

Deep Decarbonization Planning Challenges in Mexico

Concrete examples of NDC / DDP trade-offs in the
Mexican Power Sector (MILES Project)

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Contents

- Background (*MILES Project, Tempus Analítica A.C.*)
- Stock modeling and EnergyPATHWAYS
- Scenarios for Mexican Generation through 2050
- Findings from comparing NDC and DDP
- Conclusions

Use of EnergyPATHWAYS and stock modeling approach provides concrete results on YoY technology rollout

- **Stock modeling approach**

- Modeling physical fleet of energy system
- Objects of study are infrastructure and other assets, so directly meaningful to broad range of stakeholders
- Also provides building blocks for subsequent investigation, e.g. regional or subnational work, decarbonization studies, air quality, macroeconomic analysis

- **EnergyPATHWAYS model**

- Physical energy-system model based on a stock-evolution approach
- Sophisticated, open-source, bottom-up energy scenario tool
- Detailed electricity sector modeling capabilities
- Supports “*back-casting*”
- Outputs include: energy supply and use, GHG emissions, equipment stocks and sales, costs, etc

MILES Mexico generation scenarios through 2050 compare NDC with DDP, and combine them post 2030

1) Official NDC GOM

- Follows Mexico NDC (PRODESEN) to 2030
- Follows Energy Transition Strategy “ETPUTCL” to 2050
- Meets official “Clean Energy” targets, but with ~200g/kWh, total power emissions grow

2) Sustained Mitigation DDP

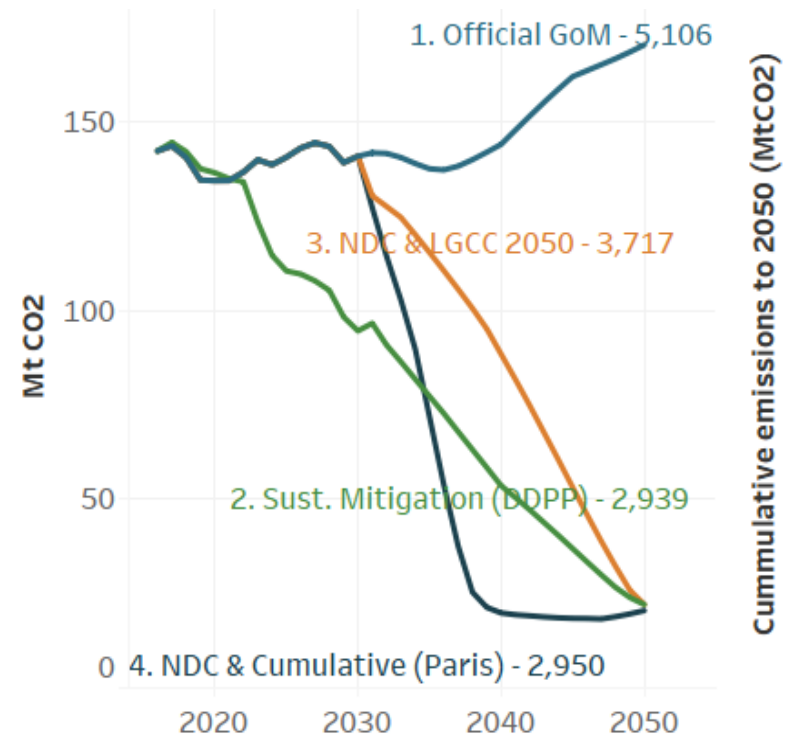
- Cumulative 2050 emissions consistent with Mexico DDPP study (2°C “attractor”)
- Begins grid decarbonization from day 1
- Reduce grid factor from 450 to ~20 g/kWh

3) NDC -> 2050 target

- Follow NDC to 2030
- Then accelerate ambition and change to achieve 2050 in-year emissions target (General Climate Change Law or “LGCC”) of ~300MtCO₂e

4) NDC -> Paris (cumulative)

- Follow NDC to 2030
- Then dramatically boost mitigation as much as needed to keep 2050 cumulative emissions same as DDP Scenario 2

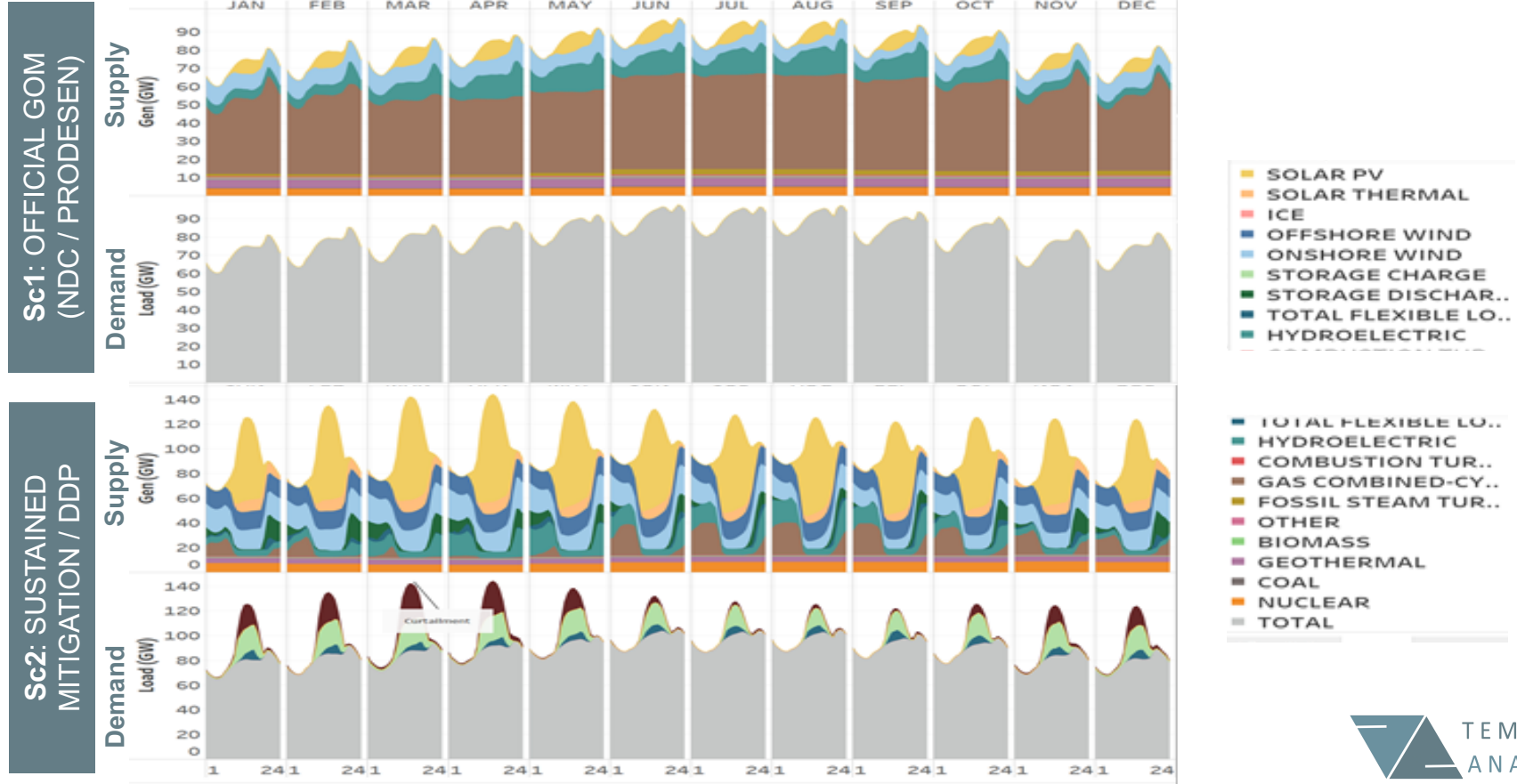


Scenario

- 1. Official GoM
- 2. Sust. Mitigation..
- 3. NDC & LGCC 2050
- 4. NDC & Cumulati..

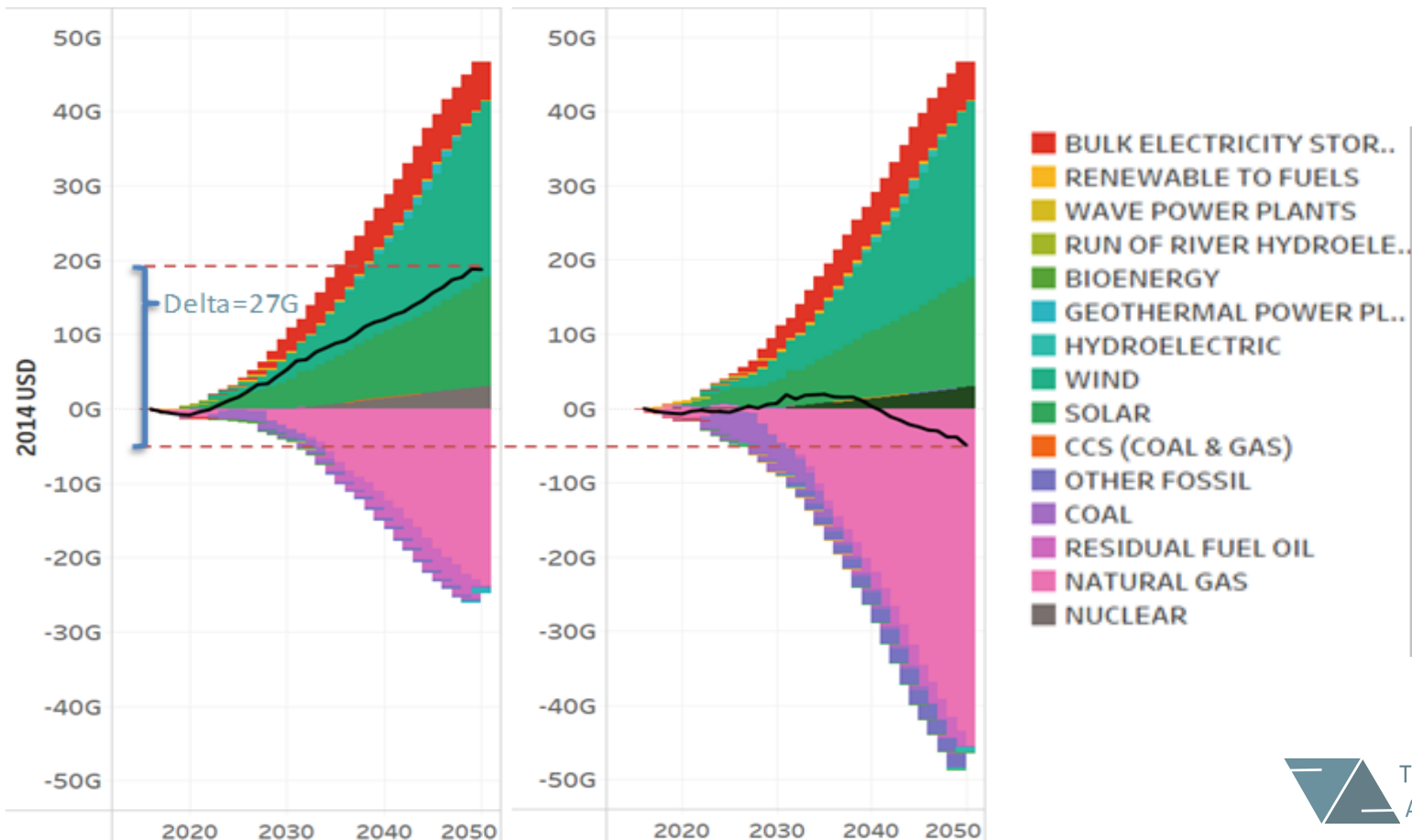
Technology findings: existing technologies can be rolled out to deliver DDP generation

- Improved transmission, storage, and load management enable a portfolio of renewables to meet the bulk of demand
- Gas plants still play important role, but volume burned will be far lower
- Conservative technology scenario; costs/performance could improve faster



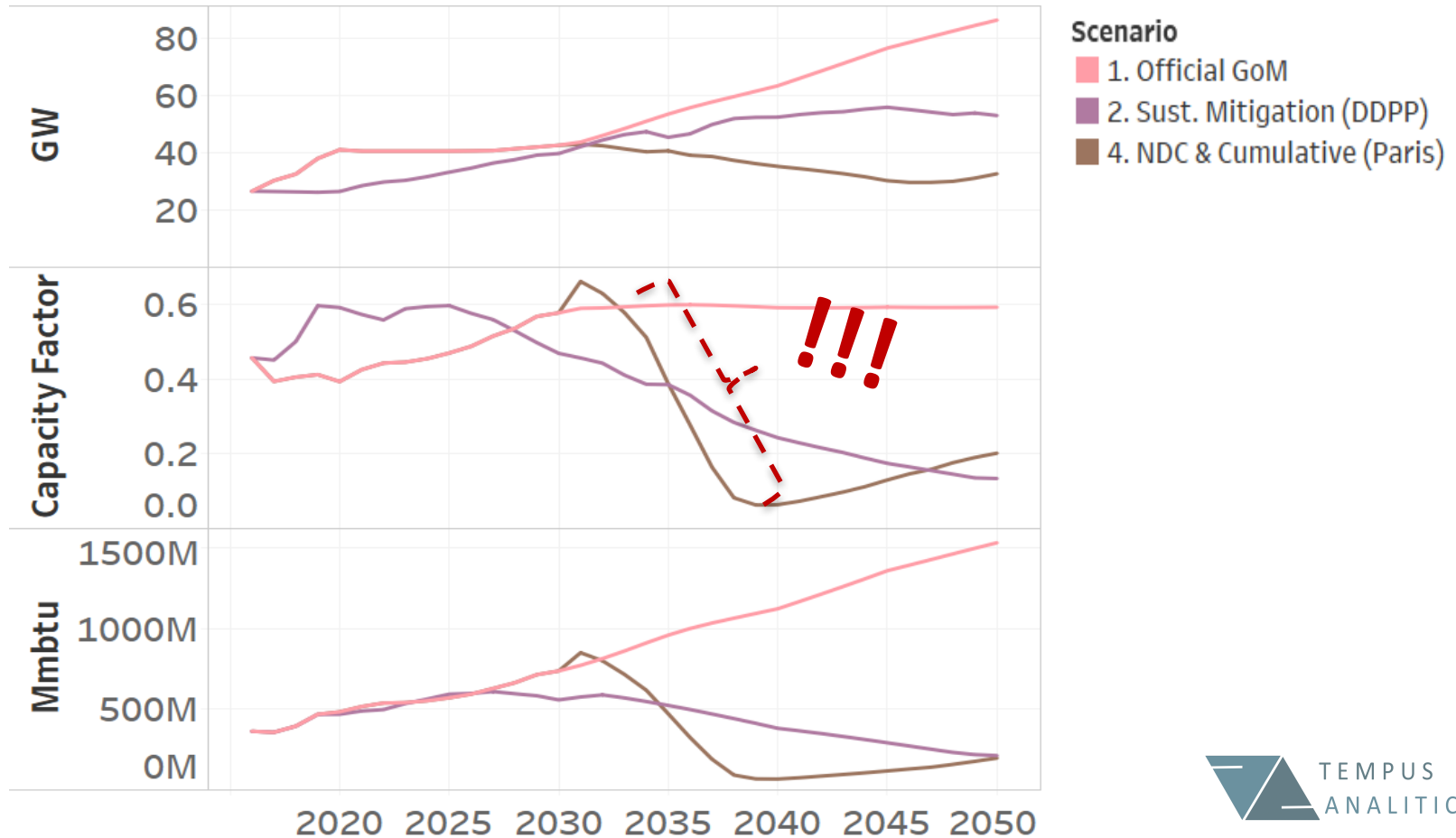
Jurisdiction findings: “credible” carbon prices make DDP scenario least costly, but Mexico unlikely to act alone

- DDP 2050 costs higher than NDC/GOM (conservative assumptions)
- High Commission Carbon Pricing numbers enough to flip this
- Though revenue can provide input for investment & development, competitiveness concerns make unilateral pricing unlikely



Timescale findings: following Mexico's NDC makes Paris hard to meet, so NDCs must be updated pre-2020

- Current(2018-2023) investment boom contributes to post2030 fleet
- Paris only feasible if gas generation much lower, so more assets built up now mean dramatic utilization reductions later
- Squaring NDCs with 2°C requires seems challenging to implement



For Mexico's power sector, NDCs not enough to deliver on Paris Agreement. This leads to personal reflections.

- 1) Paris can work, but current NDCs are obstacles to success**
- 2) NDC ambition must improve pre-2020, or we'll be locked in**
- 3) Transformation planning must be detailed in order to provide confidence in the transition and show opportunities**
- 4) Art 4.19 "Long Term Strategies" should communicate and guide this approach, especially for developing countries**

Thank you

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