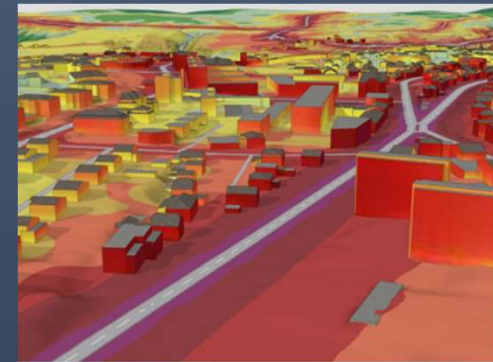




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Noise and NIR Division

Road Noise abatement Strategy Switzerland





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Federal Office for the Environment FOEN
Noise and NIR Division



Sophie Hoehn – Dr. sc. Nat. Biology

Head of Road Noise Section since 2012

Section : 5 scientific staff

Noise and NIR Division

Federal Office for the Environment (FOEN)



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Federal Department of the Environment, Transport, Energy and Communications DETEC

Federal Office for the Environment (FOEN)

Legal bases for the environment
for the protection of humans, plants and
their habitats

➤ Included abatement of noise emissions

Federal Roads Office (FEDRO)

Legal bases for Roads and vehicles



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Swiss noise situation



Swiss road noise abatement strategy



Low-noise pavements



Speed Reduction



Low noise Tyres



Noisy Vehicles

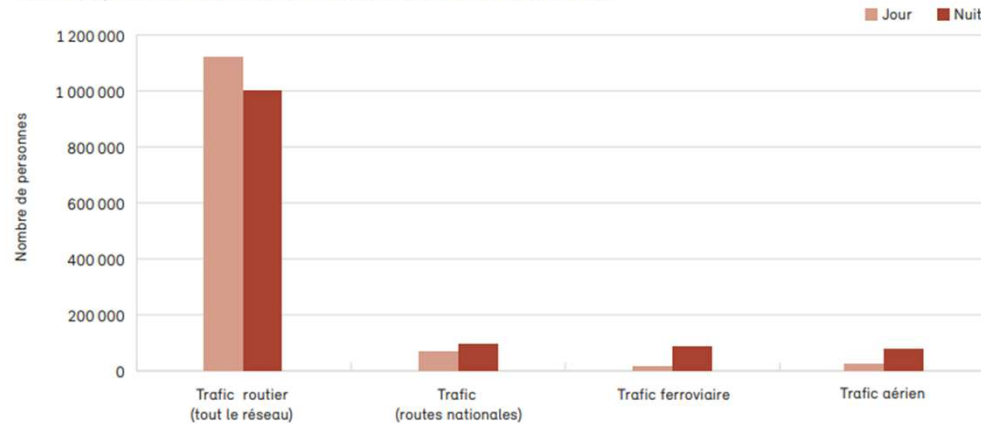




Swiss noise situation

Pollution sonore due au trafic

Personnes exposées à un bruit nuisible ou incommode dû au trafic en Suisse en 2015.



➤ **1 million people exposed to excessive traffic noise - the vast majority due to road traffic**

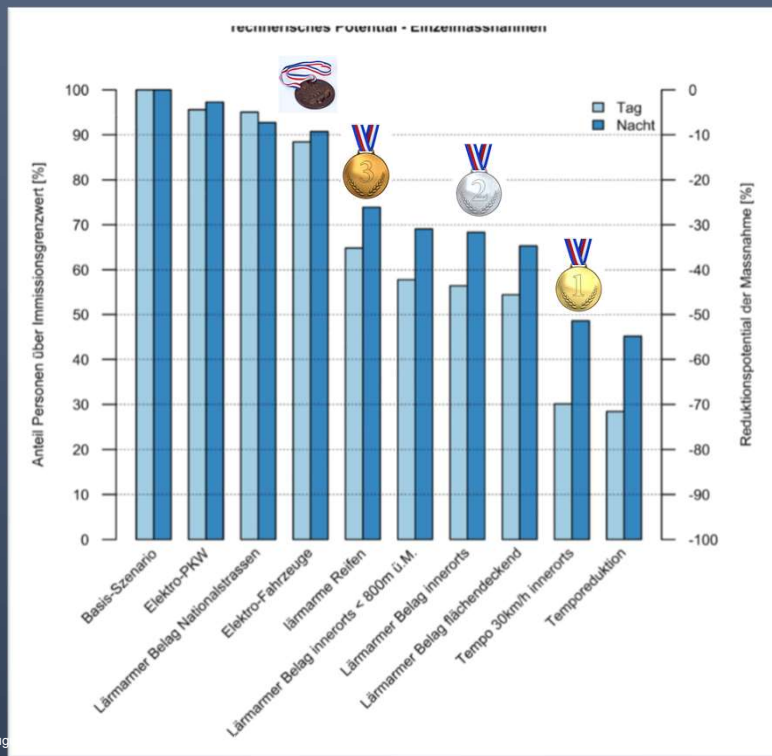
450 deaths per year

2'500 cases of diabetes per year

2.3 billion in external costs (Health and property loss)



Swiss road noise abatement strategy



➤ Measurements at source, where the noise is emitted



The Winner : Speed reduction (30 km/h)



The second one: low noise Asphalt



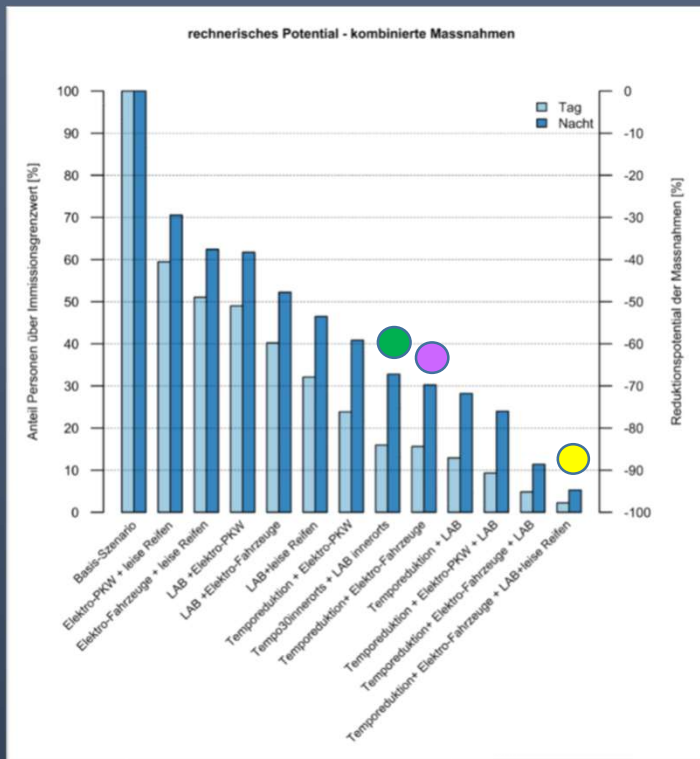
The third: low noise tyres



The fourth: Electric vehicles



Swiss road noise abatement strategy



➤ Measurements at source, where the noise is emitted => **Yes, but also combine !**

✓ **The Winner (utopic world):**

Speed reduction + low noise pavement + low noise Tyres + Electric vehicles = 95% of people protected



✓ **The best chance (real world):**

Speed reduction 30km/h + low noise asphalt = 72% night and 88% day

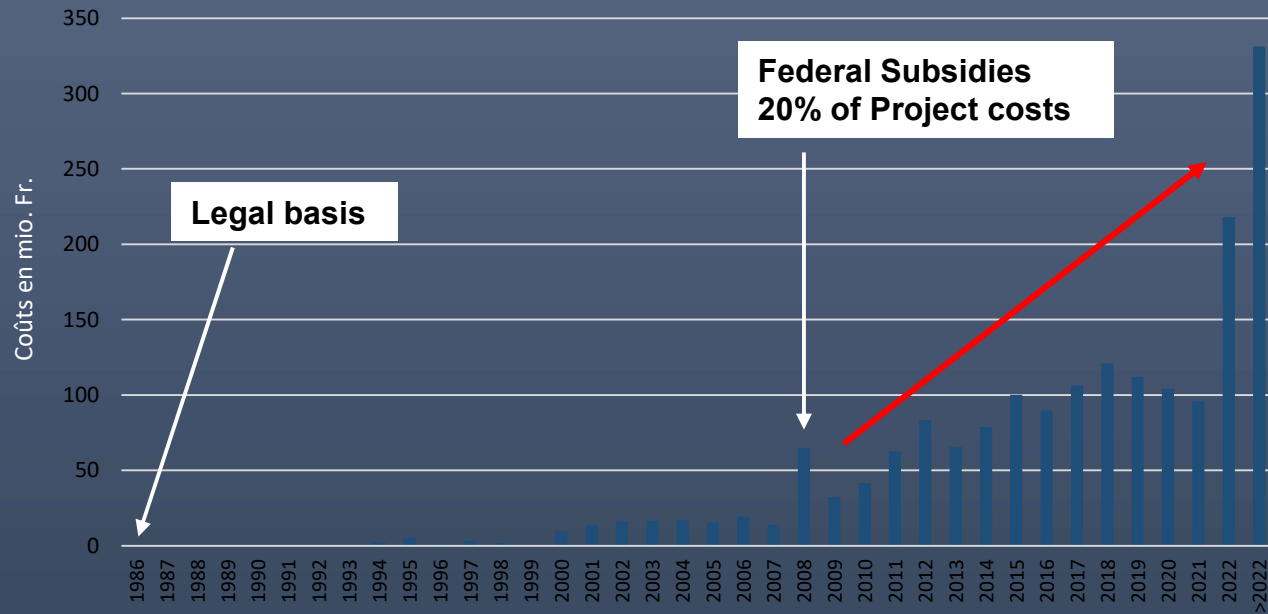
✓ **Added value (real world):**

Speed Reduction 30km/h + Electric vehicles = 70% night and 85% day



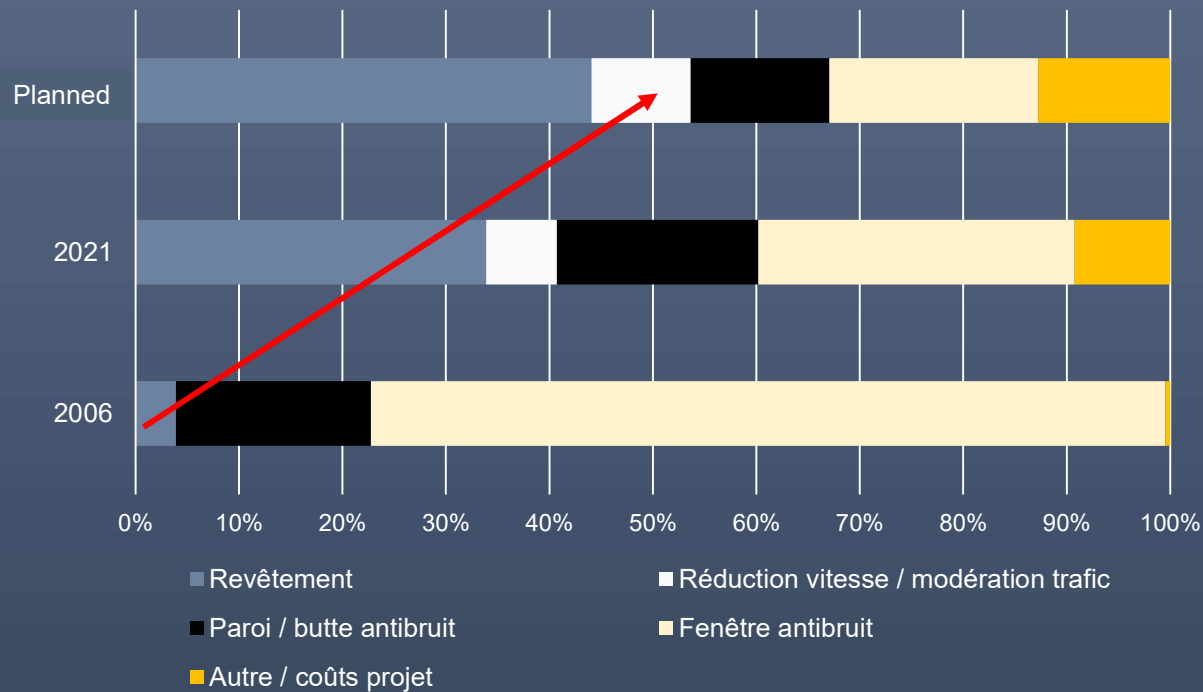


Investment roads improvement





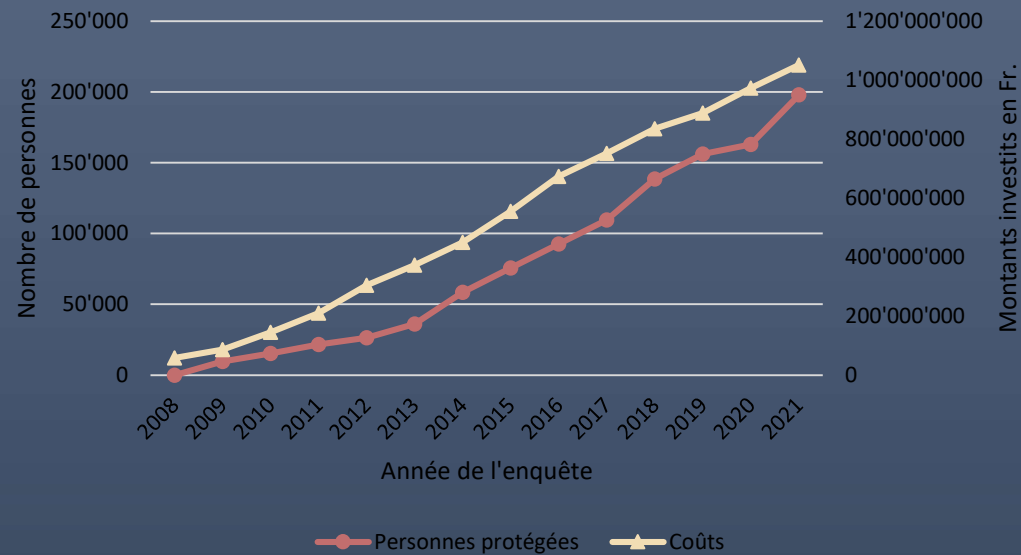
Distribution of costs by type of measure



✓ Increased investment in measures at source



Changes in the number of people protected



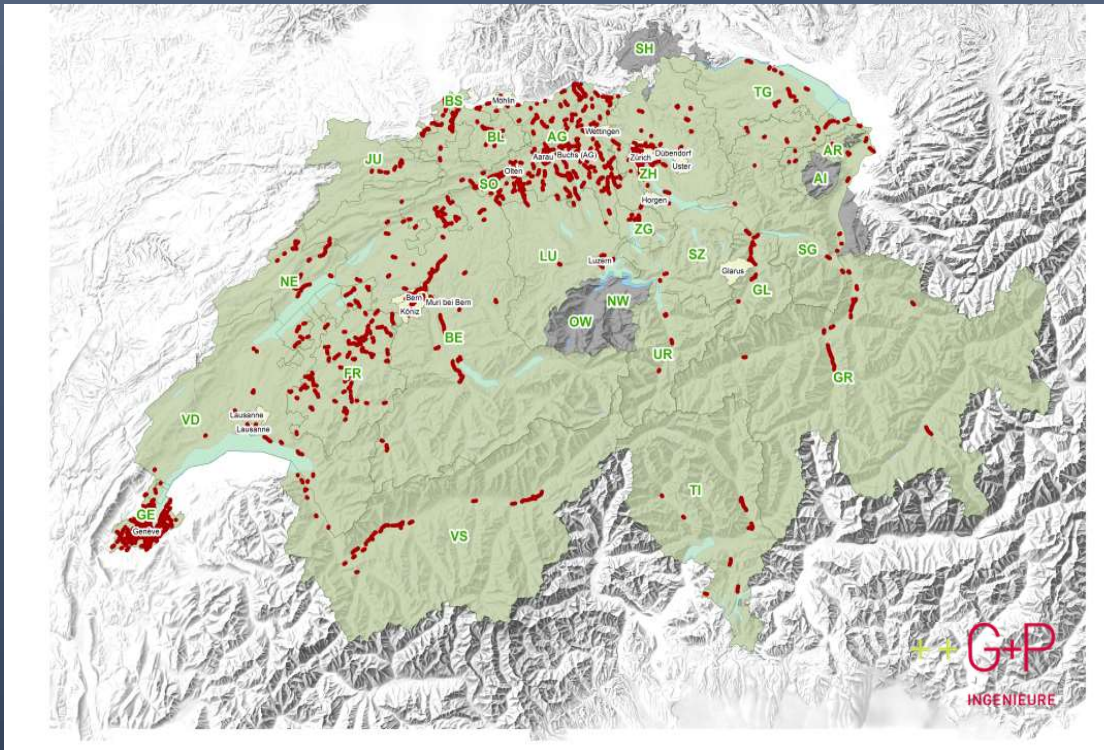
2008 – 2012 :
5'000 people / year
9'000 CHF / person

2013 – 2021 :
> 20'000 people / year
6'000 CHF / person

✓ Increased efficiency of improvements since 2012



Low-noise pavements in urban areas in Switzerland

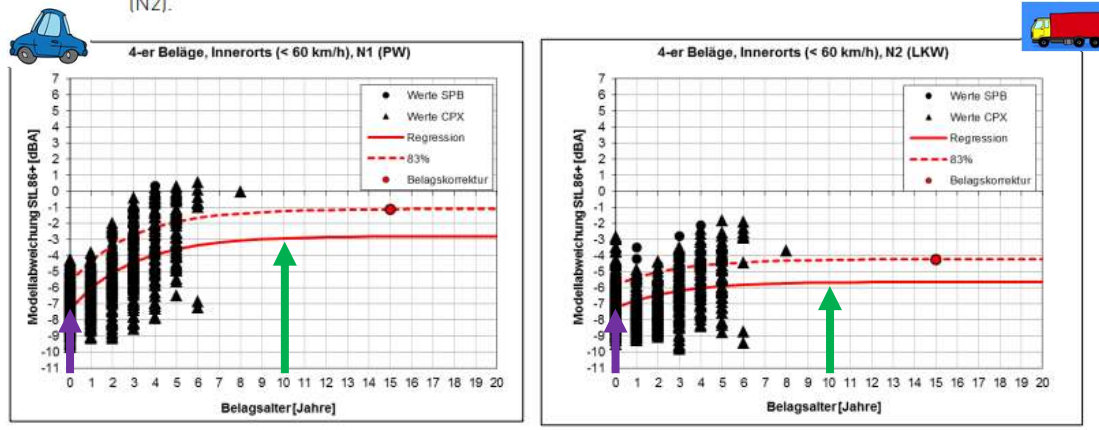


- Technology widely used today In urban areas
 - clear progress since 2012
 - Close proximity Measurements (CPX) also from FOEN for applied research
- >1'000 low-noise pavements measured

Low-noise pavements in urban areas in Switzerland

3.2.16SDA 4 (semidichter Asphalt)

Abbildung 22: Alterungsmodell für die Belagsklasse SDA 4 (alle SDA 4 Beläge) im Innerortsbereich für PW (N1) und LKW (N2).



Belagskennwert [83 %-Quantil]	PW [N1] [dB(A)]	LKW [N2] [dB(A)]	Mischverkehr [8 % LKW-Anteil] [dB(A)]
KB nach LFSL			-
nach 15 Jahren	-1.0	-4.0	-2.6
nach 10 Jahren	-1.2	-4.3	-2.7
mittlere Anfangswirkung	-6.9	-6.9	-6.9

Semi-dense asphalt 4mm
After 10 years : - 3 dB(A)

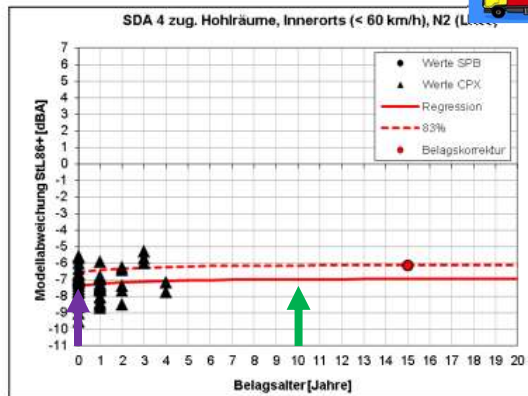
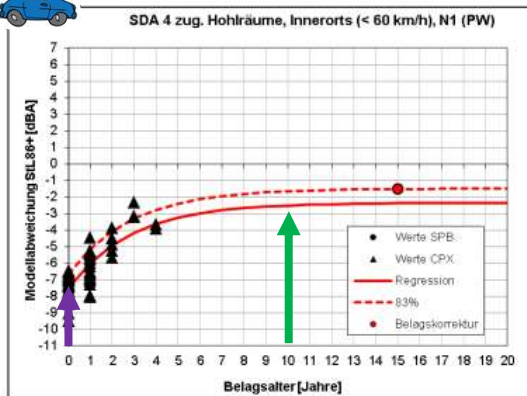
Semi-dense asphalt 4mm
Start : - 7 dB(A)



Low-noise pavements in urban areas in Switzerland

3.3.3 SDA 4 zugängliche Hohlräume [ohne Firmenlösungen]

Abbildung 26: Alterungsmodell für die Belagsklasse SDA 4 zugängliche Hohlräume [ohne Firmenlösungen] im Innerortsbereich für PW (N1) und LKW (N2).



Accessible cavities

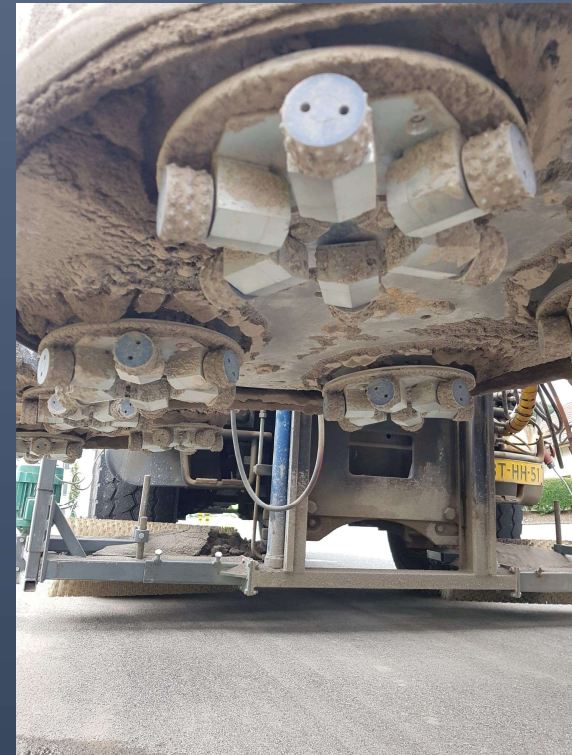
Semi-dense asphalt 4mm with accessible cavities

After 10 years : - 4 dB(A)
Start : -7.3 dB(A)

Belagskennwert [83 %-Quantil]	PW (N1) [dB(A)]	LKW (N2) [dB(A)]	Mischverkehr [8 % LKW-Anteil] [dB(A)]
nach 15 Jahren	-1.5	-6.1	-3.5
nach 10 Jahren	-1.6	-6.1	-3.6
mittlere Anfangswirkung	-7.4	-7.3	-7.3



Acoustic maintenance through grinding

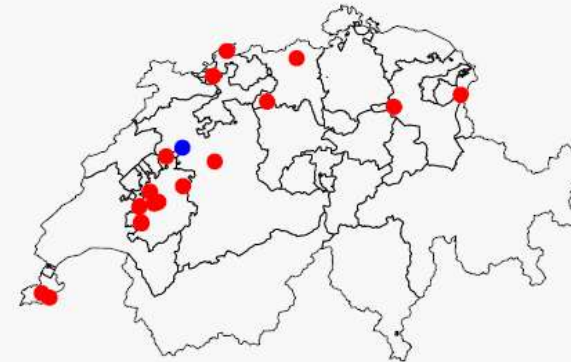




Acoustic maintenance through grinding

17 test tracks

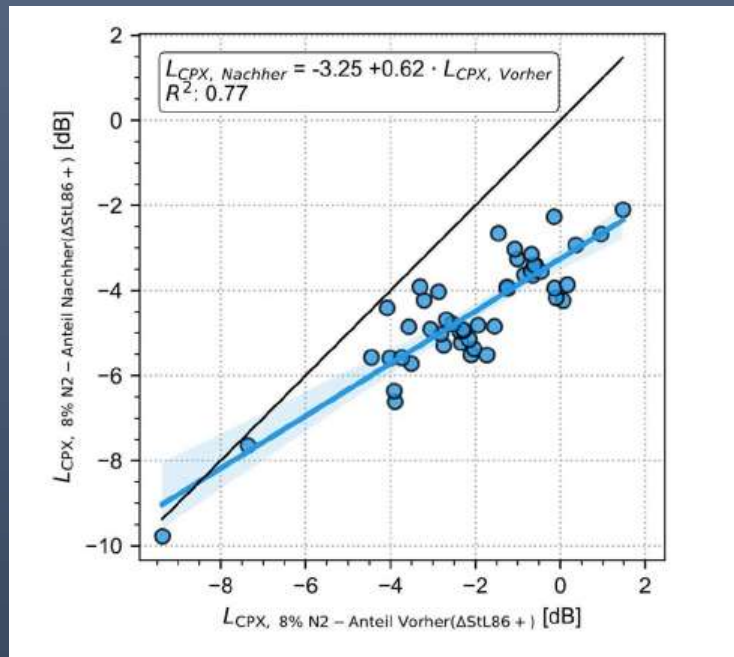
- Corserey, FR
- Dittingen, BL
- Farvagny, FR
- La Verrerie, FR
- Landerswil
- Muri b. Bern, BE
- Muttenz, BL
- Remigen, AG
- Romont, FR
- Rüthi SG
- Stadt Genf, Quai Ansermet
- Sugiez, FR
- Tafers, FR
- Uznach, SG
- Veyrier, GE
- Villarlod, FR
- Zofingen, AG





Acoustic maintenance through grinding

Initial effect of the grinding measures



- ✓ The average initial impact is about 3 dB(A)
- ✓ The initial effect (absolute improvement) depends on the initial performance : "The louder the pavement at the time of the measure, the greater the effect"
- ✓ A promise to extend the life of low-noise pavements



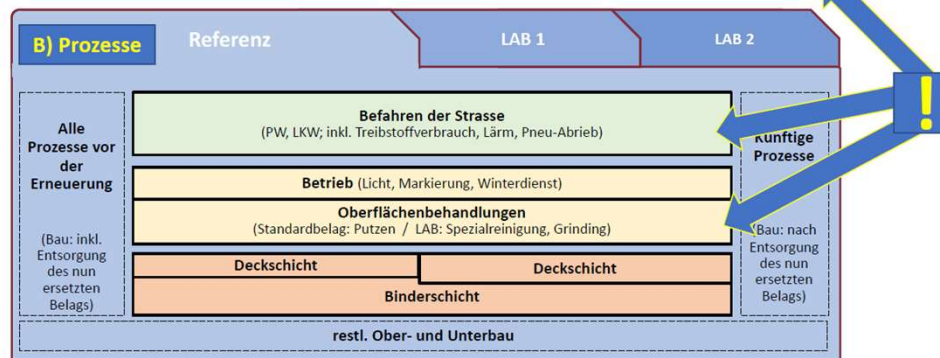
Ongoing – Life Cycle analyses Low-noise Pavements

Environmental impact score

- ✓ Construction
- ✓ Use
- ✓ Recycling

✓ A promise to combine climate gases reduction and noise reduction

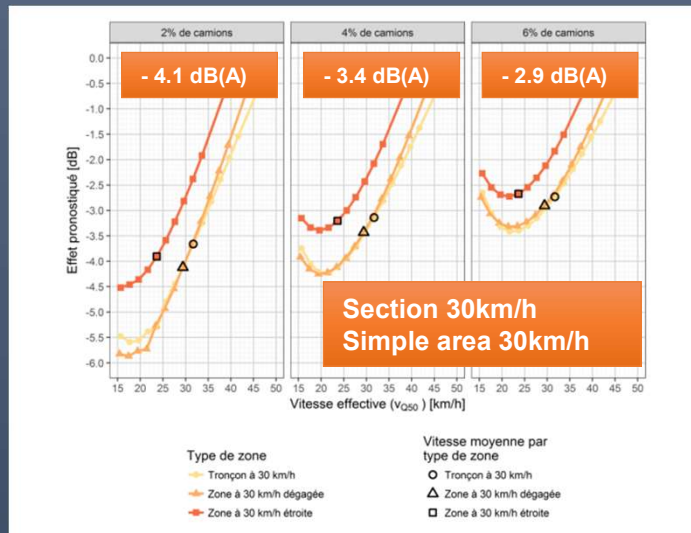
A) Wirkungen	CO2e /GHG-Emissionen	...	DALY	UBP
Beurteilung von	Klimaerwärmung (Piao & LCA LAB)	...	Humane Gesundheit (Piao)	Gesamtbelastung (LCA LAB)



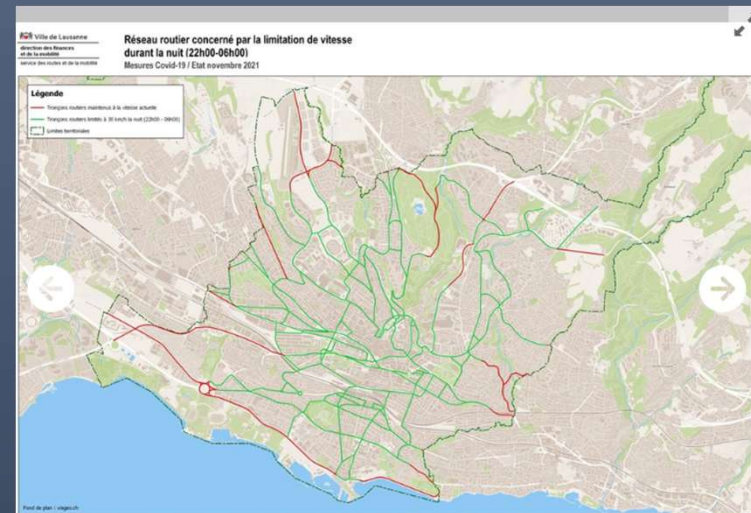


Speed reduction mainly 30 km/h in urban areas

Research project (VSS) - 2018



Implementation night Lausanne – 2021
Other swiss cities are following !



Confirmation of the proportionality of the measure !

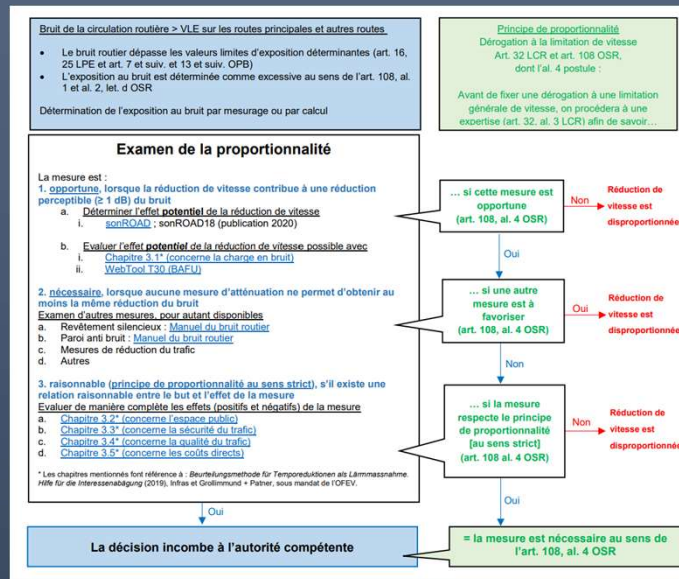




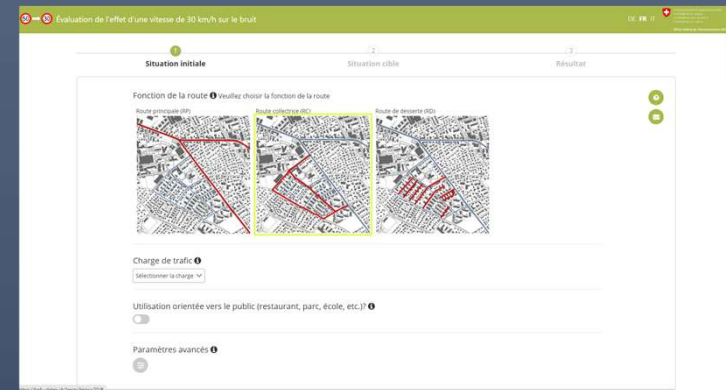
Speed reduction mainly 30 km/h in urban areas



Method - 2020



Proportionality assessment scheme ; legal bases - 2020



Webtool T30 - 2020

[Tempo30 \(bafu-daten.ch\)](http://tempo30(bafu-daten.ch))



Zürich city ; Study design - Population survey



Change of signage, mainly with new panels

6 months

6 months



Preliminary survey

Post survey

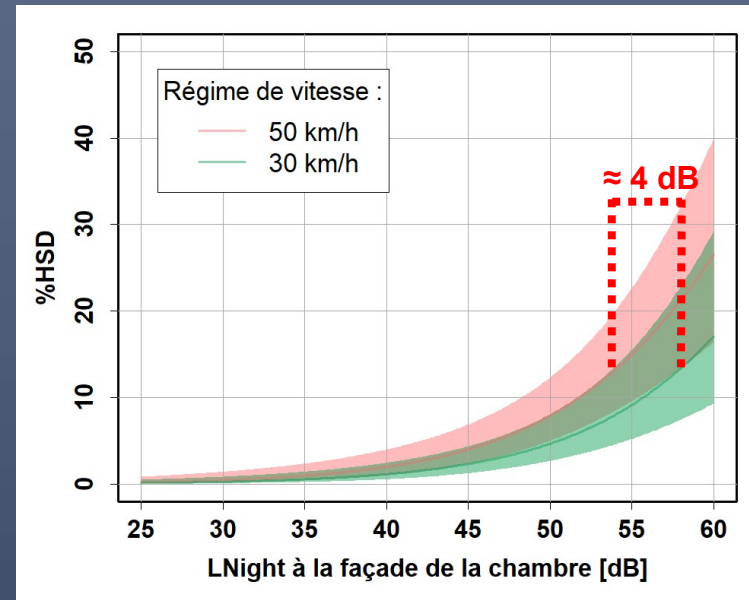
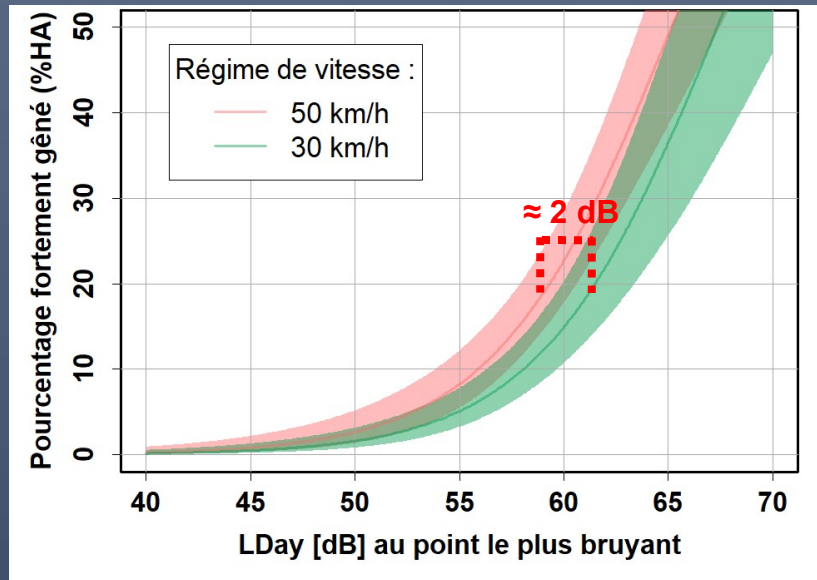
Reference period

Reference period

≈ 1 year or more since the change



Exposure-response relationships before and after



adjusted for and centred on: age, sex

✓ In addition to the effect of reducing speed by 1.6 dB during the day and 1.7 dB at night, local residents “feel” by around 2 to 4 dB reduction during the day and 4 dB at night !

Combined effect of speed reduction T30 and low-noise pavement (SDA4)



- 3 dB(A)



- 5 dB(A)

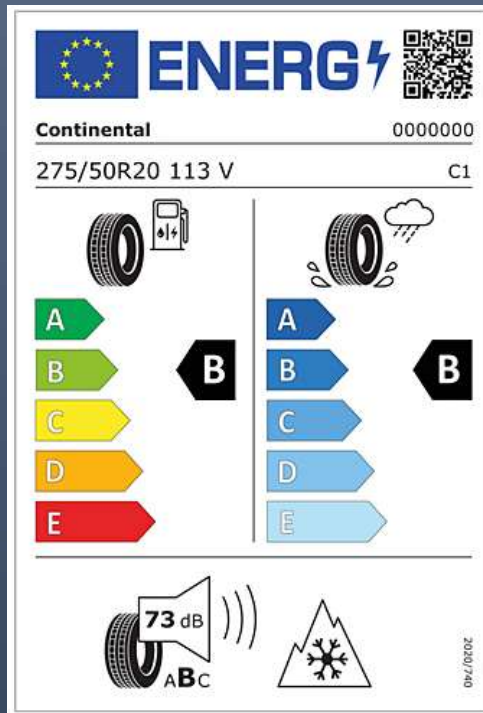


Tabelle 7: Prognose der Lärmwirkung [dB] einer Temporeduktion auf SDA 4 Belägen in Abhängigkeit von Ist- und Zielgeschwindigkeit für N2-Anteil 6 %. Im unteren Teil der Tabelle ist der entsprechende Unsicherheitsbereich ($\pm 1\sigma$, dB) angegeben.

		Prognose Lärmwirkung durch Temporeduktion auf SDA 4 [dB]															
N2-Anteil		Zielgeschwindigkeit (km/h)															
6 %		25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ist-Geschwindigkeit (km/h)	40	-2.1	-1.9	-1.8	-1.6	-1.4	-1.3	-1.1	-1.0	-0.9	-0.7	-0.6	-0.5	-0.4	-0.2	-0.1	0.0
	41	-2.2	-2.0	-1.9	-1.7	-1.6	-1.4	-1.3	-1.1	-1.0	-0.8	-0.7	-0.6	-0.5	-0.3	-0.2	-0.1
	42	-2.3	-2.2	-2.0	-1.8	-1.7	-1.5	-1.4	-1.2	-1.1	-0.9	-0.8	-0.7	-0.6	-0.4	-0.3	-0.2
	43	-2.4	-2.3	-2.1	-1.9	-1.8	-1.6	-1.5	-1.3	-1.2	-1.1	-0.9	-0.8	-0.7	-0.6	-0.4	-0.3
	44	-2.5	-2.4	-2.2	-2.0	-1.9	-1.7	-1.6	-1.4	-1.3	-1.2	-1.0	-0.9	-0.8	-0.7	-0.5	-0.4
	45	-2.6	-2.5	-2.3	-2.1	-2.0	-1.8	-1.7	-1.5	-1.4	-1.3	-1.1	-1.0	-0.9	-0.8	-0.6	-0.5
	46	-2.7	-2.6	-2.4	-2.2	-2.1	-1.9	-1.8	-1.6	-1.5	-1.4	-1.2	-1.1	-1.0	-0.9	-0.7	-0.6
	47	-2.8	-2.7	-2.5	-2.3	-2.2	-2.0	-1.9	-1.7	-1.6	-1.5	-1.3	-1.2	-1.1	-1.0	-0.8	-0.7
	48	-2.9	-2.8	-2.6	-2.4	-2.3	-2.1	-2.0	-1.8	-1.7	-1.5	-1.4	-1.3	-1.2	-1.0	-0.9	-0.8
	49	-3.0	-2.8	-2.7	-2.5	-2.4	-2.2	-2.1	-1.9	-1.8	-1.6	-1.5	-1.4	-1.3	-1.1	-1.0	-0.9
	50	-3.1	-2.9	-2.8	-2.6	-2.4	-2.3	-2.1	-2.0	-1.9	-1.7	-1.6	-1.5	-1.4	-1.2	-1.1	-1.0
	51	-3.2	-3.0	-2.9	-2.7	-2.5	-2.4	-2.2	-2.1	-2.0	-1.8	-1.7	-1.6	-1.4	-1.3	-1.2	-1.1
	52	-3.3	-3.1	-2.9	-2.8	-2.6	-2.5	-2.3	-2.2	-2.0	-1.9	-1.8	-1.7	-1.5	-1.4	-1.3	-1.2
	53	-3.4	-3.2	-3.0	-2.9	-2.7	-2.6	-2.4	-2.3	-2.1	-2.0	-1.9	-1.7	-1.6	-1.5	-1.4	-1.3
	54	-3.5	-3.3	-3.1	-3.0	-2.8	-2.6	-2.5	-2.4	-2.2	-2.1	-1.9	-1.8	-1.7	-1.6	-1.5	-1.3
	55	-3.5	-3.4	-3.2	-3.0	-2.9	-2.7	-2.6	-2.4	-2.3	-2.2	-2.0	-1.9	-1.8	-1.7	-1.5	-1.4



Project Analysis Tyre List in Switzerland

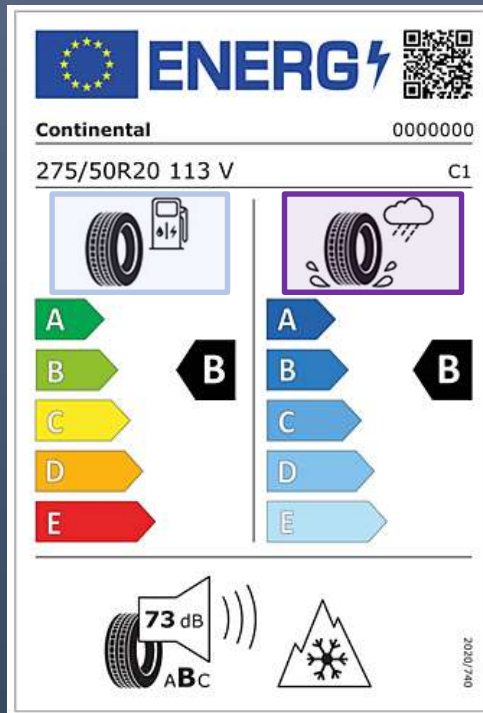


Are there tyres that are good "everywhere" ?





Project Analysis Tyre List in Switzerland



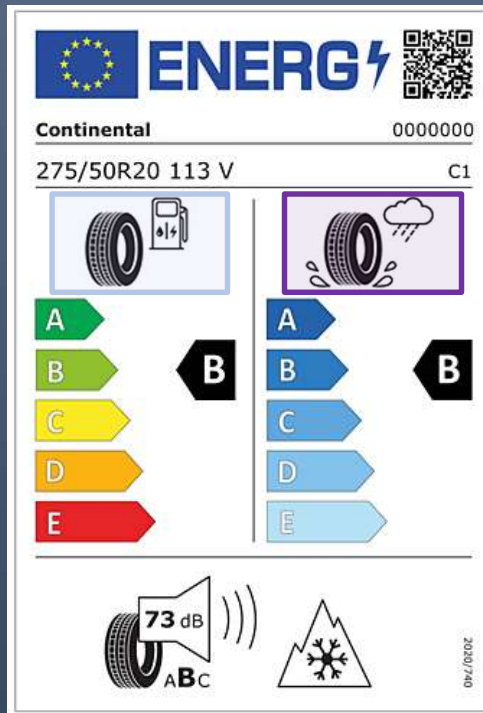
Evaluation grid

Safety	E	(A/E)	(B/E)	(C/E)	(D/E)	(E/E)
	D	(A/D)	(B/D)	(C/D)	(D/D)	(E/D)
	C	(A/C)	(B/C)	(C/C)	(D/C)	(E/C)
	B	(A/B)	(B/B)	(C/B)	(D/B)	(E/B)
	A	(A/A)	(B/A)	(C/A)	(D/A)	(E/A)
		A	B	C	D	E

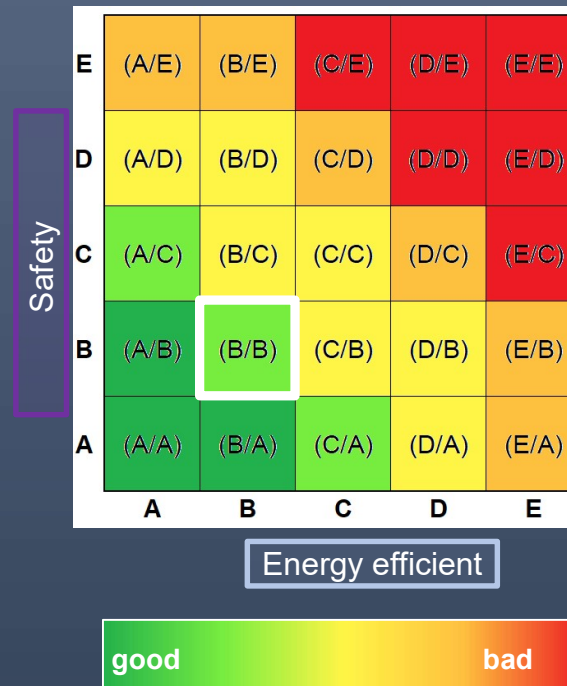
Energy efficient



Project Analysis Tyre List in Switzerland

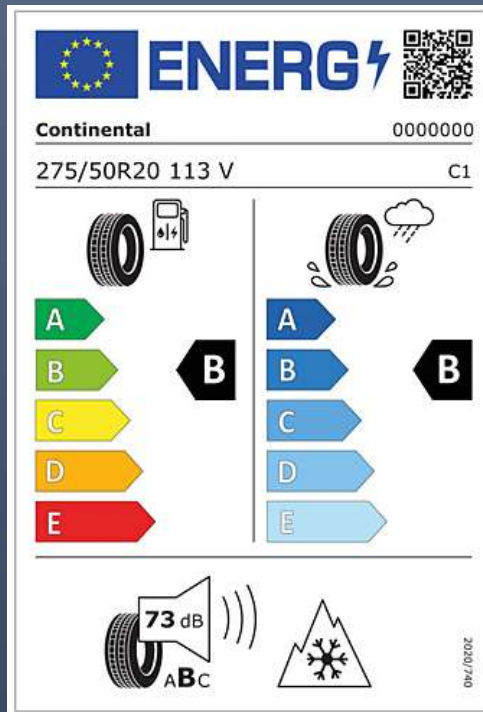


Evaluation grid

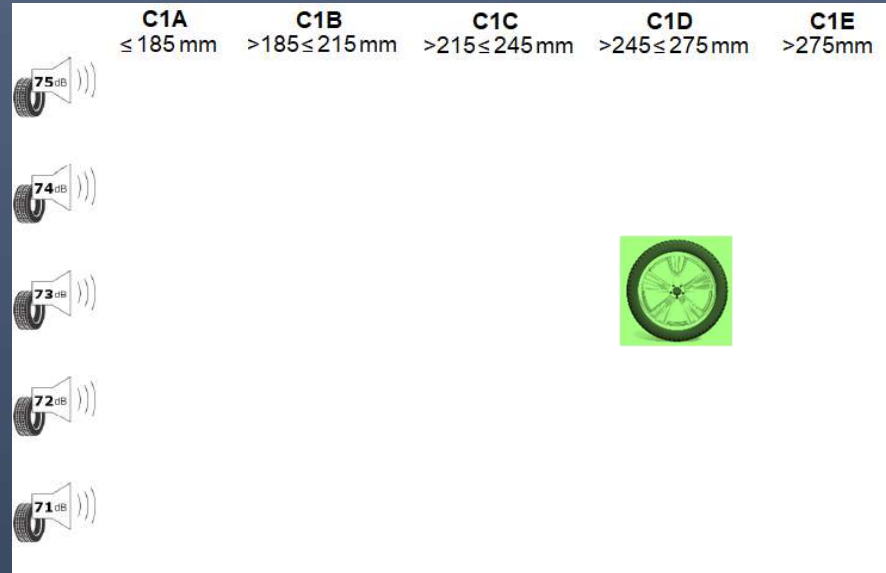




Project Analysis Tyre List in Switzerland

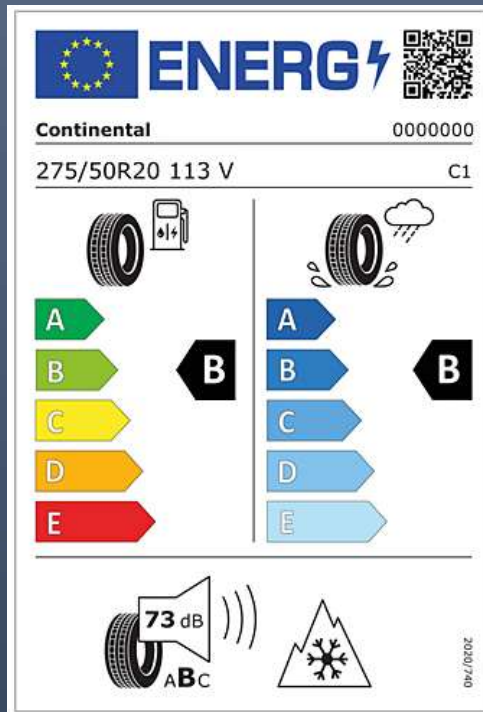


Analyses

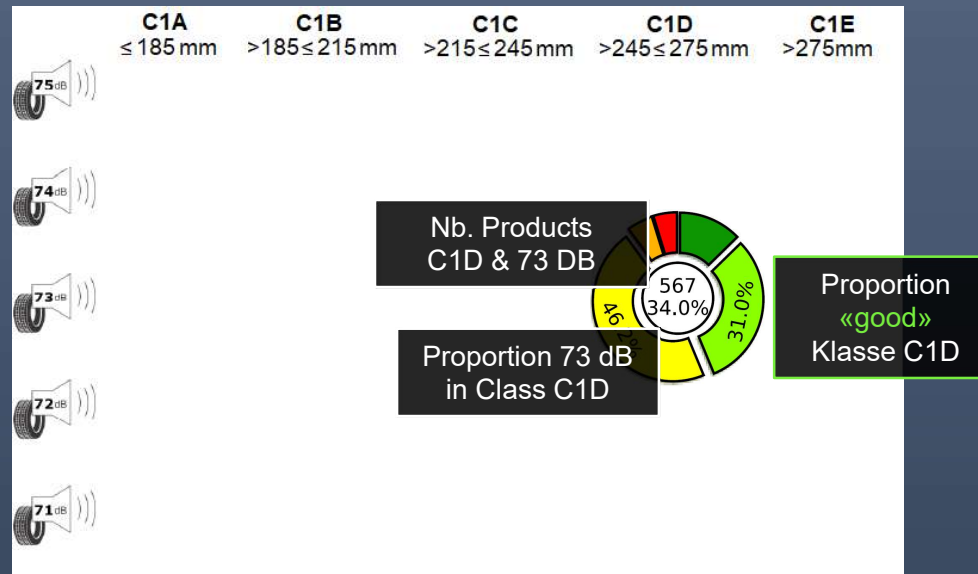




Project Analysis Tyre List in Switzerland - proceeding



Analyses



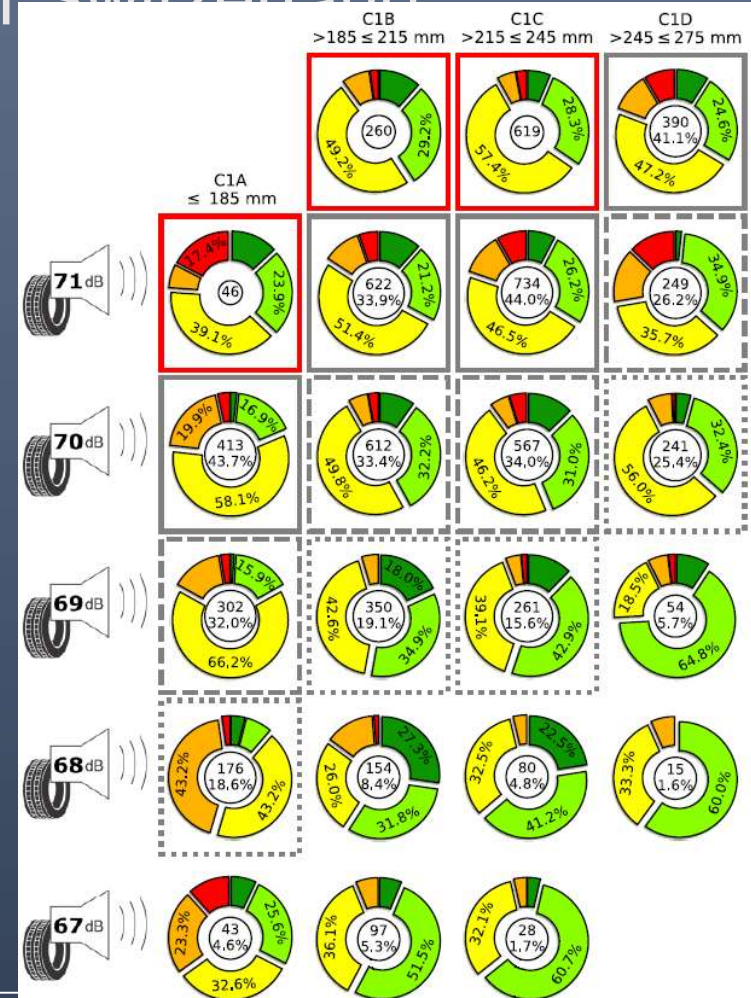
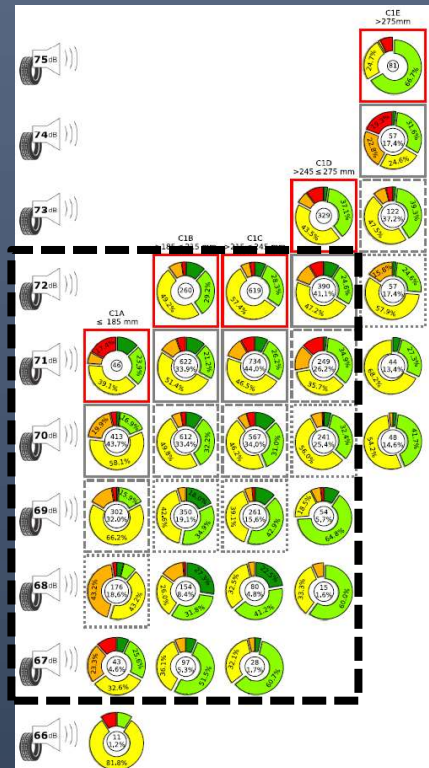


Project Analysis Tyre List in Switzerland - Results

Evaluation grid

E	(A/E)	(B/E)	(C/E)	(D/E)	(E/E)
D	(A/D)	(B/D)	(C/D)	(D/D)	(E/D)
C	(A/C)	(B/C)	(C/C)	(D/C)	(E/C)
B	(A/B)	(B/B)	(C/B)	(D/B)	(E/B)
A	(A/A)	(B/A)	(C/A)	(D/A)	(E/A)
	A	B	C	D	E

	LV+1 (Special Tyres)
	LV
	LV-1
	LV-2





Project Analysis Tyre List in Switzerland - Results

Summary

- ▶ Quiet tyres available in all classes
- ▶ Summer tyres large selection of quiet and "good" products
- ▶ Winter / all-season tyres few of "good" products, not dependent of noise
- ▶ Class C1A: Choice of "good" tyres more limited
- ▶ Rolling resistance/safety no correlation with noise

Summer



Winter



All-season





Noisy Vehicles – Problem in CH !

20.4339 MOTION

Réduire de manière efficace le bruit excessif des moteurs

Le Conseil fédéral est chargé d'élaborer un train de mesures visant à sanctionner plus simplement et plus efficacement les émissions de bruit excessives liées à la circulation routière, et de soumettre au Parlement les modifications législatives nécessaires. Il devra en particulier :

1. élaborer des mesures au niveau de la loi et de l'ordonnance permettant de mieux sanctionner ou limiter l'utilisation de pièces illégales ou les modifications apportées aux véhicules, par exemple au moyen de silencieux de remplacement trop bruyants ; outre des amendes plus élevées, il convient d'examiner la possibilité de retirer le permis de conduire ou de confisquer le véhicule concerné, ainsi que celle d'interdire certaines routes aux véhicules particulièrement bruyants ;
2. modifier les bases légales de telle sorte que les conducteurs de véhicules produisant un bruit excessif puissent à l'avenir être tenus de rendre des comptes, moyennant une charge raisonnable pour les autorités. En outre, le Conseil fédéral devra mieux soutenir les cantons dans la mise en oeuvre des dispositions concernées ;
3. examiner quelles mesures permettraient d'intensifier les contrôles policiers en matière de bruit routier ; il convient en particulier d'examiner la possibilité d'instaurer une procédure analogue à la convention passée entre la Confédération et les polices cantonales s'agissant des contrôles du trafic lourd ;
4. indiquer quels instruments permettraient à la Confédération de soutenir les activités d'exécution, en particulier par le développement et l'utilisation de radars antibruit, et quelles bases légales seraient nécessaires à cet effet.

Une minorité de la commission (Wobmann, Egger Mike, Imark, Page, Rügger, Ruppen, Steinemann) propose de rejeter la motion.

⊖ AVIS DU CONSEIL FÉDÉRAL DU 27.01.2021

⊖ PROPOSITION DU CONSEIL FÉDÉRAL DU 27.01.2021

Le Conseil fédéral propose d'accepter la motion.

- × A too noisy car can make as much noise as 24 cars driving normally
- × in total contradiction with investment in measures of noise abatement

➤ Regulation is very important !

Noisy Vehicles – Actions FOEN

International noise awareness day



Noise awareness Display



Hydra - BruitParif

Noise radar –
test in Progress in
Geneva



Thank you for your attention !



Questions & Discussion