

PPP IN GEOTHERMAL DEVELOPMENT

ROLE OF PUBLIC AND PRIVATE SECTORS IN TURKEY, AND BEYOND

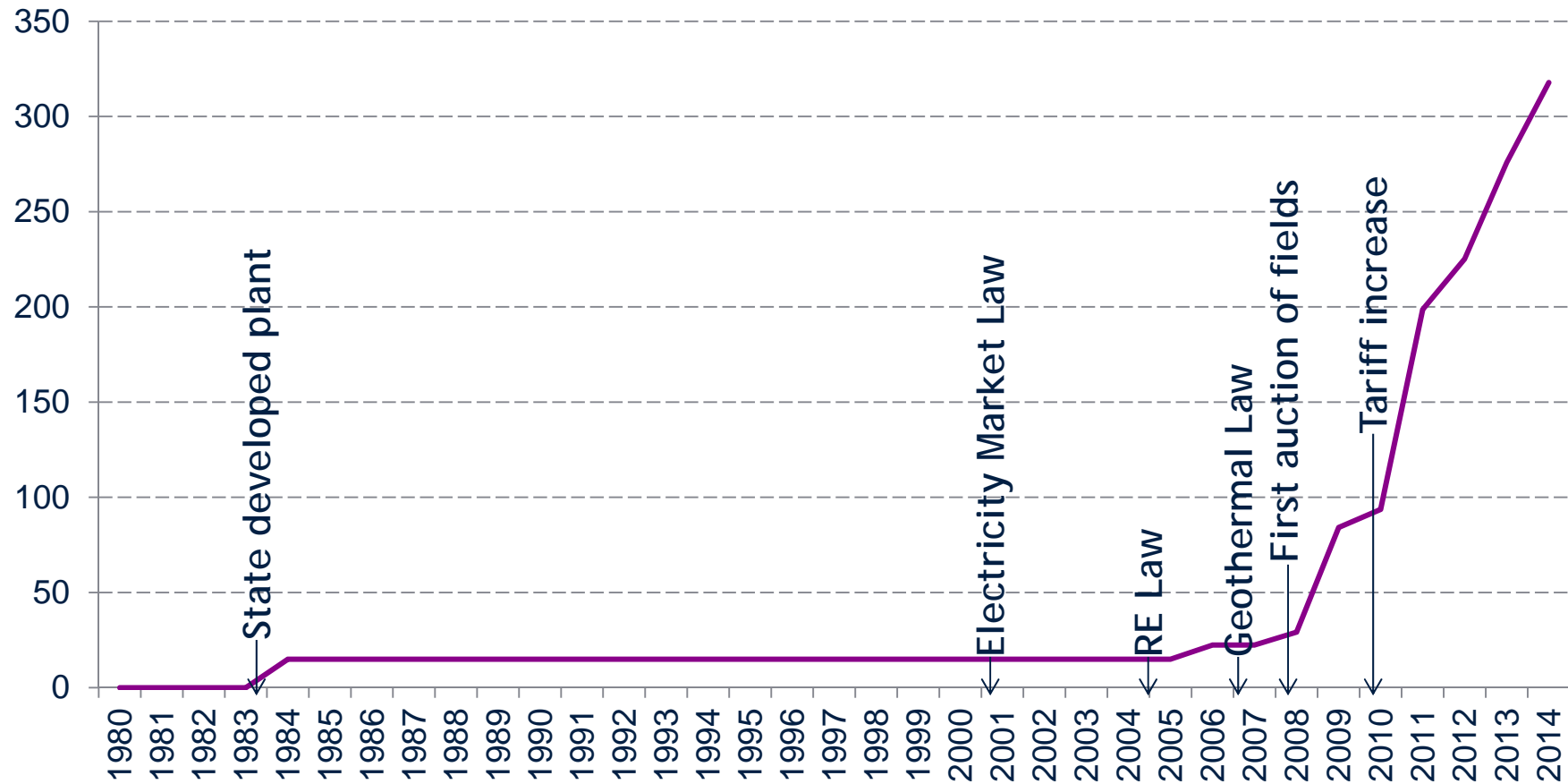


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HISTORY OF GEOTHERMAL IN TURKEY

Installed geothermal capacity (MWe)



Source: IGA, EPDK

Note: 2014 data is year to date

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ROLE OF MTA

General Directorate of Mineral Research and Exploration (MTA) established to conduct scientific and technological research on mineral exploration and geology. Started geothermal exploration in 1962

Discovered over 190 geothermal fields, of which around 20 were deemed suitable for electricity production. Over 500 geothermal wells have been drilled so far

MTA identified the best sites, drilled 1-3 wells per site, then auctioned licenses to the private sector. Through public tenders for fields, Treasury received:

- \$96.91m total for 6 fields in 2008
- \$94.65m total for 3 fields in 2010
- \$250.6m total for 6 fields in 2011
- \$34m total for 2 fields 2014

GOVERNMENT SUPPORT TO GEOTHERMAL IN TURKEY

Clear government targets and strong political will – energy makes up large % of trade deficit

Clear legal framework, albeit with some remaining issues

Exploration and drilling activities, reduces exploration risk in key projects

FiT guaranteed for 10 years (\$105/MWh + up to \$27/MWh for local content) – affordable for off-taker

Exemptions/reductions from license fees

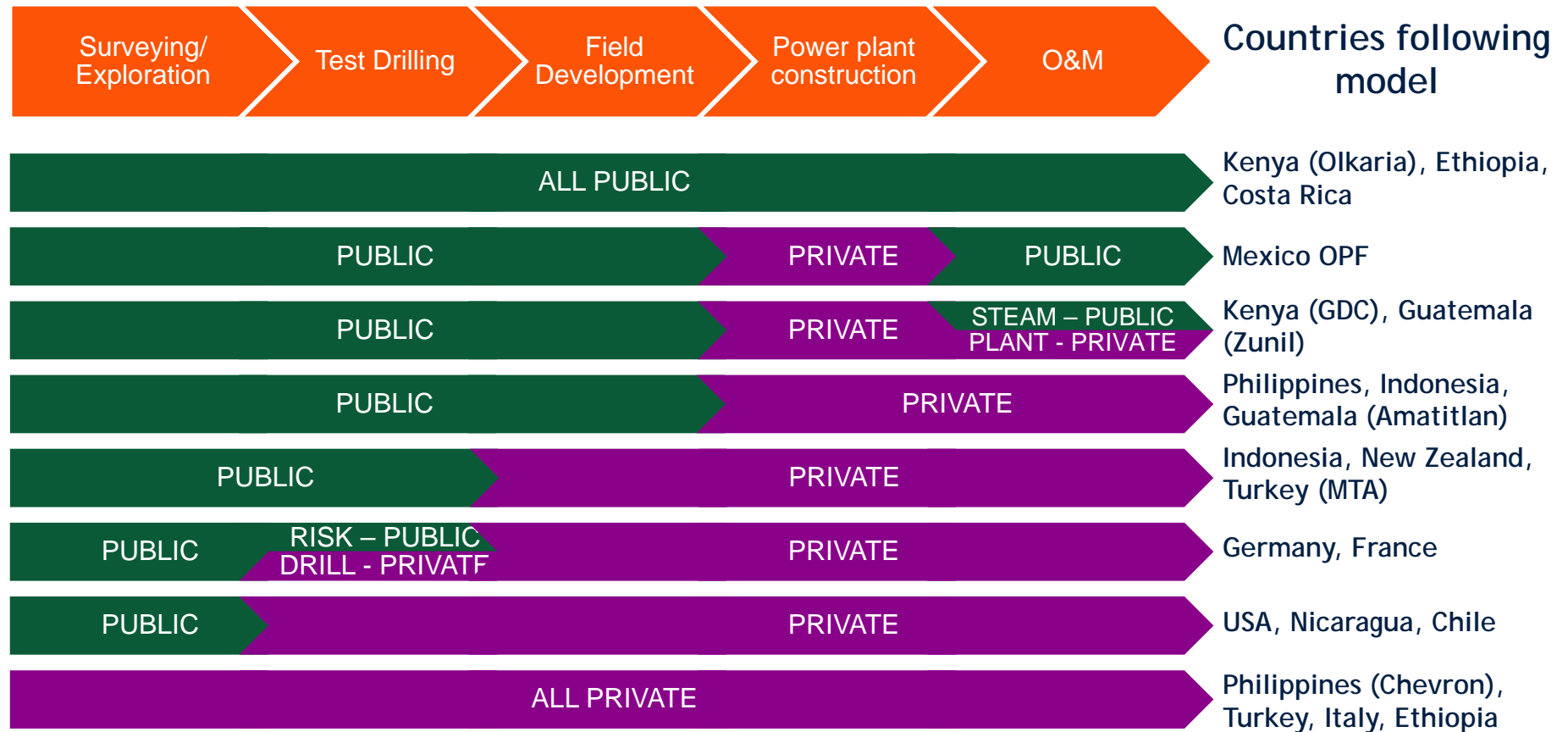
Priority grid connection and off-take

VAT exception and import duty exception

Data center

Source: ESMAP

GEOHERMAL DEVELOPMENT MODELS



Source: ESMAP - Geothermal Handbook: Planning and financing power generation

PRIVATE SECTOR FINANCING

High early-stage risk requires equity investors, or government support / donors

During production drilling, risk is still high: difficult for banks (unless strong risk mitigation?)

- Exploration risk insurance may help here, but currently more aimed at reducing equity investor IRR requirements
- Some concessional funds available as first loss guarantee
- Or can do corporate loans

After steam field development, power plant financing is straightforward (though some steam decline risk remains)

IFC experience:

- 6 geothermal investments (\$400m total) including; equity (IPO), project finance, corporate finance
- Very limited exposure to resource risk, through structuring and guarantees