both the city and FC Porto. This collaboration provided the necessary technical expertise and strategic guidance to navigate the complexities involved in implementing energy efficiency and decarbonisation measures.

### Water for Reuse (WfR)

The implementation of the pilot water reuse action at the Estádio do Dragão faced specific challenges but also benefited from actions that facilitated its progress. One of the main obstacles was the lack of a clear regulatory strategy. The absence of an efficient regulatory framework made it difficult to coordinate and define a smoother process for the use of reused water.

Another concrete challenge was the physical barrier related to the distance between the Freixo Wastewater Treatment Plant (ETAR), where the treated water is produced, and the Estádio do Dragão, where the water would be used. The lack of an immediate distribution network made it impossible to deliver water to the stadium efficiently. Additionally, the high cost of building the necessary infrastructure to implement this distribution network made a short-term solution unfeasible. These costs directly impacted the economic viability of the project.

The distrust regarding the quality and safety of the treated water was an additional challenge, but it was mitigated by the validation of the water for field irrigation, carried out by RED, the company responsible for pitch maintenance. This technical validation was crucial, allowing the water to be used for irrigation without restrictions. Furthermore, the short-term solution of water delivery by tanker was adopted, ensuring that field irrigation was maintained, especially during the summer months, when the capacity of the underground well might not be sufficient.

Success Factor: The validation of the treated water for field irrigation and the implementation of water delivery by tanker were key elements for the immediate success of the project.

Inhibiting Factor: The lack of an operational distribution network and the high costs associated with the treatment and transport of the water were the main obstacles encountered.



Figure 8. Example of an image

## 5.5 ECONOMICS AND FEASIBILITY

### 'Green Heart' Certification

The development of the Decarbonisation Roadmap involved a significant investment from FC Porto to cover the costs of conducting the energy audit and developing the corresponding decarbonisation plan. This initial investment was crucial to establish the foundation for a long-term project aimed at reducing the club's carbon footprint and improving energy efficiency in its infrastructures.

One of the main barriers to implementing energy efficiency measures, as widely identified in the literature, is the need for substantial investment, coupled with limited access to funding sources. To overcome this limitation, it is essential to be well informed about the various available funding mechanisms, ensuring that the best options are selected according to the nature of the project and the club's resources.

In this specific project, several funding sources were categorised into three main groups: Public and or private funding; own investment or thirdparty investment and other modalities.

Although the initial cost was a challenge, the financing solutions and expected long-term return, both financially (through energy savings) and environmentally ( $CO_2$  emission reductions), make the project viable and sustainable. The success of the plan will depend on the ability to efficiently explore these funding sources and ensure the club has access to the resources needed to cover the costs of implementing and maintaining the decarbonisation measures.

### Roadmap for decarbonization

The development of the Decarbonisation Roadmap involved a significant investment from FC Porto to cover the costs of conducting the energy audit and developing the corresponding decarbonisation plan. This initial investment was crucial to establish the foundation for a long-term project aimed at reducing the club's carbon footprint and improving energy efficiency in its infrastructures.

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depend on the ability to efficiently explore these funding sources and ensure the club has access to the resources needed to cover the costs of implementing and maintaining the decarbonisation measures.

### Water for Reuse (WfR)

The investment costs were borne by **Águas e Energia do Porto**. Although the final cost of using the treated water has not yet been defined, the pilot is expected to generate financial savings for the consumer by replacing potable water for irrigation, thus contributing to more efficient water resource management.



Figure 9. Example of an image

## 5.6 IMPACT ASSESSMENT

### 'Green Heart' Certification

The Coração Verde pilot project had a highly positive impact, as demonstrated by the achieved results:

- +7.5t of food surplus donated
- 101% food waste recycling rate
- 17% of recycled materials
- -1.5% of mixed waste
- -8.6t CO<sub>2eq</sub> emissions
- 150 mixed waste containers removed from offices

The project significantly raised awareness among fans, employees, and the local community about the importance of sustainability and waste management. By engaging people through on-site campaigns and actions, it fostered a sense of shared responsibility for environmental preservation. 11 awareness campaigns and several training workshops were organized for staff and the cleaning team.

### Roadmap for decarbonization

The pilot action focused on the development of a **Decarbonisation Roadmap** for FC Porto, and its primary objective was to improve energy efficiency, reduce  $CO_2$  emissions, and promote the use of renewable energy sources within the club's facilities. The impact of this action can be evaluated from multiple perspectives:

**Environmental Impact**: The plan has made significant strides towards reducing the carbon footprint of FC Porto. By conducting a detailed energy audit and implementing energy-efficient measures, such as optimising ventilation systems, heating control, and lighting, the club has reduced its overall energy consumption. The integration of renewable energy sources like solar power further contributes to the club's efforts to reduce greenhouse gas emissions, supporting the wider goals of the Porto Climate Pact and the city's decarbonisation strategy.

**Operational Impact**: From an operational perspective, the improvements in energy management have led to greater efficiency in the club's facilities. The proposed optimisations, such as the improvement of thermal diffusion and central heating systems, have contributed to better resource utilisation, lower maintenance costs, and a more streamlined energy management process.

**Economic Impact**: Financially, the initial investment required to implement these measures is expected to generate long-term savings. The reduction in energy consumption will lower operational costs, while the project also strengthens the club's reputation, making it more attractive to potential sponsors and partners who value sustainability.

### Water for Reuse (WfR)

The pilot action partially achieved its objectives, as the bacteriological and physicochemical parameters of the water were validated, allowing its use for irrigation of the pitch, overcoming initial concerns. However, the lack of an adequate distribution infrastructure still

Parameter	Unit	Average Value
Coliform bacteria	NMP/100 mL	114,8
BOD <sub>5</sub>	mg/L	<5
TSS	mg/L	<2,5
Turbidity	NTU	<1
E.Coli	Number/100 mL	<10
Legionella	Cfu/L	Not detected
Boron	mg/L B	0,055
Calcium	mg/L Ca	30,8
3. Magnesium	mg/L Mg	7,7
Salinity	mg/L	709
SAR	meq/L	3,3
Sodium	mg/L Na	79,6
Zinc	mg/l Zn	0,0378
рН	-	7,1

prevents the efficient use of the treated water. As an alternative, the distribution of this water by tanker will be assessed during periods when the well does not have sufficient capacity, as an alternative to using potable water. It is also worth noting that the Estádio do Dragão already has dedicated reservoirs for storing this water, completely separate from the water intended for human consumption.

## 5.7 REPLICABILITY POTENTIAL

### 'Green Heart' Certification

The Coração Verde project has high potential for replication, both within FC Porto's operations and beyond, particularly for other sports organizations, large public venues, and local authorities seeking to enhance their sustainability efforts.

- 1. Replicability in Other Football Clubs or Public Venues:
- The methodology of the project diagnosis, implementation, certification, and monitoring—is flexible and can be adapted to other football clubs, public spaces, or large venues like stadiums, arenas, and community centers. The clear structure and stages can be replicated easily in different contexts, with appropriate adjustments to local needs.
- 2. Scalability:
- The Coração Verde Certification is already scalable, as it targets multiple sectors, including educational institutions, restaurants, and events. This scalability makes it possible for the initiative to spread beyond FC Porto, contributing to wider community involvement in sustainability practices.
- 3. Local and Regional Expansion:
- The partnership model, involving entities such as LIPOR and Porto Ambiente, could be replicated in other regions with similar partnerships to foster sustainable waste management practices. Given the success of this model, it can be scaled to other cities or municipalities, particularly those with a focus on improving urban waste management and reducing their environmental impact.
- 4. Global Replicability:

- While initially focused on local stakeholders, the Coração Verde model could be expanded internationally. The increasing global awareness of sustainability and waste management presents an opportunity for similar actions to be taken in various countries. The project's integration with the circular economy and its focus on community engagement make it highly adaptable to different cultural and regional contexts.
- 5: Potential for Long-term Growth:
  - By continuing to refine the systems and processes involved in the pilot, FC Porto and its partners can pave the way for an ongoing learning and improvement cycle, enabling the initiative to be replicated across various sectors and regions in the long run.

The Coração Verde pilot project has not only achieved significant environmental and operational outcomes but also demonstrated a model that can be replicated and scaled, driving positive change in sustainability across a range of sectors.

### Roadmap for decarbonization

The potential for replicating this decarbonisation project is high, both within the sports sector and beyond. The roadmap developed for FC Porto serves as a model for other organisations looking to reduce their environmental impact. The following factors contribute to the replicability of the project:

**Scalable Measures**: The energy efficiency measures implemented, such as optimising ventilation systems, lighting, and thermal management, are adaptable to other sports facilities and organisations. The integration of renewable energy systems (e.g., solar panels) is also a replicable solution in any context where energy demand is high, and sustainability is a priority.

**Collaboration with Local Authorities**: The successful collaboration between FC Porto, the Porto Energy Agency, and the City Council has provided a strong foundation for the project. This collaborative approach can be easily replicated in other cities or regions, especially

those with similar sustainability targets and the availability of local or regional support.

**Financial Model**: The project's use of mixed financing options, including public and private funding and investment from both internal and external stakeholders, makes it a model that can be adapted to various organisational contexts. The mix of subsidies, grants, and investments can be tailored to different localities or institutions, ensuring that the project remains financially viable in a variety of settings.

In conclusion, the decarbonisation roadmap at FC Porto has strong replicability potential, particularly for sports organisations and other public-facing institutions that aim to reduce their environmental impact and contribute to national or regional decarbonisation goals. The use of scalable measures, collaborative partnerships, and financial flexibility makes this project a valuable reference for similar initiatives.

### Water for Reuse (WfR)

The implementation of the Pilot Action at the Estádio do Dragão demonstrated that the reuse of treated water for irrigation is feasible, but it faced significant logistical challenges, such as the lack of an efficient distribution infrastructure and the high costs associated with its construction. The temporary solution of water delivery by tanker is a viable alternative in the short term, but permanent infrastructure needs to be developed to ensure more efficient and sustainable use of treated water.

The key outcomes include the validation of water quality for pitch irrigation and the potential reduction in dependence on potable water, which contributes to more efficient water resource management.

The replicability of this project directly depends on identifying more potential consumers who could benefit from treated water reuse. The greater the number of users, the more financially viable the project will be, as the costs will be spread out and there will be a stronger justification for infrastructure investment. Furthermore, collaboration between different stakeholders, such as other sports or commercial entities, could help share costs and resources.

In terms of feasibility, the project can be scaled up and made permanent, provided that the necessary infrastructure is implemented and adequate regulatory support is in place. The main lesson learned is that water reuse is a sustainable and effective practice, but it requires careful planning, investment in infrastructure, and involvement from multiple stakeholders to ensure its success.



## 6. CONCLUSION

The pilot projects of the ACCESS project have demonstrated that sustainable change in sports is possible. The project has ensured dialogue cities. cooperation and with municipalities, and regions that wish to play in the top European league when it comes to hosting football matches and major events in a sustainable manner. This project has initiated and disseminated a systematic dialogue about cross-cutting solutions for increased circularity between football facilities, activities, and the city's physical infrastructure. The initiatives have shown that green mobility can thrive with early volunteer engagement, circular fan zones are viable with modest investments in communication and staffing, and fan engagement in sustainability can be promoted through dialogue and inclusion. The ACCESS program has shown that with targeted resources, strategic partnerships, and inclusive processes, these sustainability initiatives can be replicated and scaled across Europe, transforming our perception of sports, events, and our shared responsibility to the planet.

The ACCESS project has demonstrated that sustainable change in sports is not only possible but also highly impactful. Through various pilot projects, the initiative has addressed key themes such as transport, plastics, energy, water, and behavioral change, showcasing how sports organizations can collaborate with local communities and stakeholders to drive environmental sustainability.

One of the central themes of the project was green and active mobility. Efforts to promote walking and cycling to sports venues revealed the importance of early and continuous engagement with volunteers and stakeholders. The success of these initiatives depended on the involvement of club volunteers, local authorities, and transport organizations. By creating infrastructure such as bike parking and promoting active travel, the project not only reduced carbon emissions but also fostered a culture of sustainability among fans and participants.

The circular economy was another critical focus area, particularly in reducing single-use plastics in fan zones. The introduction of reusable cups in collaboration with corporate partners like Carlsberg proved to be a successful strategy. Despite challenges in staffing and logistics, the initiative achieved an impressive return rate of 80% for reusable cups. This success highlighted the need for clear communication, visible collection points, and behavioral nudges to encourage sustainable practices among fans.

Energy efficiency and decarbonization were also key components of the ACCESS project. FC Porto's development of a decarbonization roadmap, in collaboration with the Porto Energy Agency, demonstrated the potential for sports organizations to significantly reduce their carbon footprint. By conducting energy audits and implementing measures such as optimizing ventilation and lighting systems, the project not only improved operational efficiency but also contributed to the broader goals of the Porto Climate Pact.

Water management was addressed through the Water for Reuse pilot project at the Estádio do Dragão. This initiative aimed to optimize the use of treated water for non-potable purposes such as field irrigation. Despite challenges related to infrastructure and costs, the project successfully validated the quality of treated water for irrigation, offering a sustainable alternative to potable water and contributing to the stadium's environmental sustainability.

Behavioral change was a recurring theme across all pilot projects. Engaging fans, volunteers, and stakeholders in sustainability efforts proved to be essential for the success of the initiatives. The project emphasized the importance of early involvement, continuous communication, and the creation of a shared vision for sustainability. By fostering a sense of ownership and responsibility among participants, the ACCESS project demonstrated that sustainable practices can become an integral part of sports culture.

In conclusion, the ACCESS project has shown that with targeted resources, strategic partnerships, and inclusive processes, sustainability initiatives in sports can be replicated and scaled across Europe. The project's success in promoting green mobility, reducing single-use plastics, improving energy efficiency, optimizing water use, and driving behavioural change provides a valuable blueprint for other sports organizations and communities to follow. The path forward is clear: sustainable transformation in sports is not only achievable but also essential for the future of our planet.





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