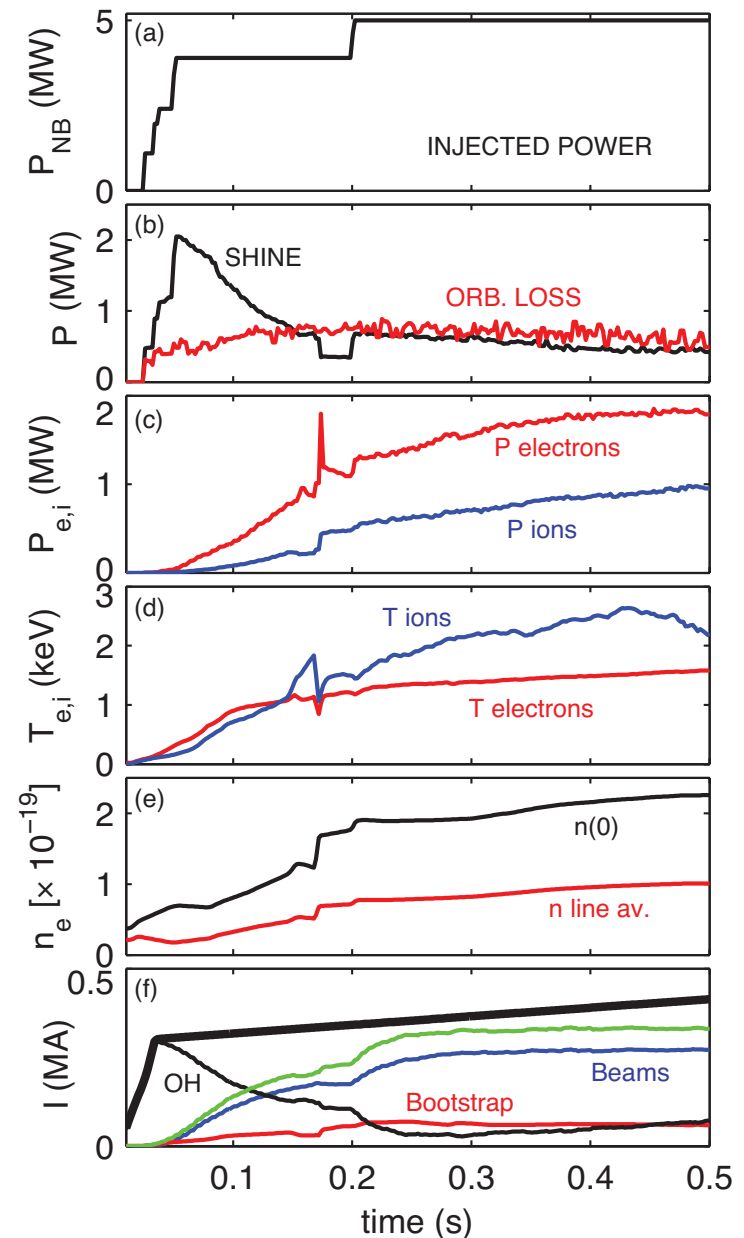


# NBI overdrive (w/o HHFW)

- Complements NBI sustainment
- Needs:
  - Low current (500-600kA max)
  - Slow ramp-up (0.5-1.0s)
- What we want to achieve:
  - Push back the beams as early as possible
  - Maintain losses within 50%
  - Broad profiles
- Why: **if we demonstrate CHI,**  
might be able to couple NBI w/o HHFW

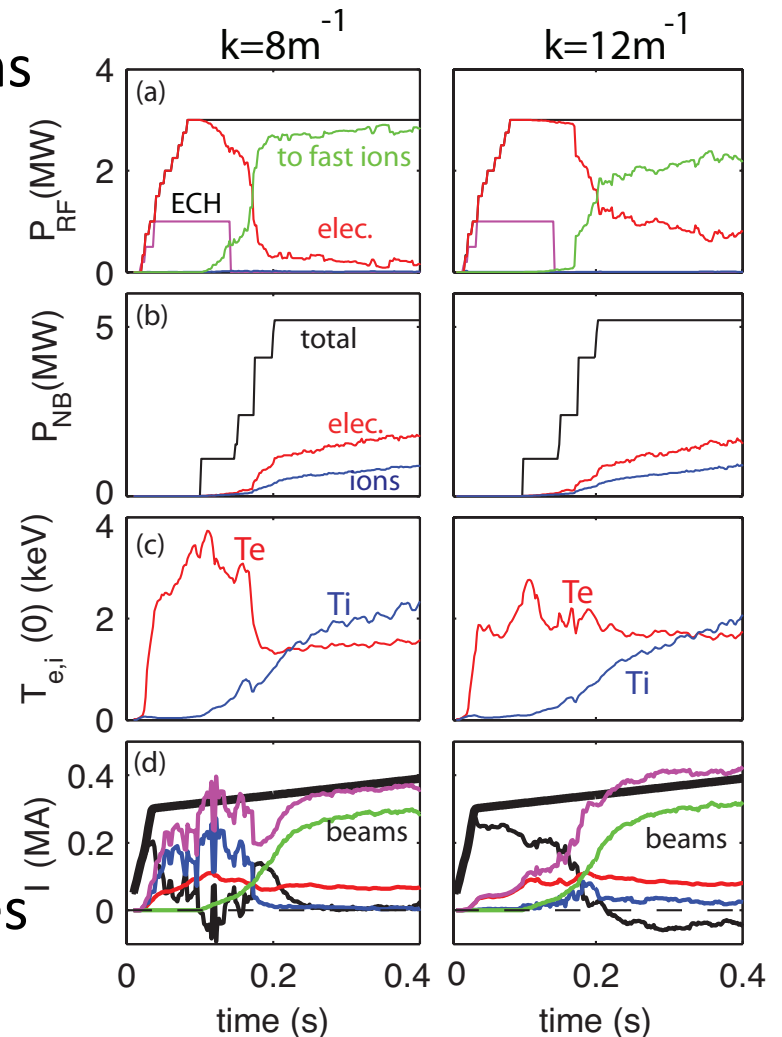
Can probably be combined with NBI sustainment with additional 0.25-0.5 day.



# NBI overdrive (with HHFW)

Can be combined with G. Taylor XP, but try something new ...

- Driven by: HHFW likely usable only 200ms
- Smooth transition to NBI phase
- Needs:
  - Low current (500kA max)
  - Slow ramp-up (0.5s max)
  - Inductive target
- What we want to achieve:
  - Broaden HHFW profiles with NBI (by changing phasing 8 => 12)
- Why: in this phase  $B_T$  does not matter
- Until we have EC, only 1 phasing drives current ( $8m^{-1}$ ), only one broadens profiles ( $12m^{-1}$ ) and reduces FI losses.



NOTE: cannot piggyback on flat-top XPs