



SiREN

Scenarios for **i**ntegration of **R**enewables in a **E**uropean Cities **N**etwork



Deliverable 3.1 Four scenarios

Renewable energy
In Keizerslanden 2020 (Deventer, NL)



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Renewable energy In Keizerslanden (Deventer, NL)

SCENARIOS FOR 2020



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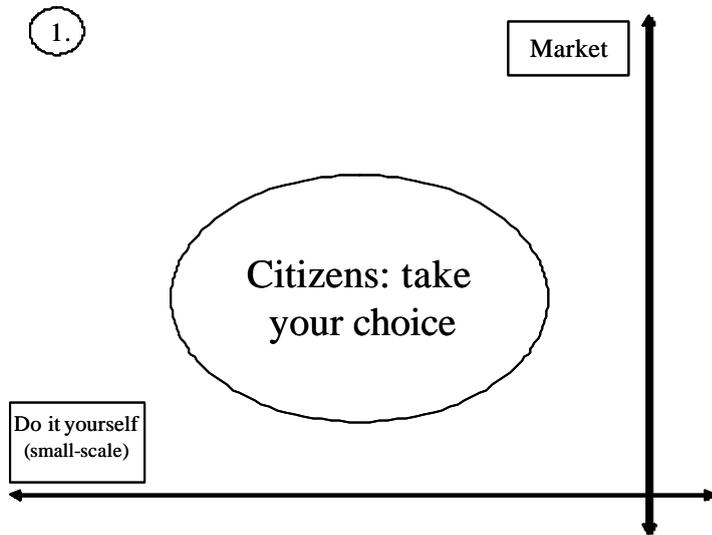
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I. Scenario 1: “Citizens: take your choice”



Introduction

In the “Citizen: take your choice” scenario renewable energy is primarily a matter for the “market”. Small-scale applications prevail. The neighbourhood approach is key, albeit that this approach has not a collective but rather an individual orientation. Leaving the initiative (in renewable energy) to the market and to the citizens, the local government mainly deals with offering space, regulation and creating the conditions for sustainable initiatives by firms and inhabitants of Deventer. The main instruments of the local government are based on offering information (‘Public relations and affairs’) and regulation. In the absence of collective initiatives only small-scale projects with a good perspective on profitability take off.



“Green Firm Ltd. Sustainable Keizerslanden. The choice is yours!”

Neighbourhood design and lay-out

In 2020 Deventer has about 83,000 inhabitants (2,5% less than in 2002), Keizerslanden almost 10,000, among which relatively many elderly. Compared to 2002 the number of households in Keizerslanden is stable (ca 5.700). In the absence of a central direction, individual, local initiatives determine what the area looks like. The result is a 'Belgian spatial planning': a varied and sometimes contrasting lay-out of the Keizerslanden area. In comparison with 2002, the overall impression of the area hasn't undergone dramatic changes. Relatively few (ca 300) houses have been demolished. Clusters of new houses have been built on a limited scale (totalling ca 300), mostly not well integrated in the total street image. The new houses are especially meant for the elderly well off (in particular luxury apartments): living in Keizerslanden has kept its 'suburban' character.



Electrical vehicles

Traffic and infrastructure

Typical of the Keizerslanden area of this "Citizen: take your choice" scenario is that vehicles for individual transportation are dominating the traffic picture (cars, bikes, mopeds, scooters, etc.). The 'shared car' is emergent. Furthermore the elderly inhabitants of Keizerslanden often use the bike with an electric auxiliary motor. Collective means of transportation are used only to a limited extent, think of private electrical call-up busses and ditto cabs. Delivery vans, pizza mopeds and bike couriers are frequently used for home delivery services.

Parking in front of where people live is common. Some small private bike shelters are scattered over the area. The transportation picture is roughly like 2002, only much more crowded.

Local quality

The quality of living in Keizerslanden is especially determined by convenience. Most facilities are easily accessible. The varying neighbourhoods of Keizerslanden all have facilities of good quality. On several places in Keizerslanden highly integrated facilities for living, working and recreation occur, mostly the result of initiatives of neighbourhood inhabitants (functional mix).

Due to the combination of decreasing population and a stable number of houses – characteristic for the "Citizen: take your choice" scenario - Keizerslanden has a relative abundance of public space. The local government does not make attempts towards design and active control of this space. Per neighbourhood the public space is being filled in differently (opponents call it fragmented). That is the result of - differing - local initiatives, but also of better matching the utilisation and the quality of the houses. Neighbourhood

management takes account of the financial strength of the inhabitants. As a result, within Keizerslanden prosperous and less affluent neighbourhoods have emerged.



Parking below the house

Energy

Many inhabitants of Keizerslanden recognise the importance of renewable energy. Also because of that, the local government considers an active renewable energy policy as redundant; providing information in order to influence the citizens' choice is sufficient in her eyes.

In the "Citizen: take your choice" scenario, energy provision is in the hands of private enterprises with an open eye for the demand for green energy. Inhabitants are allowed a choice from several packages. The cheapest packages are offering less or no guarantees for ensured delivery compared to the more expensive ones, in which the energy producers provide compensating measures in case of power failures. The housing corporations are purchasing green energy on a collective basis – against favourable conditions. The benefits are invested in housing insulation and other energy saving measures at constant rent levels.



... a relative abundance of public space ...

In 2020 all new ('own' and rented) houses have standard solar boilers, primarily for the provision of warm tap water, and besides also for low temperature heating in floors. Solar energy applications are limited and solar cells only few, mainly as solar panel on housetops (in about 15% resp. 10% of the total housing stock). In transportation, the fuel cell powered car has found broad acceptance (one out of two cars¹). In

¹ Both on hydrogen and bio-methanol basis.

2020 people in Keizerslanden use often electrical bikes and electroscooters as well. Here and there in the area wind turbines are located, rather 'untidy', without any sound landscape embedding whatsoever.

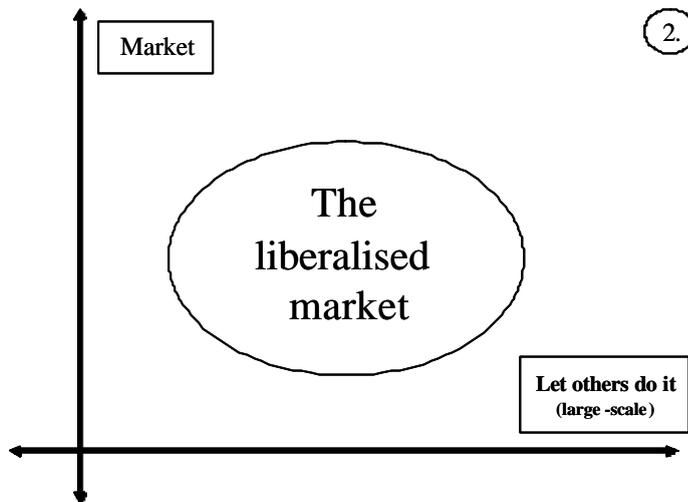
ICT

In this "Citizen: take your choice" scenario, the role of ICT is limited to small-scale applications that have developed successfully without any stimulating governmental contribution. Relevant ICT applications concern – for instance – all kinds of in-house facilities co-ordinating energy supply with demand; e.g. think of heating and lighting only if people are at home, only in rooms where people stay. Moreover, dramatically increased efficiency of household equipment has led to a substantial decrease in energy demand.

The energy demand outdoors has been reduced – wherever possible – by tailor-made measures. This implies for instance that street lighting only works when residents are around; furthermore there are applications of transportation-on-demand arrangements, internet shopping (e-commerce), and home delivery via the neighbourhood distribution system developed by local logistic service providers. Teleworking is widespread, almost only among information workers in the private sector and on personal initiative. Forced by the exploded traffic congestion, many organisations have 'turned over' themselves by gearing completely towards 'virtual operation': people 'meet' their colleagues primarily via the PC screen. A concentration of these 'e-workers' are living in the new 'Broadband neighbourhood' where - on the old hospital premises - professionals and knowledge-intensive business with an urgent need for broadband internet connections are drawn as a magnet by its glass fibre net.

The local government uses opportunities for service delivery via internet only sparsely. Most initiatives towards making the local government more efficient with 'e-government' applications got stuck in good intentions and a nice website.

II. Scenario 2: “The liberalised market”



Introduction

In the “liberalised market” scenario, renewable energy is primarily considered a matter to be taken care of by the “market”. Local government involvement remains confined to performance management, both in transportation, in security matters, and in the environment (emissions and noise, etc.). The main initiators in Keizerslanden are big market actors like the housing corporations. These actors are following the development on the global - liberalised – energy market: large-scale imports of electricity and natural gas. The market mechanism takes care of a more sustainable environment and energy use, through tradable emission rights.



“Here the market builds Keizerslanden 2020”

Neighbourhood design and lay-out

In the “Liberalised market” scenario, Deventer has more than 92,000 inhabitants (8,5% more than in 2002), and Keizerslanden about 11,000. Compared to 2002 the population density in Keizerslanden has slightly increased (about 5,900 households, 200 more than in 2002).

On the basis of commercial considerations, the housing corporations have erected about 600 new houses, predominantly in the more expensive category (after all, these are the most profitable ones), whereas about 400 houses have been demolished. In the new houses the standard energy saving instruments (EPC and EPL²) are being applied. Due to this, the composition of the Keizerslanden area has got more diversity, both in terms of the kind of housing and of the population.

Compared to 2002 Keizerslanden has also got more water gardens.



Parts of the area have so-called “open pavements”; rainwater is being discharged above the ground through “wadis” (literally a dry riverbed in a desert; here wadi refers to an unpaved ‘green’ lots meant for the collection of rainwater (as exemplified in the Ruwenbos neighbourhood of Enschede, NL; see www.kristinsson.nl/ruwenbos.html)).

Although the car is kept out of the area, the neighbourhood still is accessible for cars. Less “tin” (i.e. cars) strengthens the neighbourhood image of a “nice” residential area in a park-ish environment.

Traffic and infrastructure

Increased environmental awareness has improved the support for car-unfriendly measures, without a complete car ban in Keizerslanden. Most roads are rather narrow in order to discourage high speeds, thus limiting the mobility-related energy consumption in the area. Part of the space becoming vacant is being used for commercial purposes (e.g. shops, facilities).

Parking in Keizerslanden is expensive. Moreover, per household only one parking license is available. Part of the car population are put in mechanical underground parking facilities. Parking management as a whole is in the hands of Neighbourhood Management Ltd. This firm, which is kept to stringent performance requirements, agreed upon with the local government, takes care of a stern enforcement climate. Parking without a license is equivalent to a wheel clamp. In order to encourage their utilisation, electrical vehicles are allowed better parking facilities.

Due to these policies the car is just one of the transportation alternatives. The bike has conquered a more prominent position; many residents use the bike to go to their flexible office. With a subscription for a “public transportation bike” anyone can use a good rental bicycle, wherever you are (at the railway station, but also in different locations in the area³. For longer distances Neighbourhood Management Ltd exploits commercial Park & Ride services with small electrical vehicles, in collaboration with the Railways, Gazelle Bikes and Smart Cars. In the Mobility Shop in the area transportation demand and supply within and out

² These abbreviations refer to Energy Performance Coefficient resp. Energy Performance -on-Location, both instruments for dealing efficiently with energy in buildings (cf. www.novem.nl).

³ See e.g. www.ov-fiets.nl/voorbeeld/index.htm.

of the area is being co-ordinated⁴. The residents can buy a mobility pass that gives them access to their preferred means of transportation for a certain budget per month. According to personal preference an eco-pas is available (for the environment-conscious traveller), a budget pass (for people of modest means) and a business pass (for those with money and little time).



Mechanical underground parking facilities

Local quality

In general, the living climate has improved due to more water and green in the area and less cars being (visibly) parked. Furthermore new housing also contributes to quality improvement. The higher diversity in the composition of the area's population leads to substantial qualitative differences between neighbourhoods. As a rule groups tend to put different requirements to their living environment. Consequently, the Keizerslanden area contains 'islands' of luxurious houses with a view on water gardens, with their own surveillance and services, on the one hand. On the other hand Keizerslanden still has its rather monotonous row houses familiar from the 1950s. As a result Keizerslanden has two faces.

For efficiency reasons Keizerslanden in het "Liberalised market" scenario has hardly any functional mix. It is primarily a residential area. Shops and other facilities are mainly concentrated on a few central locations in the area. Shopping is mainly clustered in the Keizerslanden mall where the leading market actors (like Ahold) have invested in quality: a good residential climate, ample parking facilities, a distribution and delivery service centre, etc. Around these facilities also schools, a kindergarten, a cultural and medical centre, pharmacy, etc. have established. The concentration of these kind of facilities has given the shopping centre a much broader neighbourhood function, which enables Keizerslanden – also due to good parking facilities – to compete with the Deventer city centre and Colmschate, on a modest scale.

Housing allocation and renovation, and the management of green and public space is in the hands of the already mentioned Neighbourhood management Ltd. In this company, housing corporations and project developers have a substantial share. Just like in parking management, this company operates on the basis of performance requirements which have been established in a concession agreement with the local government.

⁴ Analogous to the Mobility shop in the Meerhoven neighbourhood of Eindhoven (see www.meerhoven.net).

Energy

Overall support for renewable energy is pretty broad. Market actors play along with this. Renewable energy is not only being used in private houses, but also in firms.

Energy provision is in the hands of a few giant German multinationals which have taken over the traditional suppliers. Liberalisation of the energy market and stiff competition have led to lower energy prices. Natural gas and electricity are mainly imported. An eye-catching drawback of the liberalised energy market is that lower prices are at the expense of the reliability of delivery. With a certain frequency the power breaks down. Consumers have developed appreciation for forms of renewable energy on which they can fall back in case of power breaks. Furthermore only forms of renewable energy are adopted which allow for profitability. Thanks to the mechanism of tradable emission rights per land 'sustainable', green energy can be imported from Morocco (solar), Sweden (bio-mass) and Scotland (wind).

Typical for this "Liberalised market" scenario is the large-scale approach of a limited number of renewable energy initiatives. Residents are allowed to chose from a few standard packages regarding housing insulation and solar boilers. The housing corporations have installed solar boilers in renovated and new houses.

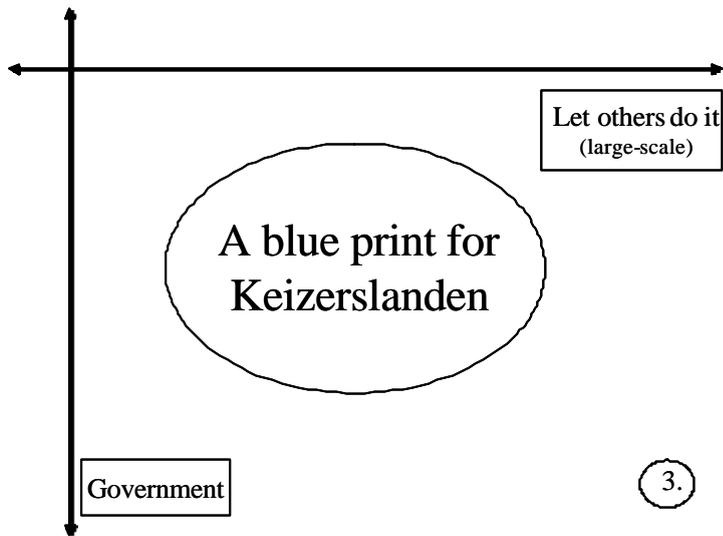
Solar panels are only to be found on the roofs of more expensive new houses (in total about 20% of the total housing stock).

ICT

On the old hospital premises Regus has launched its "In den Keyzerlande" establishment where tailor-made flexible office space is rented to locally and regionally operating professionals and knowledge workers. These offices are equipped with all necessary facilities (from Office 2020 to day care). As these offices are connected to the glass fibre net, it is extremely attractive for knowledge and information-intensive business to settle here. Around this Deventer' knowledge neighbourhood a cluster of high value-added firms has formed, all active in new media, IT and consulting services.

From the centre of Keizerslanden logistical service providers TPG and UPS are running local distribution hubs. In this way the physical flow of goods - ordered via the internet - is bundled. Electro vans and delivery bikes take care of an efficient and environmental-friendly 'last mile' towards the front door.

III. Scenario 3: “A blue print for Keizerslanden”



Introduction

In the “A blue print for Keizerslanden” scenario an ambitious local government takes the initiative in promoting mainly large-scale applications of renewable energy. On the one hand residents – recognising the importance of renewable energy - appreciate this proactive attitude. On the other hand citizens do not feel seriously involved in public planning. In fact, the low rate of citizens’ participation leads to tensions between citizen and local government, wherever the execution of plans requires sacrifices from citizens. Wind energy is OK as long as it doesn’t cause any inconvenience (‘not in my backyard’).



‘Governmental masterplan Keizerslanden’

Neighbourhood design and lay-out

In the “A blue print for Keizerslanden” scenario Deventer in 2020 has about 107,000 inhabitants (26% more than in 2002), and Keizerslanden almost 13,000. Compared to 2002 the population density in

Deventer and also in Keizerslanden has substantially increased (about 6,300 households, 600 more than in 2002). In this scenario Keizerslanden has obtained quite some additional high-rise buildings. There has been large-scale demolition of houses (ca 700). Even more new houses (total ca 1,300) have been built, especially for families. In this way the local government has accomplished a more even composition of the population of Keizerslanden, with more diversity in terms of housing types and inhabitants.

The local government and the housing corporations have taken the lead in restructuring the Keizerslanden area, in a unmistakable way. Residents have been involved in the planning process only late, partly in order to confine resistance against the ambitious governmental plans towards sustainability. That ambitious attitude shows itself in tight regulations regarding energy use in new houses: the standard (EPC-) norms for energy efficiency have systematically been lowered (with an emphasis on good insulation). Moreover, the local government and the housing corporations have shown a consistent preference for sustainable design options, e.g. by emphasising a long life span of new houses, by applying of flexible building, and by choosing in favour of high-quality urban development and architecture.

Traffic and infrastructure

Public transportation is in this scenario a serious alternative for the car. Convenient and fast electrical busses sustain a high frequency connection between the railway station and the city centre of Deventer. All public transportation vehicles use fuel cells in 2020. The local government runs a system for electric car sharing, especially for residents with a walking problem. These electrical shared cars (also running on fuel cells) are accessible on a subscription basis and are supplementing public transportation. Parking in the area is exclusively allowed for sustainable vehicles. Next to bus lanes slow traffic can use separate bike streets which do not 'compete' with car trajectories.

Local quality

In this "Blue print for Keizerslanden" scenario the quality of the area is mainly determined by governmental care for the lay-out of the area: each m² has been handled with care. Furthermore, the local government also puts stiff requirements to housing quality, and to green and water. Especially the newly built houses have a high average quality and convenience level. In this scenario Keizerslanden has an urban living climate.

The main facilities – shops, medical and business centre - are concentrated in the area. Management of these facilities is mainly large-scale oriented.



Solar cells on roof tops (Heerhugowaard, NL)

Energy

In the “Blue print for Keizerslanden” scenario, the delivery of energy is in the hands of publicly owned companies. The collapse of Enron and the electricity crises in California opened many eyes for the drawbacks and risks of privatising utilities.



'Solar' street lighting

This scenario emphasises energy saving, especially by adequate insulation of houses and drastic reduction of car use within the area. Not only new houses have been insulated properly, but also the outer walls of many renovated houses in the area have been insulated. Through their orientation on the south-west new houses catch more sunlight. The higher in-house temperature leads to a lower need for external energy. Furthermore people have a lot of attention for renewable energy applications. In the first place the housing corporations and the local government have installed solar cells (PV) in rented houses, municipal buildings, street lighting and public transportation stops. This happens in a large scale fashion⁵, in about 40% of the total housing stock in Keizerslanden.

In the second place there is large-scale implementation of ‘asphalt heating’ in Keizerslanden.

Heat from asphalt

Wherever possible, the local government has implemented heat exchangers in the top asphalt layer of the main roads. The resulting heat is being stored temporarily in underground layers, in so-called aquifers, to be used - later on - for low temperature floor heating in new houses, in renovated public housing projects and in big housing complexes (like old people’s homes, hospitals, etc.). Also, tap water is being heated in this way. The municipal investments are being recovered through a rental surcharge collected by the housing corporations. The net rent will stay at the same level in this way. In the same vein heat is being gained from the river IJssel.



In the third place there is a wind park with 6 big turbines along the A1 motorway, each with a capacity of 1,5 MW - despite dogged resistance against noise and horizon pollution, and the death of a considerable

⁵ That is, in terms of surface (m²), not so much in terms of generated kW.

number of birds involved with this type of renewable energy exploitation. The local government has given the public debate on the acceptance a wide berth. Finally, the local government also participates in a regional plant where electricity is generated from burning household waste in an incinerator.



The river IJssel, with a wind park along the A1 motorway

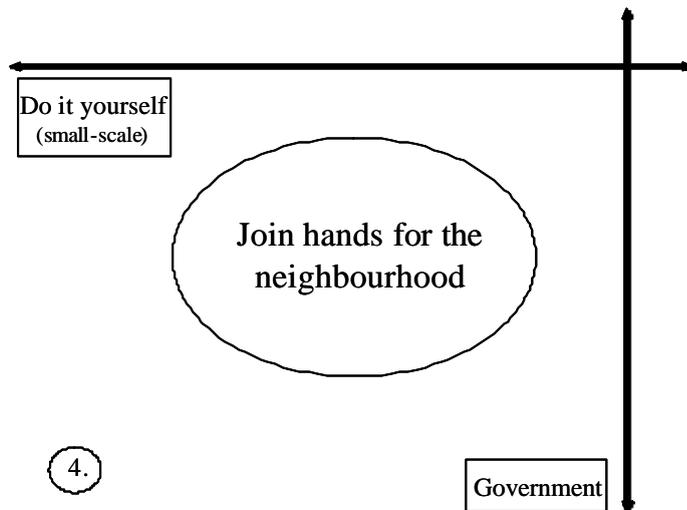
The large-scale approach generates price advantages increasing the yield of standard floor and wall heating, solar panels, heat pumps and solar boilers in combination with warm water facilities. Overall the combination of these renewable energy applications makes this scenario highly sustainable.

ICT

The local government promotes teleworking among the residents of Keizerslanden by offering the opportunity to use the facilities of the Telecentre Keizerslanden, against a small fee. In this way mobility and the resulting energy use is being reduced.

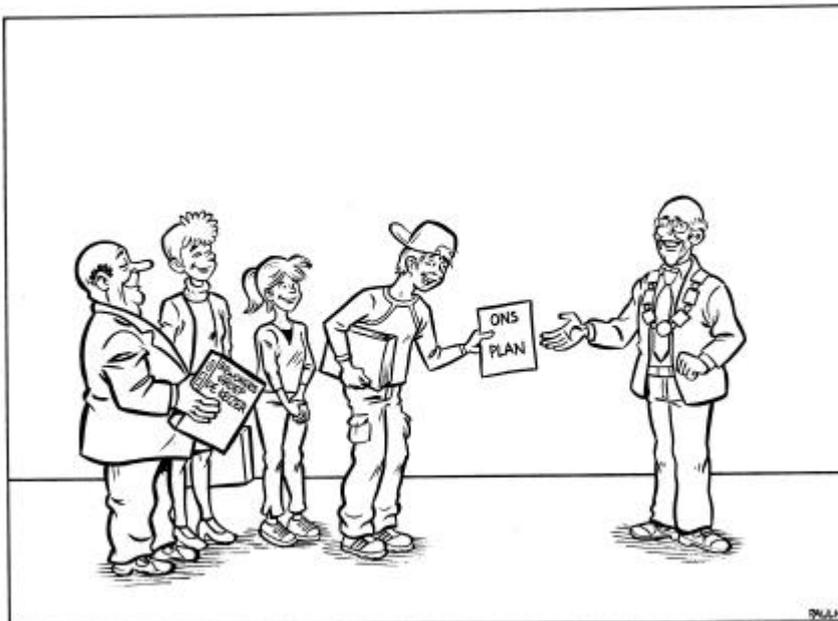
Moreover, the municipality has an active 'Electronic A1 policy' by ensuring a high-quality telecom infrastructure. Fast internet connections attract the establishment of companies in or around Deventer.

IV. Scenario 4: “Join hands for the neighbourhood”



Introduction

In the “Join hands for the neighbourhood” scenario the local government stimulates small-scale applications of renewable energy. The support for renewable energy is substantial, but in contrast with scenario 3 (“A blue print for Keizerslanden”) this occurs not in a ‘top down’ fashion, but it is rather the residents themselves who determine what the area lay-out looks like. In this scenario (i.e. number 4) the - ambitious - local government prefers to promote renewable energy through the (decentralised) area approach. Self-activation and self-management are key in that approach; the municipality gives strong support to citizens’ initiatives.



“Our plan”

Neighbourhood design and lay-out

In this scenario Deventer has more than 95,000 inhabitants; about 11,400 of these are living in Keizerslanden. Compared with 2002 the density of population has increased (about 6,300 households, i.e. 600 more). The number of new houses in Keizerslanden has increased – in comparison with previous years – substantially (plus 900), whereas the number of demolished houses is relatively limited (300). In

other words, Keizerslanden has become much more compact. In particular the need for small one-person houses is substantial.

Each neighbourhood disposes of an own neighbourhood budget and establishes the lay-out of its own street and surroundings. Typical for this scenario is the small-scale character of the different neighbourhoods in Keizerslanden. In each neighbourhood all kinds of facilities are combined with living and recreation (mix of urban functions). The area contains several playing grounds, benches and meeting places, which gives the area a somewhat messy and varied street image.



“Are you often enough in the driver’s seat? Take the bike to your work”.

Traffic and infrastructure

Due to the short distances between living residences and work and facilities Keizerslanden has developed towards *the* cycling area of Deventer. During the restructuring process of the area around the turn of the century the municipality applies the VPL instrument successfully (see textbox). As a result the existing infrastructure was adapted in such a vein that walkers and cyclists always have priority; the area as a whole has the status of a residential area with restrictions to slow down traffic. Bike streets have been optimised: always providing the short and safe track to the centre and facilities. Apart from the ‘common’ bike the electrical bike soon caught on, especially among the elderly.

Traffic Performance on Location (VPL)

A transformation of the design and lay-out of available space creates the opportunity to influence conditions in such a way that people actually will decide to walk or bike more often. In order to accomplish this, an infrastructure with short and attractive tracks for pedestrians and cyclists is a prerequisite. In this way energy economies of about 30% can be gained. For this purpose Novem developed the Traffic Performance on Location instrument (VPL ⁶) (zie www.novem.nl).

In this scenario cars in principle have to make a detour, albeit with direct connections to the main road network. This applies also to electrical, hybrid and fuel cell vehicles that are gradually replacing conventional (car-like) vehicles. Nonetheless, the parking problem has intensified; per household the number of vehicles continues to rise. In order to keep the parking problem manageable, residents – with the exception of the handicapped and elderly with an exemption – are forced to park their car-like vehicles in the fringes of the area (with a maximum of about 400 m from their residence), among others in large-scale mechanic underground facilities. In the area itself the available parking space is very limited. By banning cars Keizerslanden has become an area that is safe to children.

⁶ Literally: “Verkeers Prestatie op Locatie”.



Parking carefully embedded in the neighbourhood (Rijswijk, NL)

Local quality

The main quality in the “Join hands for the neighbourhood” scenario is that residents’ wishes are being met as much as possible. Despite the differences of these wishes and the resulting messiness of the design and lay-out of the area, the residents are quite satisfied. On the level of the neighbourhood differences in terms of social composition are modest; between the neighbourhoods in Keizerslanden differences are observable, but none of them are ver substantial. The municipality has set stiff standards for energy use and quality of housing; how these targets are met, is left to those involved. Due to the relocation of parking facilities to the fringes of the area some more room has emerged for recreation, sports and playing grounds in Keizerslanden.

Energy

The energy provision is in the hands of the local energy company, operating on the basis of a public private collaboration arrangement. Guarantees for permanent energy delivery, high quality and reliability are considered more important than low prices. Housing corporations and the municipality have applied solar cells (PV) on a relatively large scale.

Through subsidies for urban regeneration the local government tries – with a varying degree of success – to encourage private residents to invest in renewable energy. As a result the Standard Energy Performance Coefficient (EPC) has gradually decreased, in co-ordination with the housing corporations. With their renewable energy passes the residents can determine themselves how to meet the strict energy use requirements.

ICT

The municipality has created so-called telework stations on a elaborate scale, on several spots in the area. Through the EU-programme “Social quality and ICT” the local government has started four ‘digital incubators’ in the area, in order to promote the ICT-projects in the area. Despite this financial support the development in the field of ICT and e-services in Keizerslanden have lagged somewhat.

For the relatively high percentage of elderly people Keizerslanden has got a ‘senior village’. In this neighbourhood the housing corporations – with the support of home care organisations and the municipality – have erected so-called ‘sustainable senior apartments’. These houses are equipped with all kinds of ICT applications in such a way that elderly people can live longer independently (with life alert monitoring) and safely (burglary alarm). Moreover, the houses take less energy as well (through convenience regulation and energy saving measures)⁷.

⁷ See for more information www.ecn.nl/press/p011123.html .