SWIPP

INVESTIGATION INTO POTENTIAL WASTE MANAGEMENT INFRASTRUCTURE SCENARIOS

BACKGROUND

Strategic Waste Infrastructure Planning Project (SWIPP):

- WAWA and DEC initiative
- Plan future waste infrastructure needs for Perth metro & Peel regions
- Identify sustainable & cost-effective SWM infrastructure sites for the next 40 years

	Population (m)	Waste (mT/year)
2011	1.85	5.8
2026	2.44	7.7

- Waste diversion targets 2019/2020

MSW Metro – 65%
MSW Non-Metro – 50%
C&I – 70%
C&D – 75%

- Current diversion – 34.5%
  - Hyder 2011 Recycling Activity Report + DEC landfill data.

HYDER'S ROLE IN SWIPP

- Investigate possible waste management infrastructure approaches
  - Cope with future waste generation in the region
  - Meet current targets
- Develop a modeling tool to identify infrastructure needs over the next 40 years (from a 2011 baseline) until 2050.
  - Analyze and compare the effectiveness of different technology combinations to determine which infrastructure scenarios can meet the Waste Strategy diversion targets for the Perth metro & Peel regions.
- Evaluate performance against targets under current strategy and proposed infrastructure
- Need to consider:
  - Changes in population, economy and levels of source separation
  - Lifespans and capacities of infrastructure

PROJECT METHODOLOGY

- Development of the modelling tool
- Consultation with key stakeholders
  - Regional council organisations
  - Existing facility operators
  - Current proponents of new regional waste management infrastructure
  - Able to inform modelling parameters such as current flows of urban waste, facility annual and lifetime capacity limits, recovery efficiencies and estimated lead times for new facility development
- Compilation of waste flow baseline data
- Analysis of 12 scenario combinations agreed with DEC
- Sensitivity analysis around key variables agreed with DEC
- Scenario comparison

SWM SCENARIOS

MSW

A1: Business-as-Usual

A2: Alternative Waste Treatment

A3: Dirty MRF with Energy from Waste

A4: Dirty MRF with Anaerobic Digestion

A5: Source Separation with Composting

C&I

B1: Business-as-Usual

B2: Alternative Waste Treatment

B3: Dirty MRF with Energy from Waste

B4: Dirty MRF with Anaerobic Digestion

B5: Source Separation with Composting

C&D

C1: Business-as-Usual

C2: Mixed Waste

C3: Source Separated Waste

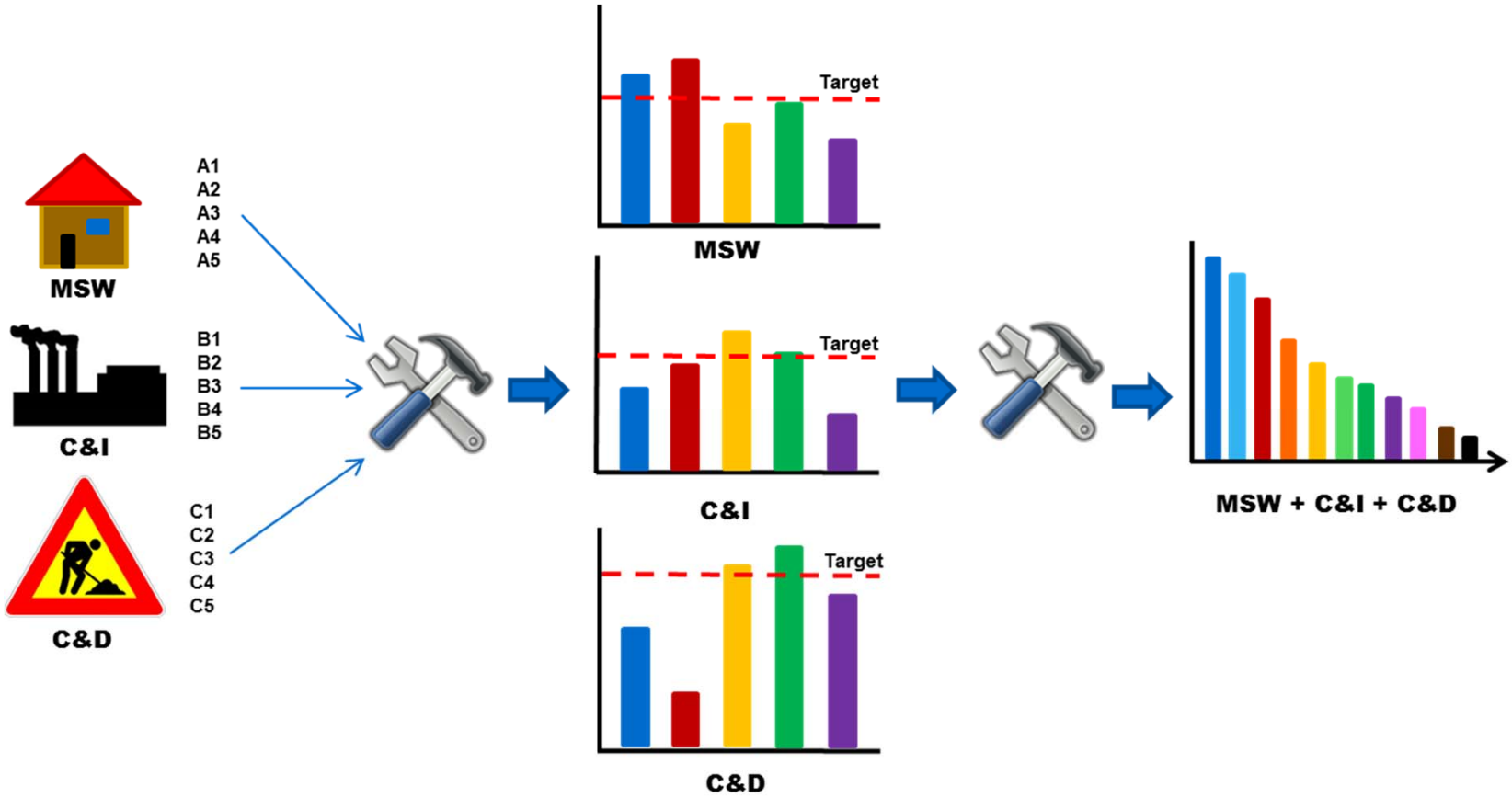
C4: Mixed Waste with Energy from Waste

C5: Source Separated Waste with Energy from Waste

MODELLING SCENARIOS

Scenario	MSW	C&I	C&D
S1	A1: BAU	B1: BAU	C1: BAU
S2	A2: AWT	B1: BAU	C1: BAU
S3	A2: AWT	B1: BAU	C2: Mixed
S4	A2: AWT	B1: BAU	C3: SS
S5	A2: AWT	B2: AWT	C1: BAU
S6	A2: AWT	B2: AWT	C2: Mixed
S6B	A2: AWT-B	B2: AWT-B	C2: Mixed
S7	A2: AWT	B5: SS + Compost	C2: Mixed
S8	A3: EfW	B3: EfW	C2: Mixed
S8B	A3: EfW-B	B3: EfW-B	C2: Mixed
S9	A3: EfW	B3: EfW	C4: Mixed + EfW
S10	A3: EfW	B3: EfW	C5: SS + EfW
S11	A4: AD	B4: AD	C2: Mixed
S11B	A4: AD-B	B4: AD-B	C2: Mixed
S12	A5: SS + Compost	B5: SS + Compost	C5: SS

MODELLING SCENARIOS



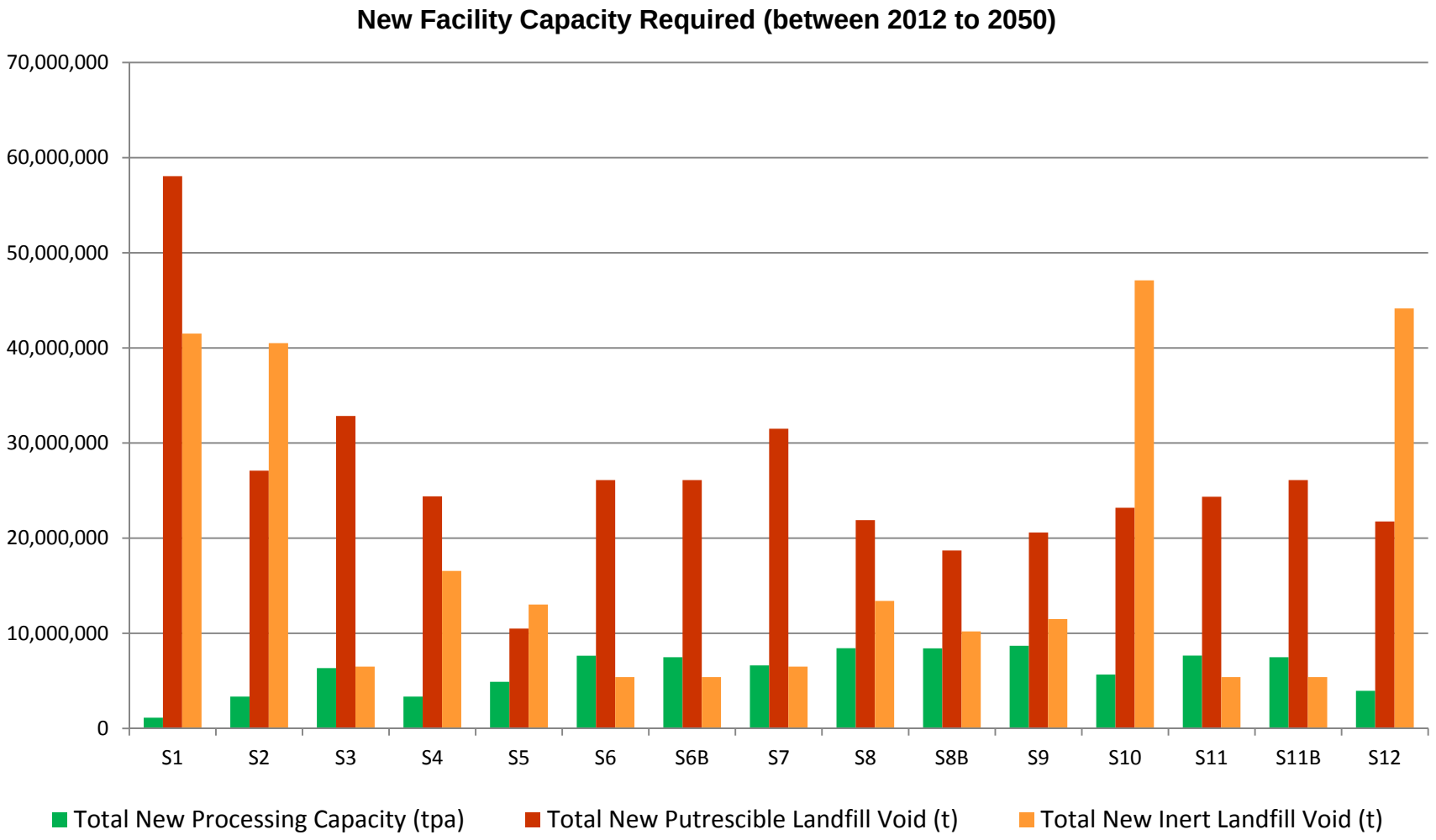
DEMONSTRATION

RESULTS

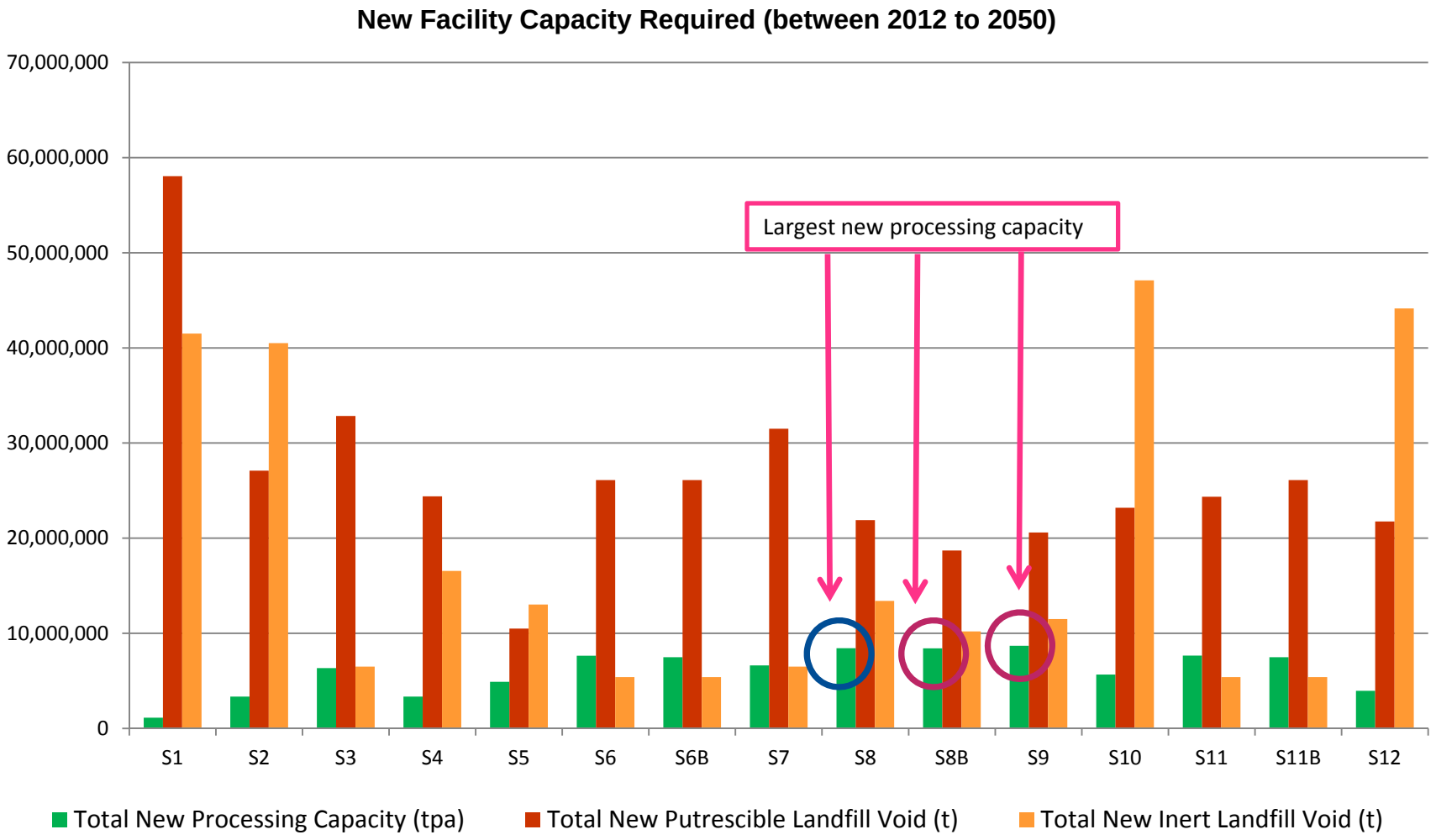
MOST EFFECTIVE SCENARIOS

- Scenarios 8, 9 and 8B
  - New thermal EfW facilities to process residual MSW and C&I waste
  - New mixed C&D recyclers and processing
  - With / without processing of C&D waste through EfW facilities
  - With / without maintenance of existing source separation levels for MSW and C&I

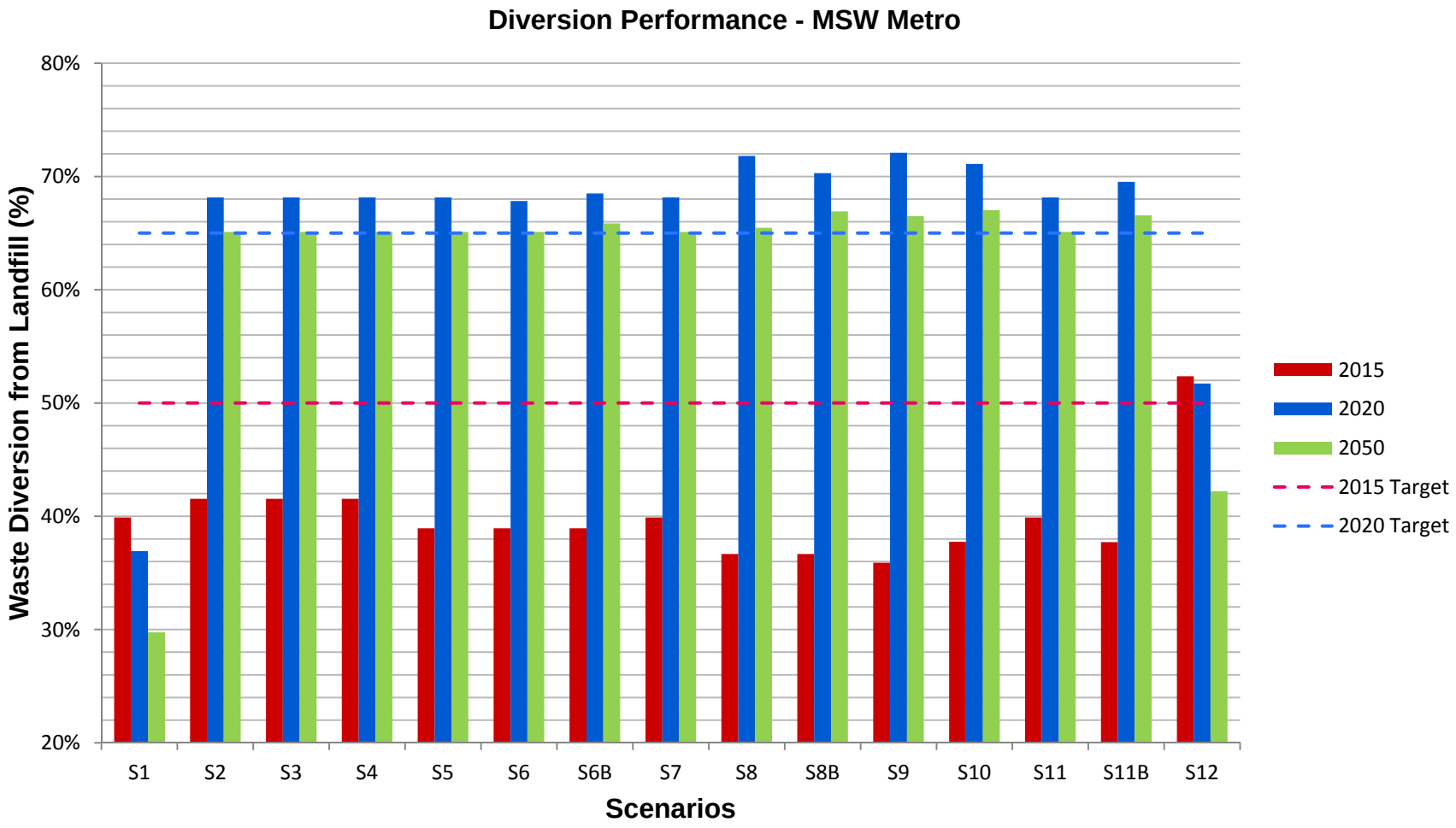
RESULTS


New Facility Capacity Required (between 2012 to 2050)
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
S1
S2
S3
S4
S5
S6
S6B
S7
S8
S8B
S9
S10
S11
S11B
S12
Total New Processing Capacity (tpa)
Total New Putrescible Landfill Void (t)
Total New Inert Landfill Void (t)

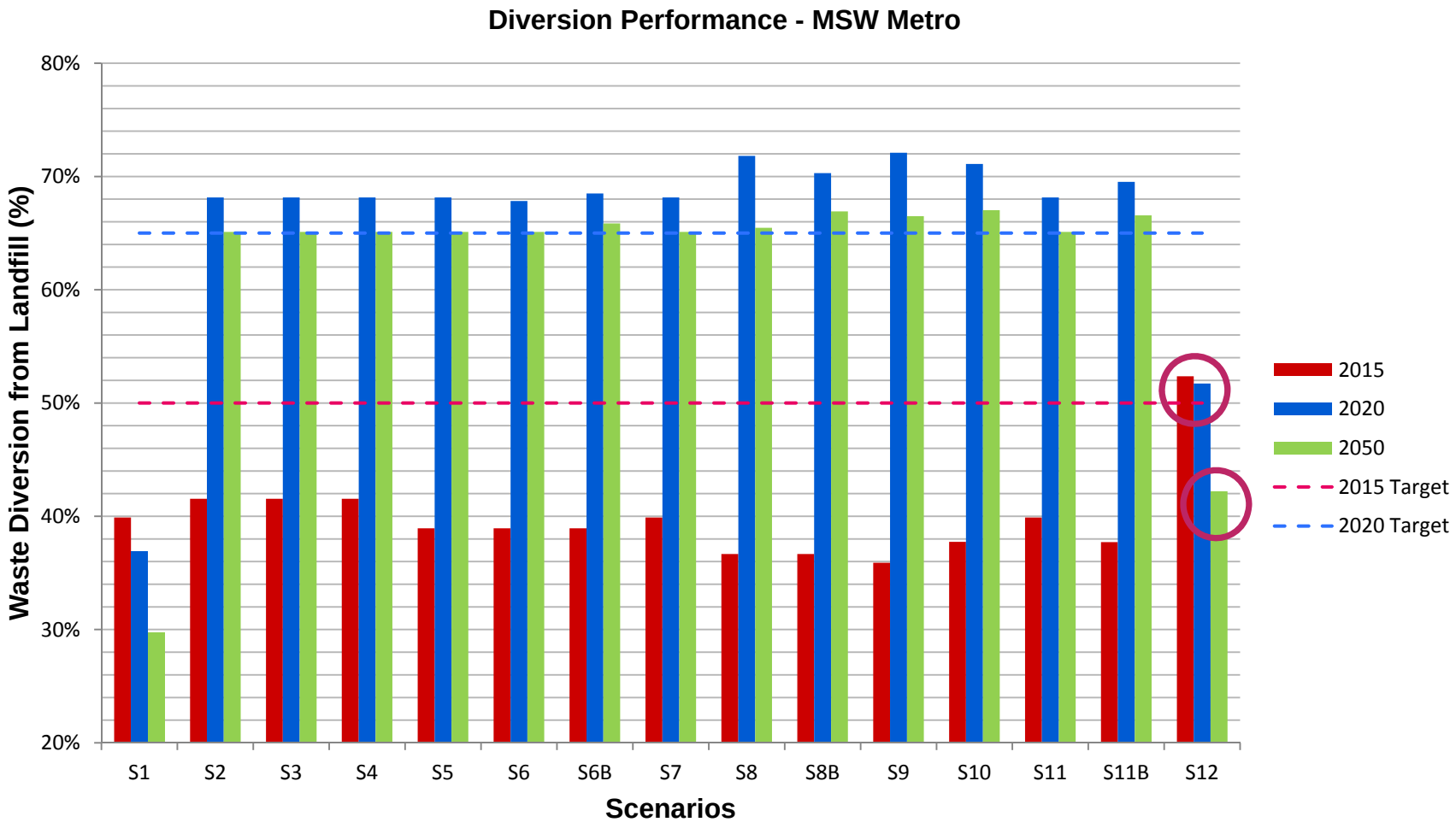
RESULTS


New Facility Capacity Required (between 2012 to 2050)
70,000,000
60,000,000
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
0
Largest new processing capacity
S1
S2
S3
S4
S5
S6
S6B
S7
S8
S8B
S9
S10
S11
S11B
S12
Total New Processing Capacity (tpa)
Total New Putrescible Landfill Void (t)
Total New Inert Landfill Void (t)

RESULTS


Diversion Performance - MSW Metro
Waste Diversion from Landfill (%)
80%
70%
60%
50%
40%
30%
20%
S1
S2
S3
S4
S5
S6
S6B
S7
S8
S8B
S9
S10
S11
S11B
S12
Scenarios
2015
2020
2050
2015 Target
2020 Target

RESULTS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80%
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50%
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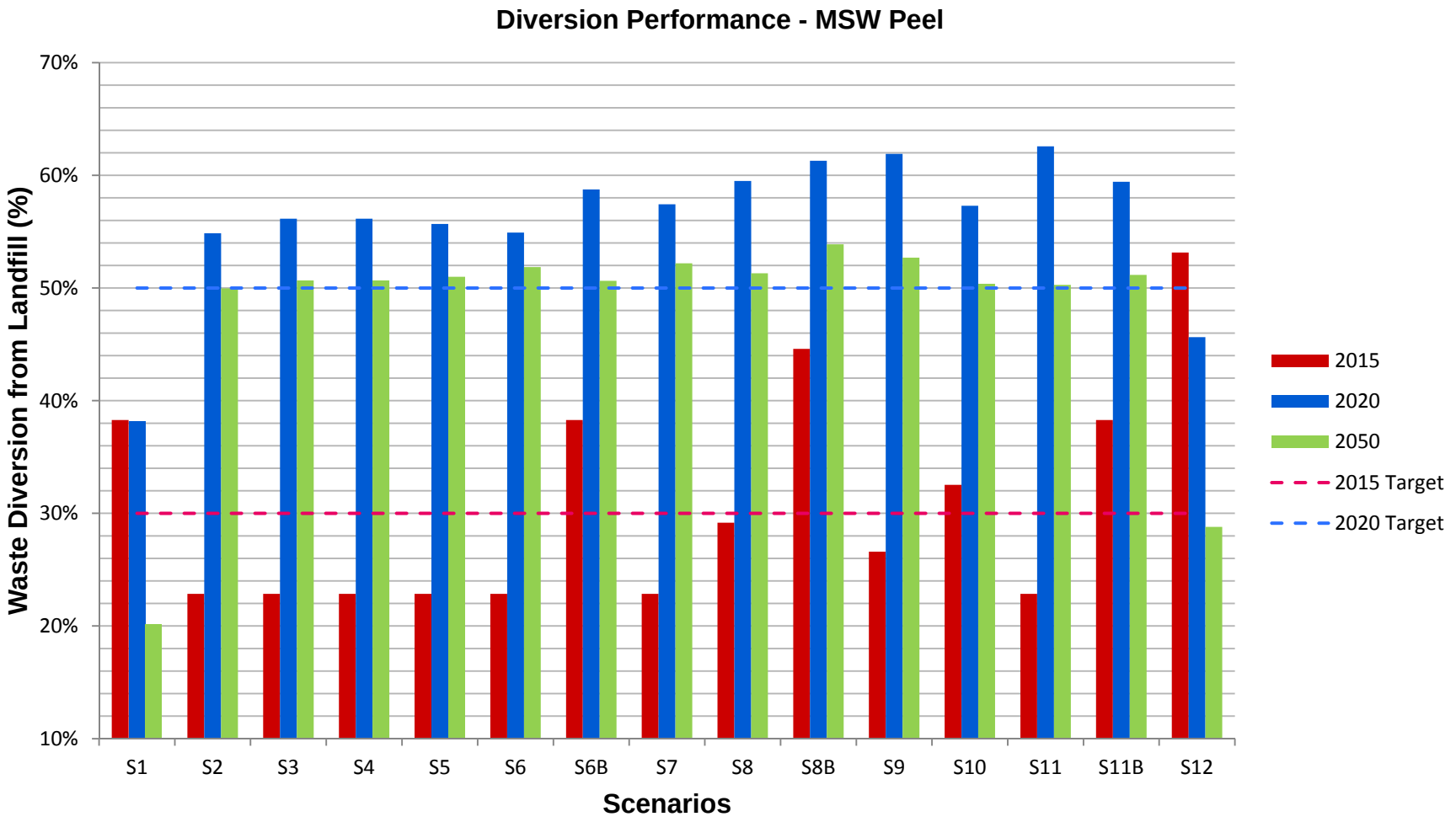
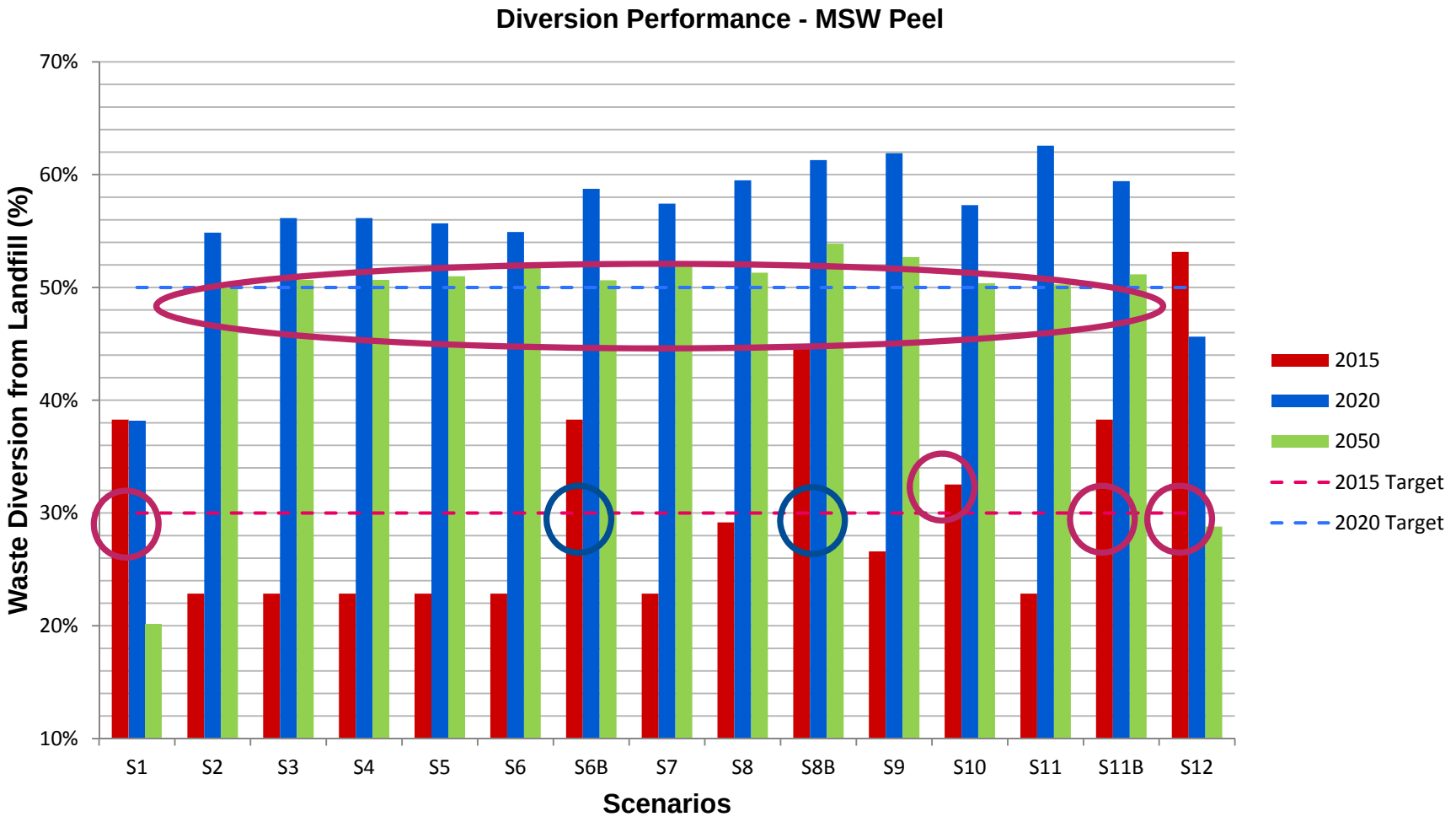
30%
20%
S1
S2
S3
S4
S5
S6
S6B
S7
S8
S8B
S9
S10
S11
S11B
S12
Scenarios
2015
2020
2050
2015 Target
2020 Target

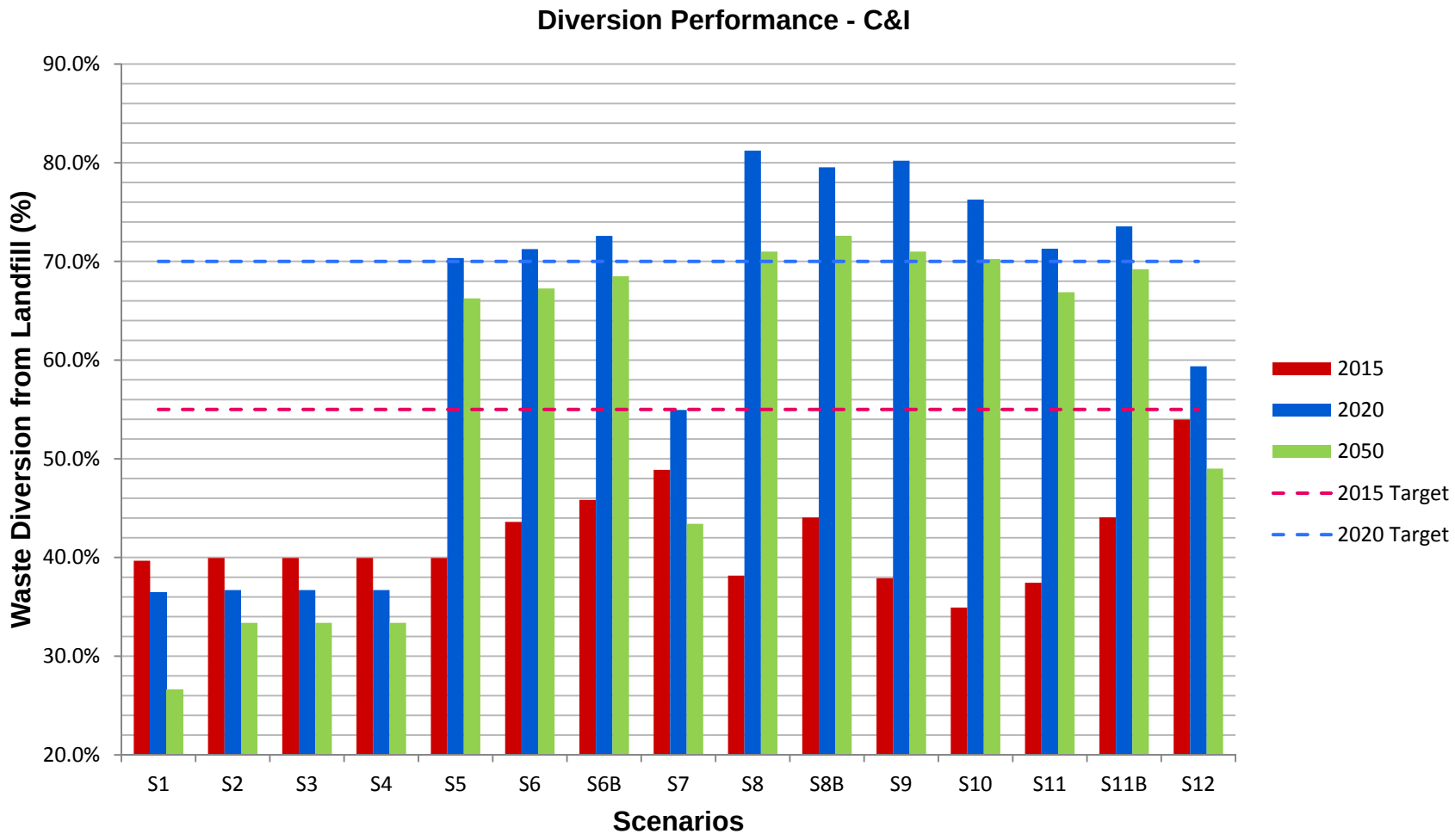
RESULTS


Diversion Performance - MSW Peel
Waste Diversion from Landfill (%)
70%
60%
50%
40%
30%
20%
10%
S1
S2
S3
S4
S5
S6
S6B
S7
S8
S8B
S9
S10
S11
S11B
S12
Scenarios
2015
2020
2050
2015 Target
2020 Target

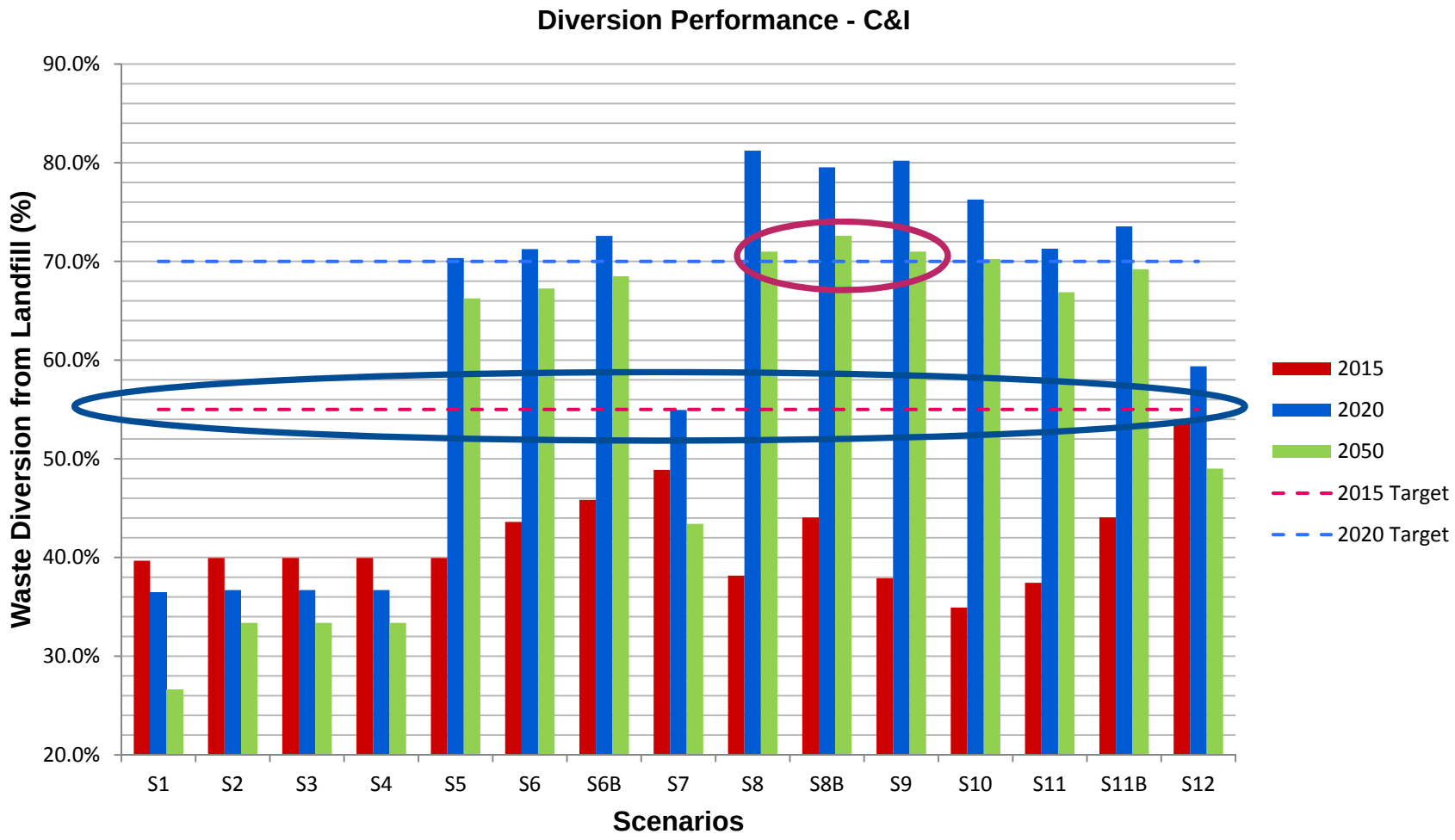
RESULTS


Diversion Performance - MSW Peel
Waste Diversion from Landfill (%)
70%
60%
50%
40%
30%
20%
10%
S1
S2
S3
S4
S5
S6
S6B
S7
S8
S8B
S9
S10
S11
S11B
S12
Scenarios
2015
2020
2050
2015 Target
2020 Target

RESULTS


Diversion Performance - C&I
Waste Diversion from Landfill (%)
90.0%
80.0%
70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
S1
S2
S3
S4
S5
S6
S6B
S7
S8
S8B
S9
S10
S11
S11B
S12
Scenarios
2015
2020
2050
2015 Target
2020 Target

RESULTS


Diversion Performance - C&I
Waste Diversion from Landfill (%)
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70.0%
60.0%
50.0%
40.0%
30.0%
20.0%
S1
S2
S3
S4
S5
S6
S6B
S7
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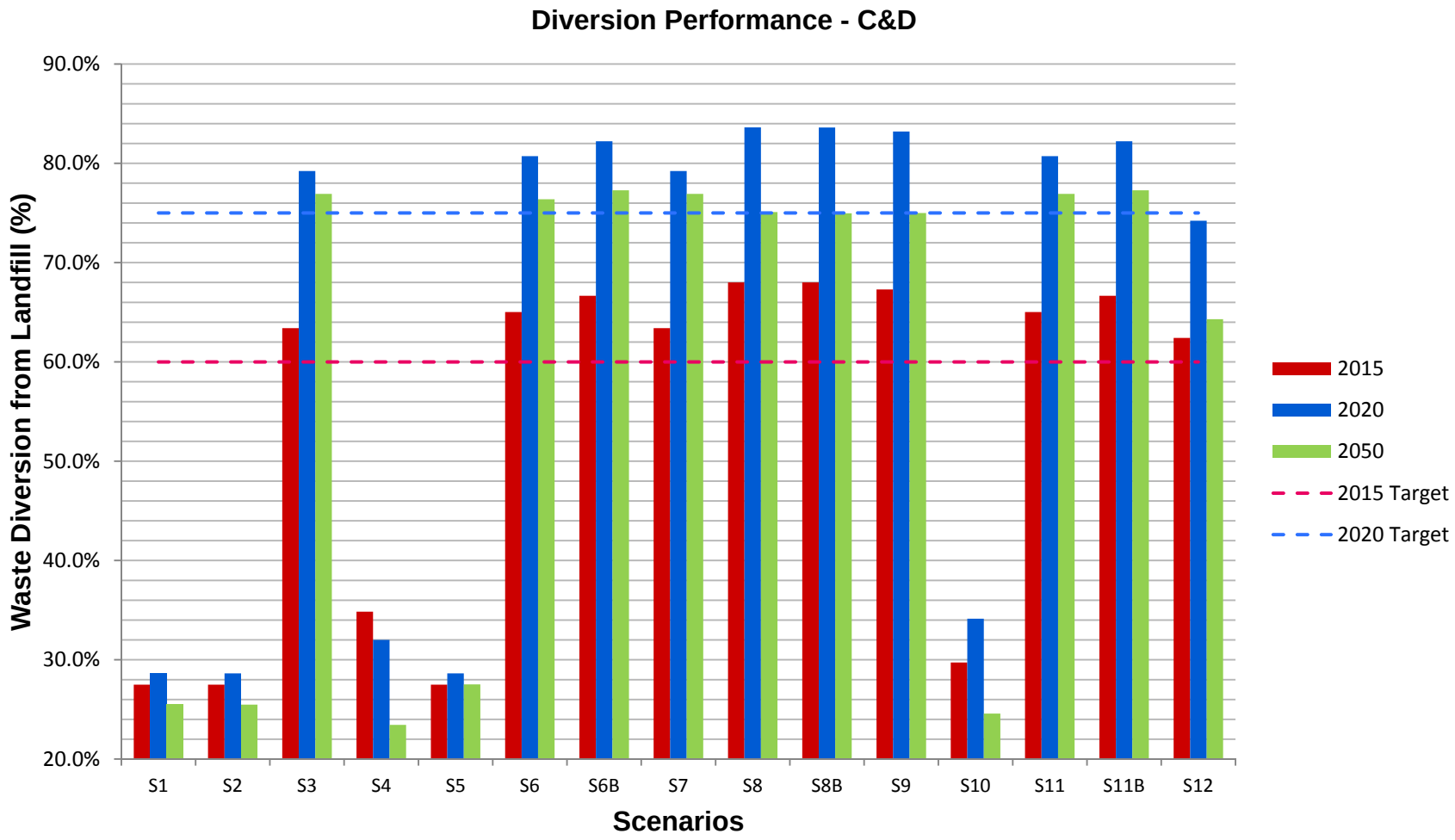
S8B
S9
S10
S11
S11B
S12
Scenarios
2015
2020
2050
2015 Target
2020 Target

RESULTS


Diversion Performance - C&D
Waste Diversion from Landfill (%)
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60.0%
50.0%
40.0%
30.0%
20.0%
S1
S2
S3
S4
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S6
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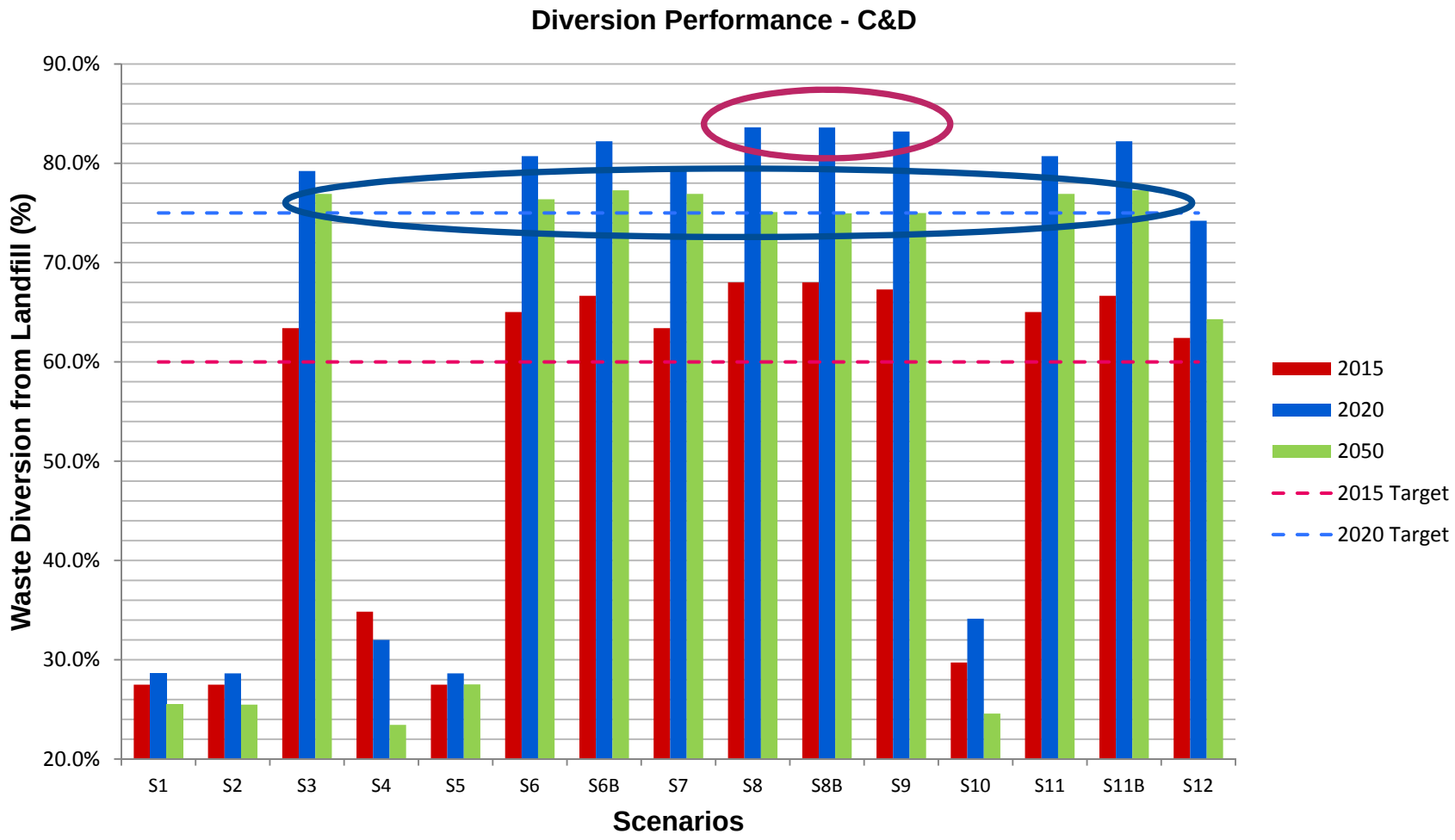
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S4
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S6
S6B
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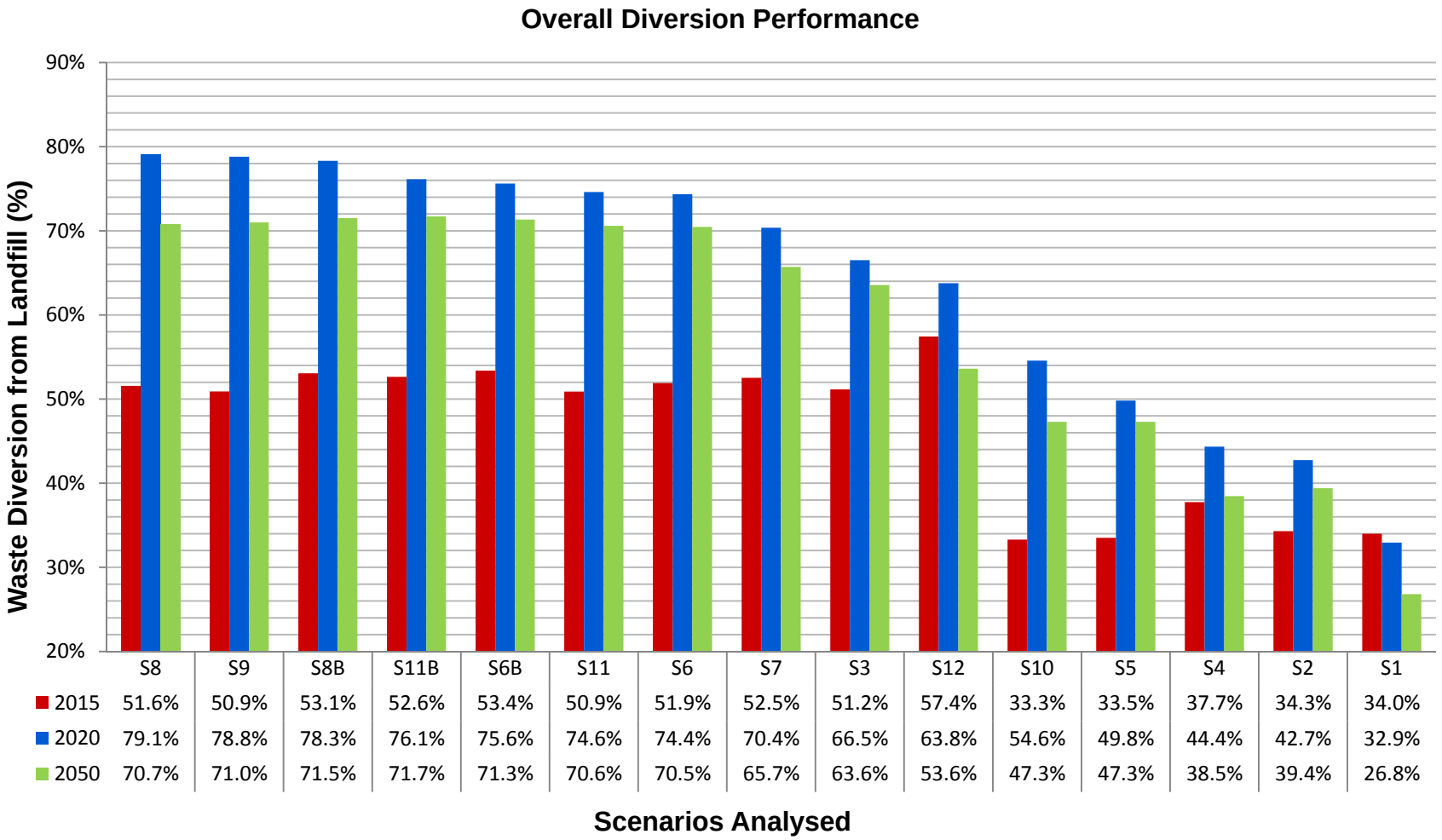


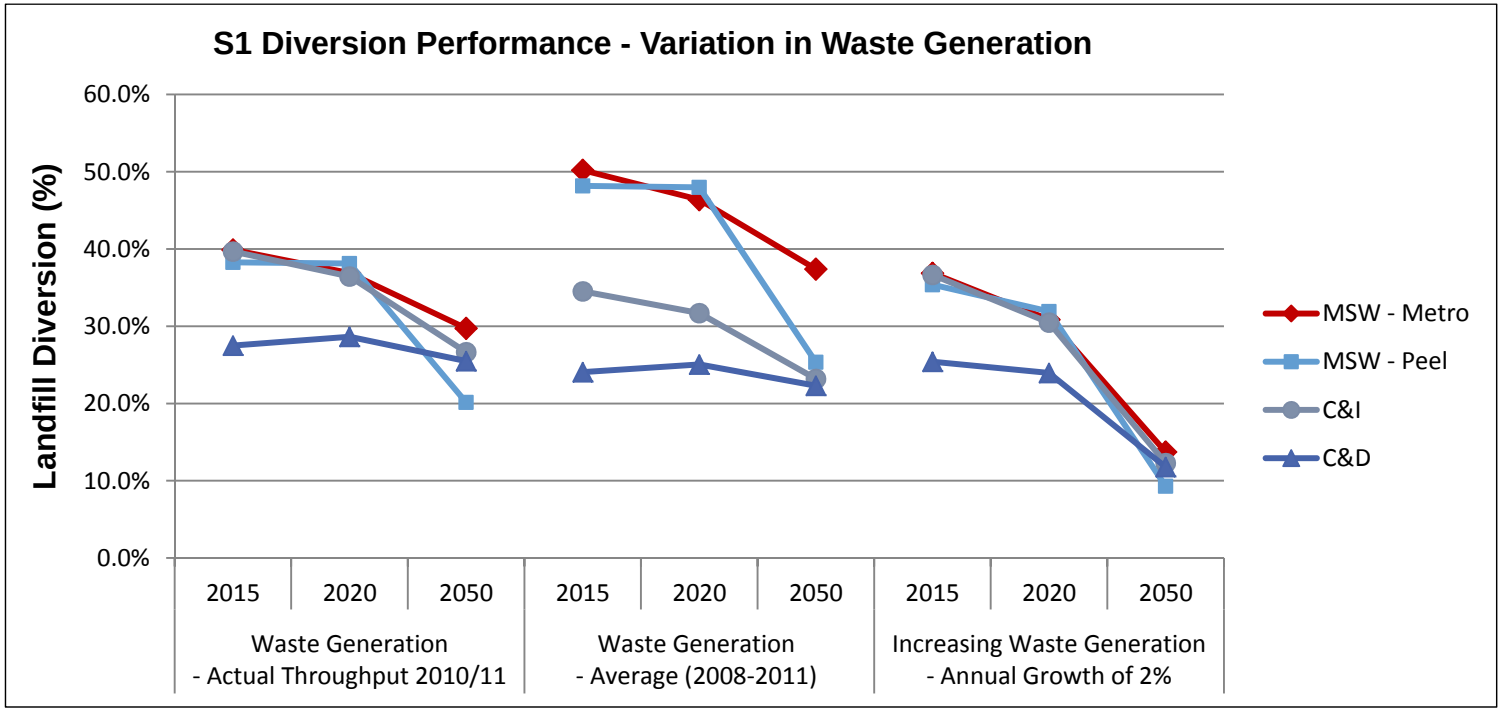
	S8	S9	S8B	S11B	S6B	S11	S6	S7	S3	S12	S10	S5	S4	S2	S1
2015	51.6%	50.9%	53.1%	52.6%	53.4%	50.9%	51.9%	52.5%	51.2%	57.4%	33.3%	33.5%	37.7%	34.3%	34.0%
2020	79.1%	78.8%	78.3%	76.1%	75.6%	74.6%	74.4%	70.4%	66.5%	63.8%	54.6%	49.8%	44.4%	42.7%	32.9%
2050	70.7%	71.0%	71.5%	71.7%	71.3%	70.6%	70.5%	65.7%	63.6%	53.6%	47.3%	47.3%	38.5%	39.4%	26.8%

MODELLING SENSITIVITY ANALYSIS

- Sensitivity analyses were conducted around the following parameters:
  - Population growth over the modelling period
  - Baseline waste generation rate and growth in per capita waste generation
  - Potential future increases in waste diversion targets
  - Recovery efficiency rates of new AWT / Dirty MRF, EfW, AD and C&D facilities
  - Material capture rates through source separation
- Variations due to: facility technologies selected, scale of facilities, complexity of processing, extent of education programs and technological developments that influence changes in consumption patterns and packaging design.

MODELLING SENSITIVITY ANALYSIS - EXAMPLE

- Used for report:
  - Waste throughput in 2010/11 then pegged to population increase
- Alternate scenarios:
  - Averaged waste generation per capita over the past 4 years
  - Additional 2% annual waste generation growth in response to economic growth



SUMMARY

- Business-as-usual will not achieve targets
- Source separation strategies unlikely to achieve targets
- AWTs could achieve 2020 targets for MSW and C&I
- EfW + Dirty MRFs could easily achieve 2020 targets
- Mixed processing for C&D could easily achieve 2020 / 2050 targets

RECOMMENDATIONS

- Ensure that current market-driven approach is not relied upon
- Strengthen policy frameworks – AWT, EfW, Dirty MRF, mixed C&D

- Future actions:
  - Analysis of available land sites
  - Logistics modelling for suitable sites
  - Re-apply the Hyder modelling tool for these sites
  - Cost Benefit Analysis of preferred infrastructure combinations
  - Address barriers to investment and planning approval