TECHNOLOGY FACTSHEET



2019 ricity generation ETS wable photovoltaic (PV) systems com efficiency. Examples of such var olar PV focuses on mainstream colar modules generate direct c e addressed in this factsheet: c grid-connected systems. In the mounting structure allows to fi erlands currently more expensi gy generation during the year, c ntages of these systems are tha need power generation during t llations. Solar tracked systems of be applied in solar fields, at a h r variants of solar PV applicatio inly to be expected. The photor ive importance in system costs llation labour. This latter componenter size 250 kWp, generally fing PV is addressed indicatively. Inses for surface rents. Is factsheet, data is presented fing PV is addressed indicatively. MW	riants comprise technology. current (DC). The off-grid systems ese, DC from the fix the panels in sive in terms of e characterised b hat more peak ca the day as a res comprise a third higher investme ons exist as well ovoltaic module is reducing, and boonent is an imp ethods exist, fro ohysical space. olar PV system t flat roofs), multi y. Note that for a for a typical 10 f	e crystalline and ne DC might be us are considered ne modules is co in the right positi electricity gene by high power po- capacity can be i sult. For the Net rd system type, sent cost and mod l, such as floating e is an important factor, w bortant factor, w bortant factor, w bortom-up to types will be add ti-MW rooftop s all layouts two of MWp floating s	multi-crysta used for off- d niche mark onverted to a on: usually a ration costs) eaks (at noo installed on t herlands, th which maxin re operation ng PV or faca t component hents are get vhich can be o top-down dressed: hou ystems (refe orientations ystem (appr	Illine silicon PV (n grid applications, sets where different a fixed tilt angle a b. There are three n) during summe the available surf ese two layout van ise electrity gen hal expenses, plus ide PV, integrated t determining the tring more weigh reduced by increase approaches. Bott usehold rooftop s erence size 5 MW are defined: Sou	combined wit ent pricing men it (AC) by an in nd a fixed orie main spatial I r. Secondly, sy ace (higher kW ariants are the eration by act more land use d in buildings. t total system t. Examples of easing the proj om-line howe ystems (typica p, flat roofs) a th and East/W	chnology), as we chanisms occur. iverter. entation, althoug ayouts: firstly a vstems may be o Vp/m2) and that most common, ively adjusting t e due to the wice These types gen cost, but as mod fother compone ject scale and by ver, is that a large ally 2-10 kWp, ou nd multi-MW so vest. The different	ell as thin film f storage system The major cor gh sun-tracking south-facing sy priented toward t the power pe and both can he inclination a der spatial requ herally are mor dule costs have ents are inverte y moving from ge potential is n sloped roofs olar PV fields (r nce lies in the p with a fixed tilt,	PV (less commo n (i.e. battery), ntribution for the g systems are a ystem, tilted at ds both east an ak during summ be realised on the angle and orien irements. e expensive, all been decreasi er costs, constri- rooftop to grou existing, and po- or on flat roofs eference size 1 respective valu	however the however the he Netherland so possible (30 to 40 deg d west at a s ner is smaller cooftops and tation. This t though cost r ng rapidly ov uction mater and based ins possibly that so), large roofto 0 MWp, grou	y). This factshe se systems will ds is expected but in the grees, for high maller tilt. r, with a more in field type of system reductions are ver time its fial and stallations. To ystem balancir op systems und-based). Als	
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eference system assumed here otal PV installations for 2020 ar ntial data have been broken do , the assumed cumulative PV ca eriod up to 2050, the building s GW (Gasunie, 2018). Solar PV f nue to reduce further. ull-load hours are averaged ove 1 to 849 kWh/kWp in year 25 (r nded average: 820 kWh/kWp).	are assumed to r own into capacit capacity potentic sector may cove technology has er the lifetime.	represent arour ity range sectors ial in the Nether ver 66 GWp (50 s been coming d An annual effici ge: 920 kWh/kV	nd 8 GWp, ba s, and that th rlands is 30 C TWh) of whit lown rapidly iency degene Vp). For East	his potential may GWp, based on Pl ch 41 GWp in the in investment co eration of 0.64% c/West-oriented s	be filled eithe BL (2019) (22 C residential se osts and electri makes that ful systems the re	r with South ori GWp on building ctor and 25 GW icity generation II-load hours for duction goes fro	ented systems gs) and Gasunie 'p in the utility cost over the p South-oriente om 890 kWh/k	, or with East/\ 2018 (8 GWp sector. Ground bast years, and d systems decr Wp in year 1 to	Vest oriented ground based -based poter it is expected ease from 99 763 kWh/kV	d systems. For d potential). Fo ntial may amou d that it will 00 kWh/kWp in Vp in year 25	
	nit	0.734					2030		2050		
·		0.704	-	0.764	0.514	-	0.645	0.259	-	0.519	
·		Min	_	Мах	Min	-	Мах	Min	-	Max	
·		Min	0.0144 –	Мах	Min	-	Мах	Min	-	Max	
min. € / ₩W		Min	-	Мах	Min	-	Мах	Min	-	Мах	
Min - Max Min - Max Min - Max The investment costs are taken from public reports (PBL, 2018 and PBL, 2019). These studies aggregate multiple information sources and various checks are performed with market data. The range results from the cost estimates that are defined in seasonal intervals. Future costs were estimated by applying the projected cost decrease as reported in FhG-ISE (2015), albeit with a newly calibrated starting point for the year 2020, for which detailed estimates exist from SDE++ (2019). For comparison purposes: the widest investment cost range according to this report is 757-892 €2014/kWp in 2020 to 278-606 €2014/kWp by 20. The fixed operational costs reported are taken from SDE++ 2020 (2019) and cover the O&M, metering, insurance and taxes (time-dependent, correlated to investment cost development), connection costs. Under 'Other costs', some of the cost components missing in the SDE+ were added: costs for societal support, asset management and land or roof lease (these three cost component are not considered in SDE+, which is a result of the chosen system boundaries of the scheme).											
nv T re	mIn. € / MW mIn. € / MW mIn. € / MW mIn. € / MW vestment costs are taken from he range results from the co costs were estimated by app tes exist from SDE++ (2019).	mln. € / MW mln. € / MW mln. € / MW vestment costs are taken from public report he range results from the cost estimates th costs were estimated by applying the proje tes exist from SDE++ (2019). For comparison ed operational costs reported are taken fro	mln. € / MW 0.704 mln. € / MW Min mln. € / MW Min mln. € / MW Min vestment costs are taken from public reports (PBL, 2018 and the range results from the cost estimates that are defined in the range results from the cost estimates that are defined in the costs were estimated by applying the projected cost decretes exist from SDE++ (2019). For comparison purposes: the ed operational costs reported are taken from SDE++ 2020 (2019)	mln. \notin / MW0.734mln. \notin / MW0.704mln. \notin / MW0.008Min-mln. \notin / MW0.0144Min-mln. \notin / MW-Min-vestment costs are taken from public reports (PBL, 2018 and PBL, 2019)The range results from the cost estimates that are defined in seasonal incosts were estimated by applying the projected cost decrease as reported sexist from SDE++ (2019). For comparison purposes: the widest invested operational costs reported are taken from SDE++ 2020 (2019) and comparison from SDE++ 2020 (2019)	mln. € / MW 0.734 0.704 - 0.764 mln. € / MW 0.008 Min mln. € / MW 0.0144 Min mln. € / MW - Max costs are taken from public reports (PBL, 2018 and PBL, 2019). These studies age the range results from the cost estimates that are defined in seasonal intervals. costs were estimated by applying the projected cost decrease as reported in FhG-ISE (20 tes exist from SDE++ (2019). For comparison purposes: the widest investment cost range ed operational costs reported are taken from SDE++ 2020 (2019) and cover the O&M, max	mln. \notin / MW0.734mln. \notin / MW0.704-0.7640.514mln. \notin / MW0.008Min-MaxMinmln. \notin / MW0.0144Min-MaxMinmln. \notin / MW-MaxMin-MaxMinmln. \notin / MW-Min-MaxMinrestment costs are taken from public reports (PBL, 2018 and PBL, 2019). These studies aggregate multiple range results from the cost estimates that are defined in seasonal intervals.costs were estimated by applying the projected cost decrease as reported in FhG-ISE (2015), albeit wites exist from SDE++ (2019). For comparison purposes: the widest investment cost range according to ed operational costs reported are taken from SDE++ 2020 (2019) and cover the O&M, metering, insura pment), connection costs.	mln. \notin / MW0.7340.580mln. \notin / MW0.704-0.7640.514-mln. \notin / MW0.0080.0080.008Min-MaxMin-mln. \notin / MW0.01440.0139Min-MaxMin-mln. \notin / MWMin-MaxMin-restment costs are taken from public reports (PBL, 2018 and PBL, 2019). These studies aggregate multiple information-'he range results from the cost estimates that are defined in seasonal intervals.costs were estimated by applying the projected cost decrease as reported in FhG-ISE (2015), albeit with a newly calibtes exist from SDE++ (2019). For comparison purposes: the widest investment cost range according to this report is 75costs metering, insurance and taxes (report), connection costs.	mln. € / MW 0.734 0.580 mln. € / MW 0.008 0.008 Min - 0.764 0.514 - 0.645 mln. € / MW 0.008 0.008 0.008 0.008 Min - Max Min - Max mln. € / MW 0.0144 0.0139 0.0139 Min - Max Min - Max mln. € / MW - - Max Min - Max vestment costs are taken from public reports (PBL, 2018 and PBL, 2019). These studies aggregate multiple information sources and vare the range results from the cost estimates that are defined in seasonal intervals. - Max costs were estimated by applying the projected cost decrease as reported in FhG-ISE (2015), albeit with a newly calibrated starting protest is report SDE++ (2019). 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ENERGY IN- AND OUTPUTS												
	Energy carrier	Unit	Current			2030			2050			
Energy carriers (per unit of main output)	Main output: Electricity	DI		-1.00			-1.00			-1.00		
		PJ	-1.00	-	-1.00	-1.00	-	-1.00	-1.00	-	-1.00	
	Solar energy	РJ	1.00		1.00			1.00				
			1.00	-	1.00	1.00	-	1.00	1.00	-	1.00	
		PJ		-			-			-		
			Min	-	Max	Min	-	Max	Min	-	Max	
		PJ		-			-			-		
			Min	-	Мах	Min	-	Max	Min	-	Мах	
8, 1 1	Solar in = 1 and electricity out =											
EMISSIONS (Non-fuel/energy-related en		s (e.g. CCS)	-									
Emissions	Substance	Unit	Current			2030			2050			
				-			-			-	T	
			Min	-	Max	Min	-	Max	Min	-	Max	
				-			-			-		
			Min	_	Max	Min	-	Мах	Min	-	Max	
			0.41	-	8.4.	0.41	-		5.4°	-		
			Min	_	Мах	Min	-	Мах	Min	-	Max	
			0.41	-	A.4.	0.41	-	8.4.	0.41	-		
			Min	-	Max	Min	-	Мах	Min	-	Max	
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