South Staffs and Cambridge Water
Demand management options – Optimiser Outputs

01/07/22

Giles Fox
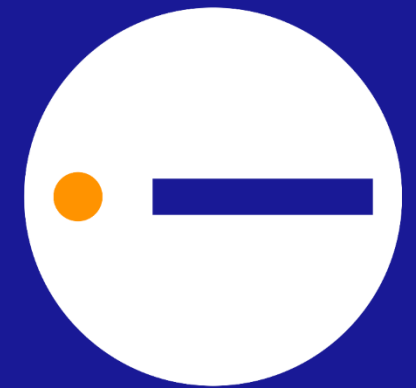
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Contents

17 June 2022

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1.Scenarios - PCC

We have considered three PCC pathways in this project, which reflect on low, medium and high levels of ambition for PCC reduction by 2050. The medium pathway is based on the national framework for water resources target of 110 litres/person/day. The High and low pathways represent lower / higher ambitions for PCC targets

Scenario Ref	Name	Description
PCC_01	PCC_LOW	120 l/h/d by 2050
PCC_02	PCC_MED	110 l/h/d by 2050
PCC_03	PCC_HIGH	90 l/h/d by 2050

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2.Scenarios – Smart Networks

Smart network plans are a key enabler in delivering options in the WRMP. The implementation of smart networks (including household smart metering) will provide a platform for data driven insights, which will enable increased efficiency for PCC, leakage and non-household consumption reductions.

For example, smart meter data will drive greater efficiency for water efficiency home visits, as the properties with most opportunity for saving can be targeted, rather than adopting an unfocused approach based on geographical area.

From our discussions with SSW, smart networks is currently at an investigation phase, so we assume that rollout will not be carried out in AMP7. We therefore propose the following two scenarios :

Scenario Ref	Name	Description
SN_01	AMP_8	Smart Network Rollout in AMP8
SN_02	AMP_9	Smart Network Rollout in AMP9

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3. Scenarios – Water Labelling

Water labelling has been identified as having a significant impact on demand reduction through reduced PCC and although out of South Staffs Water's control, the government has announced that it will to introduce water labelling from 2025. However, the extent of a water labelling scheme and its criteria have yet to be finalised

To account for this we propose the following water labelling scenarios:

Scenario Ref	Name	Description
WL_01	min_stds	Water labelling with minimum standards (higher impact on demand reduction)
WL_02	No_min_stds	Water labelling without minimum standards (lower impact on demand reduction)
WL_03	No_WL	No water label introduced (no impact on demand reduction)

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4. Scenarios – Leakage

In terms of leakage reduction we propose the two scenarios below. These meet either just the NIC recommendation or the PIC target and the NIC recommendation.

Scenario Ref	Name	Description
LEA_01	Linear to NIC	Linear leakage reduction from 2025 to 50% of the 2018 leakage value by 2050 as per NIC recommendations.
LEA_02	PIC plus NIC	Linear leakage reduction to the PIC target in 2030, then a linear reduction to the NIC target in 2050.

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Optimiser Outputs-HH

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5. HH Outputs SST

As can be seen on the following slides, the PCC ambition is the main driver in the reduction required in each AMP.
The water labelling scenarios and timing of Smart Network rollout have a significant impact on the results selected by the optimiser.

The LOW pathway is readily achieved with either no intervention required where water labelling impact is highest ('with minimum standards' scenario) or with a fairly minimal set of options required no minimum Water Labelling standards but no solution found in the no water labelling scenario.

The MED pathway can be achieved in the two water labelling scenarios, but where there is no water labelling impact and no smart network options, the optimizer could not find a solution to achieve the pathway.

The HIGH Pathway cannot be be achieved in any scenario.

Costs for these outputs are shown to the right, Plots for these combinations of scenarios can be found on the following slide:
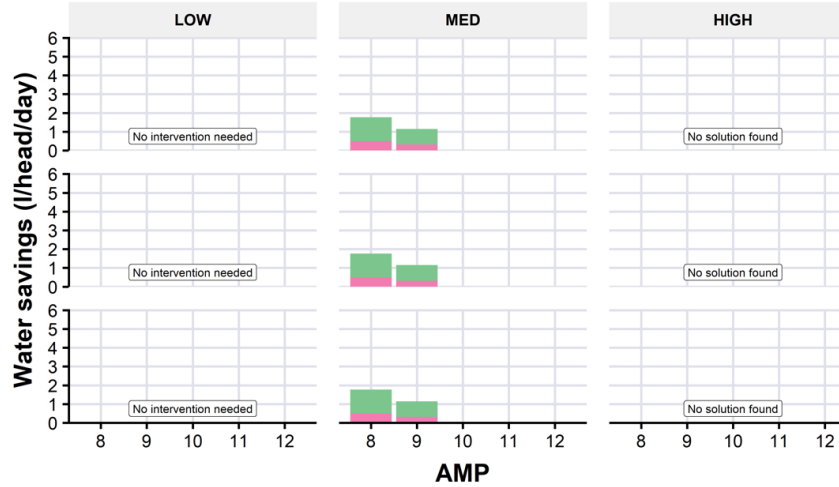
| WL Scenario	SST HH costs (£m)						SN Scenario
	Low		Med		High		
Min Stds	NAR		£	13.44	x		AMP8
	NAR		£	13.44	x		AMP9
	NAR		£	13.44	x		NoSN
	Low		Med		High		
no Min Stds	£	2.67	£	35.20	x		AMP8
	£	2.67	£	38.14	x		AMP9
	£	2.67	£	78.65	x		NoSN
	Low		Med		High		
No WL	£	50.25	x		x		AMP8
	£	61.19	x		x		AMP9
	x		x		x		NoSN

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HH PCC savings by scenario, water labelling with minimum standards
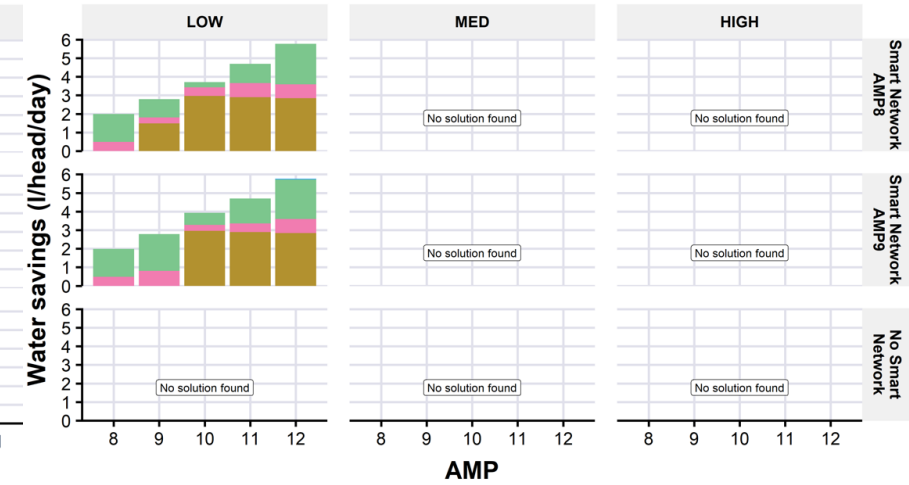
WRZ: South Staffs Water

HH PCC savings by scenario, water labelling without minimum standards

WRZ: South Staffs Water
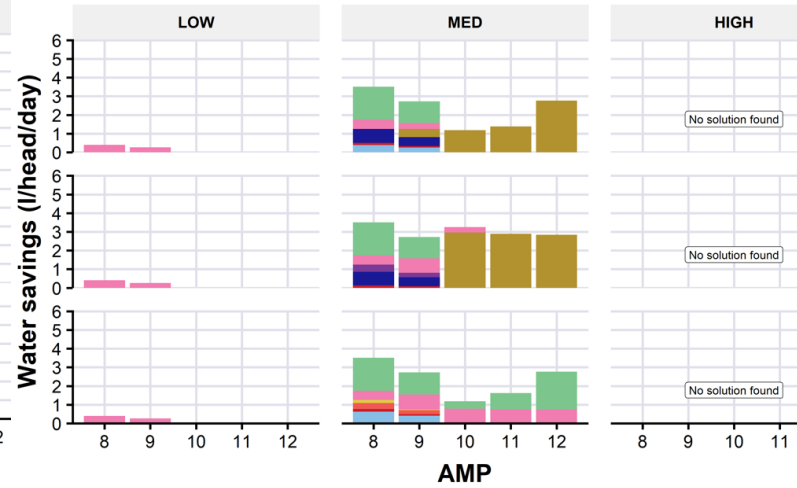
HH PCC savings by scenario, without water labelling

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2021-002 Community RWH
2021-006 Water Neutrality (with smart metering)
2021-012 Household water efficiency programme (Partnering approach, home visit)
2021-036 Housing Associations - targeted programme

2021-048 Innovative tariffs
2021-075 Home retrofit RWH/GWR
2021-076 Increased media campaigns and school education
2021-077 New homes standards - voluntary

2021-090 Targeting properties for efficiency audits (with smart metering)
2021-091 Targeting properties for efficiency audits (without smart metering)
2021-093 Community Water Efficiency Scheme (with smart metering)
2021-094 Water Neutrality (without smart metering)
2021-095 Community Water Efficiency Scheme (without smart metering)

17 June 2022

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5. HH Outputs CAM

The results for CAM follow a similar theme to SST, albeit with different options selected by the optimiser .

The LOW pathway is again readily achieved with either no intervention required where water labelling impact is highest ('with minimum standards' scenario) or with a fairly minimal set of options required(no minimum standards and no water labelling scenarios)

The MED pathway can be achieved in the two water labelling scenarios, but where there is no water labelling impact and no smart network options, the optimiser could not find a solution to achieve the pathway.

The HIGH Pathway can be achieved in the two water labelling scenarios, where Smart networks are rolled out in AMP8 or AMP9, but a solution cannot be found where there are no smart network benefits, and no solutions can be found where there are no water labelling benefits.

Costs for these solutions are shown to the right, Plots for these combinations of scenarios can be found on the following slide:

WL Scenario	CAM HH costs (£m)						SN Scenario
	Low		Med		High		
Min Stds	NAR		£	2.19	£	96.20	AMP8
	NAR		£	2.19	£	103.50	AMP9
	NAR		£	2.19		x	NoSN
no Min Stds	Low		Med		High		
	NAR		£	7.60		x	AMP8
	NAR		£	7.60		x	AMP9
	NAR		£	15.10		x	NoSN
No WL	Low		Med		High		
	£	9.53	£	87.40		x	AMP8
	£	10.26	£	225.88		x	AMP9
		x		x		x	NoSN

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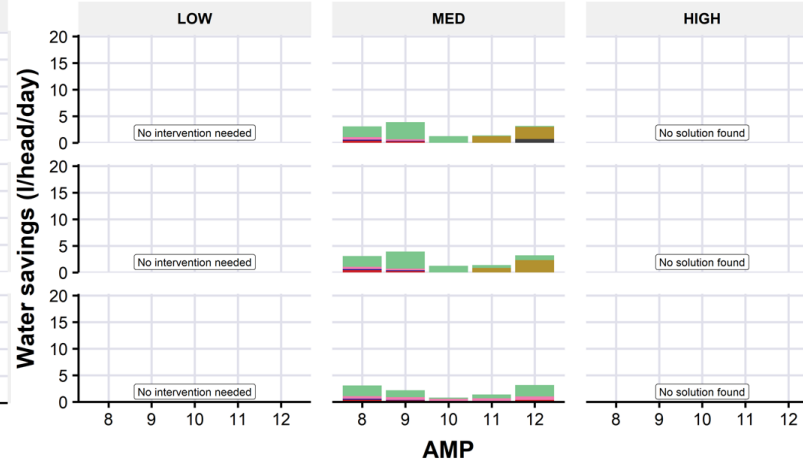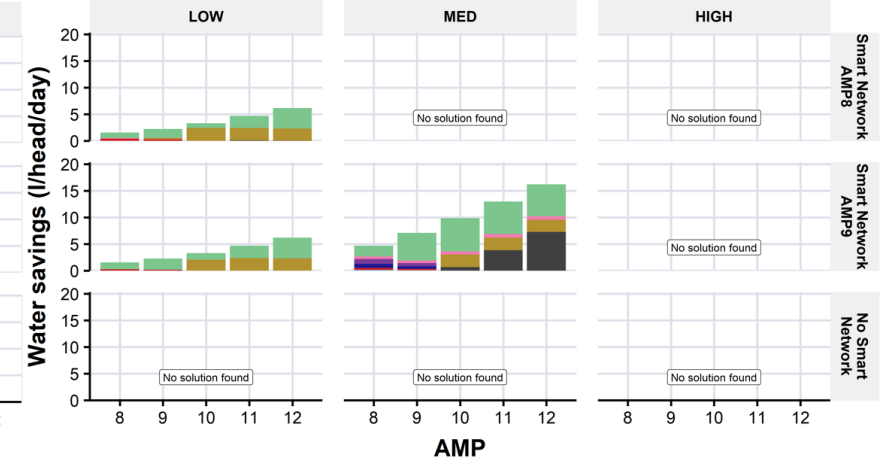**HH PCC savings by scenario, water labelling with minimum standards**

WRZ: Cambridge Water
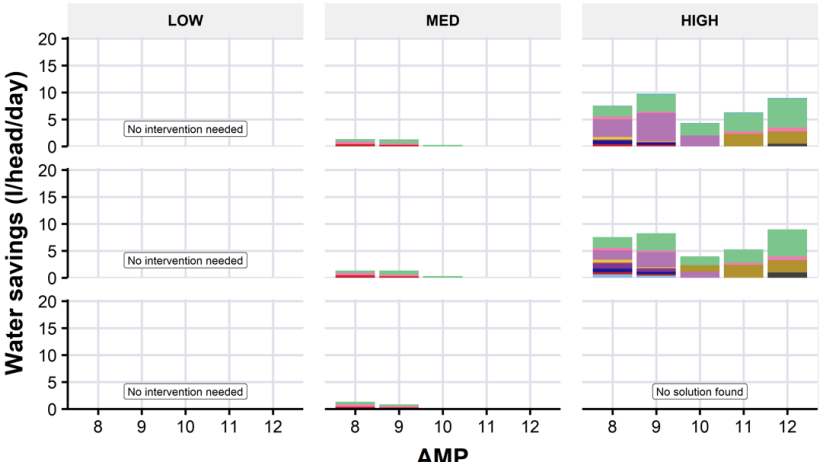
HH PCC savings by scenario, water labelling without minimum standards

WRZ: Cambridge Water

HH PCC savings by scenario, without water labelling
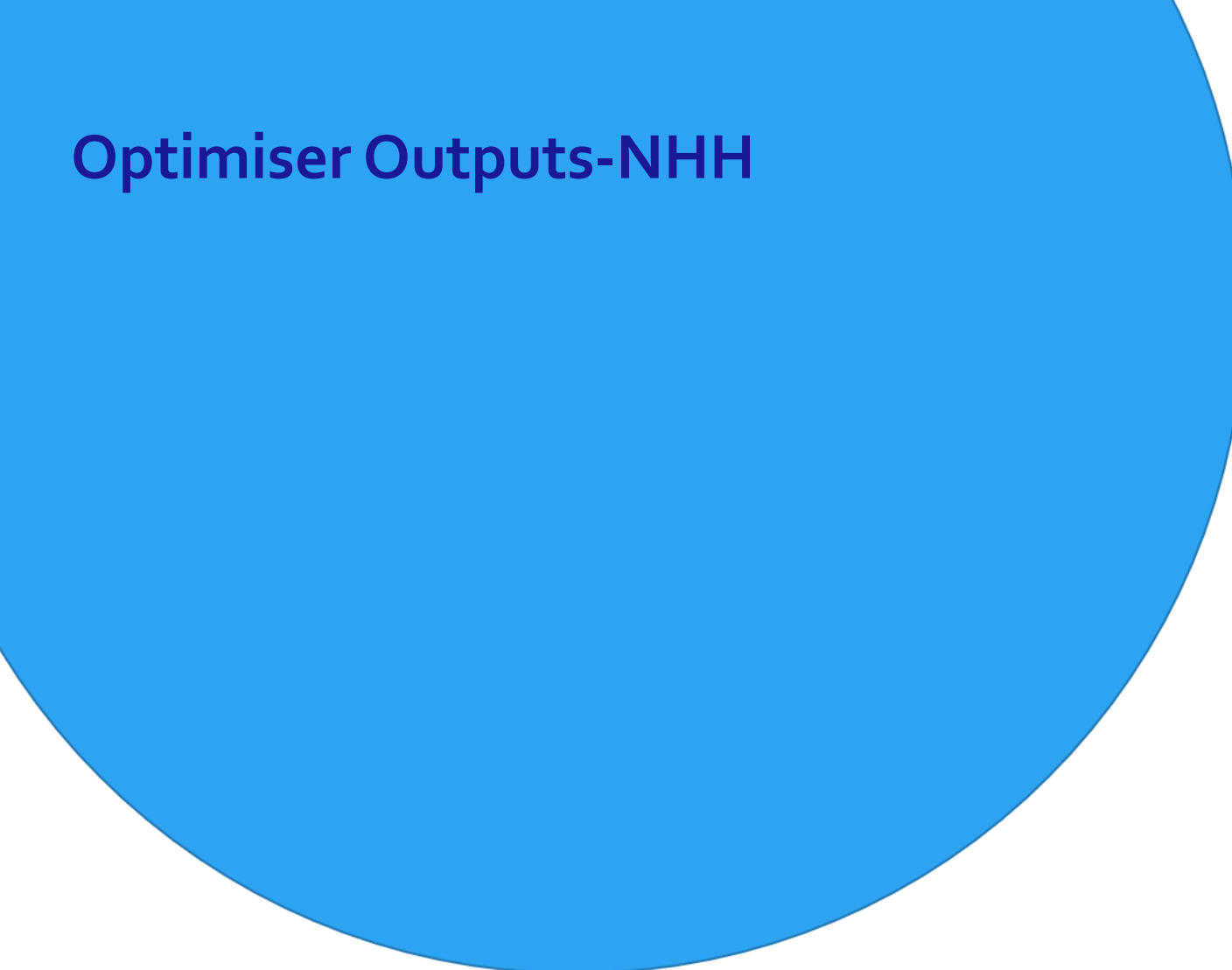
WRZ: Cambridge Water

2021-002	Community RWH	
2021-006	Water Neutrality (with smart metering)	
2021-012	Household water efficiency programme (Partnering approach, home visit)	
2021-036	Housing Associations - targeted programme	

2021-048	Innovative tariffs	
2021-075	Home retrofit RWH/GWR	
2021-076	Increased media campaigns and school education	
2021-077	New homes standards - voluntary	

2021-090	Targeting properties for efficiency audits (with smart metering)	
2021-091	Targeting properties for efficiency audits (without smart metering	
2021-093	Community Water Efficiency Scheme (with smart metering)	
2021-094	Water Neutrality (without smart metering)	
2021-095	Community Water Efficiency Scheme (without smart metering)	

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Optimiser Outputs-NHH

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6. NHH Outputs SST

The timing of Smart Network rollout has a significant impact on the results selected by the optimiser.
In the case of NHH, this refers to the rollout of Enhanced Meter Technology(EMT) on non-household properties.

Smart Network AMP 8
This pathway is readily achieved using the EMT option (2021-116)

Smart Network AMP9
This pathway is achieved mainly through a NHH Water efficiency programme(2021-015) in AMP 8 and 9 before the EMT option (2021-116) is introduced and demand reduction can be achieved.

No Smart Network
Where no EMT is introduced, the pathway can be achieved through Water efficiency programmes, but this is at a significantly higher cost
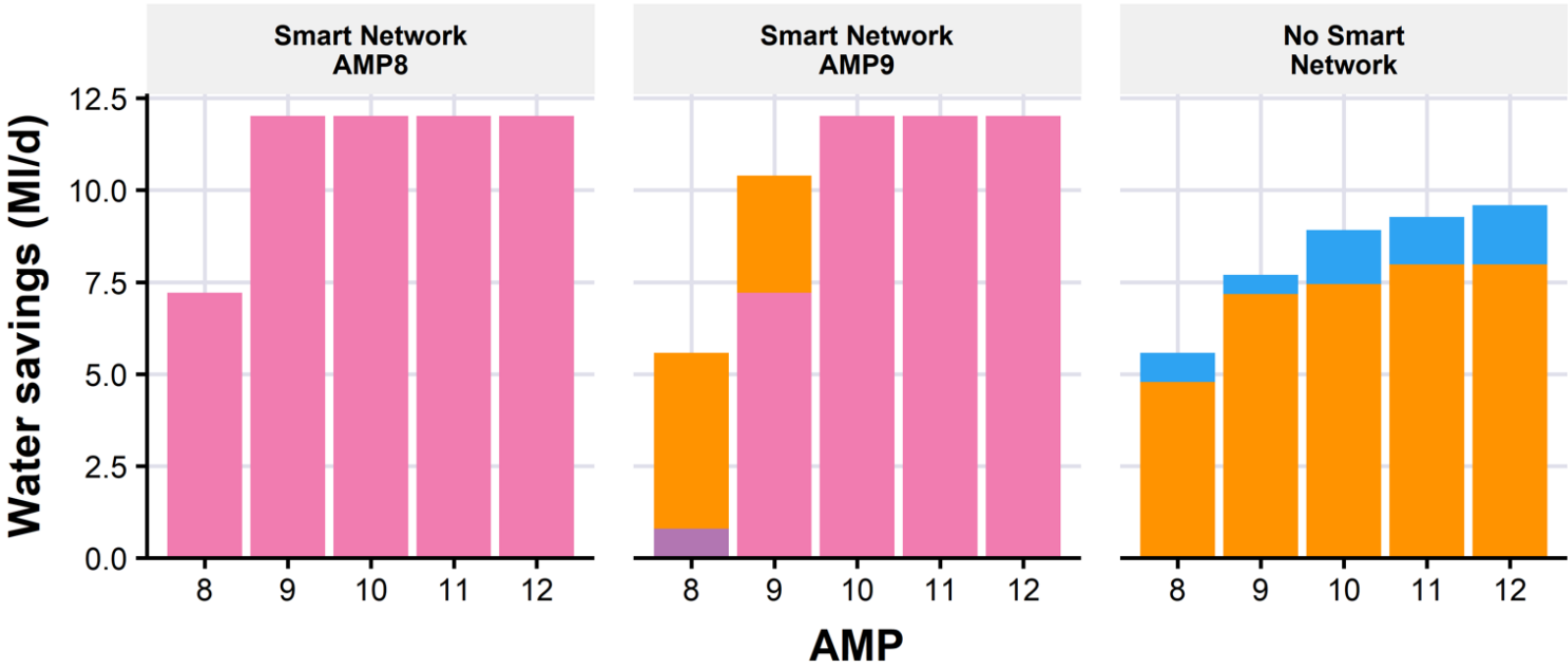
Plots and costs for these combinations of scenarios can be found on the following slide:

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NHH water savings by scenario

WRZ: South Staffs Water

SST NHH costs (£m)	
Costs	SN Scenario
£ 7.87	AMP8
£ 16.35	AMP9
£ 43.98	NoSN

Legend:
- 2021-013 Non-household water efficiency programme (Company led, self-install)
- 2021-015 Non-household water efficiency programme (Company led, site visit with install
- 2021-114 Retailer Incentive Mechanism
- 2021-116 NHH Enhanced Meter Technology
- 2021-117 Metering of Leftover Commercials
- 2021-121 Water Audits Retail - non process (non-SN)

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As can be seen on the following slides, the PCC ambition is the main driver in the reduction required in each AMP.
The timing of Smart Network rollout has a significant impact on the results selected by the optimiser.
In the case of NHH, this refers to the rollout of enhanced Meter Technology(EMT) on non-household properties.

Smart Network AMP 8
This pathway is readily achieved using the EMT option (2021-116)

Smart Network AMP9
This pathway is achieved mainly through a NHH Water efficiency option(2021-015)and also Audits of NHH properties (2021-121) in AMPs 8 and 9 before the EMT option (2021-116) is introduced and demand reduction can be achieved.
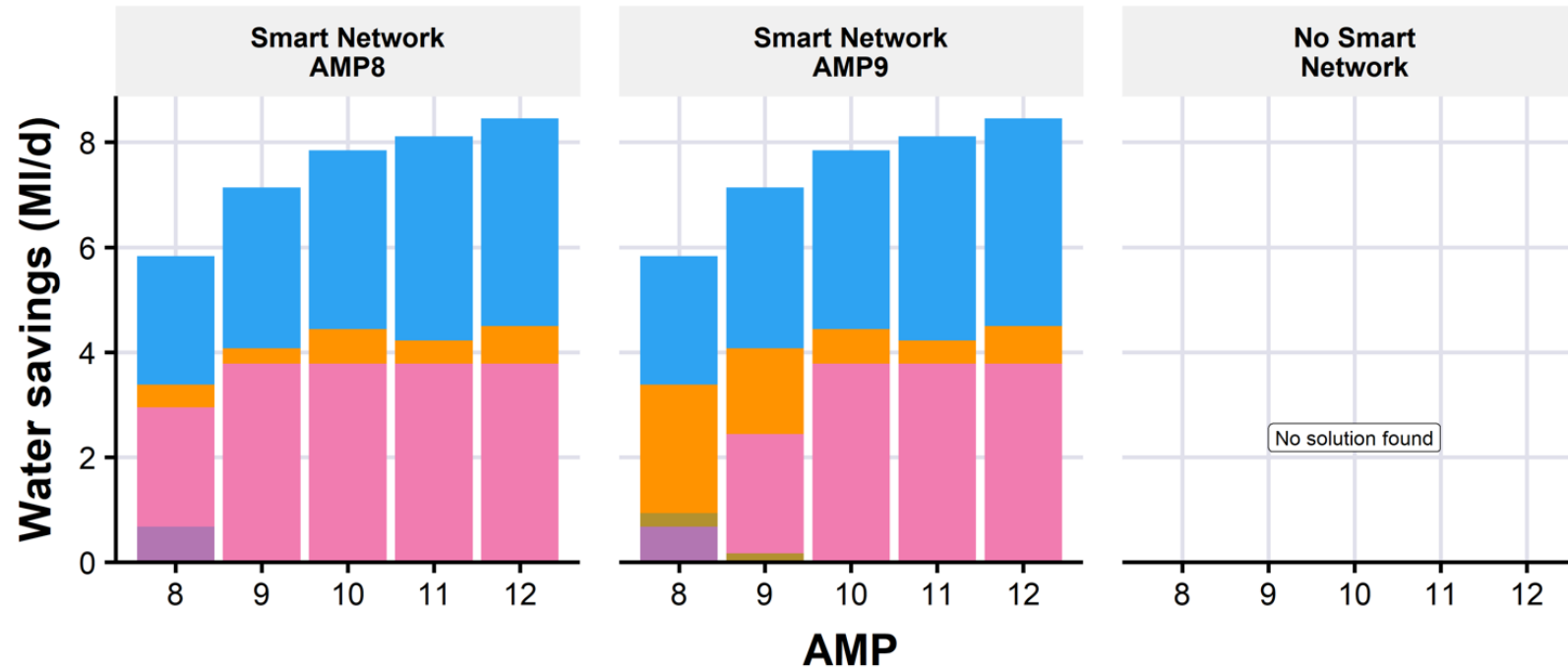
No Smart Network
Where no EMT is introduced, no solution can be found to achieve the pathway

Plots and costs for these combinations of scenarios can be found on the following slide:

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NHH water savings by scenario

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Smart Network AMP8 / **Smart Network AMP9** / **No Smart Network**

Water savings (Ml/d) vs AMP

No solution found

Legend:
- 2021-013 Non-household water efficiency programme (Company led, self-install)
- 2021-015 Non-household water efficiency programme (Company led, site visit with install
- 2021-114 Retailer Incentive Mechanism
- 2021-116 NHH Enhanced Meter Technology
- 2021-117 Metering of Leftover Commercials
- 2021-121 Water Audits Retail - non process (non-SN)

CAM NHH costs (£m)	
Costs	SN Scenario
£ 24.43	AMP8
£ 28.33	AMP9
x	NoSN

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Optimiser Outputs-Leakage

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7. Leakage Outputs SST

Smart Network AMP 8

Where Smart Network is in place in AMP8 the NIC and PIC pathways are achieved using a combination of ALC plus(2021-108), Advanced Pressure Management (2021-003), CSP repair or replacement(2012-045) and Trunk Mains leakage reduction(2021-001). Main replacement is introduced from AMP12

Smart Network AMP 9

Where Smart Networks is rolled out in AMP9 the NIC and PIC pathways are achieved using a similar combination of options, but at an increased cost due to more efficient options with Smart Network benefits being introduced from 2035-36.

No Smart Network

However, where there are no Smart Network Benefits, a solution cannot be found for either leakage scenario.
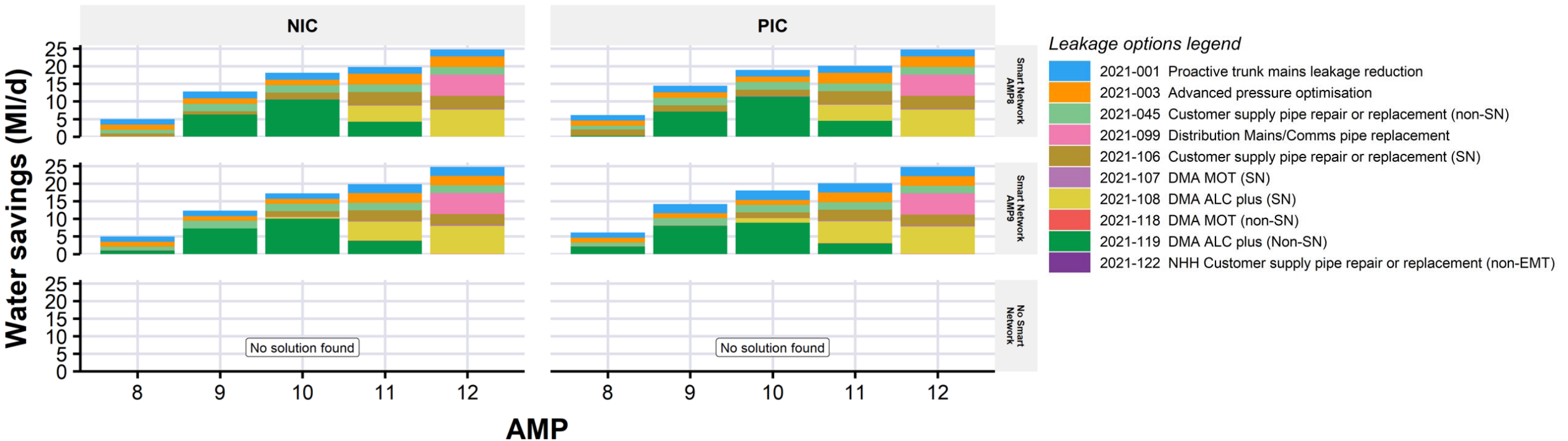
Costs for these for these combinations of scenarios can be found on the right of this slide and Plots on the following slide:

SST Leakage costs (£m)		
NIC	PIC	SN Scenario
£ 62.57	£ 63.30	AMP8
£ 71.74	£ 73.98	AMP9
x	x	NoSN

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Leakage water savings by scenario

WRZ: South Staffs Water

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7. Leakage Outputs CAM

Smart Network AMP 8

Where Smart Network is in place in AMP8 the NIC and PIC pathways are achieved using a combination of ALC plus(2021-108), DMA MOT(2021-107) Advanced Pressure Management (2021-003) and Trunk mains leakage reduction(2021-001)

Smart Network AMP 9

Where Smart Networks is rolled out in AMP9 the NIC and PIC pathways are achieved using a similar combination of options, but at an increased cost due to more efficient options with Smart Network benefits being introduced from 2035-36.

No Smart Network

However, where there are no Smart Network Benefits, both pathways are achieved using Mainly ALC plus with no Smart Network efficiency(2021-119) and distribution Mains & comms replacement(2001-099), with smaller savings from DMA MOT without Smart Network efficiency (2021-118) and Advanced Pressure Management (2021-003)

Costs for these for these outputs can be found on the right of this slide and plots on the following slide:

CAM Leakage costs (£m)				
NIC		PIC		SN Scenario
£	17.95	£	18.18	AMP8
£	18.59	£	19.68	AMP9
£	93.29	£	93.45	NoSN

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Leakage water savings by scenario

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