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# **Ten Tonne Plan: Education for Sustainability From a Whole Systems Thinking Perspective**

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## **Abstract**

The *Ten Tonne Plan* is a greenhouse gas emissions reduction initiative that aimed to reduce school emissions by 10 tonnes (metric tons) in one year. A case study was conducted on the impact of this initiative at a primary school in Western Australia. Research investigated student, staff, parent, and community partner perceptions following participation. Results showed the school achieved its goal through the implementation of a variety of environmental and social actions undertaken by the whole school community. Findings identified strengths and weaknesses of the initiative. The *Ten Tonne Plan* provided a model that is applicable in a variety of school settings.

## **Introduction**

Education for sustainability (EfS) has a vital role to play in equipping citizens for environmental and social change (Australian Research Institute for Environment and Sustainability [ARIES], 2009; Fien, 2001; Fien & Tilbury, 2002; Tilbury, Coleman, & Garlick, 2005). Consequently EfS is an important component of the Australian Curriculum, which supports learning for all Australian students from Foundation to Year 12 (Australian Curriculum, Assessment and Reporting Authority

[ACARA], 2013). One of the three cross-curriculum priorities of the Australian Curriculum is Sustainability, which reflects the importance of this issue (ACARA, 2014a).

Sustainability facilitates the development of knowledge, skills, values, and world views essential for students to act in ways that lead to more sustainable patterns of living (ACARA, 2014a). “The Sustainability priority is futures- oriented, focusing on protecting environments and creating a more ecologically and socially just world through informed action” (ACARA (2014a, p. 1). The overarching organizing ideas for the Sustainability cross-curriculum priority are systems, worldviews and futures (ACARA, 2014a). These ideas are embedded in the *Ten Tonne Plan* initiative implemented at an independent public school in the Perth metropolitan area of Western Australia.

The *Ten Tonne Plan* aimed to bring together the whole school community to reduce Green House Gas (GHG) emissions (Australian Bureau of Statistics [ABS], 2013) by ten tonnes in one year.

Flannery (2010, p. 198) explained why such action is essential:

For the first two hundred years following the industrial revolution emissions increased on an average of 2 per cent per year, but since 2000 they have increased by an average of 3.4 per cent per year, a rate that is driving atmospheric CO<sub>2</sub> levels beyond the worst case scenario of the IPCC (Intergovernmental Panel on Climate Change) projections. One of the most worrying aspects ... is confirmation that we had ample warning but did not respond.

The *Ten Tonne Plan* is a local school community response to this urgency. The initiative was implemented in 2011 and coordinated by the school's cross-curriculum coach, then evaluated the following year by a research team based at Murdoch University (Western Australia). This article reports the findings of that research, which are not only applicable to the case study school but to all schools engaged in EfS programs.

## What is the Ten Tonne Plan?

The *Ten Tonne Plan* is a whole school, whole systems thinking approach to EfS. It links directly with the various components of the Australian Sustainable Schools Initiative - Western Australian (AuSSI-WA) framework, specifically the ecological footprint and social handprint (DoE, 2014). The ecological footprint is a measure of the impact humans have on the Earth's ecosystems. The “toes” of ecological footprint address sustainability issues related to waste, biodiversity, air quality, energy, and water, involving a range of EfS programs including Waste Wise, Nearer to Nature, TravelSmart, EnergySmart, and Waterwise (DEC 2013; DoT, 2014; Water Corporation, 2014). The social handprint is a measure of action that is directed to decrease the ecological footprint and make the world more sustainable through actions that enhance student well-being, economics and the built environment, community partnerships, cultural and social diversity, and indigenous cultures. School EfS programs that relate to the social handprint include, for example, Solar Sister (2014), KidsMatter (2014), Harmony Day (DoIC, 2014), and National Aborigines and Islanders Day Observance Committee Week (NAIDOC, 2014). These diverse programs were uniquely interconnected in the *Ten Tonne Plan* and linked together to achieve the ten tonne target.

The initiative involved the whole school community engaging in numerous environmentally friendly behaviors working towards a common goal of saving 10 tonnes of GHG emissions. Actions including composting, worm farming, tree planting, utilizing solar power, walking and riding bikes to school instead of being driven to school, and installing rainwater tanks, all contributed reductions in GHG emissions. A community partnership with a local lawn mowing business involved recycling lawn clippings in the school's compost program rather than clippings going to landfill. Another partnership involved supporting the international Solar Sister (2014) solar lantern program, in which polluting kerosene lanterns in Uganda were replaced with solar lanterns, through funds raised at the school's Harmony Day (DoIC, 2014) celebration (Fig. 1).

To link all the different programs and actions together and calculate GHG emission reductions, the school was supported by a local association called Maia Maia Emissions Reduction Currency System

(Maia Maia Project, 2012). This group of community volunteers provided implementation support for the Plan, shopping vouchers (known as boyas) and professional environmental accounting services to calculate GHG emissions related to tree planting, composting, and so on. The various sustainable actions were acknowledged and rewarded by distribution of boyas (Fig. 2). Boyas were traded, saved, or used in particular contexts, both at school (for example, fetes and market day stalls) and in the wider community (such as the Hulbert Street Fiesta in Fremantle, Western Australia).

A wide range of strategies were employed to facilitate communication within and between different stakeholder groups. Strategies included, for example, project developments published on the school Web site, regular student–staff and staff–partner meetings, project posters displayed around the school grounds, items at school assemblies, regular staff professional learning sessions that included project updates, and newspaper articles about the project. In brief, stakeholder leaders attempted to maintain strong, open, communication channels.

This initiative was innovative, unique and timely because it sought to demonstrate the application of “systems thinking” in EfS. Typically, school sustainability projects have been implemented in silos with, for instance, one teacher taking on Waste Wise responsibilities and another EnergySmart (Lewis, 2012). This contributes to students developing fragmented understandings of sustainability issues, rather than embracing a whole systems thinking approach that highlighted the myriad of interconnections impacting on an issue (Eames, 2010; Lewis, 2012; Sterling, 2008). The *Ten Tonne Plan* initiative explicitly brought together a wide range of sustainability activities and demonstrated how they impacted on GHG emissions.

In summary, the dynamics of the school were characterized by being an independent public school that was an active member of AuSSI-WA. School management encouraged distributed leadership and cooperative staff relationships, in addition to parent and wider community involvement in school endeavors. Furthermore, school leaders recognized the importance of systems thinking and real world links in education, and implemented a communication plan to facilitate such understandings. These features of the school supported the adoption of the innovative *Ten Tonne Plan*.

## Research aim and methodology

By conducting a case study at one school, catering for 350 students, the research aimed to identify outcomes achieved by the *Ten Tonne Plan*, from the perspectives of different stakeholder groups.

Participants included the school principal, staff, students, parents, and community partners.

The total participant population was 75, consisting of:

- Students ( $N = 42$ ; ~12%) ranged in age from five to 12 years: Preprimaries ( $N = 3$ ), Grades 1–3 ( $N = 9$ ), Grades 4–5 ( $N = 15$ ), and Grades 6–7 ( $N = 15$ );
- Staff ( $N = 11$ ; ~50%) included teachers (8), education assistants (2), and other (1);
- Parents ( $N = 19$ ; ~17% of families); and
- Partners ( $N = 3$ ).

Ethics approval was obtained from Murdoch University and the Western Australian Department of Education. Formal written consent from parents was obtained for all student participants. In the case of adult participants, return of completed surveys indicated implied consent as response was completely voluntary. All data was de-identified so participants remained anonymous.

Three data collection methods were employed:

- Document search: analysis of project documents (school Web site, school policy, etc.);
- Interview: of the school principal and school project coordinator (cross-curriculum coa-ch);  
and
- Survey: of the four major stakeholders.

Data analysis focused on providing evidence related to project outcomes. Results of this analysis are presented in four main sections, corresponding to the stakeholder groups: students, staff, parents, and partners.

There are two main limitations to this study: sample size and case study method. The sample size of the different categories of the participant population was relatively small, so the results may have limited generalizability beyond the target population studied. The second limitation, case study as a research method, relates particularly to reliance on subjective comments. A range of techniques were employed to minimize the shortcomings of the present research. These included using cyclical processes which facilitated researchers to continually test ideas in action, asking for critical feedback, and conducting member checks (Cresswell & Plano Clark, 2007). In addition, the mainstreaming of AuSSI-WA extends the applicability of the findings, as many other schools are involved in a wide range of ecological footprint and social handprint actions (DoE, 2014).

## **Results and discussion**

### **Students**

All student participants agreed the *Ten Tonne Plan* was a good idea, and referred to a wide range of sustainability activities in which they had participated. Students were able to explain what they learned. See Table 1 for typical student responses.

From a student perspective, progress in achieving the ten tonne goal was measured using a scale involving 10 cans on a decorated board, called the Upside Down Thermometer (Fig. 3). Each can represented one tonne of GHGs. Cans were removed from the board as the school moved towards attaining its goal. Students and community members were acknowledged for their positive actions through distribution of boyas. Most students (86%) liked being rewarded with boyas for their sustainable actions, stating for example, “Yes. Because we can use them at community events to buy things and they motivate us to save carbon.”

Finally, after achieving the *Ten Tonne Plan*, students wanted another, bigger goal. Fifty percent of children preferred the next goal to be 50 tonnes, 30% 100 tonnes and approximately 7% each wanted 20 tonnes, 75 tonnes or “other.” Clearly, students were keen to continue with the initiative.

## Staff

Staff participants agreed the *Ten Tonne Plan* made an important contribution to students' education, with a representative statement being, "Absolutely! Citizenship and help them to make responsible choices. It is critical to help shape the minds of our most important resource, our children, for a better and stronger future." Table 2 presents typical staff responses on the benefits of the initiative.

All staff identified strengths in how the plan was implemented. School leaders were the only staff to also identify challenges. Three key challenges were:

- Embedding EfS: "Depth of in-class engagement with the initiative – opportunities to embed in a range of learning areas not taken up."
- Understanding whole systems thinking: "Need to enhance staff understandings about whole systems thinking."
- Communication: "Currently using a range of strategies but these are not very effective."

Embedding EfS into learning areas is an extremely important issue as Australian schools progressively engage with the new Australian Curriculum and the Sustainability cross-curriculum priority. Embedding EfS into learning areas where there is a natural fit is a broader challenge identified by other researchers in this field. For example, Littleddyke, Taylor, and Eames (2009) recognized the dilemma facing teachers in terms of the perceived constraints of curriculum emphases inhibiting the development of EfS in classrooms. These authors prepared their textbook to show how EfS may be integrated across all learning areas of the primary curriculum, so that state and national teaching requirements could be addressed, along with enacting EfS in "relevant, meaningful, enjoyable and creative ways" (Littleddyke et al., 2009, p. xi).

The *Ten Tonne Plan* is a practical and engaging example of EfS integrated across the curriculum. For the implementation of the *Ten Tonne Plan*, the scope and sequence for EfS in the case study school linked directly with the Australian Science Curriculum (ACARA, 2014b):



- Biodiversity: K–Grades 1&3 (e.g., ACSSU002, ACSSU017, ACSSU211, ACSSU044, ACSHE013, ACSHE021)
- Water: Grade 2 (e.g., ACSSU032, ACSHE022)
- Purchasing and Waste: Grade 4 (e.g., ACSSU075, ACSHE062)
- Air and Transport: Grade 5 (e.g., ACSSU077, ACSHE082, ACSHE217)
- Energy: Grade 6 (e.g., ACSSU219, ACSHE099, ACSHE100, ACSHE220)

This is illustrative of the potential depth for embedding the Sustainability priority. However, it appeared there was still a way to go in mainstreaming this outcome because staff varied in their depth of engagement with EfS issues. Some were actively involved, for example, they embedded EfS into several learning areas, distributed boyas following observation of children demonstrating sustainable behaviors, and ensured worm farms were maintained. Other staff provided less active support, such as releasing students from class to participate in lessons about the project conducted by the cross-curriculum coach. This variability in depth of engagement has also been reported by other researchers (Lewis, 2012; Pepper, 2007; Salter, Venville, & Longnecker, 2011). Staff required additional support to embed sustainability issues through, for example, professional learning opportunities, in-class teacher modelling, and performance management accountability to enhance integration of EfS, and the GHG emissions reduction plan in particular.

Staff understandings and application of whole systems thinking was identified as an area of weakness in relation to the implementation of the *Ten Tonne Plan*. Other researchers have reported similar concerns in different contexts (Sterling, 2003, 2004; Tilbury et al., 2005). For example, Sterling (2004, p. 81) Staff required additional support to embed sustainability issues through, for example, professional learning opportunities, in-class teacher modelling, and performance management accountability to enhance integration of EfS, and the GHG emissions reduction plan in particular.

Staff understandings and application of whole systems thinking was identified as an area of weakness in relation to the implementation of the *Ten Tonne Plan*. Other researchers have reported similar

concerns in different contexts (Sterling, 2003, p. 52) maintained educators need to work for change in the dominant education paradigm, with an emphasis on the whole; they need to embrace an approach that is “holistic, organismic and ecological.” Other recent publications in EfS have recognized the importance of systems thinking in the context of a growing awareness of the vital contribution the approach is progressively making (Babiuk & Falkenberg, 2010; Jones, Selby, & Sterling, 2010; Littledyke & McCrea, 2009). Furthermore, the Australian Government's National Action Plan for EfS acknowledges the critical role of systems thinking (DEWHA, 2009). This document identifies “systems thinking” as one of seven key principles of EfS, stating it “... aims to equip people to understand connections between environmental, economic, social and political systems” (DEWHA, 2009, p. 9). However, applying systems thinking can be complex, and the present research, in agreement with other studies (Henderson & Tilbury, 2004; Littledyke et al., 2009), found further professional learning and support for teachers in relation to whole systems thinking was warranted. In summary, staff were positive about the initiative and unanimously recommended implementing a *Fifty Tonne Plan* the following year. They made numerous suggestions for improvements and other comments about the sustainability initiative, such as:

- “It's a fabulous initiative and needs to be shared with other schools. It's something to be very proud of.”
- “I think the program is running well... It has been great to have students go out to do gardening in small groups with an adult.”
- “It would be fabulous to see more teachers integrating it into their daily practice.”

Overall, staff were supportive and valued the project. The communication challenge will be discussed in the next section.

## **Parents**

Parent participants expressed enthusiasm about the *Ten Tonne Plan*. The majority of parents (84%) stated they had contributed to the *Ten Tonne Plan* by participating in gardening, recycling, or

TravelSmart activities. Table 3 presents typical quotes from parents about their perception of the initiative.

Parents also identified strengths and weaknesses of the initiative, as shown in Table 4. For example, the project positively set the school apart from other schools and provided a model for other schools to follow, then, despite the variety of communication strategies adopted, some parents reported a lack of information about the project. Overall, however, parents expressed strong, supportive views about the *Plan* and outlined ideas for the following year.

Communication was a challenge identified by numerous staff and parents. Although a range of communication strategies were employed as outlined earlier, some participants did not find them effective. Other researchers have similarly found communication in sustainability contexts to be complex and problematic (Blair, 2008; Djordjevic & Cotton, 2011). It is therefore recommended that future projects arising from the *Ten Tonne Plan* initiative develop a comprehensive communication plan drawing on research findings, incorporating: inclusion of different strategies such as the hook and ladder technique; consideration of the economic, cultural and technological characteristics of the target groups; and monitoring and evaluation tools (Araz, Matulac, & Muhammad, 2006; Blair, 2008; Djordjevic & Cotton, 2011; UNEP, 2005).

## **Partners**

Survey responses were received from *Ten Tonne Plan* partners. All agreed EfS was important. As one respondent stated:

Our civilisation is on a dangerous trajectory with unsustainable consumption of and reliance upon limited natural resources, strained planetary and local ecological systems, and a still growing population. It is of critical importance that the whole society learns about sustainability quickly, and since children have been getting a relatively more comprehensive education on sustainability, there is a need for them to learn to become leaders in educating the community. This requirement is perhaps unprecedented but is reflective of the urgency of the situation. The benefit for children is that it could lead to a unique sense of empowerment.

Other authors similarly argue passionately for EfS and the vital need for urgent action (Diamond, 2005; Flannery, 2005, 2010; Littledyke et al., 2009). For example, Littledyke et al. 2009, pp. x-xi) state “Our planet is sick ... Education for Sustainability must be a major priority for planet Earth and its people.” Clearly the school's partners were keen to contribute to EfS action.

It is clear from the foregoing partner statement why community members were involved in the initiative in a voluntary capacity. Other researchers have similarly reported notable examples of the effectiveness of community partnerships for successful EfS outcomes (Blair, 2008; Collier & Smith, 2009; DEWHA, 2010; Henderson & Tilbury, 2004). Partners also identified the benefits, strengths, and weaknesses of the initiative, with representative feedback summarized in Table 5.

## **Conclusions**

The goal of the *Ten Tonne Plan* was achieved, specifically, the reduction of GHG emissions by 10 tonnes in one year. This unique and timely initiative was shown to be an effective strategy for bringing together the whole school community in a whole systems thinking approach. This approach addressed some of the “silo” concerns researchers identified in relation to EfS in schools. It demonstrated how the sustainability cross-curriculum priority could be embedded in the Australian Curriculum, as well as highlighted interrelationships between the AuSSI-WA ecological footprint and social handprint. The study also identified several challenges for the initiative and some suggestions were outlined that may address these issues. It is vital that future school GHG emission reduction plans are evaluated to determine the effectiveness of the proposed embedding, whole systems, and communication enhancements.

In conclusion, the *Ten Tonne Plan* model provided a structured means to achieve a wholistic approach to EfS in schools. Indeed, the case study school achieved a *Fifty Tonne Plan* during 2012 and subsequently consulted with the community to determine the next target, which was set as a *One Hundred Tonne Plan*. Within the previously discussed limitations to this research, sample size and case study method, this model may be adapted to suit other contexts, especially in educational settings

that have the same EfS emphasis as the case study school. A 10, 20, 50, or 100 tonne plan could be implemented based on each school's context, including dynamics, curriculum, enthusiasm, and resources. Finally, other primary and secondary schools in Perth, Western Australia, are currently implementing their own emission reduction plans, providing further evidence of the initiative's success.

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Fig. 1 Global perspective linking the school and partners Maia Maia and Solar Sister (Maia Maia Project 2012).





Fig. 2 Boya meanings (Maia Maia Project 2012).

## *About a Boya*

The Serial Number of each note is calculated to represent the amount of temperature reduction achieved by removing the equivalent of 10 Kilograms of CO<sub>2</sub>.



Maia Maia was gifted the name of BOYA by a traditional Australian Elder. A "Boya" is a stone used in trade among Indigenous Australians for necessities like water rights.



**The story, the symbolism, the significance.**

The face of the note depicts a dynamic background featuring wave and wind energy. There are symbols denoting water, waves, wind and recycling.

Maia is the the eldest sister of the Pleiades and has a significant role in Greek mythology. She is the daughter of Atlas, who holds up Earth and a sister of the seven. She is also the mother of Hermes, god of stories and communication and the wife of Zeus, god of Energy. She is also the controller of stars, the base, mother of weaving and handicrafts. The Pleiades also figures in the Dreamings of several language groups. For example, in the central desert region, they are said to be seven sisters fleeing from the moonbeam, mistress of a man, represented by some of the stars in Orion. The close resemblance of this to Greek mythology is believed to be coincidental.

The purpose of the Boya is to tell the story of a community, its efforts and engagement in aiding the environment. Each Boya record together the success of their projects or goals attained. And as the Boya circulates through the wider community the story is told and spread. The message spreads like ripples in a pond.

The QR (Quick Response) code gives instant access to rich online content via hand held devices such as smartphones and smart phones. It can show a movie or link directly to the story of each Boya.

**The atmosphere connects us all**

Fig. 3 Measuring progress with the Upside Down Thermometer (Maia Maia Project 2012).

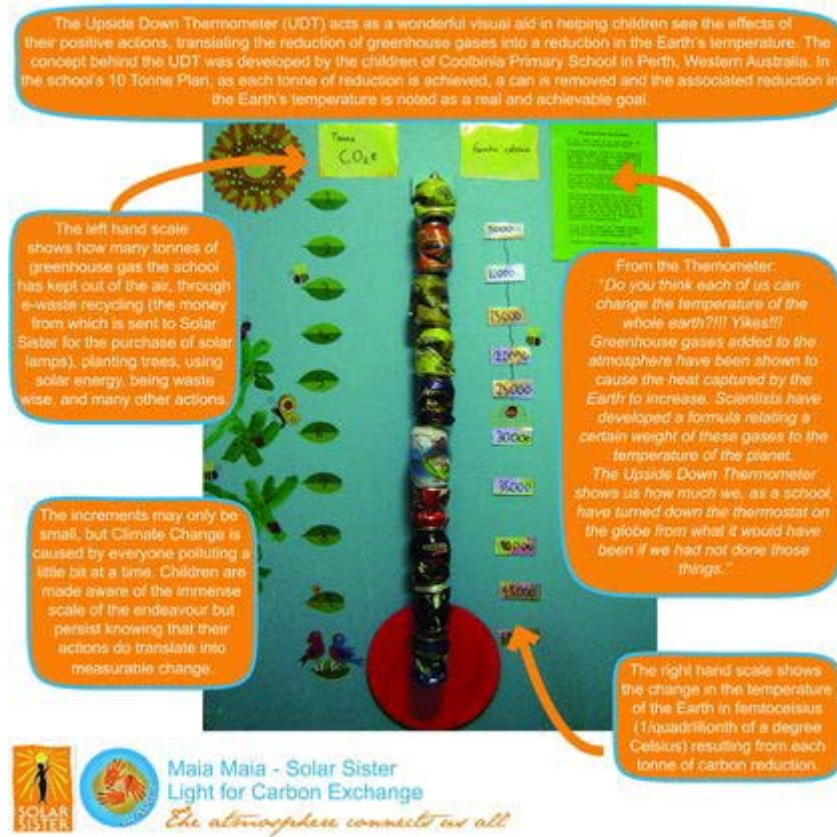


Table 1 Student perceptions of the *Ten Tonne Plan*

Year level	Learning	Learning influencing school behavior	Learning influencing home behavior
Preprimary	“Learnt about rubbish, plastic bags being eaten by turtles.”	“Recycling bricks for garden footpath.”	“Careful about rubbish at home. Got my own carrots at home.”
Grade 1–3	“I have learnt how to look after plants better and why they are important to the earth and greenhouse gases.”	“I put my rubbish in the bin. I recycle more papers.”	“I help grow homemade veggies and I turn the TV and Wii off by myself (saving electricity).”
Grade 4–5	“That recycling is good to help with the environment and if you set a goal you can always accomplish it.”	“Yes because if you are just about to put an aluminum can in the bin you will now stop and think—the can crate will be a better place!”	“I am more careful to turn off the lights and had a competition with our aunty to see who could turn on the gas heater last.”
Grade 6–7	<p>“To recycle more than just cans and food. To be travel smart.”</p> <p>“To do things helping the environment e.g. use solar panels, use water tanks, recycle cans. How much CO2 we actually let go into the atmosphere.”</p> <p>“It has made me think about ways I can help the EARTH!”</p>	<p>“Yes, because I now ‘think’ before I ‘do,’ for example, I think before I put rubbish in the bin.”</p> <p>“Yes, because I have learnt more about the ways that are good to save carbon and the ways that aren’t.”</p>	<p>“Yes at home I recycle all my paper and cardboard and I try and walk and catch the bus as much as I can.”</p> <p>“Yes because I take shorter showers now.”</p> <p>“Yes we have a veggie patch and some fruit trees—apple, orange, peach and lemon.”</p> <p>“Yes I put food scraps in the compost bin.”</p>

Table 2 Staff perceptions of the *Ten Tonne Plan*

Benefits of Plan on students	Learning influencing school behavior	Learning influencing home behavior
<p>“Yes they are definitely more aware of their actions.”</p> <p>“Satisfaction of meeting goals and making a difference.”</p> <p>“Yes they are very conscious of recycling and making sustainable choices.”</p> <p>“Yes it has helped them think more globally.”</p>	<p>“Practical application, hands on experience of a concept that is quite abstract.”</p> <p>“It gives a focus to teaching and offers a plan of implementation and sequence so children will have been exposed to many different aspects of sustainability.”</p> <p>“It was a visible/measurable way of seeing the difference we can make.” “Whole school focus and participation in the program brings everyone on board.”</p> <p>“Reminds students about regularly doing these things. See progress–record of achievement.”</p> <p>“Makes them think more globally/impact of their actions.”</p>	<p>“Yes, recycling aluminum cans ... not thrown in the bin but collected for recycling.”</p> <p>“For us we now have a more considered plan for recycling. We have three compost bins on the go and have made significant changes to how we use our air con and how much water we use.”</p> <p>“Not sure—I hope so.”</p>

Table 3 Parent perceptions of the *Ten Tonne Plan*

Importance of sustainability program	Benefits of Plan on students	Learning influencing home behavior
<p>“Yes definitely. In a world of diminishing resources and increasing populations it is a necessity that our children learn about sustainability and what they can do too as individuals for the long term benefit of our planet.”</p> <p>“Yes. Making positive choices in the future to help with looking after the ‘place they live.’ Being responsible for the management of our environment and being aware.”</p> <p>“Yes, very important that children know what is going on and things they can do to reduce their impact.”</p>	<p>“Yes, it has broadened the conversation that is started at home. More meaningful, and it is beyond what mum and dad babble about!!”</p> <p>“Yes. A hands-on approach making it more real for my children and therefore being aware of reducing greenhouse gas.”</p> <p>“Yes. Increasing awareness of the environment, consumption, recycling and how it is part of life.”</p> <p>“Yes, more awareness of how the carbon footprint is affected; including measuring the trees, walking instead of driving, recycling and community.”</p> <p>“Yes—it is a fun way in which the children can learn about their environment and hopefully learn how to make the world a cleaner place.”</p>	<p>“Recycling/reusing more often.”</p> <p>“More interest in our compost heap.”</p> <p>“Walk to school more; recycle more; have started own veggie garden.”</p> <p>“Yes they have learned lots about environmental impact and have changed habits.”</p> <p>“Yes the children are more proactive with sustainable issues and energy saving.”</p> <p>“Yes, saving water, switching lights off, recycling.”</p>

Table 4 Parent perceptions of the strengths and weaknesses of the Ten Tonne Plan

Strengths of Plan	Weaknesses of Plan	Suggestions for next Plan
<p>“Sets school apart from other schools. It is a whole approach and not just one-off lessons—so children get a strong feel about all that can be done (in-built).”</p> <p>“It is great for our kids to be spending time together as a group to work on the <i>Ten Tonne Plan</i> and come up with ideas that they see through together. Also a great opportunity for the children to share their differing knowledge with their peers.”</p> <p>“Our school set an example for other schools to follow, making the children aware of this very important issue.”</p> <p>“Helping to educate the children, parents and others in the school community.”</p> <p>“Engagement.”</p> <p>“Whole school commitment and something visual for the teachers. Having a goal that is achievable. Creates discussion at many student levels.”</p> <p>“Making our children aware they are part of a global community.”</p> <p>“Normalises the sustainability activities.”</p>	<p>“Very slow to get started, and some teachers embraced it more effectively than others. There are many opportunities for extending the conversation in class that do not seem to be taken.”</p> <p>“Needs more community involvement. Not ‘visible’ enough to parents/visitors walking through the school ... I think the posters are a good idea, but not working yet. Artworks are looking great ... and declare an interesting and vibrant place. Love the connection with Sir David Brand [School] and Solar Sisters—don't think everyone knows about it though.”</p> <p>“More information out to the wider school community.”</p> <p>“A difficult job! Perhaps more education for parents.”</p> <p>“Wider access to school community. Increased signage around the school.”</p> <p>“No, I can't think of any weaknesses.”</p>	<p>58% 50 Tonne Plan 42% 100 Tonne Plan</p> <p>“Employ the sustainability officer for more time to enable further implementation of projects. Encourage more parents to be involved. Keep up the fantastic work!”</p> <p>“I think it would be great to advertise to parents/carers/students at the start of the year what our sustainability practices are, maybe by compiling a Top 10 list of things we have all agreed as a community to do and circulating this to participants so they know exactly what they can individually do to contribute, e.g., no plastic bags, lunches packed without the use of gladwrap type products, recycling stations for batteries, printer cartridges, cans.”</p>

Table 5 Partner perceptions of the benefits, strengths, and weaknesses of the *Ten Tonne Plan*

Benefits of Plan	Strengths of Plan	Weaknesses of Plan
<p>“Myriad. This was an excellent opportunity to provide leadership in my community and to share my professional capability with the school.”</p> <p>“Seeing the dream come true. Maia Maia active in a school with Boya in hand.”</p> <p>“Insight to the options for reducing emissions and energy use. Better understanding of the issues relating to getting schools involved. Opportunity to give back to the community. Opportunity to add value by applying business administration methodologies. Nice to make a difference.”</p> <p>“Maia Maia sees Coolbinia as a valued pilot with regards to developing these ideas for export to other schools.”</p>	<p>“Most of the work we do in sustainability is in silos whereas the very essence of sustainability is connection ... using a carbon reduction plan to tie together separate silos like energy, water, waste management, and biodiversity will work better than using another area as a main organizing umbrella. This makes the concept very flexible as whatever initiatives that are going on at a school can be built into a whole-of-school and eventually whole-of-community framework. The carbon reduction plan sets up discrete and achievable goals. This is important in sustainability where the reality can be overwhelming. Celebrating achievement of these goals as a community using the upside down thermometer can create a feeling of solidarity that can inspire further action.”</p> <p>“Action connected to results in all key areas matched with the reward of a Boya.”</p> <p>“Feel part of the community. Connect with other ‘<i>Ten Tonne Plan</i>’ schools.”</p> <p>“Reinforcing to the kids that practicing sustainability is the right thing to do.”</p>	<p>“It would have been better to launch the <i>Ten Tonne Plan</i> closer to its inception to build community interest over the year ... It would also be good to engage the children and community in setting the plan targets in the beginning so people felt more involved.”</p> <p>“I think the main challenge is the time and effort involved convincing administration, staff and parents to engage in the project. I estimate that this part of the project took in excess of 50 person hours. This won't be viable in the future.”</p>