Supplementary Materials:

Radon investigation in 650 energy efficient dwellings in western Switzerland: Impact of energy renovation and building characteristics

Shen Yang ¹, Joëlle Goyette Pernot ^{2,*}, Corinne Hager Jörin ³, Hélène Niculita-Hirzel ⁴, Vincent Perret ⁵ and Dusan Licina ¹

- ¹ Human-Oriented Built Environment Lab, School of Architecture, Civil and Environmental Engineering, École Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland; shen.yang@epfl.ch (S.Y.); dusan.licina@epfl.ch (D.L.)
- ² Transform Institute, Western Swiss Centre for Indoor Air Quality and Radon (croqAIR), School of Engineering and Architecture of Fribourg, CH-1700 Fribourg, HES-SO University of Applied Sciences and Arts Western Switzerland, Switzerland
- ³ HumanTech Institute, School of Engineering and Architecture of Fribourg, CH-1700 Fribourg, HES-SO University of Applied Sciences and Arts Western Switzerland, Switzerland; corinne.hagerjoerin@hefr.ch
- ⁴ Department Health, Work and Environment, Center for Primary Care and Public Health (Unisanté), University of Lausanne, CH-1066 Epalinges, Switzerland; helene.hirzel@unisante.ch
- ⁵ TOXpro SA, CH-1227 Carouge, Switzerland; vincent.perret@toxpro.ch
- * Correspondence: joelle.goyette@hefr.ch

Received: 8 November 2019; Accepted: 29 November 2019; Published: date

Table S1. Influence of natural ground floor on indoor radon concentrations (*p*<0.01).

	With Natural Ground Floor	Without Natural Ground Floor	
Sample number	264	329	
Median (Bq/m ³)	83	66	
Mean \pm SD (Bq/m ³)	213 ± 461	163 ± 410	
Geo-mean (Bq/m ³)	100	77	
Min (Bq/m^3)	12	6	
Max (Bq/m^3)	4284	4178	

3

Table S2. Influence of building structure on indoor radon concentrations (*p*<0.001).

	Masonry	Wood	Mixed
Sample number	350	70	149
Median (Bq/m ³)	78	35	70
Mean \pm SD (Bq/m ³)	200 ± 460	64 ± 69	200 ± 485
Geo-mean (Bq/m ³)	94	41	88
$Min (Bq/m^3)$	17	6	14
$Max (Bq/m^3)$	4284	316	3819

4

5

Table S3. Influence of basement type on indoor radon concentrations (*p*<0.001).

	Completely Excavated	Semi-Excavated	Back-Grounded	No Basement
Sample number	184	117	214	95
Median (Bq/m ³)	55	108	84	60
Mean \pm SD (Bq/m ³)	129 ± 353	284 ± 582	196 ± 441	145 ± 265
Geo-mean (Bq/m ³)	68	121	97	70
$Min (Bq/m^3)$	14	16	12	6
Max (Bq/m ³)	4178	3819	4284	1593

6

7

Table S4. Influence of garage type on indoor radon concentrations (*p*<0.001).

	Outdoor	Independent	Attached	In Basement
Sample number	185	158	144	107
Median (Bq/m ³)	77	86	86	50
Mean \pm SD (Bq/m ³)	197 ± 503	210 ± 435	183 ± 325	149 ± 436
Geo-mean (Bq/m ³)	86	100	95	68
Min (Bq/m^3)	6	16	12	17
$Max (Bq/m^3)$	4178	3819	2804	4284

8

9



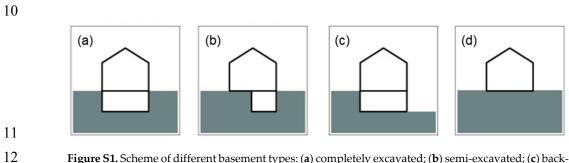
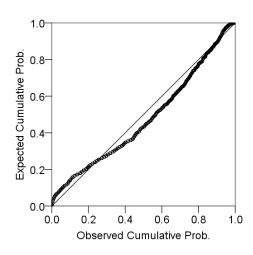


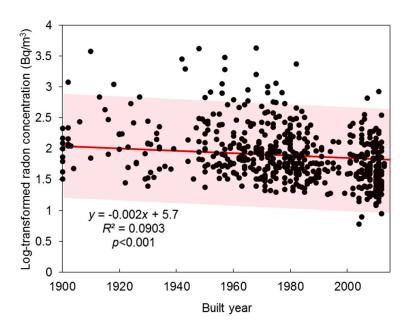
Figure S1. Scheme of different basement types: (a) completely excavated; (b) semi-excavated; (c) back grounded and (d) no basement.



14

15

Figure S2. P-P plot of measured log-transformed radon concentrations.



16

Figure S3. Relationship between log-transformed radon concentration and built year of dwellings.Red banding represents prediction intervals.