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# **INDICATOR TOOL**

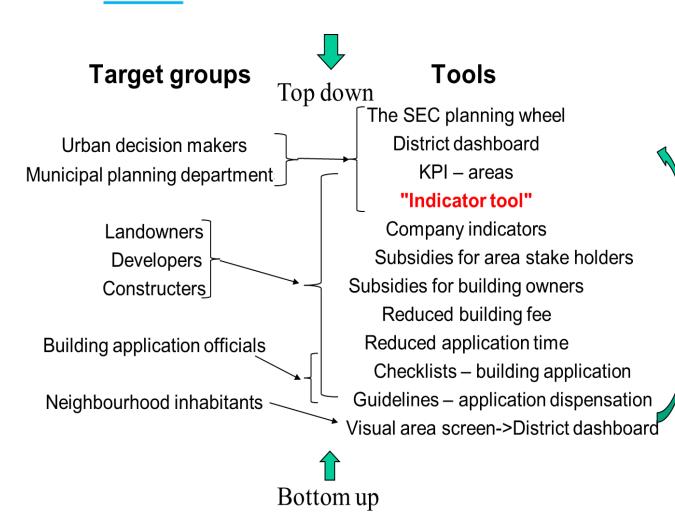
Mads Mysen, Kari Sørnes, Åse Sørensen, Harald Taxt Walnun, Åshild Hauge 1

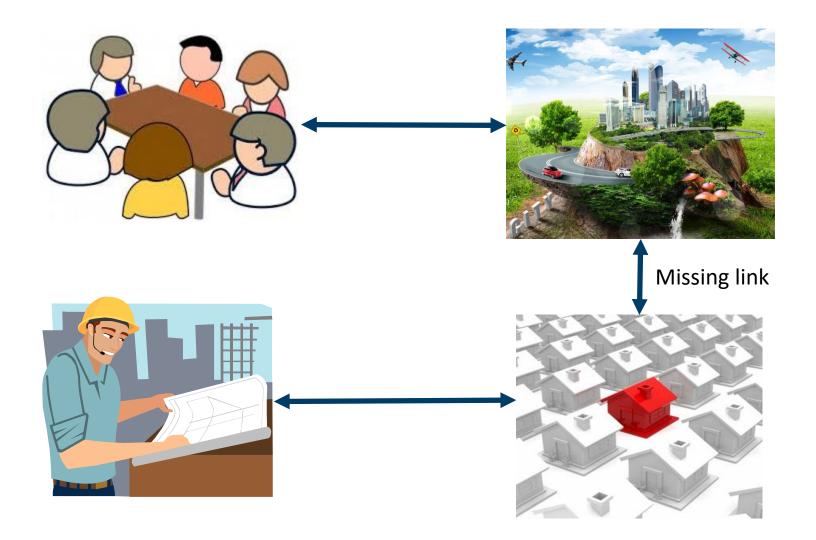
### PI SEC Indicator tool

- Why PI SEC Indicator tool?
- Step by step introduction
- Interplay with the Planning wheel
- Demonstration of Excel and Web-based versions
- SWOT
- Future development



### **Tools overview**





Urban planning:

- Define goals
- Realistic scenarioes
- Close gaps
- Target incentives

Estate development

- Define goals
- Reveal deviation

Indicators

- Define baseline
- Measure progress
- Adjust plans

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## Step 1 – Defining the project

<b>PI-SEC KPI</b>	plann	ing TOOL	Front Page							
Neighbourho	od:		Furuset							
Key data, goal	s and inc	dicators								
ŀ	EY DATA		Now	End of proje	ect					
Project timeframe			2015	2	030					
Population										
Number of jobs										
Area										
Number of buildings	5									
Area of buildings										
00410	Add	Remove	VDI	11	<b>6</b>	Deletive to	Carl at EaD			
GOALS		Remove	KPI	Unit	Comparison	1				
nergy Consumption			Energy use total	/m2 BRA	% Reduction	Baseline	20			
nergy Consumption			Electricity consumption total	/inhabitant	Absolute		10000	+	_	_
Carbon Emission			Energy/buildings	/inhabitant	% Reduction	Baseline	50			_
Energy Generation			RES produced Electricity	/inhabitant	Absolute	Initial	200			
Menu										
Create	Baseline									
			Calculate Project							
Create	Scenario		-							
				-						



### Step 2 – Building a neighborhood

PI-SEC KPI pl	annir	ng TOO	DL I	nitial Situation	2015				
Neighbourho	od			Furuset					
Buildings	Add	Upgrade	Demoli	sh					
General description									
Building			c	ategory	Year of construction	Area [m2]	Ownership	residents/ employees [#]	[#]
Furuset senter: kjøpesen	ter, bibli	otek, svømn	nehall (	ultural building	1960		Private	5	
Furuset senter: kjøpesen	ter, bibli	otek, svømn	nehall (	omercial building	1960	6500	Private	60	20
Furuset senter: kjøpesen	ter, bibli	otek, svømn	nehall (	)ffice building		9600	Private		
Furustien barnehage. Pa	rkering		ŀ	indergarten		400	Public		
Papyrusbygget: lager og l	kontorer.	(Huser bla	Dekkm	)ffice building		4000	Private		
Papyrusbygget: lager og l	kontorer.	(Huser bla	Dekkm	omercial building		600	Private		
Papyrusbygget: lager og l	contorer.	(Huser bla	Dekkml	ndustry/Workshop		12400	Private		
Furuset forum: Ishall, hå	ndballha	all, noen ko	ntorer S	ports Facility		16500	Public		
Scala barnehage, friområ	åde		ŀ	indergarten		600	Public		
Bakers bakeri (produksjo	on), Fürst	laboratoriu	im C	)ffice building		3600	Private		
Bakers bakeri (produksjo	on), Fürst	laboratoriu	ım I	ndustry/Workshop		3600	Private		
Suveren rørmøbelfabrikk			1	ndustry/Workshop		4800	Private		
Øvre Furuset borettslag,	byggeår	1980, planle	egger o P	esidential apartment building		22700	Private	505	;
Nordre Gran borettslag, I	byggeår 1	978, opprus	ting ut P	esidential apartment building		32300	Private	719	)
Granstangen borettslag,	byggeår:	1979, oppru	sting f: P	esidential apartment building		17400	Private	387	1
Granstangen borettslag,	byggeår:	1979, oppru	sting f: P	esidential apartment building		22000	Private	489	
Gransletta borettslag, by	/ggeår 197	78, opprusti	ng ute P	esidential apartment building		9100	Private	202	!
Gransletta borettslag, by	/ggeår 19)	78, opprusti	ng ute P	esidential apartment building		9900	Private	220	
Gransletta borettslag, by	/ggeår 197	78, opprusti	ng ute C	)ffice building		6000	Private		
Gransletta borettslag, by	/ggeår 197	78, opprusti	ng ute (	omercial building		2000	Private		
Kurland borettslag, bygg	eår 1978,	fasaderpu	sset of F	esidential apartment building		34500	Private	768	
UIsholt borettslag, bygge	ar 1978, 1	fasader pus	set op F	esidential apartment building		22900	Private	509	
Lager			1	ndustry/Workshop		26500	Private		
Furuset sykehjem			P	lursing home		9300	Public		
Ny Gran ungdomsskole (	bygges nå	å, FutureBui	lt-prosk	ïndergarten		4100	Public		
Ahmadiyya-moskeen			c	ultural building		4000	Private		
Furuset skole			S	chool		10000	Public		
Gran skole			s	chool		8000	Public		
Kurland barnehage			K	ïndergarten		500	Public		
Del av Furuset senter			C	)ffice building		11500	Private		
Del av Furuset senter			s	ports Facility		3000	Private		
Moske, næringsbebyggel	se		0	ultural building		1000	Private		

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Infrastructure						
General description			Energy perfor Energy performance	mance Energy consumption		
Outdoor lighting	Year of installation	# units	Category	[kWh/unit]		
Lighting		1980 100	0 Low efficiency		550	
Snow Melt Systems	Year of installation	Size [m2]	Energy performance Category	Energy consumption [kW/m2]	Energy source	Efficiency/COP [-]
	Tear or instanation			[K #11112]	350 Electric heater	
Snow Melt		1980 50	0 Low efficiency		350 Electric heater	0,9

Local energy plan	t de la constante de la consta								
Energy Source	Heating to District H	leating system	Cooling to Dist	rict Cooling system	Electricity to grid				
		CO2 Emission	Efficiceny	Capacity	Production	Capacity	Production	Capacity	Production
Туре	Energy Source	[g/k₩h]	[%]	[k₩]	[kWh]	[k₩]	[k₩h]	[k₩]	[kWh]
CHP	Pellets	19	85%	400	2500000			200	12500
Solar PV	Sun	0	100%					500	5000

Energy Source					Distribution	
				Production		
			CO2 Emission	efficiency	Distribution	
Heat Source	Coverage [%]		[g/k\h]	[%]	losses	
Electricity		28,2%	123	0,95		10
Heat Pump		7,9%	123	3,125		
Solar Collector			0	1		
Waste Heat			0	0,9		
Waste Incineration		57,6%	11	0,9		
Wood Chips			18	0,9		
Pellets		1,7%	19	0,9		
Bio-oil		3,6%	10	0,9		
Bio-gas			10	0,9		
Fossile Oil		0,2%	268	0,9		
LPG		0,8%	235	0,9		

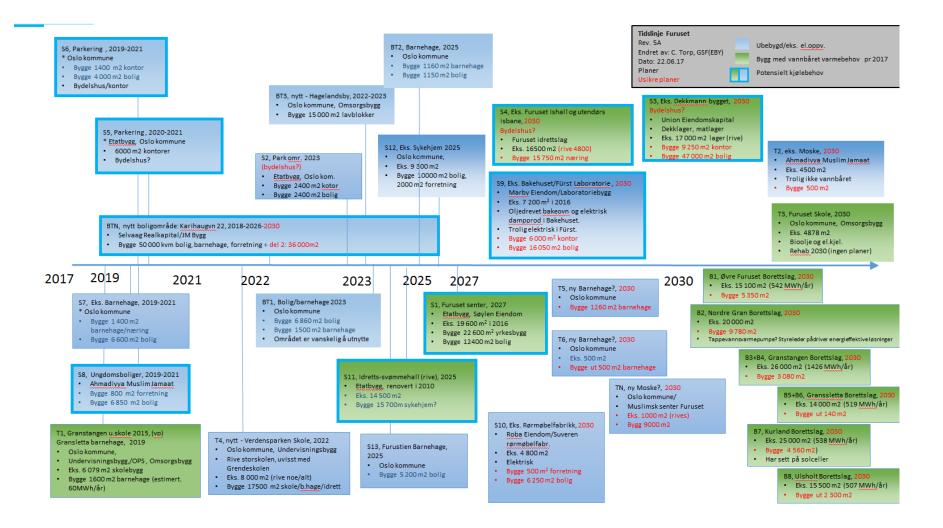


## Step 3 – Creating a baseline scenario

PI-SEC KP	l plann	ing TO	OL	Front Page						
Neighbourh	ood:			Furuset						
Key data, goa	ls and in	dicators								
	KEY DATA			Now	End of proje	ect				
Project timeframe				2015		030				
Population										
Number of jobs										
Area										 
Number of building	şs									
Area of buildings										
GOALS	Add	Remove		KPI	Unit	Comparison	Relative to	Goal at EoP		
Energy Consumptio	n			Energy use total	/m2 BRA	% Reduction	Baseline	20		
Energy Consumptio	n			Electricity consumption total	/inhabitant	Absolute		10000		
Carbon Emission				Energy/buildings	/inhabitant	% Reduction	Baseline	50		
Energy Generation				RES produced Electricity	/inhabitant	Absolute	Initial	200		
Menu										
Creat	e Baseline			Calculate Project						
Create		Create Scenario								



### Step 3 – Creating a baseline scenario



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### Step 3 – Creating a baseline scenario

Neighbourhood		Furuset			
	Upgrade De	molish			
Dunungs	.10	moran			
General descripti	on				
Building		Category	Teer of coart		Ousers
Fururotsontor:kjæporontor			1960		Privato
Fururotsontor:kj <b>a</b> porontor -			1960		Privato
Fururotsontor:kj <b>a</b> porontor					Privato
Fururtion barnohago. Parka	-	Kindergarten			Public
Papyrurbyqqot: laqor oq ko	-				Privato
Papyrurbyqqot: laqor oq ko					Privato
Papyrurbyqqot: laqor oq ko	-				Privato
Furwet forum: Irhall, håndb					Public
Scala barnohago, friomràdi		Kindergarten			Public
Bakors bakori (produksjon)	-				Privato
Bakors bakori (produksjon)	, Fürst laboratori				Privato
Suvoron rærmæbolfabrikk		Indurtry/Workshop			Privato
Øvro Fururot borottrlag, by	rggaár 1980, plan	ec Roridontial apartment building		22700	Privato
		rt Roridontial apartment building			Privato
Granstangon borottrlag, by	qqoʻar 1979, oppr	ur Roridontial apartment building		17400	Privato
Granstangon borottrlag, by	qqaar 1979, appr	ur Roridontial apartment building		22000	Privato
Granslotta borottslag, bygg	joàr 1978, apprur	tin Raridantial apartmont building		9100	Privato
Granriotta borottriaq, byqq	joàr 1978, apprur	tin Roridontial apartmont building 👘		0000	Privato
Granslotta borottriag, bygg	joàr 1978, apprur	tin Office building		6000	Privato
Granrlotta borottriaq, byqq	joàr 1978, apprur	tin Comercial building		2000	Privato
Kurland borottrlag, byggoå	r 1978, Farador p	ur Raridantial apartment building		34500	Privato
Ulrholt borattriaq, byqqaar	1978, farador pu	rre Roridontial apartmont building		22900	Privato
Lagor		Indurtry/Workshop		26500	Privato
Fururotsykohjom		Nursing home		9300	Public
Ny Gran unqd <mark>ameskal</mark> e (by q	garnà, FuturaBu	ilt Kindorgarton		4100	Public
Ahmadiyyarmarkaan 👘		Culturalbuilding		4000	Privata
Fururatskola		School		10000	Public
Granskola		School		8000	Public
Kurlandbarnohago		Kindergarten		500	Public
Dol av Fururotsontor		Office building		11500	Privato
		Sports Facility		3000	Privato
Dol av Fururotsontor		a para raciny			

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### Step 4 - Creating development scenarioes

Neighbour	hood:		Furuset						
Key data, g	oals and in	dicators							
	KEY DATA	1	No	v End of proje	ect				
Project timefram	e		201	.5 20	030				
Population								 	
Number of jobs									
Area									
Number of build	lings								
Area of building	s								
GOALS	Add	Remove	КРІ	Unit	Comparison	Relative to	Goal at EoP		
Energy Consump	tion		Energy use total	/m2 BRA	% Reduction	Baseline	20		
	tion		Electricity consumption tota	/inhabitant	Absolute		10000		
Energy Consump			Energy/buildings	/inhabitant	% Reduction	Baseline	50		
Energy Consump Carbon Emissior			Energy/barranigs						
	ı		RES produced Electricity	/inhabitant	Absolute	Initial	200		
Carbon Emissior Energy Generati	ı			/inhabitant	Absolute	Initial	200		
Carbon Emissior Energy Generati Menu	n on	1		/inhabitant	Absolute	Initial	200		
Carbon Emissior Energy Generati Menu	ı			/inhabitant	Absolute	Initial	200		



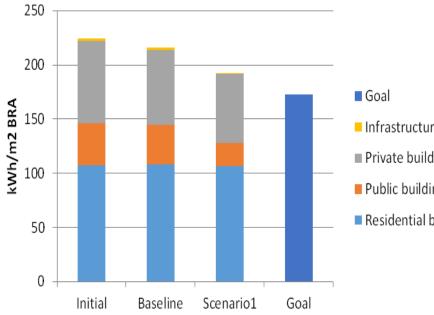
### Step 4 - Creating development scenarioes

Neighbourho	bod																		
Buildings	Add	Upgrade	Demo																
General description								En	ergy perfo	ormance			Renewab	le energy pro	oduction				
													Solar Therr	nal (calculated)	)		Solar	PV (total)	
						ts/						Electricity		Peak	Yearly			producti	Yearly
						employ					[kWh/m2	[kWh/m2			production	Size	Input		production
Building				Area [m2]	Ownershi	p ees	certificate	input	[kWh/m2]	1	1	]	[m2]	[kWp]	[kWh]	[m2]	type	[kWp]	[kWh]
Øvre Furuset borettslag,	byggeår	r 1980, plani	legger d	22700	Private	505	В	Low energy	30	29,8	0	33	678,2	678,16	474709			/	
Nordre Gran borettslag, b	byggeår (	1978, oppru	sting ut	32300	Private	719	В	Low energy	30	29,8	0	33	550,0	550,02	675467			/	
Granstangen borettslag,	, byggeår	/ 1979, oppri	usting f	17400	Private	387	В	Low energy	30	29,8	0	33	3 296,3	296,30	363874				
Granstangen borettslag,	, byggeår	/ 1979, oppri	usting f	22000	Private	489	В	Low energy	30	29,8	0	33	374,6	374,63	460070	J			
Gransletta borettslag, by	yggeår 19	978, opprust	ting ute	9100	Private	202	В	Low energy	30	29,8	0	33	155,0	154,96	190302				
Gransletta borettslag, by	yggeår 19	978, opprust	ting ute	9900	Private	220	В	Low energy	30	29,8	0	33	168,6	168,58	207032				
Gransletta borettslag, by	yggeår 19	978, opprust	ting ute	6000	Private		В	Low energy	23,2	2 5	9,8	63,2	!			125	Auto	20	20000
Gransletta borettslag, by	yggeår 19	978, opprust	ting ute	2000	Private		В	Low energy	30,4	10,5	18,7	72,8	1			100	Auto	16	16000
Kurland borettslag, bygge	eår 1978,	, fasader pi	usset or	34500	Private	768	В	Low energy	30	29,8	0	33	587,5	587,49	721474				
Ulsholt borettslag, bygge					Private	509	В	Low energy	30	29,8	0	33	390,0	389,95	478891				
Lager				26500	Private			TEK 87	134	10	32	75	i						
Furuset sykehjem				9300	Public		A	Passivhouse	20,2	29,8	11	70	1			250	Auto	40	40000

## Step 4 - Creating development scenarioes

District Heating					
Energy Source					Distribution
Heat Source	Coverage [%]		CO2 Emission [g/kWh]	Production efficiency [%]	Distribution losses
Electricity		0,0 %	123	0,95	10 %
Heat Pump		0,0 %	123	3,125	
Solar Collector			0	1	
Waste Heat			0	0,9	
Waste Incineration		100,0 %	0	0,9	
Wood Chips			18	0,9	
Pellets		0,0 %	19	0,9	
Bio-oil		0,0 %	10	0,9	
Bio-gas			10	0,9	
Fossile Oil		0,2 %	268	0,9	
LPG		0,8 %	235	0,9	

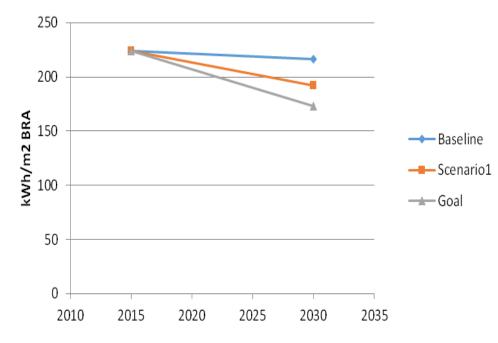
# Step 5 – Calculation & Analyzing data Step 6 – KPI follow-up



#### **Energy Consumption: Energy use total**

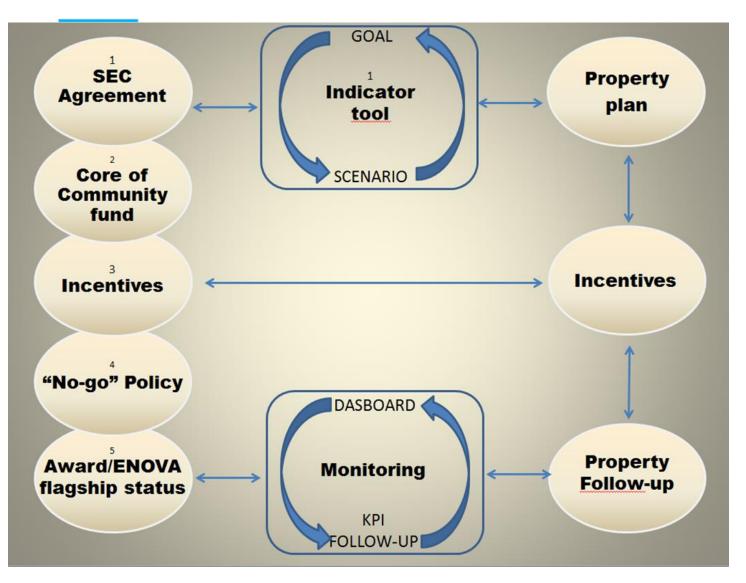
### Infrastructure Private buildings Public buildings Residential buildings

#### **Energy Consumption: Energy use total**



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# Interplay with the Planning wheel



A detailed Property plan is based on a realistic development scenario from Step 5

Property follow-up is extracted from KPI follow-up data from Step 6

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### Excel or Web-platform?

Excel: Planning - Web: Planning and indicator follow-up – information sharing

SWOT

### Strengths

- •Enabling simultaneous use by multiple users
- More options for data import and indicator follow-up

### Weaknesses

More time-consuming to develop
Require internet to use

### Opportunities

More options for enlarged functionality, for instance support a district dashboard or show energy performance among property owners.
Simpler to add-on with data-collection og data processing. More suitable for indicator follow-

### Threats

System communication is complicated.
Data import is often a challenge regardsless of data-platform.

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up.

## Further development

#### 0-6 months

- Test Indicator tool on ZVB and Furuset
- Discuss with stake-holders
- 6-12 months
- Develop and retest
- Web-based platform (3 PM)
- 9-15 months
- Final version Excelbased or web-based



What are the first thought that come to mind when you see the electronic "indicator tool"?

- Easy? Complicated? Useful? Possible to use on the case studies? Do you have people with competence to use the tool?
- Do you need the tool? Why/ why not? Other tools?
- Web-based in PI SEC





### Teknologi for et bedre samfunn