

11.2.3	Types of Tracking	456
11.2.4	Static Concentrators	456
11.3	Historical Overview	460
11.3.1	The Sandia National Laboratories Concentrator Program (1976 to 1993)	461
11.3.2	The Martin Marietta Point-focus Fresnel System	462
11.3.3	The Entech Linear-focus Fresnel System	463
11.3.4	Other Sandia Projects	465
11.3.5	The Concentrator Initiative	465
11.3.6	Early Demonstration Projects	466
11.3.7	The EPRI High-concentration Program	467
11.3.8	Other Concentrator Programs	471
11.3.9	History of Performance Improvements	472
11.4	Optics of Concentrators	474
11.4.1	Basics	474
11.4.2	Reflection and Refraction	478
11.4.3	The Parabolic Concentrator	479
11.4.4	The Compound Parabolic Concentrator	482
11.4.5	The V-trough Concentrator	483
11.4.6	Refractive Lenses	485
11.4.7	Secondary Optics	489
11.4.8	Static Concentrators	491
11.4.9	Innovative Concentrators	492
11.4.10	Issues in Concentrator Optics	494
11.5	Current Concentrator Activities	495
11.5.1	Amonix	496
11.5.2	Australian National University	496
11.5.3	BP Solar and the Polytechnical University of Madrid	496
11.5.4	Entech	497
11.5.5	Fraunhofer-Institut für Solare Energiesysteme	497
11.5.6	Ioffe Physical-Technical Institute	498
11.5.7	National Renewable Energy Laboratory	498
11.5.8	Polytechnical University of Madrid	498
11.5.9	Solar Research Corporation	499
11.5.10	Spectrolab	499
11.5.11	SunPower Corporation	499
11.5.12	University of Reading	500
11.5.13	Tokyo A&T University	500
11.5.14	Zentrum für Sonnenenergie und Wasserstoff Forschung Baden Württemberg (ZSW)	500
	References	500
12	Amorphous Silicon-based Solar Cells	505
	<i>Xunming Deng and Eric A. Schiff</i>	
12.1	Overview	505
12.1.1	Amorphous Silicon: The First Bipolar Amorphous Semiconductor	505