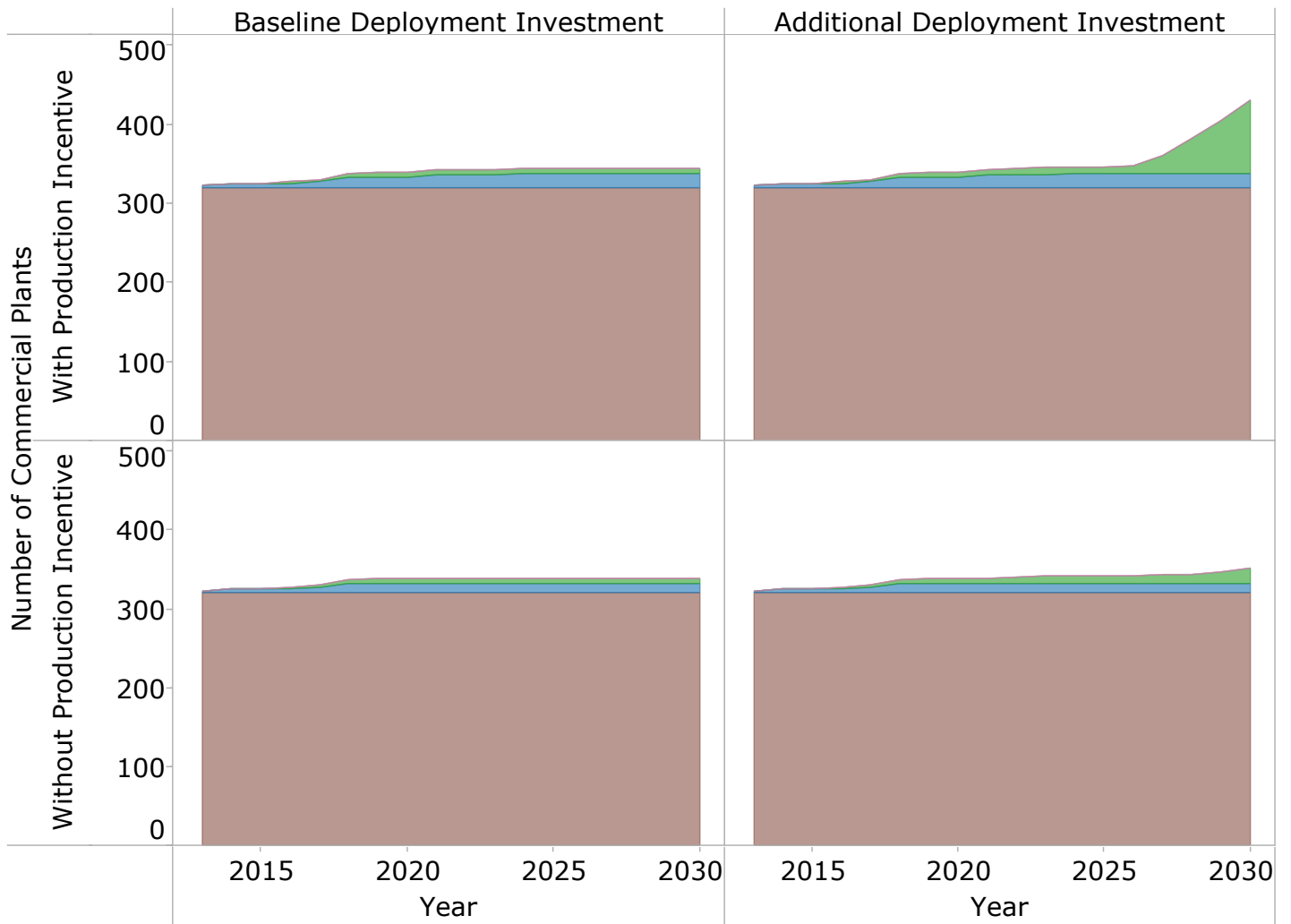


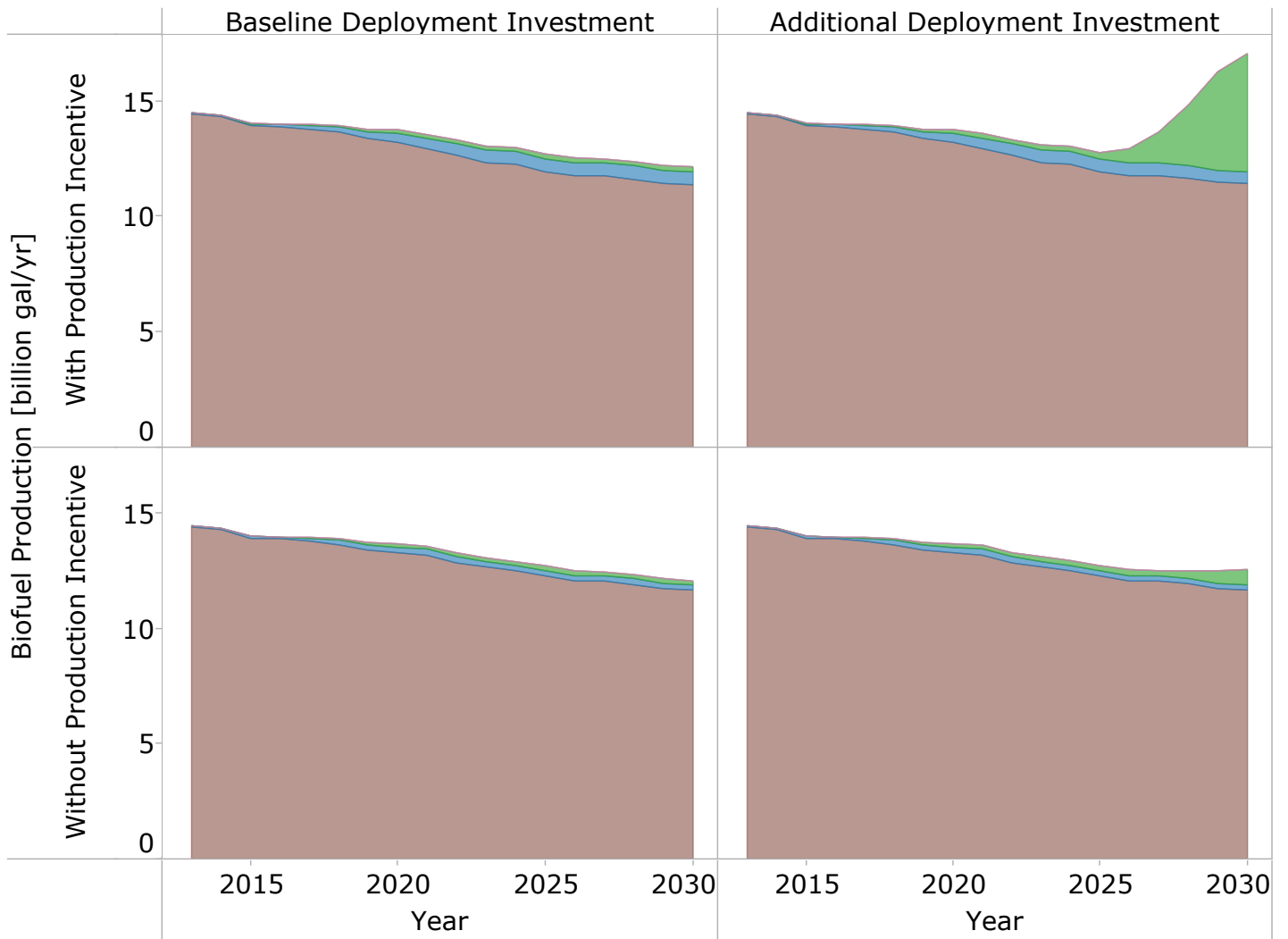
Vimmerstedt, L. and Bush, B. "Effects of Deployment Investment on the Growth of the Biofuels Industry." Golden, CO: National Renewable Energy Laboratory (December). NREL/TP-6A20-60802

Executive Summary

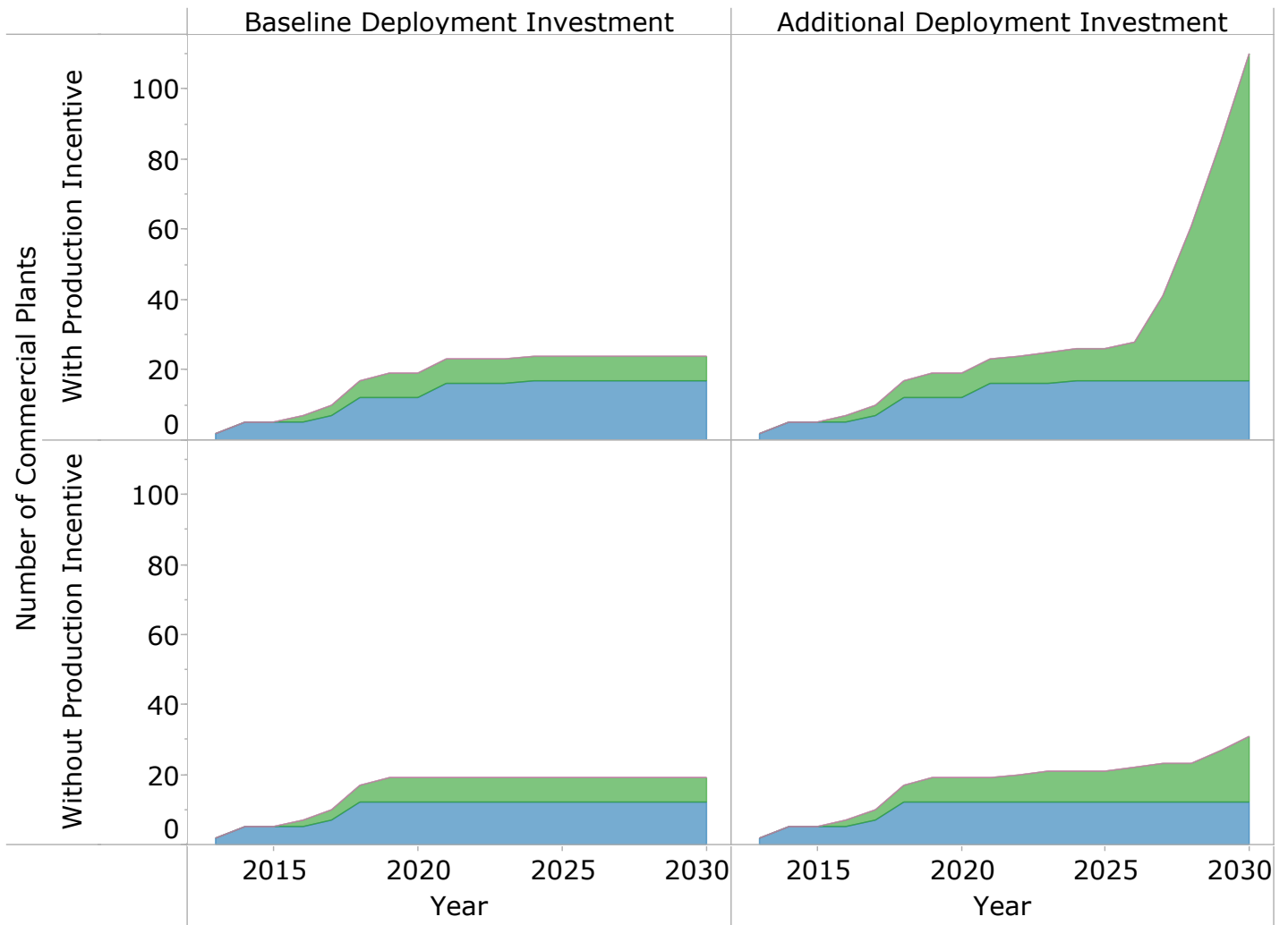
In support of the national goals for biofuel use in the United States, numerous technologies have been developed that convert biomass to biofuels. Some of these biomass to biofuel conversion technology pathways are operating at commercial scales, while others are in earlier stages of development. The advancement of a new pathway toward commercialization involves various types of progress, including yield improvements, process engineering, and financial performance. Actions of private investors and public programs can accelerate the demonstration and deployment of new conversion technology pathways. These investors (both private and public) will pursue a range of pilot, demonstration, and pioneer scale biorefinery investments; the most cost-effective set of investments for advancing the maturity of any given biomass to biofuel conversion technology pathway is unknown. In some cases, whether or not the pathway itself will ultimately be technically and financially successful is also unknown. This report presents results from the Biomass Scenario Model—a system dynamics model of the biomass to biofuels system—that estimate effects of investments in biorefineries at different maturity levels and operational scales. The report discusses challenges in estimating effects of such investments and explores the interaction between this deployment investment and a volumetric production incentive. Model results show that investments in demonstration and deployment have a substantial growth impact on the development of the biofuels industry. Results also show that other conditions, such as accompanying incentives, have major impacts on the effectiveness of such investments. This report does not advocate for or against investments, incentives, or policies, but analyzes simulations of their effects.



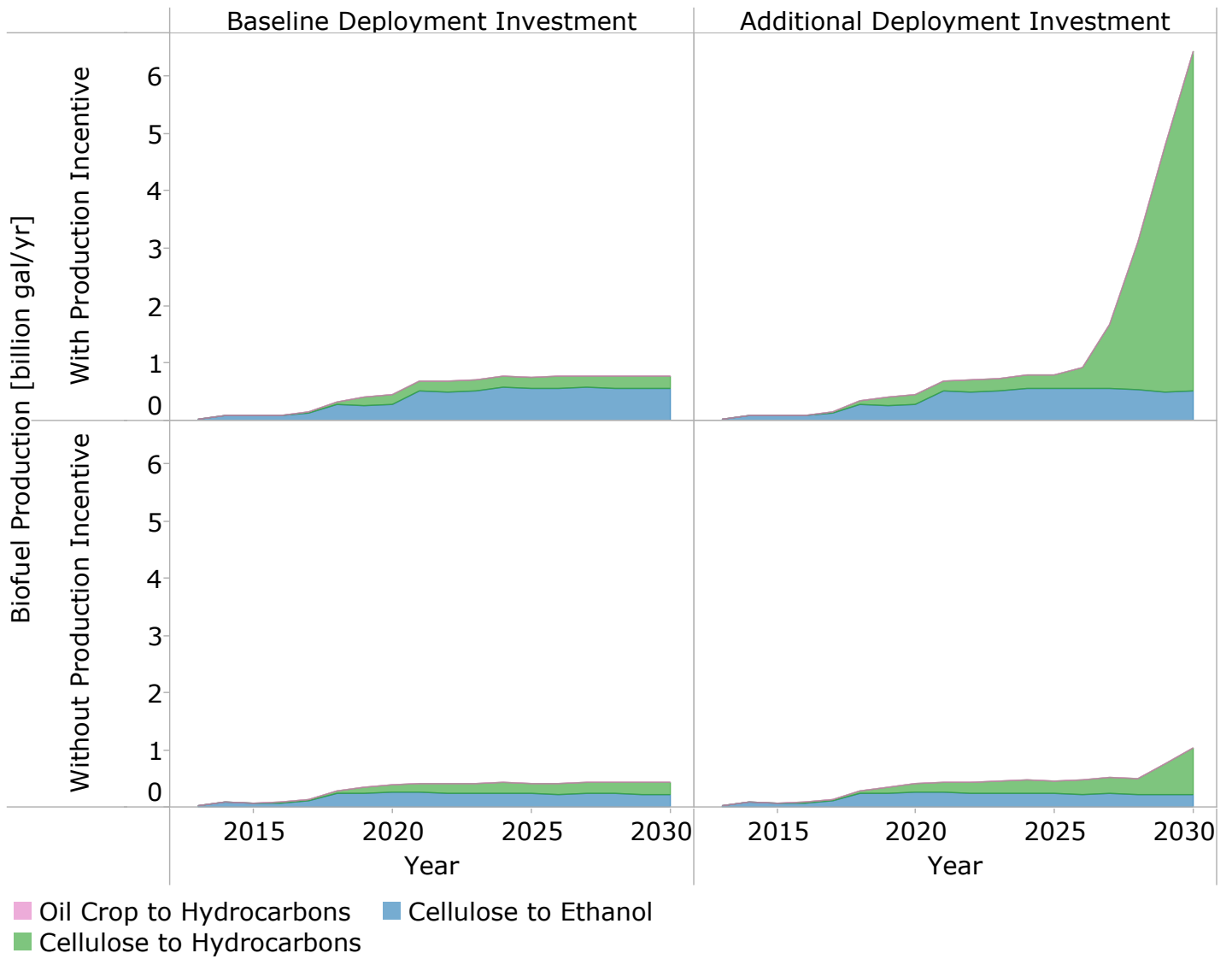
- Oil Crop to Hydrocarbons
- Cellulose to Ethanol
- Cellulose to Hydrocarbons
- Starch to Ethanol

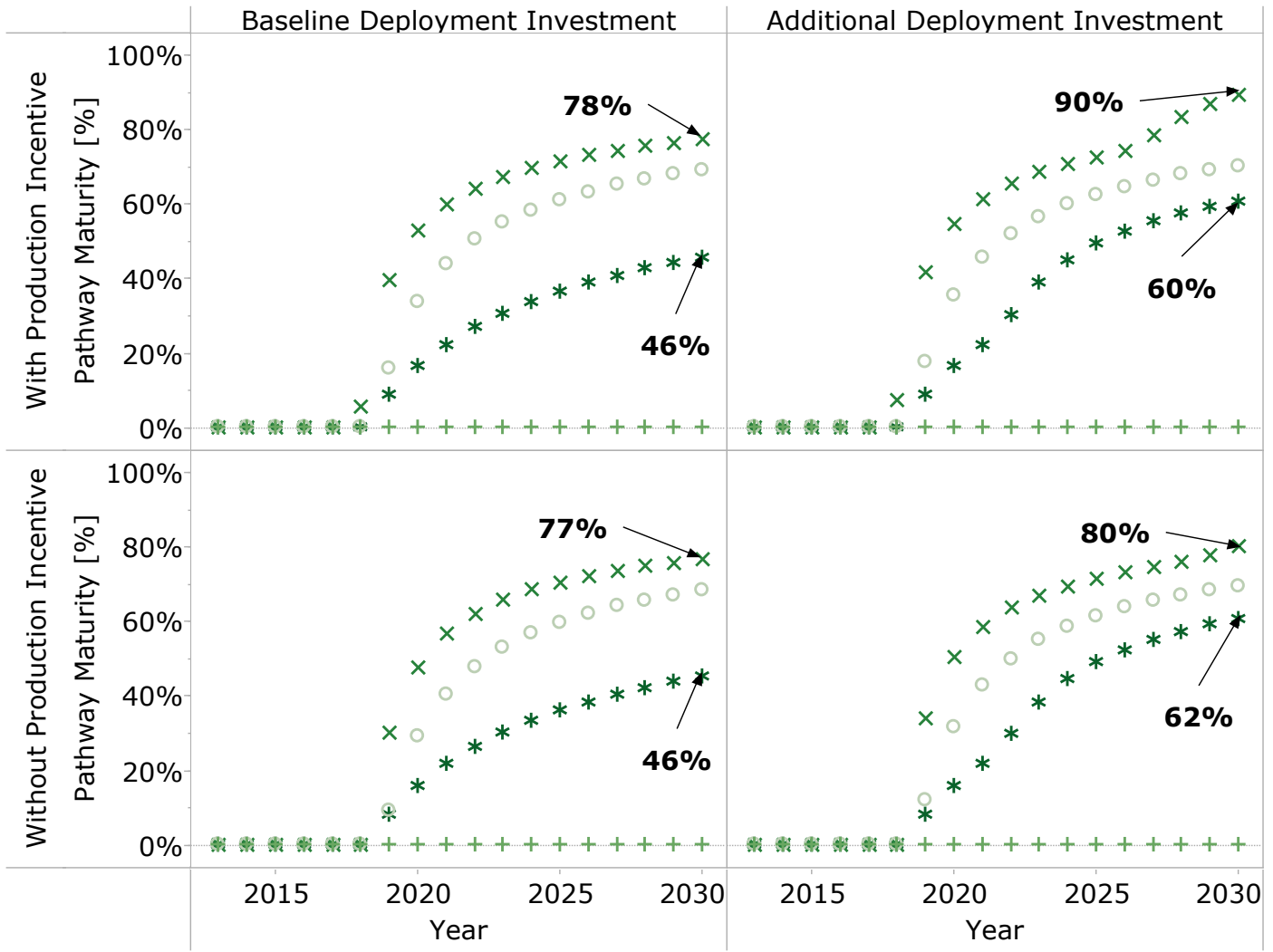


- Oil Crop to Hydrocarbons
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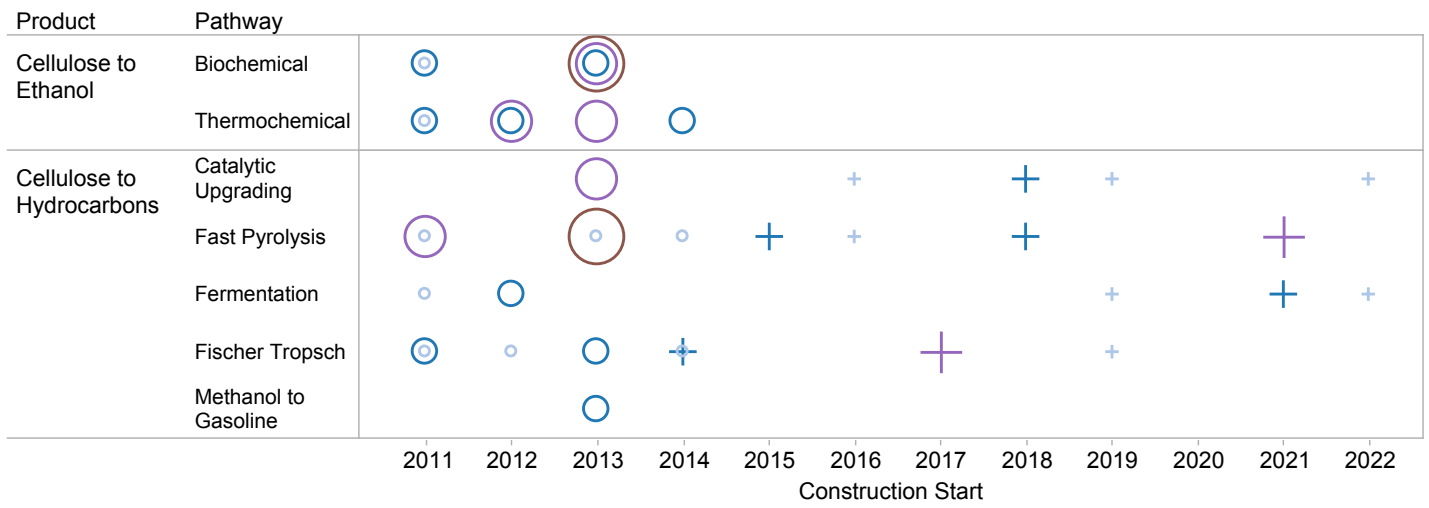


■ Oil Crop to Hydrocarbons ■ Cellulose to Ethanol
■ Cellulose to Hydrocarbons





+ Fermentation
 O Catalytic Upgrading
 × Fast Pyrolysis
 * Fischer-Tropsch



- Pilot
- Demonstration
- Pioneer
- Commercial

- Pilot
- Demonstration
- Pioneer
- Commercial

- Deployment Investment**
- Without Deployment Investment
 - + Deployment Investment