**Derivation of Supply Curve of PV**

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# Supplementary Materials

# Note 1: Korean Administrative

South Korea has three-tier local governance systems: Tier 1 (province-level or state-level) includes 8 provinces and 7 metropolitan cities, including Seoul. Tier 2 (county-level) includes 226 counties and cities affiliated with the Tier 1 governments, and 2 autonomous jurisdictions (Sejong city and Jeju Island). Lastly, Tier 3 (town-level) governments are affiliated with the Tier 2 governments. Even if Gyeonggi-do, a province in tier 1, consists of 31 cities and counties, both cities and counties will be collectively referred to as ‘cities’. (KO, 2023)

|  |  |  |  |
| --- | --- | --- | --- |
| SiGun | Gu | grdmtd\_PV | rftp\_PV |
| 가평군 | | 155 | 137 |
| 고양시 | 덕양구 | 379 | 360 |
| 고양시 | 일산동구 | 524 | 506 |
| 고양시 | 일산서구 | 521 | 504 |
| 과천시 | | 650 | 632 |
| 광명시 | | 744 | 726 |
| 광주시 | | 237 | 219 |
| 구리시 | | 592 | 573 |
| 군포시 | | 546 | 528 |
| 김포시 | | 261 | 243 |
| 남양주시 | | 267 | 249 |
| 동두천시 | | 203 | 185 |
| 부천시 | | 991 | 973 |
| 성남시 | 분당구 | 1,139 | 1,120 |
| 성남시 | 수정구 | 722 | 703 |
| 성남시 | 중원구 | 873 | 854 |
| 수원시 | 권선구 | 507 | 489 |
| 수원시 | 영통구 | 773 | 755 |
| 수원시 | 장안구 | 444 | 425 |
| 수원시 | 팔달구 | 933 | 915 |
| 시흥시 | | 393 | 376 |
| 안산시 | 단원구 | 334 | 317 |
| 안산시 | 상록구 | 504 | 486 |
| 안성시 | | 168 | 150 |
| 안양시 | 동안구 | 1,140 | 1,121 |
| 안양시 | 만안구 | 654 | 636 |
| 양주시 | | 225 | 207 |
| 양평군 | | 166 | 148 |
| 여주시 | | 161 | 144 |
| 연천군 | | 146 | 129 |
| 오산시 | | 407 | 389 |
| 용인시 | 기흥구 | 489 | 471 |
| 용인시 | 수지구 | 556 | 538 |
| 용인시 | 처인구 | 212 | 194 |
| 의왕시 | | 451 | 432 |
| 의정부시 | | 443 | 425 |
| 이천시 | | 178 | 160 |
| 파주시 | | 205 | 187 |
| 평택시 | | 239 | 221 |
| 포천시 | | 166 | 148 |
| 하남시 | | 492 | 473 |
| 화성시 | | 220 | 203 |

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# Note 2: Ratio (Area covered by PV to the total area, %)

- South Korea consists of a total of 17 provinces, each of which encompasses cities & counties, as indicated in the following table. In this paper, the administrative category at high-level is consistently referred to as 'province', while at low-level it is expressed as 'city & county'.

# Note 3: Coefficient (Required area to install PV, m2/kW)

- In the standard version of GCAM, there are two systems: the model engine (GCAM-core) and the model interface for querying scenario output. In contrast, GCAM-EML combines a model engine with a model interface. The model engine of GCAM-EML is written in C#, and the model interface is developed using Windows Presentation Foundation (WPF). The requirements for the GCAM-EML are as follows.

|  |  |  |
| --- | --- | --- |
| Land-use type | Description | Data source |
| Industrial complex |  |  |
| Logistics complex |  |  |
| Residential complex |  |  |
| Public buildings |  |  |
| Mountainous area |  |  |
| Farmland |  |  |
| Parking lot |  |  |
| Roadside land |  |  |
| Water |  |  |

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Fig. . Area covered by PV to total area of individual site. (Total area vs. PV installation area)

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Fig. . Required area for PV installation (capacity(kW) vs. area(m2))

**References**