



北京顺义国际学校
INTERNATIONAL SCHOOL OF BEIJING

SUSTAINABILITY IMPACT REPORT 2019

2019 SUSTAINABILITY IMPACT REPORT



The International School of Beijing (ISB) is evolving into a healthier, more sustainable place of learning. This annual Sustainability Impact Report will share with our students, staff, parents, and the greater community on our progress towards the commitments we set in our Sustainability Roadmap 2025.

2019 marked a stepwise change in ISB's approach to sustainability. We finalized and published our Sustainability Roadmap 2025 and follow-up Sustainability Action Plan. Through careful evaluation of our operations, the facility department was able to lower our climate change-causing greenhouse gas emissions by 5% from the previous year. Our staff proactively identified and acted in numerous ways in and out of their classrooms to drive a positive impact.

For our students, sustainability can connect purpose with learning. At ISB we utilize the school as a real-world 'Living Lab', where students are empowered to observe their surroundings and challenge us on how we can improve our impact on the local and global community.

We hope you enjoy reading about our progress and take-away a few learnings for your school, organization, or family.

About this report: This Sustainability Impact Report covers events and activities that occurred during the 2019 calendar year. At times we may preview items that occurred in early 2020. For data presented in this report, the scope includes operations over which we have operational control (e.g. our campus and bussing). Climate data was determined in alignment with the GHG Protocol Corporate Accounting and Reporting Standard methodology.

CO-CURRICULAR

LEARNING + SHARING

Goal

Develop and introduce service learning and sustainability guidelines for whole school co-curricular program with the intent of establishing holistic impact thinking and action by 2020.

Commitment to

Foster a new generation of environmental leaders by providing mentoring, networking, experiential learning opportunities that prepare students with the insight and foresight to safeguard our environment in the years and decades to come.

Commitment to

Support student entrepreneurship by facilitating sustainability-minded opportunities on campus.

Empowered with the knowledge and tools to make purposeful action, our students were busy in 2019.

- 110+ HS students were provided training focused on effective meeting strategies and a greater understanding of the needs of their benefactors.
- 5 students presented at a Global Issues Network conference hosted by Keystone Academy.
- 50+ students were involved in clubs mentoring students into becoming environmental change agents. This Report includes many examples of impactful work by those students.

Visible examples of our students growing into environmental leaders:

- In 2018, 6 students visited the Green School in Bali with the purpose of taking learnings back to ISB. Since returning, they were instrumental in rebooting our recycling program, taught Grade 9 how to reuse kitchen waste oil into soap, organized a Climate Awareness Day, and launched Bike Week.
- Climate Awareness Day organized by three of our HS clubs (Greenkeepers, Net Impact ISB, and Roots & Shoots). Read more on how they dimmed lights to illuminate climate change [HERE](#).



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The Next Generation of Environmental Leaders Raise Awareness for the Climate

GOVERNANCE

LEARNING + SHARING

Goal

Establish Sustainability Guiding Statements and develop a Sustainability Action Plan to support achievement of the Sustainability Roadmap 2025 by 2019.

Goal

Develop and integrate a Social Cost of Carbon and Water into purchasing processes by 2021.

Commitment to

Facilitate strong governance structures to ensure integration of sustainability into all operational practices and participation of the ISB community.

Commitment to

Create, maintain and continuously improve programs that drive progress towards this Sustainability Roadmap.



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In 2019, ISB developed and published its Sustainability Action Plan, which outlines the discrete action steps we strive to take to achieve our overarching commitments. You can view this Plan and learn more about our sustainability program [HERE](#).

Beginning in 2018, we established a dedicated sustainability manager position to ensure the integration of sustainability into all operational practices and participation of the ISB community. The successes presented in this Report demonstrate the strength of our governance structures around sustainability.



Sustainability Roadmap 2025 working process (red and blue tags indicate where we are today and where we aspire to be)

IMPACTFUL SHARING

LEARNING + SHARING



BEGINNING	APPROACHING	MEETING	MASTERING
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Commitment to

Transparent and open sharing of ISB's progress to this Roadmap via ISB's public website on an annual basis starting in 2019.

Commitment to

Communicate ISB's 'People, Planet, Purpose' sustainability story to educate, engage, and motivate the ISB community.

Commitment to

Recognize individuals providing significant contributions to ISB's sustainability accomplishments.

Commitment to

Cultivate external partnerships within the wider community, that help inform ISB's efforts and amplify our local and global impact.

The Sustainability Roadmap 2025 is ISB's strategic pathway to evolve into a healthier, more sustainable place of learning. The Roadmap establishes a holistic vision for our future with clear goals and priorities in the areas of learning and sharing, people, planet, and campus. It also encourages students and staff to continue investigating, planning, creating, and acting on sustainability opportunities by using learning experiences inside and outside the classroom to tackle real-world challenges on our campus.

I'm delighted that ISB is making clear its commitment to sustainability. We are building our students' futures, and our students happen to be about as well-informed on this issue as any adult I've met. Their participation in constructing a Roadmap for Sustainability at ISB impresses me and is a demonstration of applying knowledge to real-world situations and ensuring that that knowledge has a positive and measurable impact on everything taking place at ISB.

The Roadmap is one thing; we must commit as a school community to make sure the hard work of its creators is rewarded with action. Who can argue that a commitment to environmental stewardship is

Learn more about Sustainable ISB on our website

WELLNESS + SAFETY
The LEAF of focus for this page

PEOPLE ACTION PLAN
Identifies which BRANCH the LEAF belongs with

ISB SUSTAINABILITY ACTION PLAN

To support the achievement of the International School of Beijing's (ISB) [Sustainability Roadmap 2025](#), this Sustainability Action Plan was created. The purpose of this Plan is to outline actionable next steps, when they should be performed, and who is responsible for their completion.

ISB's vision: *Empowered with Purpose and Compassion.*
ISB defines sustainability as *'To explore, plan, create, and act with the Purpose of making a net positive impact on People and the Planet.'*

This Action Plan takes these to heart by including students as responsible stakeholders, empowering them to translate what they learn in and outside the classroom into lasting, impactful change within the community.

ISB publishes its Sustainability Action Plan to the world

2019 was a busy year for Impactful Sharing. In the fall we publicly launched our [Sustainability Roadmap 2025](#) on the ISB website. Understanding that commitments must be backed up by action, we published our [Sustainability Action Plan](#) later than fall.

We published articles presenting our 'People, Planet, Purpose' story and ways in which our students became engaged ranging from electric buses to climate awareness. In March, ISB was highlighted by Beijing Kids on its work of empowering students to convert learnings on sustainability into real impactful actions. You can read the article [HERE](#).

A group of middle and high school students collaborated this past fall to organize a school-wide Earth Day event with speakers, panels, and education activities. While current events prevented this event from occurring in 2020, all the building blocks are in place for a 2021 success!

Internally, we established the Darren Smyth Sustainability Change Agent award to recognize individuals providing significant contributions to ISB's sustainability accomplishments. In 2019, ISB recognized six staff members across the school ranging from TAs to administrators, demonstrating that everyone can make a positive impact on our community and the planet. Their actions included eliminating the use of plastic and paper and creative reuse of packaging materials for student art.

FOOD

PEOPLE

Standard

Develop Sustainable + Healthful Food Standard (w/consideration towards nutrition, labeling, sourcing, and impact) by 2020.

Commitment to

Education and empower the ISB community to make sustainable food choices and form healthy eating habits.

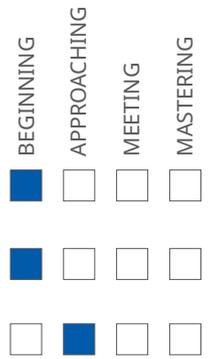
Commitment to

Promote drinking water on campus to support healthy choices and hydration.

Sodexo and ISB initiated a discussion in late 2019 centered on the development of a healthy food standard built off Sodexo's expertise combined with best practices around the world. Sodexo has already taken actions to improve its labeling to empower students and staff to make more informed decisions.

Plant-based food has become a notable topic in China and elsewhere in the world over the past year. ISB is looking into forming partnerships with outside organizations to bring this food innovation to our students over the next year. This topic also caught the eye of a few students. One, in particular, Daniel S. ('23) from the Net Impact ISB club engaged Sodexo food services and students to initiate a Plant-based Friday menu.

Students are also exploring how to improve drinking water fountains to increase student and staff use. In 2019 they met with the facilities team to explore the water filtration and pumping system and identified key barriers to the use of the drinking water fountains.



ISB began purchasing ethically-sourced chocolate (using Mondelēz's Cocoa Life Program) after a Grade 7 unit that had students investigate the social impact of growing cocoa, particularly child labor, started looking inward to the impact of the chocolate ISB was purchasing.

Waste

PEOPLE

Target

Reduce waste per student by 60% by 2025 from a 2017 baseline. Where waste is defined as 'no longer wanted materials leaving the campus not managed by one of the 5Rs'.

Commitment to

Improve awareness and education of the ISB community on the 5Rs (refuse, reduce, reuse, recycling, rot) and the impacts of the waste we generate.

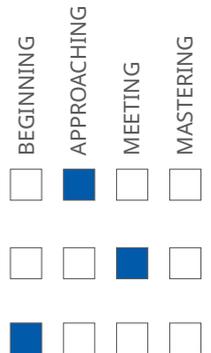
Commitment to

Long-term ambition to become a zero-waste school.

ISB generated an estimated 120 metric tons of waste in 2019. At 0.065 kg per student, this is an 8 percent reduction from 2017. Our recycling system was relaunched on Earth Day. 3,700 kg of paper, plastic, and cans were recycled by the China Recycling Development Corporation, representing 4% of our total waste.

Plastics in the environment is top of mind for our students and staff. Sodexo has supported us by eliminating single-use plastic bottles, straws, stirrers, and utensils from the foodservice operations. We also replaced single-use coffee cups with durable ceramic mugs and established a 2Y fee for single-use cups, the proceeds of which go to student-centered environmental projects.

Students have taken a major role in improving ISB's waste management system. Read more on how students brought recycling back to ISB [HERE](#). These passionate students continued to conduct audits and staff/students training throughout the year. Composting is the next step in our journey and students are leading again here with a pilot program in the fall.



Grade 2 taking turns spinning our tumbler composter during their 'reduce, reuse, recycle' unit.

Learn more about the process ISB went through to establish its recycling system. Read our **RECYCLING CASE STUDY**

CASE STUDY: RECYCLING

PEOPLE

During the 2018-2019 school year, the students of the International School of Beijing (ISB) worked through the process of how to establish a campus-wide recycling program. This case study outlines the steps we took and lessons learned along the way.

Step 1: Set your objectives. You can do this by asking key stakeholders in the community what they expect from a recycling system and what the boundary should be. At ISB we surveyed students and staff to help us answer questions such as:

- Cover just inside the building or both inside and outside?
- How much should students be involved?
- More or fewer waste bins?

Step 2: Major Waste Streams

Identify the major streams of waste generated at your school. Are these streams recyclable? How much is generated? We learned that our largest streams of recyclables were paper in the classrooms and Tetra Paks in the cafeteria.

Step 3: Recycling Partners

Identify external vendor that can accept the recyclable stream you've identified. ISB found the China Recycling Development Corporation to take our paper/cardboard, metals, electronics, and #1,2 and 5 plastics. As a non-standard type of material, Tetra Paks required a specialty recycler and we identified Xinhongpeng Paper Beijing, located in Fangshan District. Both vendors agreed to pick up our recyclables at no cost.

Step 4: Labeling and Bin System

Create an effective design to pass what we call the 'One Second Test'. The idea is you have one second of someone's attention span to guide them towards the correct bin. This ended up being a great design project for our middle and high schoolers.

Step 5: Collection and Storage

Find a dedicated location on campus where 1 to 2 weeks of recyclables can be stored. To avoid vendor confusion, we found a space away from the waste storage area. One big lesson learned was recyclables need to be clean if they are going to be stored for up to two weeks. Our Tetra Paks unfortunately failed this test and caused odor issues and thus we had to cease recycling them.

Step 6: Training and Awareness

The most challenging step of them all. Your program will live and die based on proper usage of the recycling bins. At ISB the students took this step seriously by taking the following actions:

- Talked with the entire Sodexo custodial staff on how the recycling system worked and why it was important
- Performed sketches for the entire student body to build awareness
- Trained all ISB staff
- Created Kahoots for students to play
- Created a machine learning algorithm to tell users which bin to use.



Whole school waste audit conducted in Spring 2018



Grade 2 helping us test our various recycling can designs



Recycling bin designs from Grade 6 and 7 students



The Recycling Project group with the new bins

WATER

PEOPLE

Target

Reduce water withdrawal by [percent to be determined in 2020] by 2025 from a 2018 baseline.

Commitment to

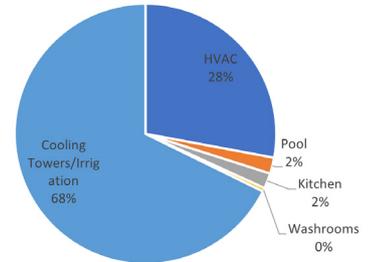
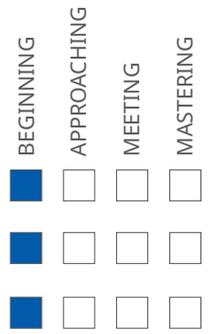
Review water use campus-wide with the intent of establishing a water reduction target on a per occupant basis by 2020.

Commitment to

Minimizing additional stress on the Beijing water system from new water needs through focus on reuse and efficiency.

ISB consumed 94,171 cubic meters of water across the campus in 2019, an 11 percent increase from the previous year. Main uses of water include the cooling towers, irrigation, and HVAC system. The increase is related to the construction efforts associated with our building expansion.

To provide high-quality water for our food services and water fountains, ISB has a water purification system with filtration and bacteria-killing UV components. Over the next year, we hope to conduct a water audit to further delineate our water use and identify opportunities to improve. This study will also inform the establishment of our water target.



Breakdown of Water Usage at ISB

WELLNESS + SAFETY

PEOPLE

Commitment to

Review staff and student injury rates with the intent of establishing a target by 2020.

Commitment to

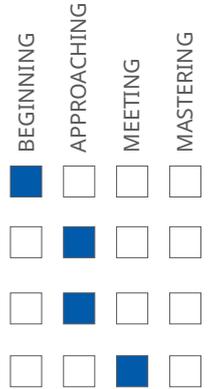
Assessing compensation of all on-site workers with comparison to the Beijing-specific living wage.

Commitment to

Promote healthy lifestyles via existing wellness + safety programs and positive campus nudges.

Commitment to

Assess and communicate results of community satisfaction with indoor environmental every two year.



In 2019, we completed the following activities:

1. Worked with the nursing staff to understand the processes and data available related to staff and student injury rates.
2. Worked with the Fair Wage Network to identify the Beijing-specific living wage.
3. Our student and staff wellness councils continued to support healthy lifestyles through our healthy month celebrations and awareness training on ergonomics.
4. Completed our biannual indoor satisfaction survey. Noise and temperature were the two areas requiring correction action.



Organic apples provided to all staff and students to cap off our Healthy Women and Men's months

EMISSIONS

PLANET

Target

100% of electricity from renewable sources starting in 2020

Target

Reduce greenhouse gas emissions by [percent to be determined by 2020] by 2025 from a 2018 baseline.

Commitment to

Reducing greenhouse gas emissions to align with the most ambitious aim of the Paris Agreement, to limit global temperature rise to 1.5C above pre-industrial levels, meaning to reach net-zero emissions by no later than 2050.

ISB emitted 13,398 metric tons of carbon dioxide equivalent emissions from our direct operations, representing a 5 percent reduction from 2018.

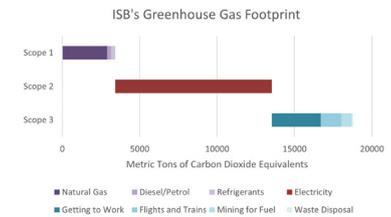
Our largest source of emissions is from electricity consumption. To address, our commitment to transitioning to clean renewable electricity will have an outsized impact on our climate footprint. In 2019, we started looking at options to source renewable electricity, culminating with our announcement on Earth Day 2020 that ISB started using 100% wind power in January 2020. Read more on this achievement [HERE](#).

ISB understands that greenhouse gas emissions are also generated through more indirect activities such as the goods we purchase and methods our employees travel to work. ISB is working to expand our calculation of these indirect emissions, which are often referred to as Scope 3 emissions.

Climate data is provided at the end of this Report.



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A breakdown of where ISB generated greenhouse gases in 2019

Learn more about the process ISB went through to purchase renewable electricity. Read our **RENEWABLE ELECTRICITY CASE STUDY**

ENERGY

PLANET

Target

Achieve an ENERGY STAR building score of [score and achievement year to be determined by 2020].

Commitment to

Assess energy use by building and space type to inform ENERGY STAR goal setting by 2020.

Commitment to

Engaging campus in energy conservation

Commitment to

Conduct on-site renewable energy study to inform goal setting.

Commitment to

Assess feasibility, timeline and develop initial action steps for the transition into a fossil-free campus

ISB achieved an ENERGY STAR score of 10 in 2019 (on a scale of 0 to 100), an increase from a score of 7 in 2018. Three energy efficiency projects including the conversion of 4,000 LED light fixtures were completed this year reducing our energy usage by nearly 900-megawatt hours annually, equivalent to powering 82 homes for an entire year.

To empower our students, we celebrated Earth Hour this year by turning off all non-essential lights for an hour on March 29, an initiative founded by the WWF to show support for our planet.

A few students went above and beyond to help us identify ways to reduce our energy. Notably, Hannah L., Anna N., and Vimala M. of the Greenkeepers student club performed an in-depth analysis of building temperature and how we could better balance energy efficiency with personal comfort. ISB will be using their work to inform our future energy audit.



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Reducing Energy Consumption of ISB's HVAC System



Proposed Solution:

- Operational hours: 7:30 am - 6:30 pm
- Summers:
- Operational hours: 24 ± 1°C
 - Closed hours: 28 ± 1°C
- Winter:
- Operational hours: 20 ± 1°C
 - Closed hours: 16 ± 1°C
- Changing seasons (October / April):
- 22 ± 1°C regardless of operational hours (same as current setpoint)

Empirical Testing:

- Confirm that daytime setpoints can be reached in a decent period of time
- Quantify the energy consumption under different policies, confirm that energy will be conserved

Greenkeepers presentation to ISB leadership

CASE STUDY: RENEWABLE ELECTRICITY

PLANET

On 1 January 2020, the International School of Beijing (ISB) began sourcing 100% of its electricity from the Guanting Wind Farm in Beijing. Given that coal is the primary source of electricity generation in China, this action has the same climate impact as planting 165,000 trees every year.

Step 1: Calculate Annual Electricity Usage

Talk with your Facility Director to receive a report of the total electricity consumed by your school over the last two years. This will be used to determine what renewable electricity options are realistic and how much the cost would be.

Step 2: Understand Available Renewable Electricity Options

Options to purchase renewable electricity vary significantly from country to country and even region to region within a country. In general there are six possible ways to purchase renewable electricity, however, many may not be available to you. Visit RE100.org for more details on these options or talk with an experienced professional.

In China, the only current option for a smaller electricity user like ISB is to purchase International Renewable Energy Certificates (I-RECs). Watch this YouTube video to learn more about how these certificates work:

<https://www.youtube.com/watch?v=opjMrzNauFQ>

Step 3: Request for Proposal

For this step we reached out to suppliers of I-RECs providing them with our requirements and gave them 10 days to respond. For ISB those requirements included:

- Quantity needed to meet the % of the electricity you want to be renewable
- Vintage, which means the year the electricity was generated - this should be the same year you use the electricity
- Certification - International REC Standard in our case
- Retirement - should be retired on your behalf
- Type - we wanted either wind or solar
- Geography - we preferred a project close to or in Beijing

Here are a few reputable vendors to consider: ACT Commodities, 3Degrees, and ECOHZ.

Step 4: Evaluate Offers

With quotes in hand, we evaluated each offer based on what was most important to us - a combination of price, generation type, location, and opportunity to visit the site.

I-RECs range from 0.50 to 2 USD per MWh. North American RECs are similarly priced while European GOs may be a bit more expensive. The two current outliers are Japan and Australia, which both run 20USD+ per MWh due to government tariffs being priced in.

Step 5: Sign Contract and Celebrate!

Renewable electricity is often the largest action an organization can take to reduce its impact on climate change.



ECOHZ Renewable Electricity Certificate Availability Map.

The different colors represent different types of certificates available in each region.

- Purple are North American RECs
- Blue are I-RECs (light blue is considered countries with grid connections to the Blue countries)
- Green are European GOs
- Grey are Nation-specific certificates



PROCUREMENT

PLANET

Target

[Percent to be determined by 2020] of procurement spend meeting sustainability purchasing standard by 2025, 100% by 2030.

Standard

Develop sustainable purchasing standard for paper, lighting, and electronics by 2020; other relevant items by 2022.

Commitment to

Purchasing in an environmental, social, and financially sustainable manner.

Commitment to

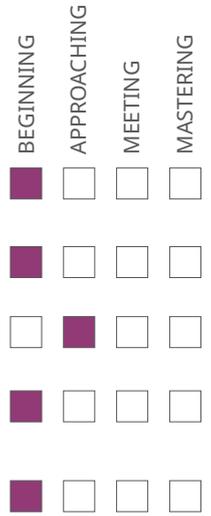
transparent and open sharing of ISB's progress to this Roadmap via ISB's public website on an annual basis starting in 2019.

Commitment to

Including environmental and social criteria as part of major partner procurement and require major partners to support the achievement of and provide reporting for relevant ISB targets and commitments.

Introductory discussions were completed with our procurement team to better understand how and what we purchase. Further action will be taken on this leaf in 2020.

Our staff made the largest moves in 2019 by proactively embedding sustainability considerations into their classroom purchasing decisions. Specifically, piloting the use of reusable markers, trading paper towels for cloth towels, and acquiring reusable kitchenware for classroom celebrations



Grade 5 celebrating with their reusable plates and cups

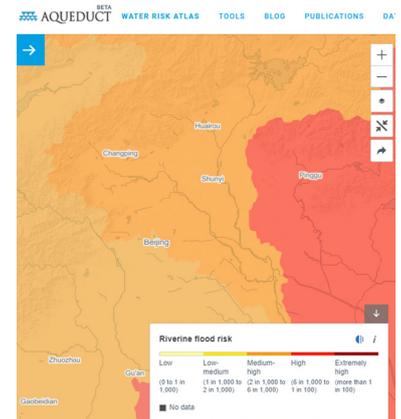
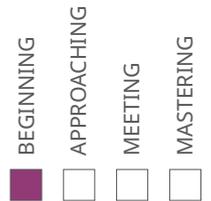
RESILIENCE + ADAPTATION

PLANET

Goal

Develop a Climate Preparedness and Campus Resilience Plan by 2021.

Scientists have stated we should expect changes to our climate. It is our responsibility to our current and future students to understand how those changes will impact ISB and prepare for them. In the next year, we will begin to use leading scientific information such as the water predictions from the World Resource Institute's Aqueduct Water Risk Atlas to help us complete this process.



WRI's Aqueduct tool to help us understand how climate change will impact flood risk and the water supply.

DESIGN

CAMPUS

Commitment to

Responsible campus design that minimizes negative impacts on the local community.

Commitment to

Enhance student and staff wellbeing and productivity through incorporation of biophilia into campus design and subsequent ISB strategic planning processes.

In summer 2019, ISB installed a new front facade. With wood paneling and natural color highlights, this new facade is biophilia in action - the need to experience and love nature - which studies have shown to improve student and employee performance and well-being.

Students are conscious of the impact of having nature in their learning environment plays. Multiple groups of high school students took it upon themselves to investigate the possibility of a living green wall within the school. These students identified plants, designs, and potential vendors. ISB leadership is looking forward to hearing their final proposal as we believe the project has the potential to make a significant positive impact on our community.



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ISB's New Building Facade

DESIGN

CAMPUS

Target

Electrify 75% of maintenance equipment by 2025; 100% by 2030.

Standard

Develop Sustainable Landscape Guidelines to outline methods to review, discuss, and decide how best to maintain or improve campus landscape space from an ecological, functional, and aesthetic perspective.

Commitment to

Enhance student and staff wellbeing and productivity through incorporation of biophilia into campus design and subsequent ISB strategic planning processes.

In fall 2019, ISB established a Landscape Working Group with representation from students, staff, and administration. This Group will provide advisory support as we move forward.

Angela K. ('21) a member of the Net Impact ISB club, expressed interest in establishing a community garden. This past year she conducted desktop research, visited Keystone to tour and talk with their community garden leader, and prepared a proposal for school leadership. We are currently evaluating locations on campus for the community garden.



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Angela K. ('21) visits Keystone Academy to learn about their community garden

OPERATIONS

CAMPUS

Goal

Achieve LEED Operation + Maintenance certification by [year to be determined by 2020] at Silver level or higher.

Standard

Develop ISB Green Cleaning Standard by 2022.

Commitment to

Develop best practice guidelines for managing and operating buildings and capital goods in excess of 500,000 RMB in a sustainable and energy-efficient manner in order to assist in achievement of sustainability-related targets, standards, and commitments.



BEGINNING	APPROACHING	MEETING	MASTERING
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In 2019 we began the process of setting expectations around building operation practices, what metrics we are hoping to track, and how they relate to LEED Operation + Maintenance credits.

CONSTRUCTION

CAMPUS

Standard

Develop ISB Green Building Standards by 2020, reviewed and revised every four years.

Commitment to

All significant standalone new construction to achieve LEED certification at Silver level or higher.

Commitment to

Prioritizing sustainable design elements determined by research to have a positive impact on student and staff wellness and academic learning and performance.

Research is growing around the connection between learning capabilities/wellness and biophilic building/space design. The scientific consensus thus far shows that how you build spaces has a significant impact on learning. The research findings center on five design choices rooted in sustainability building thinking:

- Natural light
- Noise - specifically the minimization of outside sources and reverberation within the space
- Inclusion of natural elements
- What colors and how they are used
- Indoor air quality

During summer 2019, ISB and Sodexo added sound dampening tiles into the cafeteria to lower reverberation within that space.

This sustainable building thinking was incorporated into our now completed new building spaces as seen through the use of color and abundance of natural light.



BEGINNING	APPROACHING	MEETING	MASTERING
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Natural light floods into our new building.

TRANSPORTATION

CAMPUS

Target

Electrify 75% of bus and taxi fleet by 2025; 100% by 2030.

Commitment to

Reduce emissions of harmful vehicle-related air pollutants within the community and particularly on campus.

In spring 2019, ISB worked with its bus partner to expand the usage of electric buses from two to 27. This represents 50 percent of our bus fleet today. Researchers have indicated noise and air pollution lower student performance. We believe the shift from diesel to quiet and air pollution free buses provide a higher quality of learning for our students.

Students were instrumental in our shift towards electric buses. Read more about how they electrified their transportation [HERE](#).



BEGINNING	APPROACHING	MEETING	MASTERING
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Clean emission-free transportation for our students and staff

Learn more about how we made the transition and lessons learned along the way. Read our **ELECTRIC BUS CASE STUDY**

CASE STUDY: ELECTRIC BUSES

CAMPUS

In 2017, three students created a plan to lower the impact of the buses they rode each day. By 2018, the International School of Beijing (ISB) had added two electric buses to learn more about their operation. In the fall of 2019, ISB added 25 more zero-pollution electric buses, representing half of our fleet.

The steps ISB took to go from 0 to 27 electric buses in a span of 2 years.

Step 1: Daily Bus Travel Distance

Battery range remains the largest limitation to the roll out of electric buses. Understanding what the daily travel distance is for each bus will support determining which routes are electric capable. At ISB our students took the lead to reviewing bus route information and calculating these daily distances.

Step 2: Research Available Electric Buses

Battery technology is rapidly evolving with more manufacturers jumping into the electric bus market. The intent of this step is not to select a bus for your school, but to understand what rated ranges are available for the bus types your school uses.

Step 3: Determine Worst Case Rated Range

Actual range is often lower than the rated range provided the manufacturer. Here are the factors ISB applied in our calculations:

- 0.7 to rated range calculated using the NEDC (New European Driving Cycle) standard, which remains common in China
- 0.76 for operation on the coldest days here in Beijing
- 0.8 for typical 5-year battery degradation
- 0.95 for when routes are longer to avoid accidents
- 0.95 safety factor for traffic and other conditions

As an example, a bus with a manufacturers rated range of 200 km would have a worst case actual range of 77 km.

Step 4: Identify Routes that can be Electrified

Combine the information gathered in Steps 1 and 3 to determine routes that can be serviced with an electric bus.

Step 5: Start with a Pilot

Our #1 goal was to not negatively impact bus service to staff and students. As electric buses were new to our bus fleet teams, we elected to pick two routes to pilot their use for a year. This allowed our teams to learn more about the technology and develop a charging strategy (i.e. are their sufficient chargers available locally or will we need to install chargers on campus).

Step 6: Full Scale Roll Out

After a successful pilot ISB was ready to go full scale. In our vendor bid request we created a matrix of electric/diesel buses mixes based on a few electric bus rated range scenarios. Our findings from the bid:

- All vendors have access to buses with at least 200 km of rated range
- Electric versions of small (22 - 25 seaters) motor coaches ranged from 5% to 27% more expensive
- Electric versions of large (45+ seater) motor coaches ranged from 12% cheaper to 4% more expensive.

As battery technology advances we expect electric bus range to increase and pricing to become even more competitive.



IMPACT DATA

As part of ISB's commitment to transparency, below is a compilation of environmental, social and governance indicators. All reported values represent best available data at the time of publication. Data may be adjusted in the future to incorporate updated methodology, structural changes, and/or minor corrections. Additional detail on these changes is included as footnotes where applicable. Environmental Data is based on the calendar year. Students and staff data values are from that year's ISB Annual Report.

	Units	2019	2018	2017
Students (EY3 through Grade 12)	#	1784	1722	1619
Staff	#	418	399	363
Student-Driven Sustainability Projects Implemented	#	2	2	0
Staff Recognized as Sustainability Change Agents	#	6	0	0
Students Making an Impact News Articles	#	3	1	0
Scope 1 - Direct Emissions ¹	MTCO2e	3415	3728	3465
Scope 2 - Purchased Electricity ²	MTCO2e	10118	10437	10922
Scope 2 - Electricity (default supply) ²	MTCO2e	10118	10437	10922
Scope 3 - Fuel- and Energy Related Activities ³	MTCO2e	682	703	726
Scope 3 - Waste	MTCO2e	68	68	67
Scope 3 - Business Travel	MTCO2e	1319	1485	1646
Scope 3 - Employee Commuting	MTCO2e	3163	2977	2708
Total Greenhouse Gas Emissions (Scope 1+2+3)	MTCO2e	18764	19396	19533
Total Energy Use	MWH	27166	29130	28213
Electricity - Buildings	MWH	10268	10771	11283
Electricity - Buses	MWH	184	11	0
Natural Gas / Diesel / Petrol	MWH	16713	18348	16930
Renewable Energy Use	MWH	0	0	0
Percentage of Renewable Electricity	%	0	0	0
Percentage of Bus Fleet Electrification	%	50	4	0
ENERGY STAR Score	1 to 100	10	7	6
Water Withdrawal	Cubic Meters	94060	84670	82477
Waste Landfilled/Incinerated	Metric Tons	116	113	114
Waste Recycled	Metric Tons	5	7	7
Waste Composted	Metric Tons	<1	1	0
Waste Generated per Student	kg / student	0.065	0.066	0.070
Compost and Recycling Rate	%	4	6	6

Footnotes:

- 1.) Direct emissions means emissions that are in our direct control. This includes the natural gas we burn in our boilers, the diesel in our buses, and the refrigerants released from our chillers.
- 2.) Best practice is to report the emissions from electricity in two ways. The first is based on who you buy your electricity from, which could be from a wind or solar farm, resulting in no emissions; this is called the market method. The second is based on where you are and the average emission impact of the electricity in the region; this is called the location method. The intent of showing both is to understand the impact of your electricity purchasing decisions.
- 3.) Fuel- and Energy Related Activities refers to the emissions associated with extracting, processing and transporting the energy consumed, whether it be coal, natural gas, or oil. MTCO2e = metric tons of carbon dioxide equivalents. All greenhouse gases have different global warming potentials; to determine the carbon dioxide equivalent of methane (CH4) for example, you would multiple the emissions by its global warming potential of 28.

TAKE HOMES FOR OUR PEERS AROUND THE WORLD

The International School of Beijing (ISB) challenges our APAC and EARCOS peers to rise to the greatest challenges of our lifetime - as outlined by the UN Sustainable Development Goals. Here are a few major action you can take home to your school to begin or further your own journey.

	EFFORT	COST	IMPACT	STUDENT OPPORTUNITIES
<p>Create a Strategy or Roadmap</p> <p>How to get started? Look at example frameworks such as ISB's, Harvard's, and Compass Education. If you do not have someone on staff with sufficient experience, you may need to look for external support or alternatively, use the free maturity model guidance provided by Decoding Sustainability that can be used in tandem with Compass Education's self assessment tool.</p>	+++++	+ TO ++++	+ (directly) +++++ (indirectly)	+++
<p>Baseline Your Environmental Impact</p> <p>How to get started? There are a number of guidance documents online for conducting waste audits at schools, which represents the bulk of the effort and student involvement. Energy and water data should be available from your facilities department and can be input into online tools like the USEPA's ENERGY STAR PORTFOLIO MANAGER. Calculating your total greenhouse gas emissions can become a bit more technical, although tools exist online to help you in most regions</p>	+++	+	+	+++
<p>Create a Recycling System</p> <p>How to get started? Take a look at our case study in this Report. Our biggest caveat is to not lose sleep over the system not working perfectly. No amount of training and awareness campaigning can overcome the degree of personal responsibility required for 100 percent compliance. That said, the opportunities for students to engage in the creation and subsequent awareness building is only limited by your creativity.</p>	++++	+++	++	+++++
<p>Renewable Electricity</p> <p>How to get started? Take a look at our case study in this Report for purchasing renewable energy certificates. There are two approaches a school can take to renewable electricity; 1) purchasing renewable energy certificates, which is low effort, low cost, high impact, but minimal student involvement, OR 2) go for on-site solar / wind, which can be high effort and cost while providing a number of creative student opportunities. On-site renewables will require outside expertise and considerable planning.</p>	+ OR ++++	+ OR ++++	+++++	+ OR ++++
<p>Electric Buses</p> <p>How to get started? Take a look at our case study in this Report. While ISB found there to be no cost differential between electric and conventional buses, this will vary vendor to vendor, region to region based on government incentives and maturity of electric bus manufacturers and charging infrastructure.</p>	+++	+ TO ++++	++++	++

[free maturity model guidance provided by Decoding Sustainability](#)
[Compass Education's self-assessment tool](#)
[USEPA's ENERGY STAR PORTFOLIO MANAGER.](#)

	+	++	+++	++++	+++++
EFFORT	<10 hours	20 hours	50 hours	100 hours	>200 hours
COST	<5,000 USD	10,000 USD	20,000 USD	50,000 USD	>100,000 USD
IMPACT (trees planted)	<10 trees	100	1,000	10,000	>100,000
STUDENT ENGAGEMENT	Minimal	Single instance topic; grade level limited	Single instance across all grade levels	Ongoing topic; grade level limited	Ongoing across all grade levels