



Smart Greenfield Neighborhoods

Strategies, products
and ideas to make
neighborhoods smart

PLANET
 **IDEA**
SMART ENGINEERING

Smart Greenfield Neighborhoods

Strategies, products
and ideas to make
neighborhoods smart

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PART I

Planet Idea

Planet Idea s.r.l. is a smart city Competence Center which aims to cooperate with real estate developers to design and build cities for the future. Thanks to the experience gained at the national and international level, Planet Idea employs an innovative process to develop greenfield neighborhoods, large real estate projects (retail, hospitality, health & care), and major infrastructure projects (ports and airports). Planet enables Real Estate developers to create innovative spaces to meet the expectations of end users.

1

Introduction

Planet Idea creates innovative solutions which respond to emerging urban challenges in greenfield neighborhoods.

The smart city market is rapidly growing and continues to grow globally. It is increasingly clear that the use of advanced technologies and integrated systems within cities will be the ideal solution for sustainable urban development.

Planet Idea is a Turin-based company part of the international Planet Holding Group. Planet Idea identifies areas of expertise, actions and solutions (products and best practices), and integrates them into new real estate developments.

Planet Idea plans and integrates systems into urban areas using research developed at its own Competence Center. Four key macro-areas have been identified: Ecosystem Resources, Built Environment, Technological Systems and Society.

The Planet Group has achieved its vision through the involvement in the creation of the world's first smart city with social housing. The project was launched in 2014 in Croatia, Brazil and is expected to be completed in 2020. In 2016 Planet also developed the first smart square in Italy, located in Turin.

Through these projects Planet Idea has consolidated a partnership network with more than 40 companies of national and international relevance (such as Tim, Enel, Samsung, a2a) all sharing a similar vision. Together with Planet the most innovative products and services are integrated into existing and new real estate developments. A type of 'smart city strategic alliance' at the service of real estate developers.

Planet Idea helps decision makers (real estate developers, administrators and designers) identify smart strategies for developing greenfield neighborhoods. Planet Idea in collaboration with Arup Italia and Recs Architects has developed a pre and post intervention assessment tool called the Social Smart City Matrix. This unique evaluation framework assesses the level of "smartness" achieved by a real estate project. The "smartness" score for various infrastructures and services are easily measurable, intelligible, and available to all stakeholders.

There are many benefits of collaborating with Planet Idea and they are immediately cash convertible. For example the media impact can accelerate sales and increase the real estate value of the project or savings from energy efficiency improvements. Also, the big data generated by Planet App can be used innovatively to generate further revenues.

2

Planet Idea

Competence Center and Operating Protocol

2.1 Competence Center

Planet Idea is a Competence Center that provides strategic consulting and develops projects which integrate innovation in urban areas (products, ideas and best practices).

The staff consists of over 30 professionals from various sectors: planners, architects, agronomists, civil and energy engineers, IoT experts, social inclusion experts, financial analysts, and communications experts. It relies on the collaboration with local and international research centers and serves as a consultant to national round-tables in the smart cities field.

2.2 Real Estate Operating Protocol

Planet Idea advises clients on the implementation of a 'smart' strategy through an engagement protocol, which defines all stages of the design process from feasibility studies to project execution.

Following the projects construction, Planet Service will be responsible for maintenance and management operations. Planet App is a local platform that can be used to easily monitor and maintain the integrated solutions in the neighborhood.

2.3 Planet App

The sharing and collaborative economy as well as remotely controlled utilities and appliances will play strategic roles in the cities of the future.

The smartphone application will give citizens the ability to control their homes with cameras and sensors, activate home appliances and services when needed, and manage utility usage. Purchases and payments may be carried out using the App and the transactions will generate revenues for the platform manager.



3

Our qualifications

The Planet Group has gained extensive experience through its commitment towards its active and completed projects. In 2016 they completed the first smart square in Italy, which integrated different smart technologies to create a space to better serve citizens. Among Planet's first brownfield projects includes the Quartiere Giardino "Vivere Smart" at Cesano Boscone, in Milano. There they have redesigned an existing apartment complex into a smart urban ecosystem that is bound to serve as a model for future projects.

One of the major ongoing projects, launched in 2014, involves the world's first smart city with social housing. It is currently under construction in São Gonçalo do Amarante in Brazil and is expected to be completed in 2020. This development model, coined the Social Smart City, is targeted at the medium/ low average income group.

Another ongoing project includes a smart square for GREAT Campus, in Genoa. When completed it will be the largest science and technology park in Italy and at its center will be the smart square. The square will have two distinctive areas that will offer spaces for games and sports, cultural events, exhibitions, and other recreational activities.

Lastly, in Santa Palomba, Lazio (just outside of Rome), a project is envisaged for a predominantly residential community called "Santa Palomba Città Dinamica". In this case, the Planet Group is piloting innovative solutions specifically appropriate for the suburban environment.

3.1 Santa Palomba Città Dinamica, Roma

The presentation of the Santa Palomba Città Dinamica project was held on Monday, May 14, 2018. It involves the construction of over 950 apartments on a 75,000 m² property in the IX Municipality of Rome.

The CDP Group has already been working nationally for several years in support of social housing. They are now launching a program in Rome to create more than 20,000 homes and university residences with 8,500 beds.

Planet Idea has selected a range of hi-tech solutions that are digital and enable home automation which can improve the quality of life for residents and reduce management costs.

Presentation of Santa Palomba Città Dinamica - work in progress





Photos of Social Smart City Laguna - work in progress

3.2 Smart City Laguna, Croatá - Brazil

Smart City Laguna is a city under construction in Croatá, in the municipality of São Gonçalo do Amarante, 55 km far from Fortaleza, Brazil. The construction site has 5,000 dwellings underway, with an expected population of around 20,000 residents.

The social smart city is a unique project as it is directed to people with a medium-low income. This has led to the adoption of intelligent social housing solutions capable of meeting the strict economic parameters that set the sale prices for the Brazilian 'Minha Casa Minha Vida' program.

The smart city concept offered by Planet reduces management and maintenance costs. Planet's platform is ideal as digital technologies accelerate the creation of local informal economies and a sharing economy. Such dynamics improve the livability of the neighborhood and produce greater returns for real estate developers.



Smart implementations in Piazza Risorgimento

3.3 Piazza Risorgimento, Turín - Italy

Piazza Risorgimento is the first smart square created in Italy. The project was developed under the 'Torino Living Lab' tender, promoted by the City of Turin along with the Fondazione Torino Smart City [Turin Smart City Foundation] and Circoscrizione 4 [District 4].

Planet Idea introduced 25 innovations to the square, and improved the existing playground and bocce court. Some of the features used include: a smart bench for exchanging data or to recharge mobile devices, parking-lot sensors which track free spaces; beacons for receiving information on mobile devices, a free library to exchanging books with other citizens, interactive totems, and a shared urban vegetable gardens. The goal of the project was to create a common urban space using the smart city concept. A space where community is fostered through innovative solutions while achieving energy savings, social inclusion, increased quality of life, advancement of technological knowledge, and environmental awareness.

The involvement of citizens in the smart square project also took place through the smartphone App specially developed by Planet Idea. Through this platform citizens were able to fully access the benefits offered by the installed features in the square.

3.4 Quartiere Giardino "Vivere Smart", Cesano Boscone, Milano

Quartiere Giardino is a residential complex dating back to the 70s and located just south-west of Milan, in the Municipality of Cesano Boscone. It consists of 1,500 apartments providing housing for about 5,000 residents.

The project Quartiere Giardino Vivere Smart will redesign the existing neighborhood to create a socially smart one. It is the first brownfield redevelopment project of its kind realized in Italy, a truly innovative pilot project.

The project began in December 2017 and will introduce a series of coordinated and integrated services that will be accessible through the Neighborhood App. It will favor new ways of accessing information on community life and new social innovation practices fostering a better quality of life for residents.

The first phase included various smart solutions such as: Free WiFi areas, a smart gym with gymnastic equipment that produce energy, urban gardens with smart irrigation, community composting, a relamping project which introduced smart lighting, a library-of-things, fun theory to help residents source separate waste, and a neighborhood bookcrossing.

Photos of Quartiere Giardino and implementations smart - project completed



3.5 REDO "Smart Living", Milano

REDO is a new smart greenfield neighborhood and is currently under construction in Milan. It is located just southeast of the city center, less than 10 minutes from Rogoredo station.

The project is being developed in an area that is experiencing an extraordinary transformation that will make it one of the most innovative hubs in the city. REDO will be a space offering many services, schools, libraries, sports centers, and shops.

It is a social housing neighborhood made up of 615 apartments with a new form of intelligent, social, and collaborative living. The apartments are designed to optimize the use of spaces, with large windows overlooking green courtyards, and spacious balconies or private gardens.

An app will help residents monitor the energy consumption in their apartments, adjust the thermostat, book a common room, or attend an event. The buildings will have an A energy classification, equipped with district heating, and well connected thanks to an advanced network of fiber optics. Urban gardens, cultural events, and shared spaces are all solutions which offer opportunities for residents to meet, build new relationships, and create a rich neighborhood network.

The project was developed by Investire s.g.r. in collaboration with the Fondazione Housing Sociale and Planet Idea who provided smart engineering services.

Render of project REDO - work in progress





Render of project GREAT Campus - work in progress

3.6 GREAT Campus, Genova

The GREAT Campus is a project born in Genoa, and will be the largest science and technology park in Italy. It will bring together companies and talent creating a space where students, researchers, and managers can meet and exchange ideas and skills to grow together.

On the 25th of May 2018 the “first plant” was laid marking the official opening of the construction site. The GREAT Campus is a true science district sitting on a 400,000 m² parcel overlooking the sea in the heart of the city.

The Smart Square and the Erzelli Urban Park are at the center of the campus offering spaces for games and sports, cultural events, exhibitions, and other recreational activities.

Planet is providing consulting services, helping to choose innovative solutions to transform the GREAT Campus into a smart district. The solutions include: a drinking water dispenser, a renewable energy system and electrical network, recharging stations for electric vehicles, free Wi-Fi, a smart bench, fun theory, solar bricks, a smart gym, and an app that will provide access to digital services such as car pooling and sharing.

4

Planet Idea Observatory

Technology is constantly evolving and expanding including those used in homes and cities. The Planet Idea Observatory is a key element within the Competence Center. The Observatory monitors and selects innovative products, services and best practices to be applied in smart neighborhoods.

4.1 How it works

Planet Idea is a system integrator capable of selecting competitive and innovative products in the global marketplace. The Observatory collects and organizes information regarding smart products and services, and arranges them in a database accessible by the Competence Center.

Information is organized according to a preset structure that is divided according to the areas of the Social Smart City Matrix developed with Arup Italia and Recs Architects.

Planet firstly identifies products, compiles a product database, and then issues a product card with costs and technical specifications for installation purposes.

The Observatory's staff is continuously up to date on the latest technologies and their evolution. As well as the latest smart city studies developed by researchers and partner companies at the national and international level.

The European Commission assesses technological maturity using a scale referred to as the Technology Readiness Level (TRL). It is based on a scale from 1 to 9, where 1 is the lowest (the basic principals are defined) and 9 is the highest (system is already operating in the field). Planet Idea monitors the scientific advancement of international research, so as to predict the technological evolution of a product or service. The Observatory's database includes only products with a high technology readiness level, in other words products and services already immediately available on the market. This choice guarantees the real estate developer the utmost reliability of the products both in the implementation and management stages.

Planet Idea may also suggest the adoption of trending technologies (i.e. 5G internet services) even if they are still at the experimental stage. These features can be used in pilot projects to demonstrate their potential to the world.

4.2 An always open window on innovation

Planet Idea's Observatory has established relationships with research centers and specialized companies at a national and international level. Building the city of the future also involves the identification of technologies and approaches under development which in the future may positively impact citizens' lifestyles.

Planet offers clients access to a well developed knowledge base as well as an external network of professionals and researchers. The goal is to make the selection of efficient innovative products a more simplified process.

The Observatory is currently developing standardized 'all inclusive' solution packages that can be applied in different contexts, for example:

- / Broadband and free Wi-Fi;
- / Smart grid;
- / Home automation;
- / Street lighting;
- / Smart mobility;
- / Urban operating system..

4.3 Business models and services

The Observatory is not only concerned with product and service research, but also analyzes business models for supply companies and their implementation in the smart neighborhood. A cost-benefit analysis is conducted to maximize the client's economic resources. Solutions are offered to the client by hypothesizing multiple financial scenarios based on a variety of suppliers selected by Planet.

Several scenarios are differentiated according to the economic costs and the applicable model. Developers can often purchase complex solutions at nearly no expense, thanks to:

- / Operating lease
- / ESCo model
- / Margins realized on services



LED smart public lighting



Public wi-fi hotspot



Green IQ Smart Irrigation



Urban gardens in collective spaces



PART II

Greenfield neighborhood

The creation of greenfield neighborhoods represents an opportunity to offer innovative housing solutions to today's market. Future residents can experiment daily with systems consisting of the latest technological advancements. This interaction is done according to the users own abilities and interests.

Social inclusion is a fundamental aspect of Planet Idea's strategic vision. Planet's new smart neighborhoods are thus designed and built to improve the living conditions of citizens.

Planet Idea's involvement with smart greenfield neighborhoods is redefining the smart city. It is no longer a theoretical or utopian concept but a concrete opportunity for sustainable local development.

Working in a smart city environment should be considered an attractive business opportunity which can generate active cash flows capable of multiplying the economic potentials of real estate investments.

5

Smart City: the theoretical field

The smart city is a relatively new concept. It has evolved from sustainable development concepts established in the late 1980s (Brundtland Report, 1987). The smart city was first formally defined in 2007 at the University of Technology in Wien. The Centre of Regional Science (SRF) published a report called “Smart Cities - Ranking of European medium-sized cities” following a European level conference.

The report discussed how the smart city is linked to Information and Communications Technology (ICT) structures for their ability to stimulate economic growth, and how it must be supported by the development of human capital, new governance models, and sustainable environmental development.

In 2012, the Italian ANCI [Associazione Nazionale dei Comuni Italiani - National Association of Italian Municipalities] founded the Osservatorio Nazionale Smart City (Smart City National Observatory). The ‘Rapporto Monografico Smart City. Progetti di sviluppo e strumenti di finanziamento’ [Smart City Monographic Report. Development projects and financing tools] written in 2013 defined the smart city as: “[...] *an abstract projection of communities of the future, an applicative and conceptual perimeter defined by a set of needs that find responses in technologies, services and applications that can be recalled at different domains*” such as “*smart building, inclusion, energy, environment, government, living, mobility, education, health.*”

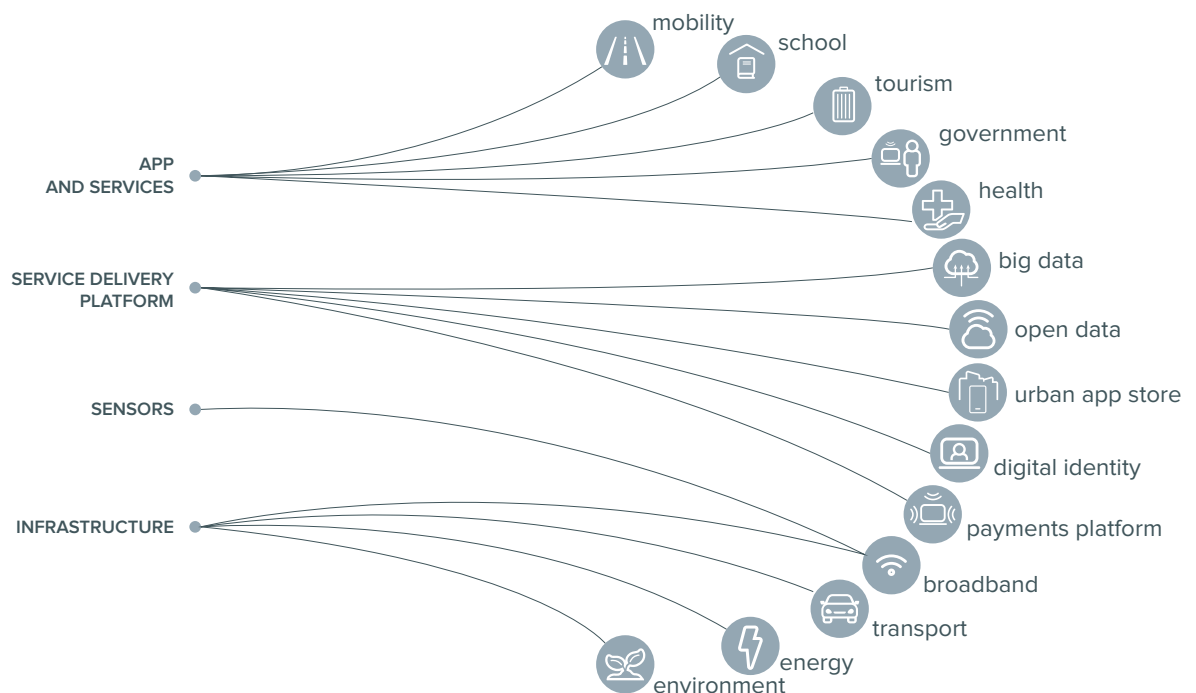
However, the report highlights how “*Such technologies, services and applications do not form, individually or collectively, a smart city unless they are integrated into a platform that ensures interoperability and coordination, but above all, the definition of appropriate governance and financing tools [...]*” so that, through the integration of information, collective smartness is generated. This can lead to improved social and generational inclusion and quality of life for citizens.

5.1 Smart designing: references for programming the cities of the future

Due to the number of people involved in the smart city field and the rapid evolution of technical solutions, smart features are not clearly identifiable.

Identifying the fields that define a smart city is necessary to define elements that determine the city’s smartness. The goal is to have objective, and possibly shared, methods and tools to perform a city’s assessment and comparison. Several organizations have already been involved including: the British Standards Institute (BSI), the TUWIEN + EU commission project, and the IESE University of Navarra. The resulting rankings allow for the identification of the most effective smart solutions and processes, and also outline areas for improvement for less successful cases.

The first evaluations of Planet Idea have led to the identification of six qualities that can be associated with the smart city and that need to be balanced in order to achieve the smart development of the city. These are: attractive city, healthy city, digital city, informative city, efficient city and inclusive city.



6

Planet Idea's Smart Program

Planet Idea consults real estate companies on strategies to ensure their projects meet the smart city requirements. Today these requirements have become essential to the sustainable development of urban housing.

6.1 Economic Advantages

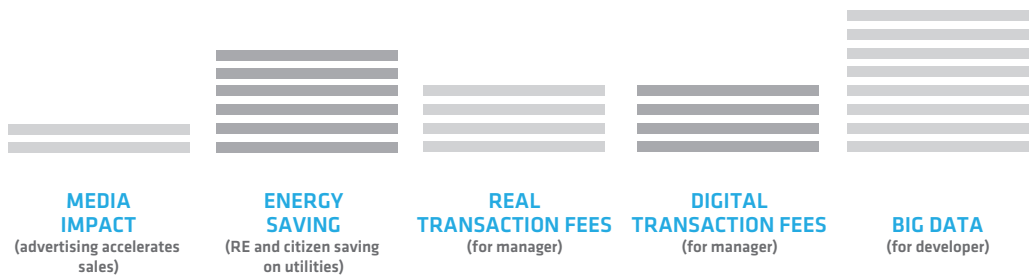
Planet's strategic programs immediately add value to the client's project in five areas: media, energy, real economy, digital economy, and big data.

Firstly, media activity is stimulated and can exponentially accelerate sales. This is a result of the quality of Planet's smart neighborhoods compared to traditional real estate development models. The increased media exposure also generates interest both in the public and private sectors. This fosters support partnerships both in terms of implementation and in the management of the smart city.

The smart neighborhood will be more energy and time efficient resulting in economic returns for both the residents and providers. If active energy production systems are introduced revenue can also be generated.

Integrating smart services for residents also creates business opportunities from the transaction fees to access them. For example, transaction fees for both material services (i.e. personal assistance, gyms, and sports activities) and digital services in a sharing economy (i.e. services exchange on the App). These represent potential sources of revenue for the real estate developer.

Lastly, the vast amount of data (big data) generated by a smart system can be analyzed and re-used to improve the performance of the neighborhood and the services offered (i.e. telephone and energy providers).



Monetisation models of innovative solutions

6.2 Methods

Planet integrates smart designing solutions for both new construction and redevelopment projects. The advantages include the following:

- / implementing solutions on a neighborhood level reduces costs due to the economy of scale
- / products yield more due to the favorable synergy of the whole system
- / supports smart public management for local administrations of the neighborhood
- / the large scale of the neighborhoods attract partnerships with private supply and management companies
- / post-sale planning for the management of complex can determine long-term economic benefits for the real estate manager.

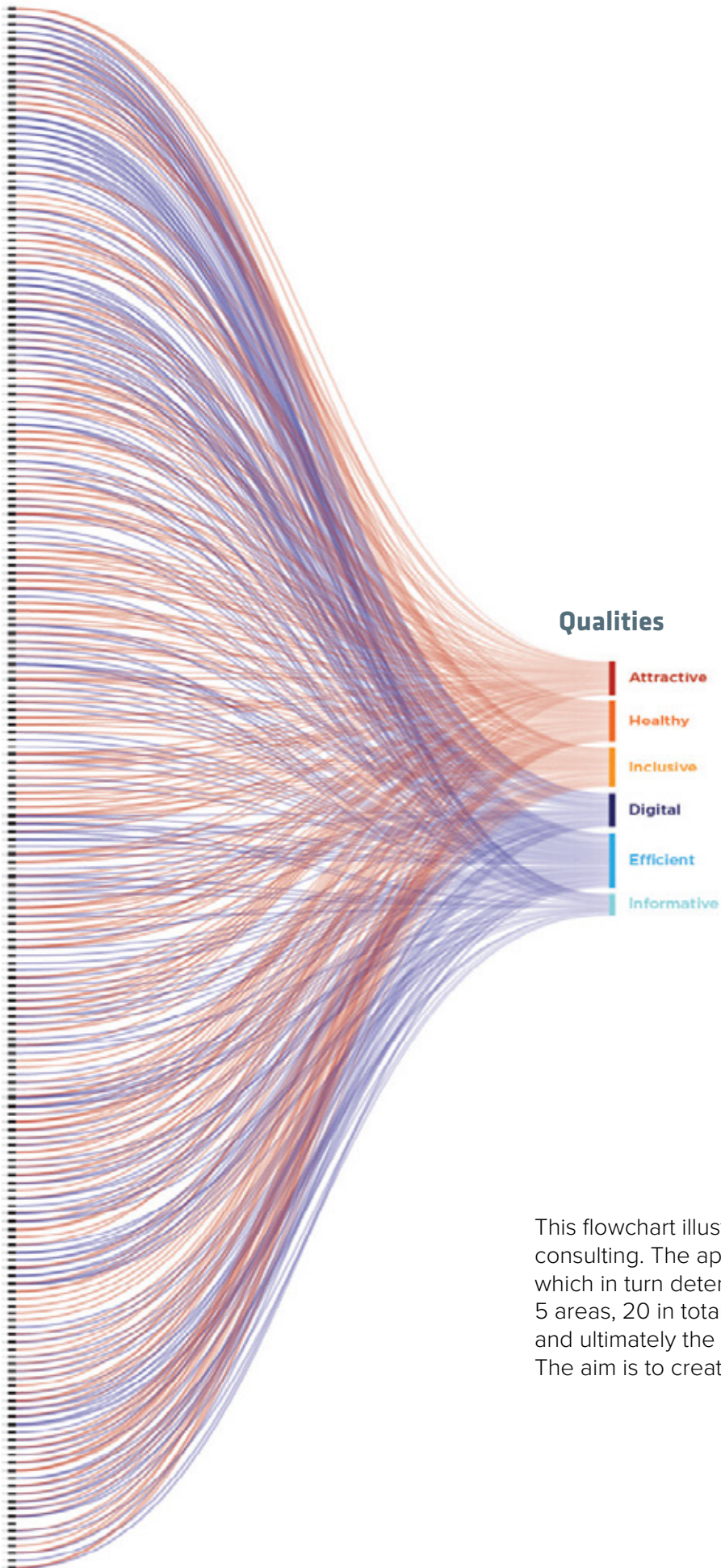
6.3 Tools

Planet Idea operates in four thematic areas: ecosystem resources, built environment, technological systems and society. Within each area, it has identified categories of smart solutions to be proposed to the client.

These are specific intervention areas that include 'hardware' and 'software' solutions. For example hardware solutions are physical objects implemented in the city, such as smart lighting for streets and other public venues. Software solutions are innovative best practices that make the smart city more livable and more socially cohesive. The solutions are discussed further in the following chapters.

Planet provides an economic plan to clients highlighting the financial costs for the various solutions. Some solutions are offered for free because of agreements with external operators who will later provide services and supplies in the neighborhood (i.e. smart utility metering). Other solutions require greater economic investment from the real estate developer but are characterized by higher returns. Regardless the solution economic opportunities are created through special agreements with third-party companies.

Planet Idea has also developed the Social Smart City Matrix (SSCM) with Arup Italia and Recs Architects. It is a standard and international evaluation tool and the basis for Planet App. The App integrates the smart solutions rendering them more tangible and effective.



This flowchart illustrates Planet’s approach to consulting. The appropriate actions are selected which in turn determine the marcoareas (each having 5 areas, 20 in total), smart solutions implemented, and ultimately the qualities achieved for the project. The aim is to create a holistic and balanced project.

Built environment

- / Architecture
- / Urban Functions
- / Infrastructure
- / Public Space
- / Mobility



Society

- / Community
- / Well-being
- / Education
- / Economy
- / Security



7 Ecosystem resources

The city is an ecosystem in which humans play a crucial role in defining the flows of matter and energy and in regulating the relationships between the various constituent parts.

The development of a smart city must consider practices that protect and maintain the quality and health of natural resources, while being economically and socially sustainable.

Ecosystem resources should be planned with an interdisciplinary approach, addressing issues ranging from pollution control to the management of green areas, water bodies and all other elements that sustain the territory.

Residents of a smart neighborhood designed by Planet Idea live in a green and healthy environment.

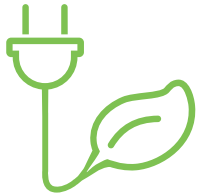
Areas

NATURE
AIR
SOIL
WATER
ENERGY



7.1

Beyond sustainability for an efficient city



RESPECT FOR THE ENVIRONMENT AS A FUNDAMENTAL REQUIREMENT

Smart communities that feel part of a common urban ecosystem have a greater sensitivity and respect for the environment in which they live

The focus is to operate systematically where the outputs of one subsystem become inputs of another, thus minimizing investment and management costs, and significantly reducing power consumptions.

Some of the innovative solutions selected by Planet Idea to be integrated into the smart neighborhood include:

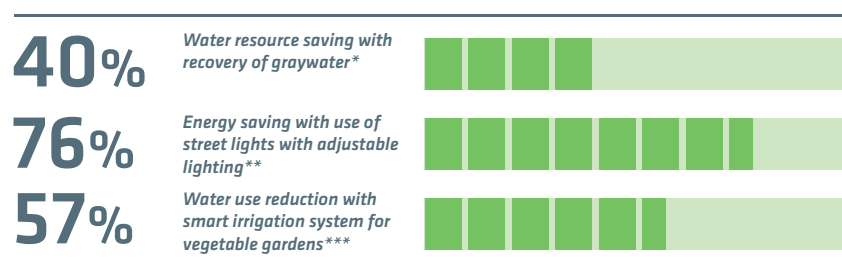
- | | | | | |
|---|---|---|---|---|
| 
Micro hydroelectric plant | 
Smart lighting | 
Solar street lights with accumulators | 
Photovoltaic system | 
Micro wind turbines |
| 
Geothermal heat pump | 
Urban ecological network | 
Microhabitats for local fauna | 
Native plant species | 
High CO2 absorbing plants |
| 
Drought resistant plants | 
Naturalized green areas | 
Urban forestation | 
Rainwater harvesting system | 
Potable water storage system |
| 
Graywater reuse system | 
Rain garden | 
Superabsorbent polymers | 
Constructed wetlands for water treatment | 
Intelligent irrigation systems |
| 
Discontinuous targeted pruning | 
Biological wastewater treatment | 
Natural lawn mowers | 
Infiltration trench | 
Biosolids fertilizer |
| 
Urban agriculture | 
Green area management by farmers | 
Smart electricity metering | 
Smart water metering | 
Energy producing speed bump |
| 
Wetlands | 
Solar bricks | 
Indoor air purification filter | 
Desalination system | 
Solar water heating system |

Advantages of the proper use of ecosystem resources

When supporting nature, benefits are immediate and collective. Some examples are:

- / significant improvement of quality of life
- / reduction of emissions that could cause health problems over time
- / recovery and savings of resources that represent an avoidable economic expense
- / positive effects on psychological well-being: scientific evidence shows that effective distribution of green spaces in urban areas improves moods and reduces stress

PERCENTAGE OF BENEFITS



* <http://www.tuttogreen.it>

** <http://www.planetidea.it> (dati piazza smart monitoraggio progetto "Piazza Risorgimento", Torino)

***<http://www.planetidea.it/smartsquare/>

8

Built environment

Planet is rethinking the way we live in the city. Designing fluid, multipurpose and sustainable spaces can help to improve the quality of life for residents.

Regardless of the size and number of residents the urban space will have adequate services to meet the daily needs of everyone.

Small public areas for residents will mediate the transition between their homes and larger urban spaces thus fostering social integration in the neighborhood.

Areas

ARCHITECTURE
URBAN FUNCTIONS
INFRASTRUCTURE
PUBLIC SPACE
MOBILITY



8.1 Smart infrastructures and governance






ELEMENTS FOR EFFECTIVE URBAN PLANNING

A balanced city for a high quality of life

The built environment is not a static background where a community lives but is designed to interact with emerging social needs, actively involving citizens in the use of inclusive public spaces and smart features.

Some of the innovative solutions selected by Planet Idea to be integrated into the smart neighborhood include:

- | | | | | |
|---|---|--|---|--|
| 
Bike path network | 
Pedestrian path network | 
Smart parking | 
Innovation hub | 
Traffic calming zone |
| 
Shopping street | 
Smart pedestrian crosswalk | 
Urban Furniture Designed for All (DfA) | 
Universal accessibility | 
Bike sharing |
| 
Car sharing | 
Mixed use design | 
Recharging stations for electric cars | 
Intelligent bus shelter | 
Smart bench |
| 
Educational game area | 
Sewage system controls and monitoring | 
Water distribution monitoring system | 
Outdoor cinema | 
Green roofs |
| 
Green walls | 
Separated waste collection area | 
Community composting | 
Pop-up market | 
Fitness area |
| 
Planned and sustainable construction site | 
Pedestrian accessibility to services | 
Dog playgrounds | 
Infopoint | 
Road hierarchy |

Benefits of proper and effective planning of the built environment

If the smart city is strategically planned, the following advantages can be achieved:

- / ease of use of conventional services, which become more efficient and faster resulting in saving resources and time
- / extensive networks improve the use of local and global services and ensure they are equally distributed in the neighborhood
- / increase in the quality of public spaces
- / increase in smart and inclusive mobility that facilitates accessibility for all citizens. Efficient public infrastructures make travelling in the neighborhood easy and more environmentally friendly.
- / monitoring of infrastructures with quantitative flow analysis.

PERCENTAGE OF BENEFITS



* Recs Architects

** <http://www.sietitalia.org/wpsiet/Danielis%20-%20WPSIET%202017.pdf>

9 Technological Systems

Technological systems are an essential prerequisite for the development of smart services. Many of Planet's innovative solutions use digital infrastructures.

Public Wi-Fi hot-spots, 4G/5G internet service coverage, efficient public transportation, and real-time data monitoring systems are but a few examples.

Living in a highly connected neighborhood with technological services that improve the quality of life for residents will become an achievable dream for everyone.

Areas

OPERATIONS & ADMINISTRATION

DATA & SENSORS

NETWORKS & DEVICES

MATERIALS

LIFE CYCLE



9.1 Technology at the service of citizens



THE FUTURE IS INCREASINGLY CONNECTED

The connection between systems and people in the neighborhood encourages not only the management and energy saving, but social relations as well

Systems are technical solutions that support an increasingly connected and mobile society. Automating and facilitating responses to citizens' new requirements in residential environments.

Some of the innovative solutions selected by Planet Idea to be integrated into the smart neighborhood include:

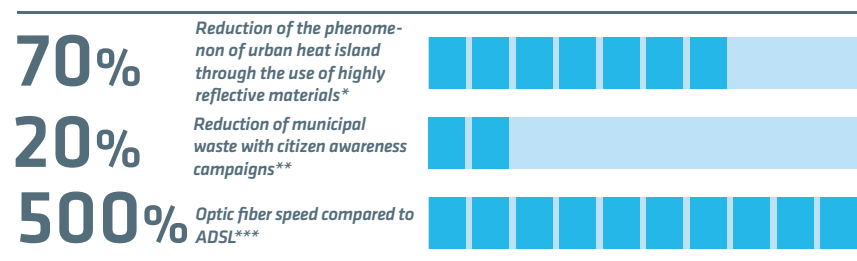
- | | | | | |
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| 
Free Wi-Fi | 
Personalized diet device | 
Home automation | 
Smart thermostat | 
Sound-absorbing pavement |
| 
Waste collection using RFID | 
Intelligent garbage bins | 
Building automation | 
Permeable paving systems | 
Energy producing flooring |
| 
Anti-trauma materials | 
Photocatalytic materials | 
Innovative materials for potable water distribution networks | 
Special paints | 
Noise barrier |
| 
Acoustic detectors | 
Digital maintenance log | 
Optic fiber | 
Pet tracker | 
Fire detectors |
| 
Flood detection system | 
Seismic detectors | 
Beacon | 
Open data sharing | 
Nowcasting system |
| 
Rainfall monitoring using cameras or rain gauges | 
Domestic health care device | 
City information network | 
Sharing community services | 
Personal security device |
| 
Mobility on demand (MOD) | 
Child tracker | 
Waste converter | 
Air quality control system | 
Neighborhood app |

Benefits of smart systems

Technological solutions that meet people's needs bring countless benefits to the community, such as:

- / more security and increased automation, resulting in more free time and less stress
- / faster communication speeds, both between the components of a local community and towards the entire neighborhood
- / new community relationships, efficient space management, and reduced traffic and hence waiting times
- / control of public lighting, LED lights with photovoltaic panels, dimmable lights with sensors, resulting in energy and economic savings.

PERCENTAGE OF BENEFITS



* Report Ricerca di sistema Elettrico, ENEA 2011

** Reducing Municipal Waste through Promoting Integrated Sustainable Waste Management (ISWM)

Practices in Surabaya city, Indonesia.pdf

*** <https://www.wired.it/internet/web/2014/12/12/adsl-fibra-ottica-quali-differenze-tempi-download/>

10 Society

Improving social inclusion in a community is the specific goal of the society area. For a city to be smart it must provide quality infrastructure, a digital platform to supports its services, and equally importantly it must nurture an intelligent community.

Living in a smart city is much more than just owning a home. Rather it is an opportunity to actively participate in the life of the community, creating new experiences and reshaping the way of life there. It is a context in which all citizens contribute together to create a safer and more sustainable city.

The fundamental prerequisite of each project is to consider people as the center of the city, and their education and involvement become fundamental tools for the city's evolution.

Areas

**COMMUNITY
WELL BEING
EDUCATION
ECONOMY
SECURITY**



10.1

Designing solutions with high social impact



INCLUSION FOSTERS INNOVATION

A smart environment promotes new relationships between the residents, engaging them in common activities and providing them with collective services.

Each inhabited environment is characterized by specific relations and interrelations between individuals that contribute to a cohesive community.

Some of the innovative solutions selected by Planet Idea to be integrated into the smart neighborhood include:

 Guidelines for responsible water consumption	 Guidelines for nutrition education	 Guidelines for reducing energy consumption	 Guidelines for waste reduction, reuse and recycling	 Guidelines for the reduction of food waste
 Urban gardens	 Co-working space	 Fabrication laboratory	 Repair and reuse workshop	 Library of things
 Shared social kitchen	 Virtual bulletin board	 Smart gym	 Playground equipment that generate electricity	 Fitness trail
 Automated external defibrillator (AED) Totem	 SOS column	 Video surveillance system	 Community center for workshops, courses, and social activities	 Interactive totem
 Bookcrossing	 Community bulletin board	 Infographic advertisements	 Fun theory	 Storytelling Corner
 Promoting ecologically responsible behaviors	 Time bank	 Green area management by schools	 Business incubator	 Sharing card

Benefits of innovative solutions for the society

Actions are promoted to benefit a wide range of areas, for example:

- / reduction in harmful behaviors between citizens and towards the environment
- / better relationships and community engagement through a sharing economy, support services, and leisure activities
- / greater sensitivity and awareness of the environment
- / meeting spaces (e.g. square, parks) stimulate social cohesion improving the quality of life, health and security of residents

PERCENTAGE OF BENEFITS



* <http://www.westartitaly.com/news/-non-comprare-condividi-il-boom-della-sharing-economy>

** estudio de la Comisión Europea (ECF, 2011, Cycle more often 2, Cool down the planet! Quantifying CO2 savings of Cycling)



PART III

Added value

Planet Idea has developed a well-structured and strong network of partners with international companies who prioritize the use of innovative social technologies.

This collaboration allows the real estate developer to benefit from products at nearly no expense thanks to innovative business models that support the latest sharing economy services.

11

App - Digital platform

11.1 Neighborhood App: an essential tool

Following the completion of the smart project Planet Idea offers the client a local App to enhance the potential of the implemented solutions.

Planet Idea's vision is a smart city for today and the future, where the available technologies are integrated and interact together. Citizens are provided with a safe, social, and service-rich urban environment in which sharing and collaborative economy play a strategic role.

Alone the different technologies developed in the smart city fail to interconnect and create a holistic system. For this reason an instrument panel is needed: to monitor the various technologies, acquire information that is useful to the citizen, serve as an 'information hub', and allow the user to interface with the various service providers. The local App is an essential tool for structuring, interconnecting and amplifying the effectiveness of different technologies. It is a free downloadable application enabling all stakeholders a simple but powerful means to interact with everything available in the smart neighborhood..

11.2 Information from the APP

The App is a powerful tool that displays information at different levels for residents: from the urban level to the interpersonal level. The App provides residents with access to:

- / information on events, city issues, and traffic or weather conditions
- / special offers from local shops and it' location (through proximity sensors)
- / smart mobility like car and bike sharing and food delivery
- / control his/her home, managing consumptions by turning on or off home appliances and home services.

The App will be an open system in continuous evolution, designed to allow the management of new technologies in the future. Its use fosters a 'dialogue' between citizens, public administration (PA), and private operators, a discussion panel that evolves dynamically. This open concept can also accommodate subjects or other urban scenarios that are unknown today.

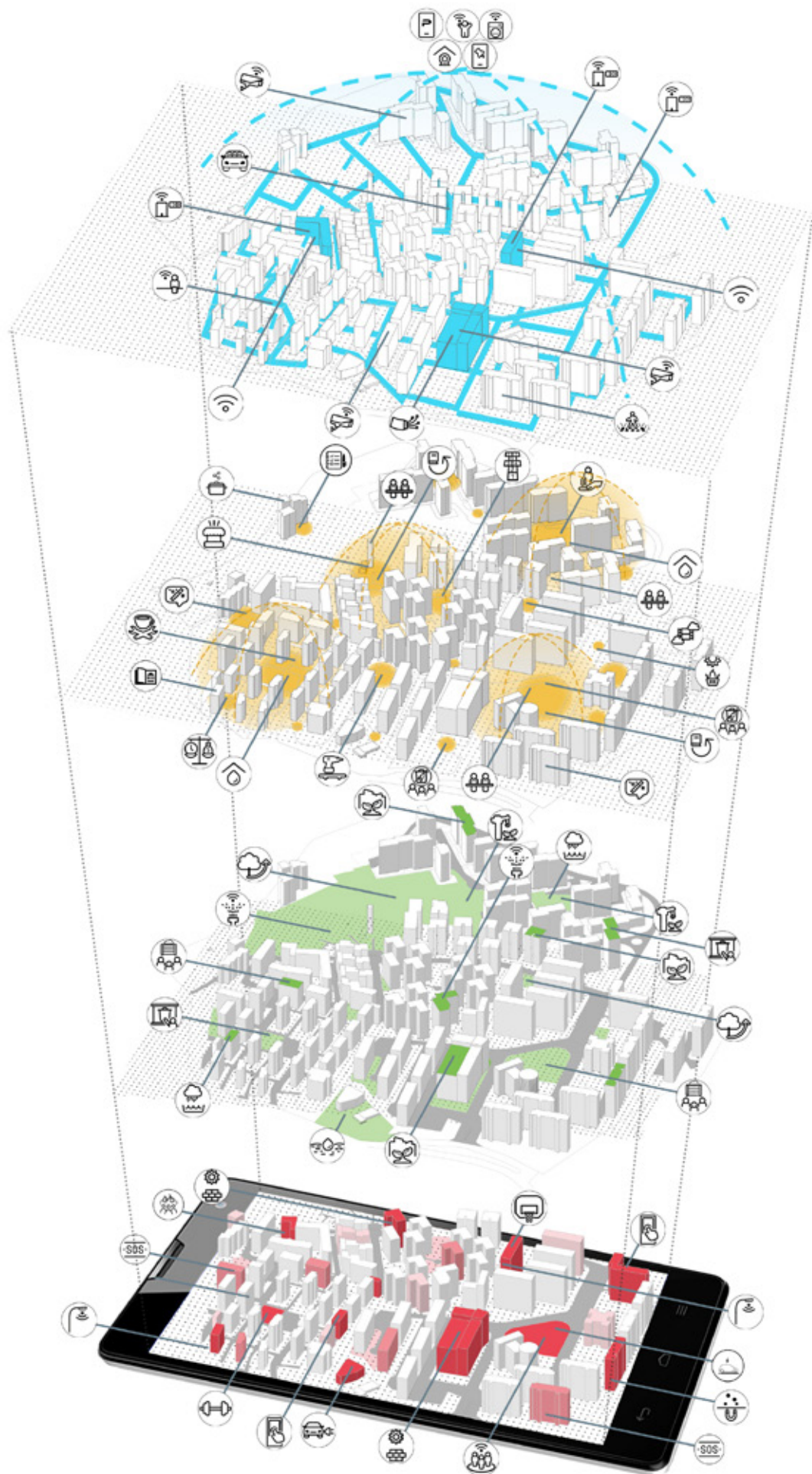
11.3 Big Data

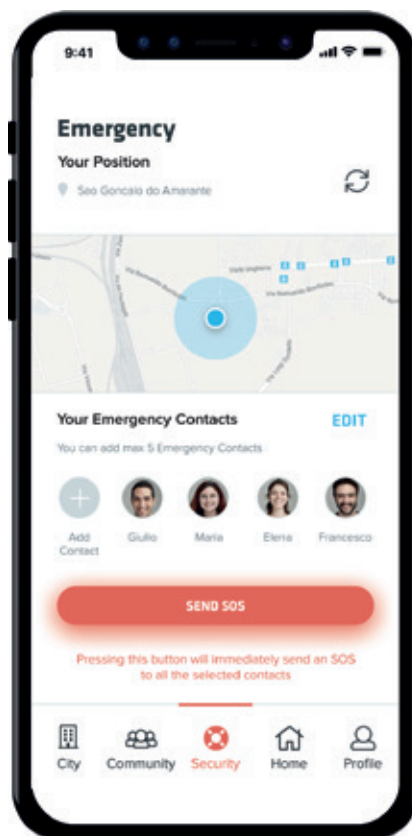
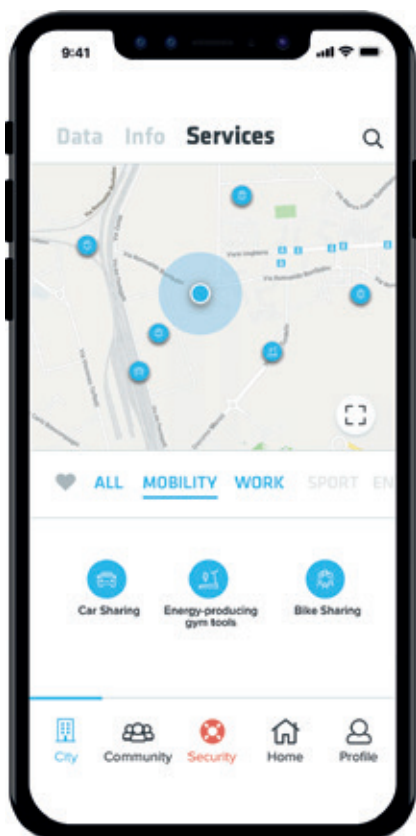
A technologically advanced and interconnected system such as the smart neighborhood generates big data, a large set of data and indicators fundamental to managing services and consumptions. The private operators and the public administration can use this data to ensure they are offering services in a timely and continuous manner.

The App is a tool that enables the client to manage, plan, and utilize all aspects of the new smart urban context, and provide improved public services for citizens. In addition, the App can improve the relationship between the citizen and administrators and the urban environment. A few examples include: streamlined tax and utility payment collection, information on important events, real-time information for citizens, and supervision of school activities.

Developing the big data and generating transaction fees creates a sustainable and scalable business model. It is economically viable and a strategic tool for all stakeholders, functional throughout the entire smart neighborhood. The community supports and enriches the model fostering the natural generation and amplification of services.







12

Social Smart City Matrix

12.1 What is this tool used for?

Planet Idea has developed the Social Smart City Matrix in association with Arup Italia and Recs Architects. It is an evaluation tool to quantify the degree of 'smartness' of the project before and after Planet's intervention. The SSCM can be considered a guide and a means of creating dialog between Planet and the client. The aim is to achieve the smart goals set by the clients, and also to empirically justify the benefits of a smart city to the client.

The Social Smart City Matrix tool allows planners and clients to balance social, environmental, architectural, and technological factors. This permits the development of a truly holistic and smart neighborhood. The tool produces a final evaluation sheet summarizing the projects performance in the four macro-areas identified by Planet.



12.2 How the tool works

The project evaluation begins by selecting one or more of the following work areas: planning, activating, managing, monitoring, or improving. After selection, the proposed solutions/products (200 have been identified thus far) are given an impact percentage for each city quality. The smart city qualities have been defined as: attractive, healthy, digital, informative, efficient, and inclusive. The final evaluation is expressed in terms of these qualities.

12.3 Certificate of smartness

At the end of the evaluation, Planet will produce a certificate of smartness with a numerical evaluation expressed on a scale from 0 to 10.

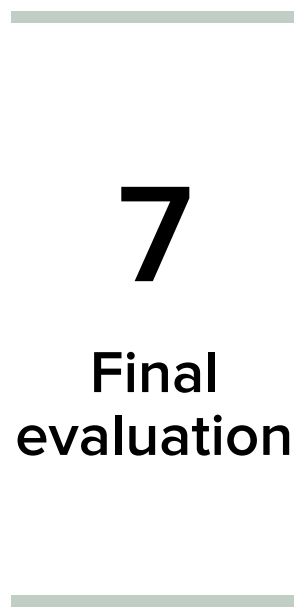
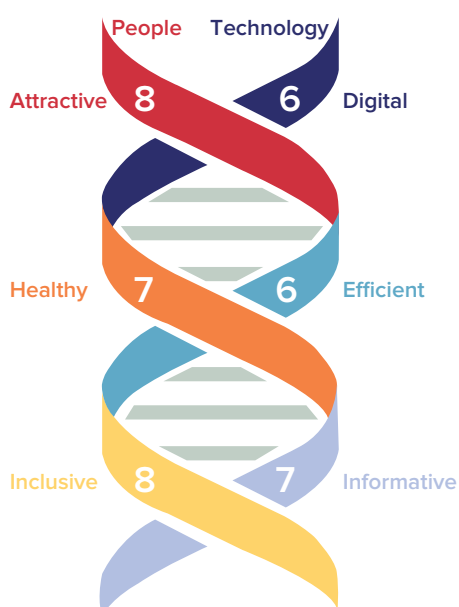
The evaluation is visually represented by a DNA helix, to evoke the necessary synergy between the intrinsic features of the smart city. The evaluation is structured according to the six qualities previously discussed.

Each quality has a different score obtained from the number of relevant solutions adopted. The set of scores determines the final result of the assessment.

Planet Idea applies the SSCM evaluation tool to quantify the level of innovation or ‘smartness’ of the client’s project. It also guarantees the client’s investment as the economic value of the different features can be constantly monitored and maintained.

Certificate of Compliance

Development: Smart City Laguna
Place: São Gonçalo do Amarante, Brazil



13

Smart solutions and business models

13.1 Investing in the smart neighborhood

Through Planet Idea's market research more than 200 smart solutions have been identified and divided into four macro-areas of expertise: Ecosystem Resources, Built Environment, Society, and Technological systems.

Planet has also identified different business models in which suppliers may offer these solutions to the market. The following table shows a hypothetical cost distribution for various business models. Often real estate developers can implement many smart solutions with near zero costs (inside red box). In this case the supply companies bear the initial financial costs, in exchange for exclusive rights to deliver the service. Examples include: smart counters, car sharing services, bike sharing, and free Wi-Fi. Service delivery revenues paid by the end customer compensate for the initial installation costs.

The remaining solutions (outside the red box) were rearranged according to the returns on investment possible for the real estate developer (i.e. low cost, moderate cost, or expensive).

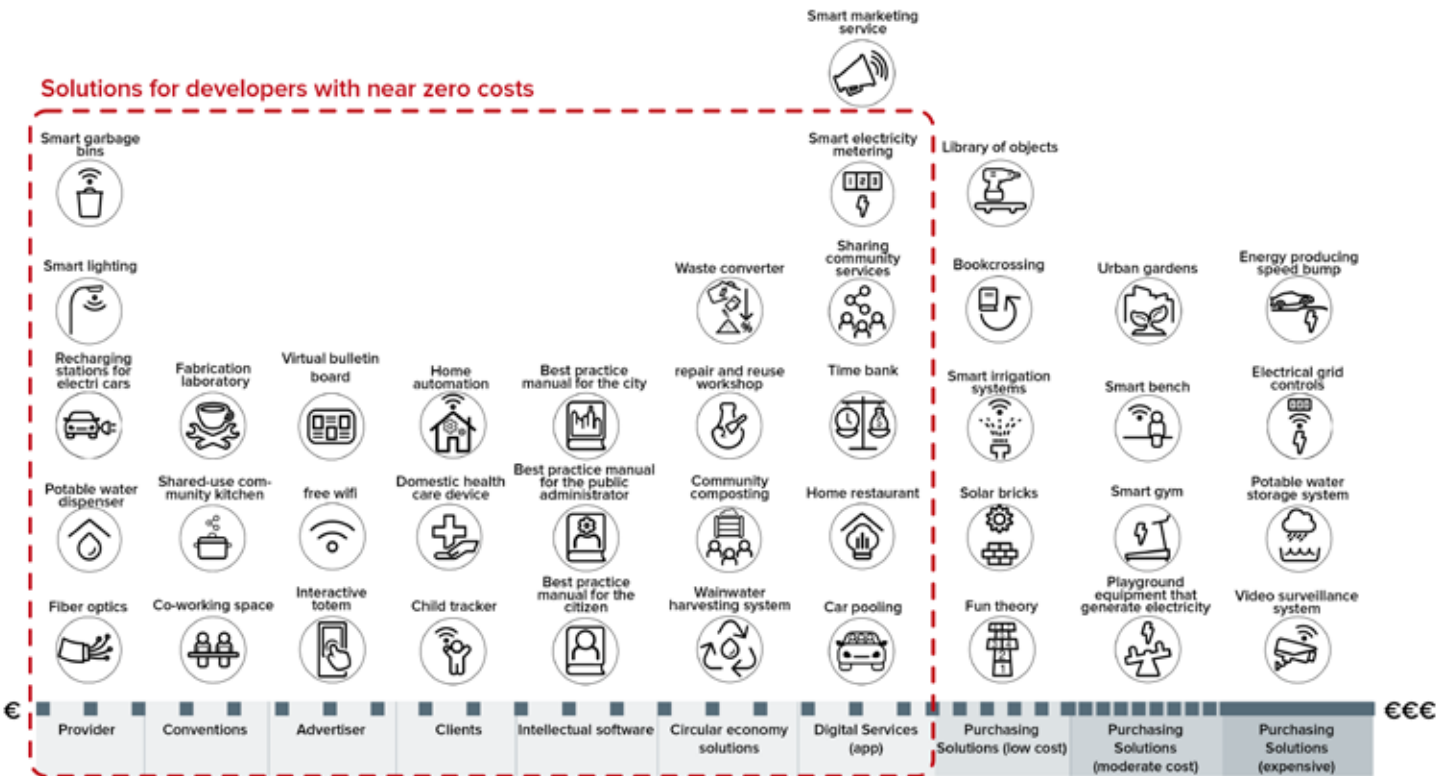
Planet Idea makes it possible to create smart neighborhoods without drastically increasing construction costs. Planet interventions range from being free to costing only 4-7% more depending on the type of solutions and the business models applied.

Designing and building a neighborhood to be smart has subsequent reduced costs compared to a traditional neighborhood and offers several advantages such as improving the quality of life of citizens and adding value for real estate developers.

13.2 Business models

- / *Provider*: Products provided by companies delivering an exclusive service that will be paid by the end user (examples: energy, connectivity, mobility)
- / *Corporate rates*: real services made available to the citizen with affordable terms due to agreements between the developer and the supplier/ manufacturer (e.g. gyms, soccer schools, co-working services)
- / *Advertiser*: Products are paid for by advertising companies that then use the feature to sell ads space
- / *Customers*: optionally services and products that can be purchased by the end user
- / *Intellectual software*: best practices and social innovation projects that improve the quality of life in the smart neighborhood
- / *Circular economy solutions*: cyclic economic systems that transform waste into profitable commodities
- / *Digital services*: Planet App integrates data from hardware and software solutions and makes them available to the citizen (for example: individual smart metering from electronic counters, food sharing, car sharing, car pooling, exchange of small tasks)
- / *Purchasing Solutions*: Products and services expensed to the client (e.g. video surveillance system)

Cost distribution based on business models



14

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