



# Nordic Smart City Report

2018

**”Small and medium-sized municipalities seem to be lagging behind. Is this a natural consequence of having smaller populations and fewer resources, or are the barriers rooted in something else?”**

# Introduction

The smart city idea or concept has been trending for more than a decade. In recent years, most of the larger cities across the Nordics, including Copenhagen, Stockholm, Oslo, Helsinki, Aarhus and Gothenburg, have invested in smart city solutions and developed comprehensive road maps for future initiatives. Many of these front-runners act as best practice examples for the rest of the world, and their visionary foresight and curiosity have created numerous benefits for citizens and the environment.

However, small and medium-sized cities seem to be lagging behind. Is this a natural consequence of having smaller populations and fewer resources, or are the barriers rooted in something else? To uncover what has already been done and how the smart city potential for small and medium-sized municipalities can be unlocked, Signify has

conducted a survey across Denmark, Norway, Sweden and Finland to map out the best practices and challenges associated with implementing smart city solutions in the municipalities.

More than 100 interviews were conducted with key decision-makers in small and medium-sized municipalities, and the willingness of the interviewees to share their experiences was overwhelming. The insights gathered across the four Nordic countries are valuable for both cities and municipalities developing and prioritising future smart city projects.

Enjoy!

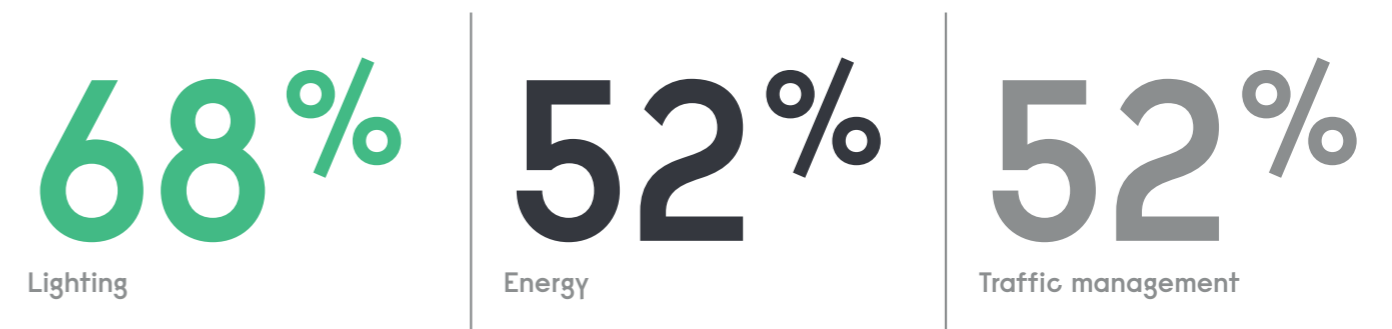




# Executive Summary

The survey very much confirms that small and medium-sized municipalities are lagging behind the larger cities in the Nordics. Even though the vision of becoming a smart city is on the agenda of most municipalities and 65% of the respondents have initiated smart city projects, the survey shows that most of the initiatives are not rooted in an overarching smart city strategy that prioritises initiatives and sets the direction for future investments.

**65% of the municipalities have initiated smart city projects. Most widespread categories are:**



## Barriers

Only 21% of the surveyed municipalities across the Nordics have implemented a dedicated smart city strategy, and the consequences of not having a well-defined scope are less return on invested capital and fewer benefits for citizens. Unfortunately, many of the respondents will not be developing a strategy any time soon. Many of the department heads made it clear that budget constraints mean they are focused solely on administration, with little opportunity to innovate or evaluate new projects.

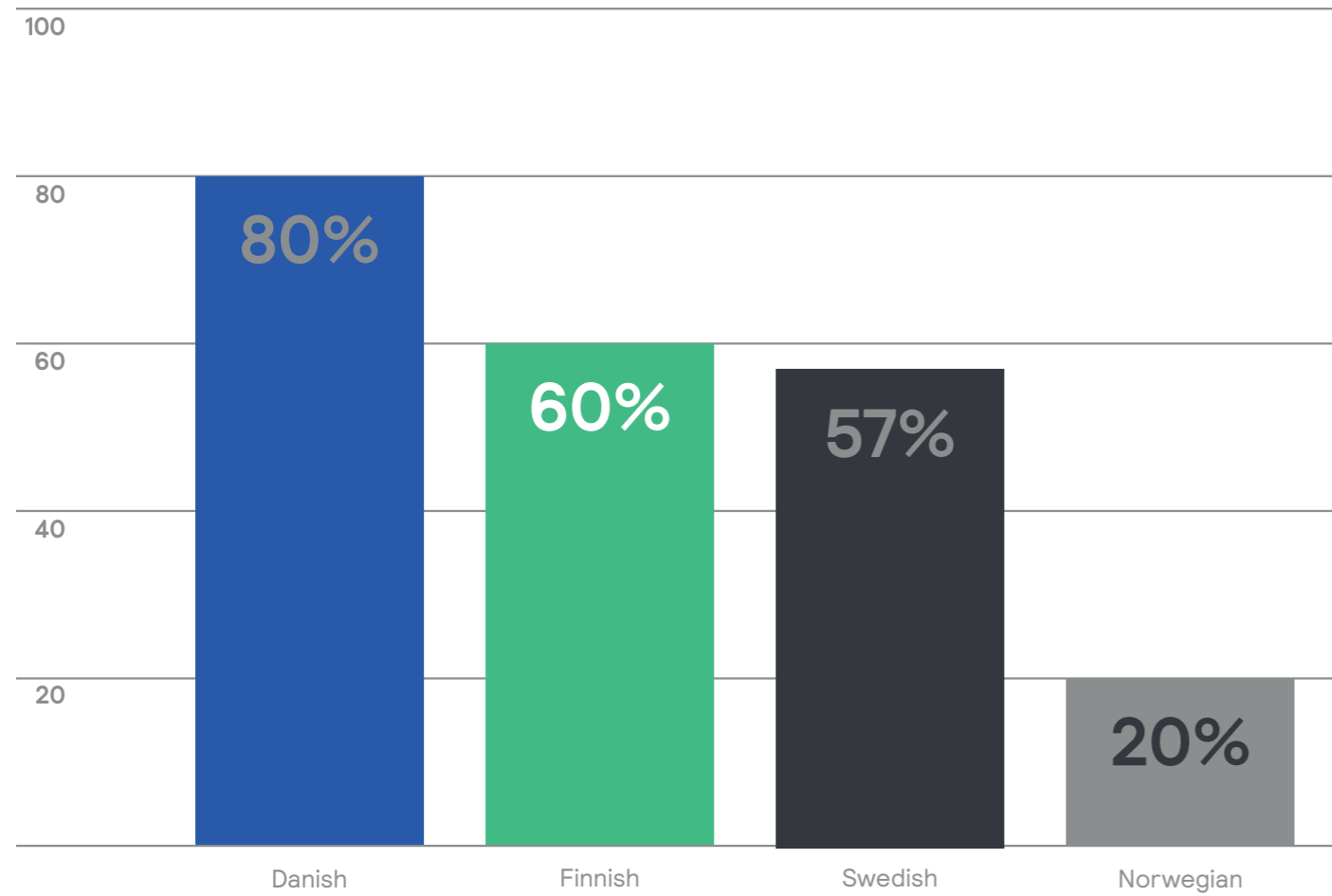


Furthermore, many municipalities reported a syndrome dubbed “pilotitis”, meaning that those smart city initiatives that have already been rolled out are mainly pilot projects based on “a good idea”, not on previous experiences, and lacking clear goals in terms of scaling the solution across administrations. The result of this is “silotitis”, where each department or division ends up innovating within its own organisation. The consequences are very few, if any, synergies between projects because knowledge and experiences are not shared. Looking more closely at the barriers, 66% of respondents pointed to lack of competences as a barrier to implementing smart city solutions.

## How to move on?

Municipalities often look to their peers for inspiration, and will keep on doing so, but when asked how they could get more out of their investments in smart city solutions, many municipalities pointed to stronger collaboration with suppliers and other industrial partners.

## No strategy – No smart city:

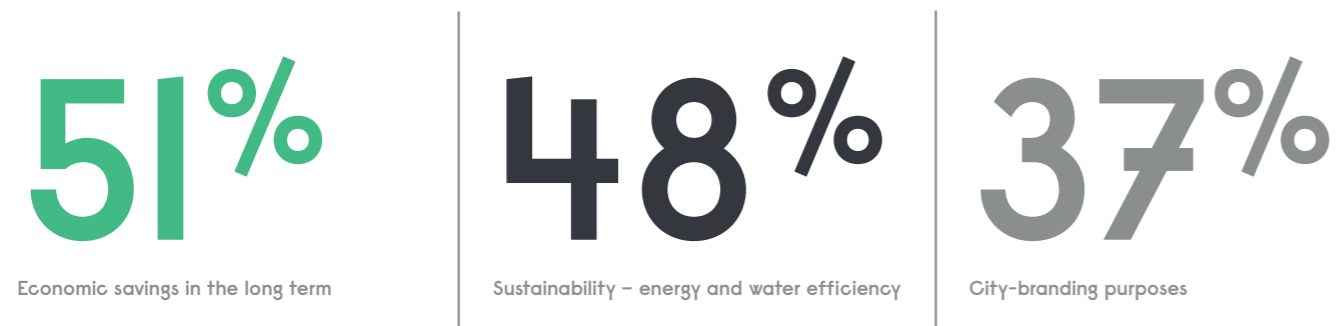


Municipalities lack a concrete strategy

In fact, 64% of the municipalities expressed a direct interest in public private partnerships (PPPs) as a way of sharing investment risks and a solution to lack of in-house resources and competences.

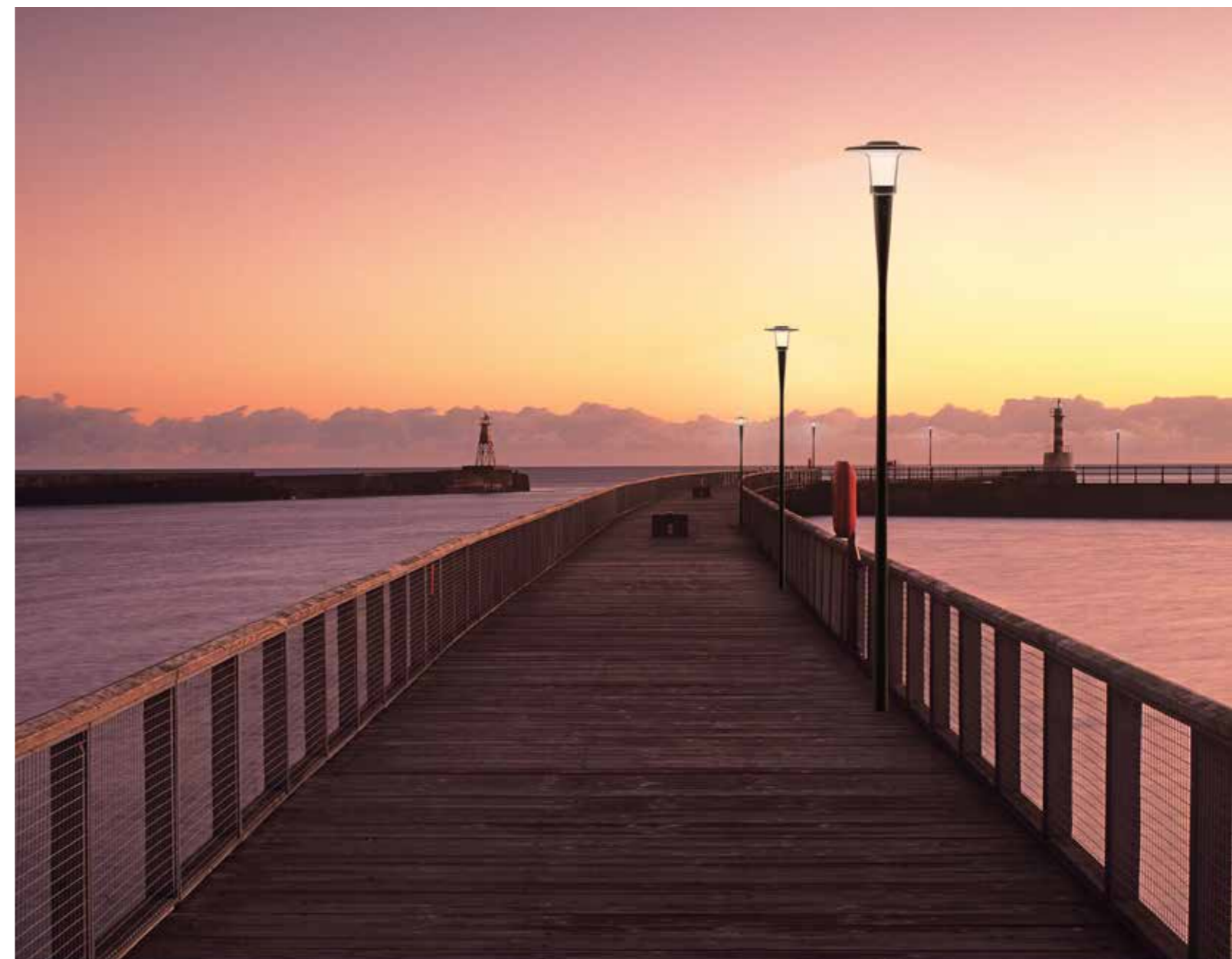
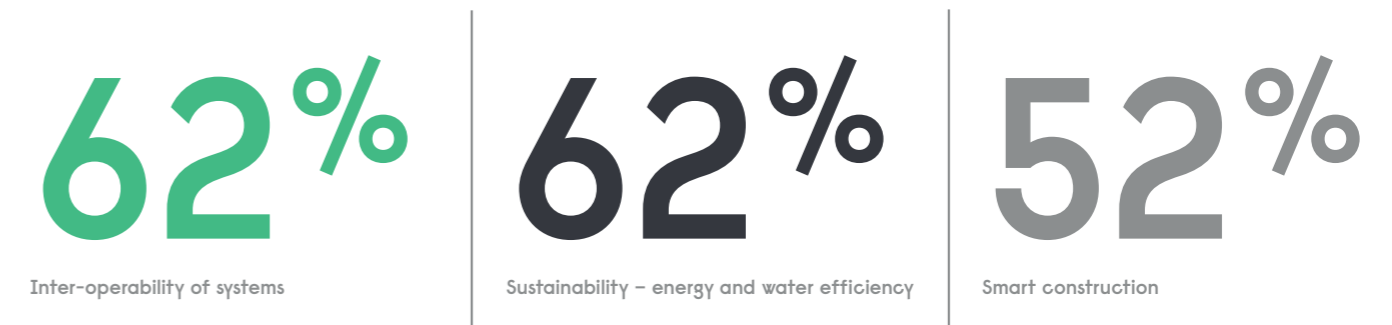
Moreover, many respondents perceived that a common technology standard for smart city projects is necessary for realising the full potential of their projects. This perception is often preventing them investing in new smart city solutions because they fear that different systems will not be able to communicate and share data. So, it is clear that “guaranteed” interoperability between different systems and removal of potential vendor lock-ins could also accelerate the development of more smart cities.

## The 3 most important outputs of a smart city solution are:



The point is that increasing the critical mass of resources and competences through PPPs and formalising the processes for sharing data between systems and experiences between departments and projects makes it possible to start creating a more future-proof framework for building a smart city. In the future, we need to move on from discussing only specs and prices, and instead set long-term goals and include the ability to be open and collaborate across sectors. As a first step, we look forward to sharing the insights from this report with the Nordic municipalities.

## The 3 most vital components of a smart city are:



# Results

# Lighting initiatives are most popular

Two thirds of the surveyed municipalities have initiated smart city projects, the most common being within lighting, energy optimisation and traffic management. At 68%, lighting is by far the most prominent of the three categories, while only 6 percentage points separate number 2, Energy, and number 8, Public Space and Planning.

Lighting seems to be the safest bet given the estimate by research and consultancy firm Gartner in a 2017 report\* that: "By 2020, streetlamps will be the primary network infrastructure for 80% of smart cities."

Finland in particular is showing a need for open platforms that integrate easily with different systems. The Finnish municipalities

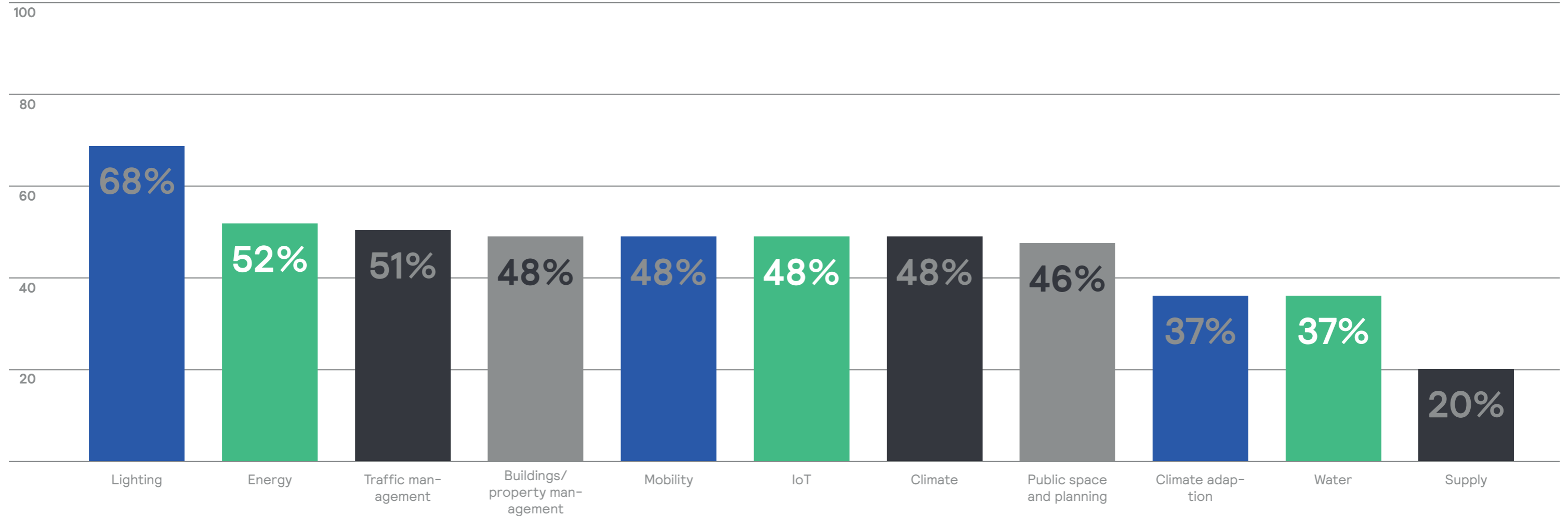
have initiatives within far more smart city categories than the other Nordic countries. The Norwegian municipalities also have a large number of initiatives. But whereas the Finnish municipalities show a spread of initiatives across categories, Norway tops the list of most initiatives per municipality.

When asked how many initiatives are currently running, 65% of Norwegian municipalities indicated that they had more than 10 smart city initiatives ongoing. This is well above the other Nordic countries, which mostly fall between 1 and 6 initiatives.

\*Gartner, "Smart Streetlamps – The Network Backbone of the Smart City," Dean Freeman, Bill Ray, Margaret Ranken, 23 June 2017.



## In which areas does your municipality have initiatives?



# No strategy is time wasted

With two thirds of the surveyed municipalities having launched smart city initiatives, it is a worrying fact that only 21% of those municipalities have a strategy to ensure that their initiatives contribute to overall decision-making processes and visions. 51% of the respondents said they had no strategy, while 28% said they did not know.

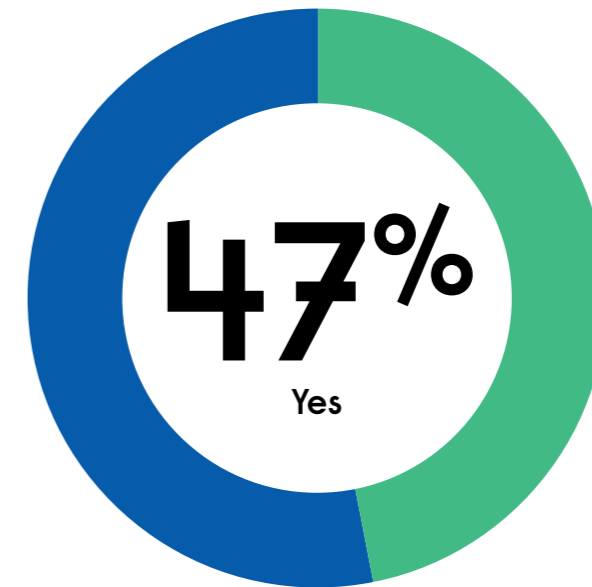
However, it is not equally worrying across the Nordics. The Norwegian municipalities seem to be way ahead of their neighbours in this respect, with 40% reporting that they have a strategy, compared with only 10% in Sweden and 15% in both Denmark and Finland. This might explain why the Norwegian municipalities have initiated more smart city projects than the other countries.

Having said that, the Norwegian municipalities are also the most unsure about whether they actually have a strategy or not. As many as 40% of the respondents said they don't know whether their municipality has a strategy. In Denmark, the figure is just 5%, though it is worrying that 80% of the surveyed municipalities in Denmark have no smart city strategy – the highest percentage of all in the Nordics.

On the positive side, the survey shows that 65% of the Danish municipalities and 63% of the Swedish municipalities that do not have a strategy want to develop one to set the direction for their future smart city investments. Although in these cases a strategy is not imminent, almost half of these respondents could imagine getting one within 12-18 months – 47% and 44% in Denmark and Sweden respectively. Across all four countries, the percentages are a bit lower: 47% of the municipalities that do not have a strategy want one, and 33% expect to get one within a year and a half.

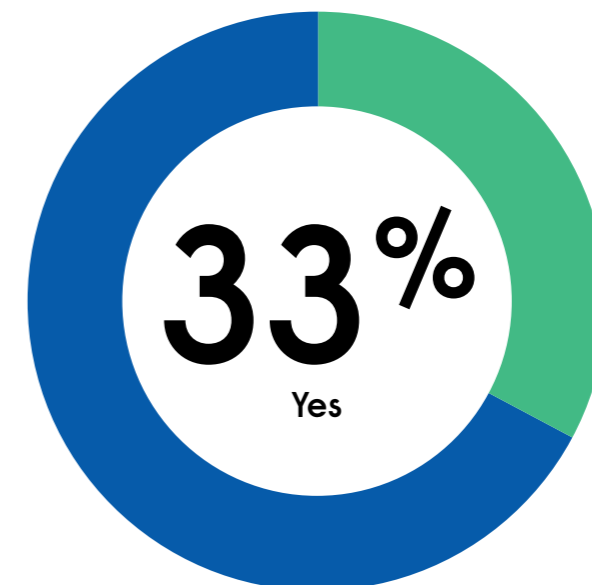
Overall, the municipalities agree that without a strategy it is very difficult to create strong links between projects and build additional synergies for the environment, the municipality and citizens. This is highlighted by the responses of the municipalities that have a strategy when asked what the three most vital components of a smart city should be: They point to interoperability of systems (62%), sustainability – energy and water efficiency (62%) and smart construction (52%).

Do you think your municipality should have a smart city strategy?



47% Yes 53% No

Could you imagine your municipality getting a smart city strategy within 12-18 months?



26% Yes 74% No



# Barriers



# No time means lack of skills and experience

What are the biggest barriers to implementing smart city solutions? Asked directly, 66% of the municipalities cite lack of competences or lack of sufficient in-house expertise and experience as the biggest barrier. Lack of resources is the second biggest barrier (53%), while, somewhat surprisingly, budget constraints (41%) is only the third biggest barrier among the surveyed municipalities.

This trend applies for Denmark, Finland and Sweden, while the Norwegian municipalities cite budget constraints and lack of competences as the two biggest barriers. As the third biggest barrier, Norwegian municipalities point to a lack of political will (50%).

Looking more closely at the qualitative material of the survey and bearing in mind that only one fifth of the surveyed municipalities have a dedicated smart city strategy, lack of time seems to be the root cause of the three major barriers. It means that little or no evaluation of pilot projects is performed,

again leading to insufficient results for presenting to politicians when planning budgets for future years. In turn, this leads to a lack of prioritised personnel dedicated to innovating and implementing comprehensive smart city solutions across administrations. As a result, the skills and experience gained from pilot projects remains tacit within each administration rather than being put to use for the benefit of the wider municipality or other municipalities.

Actually, there is a name for this trend. A Danish department head aptly dubbed this the “pilotitis syndrome”, meaning that municipalities start pilot projects based on “a good idea” but forget to evaluate the results in terms of scaling the solution across administrations, thus neglecting the potential of an actual smart city solution. The pilotitis syndrome is also found in Sweden, Finland and Norway.

**“Lack of time stands in the way of smart city. I had a workshop on smart city last year with the municipal council. If you take four hours out of a day, you can actually get a framework done.”**

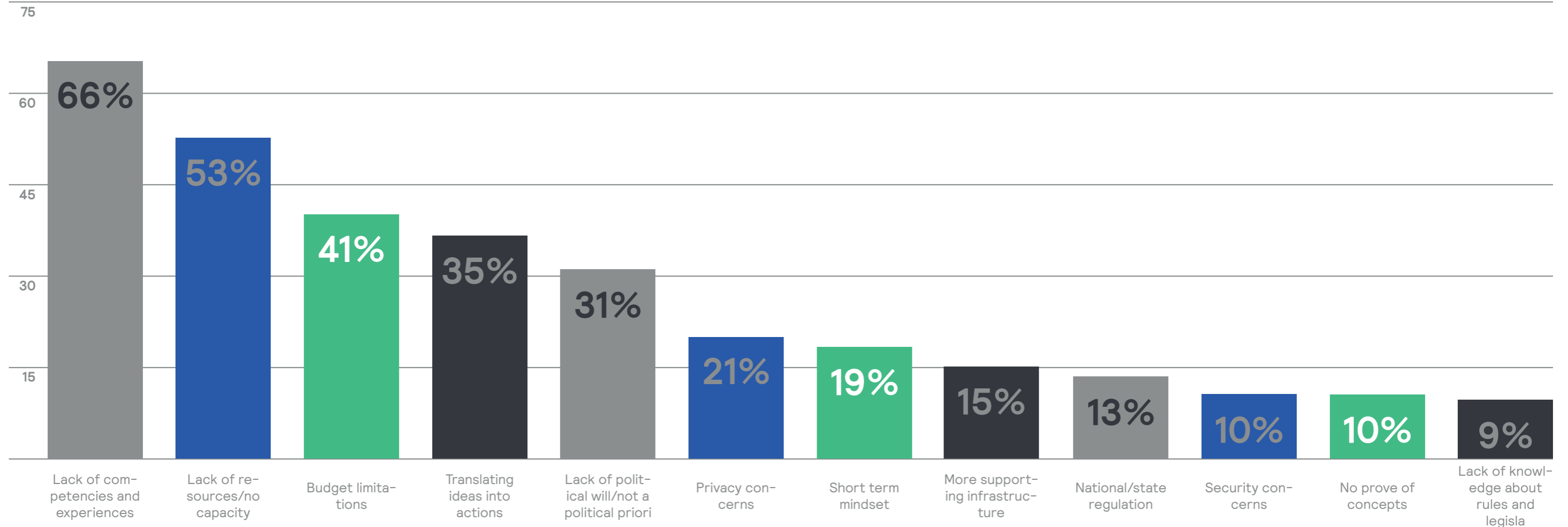
**Head of Planning and Environment, Denmark**



## What are the biggest barriers to implement smart city solutions? (all markets)



“The municipality is lacking information about this type of technology. It’s a relatively new term and it will take time before it’s common knowledge and a priority in the municipality.”  
City planner, Norway



**Solutions**

# Calling the industry:

## Common standards will ease data sharing

The survey shows that the municipalities consider more collaboration to be beneficial for a faster smart city transformation. Across the Nordics, 58% of respondents said that partnering with other municipalities or knowledge centres that are further into the smart city journey would make smart city implementation easier, and 48% point to greater education and knowledge sharing as the second most important factor. At 36%, more funding is perceived as only the fourth most important factor for easier implementation.

Visionary leadership is the third most important factor, at a 42% average across all four countries, but ranks as the most important factor, at 86%, for the Finnish

municipalities surveyed. Unprompted, the municipalities across all four countries put harmonised standards for smart city solutions on their wish list. Although interoperability between many systems already exists, a perceived lack of standards is preventing many municipalities from investing in new solutions as they might risk losing valuable data trying to share them from one platform to another.

To prevent municipalities experiencing vendor lock-in or similar obstacles, suppliers could benefit from working with open interfaces for integration with other platforms and systems.



**“Greater regional cooperation. Either in government or through NGOs to coordinate procurement of solutions. It does not make sense that we buy one system if Kerteminde buys something else. There is a lack of coherence.”**  
Smart city project leader, Denmark



## What would make smart city implementation easier in your area? (all markets)

58%

Partnering up with other centres that are further down smart city journey

48%

Greater education and knowledge sharing

42%

Visionary leadership

36%

More funding

24%

Greater collaboration between agencies

24%

Creation of a smart cities task force

21%

More experts in this field welcomed to your office

15%

More local gov. powers



## Get the focus right

With an acute lack of time in the municipality, suppliers really need to get to the point quickly when introducing new smart city solutions. A point made by many of the respondents is that both suppliers and municipalities often get lost in specs and features. Suppliers need to focus more on total financial gains and benefits for citizens rather than talking about specs with no link to the reality for municipalities of shortage of time and budget constraints.

It is crucial to understand that technology is only valuable when it improves the total cost of ownership, optimises municipal operations and creates clear benefits for citizens and the environment. Hence, the starting point in a dialogue with municipalities should always be the need for a strategy, acknowledging that a strategy establishes the necessary scope, thus making it easier to manage time and make the knowledge useful for both the municipality and its citizens.

The message from the municipalities is clear:

“I miss the hardcore finance types having the municipality’s perspective on budgets and daily operations. I won’t go to conferences about smart cities until there is a greater focus on finance and operations.” Head

of Urban Development & Landscape, Frederikssund Municipality, Denmark

“It’s often too complex for others to understand. They have a hard time understanding the stage in the planning. They want to implement the solutions either too fast or too slow.” Head of Department, Town Planning & City Planning Administration, Luleå, Sweden.

“They are very focused on the nuts and bolts, which they are already familiar with. They lack the broad perspective.” Director, Technology, Business and Culture, Nordfyn Municipality, Denmark

“Data is unmanageable for both them and us. But they forget to look at data in our context. For example, in the energy field: Is it smart to build a new heating plant or are you merely saying that because you have the technology for it?” Chief consultant, Vejen Municipality, Denmark

“Suppliers need better domain knowledge about the municipal market. They need to spend more time telling me how the solutions can be used to improve the service for citizens.” Director Technology & Development, Kalundborg Municipality, Denmark



## Long-term savings still the most important outcome

Across the Nordics, department heads and consultants have to deliver tangible results every day, resulting in a major focus on financial savings. Caged in by budget constraints and shortage of time, 51% of the surveyed municipalities point out that the potential for long-term savings continues to be the most important outcome for smart city solutions. However, with a gap of only 3 percentage points, delivering on sustainability measures is not far behind as the second most important outcome.

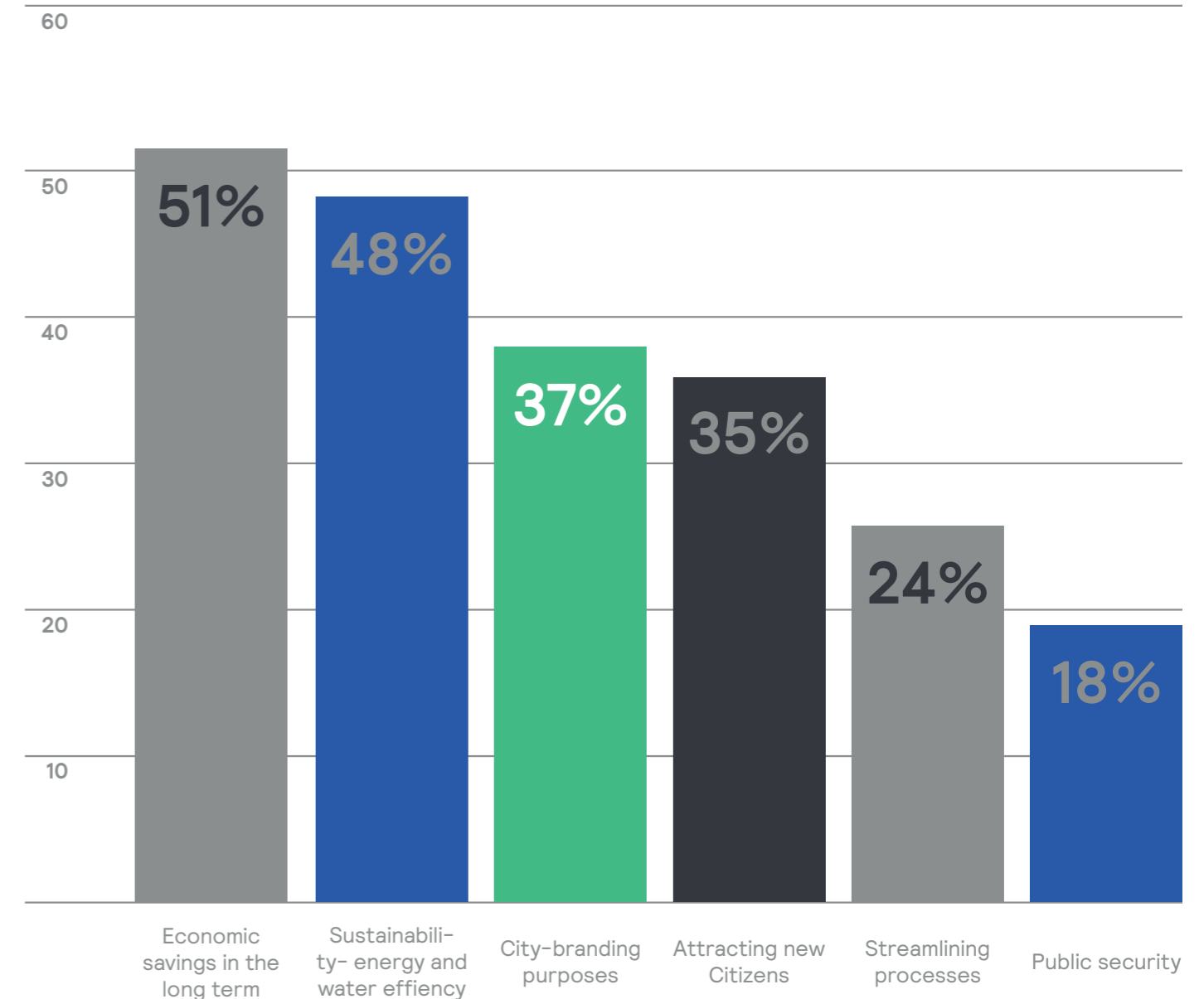
Interestingly, the financial focus is particularly strong in Norway and Denmark, while Sweden

and Finland value sustainability higher, at 64% and 61% respectively. The Finnish municipalities rank municipal branding as the second most important outcome, while the Danish municipalities point to optimising processes as their second most important outcome.

However, qualitatively the municipalities view both financial savings and process optimisation as means to ensuring a better and more efficient service for their citizens.

**“It should make sense for the individual citizen. It must help them to have a good life.”**  
**Head of Technical Operations, Denmark**

What is the most important output of a smart city solution? (all markets)



# Public Private Partnerships Are Key

The surveyed municipalities generally show a keen interest in greater collaboration with industrial partners, vendors and suppliers. 64% of the municipalities expressed a direct interest in public private partnerships, with the reservation that the framework for a partnership should accommodate the municipality's specific needs and challenges. Even those municipalities with only a small smart city budget allocated, or none at all, were willing to further investigate the opportunities and develop more concrete initiatives.

Several of the respondents were already collaborating with vendors and other municipalities on concrete projects or as part of open municipal networks for knowledge sharing, but, as one of the Norwegian

municipalities stated, vendors also need to work on their competences and mindset:

“Companies only see their own part of the solution and have a hard time understanding the context.” Technical Manager, Växjö, Norway

This is backed up by the Head of Department, Town Planning & City Planning Administration, Luleå, Norway: “They have a tendency to focus on a single solution instead of seeing the whole picture and the whole organisation's needs.”

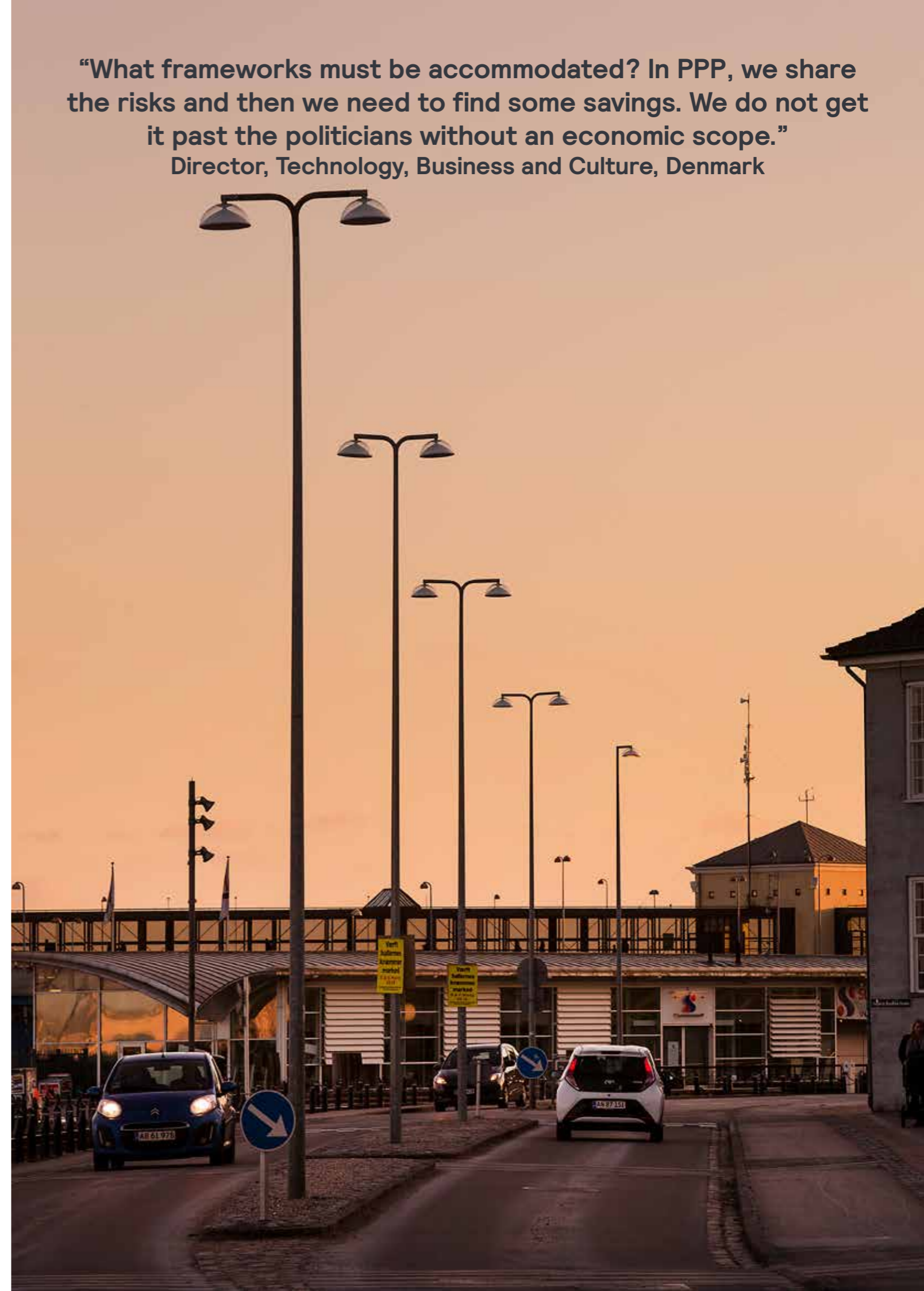
In a long-term perspective, others pointed to triple helix projects, where municipalities, universities and vendors collaborate to create the most innovative smart city solutions.

**“Yes, I'd like to try it out, but I have to be able to present my politicians with concrete calculations of the potential savings in order to get them on board.”**

**Director Technology & Development, Denmark**

**“What frameworks must be accommodated? In PPP, we share the risks and then we need to find some savings. We do not get it past the politicians without an economic scope.”**

**Director, Technology, Business and Culture, Denmark**



# Wrap up

Even though smart city is a familiar concept among the small and medium-sized municipalities in the Nordics, for many of them there is still a long way to go. Only 21% of the surveyed municipalities have a smart city strategy and many synergies remain unrealised due to the pilotitis and silotitis syndrome. The respondents highlight the crucial role that the private sector plays if we as a society want to realise the full potential of smart city solutions

No doubt there is considerable scope for greater collaboration between the public and private sectors, and for municipalities to learn from each other. We need to rethink previous efforts and projects, and step into the

future with a mindset that is open to closer collaboration vertically as well as horizontally. And we need to realise that many of the most innovative solutions will be developed in co-creation processes that involve municipalities, companies and citizens.

Strong coordination and sharing of ideas, resources and competences are the (only) pathway from pilot projects to large-scale solutions spanning multiple departments or municipalities for the full benefit of citizens, the environment and society as a whole.

Let the sharing begin.



## Who is Signify?

Signify is the new company name of Philips Lighting. Signify is the world leader in lighting.

We focus on providing our customers with quality, energy-efficient lighting products, systems and services. Our purpose is to unlock the extraordinary potential of light for Brighter Lives and a Better World.

For more than 125 years we have pioneered breakthroughs in lighting and been the driving force for many innovations. Our track record in innovation is strong and we invest heavily in R&D to stay at the forefront of technological developments.

We strive for continued innovation in LED lighting we are leading the industry expansion to lighting systems in both the professional and consumer markets. Our position as the industry leader in connected lighting, makes Signify the lighting company for the Internet of Things (IoT).





# Appendix

## Methodology

This survey seeks to understand and identify overall perceptions and key barriers around the implementation of smart city solutions across small and medium-sized municipalities in the Nordics – Denmark, Norway, Sweden and Finland.

The survey sets out to gain insight into the present use of smart city solutions. In the process, the survey aims to identify drivers and barriers to smart city implementation as well as how potential barriers can be overcome or bypassed. The results of the survey are the basis for this white paper on smart cities in the Nordics.

### Target audience

The target respondents for the survey were identified as high-level municipal decision-makers, with 36% being directors or heads of department. In both Denmark and

Finland, 65% of the respondents were at director level. In addition, nearly 10% of the respondents were politicians from technical committees.

### Which job functions were targeted?

- Mayors
- Municipal Department Heads
- Technical Consultants

### Background to the survey questions

1. Smart city maturity
2. Decision-making structure
3. Suppliers/partnerships
4. Final thoughts

**100 decision makers provided valuable insights to the survey which ran between April and May 2018.**

#### **Municipalities surveyed**

##### **Denmark**

Faxe, Frederikssund, Herlev, Hillerød, Ikast-Brande, Ishøj, Jammerbugt, Kalundborg, Kolding, Middelfart, Nordfyns, Nyborg, Odsherred, Randers, Roskilde, Silkeborg, Tønder, Vejen, Viborg Aabenraa.

##### **Sweden**

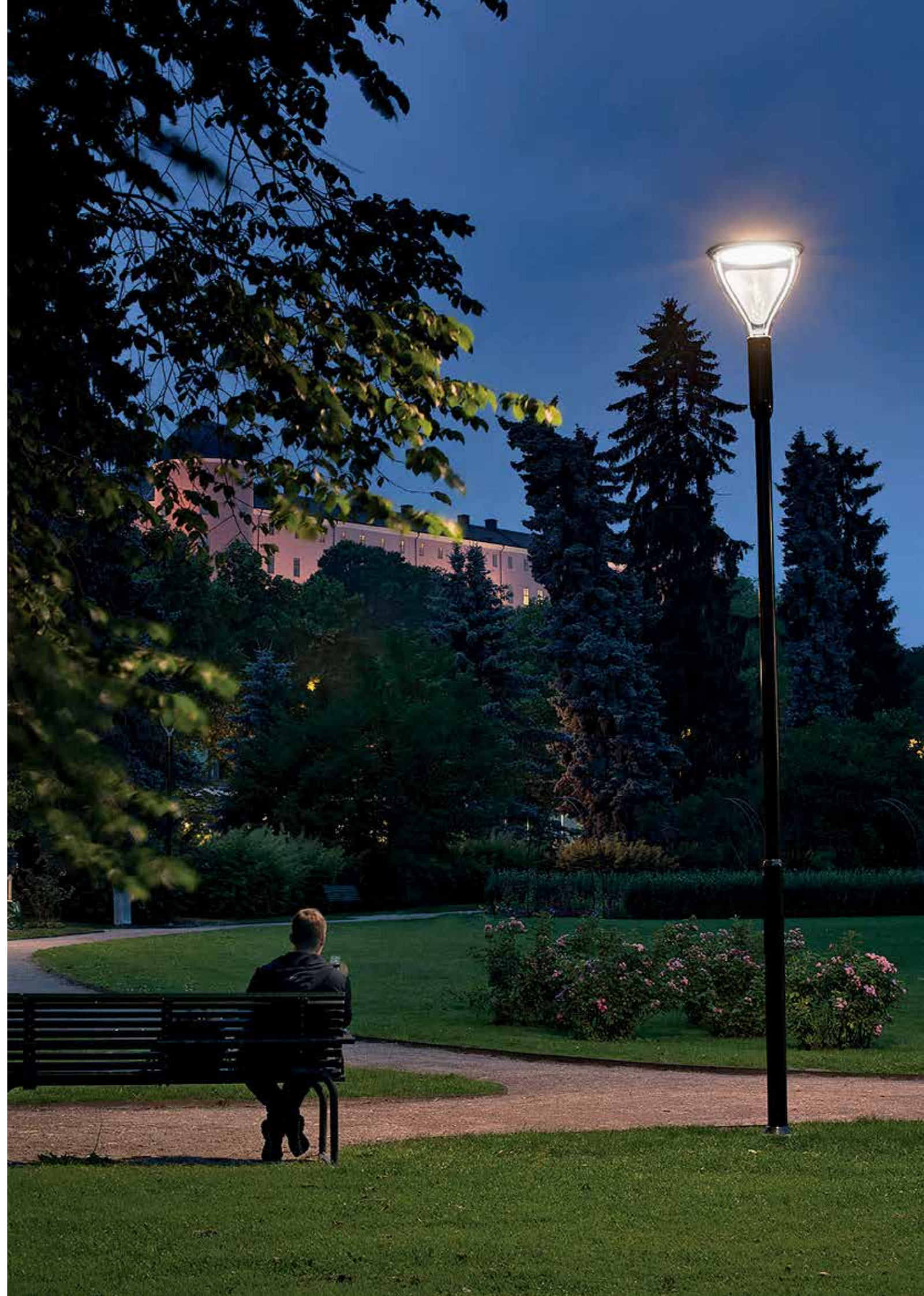
Ängelholms, Botkyrka, Enköpings, Gävle, Gotlands, Haninge, Härryda, Hudiksvalls, Järfälla, Karlskrona, Karlstads, Kungsbacka, Lidköpings, Luleå, Nacka, Norrtälje, Nyköpings, Örnsköldsviks, Östersunds, Österåkers, Partille, Skellefteå, Skövde, Södertälje, Trelleborgs, Trollhättans, Varbergs, Vänersborgs, Värmdö, Växjö.

##### **Norway**

Alta, Bamble, Bodø, Bærum, Fjell, Fredrikstad, Gjesdal, Gjøvik, Grimstad, Halden, Hamar, Harstad, Hurum, Hvaler, Hønefoss, Kongsberg, Kongsvinger, Kristiansand, Kristiansund, Modum, Molde, Narvik, Nedre-Eiker, Oslo, Røyken, Sandnes, Sarpsborg, Tynset, Tønsberg.

##### **Finland**

Hämeenlinna, Hyvinkää, Imatra, Järvenpää, Joensuu, Kokkola, Kotka, Kouvola, Mikkeli, Lappeenranta, Lohja, Nurmijärvi, Porvoo, Rauma, Rovaniemi, Salo, Sastamala, Seinäjoki, Savonlinna, Vaasa.



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