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Title: The distribution of green walls and green roofs throughout Australia: Do policy instruments influence the frequency of projects?

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1 **The distribution of green walls and green roofs throughout Australia: Do policy**
2 **instruments influence the frequency of projects?**

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15 **Abstract**

16 Green roofs and green walls are gaining popularity as a means of mitigating a range of
17 environmental impacts associated with urbanisation. Although this technology has been
18 widely implemented in some parts of the world, uptake within Australia has been slow. This
19 might be attributed to a range of factors, including a lack of awareness; a scarcity of urban
20 green infrastructure policies; a lack of examples to give urban designers confidence in the
21 technology; and perhaps also a limited number of professionals capable of installing green
22 infrastructure systems. This paper researches the distribution of green wall and green roof
23 projects in urban Australia, and the possible influence of local government policies and
24 guidelines that have been designed to promote the increase of green infrastructure in
25 Australia's cities. Differences were observed among project distributions and frequency, both
26 within and between cities. In addition, councils that offered policy instruments and guidance
27 tended to have more green wall and green roof projects than those which have no such
28 policies in place. Compared to successful examples seen internationally, further policy
29 implementation in Australia could increase the frequency of green infrastructure projects,
30 indicating that governmental influence may play a substantial role in encouraging green
31 infrastructure installation.

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33 **Keywords** Green infrastructure; green walls; green roofs; sustainable development; urban
34 vegetation

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36 **1. Introduction**

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38 The majority of the world's population now lives in cities, and urban populations are
39 densifying and urban areas are expanding faster than any other land-use type (United Nations
40 2015; Dallimer, 2011). Urbanisation has been linked with a range of negative environmental
41 impacts, such as increased air pollution, stormwater runoff, and urban heat island effects, plus
42 greatly reduced vegetation areas and biodiversity (Berndtsson, 2010; Shwartz et al., 2014;
43 Łopucki and Kiersztyn, 2015). These impacts also have secondary effects, such as increased
44 physical discomfort and health problems, and a greater demand for building cooling, leading
45 to increased energy consumption (Pantavou et al., 2011; Santamouris, 2015; Wang et al.,
46 2015). Consequently, there is a requirement for sustainable practices to be integrated into
47 new and existing developments, to assist in mitigating the detrimental effects of urbanisation
48 (Berardi, 2012).

49 Urban forestry, green infrastructure (GI) and, in particular, living greenery integrated
50 into building design, including green wall and green roof (GWGR) projects, are gaining in

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