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Measuring the cost-effectiveness of noise-mitigating measures for Schiphol Airport

In the context of the Balanced Approach procedure

Addendum to initial report, 31-8-2023

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1. Study background

1. Study background

Introduction

On the 24th of June 2022 the Dutch government announced plans to reduce Schiphol's annual capacity from 500,000 to 440,000 movements per year, with the aim to reduce the noise impact around the airport. The capacity reduction should be implemented as of November 2024.

Reducing Schiphol's annual capacity with the aim to reduce its noise impact, requires a so-called Balanced Approach procedure laid down in EU Regulation 598/2014

The Balanced Approach procedure contains three consecutive steps:

1. Define the noise abatement objectives, identify feasible measures to achieve the objectives and assess the cost-effectiveness of each measure and combination of measures
2. Consult relevant stakeholders on the outcomes of step 1
3. Determine the most cost-effective combination of measures to achieve the noise objectives by taking the stakeholder inputs into account

1. Study background

Step 1: Define noise objective and assess cost-effectiveness of feasible measures

The first step was conducted between October 2022 and March 2023.

The noise abatement objective for November 2024 was defined as follows by the Ministry of Infrastructure and Water Management as in the table below:

Noise objectives with respect to baseline (nov 2024)	
• Houses within 58 dB(A) Lden contour	-20%
• Highly annoyed people within 48 dB(A) Lden contour	-20%
• Houses within 48 dB(A) Lnight contour	-15%
• Severely sleep disturbed people within 40 dB(A) Lnight contour	-15%

The Ministry commissioned a consortium consisting of Decisio, Beelining and To70 to identify feasible measures to achieve the noise objective and to assess the cost-effectiveness of each measure and of a combinations of measures.

The results of the initial cost-effectiveness study can be found here: [Decisio and Beelining \(2023\). Cost-effectiveness of noise mitigating measures for Schiphol. Final Report. 10 March 2023](#)

1. Study background

Step 2: Consult relevant stakeholders

The Balanced Approach procedure – and the cost-effectiveness study – were open for consultation between March 15 and June 15 2023 (as prescribed by EU Regulation 598/2014).

The consultation phase yielded 224 responses from local governments, local communities, environmental organization, airlines and the airport.

Several alternative measures were suggested. Some of these, such as a night curfew and a ban on noisy aircraft, might have a large impact on noise, but cannot be implemented before november 2024 and therefore were not short-listed.

Other measures required additional analysis and therefore were not short-listed.

Taking this into consideration, the government leaves the noise objectives intact, but chooses to realise an initial step (per November 2024) of approximately 15 percent and in a subsequent step realise the remaining 5 percent in the 24-hour period.

1. Study background

After careful consideration and applying the selection criteria defined in the initial study two additional measures were short-listed:

- Fleet renewal
- Use of quieter aircraft during nighttime period

Furthermore, a safety and feasibility assessment by competent authorities (LVNL and ILT) led to the removal of four measures from the short-list:

- Stimulate airlines to use quieter aircraft, as this cannot be implemented before nov. 2024
- Extend the night regime, as this would increase Peaks and complexity in the shoulder-periods
- Runway closure (Buitenveldertbaan), as the use of this runway is already minimized

This resulted in the following definitive short-list of noise-mitigating measures*. For some measures multiple variants were considered:

Measure	Variants
Fleet renewal	Three variants
Minimize the use of secondary runways	
Cap on total annual flight movements (440k)	Two variants with 32k and 29k during the night were considered
Use of quieter aircraft during nighttime period	
Cap on annual flight movements during the night	Three variants with 29k, 27k and 25k movements during the night were considered



* For more information on the selection of measures we refer to the addendum of the To70 report

1. Study background

Step 3: Determine most cost-effective combination of measures to achieve noise objective

For each measure – and variant – on the definitive short-list To70 estimated its contribution to the noise abatement objectives. Subsequently, Decisio and Beelining assessed the cost-effectiveness of each measure – and variant.

Based on the cost-effectiveness of the individual measures and their contribution towards the noise objectives, two sets of measure combinations were defined that are able to achieve the noise objectives for November 2024.

The caps on annual and night movements were adjusted in such a way that the objectives are achieved with the slightest overshoot.

The results of the final cost-effectiveness analysis are described in this report.

The report acts as an Addendum to our initial report. For a comprehensive understanding of the study background, the methodology used and the cost-effectiveness of previously assessed measures, we recommend to familiarize yourself with our initial report: [*Decisio and Beelining \(2023\). Cost-effectiveness of noise mitigating measures for Schiphol. Final Report. 10 March 2023*](#)

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2. Cost-effectiveness per measure

Assessment of new measures

This section describes the cost-effectiveness of the new measures that were short-listed:

- Accelerated fleet renewal
- Use of quieter aircraft during nighttime period

For a description of the cost-effectiveness of the previously assessed measures, we refer to our initial report: [*Decisio and Beelining \(2023\). Cost-effectiveness of noise mitigating measures for Schiphol. Final Report. 10 March 2023*](#)

Fleet renewal

Fleet renewal is a continuous process driven by operational costs. A trend-based development of airline fleets has therefore been assumed in the baseline scenario.

During the consultation phase it was indicated that airlines may renew their fleet at a faster pace than the assumed trend-based development. As the noise-abatement objectives are defined within the year 2024, any additional fleet renewal ahead of this time cannot be taken into account in the baseline.

Therefore, it was decided to treat fleet renewal as a separate ‘measure’. This was estimated based on fleet renewal data provided by the home-based carrier for the period until november 2024. Three variants of possible fleet renewal variants were used by to70 to assess the impacts on noise. We refer to the addendum of the to70 report for more detailed information about these variants. We apply these fleet renewal variants also to our cost-effectiveness analysis.

It should be noted that fleet renewal strategies cannot be changed significantly in the short-term as aircraft manufacturers have order backlogs of multiple years.

Fleet renewal

Cost estimation

- **Passengers/Freight:**
 - No impact on (generalised travel) costs for passengers and freight as flight movements and schedules do not change.
- **Airlines:**
 - Increased operational costs in the short-term as higher fixed costs (depreciation, insurance and rentals) outweigh lower variable costs (fuel and maintenance) in the short-term. Over the longer-term – outside the scope of this assessment – the lower variable costs will outweigh the higher fixed costs.
 - Airlines will fully absorb increase in operational costs because of competitive market.
- **Airports:**
 - No overall impact on profitability. Less aeronautical revenues due to more efficient fleet, but this will be compensated in the charges, as charges need to remain cost-based.
- **Indirect economic impacts (agglomeration effects)**
 - Less efficient operation and increase in generalised travel costs have negative economic effects on the agglomeration of Schiphol.
- **Government:**
 - No impact on government expenses
- **Society:**
 - No global impact on CO₂ and non-CO₂ as older aircraft are deployed elsewhere.
 - Mixed impact on local air quality. Negative impact on NO_x and PM as newer aircraft emit more NO_x and PM than older aircraft. Positive impact on CO and HC as newer aircraft emit less of these substances than older aircraft.
- **Employment and value added (local effect):**
 - No gross impact as total number of flight movements does not change.

Fleet renewal - results

Total costs in 2024:

- Direct costs are only incurred (and fully absorbed) by the operation of airlines.
- Variant 1 shows lowest increase in costs because older aircraft are replaced by newer aircraft with somewhat the same size. In variant 2 smaller (older) aircraft models are replaced by newer bigger models. Variant 3 falls in between. For more detailed information about the variants we refer to the addendum of the to70 report.

Total costs in million euro's with respect to baseline (500k)

	Variant 1	Variant 2	Variant 3
Net costs			
Operational costs airlines	-€ 9,7 +/- PM	-€ 17,3 +/- PM	-€ 13,5 +/- PM
Generalised travel cost passengers/freight	-€ 0,0	-€ 0,0	-€ 0,0
Government costs	-€ 0,0	-€ 0,0	-€ 0,0
Direct costs	-€ 9,7 +/- PM	-€ 17,3 +/- PM	-€ 13,5 +/- PM
Net External effects (less flights)			
Climate effects - CO2 and non CO2			
Air quality - NoX			
Air quality - PM10			
Additional economic impact Schiphol (agglomeration)	-€ 1,5 +/- PM	-€ 2,6 +/- PM	-€ 2,0 +/- PM
Total costs (including indirect and external costs):	-€ 11,2 +/- PM	-€ 19,9 +/- PM	-€ 15,5 +/- PM

Fleet renewal - results

Cost effectiveness of reduction per house/annoyed person:

- The measure in itself does not reach any noise objective.
- The noise impacts of the measure are relatively small, ranging between +1.3% and -0.9%. This indicates that the assumed fleet renewal strategies are largely in line with trend-based developments.
- On some noise indicators the measure scores worse than the baseline, meaning that the assumed fleet renewal strategies do not go beyond the trend-based developments in the baseline. For those indicators that score worse than the baseline a calculation of the cost-effectiveness per house/annoyed person is not possible as there is no reduction.

With respect to baseline 500k:	Change in number of houses/persons:	Change in % of houses/persons:	<i>Net operational costs per reduction of:</i>	<i>Direct costs per reduction of:</i>	<i>Total costs per reduction of:</i>
Variant 1					
Houses within 58 dB(A) Lden contour	-28	-0,4%	-€ 344.207	-€ 344.207	-€ 395.838
Highly annoyed people within 48 dB(A) Lden contour	-51	-0,9%	-€ 190.547	-€ 190.547	-€ 219.129
Houses within 48 dB(A) Lnight contour	228	0,2%			
Severely sleep disturbed people within 40 dB(A) Lnight contour	-73	-0,3%	-€ 133.379	-€ 133.379	-€ 153.386
Variant 2					
Houses within 58 dB(A) Lden contour	64	0,9%			
Highly annoyed people within 48 dB(A) Lden contour	-40	-0,7%	-€ 433.881	-€ 433.881	-€ 498.963
Houses within 48 dB(A) Lnight contour	1.480	1,3%			
Severely sleep disturbed people within 40 dB(A) Lnight contour	-	0,0%			
Variant 2					
Houses within 58 dB(A) Lden contour	7	0,1%			
Highly annoyed people within 48 dB(A) Lden contour	-45	-0,8%	-€ 297.005	-€ 297.005	-€ 341.556
Houses within 48 dB(A) Lnight contour	797	0,7%			
Severely sleep disturbed people within 40 dB(A) Lnight contour	-49	-0,2%	-€ 277.197	-€ 277.197	-€ 318.777

 = Noise abatement objective not achieved
 = Noise abatement objective achieved

Use of quieter aircraft during nighttime period

This measure aims to reduce noise at night through the operation of less noisy aircraft during the night. This is achieved by:

- Moving noisy (widebody) aircraft to the daytime and using the freed-up night slots for the operation of less noisy (narrowbody) aircraft.
- Deploying less noisy aircraft types on routes operated during the night.

However, this means that more noisy (widebody) aircraft are operated during the daytime.

The assessment was based on the operational changes that the home-based carrier can implement in this respect until November 2024.

Use of quieter aircraft during nighttime period

Cost estimation

- **Passengers/Freight:**
 - Increase in generalised travel costs as travel times increase for some transfers passengers: travel time increase x time valuation for air passengers in Netherlands.
- **Airlines:**
 - Increase in operational costs due to lower utilisation of assets: increase in fixed costs (based on operational costs per block hour).
- **Airports:**
 - No overall impact on profitability. Less aeronautical revenues due to more efficient fleet at night, but this will be compensated in the charges, as charges need to remain cost-based.
- **Indirect economic impacts (agglomeration effects)**
 - Less efficient operation and increase in generalised travel costs have negative economic effects on the agglomeration of Schiphol.
- **Government:**
 - No impact on government expenses.
- **Society:**
 - No overall impact on CO2 and non-CO2 as noisy (and probably less-efficient aircraft) are operated at other times of the day.
- **Employment and value added (local effect):**
 - No gross impact as total number of flight movements does not change

Use of quieter aircraft during nighttime period

Cost effectiveness of reduction per house/annoyed person:

- The measure in itself does not reach any noise objective
- The measure contributes relatively much to the noise objectives for the night, but less for the objectives during the entire day
- The measure is highly cost-effective both for the night (Lnight) and the entire day (Lden)

Total costs in million euro's with respect to baseline (500k)

	Quieter aircraft
Net costs	
Operational costs airlines	-€ 3,3 +/- PM
Generalised travel cost passengers/freight	-€ 3,8 +/- PM
Government costs	-€ 0,0
Direct costs	-€ 7,1 +/- PM
Net External effects (less flights)	
Climate effects - CO2 and non CO2	
Air quality - NoX	
Air quality - PM10	
Additional economic impact Schiphol (agglomeration)	-€ 1,1 +/- PM
Total costs (including indirect and external costs):	-€ 8,2 +/- PM

With respect to baseline 500k:	Change in number of houses/persons:	Change in % of houses/persons:	Net operational costs per reduction of:	Direct costs per reduction of:	Total costs per reduction of:
Houses within 58 dB(A) Lden contour	-248	-3,5%	-€ 13.336	-€ 28.766	-€ 33.081
Highly annoyed people within 48 dB(A) Lden contour	-819	-14,4%	-€ 4.037	-€ 8.709	-€ 10.015
Houses within 48 dB(A) Lnight contour	-2.505	-2,2%	-€ 1.319	-€ 2.846	-€ 3.273
Severely sleep disturbed people within 40 dB(A) Lnight contour	-2.242	-9,2%	-€ 1.474	-€ 3.180	-€ 3.657

= Noise abatement objective not achieved

= Noise abatement objective achieved

Overview results measures

In the table below the total costs (in 2024) of the measures on the definitive short-list (see page 7) are presented:

Total costs in million euro's with respect to baseline (500k)

Measures	Fleet renewal			Minimize 2nd rwy use (M10)	Cap on total annual movements (M14)		Use of quieter aircraft during nighttime period	Cap on annual movements during night (M15)		
	Variant 1	Variant 2	Variant 3		440k/29k	440k/32k		500k/29k	500k/27k	500k/25k
Variants	Variant 1	Variant 2	Variant 3		440k/29k	440k/32k		500k/29k	500k/27k	500k/25k
Net costs										
Operational costs airlines	-€ 9,7 +/- PM	-€ 17,3 +/- PM	-€ 13,5 +/- PM	-€ 4,7	-€ 236,2 +/-PM	-€ 219,7 +/-PM	-€ 3,3 +/- PM	-€ 10,8	-€ 19,0	-€ 30,9
Generalised travel cost passengers/freight	-€ 0,0	-€ 0,0	-€ 0,0	-€ 5,0	-€ 620,6 -PM	-€ 613,9 -PM	-€ 3,8 +/- PM	-€ 8,0	-€ 14,9	-€ 33,4
Government costs	-€ 0,0	-€ 0,0	-€ 0,0	€ 0,0	-€ 14,4	-€ 14,4	-€ 0,0	€ 0,0	€ 0,0	€ 0,0
Airport authorities					- PM	- PM				
Direct costs	-€ 9,7 +/- PM	-€ 17,3 +/- PM	-€ 13,5 +/- PM	-€ 9,7	-€ 871,2 -PM	-€ 847,9 -PM	-€ 7,1 +/- PM	-€ 18,8	-€ 33,9	-€ 64,2
Net External effects (less flights)										
Climate effects - CO2 and non CO2					€ 90,9	€ 84,6				
Air quality - NoX					€ 4,3	€ 4,3				
Air quality - PM10					€ 0,4	€ 0,4				
Additional economic impact Schiphol (agglomeration)	-€ 1,5 +/- PM	-€ 2,6 +/- PM	-€ 2,0 +/- PM	-€ 1,5	-€ 128,5 +/- PM	-€ 125,0 +/- PM	-€ 1,1 +/- PM	-€ 2,8	-€ 5,1	-€ 9,6
Total costs (including indirect and external costs):	-€ 11,2 +/- PM	-€ 19,9 +/- PM	-€ 15,5 +/- PM	-€ 11,1	-€ 904,0 - PM	-€ 883,7 - PM	-€ 8,2 +/- PM	-€ 21,6	-€ 39,0	-€ 73,9



Overview results measures

In the table below the cost-effectiveness (in 2024) of the measures on the definitive short-list (see page 7) are presented:

Costs in euro's per house/annoyed persons with respect to baseline (500k)

Measures	Fleet renewal			Minimize 2nd rwy use (M10)	Cap on total annual movements (M14)		Use of quieter aircraft during nighttime period	Cap on annual movements during night (M15)		
	Variant 1	Variant 2	Variant 3		440k/29k	440k/32k		500k/29k	500k/27k	500k/25k
Change in % of houses/annoyed persons										
Houses within 58 dB(A) Lden contour	-0,4%	-0,9%	0,1%	-2,6%	-15,3%	-14,0%	-3,5%	-3,4%	-4,9%	-6,0%
Highly annoyed people within 48 dB(A) Lden contour	-0,9%	0,2%	-0,8%	0,0%	-13,2%	0,0%	-14,4%	-13,2%	-22,2%	-30,4%
Houses within 48 dB(A) Lnight contour	0,2%	-0,3%	0,7%	-2,9%	-16,7%	-13,9%	-2,2%	-2,8%	-4,6%	-6,4%
Severely sleep disturbed people within 40 dB(A) Lnight contour	-0,3%	0,0%	-0,2%	0,0%	-10,8%	0,0%	-9,2%	-10,8%	-18,6%	-26,5%
Net operational costs per reduction of (wrt baseline 500k in euro's):										
Houses within 58 dB(A) Lden contour	-€ 344.207			-€ 25.059	-€ 217.506	-€ 221.652	-€ 13.336	-€ 44.988	-€ 55.100	-€ 72.442
Highly annoyed people within 48 dB(A) Lden contour	-€ 190.547	-€ 433.881	-€ 297.005		-€ 314.111		-€ 4.037	-€ 14.298	-€ 15.087	-€ 17.828
Houses within 48 dB(A) Lnight contour				-€ 1.439	-€ 12.438	-€ 13.847	-€ 1.319	-€ 3.423	-€ 3.651	-€ 4.204
Severely sleep disturbed people within 40 dB(A) Lnight contour	-€ 133.379		-€ 277.197		-€ 90.036		-€ 1.474	-€ 4.098	-€ 4.205	-€ 4.778
Net total costs per reduction of (wrt baseline 500k in euro's) :										
Houses within 58 dB(A) Lden contour	-€ 344.207			-€ 51.727	-€ 802.227	-€ 855.639	-€ 28.766	-€ 78.566	-€ 98.307	-€ 150.760
Highly annoyed people within 48 dB(A) Lden contour	-€ 190.547	-€ 433.881	-€ 297.005		-€ 1.158.535		-€ 8.709	-€ 24.970	-€ 26.917	-€ 37.102
Houses within 48 dB(A) Lnight contour				-€ 2.971	-€ 45.874	-€ 53.452	-€ 2.846	-€ 5.977	-€ 6.514	-€ 8.749
Severely sleep disturbed people within 40 dB(A) Lnight contour	-€ 133.379		-€ 277.197		-€ 332.080		-€ 3.180	-€ 7.157	-€ 7.502	-€ 9.944
Total societal costs per reduction of (wrt baseline 500k) :										
Houses within 58 dB(A) Lden contour	-€ 395.838			-€ 59.486	-€ 832.450	-€ 891.747	-€ 33.081	-€ 90.351	-€ 113.053	-€ 173.374
Highly annoyed people within 48 dB(A) Lden contour	-€ 219.129	-€ 498.963	-€ 341.556		-€ 1.202.181		-€ 10.015	-€ 28.715	-€ 30.955	-€ 42.667
Houses within 48 dB(A) Lnight contour				-€ 3.416	-€ 47.603	-€ 55.708	-€ 3.273	-€ 6.874	-€ 7.491	-€ 10.061
Severely sleep disturbed people within 40 dB(A) Lnight contour	-€ 153.386		-€ 318.777		-€ 344.591		-€ 3.657	-€ 8.231	-€ 8.628	-€ 11.435

= Noise abatement objective not achieved

= Noise abatement objective achieved

Overview results measures

- Operating quieter aircraft during the night is the most cost-effective measure. It contributes relatively much to the noise objectives for the night, but less for the objectives during the entire day.
- Minimizing use of secondary runways is the second most cost-effective measure. However, it contributes relatively little to the noise objective during the entire day and has no impact on noise during the night.
- A cap on the annual flight movements during the night is the third most cost-effective measure. It contributes relatively much to the noise objectives for the night, but less for the objectives during the entire day. A reduction to 29k movements is more cost-effective than a larger reduction.
- A cap on total annual flight movements appears least cost-effective for the night and the entire day. However, it contributes significantly to the noise objectives.
- Accelerated fleet renewal contributes marginally or negatively to the noise objective and shall therefore not be considered any further.
- None of the measures are able to reach the noise objectives in isolation. Therefore, a combination of measures is required (see next section).

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3. Cost-effectiveness of combination of measures

Combinations of measures

The previous section showed that there is no single measure with which all four noise objectives can be reached. Therefore, a combination of measures is required.

The combinations were defined as follows. First, the most cost-effective measures were included:

- Use of quieter aircraft during nighttime period
- Minimize the use of secondary runways

Secondly, it was determined to what extent the number of total movements and night movements should be reduced to reach the objectives for November 2024.

As a higher number of night movements allows for less total movements and vice versa, multiple combinations are possible. The following two sets of combinations were eventually defined:*

Combination A	Combination B
Use of quieter aircraft during nighttime period	Use of quieter aircraft during nighttime period
Minimize the use of secondary runways	Minimize the use of secondary runways
Cap on total annual flight movements: 452,500	Cap on total annual flight movements: 462,500
Cap on annual flight movements during the night: 28,700	Cap on annual flight movements during the night: 27,000

* For more information on the definition of the combinations of measures we refer to the addendum of the To70 report

Combinations – Total costs

- The combinations of measures leads to a net cost increase of € 630-760 million per year in the short-term.
- The majority of the cost increase consists of increased travel times and costs for passengers.
- Because of 10k less total flight movements in Combination A with respect to Combination B the effect on employment and value added is slightly more negative.

Total costs in million euro's with respect to baseline (500k)

	Combination A	Combination B
Net costs		
Operational costs airlines	-€ 186,0 +/- PM	-€ 157,2 +/- PM
Generalised travel cost passengers/freight	-€ 500,1 +/- PM	-€ 404,5 +/- PM
Government costs	-€ 11,4 +/- PM	-€ 9,0 +/- PM
Direct costs	-€ 697,5 +/- PM	-€ 570,7 +/- PM
Net External effects (less flights)		
Climate effects - CO2 and non CO2	€ 33,5	€ 26,4
Air quality - NoX	€ 3,4	€ 2,7
Air quality - PM10	€ 0,3	€ 0,3
Additional economic impact Schiphol (agglomeration)	-€ 102,9 +/- PM	-€ 84,3 +/- PM
Total costs (including indirect and external costs):	-€ 763,3 +/- PM	-€ 625,6 +/- PM

	Combination A		Combination B	
	Gross effect (direct+indirect)	Net effect (short-term friction)	Gross effect (direct+indirect)	Net effect (short-term friction)
Employed Persons	-10.834	-542	-8.553	-428
FTE	-8.864	-443	-6.998	-350
Value added (mln. euro's)	-€ 1.015,3	-€ 50,8	-€ 801,6	-€ 40,1

Combinations – Cost effectiveness

- Both combinations reduce noise levels in november 2024 by at least 15% during the night and the entire day.
- This means that the (adjusted) noise objectives for November 2024 are reached by both combinations.
- After November 2024 additional measures are needed to reach the longer-term objective for noise during the entire day (20% reduction).
- Although combination A leads to higher costs, it contributes more to the objective for noise during the entire day by November 2024.
- Combination B overshoots the noise objectives for the night.

With respect to baseline 500k:	Change in number of houses/persons:	Change in % of houses/persons:	Net operational costs per reduction of:	Direct costs per reduction of:	Total costs per reduction of:
Combination A					
Houses within 58 dB(A) Lden contour	-1.225	-17,3%	€ 151.872	€ 569.399	€ 623.062
Highly annoyed people within 48 dB(A) Lden contour	-1.074	-18,9%	€ 173.152	€ 649.180	€ 710.361
Houses within 48 dB(A) Lnight contour	-18.104	-15,9%	€ 10.276	€ 38.528	€ 42.160
Severely sleep disturbed people within 40 dB(A) Lnight contour	-3.655	-15,0%	€ 50.905	€ 190.853	€ 208.840
Combination B					
Houses within 58 dB(A) Lden contour	-1.197	-16,9%	€ 131.333	€ 476.905	€ 522.784
Highly annoyed people within 48 dB(A) Lden contour	-1.507	-26,5%	€ 104.323	€ 378.823	€ 415.267
Houses within 48 dB(A) Lnight contour	-17.876	-15,7%	€ 8.792	€ 31.925	€ 34.997
Severely sleep disturbed people within 40 dB(A) Lnight contour	-5.336	-21,9%	€ 29.454	€ 106.955	€ 117.245
		= Noise abatement objective not achieved			
		= Noise abatement objective achieved			

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Sensitivity analyses

Sensitivity analyses

The responses gathered from stakeholders during the consultation phase, gave rise to several sensitivity analyses (see the Appendix Sensitivity Analyses for explanations and calculations of these sensitivity analyses):

1. Use a higher CO₂-price (in line with 2 degree scenario)
2. Use a lower value-of-time for travel to/from the airport
3. Use a European scope instead of a global scope
4. Apply an alternative method to assess the generalised travel costs for passengers that can not be accomodated to Schiphol anymore.

The main conclusion is that a higher CO₂-price, a lower value-of-time to/from the airport and an alternative method to calculate the generalised travel costs for passengers lowers total costs for measures in which the annual flight capacity is reduced (i.e. M14: 440k/29k) and increases the cost-effectiveness. However, the cost-effectiveness (i.e. M14: 440k/29k) is still worse in all sensitivity analyses compared to the other short-listed measures.