



Parliamentary Budget Office - Election Policy Costing

NSW Parliament • Parliament House, Macquarie Street Sydney NSW 2000

Referred By: Australian Labor Party

Proposal No: B432

Date Referred: 13/03/2019

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Proposal Title: Cool Schools/Solar Schools

Cluster: Education

General Government Sector Impacts

	2018-19 \$'000	2019-20 \$'000	2020-21 \$'000	2021-22 \$'000	4 year Total \$'000
Expenses (ex. depreciation)	-	-	-	-	-
Depreciation	-	-	1,686	3,800	5,486
Less: Offsets	-	-	6,019	12,623	18,642
Revenue	-	-	1,719	3,517	5,235
Net Operating Balance:	-	-	6,052	12,340	18,392

Capital Expenditure	-	84,310	105,690	55,000	245,000
Capital Offsets	-	-	-	-	-
Net Capital Expenditure:	-	84,310	105,690	55,000	245,000

Net Lending/(Borrowing):	-	(84,310)	(97,952)	(38,860)	(221,122)
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Total State Sector Impacts

Net Lending/(Borrowing):	-	(84,310)	(97,952)	(38,860)	(221,122)
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Notes and costing assumptions

The policy proposes to:

- Allocate \$100 million for the installation of solar panels on schools as soon as practicable from the formation of government.
- Allocate \$200 million over four years from 2019-20, to support the installation and powering of air conditioning in schools. The profile of the allocation is as follows:
 - \$35 million for 2019-20
 - \$55 million per year for 2020-21, 2021-22 and 2022-23.

The policy specifies that an audit will be performed to prioritise the delivery of air conditioning, and that the cost of the audit is to be absorbed by the Department of Education. In addition, the policy specifies that the government would review the prioritisation and allocation of resources so that all new classrooms would be built with air conditioning. The policy states that this process is subject to further government approval.

The PBO estimates the total net lending impact of the policy is \$221.1 million over the forward estimates, comprising:

- \$76.1 million for solar panels
- \$145.0 million for air conditioning.

Notes and costing assumptions continued:

Summary of the budget impacts for solar power

The table below summarises the net budget impact of \$76.1 million over the forward estimates for the solar power part of the policy. This is less than the \$100 million allocation, which is mostly due to the impact of reduced electricity costs (\$18.6 million). A breakdown over the period 2019-20 to 2027-28 is summarised in Appendix A.

(\$)	2018-19	2019-20	2020-21	2021-22	Total by 2021-22
Capital costs		49,309,665	50,690,335		100,000,000
Depreciation expenses			986,193	2,000,000	2,986,193
Electricity expense savings			6,019,298	12,623,101	18,642,399
Offsets from exporting solar power			1,718,776	3,516,541	5,235,318
Net outcome (excl. depreciation)		-49,309,665	-42,952,261	16,139,642	-76,122,283

This costing is based on high-level estimates of the average cost of solar power and the average electricity consumption across the NSW school portfolio.

Timeframes for installing solar power

The costing assumes the Department of Education will commence scoping and development of the implementation strategy for the \$100 million capital program from 2018-19. The installation of on-site solar power facilities is assumed to take place over the period 2019-20 and 2020-21. The estimated number of schools to be installed with solar power systems is 359 by the end of 2019-20 and a further 379 by the end of 2020-21 (738 in total).

Size of the solar power system to be installed

The average size of the solar power system for each school is estimated to be 91.0 kilowatts. This is based on consumption of 364 kilowatt hours per day and the industry/commercial practice to install 1 kilowatt per 4 kilowatt hours. The average electricity consumption of schools is based on information provided by the Department of Education for its entire school portfolio. The estimated ratio of 1 kilowatt per 4 kilowatt hours is based on publicly available quotes and benchmarks.

Average cost per solar power system for a school

The average cost for a 91.0 kilowatt system is estimated to be approximately \$134,000 per system, comprising:

- Approximately \$89,000 for the base cost of a solar power system. This is calculated using the benchmark rate of \$982 per kilowatt. The benchmark rate is from publicly available price indices for a similar-sized unit, less 10% for GST.
- Contingencies allowance of 25% and design fees of 5% of the base cost. These rates are based on standard cost estimation practices for major projects which have yet to be fully reviewed and scoped for tendering.
- Preliminaries of 14% and margins of 5%, based on industry benchmarks for the Sydney area. These costs represent the additional cost of contractors, suppliers and set up costs for the site.
- Project management costs of 1% of the base cost. This is based on the Department's advice and is broadly consistent with industry benchmarks.

The roof space required for 91.0 kilowatt system is around 600 to 650 m². The costing assumes there are no material site constraints affecting the installation of solar power systems. The costing also assumes indexation of 2.8% per annum, based on the 10-year trend for the ABS Construction Cost Index for NSW.

Allowing for future price falls for solar systems, costs could be lower

This costing has not made an allowance for any potential future decrease in the price of solar power systems, or for possible new solar technologies. This is because future prices are highly uncertain, and depend among other things on: global markets for solar panels and related equipment, global silicon markets, the value of the Australian dollar, levels of domestic demand and regional solar energy supply and demand. Future technological breakthroughs are impossible to predict.

Notes and costing assumptions continued:

The PBO notes however that the costs of solar systems have declined rapidly over the past ten years and technological improvements have been frequent (see for example CSIRO's *Electricity generation technology cost projections 2017-2050* (CSIRO, December 2017). This costing is therefore likely to overstate the cost of solar systems should these trends continue in the period 2018-19 to 2021-22.

Depreciation costs for solar panels

The costing assumes the solar power systems units will be integrated with school buildings, and so depreciation is calculated according to accounting standards applicable to school building lifespans (2% per year for 50 years, using a straight line profile). The Department of Education advised that this is consistent with its standard accounting practices for depreciation of education buildings.

Savings on schools' electricity expenses and tariff revenue from exporting solar power

The costing includes the estimated savings on schools' electricity expenses, averaging approximately \$16,000 per school as schools will consume electricity generated by solar power, rather than by an electricity provider. This average rate is based on:

- A broad assumption that 60% of the electricity generated (or 218 kilowatt hours per day) will be used by the school. This average rate is based on the Department of Education's review of schools with existing solar power facilities.
- An average savings rate of 20 cents per kilowatt hour, plus escalation of 2.5% per annum, which is based on the Department's existing electricity supply contracts.

For electricity not consumed on site, the costing assumes they will be exported to the electricity grid. This will generate a revenue offset based on a tariff of 9 cents per kilowatt hour, or approximately \$4,800 per school per annum. This average rate is based on the Department of Education's review of schools with existing solar power facilities and it has not been indexed.

Degradation rate for solar power

For both savings and revenue offsets, the costing assumes a 1% decrease in output from solar power per annum. This represents the natural decline in the output of solar power systems over the life the asset, which is broadly consistent with industry and commercial benchmarks.

Summary of the budget impacts for air conditioning

The table below summarises the net budget impacts of the air conditioning part of the policy. The PBO estimates the cost is \$145.0 million over the forward estimates, plus \$2.5 million for depreciation expenses. By 2022-23, the total cost is estimated to be \$200.0 million, plus \$5.4 million for depreciation expenses.

(\$)	2018-19	2019-20	2020-21	2021-22	2022-23	Total by 2021-22	Total by 2022-23
Capital costs		35,000,000	55,000,000	55,000,000	55,000,000	145,000,000	200,000,000
Depreciation expenses			700,000	1,800,000	2,900,000	2,500,000	5,400,000

Depreciation costs for air conditioning systems

The PBO assumes the air conditioning units will be integrated with school buildings, and so depreciation is calculated according to accounting standards applicable to school building lifespans (2% per year for 50 years, using a straight line profile). As air conditioning installation will occur at a staggered pace, total depreciation costs will continue to increase over the forward estimates as more units are completed with each passing financial year (totalling \$2.5 million over the forward estimates).

Should air conditioners be installed as external units separate from school building assets, depreciation expenses would be higher due to the shorter lifespan of plant and equipment assets (between 10-25 years according to ATO taxation rulings).

Maintenance and utilities costs for air conditioning systems

Maintenance costs are excluded from the costing. It is assumed that maintenance, parts and labour costs are included as part of the initial warranty period following installation. The costing also excludes additional utilities costs (e.g. energy costs) borne by schools, which will depend on variable factors such as the existence of on-site solar power (see above), the amount of cooling required, location of schools, time of year, weather conditions and electricity prices. This is because the program is yet to be fully scoped, and accordingly these costs are unknown.

Auditing schools and ensuring all new schools would have air conditioning

The policy states that:

- The Department of Education would perform an audit to identify and prioritise the delivery of air conditioning, and that the Department is to absorb the cost of the audit.
- The government would review resourcing and ensure new classrooms would be built with air conditioning. The policy specifies that this process is subject to further government approval.

The PBO estimates the budget impact for the audit and resourcing review is nil.

- The audit is part of the Department's core asset management functions and there is scope for the Department to reprioritise its existing \$15.7 billion recurrent expenditure budget to meet the cost of the audit.
- For the resourcing review, the policy is to review and reprioritise expenditure rather than allocate new funding.

Notes and costing assumptions continued:

Appendix A: 10-year financial impact of the \$100 million capital expenditure program

	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28
Capital costs		49,309,665	50,690,335	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000
Depreciation expenses		986,193,29	6,019,298	12,623,101	12,809,291	12,998,228	13,189,952	13,384,504	13,581,926	13,782,259
Electricity expense savings			1,718,776	3,516,541	3,481,376	3,446,562	3,412,096	3,377,975	3,344,196	3,310,754
Offsets from exporting solar power										
Net outcome (excl. depreciation)		-49,309,665	-42,952,261	16,139,642	16,290,667	16,444,790	16,602,049	16,762,480	16,926,121	17,093,013