



Parliament of Australia
Parliamentary Budget Office

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Parliamentary Budget Officer

Senator Richard Di Natale
Leader of the Australian Greens
Parliament House
CANBERRA ACT 2600

Dear Senator Di Natale

Please find attached a response to your costing request, *Energy Storage Revolution* (letter of 30 June 2016).

The response to this request will be released on the PBO website (www.pbo.gov.au).

If you have any queries about this costing, please contact Colin Brown on (02) 6277 9530.

Yours sincerely

Phil Bowen

30 June 2016



Policy costing—during the caretaker period for the 2016 general election

Name of proposal:	Energy Storage Revolution
Summary of proposal:	<p>The proposal has four components.</p> <p><u>Component 1: Refundable tax credit</u></p> <ul style="list-style-type: none">• This component would introduce a 50 per cent refundable tax credit for individuals to assist with the cost of household solar energy storage systems.<ul style="list-style-type: none">– The credit would apply regardless of income and would be capped at \$5,000 in the 2016-17 financial year, declining to \$1,000 from 1 July 2020.– A separate mechanism would be available so that those who do not lodge a tax return could claim the tax credit. <p><u>Component 2: Low Income Solar Storage (LISS) grants</u></p> <ul style="list-style-type: none">• This component would introduce a Low Income Solar Storage (LISS) grant to be administered by the Clean Energy Regulator (CER).<ul style="list-style-type: none">– The LISS grant would be available in addition to the refundable tax credit for households with adjusted taxable income of less than \$80,000 per year.– In the 2016-17 financial year, the LISS grant would be capped at \$5,000 or half of the total cost of the system, whichever is lower.– This would gradually decline to be \$1,000 from 1 July 2020. The number of LISS grants would be capped at 20,000 per year. <p><u>Component 3: Review by the CER</u></p> <ul style="list-style-type: none">• This component would fund CER to review the operation of the tax credit and LISS grant scheme and advise Parliament as to whether the scheme should continue in some form beyond 2020.

	<p><u>Component 4: Business battery storage depreciation</u></p> <ul style="list-style-type: none"> This component would decrease the period over which the cost of installing battery storage systems at business premises is depreciated from 15 to three years. <p>The following table provides the proposed maximum refundable tax credit and LISS grant amounts in each year under the proposal:</p> <table border="1"> <thead> <tr> <th></th> <th>2016-17</th> <th>2017-18</th> <th>2018-19</th> <th>2019-20</th> <th>2020-21</th> </tr> </thead> <tbody> <tr> <td>Tax credit</td> <td>\$5,000</td> <td>\$4,000</td> <td>\$3,000</td> <td>\$2,000</td> <td>\$1,000</td> </tr> <tr> <td>LISS grant</td> <td>\$5,000</td> <td>\$4,000</td> <td>\$3,000</td> <td>\$2,000</td> <td>\$1,000</td> </tr> </tbody> </table> <p>The proposal would have effect from 1 September 2016 and would cease after 31 December 2020.</p>		2016-17	2017-18	2018-19	2019-20	2020-21	Tax credit	\$5,000	\$4,000	\$3,000	\$2,000	\$1,000	LISS grant	\$5,000	\$4,000	\$3,000	\$2,000	\$1,000
	2016-17	2017-18	2018-19	2019-20	2020-21														
Tax credit	\$5,000	\$4,000	\$3,000	\$2,000	\$1,000														
LISS grant	\$5,000	\$4,000	\$3,000	\$2,000	\$1,000														
Person/party requesting costing:	Senator Richard Di Natale, Australian Greens																		
Date of public release of policy:	5 May 2016 http://greens.org.au/batteries																		
Date costing request received:	30 June 2016																		
Date costing completed:	30 June 2016																		
Expiry date for the costing:	Release of the next economic and fiscal outlook report																		

Costing overview

The proposal would be expected to decrease the fiscal balance by \$3,588 million and decrease the underlying cash balance by \$2,868 million over the 2016-17 Budget forward estimates period. On a fiscal balance basis, this reflects a decrease in revenue of \$54 million and an increase in expenses of \$3,534 million. Detailed financial implications of the proposal to 2022-23 are provided at [Attachment A](#).

The underlying cash balance impact of this proposal differs from the fiscal balance impact due to the timing of the refundable tax credit payments. The fiscal balance impact of the refundable tax credit occurs in the year in which the qualifying solar energy storage system purchase is made. The underlying cash balance impact occurs when the tax return or separate application for a tax credit is processed.

Departmental expenses for components 1, 2 and 3 have been estimated based on the cost of administering and reviewing similar tax credit and grant programs in the past. Departmental expenses for component 4 are not expected to be significant and have not been included in this costing.

The proposal would have a significantly reduced impact beyond the 2016-17 Budget forward estimates period.

- The household components of the proposal (components 1 to 3) would continue to have financial implications on an underlying cash basis in the 2021-22 financial year as tax credit claims are paid. The tax credit and LISS grants would not be claimable for installations from 1 January 2021.
- The business component (component 4) would have an ongoing positive impact from 2022-23 as changes in depreciation policy have an impact on the timing, but not on the total amount, of depreciation deductions over the full life cycle of the asset – the decrease in revenue seen in the forward estimates period would reverse over the course of the current 15 year depreciation time scale.

This costing is considered to be of very low reliability. It relies on a number of assumptions, and variations in assumptions may lead to a significant change in the estimated financial impact.

Table 1: Financial implications (outturn prices)^(a)

Impact on (\$m)	2016–17	2017–18	2018–19	2019–20	Total
Fiscal balance	-538.0	-1,087.0	-1,180.0	-783.0	-3,588.0
Underlying cash balance	-108.0	-527.0	-1,070.0	-1,163.0	-2,868.0

(a) A positive number represents an increase in the relevant budget balance, a negative number represents a decrease.

(b) Figures may not sum to totals due to rounding.

Key assumptions

Household components

- The estimated total number of household installations in each year of the proposal has been based on the Australian Energy Market Operator report titled 2015 Emerging Technologies Information Paper, and the growth trajectory of installations of photovoltaic cell systems between 1 January 2009 and 31 December 2013, as reported by the Australian Photovoltaic Institute.
- For the purpose of converting the aggregate capacity reported in the 2015 Emerging Technologies Information Paper into the number of installations, it is assumed that the average capacity of an installation will be 10 kilowatt hours, and this average capacity will remain constant over the five year period.

- There is assumed to be no difference in the average cost or capacity of household solar energy storage system installations between those eligible for LISS grants and those ineligible for such grants.
- It is assumed that all LISS grants available (20,000 in each financial year from 2016-17 to 2020-21) would be claimed and paid in each financial year.
 - This has been based on the incomes of households with solar photovoltaic cells in 2012, as well as the expected out of pocket cost of a solar storage system after accounting for the tax credit and the LISS grant.
- Tax credits are assumed to be claimed for all installations from 1 September 2016 to 31 December 2020, inclusive. All tax credits are assumed to be claimed and paid in the financial year immediately following the financial year of installation.
- The average cost of a household solar energy system installation is assumed to be \$10,000 in 2016-17. This average cost is assumed to decrease over time in a linear manner, reaching \$5,000 from 1 July 2020.

Business component

- The estimated total number of business battery installations in each year of the proposal is proportional to the number of business photovoltaic solar panel installations in each year, which has been based on the Green Energy Markets report titled *Small-scale technology certificates – Data modelling for 2015 to 2017*.
- This costing assumes two types of behavioural response for business battery installations:
 - First, 10 per cent of businesses that choose to install a new photovoltaic system will also invest in battery storage.
 - Second, an additional 10 per cent of businesses will install a photovoltaic and battery storage system in response to the proposal, where previously they would not have invested in a photovoltaic system.
 - This results in battery storage activity equivalent to 20 per cent of the current photovoltaic installation rate.
- The costing assumes that businesses that currently have a photovoltaic system installed do not install battery storage as the cost of retro-fitting existing infrastructure is prohibitive.

All components

- Assets are assumed to be purchased evenly throughout the year.

Methodology

Household components

- The number of household installations was estimated for each financial year. The assumed average cost of installations (and thus the average tax credit) was then applied to the number of installations to derive the cost of refundable tax credits in each financial year.
- The cost of the LISS grants program was estimated by multiplying the number of grants available in each year by the maximum value of the grant in the relevant year.

Business component

- The number of business photovoltaic installations was estimated for each year, and a proportion of these systems was assumed to include battery storage. The period for depreciating these battery assets was reduced from 15 years to three, with businesses claiming depreciation expenses over three years rather than the current 15 years.

All components

- Departmental expenses for the administration and review of the program have been estimated based on the cost of administering and reviewing similar tax credit and grant programs in the past.
- The costing takes into account the timing of payments and revenue.
- Estimates of administered expenses have been rounded to the nearest \$10 million. Estimates of departmental expenses and revenue have been rounded to the nearest \$1 million.

Data sources

- *2015 Emerging Technologies Information Paper*, Australian Energy Market Operator.
- *Australian PV installations since April 2001: total capacity (kW)*, Australian Photovoltaic Institute.
- *4670.0 – Household Energy Consumption Survey, 2012*, Australian Bureau of Statistics.
- *Small-scale technology certificates – Data modelling for 2015 to 2017*, Green Energy Markets.
- *Energy storage study*, AECOM.
- *Emerging technologies information paper*, Australian Energy Market Operator.
- *Global trends in clean energy investment*, Bloomberg New Energy Finance.

Attachment A: Energy Storage Revolution —financial implications

Table A1: Combined impact of all components—Financial implications—Fiscal balance^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022-23
Impact on fiscal balance									
Revenue	-5.0	-14.0	-17.0	-18.0	-54.0	-15.0	-5.0	3.0	-71.0
Expenses	-533.0	-1,073.0	-1,163.0	-765.0	-3,534.0	-185.0	-1.0	-	-3,720.0
<i>Administered</i>	<i>-530.0</i>	<i>-1,070.0</i>	<i>-1,160.0</i>	<i>-760.0</i>	<i>-3,520.0</i>	<i>-180.0</i>	-	-	<i>-3,700.0</i>
<i>Departmental</i>	<i>-3.0</i>	<i>-3.0</i>	<i>-3.0</i>	<i>-5.0</i>	<i>-14.0</i>	<i>-5.0</i>	<i>-1.0</i>	-	<i>-20.0</i>
Total	-538.0	-1,087.0	-1,180.0	-783.0	-3,588.0	-200.0	-6.0	3.0	-3,791.0

(a) A positive number for the fiscal balance indicates an increase in revenue or a decrease in expenses or net capital investment in accrual terms. A negative number for the fiscal balance indicates a decrease in revenue or an increase in expenses or net capital investment in accrual terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil.

Table A2: Combined impact of all components— Financial implications — Underlying cash balance ^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022–23
Impact on underlying cash balance									
Revenue	-5.0	-14.0	-17.0	-18.0	-54.0	-15.0	-5.0	3.0	-71.0
Expenses	-103.0	-513.0	-1,053.0	-1,145.0	-2,814.0	-745.0	-161.0	-	-3,720.0
<i>Administered expenses</i>	<i>-100.0</i>	<i>-510.0</i>	<i>-1,050.0</i>	<i>-1,140.0</i>	<i>-2,800.0</i>	<i>-740.0</i>	<i>-160.0</i>	-	<i>-3,700.0</i>
<i>Departmental expenses</i>	<i>-3.0</i>	<i>-3.0</i>	<i>-3.0</i>	<i>-5.0</i>	<i>-14.0</i>	<i>-5.0</i>	<i>-1.0</i>	-	<i>-20.0</i>
Total	-108.0	-527.0	-1,070.0	-1,163.0	-2,868.0	-760.0	-166.0	3.0	-3,791.0

(a) A positive number for the underlying cash balance indicates an increase in receipts or a decrease in outlays or net capital investment in cash terms. A negative number for the underlying cash balance indicates a decrease in receipts or an increase in outlays or net capital investment in cash terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil.

Table A3: Component 1: Refundable tax credits — Financial implications — Fiscal balance ^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022–23
Impact on fiscal balance									
<i>Administered expenses</i>	-430.0	-990.0	-1,100.0	-720.0	-3,240.0	-160.0	-	-	-3,400.0
<i>Departmental expenses</i>	-1.0	-1.0	-1.0	-1.0	-4.0	-1.0	-1.0	-	-6.0
Total	-431.0	-991.0	-1,101.0	-721.0	-3,244.0	-161.0	-1.0	-	-3,406.0

(a) A positive number for the fiscal balance indicates an increase in revenue or a decrease in expenses or net capital investment in accrual terms. A negative number for the fiscal balance indicates a decrease in revenue or an increase in expenses or net capital investment in accrual terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil

Table A4: Component 1: Refundable tax credits — Financial implications — Underlying cash balance ^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022–23
Impact on underlying cash balance									
<i>Administered expenses</i>	-	-430.0	-990.0	-1,100.0	-2,520.0	-720.0	-160.0	-	-3,400.0
<i>Departmental expenses</i>	-1.0	-1.0	-1.0	-1.0	-4.0	-1.0	-1.0	-	-6.0
Total	-1.0	-431.0	-991.0	-1,101.0	-2,524.0	-721.0	-161.0	-	-3,406.0

(a) A positive number for the underlying cash balance indicates an increase in receipts or a decrease in outlays or net capital investment in cash terms. A negative number for the underlying cash balance indicates a decrease in receipts or an increase in outlays or net capital investment in cash terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil

Table A5: Component 2: Low Income Solar Storage grants — Financial implications — Fiscal balance ^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022–23
Impact on fiscal balance									
<i>Administered expenses</i>	-100.0	-80.0	-60.0	-40.0	-280.0	-20.0	-	-	-300.0
<i>Departmental expenses</i>	-1.0	-1.0	-1.0	-1.0	-4.0	-1.0	-	-	-5.0
Total	-101.0	-81.0	-61.0	-41.0	-284.0	-21.0	-	-	-305.0

(a) A positive number for the fiscal balance indicates an increase in revenue or a decrease in expenses or net capital investment in accrual terms. A negative number for the fiscal balance indicates a decrease in revenue or an increase in expenses or net capital investment in accrual terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil

Table A6: Component 2: Low Income Solar Storage grants — Financial implications — Underlying cash balance ^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022–23
Impact on underlying cash balance									
<i>Administered expenses</i>	-100.0	-80.0	-60.0	-40.0	-280.0	-20.0	-	-	-300.0
<i>Departmental expenses</i>	-1.0	-1.0	-1.0	-1.0	-4.0	-1.0	-	-	-5.0
Total	-101.0	-81.0	-61.0	-41.0	-284.0	-21.0	-	-	-305.0

(a) A positive number for the underlying cash balance indicates an increase in receipts or a decrease in outlays or net capital investment in cash terms. A negative number for the underlying cash balance indicates a decrease in receipts or an increase in outlays or net capital investment in cash terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil.

Table A7: Component 3: Review by the Clean Energy Regulator — Financial implications — Fiscal balance^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022–23
Impact on fiscal balance									
<i>Departmental expenses</i>	-1.0	-1.0	-1.0	-3.0	-6.0	-3.0	-	-	-9.0
Total	-1.0	-1.0	-1.0	-3.0	-6.0	-3.0	-	-	-9.0

(a) A positive number for the fiscal balance indicates an increase in revenue or a decrease in expenses or net capital investment in accrual terms. A negative number for the fiscal balance indicates a decrease in revenue or an increase in expenses or net capital investment in accrual terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil

Table A8: Component 3: Review by the Clean Energy Regulator — Financial implications — Underlying cash balance^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022–23
Impact on underlying cash balance									
<i>Departmental expenses</i>	-1.0	-1.0	-1.0	-3.0	-6.0	-3.0	-	-	-9.0
Total	-1.0	-1.0	-1.0	-3.0	-6.0	-3.0	-	-	-9.0

(a) A positive number for the underlying cash balance indicates an increase in receipts or a decrease in outlays or net capital investment in cash terms. A negative number for the underlying cash balance indicates a decrease in receipts or an increase in outlays or net capital investment in cash terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil.

Table A9: Component 4: Business battery storage depreciation — Financial implications — Fiscal balance ^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022–23
Impact on fiscal balance									
Revenue	-5.0	-14.0	-17.0	-18.0	-54.0	-15.0	-5.0	3.0	-71.0
Total	-5.0	-14.0	-17.0	-18.0	-54.0	-15.0	-5.0	3.0	-71.0

(a) A positive number for the fiscal balance indicates an increase in revenue or a decrease in expenses or net capital investment in accrual terms. A negative number for the fiscal balance indicates a decrease in revenue or an increase in expenses or net capital investment in accrual terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil

Table A10: Component 4: Business battery storage depreciation — Financial implications — Underlying cash balance ^{(a)(b)}

(\$m)	2016–17	2017–18	2018–19	2019–20	Total to 2019–20	2020–21	2021–22	2022–23	Total to 2022–23
Impact on underlying cash balance									
Revenue	-5.0	-14.0	-17.0	-18.0	-54.0	-15.0	-5.0	3.0	-71.0
Total	-5.0	-14.0	-17.0	-18.0	-54.0	-15.0	-5.0	3.0	-71.0

(a) A positive number for the underlying cash balance indicates an increase in receipts or a decrease in outlays or net capital investment in cash terms. A negative number for the underlying cash balance indicates a decrease in receipts or an increase in outlays or net capital investment in cash terms.

(b) Figures may not sum to total due to rounding.

- Indicates nil