



In their own words

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Infrastructure against inequality

The links between economic sustainability and social development are clear, albeit there are issues to resolve – not least around inequality. It's true that the world is a more fragile place when it leaves large sections of society behind in the pursuit of growth.

But the link between economic sustainability and inclusive social outcomes is even more crucial when you think of the importance of maintaining an

environment in which we can enjoy healthy and prosperous lives. Climate change, air pollution, water quality, ecosystem fragility and species loss all impact society at large.

What's becoming increasingly evident is that infrastructure companies like our own have an obligation to provide solutions that are more inclusive. **We must play our part in addressing inequalities.**

The 17 UN Sustainable Development Goals provide a framework for more equal and sustainable global development everywhere. Infrastructure is explicitly present in goal nine, which notes that investment in transport, irrigation, energy and information and communication technology is crucial to achieving sustainable development and empowering communities. But what we do as an industry has a significant impact on many, if not all, of the other 16 goals.

Planned and delivered with thought, infrastructure can provide outcomes that are both environmentally sensitive and socially inclusive. And it can help resolve many of the challenges we face as a society.

The projects you can read about in this report demonstrate poignantly how interventions can make a lasting, personal difference to many individuals.

**Keith Howells, chairman,
Mott MacDonald**



When we sat down to plan this publication, our aim was simple.

Projects always talk about leaving a legacy of change. The best way to bring that to life is by asking the people whose lives have been altered. For example, what does it mean to see parents in your community choose education for their girls, not early marriage? Or to know your courage saved your hometown from economic ruin? To see your skills or vision improve the aspirations of strangers you pass in the street? Or to understand the value of what you had, lost but recovered with human ingenuity?

In this report, we have captured those stories from people whose lives are impacted by our work across the world, sharing their views on how decisions and actions are making a difference.

I firmly believe that to be better at our job we must see people and communities as the end users of projects and the providers of dreams and proposals to change the world around them.

It's people who fight to make things happen. It is communities who rally together to turn ideas into reality.

As a professional services company, **our role is to help individuals and communities get to their destination as skilfully as we can.** Only by understanding what they experience, believe and desire can we truly deliver the services they want.

That's the connection we set out to make in the following pages. That's the connection we make in delivering the projects we are involved in. And that's the connection we always keep in mind

at Mott MacDonald. As an employee owned firm, our owners are also custodians of the company for the future. Our decisions do have an impact and we experience that. We understand that our company, our clients and our communities are all interconnected. Getting projects right, to leave positive, lasting legacies, is important for us all.

**Davide Stronati, global
sustainability leader,
Mott MacDonald**



Education is power

Education is life

Elizabeth Bahago is chairperson of the local women's committee that helps support girls education in her community. Through the Education Sector Support Programme in Nigeria, mums like Elizabeth are making their voices heard.

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We've seen a momentous difference in our community. For a start, the number of girl students has increased greatly. Before, parents didn't care about their girls' education. There was true gender segregation. This was badly affecting girls' lives. Too many girls were forced into early marriage.

Parents are now seeing the need to send their girls to school and the value for these future mothers. Many girls are staying in school through primary and secondary levels, and some are going on to graduate from further education institutions. They are taking responsible positions in society. Nigeria is starting to see more female accountants and lawyers. The government is supporting this. If a girl can read well, then she can contribute a big role in society.

I was very lucky growing up. My father was a clergyman in our village and he made sure I was literate. People looked down on him for sending me to school, but he was determined that I should be able to read. I am happy today as a result.

Why am I so passionate about this? There is no asset like an education. Educate children and they will become an asset in society, not a liability. It gives me great joy to see girls being educated. It changes their lives.

Once you have knowledge, it can't be taken away from you. Girls who can read can pass on their learning. They have the tools to share their thoughts. I truly believe that if you educate your girls, you educate the entire nation.

Mothers have a huge role to play: we want to know our children are happy and can play their role in society. By putting us on the school committees and empowering us to play a prominent role, we are driving progress. That means everything to me.

I think there is a bright future for our country. I want to believe that illiteracy will disappear in Nigeria. That future will come so long as we keep the emphasis on education.

Education is power.
Education is life.



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A classroom drama

In Nigeria, only around 70% of children of primary school age are receiving a formal education – a real threat to the country’s chances of future social and economic prosperity.

With funding from the UK’s Department for International Development, our experts in Cambridge Education, which is part of the Mott MacDonald family, have helped to design and run a new education system in which every child in Nigeria has the opportunity to receive a basic standard of literacy and numeracy. In addition, more than 120,000 children now have toilets and 165,000 children have potable water in their schools.

By adopting Nigeria’s traditional love of interactive theatre, the initiative engaged parents in improving school performance in a country where there is not a strong reading culture and many people cannot access electronic mass media.

Project

Education Sector Support
Programme in Nigeria (ESSPIN)

Location

Nigeria

Client

Government of Nigeria

Expertise

Programme designer
and manager



Solar is becoming par for the course

Nate Franklin, MD of Pacifico Energy, gives his predictions for the solar industry in Japan and worldwide. He also reveals why it feels good to harvest clean energy for this island nation.



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People still ask me when solar will be seen as a commercial option, not just environmental. I tell them we're already there. Solar competes with other generating technologies even without subsidies. Costs are a quarter of what they once were. Lenders are more comfortable with the technology. The modules are more efficient. Energy yield has grown, largely because our understanding of the irradiance of a given location is that much better than 10 years ago.

Take our 257.7MW Sakuto solar photovoltaic (PV) project in Mimasaka-shi, Okayama, as an example. This is the largest solar PV scheme under construction in Japan to date. It's a complex, mountainous, space-constrained site, with one third located on a former golf course.

The varied terrain brings real challenges, so we were reliant on advanced 3D layout modelling and satellite data to understand and optimise the energy yield. Without it, we'd have struggled to accurately set the module spacing with a view to mitigating shadow changes and limiting shading loss due to the nearby mountains. Suitable sites of this size are rare, given the number of small landowners in Japan. So if you get one, you need to trust that the estimates prove correct when you go operational.

The next step for solar in Japan is to incorporate storage. Of course, we already know how to do it. But we haven't reached the point where combining them is the natural thing to do. There's a sense among the utilities that solar doesn't feed enough of the grid to require storage. Once that line is crossed, then I can see the balance shifting very rapidly away from fossil fuels.

Worldwide, we're going to see more and more renewable energy because it makes economic sense. Lowering of emissions won't come from global treaties or government interventions, but rather private industry pursuing good business. I don't listen too closely to what the politicians say on this. I prefer to seek the opinion of economic analysts, such as Bloomberg New Energy Finance. Its outlook

for how fuel and electricity markets will evolve by 2040 suggests that solar will quickly replace coal as a more affordable source of energy – even by the early 2020s in China and India. Solar generation costs will drop a further 85% in Japan by 2040, it says.

Five years ago, Japan was playing catch up. There was a palpable sense of urgency after the Fukushima Daiichi nuclear disaster in 2011. The government wanted to push solar forward and provided good incentives. The industry is well established here now, so the policy is for measured growth, alongside wind and biomass. Of course, Japan is already leading the way with electric and hybrid cars, with more than 40,000 charge points nationwide. The rest of the world will surely follow soon.

Harnessing natural, domestic resources is especially important for national security, as Japan won't need to rely on foreign imports, as it does for coal or gas. Solar can give independence to an island nation like Japan. Additionally, people don't feel comfortable living around nuclear plants now, and I don't blame them.

Conversely, solar parks are very peaceful. There's no activity – no noise from moving parts. No pipes and emissions. No whirring turbines. No people. Once you set them up, they look after themselves. The grass grows up under the panels. You see a lot of nature. Sakuto especially is really pretty, with mountains rising up on every side. Sometimes I get the chance to sit quietly and reflect a little on where all this electricity will end up, and the families and communities who will use it. It feels great to be contributing to Japanese society by providing power across the grid, and all the benefits that brings to everyday life. We're increasing energy reliability without polluting the environment. That's got to be a good thing.

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Leading a peaceful revolution

Project
Sakuto solar PV plant

Location
Japan

Client
Pacifico Energy

Expertise
Owner's engineer

Japan established a favourable feed-in tariff for solar PV power in 2012 to promote the development and exploitation of renewable energy resources in the country. The 257.7MW Sakuto plant fits into this vision and will reduce carbon emissions by approximately 4Mt over 20 years. The project involved moving 8Mm³ of earth to smooth site contours and undulations, making it easier to accommodate the panels and reduce shading. A new 77kV, 17km long underground transmission line connects the installation to the grid.

The plant has improved industry understanding of project performance in the context of Japan's complex microclimates. We supported our client's engagement with the lenders, helping to facilitate both project bankability and broader maturing of the industry, which will be necessary moving forward, as tariffs for solar fall.

A window to opportunity

English in Action is helping to equip a sixth of Bangladesh's population with language skills that enable them to pursue paths to greater prosperity. Teacher Rakiba Akter, student Shakib Ahammad and education officer Siddiqur Rahman share what the programme means to them.



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Before English in Action, students were taught reading, writing and how to answer questions in exams. It was all about hearing and memorising, rather than speaking. In truth, the classes were boring. We used to go to homes and invite the children to school. But it rarely worked. With the new songs and rhymes, the students are coming automatically. They think that school is a place of fun and enjoyment. They used to be inactive and stuck to their desks. Now they move about the classroom, playing games with English words. The faces of my little learners are glowing.

I teach a seven-year-old boy who climbs the hills and knows every part of his region. If he can learn English, he can become a tour guide and earn a livelihood. In remote schools this is making a big difference. English will give Bangladesh a great future in tourism.

My little learners are gaining the confidence to speak. This is such a pleasing thing for me. As teachers, we are growing in confidence too. We always share ideas together, discussing them in English and improving our fluency.

Parents are also happy to let their girls go to school. Obviously, this is a big change. We still have a culture of early marriage, which is a tremendous problem in our society.

After girls finished class five [end of primary school], they sat on the marriage chair. Now, they sit behind a desk with their friends. **They have an opportunity to learn about life before they get married. They have more freedom and choice.** I must say, from my heart, that English in Action is responsible for these things.

Rakiba

I love listening to international English, such as the cricket commentary on the radio, pop songs or science fiction movies. I watch YouTube as much as possible, as it helps me to see a different world. My parents are so excited for me. My dad brings back English newspapers and asks me to read them to him. If he doesn't understand a word, I'll often Google it for him.

My friends all want to be doctors or engineers, but I dream of becoming a barrister. I wish to travel to England in the future to study as a barrister there. That's why I am so focused in my studies. I need English for my designs in life. I can see a better future for Bangladesh if I can get into law and help my society grow. There are many lawyers who don't use their powers correctly. I want to make Bangladesh a developed country and make sure everybody follows the law. That's very important to me.

Social inclusion is a big part of English in Action. With some friends, I hold free classes in my house where boys and girls of any age from my local community are welcome. Even parents.

Before we start, we always sing: 'Good morning, good morning, how are you today?' It immediately creates a good atmosphere and makes everybody smile. **Even the slow learners are doing well because it is fun.** My teachers encourage us to speak more. We get the chance to come up with our own games, and then teach the teachers!

This was my first time speaking to a foreign person. I got such shaky legs before the call! What will people think of me? But maybe I shouldn't worry what people think. I just need to do what I think is right.

Shakib

Project

English in Action

Location

Bangladesh

Client

UK Department for
International Development

Expertise

Project design and management



Before the project, teachers and students were learning to read and write English only. They were not able to speak the language. Now they can apply English in their daily life. Children can follow audio and listen to it being spoken. This wasn't possible before. Students and also teachers were scared about talking. You can see the confidence growing.

This will make a big impact on school as well as society. We are becoming familiar with English and are already seeing the benefits. Children who speak English are getting better jobs than those who don't. They are getting more pay and becoming more prosperous. This is a big opportunity for them.

Bangladesh is now better equipped for jobs in technology and the business world. Now we can put our abilities on show.

English in Action will sustain education in Bangladesh for a long time. The materials we have will continue to help us grow, even after the project leaders have left. We have created a group of teachers who can continue teaching students with training from the programme. **There is a permanent impact.**

I am proud to be part of this. Students who are involved in English in Action feel the same. They are proud of what they are achieving. Because of that, I am confident the momentum will continue.

Siddiqur



27M reasons to be cheerful

English in Action is a programme of collaboration between the UK and Bangladesh governments that aims to help a sixth of the 160M population in the South Asian country improve their English. By equipping some of the poorest people in the country with language skills, they may gain access to jobs that will improve their standard of living.

Our project aims to embed techniques that put children at the heart of the teaching experience and achieved its goal in August 2017 to reach 51,000 teachers and 7M students. Adults benefit from BBC Janala ('window' in Bangla) – an award-winning, multiplatform service enabling millions of Bangladeshis to learn English affordably through their mobile phones, the web, television programmes, print media and peer-to-peer learning.

You don't know what you've got, until it's gone

Hurricane Harvey made landfall at Rockport in Texas on 26 August 2017. The tropical storm choked the natural fish pass that links nearby Cedar Bayou to the Gulf of Mexico, putting at risk a local economy reliant on sport fishing and bird tourism. It is not the first time the channel has shut. In 1979, it was blocked off to protect the bay from an oil spill in gulf waters. The run stayed mostly in a closed state until 2014. Just prior to Harvey, local fishing guide David Nesloney spoke about how keeping the pass open is vital for the whole region.



FLWFishing.com

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Back in the early 1960s, when I was about 10 years old, Cedar Bayou was a beautiful place to go fishing. In those days, you could fill tubs of trout in no time. You could catch all the live shrimp you wanted, and I'm talking big white shrimp. We used to take out nets at night and we'd fill up an ice chest in just a few casts.

Let me tell you a true story. One night, when I was a boy, I went floundering with a friend. From one end of Mesquite Bay to the mouth of Cedar Bayou, where it enters the gulf, we saw billions of blue crabs. And I mean billions. It's hard to believe, I know. But I don't need to exaggerate. I've been around here a long time.

In the early 1970s, I once saw a school of trout. I remember it like yesterday. There were more than 400, all a good size, swimming together in the crystal clear water. Seeing the trout was special. I've never seen a school of trout since.

Everything changed after the oil spill in 1979. The bay was closed and the waters became dormant. No crabs. No flounder. No trout. No redfish. Fishing declined every year. All the local marinas, hotels, motels and restaurants were affected. You'd go down to Mesquite Bay and it was like a ghost town because there was no trout, no redfish, no mullet. Just stagnant water. The salinity was so high in the water. Dead water is what I call it. It was like that for a long time.

Now that the bay is open again, it's a thousand times better. You can catch a limit of trout everywhere. Not just in certain areas. I mean everywhere. The water is absolutely gorgeous. We could go out in my airboat right now and catch a limit of trout or redfish. We could go gigging flounder and catch the heck out of them.

Ask the shrimpers that trawl in the surrounding bays and they will all say it's better than it has been for a long, long time. The blue crabs have returned too. Nobody set a trap for six or so years. Of course, the little crabs are the staple of the wintering whooping crane, which is an iconic bird in these parts. Our birding tours are a big show again, with five busy boats.

It's done a heck of a deal for this whole community. You can't find space at a boat ramp, hotel or restaurant on a Tuesday, let alone the weekend. **Everybody is benefiting: the fishing guides like me, the oyster people, the shrimpers, flounder giggers, bird spotters, hoteliers, restaurant owners.** And of course all the folk who come here from Houston or San Antonio.

These past years have definitely increased my respect for nature. If you give her a chance, she comes back strong. But you can't take her for granted. I wish I could get more young people to understand that. They don't always appreciate what they have. I tell them you gotta take care of what you have. I say: Do me a favour. When you're on the boat, look around and imagine you're seeing this for the first time. Now, imagine it's gone.

Believe me, you don't want to lose this. I know what that feels like.

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Making a connection

In 2014, our coastal engineers helped to reconnect Texas’ Cedar Bayou with Mesquite Bay for the first time in 35 years. The closure had kept the eggs and larvae of fish, shrimp, and crabs from entering the area, causing the ecosystem to crash. The thriving fishing and tourist industry had suffered too.

Today, fish and crustacean populations are soaring. Once again, the bay harbours the world’s largest flock of endangered whooping cranes. Larger numbers of fish, crabs and birds attract more people who want to fish, watch birds, go hunting or who just want to visit this beautiful coastal area.



Project
Cedar Bayou restoration
Location
Gulf of Mexico, Texas, USA
Client
Aransas County and the Coastal Conservation Association
Expertise
Hydraulics engineering

Tackling visceral leishmaniasis

Dr Sakib Burza, medical advisor for Médecins Sans Frontières, has witnessed the impact of visceral leishmaniasis on communities in South Asia and East Africa. He reflects on the ‘watershed moment’ in the struggle against the world’s deadliest parasitic disease after malaria.



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It’s likely you’ve never heard of visceral leishmaniasis (VL): a tropical disease also known as kala-azar or black fever. Yet, VL is a truly horrible killer that impacts many thousands of people every year.

The parasite attacks your internal organs (hence visceral), causing severe swelling of the spleen and liver, and is almost always fatal if left untreated. Eventually, the immune system runs so low, you’ll fall victim to severe anaemia and more routine infections such as pneumonia. I’ve heard patients describe it as a slow-working poison.

VL is transmitted through the bites of infected female sandflies. These tiny bloodsuckers typically breed in the cracks of sub-quality housing and the soil of nearby animal shelters, meaning that people who sleep near livestock or out in the open are the most vulnerable. It’s therefore a disease of the most marginalised in society – the very poorest of the poor – who also face hardships such as malnutrition and the HIV pandemic. They are the least prepared to fight off a disease like this.

At the start of the century, when Médecins Sans Frontières stepped up its work in finding an alternative treatment for VL, the survival rate was low.

Symptoms were often mistaken for other infections like malaria, so sufferers would spend precious savings and income on ineffective treatments, based on misdiagnosis. The whole family suffered as a result. Those correctly diagnosed could expect a month-long course of expensive, painful, toxic injections, usually administered by local untrained practitioners.

In India, the watershed moment came in 2014, when the protocol for treatment changed.

After a decade of making the clinical case, policymakers accepted the drug AmBisome as a safe first-line drug. **VL could now be cured with a two-hour intravenous treatment**, without the need for lengthy hospitalisation and all the subsequent costs for both patient and provider.

I have such a range of emotions about playing a part in this. Of course, there is huge satisfaction that we were instrumental in finding a treatment that is less toxic, less time-consuming and more accessible. There’s pride that we intervened successfully to prove this was the most appropriate treatment. Since 2014, we have helped to cure thousands of patients who would have suffered greatly.

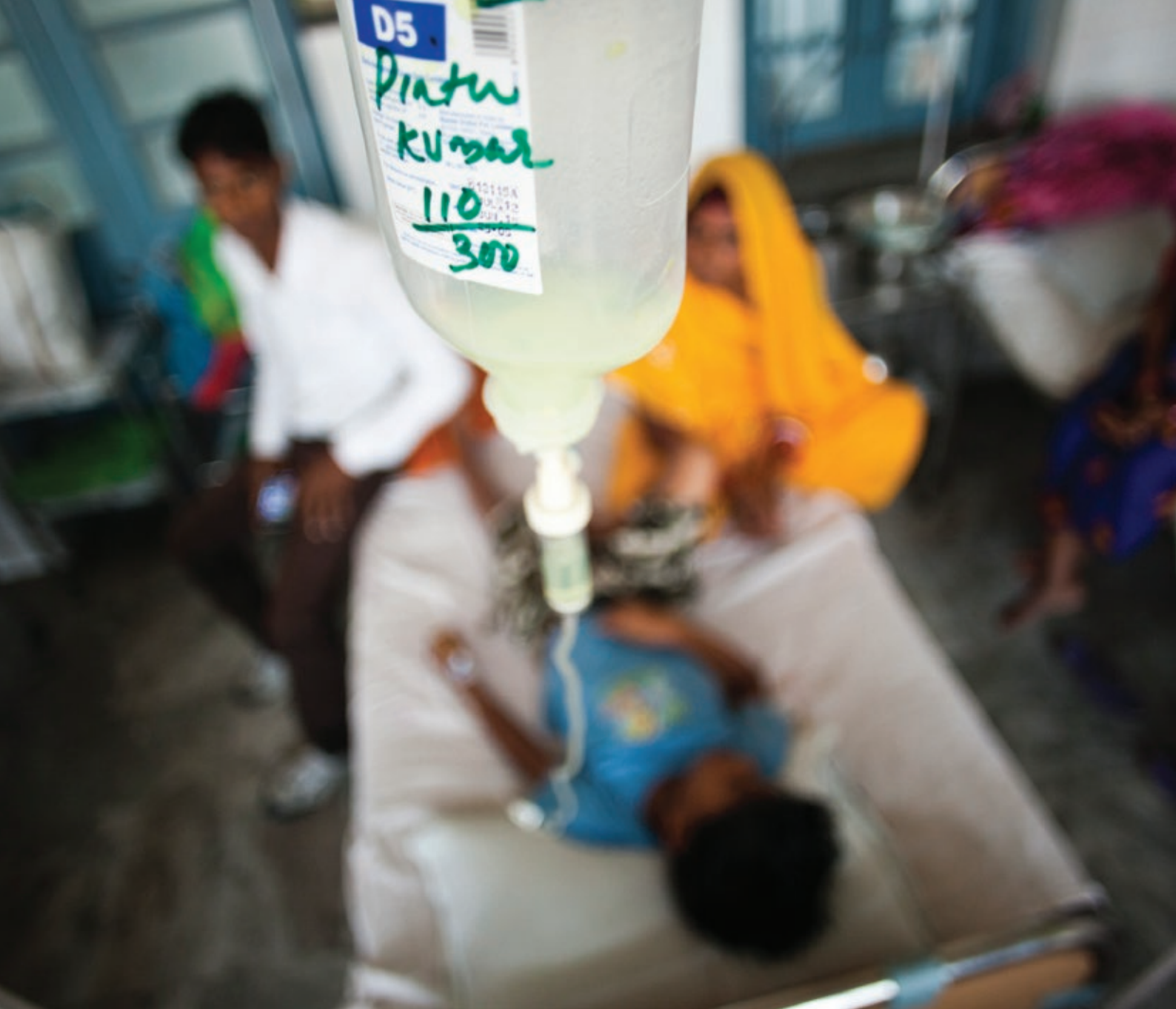
Yet, this progress is tinged with sadness too. In the past, I would regularly find patients in the advanced stages of the disease and with severe malnutrition. Almost half of these patients were children.

Why was VL neglected for so long? Because it’s endemic to the very poorest and most vulnerable in society. They don’t offer a financial incentive to pharmaceutical companies.

But we are now on the right track. I’ve never before seen such a huge political commitment from across the spectrum, especially from the World Health Organization. To put it simply, if we don’t manage to control this disease in the next few years with all the political, financial and stakeholder support we now have, then it’s going to be hard to do it in the future.

This is our time to act.

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Project

KalaCORE

Location

South Asia and East Africa

Client

UK Department for
International Development

Expertise

Management agent



Project hope

Visceral leishmaniasis (VL) is the second most deadly parasitic disease after malaria. We are the management agent for KalaCORE, an international consortium set up to tackle VL in South Asia and East Africa. KalaCORE was established by the Drugs for Neglected Diseases Initiative, the London School of Hygiene & Tropical Medicine and Médecins Sans Frontières as well as ourselves.

To date, KalaCORE has improved awareness of VL’s cause, prevention and treatment among 4.5M people, training more than 10,000 health workers in recognising and treating the disease. About 11,000 VL patients worldwide have benefited directly from KalaCORE support and training.

Making Adelaide proud

Managing director Andrew Daniels has led the iconic Adelaide Oval for the past five years, overseeing the redevelopment of this beloved stadium into a 21st century destination. Getting the project across the line was an emotional rollercoaster.



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The Adelaide Oval is in the heart of the city and it holds a special place in the heart of all South Australians. Today, it's the state's pre-eminent sporting and entertainment destination – hosting world-class events; from the Ashes, to the Australian Football League (AFL) to Adele.

The initial redevelopment concept was met with a degree of public scepticism. There was community concern about the project's cost and the effect the changes would have on the original Oval and its iconic features – such as the heritage scoreboard, the stands and the memories that many South Australians hold dear.

Protecting this heritage and beauty was paramount to the redevelopment project. Designing a unique timber viewing platform around the Moreton Bay fig trees on the northern mound, preserving the heritage scoreboard, carefully designing the architecture so that the Oval remains integrated into the surrounding parklands and maintaining unobstructed views of the Cathedral were all critical elements to the redevelopment's success.

This need to preserve the Oval's heritage had to work hand in glove with the need to offer 21st century facilities. Today's public expect high quality coverage, lighting, replay screens, viewing and catering. They expect a first-class entertainment experience. Getting this mix of the best of old and new right was crucial to the Oval's success.

Initially, we discussed building a new stadium out of the city. This would have been a grave mistake. **One of the key reasons for the success of the Oval is its proximity to the centre of Adelaide.** The city is a central hub for public transport and people can take a five-minute walk to the stadium from the city across the River Torrens Footbridge. On AFL game day the roar of the crowd, the lights, the sounds and the raw energy of the match spill out and echo across Adelaide.



Events at the Oval have dramatically increased the life and economic activity of the city. Restaurants, cafés and bars are crammed with people enjoying pre and post-event meals and drinks. This activity has been quantified at approximately A\$170M a year, but the social benefits are incalculable.

It's difficult now to find somebody who would say that they were against the Oval's redevelopment. At the time though, it was highly controversial and there was a lot at stake. We put such importance on getting everything right the first time. We needed the doors to open and everything to work.

I never thought we couldn't do it. **We asked people to do amazing things. And amazing people did amazing things.** In the end, the whole redevelopment was completed on time, under budget, without scandal or major error.

The Adelaide Oval is now a unifying destination that all South Australians have embraced with pride. Whether it is a game of cricket, a football match, a concert, a meal, a tour of the ground or the award-winning RoofClimbs, the Adelaide Oval is a beacon of success.

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More than sport

Total remodelling of the iconic Adelaide Oval in Australia was needed to meet rising spectator expectations, broadcaster needs and diversify the stadium's revenue base in the face of a fast-changing and aggressively competitive sports and entertainment industry – while preserving the ground's heritage and identity. For added challenge, work had to be fitted in around a full schedule of international cricket and league football fixtures.

As project managers, we co-ordinated a team that included three architectural firms, two building services consultancies, two structural and civil engineering firms, and 20 specialist sub-consultants. The new Oval has put Adelaide on the global map of entertainment and sporting events, providing unforgettable experiences for thousands of fans.

Project
Adelaide Oval redevelopment

Location
Australia

Client
Government of South Australia/
Stadium Management Authority

Expertise
Design management and
project management

Turning the tide of decline

Councillor Geraint Edwards was instrumental in carrying through the regeneration of the Colwyn Bay seafront. He recalls the ups and downs along the way.



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Colwyn Bay was struggling. No two ways about it. Residents were starting to give up on the town. You didn't go there to shop any more, or out in the evenings. There was talk of some small-scale pedestrianised areas to revive trade. But we needed a big intervention. Anything less was just a sticking plaster.

Change had to start with the seafront. Colwyn Bay has an illustrious history because of its promenade. Only a proper sandy beach could give our town a future. But, there wasn't a beach, as such. The sands were lower than they are now by six feet. So the tide was in most of the time. The seafront hadn't been a draw for decades. It didn't make the residents proud any more.

Inevitably, there were those willing the project to fail. Our every move was followed on social media, including a live cam during the first big storm to see if the sand washed away. But the waves just rippled across the beach. The trolleys were left high and dry!

Personally, this has been the most fantastic learning experience. Were there dark times? Absolutely. You question your own judgement. Will this idea work? What if it fails? But we faced a situation that needed tough decisions. If we applied a quick fix, there would be no town to save. We'd be sealing the tomb.

All the small milestones have added up to something huge, which is far bigger than I ever imagined. That's largely because others have seen the vision, grabbed hold of it, added to it and made it theirs.

Attracting leading chef Bryn Williams was a major coup for the Porth Eirias building that dominates the rejuvenated seafront. He saw the potential immediately and played a big role in the interior design, such as opening up the kitchen to make it a major feature. That building was a big risk in itself. Some said it would turn into a white elephant. Yet, we've filled it ahead of schedule and people enjoy using it all the year round.

We won awards for the design, although we still get our share of bad press. But if you don't notice, it doesn't exist, right? This development has put us on the map again. A lot of people have nostalgia for a bygone era, and I understand that. But we can't keep looking back.

I'm so very proud of everyone involved. We have a chunk of the town that wasn't there before. We have a beach that protects the town and provides a focal point. It needed that dual purpose. Just protecting the coast wasn't enough. People have changed their opinion. Many who thought it wasn't possible are asking what we're going to do next.

Colwyn Bay is now a symbol of change. The town demonstrates what can happen when you harness community spirit. We want to repeat this success elsewhere by providing a benchmark for other towns.

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Bringing the sand back

Scoured away by tides, currents and storms, the beach at Colwyn Bay had all but disappeared. Without its famous sands, the town had lost its appeal to holidaymakers. And with no beach to ‘soak up’ the energy of crashing winter waves, the town was vulnerable to climate change.

A decision based on cold, hard cash alone would have given the town an ugly rock-armour wall that would forever cut off the sea from the town and destroy its future as a resort. By reinstating the beach with 1Mt of dredged sand, the new seafront has helped to turn Colwyn Bay’s fortunes around.

Today, the new sea wall provides the residents with a hard line of defence, but it has also given their town a new promenade and the site for a brand new watersports centre and restaurant. Meanwhile, the beach buffers against winter storms while acting as a magnet for summertime sandcastle builders, sunbathers and surfers.



Project

Colwyn Bay Waterfront Project

Location

Colwyn Bay, Wales

Client

Conwy County Borough Council

Expertise

Civil engineering, environmental impact assessment, project management

Make dreams come true

Dr Anwar Hossein is an expert in agriculture who helps run the Farmer Field School courses which form part of the Blue Gold programme in Bangladesh. He shares the stories of two farmers who are changing their prospects in the Khulna District.



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In the delta region of Bangladesh, water is everything. Therefore, at the heart of any long-term change, you will find water management. Improvements in agriculture, the reduction of poverty and the empowerment of women have all stemmed from engineering feats that have created and strengthened polders across the delta.

I recently met Noresh Mandal, a farmer who grows crops in Polder 30, a typical section of reclaimed land protected by embankments, dykes and sluice gates. Until last year, his land could only support rice. He struggled with water salinity in the winter and then flooding in the wet season. Noresh and his family were trapped by crop limitation and weather dependency.

Their prospects changed with the re-excavation of the Kharia and Dabitola Canal to create vast reservoirs of sweet water. This is a new era for farmers like Noresh. More than that: **the irrigation has sparked a revolution. Suddenly, he could introduce a second crop cycle.** Watermelons! Every fruit can earn him up to US\$1.

Noresh is a typical farmer. He only likes to talk about his crops. But it's not hard to see the social benefits of this economic revolution.

Farming here has become more predictable. It's less vulnerable and stressful. All of his family members now work together on the farm. There are more books for the children and fuller plates on the table. Noresh can plan for the future. He's not alone. Backed by technical support from the Farmer Field School, 120ha were planted with watermelons across the polder.

Personally, it's very satisfying to help teach new skills. Yet, our team can't reach everyone. All we can do is set the ball rolling. For example, again in Khulna, I helped with an initiative to improve poultry rearing with the use of hajols. These are hatching bowls made of baked mud, which include two small troughs at the front for grain and water. Mother hen never needs to leave her eggs, which means more hatch successfully. Once hatched, you separate her from her chicks, and she is happy to lay another batch. In this way, farmers can get up to six cycles a year from the same hen.

We trained 25 members of the Milemara Water Management Group, which is mostly populated by a marginalised Hindu community. The women here work closely together and share ideas to support each other.

Dipali Mondal, a housewife and mother, embodies the local drive to make the most of what you have. She couldn't join our Farmer Field School, but she was determined to learn about the hajols from her neighbour, who did. Starting with just 10 hens and a cock, Dipali sold 110 hens, 1200 eggs and 300 chicks in her first year. On top of all her usual household activities, she has added Tk49,400 (US\$600) – and a regular supply of eggs and meat – to the family pot.

Her status has grown in her family and the wider community. Dipali is hugely excited for the future. 'From just 10 birds, I can now afford the full cost of my son's college fees and support my five family members,' she says. 'My dream is to own a big poultry farm one day and I am preparing to make this happen.'

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Secure roots for the future

Almost 40% of people in Bangladesh’s southwestern-coastal region live below the poverty line and face food and water insecurity. Their hardship is made worse by cyclones, storm surges, salt water contamination of land and drinking water, droughts, river siltation and land erosion. Managing the country’s abundant water resources and fragile land are crucial to long-term development. The Blue Gold programme covers 115,000ha and makes the area safer for local people by strengthening dykes and clearing silt from drainage channels.

We supported the formation of water management organisations (WMOs), a third of whose members are women, to give local people control over the water resources affecting their lives. The WMOs are complemented by Farmer Field Schools, which equip people with training in horticulture and aquaculture, leading to better harvests. Blue Gold’s greatest legacy will be the self-sufficiency of the area’s communities once the programme closes.



Project
Blue Gold
Location
Bangladesh
Client
Government of the Netherlands
Expertise
Lead consultant, including technical, stakeholder engagement and programme management services



Desert diversification

Malcolm Haddock, manager of planning and forecasting at Abu Dhabi Sewerage Services Company, explains how his adopted homeland is transitioning to a low-carbon future.



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I've lived and worked in Abu Dhabi for nine years and seen huge changes in local attitudes and behaviour towards tackling greenhouse gas emissions. This isn't just about moving with the times or doing our bit. There's a real appetite here to take a lead on the world sustainability stage.

We realise that at a national level, we need to contribute to global targets, as so much of the rest of the world relies on our region as a source of energy. A physical manifestation of that commitment is the permanent headquarters for the International Renewable Energy Agency (Irena). Described as one of the greenest buildings in the region, it's also the first truly international, charter-based organisation to be located in the UAE, according to Adnan Amin, the agency's director general.

Of course, we face certain limitations and challenges as a desert nation. The geography is unyielding, while our city population is largely transient due to its 80% expatriate demographic. Per capita, we remain one of the highest consumers of energy and water worldwide. However, the winds are changing. Social awareness is growing on the need to collectively tackle waste. Tariffs are being slowly increased and subsidies reduced to encourage people to use water more sparingly and consume electricity more intelligently.

The Emirate has already taken large strides towards sustainable energy and away from relying on fossil fuels. In particular, the government has invested huge sums into nuclear power, and started uncoupling power from water. In the past, the two were combined through multi-stage flash distillation facilities. We're now looking to separate them by addressing the baseload with nuclear.

Solar energy is likewise gathering pace, not least with the Sweihan photovoltaic project, which promises to offer a world-record low tariff of just US\$0.0242/kWh when it opens in 2019. Meanwhile, Masdar City is fast becoming a centre for exciting innovation, especially in the field of low-energy water production. I'm fascinated to see how the next generation of researchers will advance technology in reverse osmosis, graphene membrane, quartz wool and carbon nanotube treatment.

A more sustainable vision has a clear commercial incentive too. Lower oil prices are inevitably impacting GDP. So, what we can't control in terms of income, we can improve in terms of efficiency. For wastewater – my area of expertise – carbon management is an obvious place to start, as our footprint is dominated by electricity consumption. We are finding ways to offset waste energy, incorporate small solar arrays, become more efficient with our pumping systems and identify whole lifecycle reductions that translate into real cost benefits.

This greener direction is also vital for keeping Abu Dhabi on the world map as one of the best places to visit, live and work. We can't be reliant on fossil fuels forever, so we need to be clever in the way we diversify. It's difficult to change popular behaviours, but we are prepared to invest the time. In my experience, the will and the ability are both here to make it happen.

In fact, it's already happening.

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City on the move

Project
ADSSC carbon footprint

Location
Abu Dhabi, UAE

Client
Abu Dhabi Sewerage Services Company

Expertise
Carbon management strategy

Abu Dhabi Sewerage Services Company (ADSSC) is responsible for the collection, treatment and disposal of 344Mm³ of wastewater for the Emirate of Abu Dhabi's 2.9M residents. ADSSC was keen to calculate its carbon footprint and understand how the company could reduce its climate change impacts, cut costs and provide carbon data to stakeholders.



We were commissioned to measure ADSSC's carbon emissions, identify potential reductions and provide a roadmap to guide the company's 2030 sustainability strategy. By developing a carbon footprint calculation tool and forecasting scenarios, we helped to identify reductions in emissions of 35-54% as well as operational cost savings. This is the first wastewater utility carbon footprinting project in the Middle East.

Swings and roundabouts

Olean in New York State was typical of many once-proud cities. The downtown area had seen much better days. Local business owner Jeff Belt knew how to save it. That bit was easy. But first, he needed to get his fellow residents on board.



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Sometimes you've got to make a stand. I'm a small-town-guy and I hate seeing what's happening to small-town-America. I'm fed up of car dependency, urban sprawl and inner-city ghost towns. In the 1920s, our small towns were the best planned in the world. But we turned our back on them in the 1950s and left them to rot. I wanted to save this little town where I have a business. I dreamed of making Olean the beautiful and vibrant rural town centre that it once was and could be again.

Highways carve up cities, and they divide society too. We're seeing a worrying division between those who can drive and those who can't, such as the very old and the very poor. If you can't drive, your prospects become diminished. You risk isolation. Whole communities are losing hope. We're creating a society that leaves some people marginalised. Sure, it works when it's working. But when there's a crosswind, people get blown away. I could see it happening in Olean.

When I first recommended the traffic calming measures, I framed it as an economic development initiative. I met a lot of resistance, because the traditional leaders – whether in City Hall or the loudest guy at the end of the bar – couldn't see the link. For them, economic development means a tax inducement to a big company. But that literally does not work in the US any more. If you want a strong economy, you must attract people with in-demand skills. Then the employers will choose your town. Look at Google. They ask their people where they want to live, then build a Googleplex in that community. They're doing OK.

The two things people are most frustrated with are the status quo and change. **There was huge fear of the unknown in Olean. When the roundabouts started to go in, people really reacted negatively. But when they started using them, they changed their minds.** This is very predictable for traffic calming and passive intersection devices. Ultimately, people will like them more than huge roads and traffic lights.

Now, folk are out in the evenings and pushing strollers. It's like having a linear park through the middle of our city. People are encouraged to walk and ride bikes. You'd never see anyone cycling on the old street scheme. We've truly civilised the downtown. Even the drivers are more polite.

The inner-city retailers are taking more pride. Footfall is up. For years there was no construction or improvements. Now, there's a dozen storefronts being renovated. Property values are rising and new businesses are coming in. **There's a sense of renewed optimism. Olean is on the comeback trail.**

You can get a good meal with the family too. Before, the restaurants didn't address the street. Why would you with cars and trucks chugging past? Now, these buildings are being renovated with more glass out front and areas for outdoor dining. They're piping music, whereas in the old days you wouldn't hear it.

So, the vision is happening. I've said from the beginning: this is not going to fail. If you do a really good walkability makeover in the downtown area you're going to get follow-on private investment. Fact.

That's why walkable urban placemaking is the single most effective economic development strategy in the US today.

I'm not really a high profile guy. I try to stay behind the scenes and give credit to elected leaders who need it more. But I like the fact I can walk my daughter to her dance class, and not fear we're going to get squashed on the street. And I'm getting fewer evil looks these days. I don't cringe when people approach me in a restaurant. They're coming to shake my hand rather than shake a finger in my face.

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Sunny side of the street

North Union Street is the heart of Olean, serving 50,000 people in southern New York and northern Pennsylvania. Despite its scenic position in the Enchanted Mountains, downtown Olean had lost its charm. A four-lane roadway with seven traffic signals, no bicycle facilities and a high accident rate had driven away footfall and civic pride.

Our project team of engineers, landscape designers, architects, public engagement specialists and urban planners helped the city achieve its vision of a ‘Walkable Olean’. The result is a transformed community with a complete and green main street that maintains traditions and provides opportunities for economic growth.

Project
North Union Street transformation
Location
Olean, New York
Client
City of Olean
Expertise
Urban planning and landscape design



Better data, smarter forecasts

Dukessa Blackburn-Huettner, operations and planning manager for Healthy Waters at Auckland Council, describes how better data is helping address the mounting challenges that face her city.



Auckland is growing fast. As other parts of the world grapple with increased uncertainty, New Zealand is seen as a safe, healthy and settled place to live. We're enjoying huge immigration, coupled with a surge of expats coming home. But as our population rises, so pressure is mounting on our infrastructure to accommodate the huge demand for housing. We risk becoming a victim of our own success.

The increased number of climatic events – which we are definitely seeing – adds another level of complexity. Just this year, across March and April, tropical storms dropped 600mm of rain in a 30-day period. Auckland faced nearly every consequence of flooding, from roads scoured away and evacuations of building occupants to major stock losses, significant wastewater overflows and loss of services.

However, it's worth noting that the fundamental shift required in the management of flooding is not related to pipes and culverts, which are primarily designed for land drainage purposes.

Property flooding most often occurs where the flow of surface water is impeded by development in the wrong location or at the wrong elevation. In fact, blockage and inadvertent diversion of overland flow paths cause as much flooding as streams and rivers bursting their banks.

Developers and homeowners can unknowingly channel these paths into properties or obstruct them with fences. Likewise, if they are tipping garden rubbish into waterways, then it will block up the culverts during flash flooding. **Building community resilience is a big part of the solution. This means helping households to recognise the limitation of the system and take ownership of the outcomes.**

By choosing a more water sensitive approach to flood management – and safeguarding the natural 'green fingers' that run through the city – we will also improve water

quality, riparian planting and recreational amenity. Rather than thinking how to convey floodwater away as quickly as possible with the smallest footprint, we need to find ways of dealing with it at source, using rain gardens and green infrastructure.

It's critical that we work with nature to ensure ancient waterways and gullies remain vegetated and intact, rather than being scraped, piped and filled for higher-density housing.

Data is a key weapon in our team's armoury. We're working on gaining a faster intelligence feed from rain gauges and radars, so our operators can chart how storms are tracking across the region and then react with crisp decisions.

Our systems are improving how we forecast and now-cast, so we can see what's coming, whether in 30 hours or 30 minutes. We can then pass that information on to the public.

The water debate is rising up the agenda here. While there is growing political and media pressure on

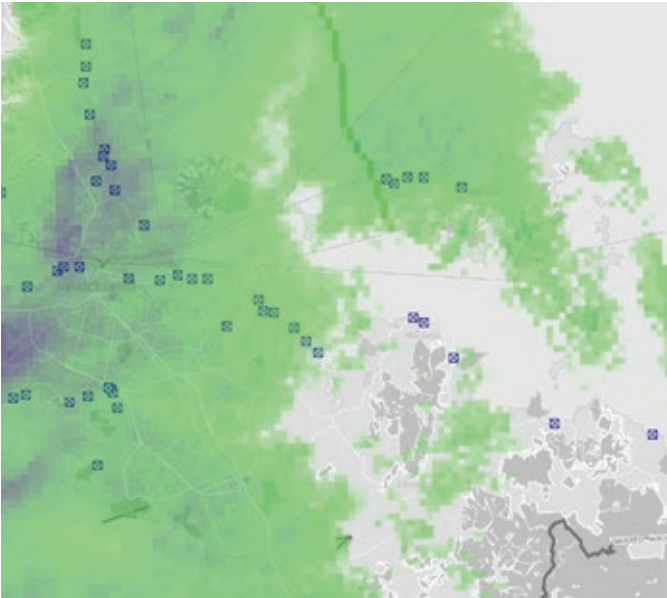
councils to provide better services, the prevailing public sentiment is that water falls out of the sky and should be free. In New Zealand, water underpins our economy, especially in our primary industries like fishing, forestry and agriculture. Tourism, likewise, is a huge asset, and it relies largely on our clean and green image. Fresh and plentiful water is something we expect to take for granted.

Finding the balance is a challenge we simply must rise to in Auckland, if we want our city to remain a top destination for travel, work and everyday living. I'm optimistic that we will. There's something about the water sector that attracts determined people. **It doesn't get more essential than drinking, washing and flushing, does it?**

Know the flow

Our smart infrastructure system H₂knOw-how comprises sensors installed at critical points of the water or wastewater network, collecting real-time information on flow rates, water levels and pressures. It can predict in advance (two-three hours) where flooding might occur during a rain event and provide detailed risk profiles for the water infrastructure network. Operators can now ‘visualise’ burst pipes and leakages below the ground, and fix the fault before the taps run dry or the sewers overflow.

Twelve local authorities in New Zealand currently use H₂knOw-how to provide a better and cheaper service to their customers. In Auckland, where the city council manages more than NZ\$5bn of storm water assets, H₂knOw-how has digitised the entire management system and is now driving investment in critical asset renewal projects worth about NZ\$10M. The council has also gained valuable transparency to build trust with residents that their money is being spent where needed.



Project
H₂knOw-how flow monitoring, modelling and prediction

Location
Auckland, New Zealand

Client
Auckland Council

Expertise
Smart infrastructure

Operating in a green environment



Estates and support services manager Colm Murray was tasked with securing LEED Gold for 26 York Street, a new state-of-the-art facility for the Royal College of Surgeons in Ireland that will train the next generation of healthcare leaders.

“

The doors of 26 York Street in Dublin will open officially in time for the new academic year in 2017. That's also when we learn if we gained enough credits for [environmental performance rating] LEED Gold. All signs point to a win, but the standards are predictably rigorous, so we take nothing for granted.

Regardless of the eventual outcome, the opening will give us the chance to reflect. Was commissioning for LEED worth the extra push? Will we genuinely benefit from the added effort across the design, construction and occupancy phases?

The answer to both questions is yes, absolutely. We've never felt regret throughout the process. Don't get me wrong. It's hard work staying above the 60-point threshold. You need to be tenacious. But we also wanted LEED Gold to work hard for our new 11,148m² building. We'll be open late seven days a week, with hundreds of students active at any one time. There are 10 floors containing a world-class surgical and

clinical training suite, including a flexible wet lab, mock operating theatre, clinical training wards and out-patient rooms. There is also a 540-seat auditorium, a library spanning three floors, a sports hall and fitness suite.

It is a facility that will generate real efficiency savings for many years.

I think energy efficiency is important for our students too. They're hugely ambitious and work hard to get the best results possible, and it's our priority to provide them with the best possible learning environment.

It makes a difference; we can help set expectations on how they see the world. As well as being future healthcare leaders, our students may also be involved in designing the hospitals of the future. We are exposing them to a culture of sustainability that we hope will stay with them throughout their career.

Personally, I don't see LEED Gold as a badge for today, but rather a change of mindset for the future. We've gained a detailed matrix of how to do sustainability well moving forward.

Besides, LEED stretches beyond sustainability into everyday operations such as maintenance and cleaning, training and safety. The process is about preventing mistakes, not finding them afterwards. I'd definitely recommend maintaining a log that documents issues and benefits. And take lots of photos.

26 York Street is the college's first major build for 40 years, and offered us the opportunity to make a great statement about our heritage and commitments.

Going for LEED Gold is not something we had to do, but I'm very glad we did.

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Project

26 York Street

Location

Dublin, Ireland

Client

Royal College of Surgeons in Ireland

Expertise

LEED consultancy and certification management

For the next generation
and beyond

26 York Street, Dublin, a new teaching facility for the Royal College of Surgeons in Ireland, builds on the institution's heritage of excellence and innovation. It will boast modern, inspiring and ambitious medical sciences and surgical training facilities, provide a catalyst for enhancing student amenities across the entire campus and promote the continued development of the college community in the heart of the city.

Our experienced LEED accredited professionals provided support throughout the programme and played a key role in upskilling the in-house college team, ensuring that consideration was given to sustainable design and construction practices.



Flicking the switch



When our senior engineer K Madhu Babu is presented with a problem, he can't help trying to solve it. But what if the solution means changing the way thousands of children think about energy?

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In my small village in India, there were regular power shortages. So I went to the local government to see if they could get to the bottom of it. They said it was out of their hands.

This got me thinking. How can I make things different, rather than using the same old method? What if we tried something else instead?

My rationale was that if I couldn't impact power generation, I had to target conservation instead. And to make a difference in society, any meaningful initiative has to start with the children. I remembered an idea I'd had working in Dubai. We wanted to stop water wastage across 25 camps housing workers. Why not make it a competition? Whichever camp saved the most water would get its mess bill paid. First incentivise, then habituate. I thought it might just work in India. And it has!

The children get a card to record their energy saving. Whoever helps to save the most is rewarded. Simple as that. **They are motivated to switch off lights and appliances. They educate their parents too.** In fact, I was speaking recently to a friend, who grumbled that his children wouldn't let him put on a fan because they wanted to save electricity for some government scheme. He had no idea it was me who started it!

In the first year, 2014, we reached 20,000 children. By 2016, we had signed up one 'lakh' [100,000] children. On average, they are saving 20 units per family over the three months of each competition round. These are small steps, but the government is already supporting us across five states. There is no other activity like this. I hope one day, this will be a national initiative. I'm told there is interest in the idea in Japan and Turkey too.

When you ask children to do and see things for themselves, they act. Learning from childhood lasts a lifetime. Who knows how much energy we can help save in that time?



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Clearing the boundaries

In 2015, our group sustainability graduate Angus Berry founded the charity Connecting Clubs to harness sport's power in achieving social change in developing countries.

His inaugural project received funding from us and used cricket coaching to address gender discrimination in Nepal's second largest city Biratnagar. Angus and assistant project manager Nidda Yusuf reflect on the experience.

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I had the blueprint for the charity in my mind, but nowhere to set it up. When a friend from university told me about the problems in his hometown of Biratnagar, in the aftermath of Nepal's devastating earthquake in 2015, I knew immediately that I had found the missing piece of the jigsaw.

Looking back, our most important decision when setting up Cricket for Equality was to consult locally on the big issues that most needed to be tackled. The danger with such an initiative is that outsiders come in and tell local people how they should run their society. We asked: What's holding back development in Biratnagar? The answer we were given time and again was gender inequality.

Asking teenage boys to talk about gender inequality and violence is challenging wherever you are in the world. From New Hampshire to Nepal, they're either uncomfortable, can't see the problem, or they're bored. Cricket allowed us to grab their attention. While Biratnagar is a relatively cosmopolitan city, if you go 10 minutes into the countryside, families still practice dowry.

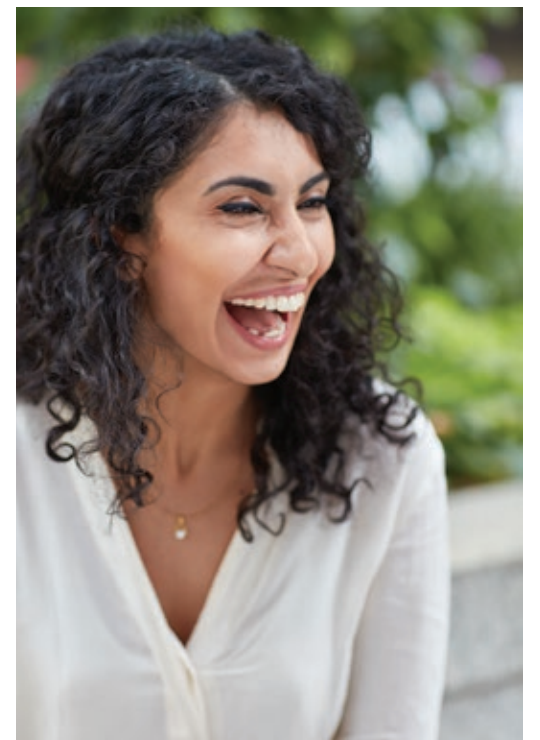
So attitudes remain very conservative. We set out to confront the exclusion of women from sport and recreation. We encouraged them to take a lead where boys might be expected to do so. We spoke to them the same as the boys. You could see their confidence grow.

The earlier you can embed equality as a concept the better. The next step for the charity is to bring in lighter weight equipment that will appeal to lower school kids, aged six to 10. This will remove a barrier to entry for many children. Too often, their first taste of cricket is facing a rock-hard ball on a bumpy pitch with a bat they can barely lift, let alone swing.

If all of these kids become ambassadors for change in their communities; if they become the people who challenge gender stereotypes and challenge gender violence; then we can create a generation of change.

But it mustn't stop there. Sport provides the spark to engage people who are not engaged by traditional education methods. This blueprint can be replicated across the world.

Angus





It was moving to see the girls play. To start off with they weren't comfortable holding the bat and often took their eye off the ball. But the difference from day one to day five was astonishing.

Before long, the girls who had played before were going off on their own to coach the beginners. The boys also took pride in showing the girls how to hold the bat and how to bowl.

I was also moved to see how quickly the boys got their heads round gender bias. We acted subtly at times, getting them to interact with the girls in training, warm-ups or fitness. By the end, they had accepted that girls could play cricket too.

But we also made them answer tough questions, or they didn't get their free coaching and equipment. They definitely began to recognise the unfairness in society. Why should their sister stay at home and clean, while they play sport? How does that make her feel? They had never been asked questions like this before.

For me, it is important that this is a long-term, sustainable project. The coaching – both in terms of cricket and gender sensitisation – is continuing, even if we can't be there. We have a Facebook page to keep regular contact with the organisers and kids. They know we're not going to abandon them.

Why does this matter to me? I am a woman. I am of south Asian background. When I was younger, I would visit my relatives in Pakistan. I would see first-hand the discrimination. Of course, living in the UK, this felt so alien to me. How can I have so much freedom and others don't?

This charity is a powerful and personal part of my life. **It means so much to get involved and help create lasting change.**

Nidda



Opening opportunities with connected thinking.

Talk to us: davide.stronati@mottmac.com

mottmac.com